Appendix C
Discussion of Quality Assurance and Quality Control

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Quality Assurance/Quality Control

Laboratory quality assurance/quality control followed the protocols set by the State of California's Surface Water Ambient Monitoring Program (SWAMP) and identified in the Quality Assurance Program Plan (QAPrP). The procedures include implementation of standard laboratory procedures including replicates, spikes, reference materials, setting of control limits, criteria for rejection, and data validation methods. Laboratory blanks, method blanks, matrix spikes, field blanks and laboratory control standards were used for each sample collection. Field blanks were collected for each sample and analyzed in triplicate for each preservation method. When result of a field blank is above the reporting limit for a constituent it does not meet QA standards. Matrix spikes and matrix spike duplicates were made in the lab per each analytical batch. Matrix spikes whose recoveries were below 80% or above 120% do not meet QA standards. Field Blanks and Matrix Spikes that fell outside of SWAMP QAPrP protocol are identified for each constituent.

Soluble Reactive Phosphorus

Field Blanks for samples analyzed for SRP with both frozen and refrigerated preservation met SWAMP QAPrP standards. The reporting limit for SRP is 0.05 mg/L. Matrix spikes for the frozen samples collected at Orcutt Creek and analyzed at the 28 day holding time and refrigerated samples collected for the Central Coast Sites and analyzed at the less than 48 hour analysis and the 7 day holding time and 28 day holding time did not meet SWAMP QAPrP standards however spike concentration added was less than one half sample concentration and lab control spike and method blank were within control limits therefore data considered valid. Table C1 shows the field blank results for samples that were frozen for SRP and Table C2 shows the field blank results for samples that were refrigerated for SRP. Table C3 shows the matrix spike results for samples that were frozen for SRP and Table C4 shows the matrix spike results for samples that were refrigerated for SRP.

Nitrite

Field Blanks for samples analyzed for nitrate with both frozen and refrigerated preservation met SWAMP QAPrP standards. The RL for nitrite is 0.02 mg/L. Matrix spikes for samples collected at Orcutt Creek and analyzed within 48 hours of collection did not meet SWAMP QA/QC standards however spike concentration added was less than one half sample concentration and lab control spike and method blank were within control limits therefore data considered valid. Matrix spikes failed for samples collected at Orcutt Creek at the 7 day and 28 day holding times for the frozen samples. Matrix spikes failed at the less than 48 hour, 7 day, and 28 day holding times for the refrigerated samples. Table C5 shows the field blank data for the samples that were frozen and Table C6 shows the field blank data for the samples that were refrigerated. Table C7 shows the matrix spike data for the samples that were frozen for Nitrite. Table C8 shows the data for the matrix spikes for the refrigerated Nitrite samples.

Ammonia

Field blanks for samples analyzed for ammonia with both frozen and refrigerated preservation met SWAMP QAPrP standards. The RL for ammonia is 0.02 mg/L. Matrix spikes for samples analyzed for ammonia with both frozen and refrigerated preservation met SWAMP QAPrP standards. Table C9 shows the field blank data for the ammonia samples that were frozen. Table C10 shows the field blank data for the ammonia samples that were refrigerated. Table C11 shows the matrix spike data for the samples that were frozen. Table C12 shows the matrix spike data for samples that were refrigerated.

Nitrate + Nitrite

The field blanks for the Orcutt Creek samples at each hold time for samples that were preserved by both freezing and refrigeration did not meet SWAMP QAPrP however data considered valid because sample concentration was ten times greater than field blank result. The RL for nitrate + nitrite is 0.05 mg/L. Field blanks for all other nitrate + nitrite samples met QAPrP standards. The matrix spikes for the samples taken from San Joaquin River and analyzed at the 48 hour hold time for both frozen samples and refrigerated samples failed. The matrix spikes failed for the Sacramento River samples that were refrigerated and analyzed at the 48 hour hold time. Table C13 shows the field blank data for the samples that were frozen. Table C14 shows the field blank data for the samples that were refrigerated. Table C15 shows the matrix spike data for the samples that were frozen. Table C16 shows the matrix spike data for samples that were refrigerated.

Nitrate

Due to QA data failures for nitrite and nitrate + nitrite samples which the nitrate results are calculated from the results for nitrate are inconclusive.

Total Nitrogen

The field blanks collected at Orcutt Creek for each holding time did not meet SWAMP QAPrP however data considered valid because sample concentration was ten times greater than field blank result. The RL for total nitrogen is 0.05 mg/L. All other field blanks for TN met QAPrP standards. The matrix spikes for the samples collected at Upper Truckee River, San Joaquin River, and Orcutt Creek and analyzed at the 28 day holding time as well as the samples collected at Sacramento River and analyzed at the 48 hour holding time did not meet SWAMP QAPrP standards however spike concentration added was less than one half sample concentration and lab control spike and method blank were within control limits therefore data considered valid. Table C17 shows the field blank data for the samples. Table C18 shows the matrix spike data for the samples.

Total Phosphorus

All of the field blanks for the total phosphorous samples passed SWAMP QAPrP requirements. The RL for total phosphorous is 0.05 mg/L. The matrix spikes failed SWAMP QAPrP requirements for samples collected at Franklin Creek for all holding times. Matrix spikes collected at Orcutt Creek for all holding times did not meet SWAMP QAPrP standards however spike concentration added was less than one half

sample concentration and lab control spike and method blank were within control limits therefore data considered valid. Table C19 shows the field blank data for the samples. Table C20 shows the matrix spike data for the samples.

Table C1. Field Blank Results for Soluble Reactive Phosphorus frozen.

Time	Upper Truckee River		West Fork Carson River		San Joaquin River		Sacramento River		Franklin Creek		Orcutt Creek	
	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)
<48 Hours	1	-0.007	1	-0.005	1	-0.005	1	-0.005	1	-0.003	1	-0.003
	2	-0.007	2	-0.009	2	-0.005	2	-0.005	2	-0.005	2	-0.003
	3	-0.005	3	-0.008	3	-0.005	3	-0.005	3	-0.003	3	-0.003
4 days	1	-0.003	1	0.001	1	0	1	0	1	-0.003	1	-0.002
	2	0	2	0	2	0	2	0	2	-0.003	2	-0.003
	3	0	3	0	3	0	3	0	3	-0.003	3	-0.003
7 days	1	-0.001	1	-0.003	1	0	1	0.002	1	-0.002	1	0
	2	0	2	0	2	0	2	0	2	-0.002	2	0
	3	-0.001	3	-0.001	3	0.002	3	0	3	-0.002	3	0
28 days	1	-0.001	1	0	1	-0.001	1	-0.001	1	-0.001	1	-0.001
	2	-0.001	2	0	2	-0.002	2	-0.001	2	-0.001	2	-0.001
	3	0	3	0	3	-0.001	3	-0.001	3	-0.001	3	-0.001

Table C2. Field Blank Results for Soluble Reactive Phosphorus refrigeration.

Time	Upper Truckee River		West Fork Carson River		San Joaquin River		Sacramento River		Franklin Creek		Orcutt Creek	
	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)
<48 Hours	1	-0.005	1	-0.002	1	-0.005	1	-0.005	1	-0.003	1	-0.003
	2	-0.005	2	-0.002	2	-0.005	2	-0.005	2	-0.003	2	-0.005
	3	-0.005	3	-0.002	3	-0.005	3	-0.006	3	-0.002	3	-0.002
4 days	1	0	1	-0.003	1	0	1	-0.002	1	-0.003	1	0
	2	0	2	0	2	0	2	0	2	-0.005	2	-0.002
	3	0	3	0	3	0	3	-0.002	3	-0.005	3	-0.002
7 days	1	0	1	-0.004	1	0.002	1	0.002	1	-0.002	1	0
	2	0.001	2	-0.004	2	0.002	2	0.003	2	-0.002	2	0
	3	0.001	3	-0.004	3	0.002	3	0.002	3	0	3	0
28 days	1	-0.001	1	-0.001	1	-0.002	1	-0.001	1	-0.001	1	-0.001
	2	-0.001	2	-0.001	2	-0.002	2	-0.001	2	-0.001	2	-0.001
	3	-0.001	3	0	3	-0.001	3	-0.003	3	-0.001	3	-0.001

Table C3. Matrix Spike Results for Soluble Reactive Phosphorous samples that were frozen.

Time	Upper Truckee River				West Fork Carson River				San Joaquin River				Sacramento River				Franklin Creek				Orcutt Creek			
	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)
<48 Hours	1	0.082			1	0.082			1	0.116			1	0.087			1	0.074			1	0.493		
	2	0.084	0.083	99.1	2	0.076	0.079	111.4	2	0.117	0.117	114.1	2	0.085	0.086	116.0	2	0.076	0.075	116.3	2	0.497	0.497	97.1
4 days	1	0.089			1	0.076			1	0.114			1	0.082			1	0.069			1	0.51		
	2	0.091	0.090	109.7	2	0.082	0.079	108.3	2	0.113	0.114	99.9	2	0.081	0.082	105.9	2	0.069	0.069	101.1	2	0.519	0.515	99.0
7 days	1	0.08			1	0.079			1	0.113			1	0.078			1	0.071			1	0.519		
	2	0.084	0.082	92.6	2	0.079	0.079	109.1	2	0.107	0.110	103.1	2	0.077	0.078	94.1	2	0.07	0.071	102.1	2	0.519	0.519	91.7
28 days	1	0.091			1	0.078			1	0.109			1	0.075			1	0.069			1	0.495		
	2	0.091	0.091	111.4	2	0.08	0.079	102.6	2	0.107	0.108	98.6	2	0.079	0.077	100.6	2	0.072	0.071	104.1	2	0.51	0.503	128.1

Table C4. Matrix Spike Results for Soluble Reactive Phosphorous samples that were frozen.

Time	Tahoe Sites (UTR)				Central Valley Sites (SRF)				Central Coast Sites (OC)			
	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)
<48 Hours	1	0.074			1	0.084			1	0.532		
	2	0.078	0.076	93.7	2	0.083	0.084	112.4	2	0.495	0.514	140.7
4 days	1	0.082			1	0.081			1	0.522		
	2	0.083	0.083	105.9	2	0.082	0.082	108.1	2	0.543	0.533	119.6
7 days	1	0.082			1	0.082			1	0.501		
	2	0.084	0.083	98.9	2	0.082	0.082	99.1	2	0.501	0.501	72.9
28 days	1	0.087			1	0.076			1	0.501		
	2	0.087	0.087	111.1	2	0.075	0.076	98.1	2	0.486	0.494	157.3

Table C5. Field Blank Results for Nitrite frozen.

Time	Upper Truckee River		West Fork Carson River		San Joaquin River		Sacramento River		Franklin Creek		Orcutt Creek	
	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)
<48 Hours	1	0.005	1	0.004	1	0.005	1	0.005	1	0.002	1	0.002
	2	0.005	2	0.005	2	0.005	2	0.005	2	0.002	2	0.002
	3	0.005	3	0.005	3	0.005	3	0.005	3	0.002	3	0.003
4 days	1	0.005	1	0.004	1	0	1	0.002	1	0.001	1	0
	2	0.005	2	0.004	2	0	2	0.002	2	0.001	2	0.001
	3	0.004	3	0.004	3	0.002	3	0.002	3	0.001	3	0.001
7 days	1	0	1	-0.002	1	-0.002	1	-0.002	1	0.002	1	0.002
	2	0	2	-0.002	2	-0.002	2	-0.002	2	0.002	2	0.002
	3	0	3	-0.002	3	-0.002	3	-0.002	3	0.002	3	0.002
28 days	1	0.006	1	0.003	1	0.002	1	0.002	1	0.004	1	0.005
	2	0.006	2	0.001	2	0.002	2	0.002	2	0.004	2	0.005
	3	0.006	3	0.001	3	0.002	3	0.002	3	0.004	3	0.005

Table C6. Field Blank Results for Nitrite refrigerated.

Time	Upper Truckee River		West Fork Carson River		San Joaquin River		Sacramento River		Franklin Creek		Orcutt Creek	
	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)
<48 Hours	1	0.005	1	0.005	1	0.005	1	0.005	1	0	1	0.002
	2	0.005	2	0.005	2	0.005	2	0.005	2	0.002	2	0.002
	3	0.005	3	0.005	3	0.005	3	0.005	3	0.002	3	0.002
4 days	1	0.004	1	0.004	1	0.002	1	0.002	1	-0.002	1	0.001
	2	0.004	2	0.004	2	0.002	2	0.002	2	-0.002	2	0.001
	3	0.004	3	0.005	3	0	3	0.002	3	0	3	0
7 days	1	0	1	0	1	-0.002	1	-0.002	1	0.002	1	0.002
	2	0	2	0	2	-0.002	2	-0.002	2	0.002	2	0.002
	3	0	3	0	3	-0.002	3	-0.002	3	0.004	3	0
28 days	1	0.006	1	0.006	1	0.002	1	0.002	1	0.005	1	0.005
	2	0.006	2	0.006	2	0.002	2	0.002	2	0.004	2	0.004
	3	0.004	3	0.006	3	0.002	3	0.002	3	0.004	3	0.004

Table C7. Matrix Spike Results for Nitrite samples that were frozen.

Time	Upper Truckee River				West Fork Carson River				San Joaquin River				Sacramento River				Franklin Creek				Orcutt Creek			
	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)
<48 Hours	1	0.122			1	0.121			1	0.086			1	0.056			1	0.184			1	0.281		
	2	0.124	0.123	93.9	2	0.124	0.123	96.5	2	0.087	0.087	101.3	2	0.058	0.057	99.7	2	0.184	0.184	87.1	2	0.271	0.271	66.3
4 days	1	0.124			1	0.126			1	0.082			1	0.05			1	0.18			1	0.281		
	2	0.124	0.124	96.1	2	0.123	0.125	99.5	2	0.082	0.082	100.0	2	0.05	0.050	95.4	2	0.182	0.181	84.0	2	0.282	0.282	83.6
7 days	1	0.072			1	0.07			1	0.078			1	0.048			1	0.184			1	0.283		
	2	0.072	0.072	98.9	2	0.07	0.070	102.9	2	0.078	0.078	100.3	2	0.048	0.048	99.4	2	0.185	0.185	87.9	2	0.283	0.283	79.1
28 days	1	0.075			1	0.074			1	0.08			1	0.053			1	0.191			1	0.287		
	2	0.077	0.076	96.9	2	0.075	0.075	95.6	2	0.08	0.080	95.7	2	0.051	0.052	98.0	2	0.186	0.189	92.7	2	0.284	0.286	75.9

Table C8. Matrix Spike Results for Nitrite samples that were refrigerated.

Time	Tahoe Sites				Central Valley Sites				Central Coast Sites			
	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)
<48 Hours	1	0.122			1	0.055			1	0.281		
	2	0.124	0.123	94.4	2	0.053	0.054	94.0	2	0.278	0.280	76.7
4 days	1	0.123			1	0.05			1	0.288		
	2	0.124	0.124	98.2	2	0.05	0.050	92.0	2	0.276	0.282	85.4
7 days	1	0.07			1	0.048			1	0.277		
	2	0.07	0.070	95.4	2	0.048	0.048	97.7	2	0.28	0.279	75.3
28 days	1	0.077			1	0.051			1	0.284		
	2	0.075	0.076	97.4	2	0.051	0.051	96.3	2	0.284	0.284	75.4

Table C9. Field Blank Results for Ammonia frozen.

Time	Upper Truckee River		West Fork Carson River		San Joaquin River		Sacramento River		Franklin Creek		Orcutt Creek	
	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)
<48 Hours	1	0.002	1	0.015	1	0.003	1	0.008	1	0.002	1	0.002
	2	0.002	2	0.002	2	0.001	2	0.003	2	0.002	2	0
	3	0.002	3	0.013	3	0.004	3	0.001	3	0.002	3	0.002
4 days	1	0	1	0.006	1	0	1	0	1	0.006	1	0.004
	2	0	2	0.002	2	-0.002	2	0	2	0.001	2	0.001
	3	0	3	0.002	3	-0.002	3	0	3	0.001	3	0.004
7 days	1	-0.003	1	0	1	-0.001	1	-0.001	1	0.001	1	0.001
	2	0	2	0	2	-0.001	2	-0.001	2	0	2	0.003
	3	-0.003	3	0	3	-0.001	3	-0.003	3	0.001	3	0.003
28 days	1	0.006	1	0.006	1	0.002	1	0	1	0	1	0
	2	0.006	2	0.006	2	0.002	2	0.002	2	0	2	0.003
	3	0.006	3	0.006	3	0.002	3	0.002	3	0	3	0.003

Table C10. Field Blank Results for Ammonia refrigerated.

Time	Upper Truckee River		West Fork Carson River		San Joaquin River		Sacramento River		Franklin Creek		Orcutt Creek	
	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)
<48 Hours	1	0	1	-0.002	1	0.003	1	0.003	1	0.002	1	0.002
	2	-0.002	2	0.002	2	0.005	2	0.003	2	0.002	2	0.002
	3	0.011	3	0.002	3	0.008	3	0.003	3	0.002	3	0.002
4 days	1	0.006	1	0.006	1	-0.002	1	0	1	0.001	1	0.004
	2	0.004	2	0.006	2	-0.002	2	0	2	0.001	2	0.001
	3	0.006	3	0.006	3	0	3	0	3	0.001	3	0.001
7 days	1	-0.003	1	0	1	-0.001	1	-0.001	1	0.001	1	0.001
	2	-0.003	2	0	2	-0.001	2	-0.001	2	0.001	2	0.001
	3	-0.003	3	-0.003	3	-0.001	3	-0.001	3	0.001	3	0.003
28 days	1	0.006	1	0.006	1	0.002	1	0.002	1	0	1	-0.001
	2	0.006	2	0.008	2	0.002	2	0.004	2	0	2	-0.001
	3	0.006	3	0.008	3	0.002	3	0.004	3	0	3	0

Table C11. Matrix Spike Results for Ammonia samples that were frozen.

Time	Upper Truckee River				West Fork Carson River				San Joaquin River				Sacramento River				Franklin Creek				Orcutt Creek			
	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)
<48 Hours	1	0.076			1	0.074			1	0.073			1	0.069			1	0.072			1	0.161		
	2	0.078	0.077	101.4	2	0.076	0.075	97.4	2	0.069	0.071	99.4	2	0.067	0.068	97.7	2	0.085	0.079	105.3	2	0.157	0.157	90.3
4 days	1	0.084			1	0.073			1	0.081			1	0.072			1	0.077			1	0.157		
	2	0.093	0.089	119.3	2	0.075	0.074	99.1	2	0.067	0.074	115.4	2	0.07	0.071	100.6	2	0.072	0.075	97.9	2	0.161	0.159	87.3
7 days	1	0.072			1	0.072			1	0.063			1	0.063			1	0.068			1	0.16		
	2	0.072	0.072	97.7	2	0.072	0.072	98.3	2	0.063	0.063	98.0	2	0.063	0.063	98.0	2	0.068	0.068	101.4	2	0.165	0.163	87.9
28 days	1	0.078			1	0.081			1	0.062			1	0.064			1	0.069			1	0.156		
	2	0.078	0.078	94.9	2	0.083	0.082	99.4	2	0.064	0.063	91.7	2	0.067	0.066	95.6	2	0.069	0.069	96.3	2	0.156	0.156	87.4

Table C12. Matrix Spike Results for Ammonia samples that were refrigerated.

Time	Tahoe Sites				Central Valley Sites				Central Coast Sites			
	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)
<48 Hours	1	0.076			1	0.069			1	0.159		
	2	0.074	0.075	101.4	2	0.069	0.069	102.6	2	0.159	0.159	89.7
4 days	1	0.075			1	0.07			1	0.161		
	2	0.075	0.075	94.0	2	0.072	0.071	104.3	2	0.163	0.162	86.0
7 days	1	0.07			1	0.063			1	0.16		
	2	0.07	0.070	97.1	2	0.063	0.063	96.9	2	0.16	0.160	86.0
28 days	1	0.081			1	0.05			1	0.141		
	2	0.078	0.080	99.6	2	0.056	0.053	94.6	2	0.141	0.141	83.7

Table C13. Field Blank Results for Nitrate+Nitrite frozen.

Time	Upper Truckee River		West Fork Carson River		San Joaquin River		Sacramento River		Franklin Creek		Orcutt Creek	
	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)
<48 Hours	1	-0.007	1	-0.01	1	-0.101	1	-0.012	1	0	1	0.406
	2	-0.009	2	-0.009	2	-0.196	2	-0.012	2	0	2	0.406
	3	-0.006	3	-0.01	3	-0.189	3	-0.008	3	0	3	0.406
4 days	1	-0.002	1	-0.004	1	-0.089	1	-0.008	1	-0.239	1	0.347
	2	-0.002	2	-0.005	2	-0.097	2	-0.007	2	-0.239	2	0.355
	3	-0.002	3	-0.005	3	-0.089	3	-0.007	3	-0.222	3	0.355
7 days	1	-0.006	1	-0.006	1	-0.082	1	-0.004	1	-0.215	1	0.415
	2	-0.008	2	-0.008	2	-0.082	2	-0.004	2	-0.215	2	0.397
	3	-0.008	3	-0.006	3	-0.082	3	-0.004	3	-0.215	3	0.406
28 days	1	-0.002	1	0	1	-0.108	1	-0.002	1	-0.1	1	0.506
	2	-0.002	2	-0.002	2	-0.1	2	-0.004	2	-0.1	2	0.481
	3	-0.002	3	-0.002	3	-0.108	3	-0.004	3	-0.092	3	0.490

Table C14. Field Blank Results for Nitrate+Nitrite refrigerated.

Time	Upper Truckee River		West Fork Carson River		San Joaquin River		Sacramento River		Franklin Creek		Orcutt Creek	
	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)
<48 Hours	1	-0.01	1	-0.012	1	-0.205	1	-0.01	1	0	1	0.414
	2	-0.009	2	-0.01	2	-0.205	2	-0.01	2	0	2	0.414
	3	-0.01	3	-0.009	3	-0.213	3	-0.01	3	0	3	0.397
4 days	1	-0.004	1	-0.002	1	-0.089	1	-0.005	1	-0.239	1	0.495
	2	-0.007	2	-0.004	2	-0.097	2	-0.007	2	-0.239	2	0.495
	3	-0.007	3	-0.002	3	-0.089	3	-0.008	3	-0.239	3	0.495
7 days	1	-0.008	1	-0.008	1	-0.082	1	-0.002	1	-0.206	1	0.389
	2	-0.006	2	-0.008	2	-0.082	2	-0.002	2	-0.215	2	0.389
	3	-0.006	3	-0.006	3	-0.074	3	0	3	-0.206	3	0.389
28 days	1	-0.002	1	-0.002	1	-0.108	1	-0.004	1	-0.092	1	0.621
	2	0	2	-0.002	2	-0.108	2	-0.004	2	-0.1	2	0.621
	3	0	3	0.001	3	-0.1	3	-0.002	3	-0.092	3	0.629

Table C15. Matrix Spike Results for Nitrate + Nitrite samples that were frozen.

Time	Upper Truckee River				West Fork Carson River				San Joaquin River				Sacramento River				Franklin Creek				Orcutt Creek			
	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)
<48 Hours	1	0.152			1	0.147			1	2.24			1	0.079			1	30.2			1	36.6		
	2	0.161	0.157	108.2	2	0.148	0.148	105.1	2	2.25	2.245	77.1	2	0.077	0.078	117.4	2	30.2	30.200	88.3	2	36.6	36.600	82.6
4 days	1	0.585			1	0.575			1	2.34			1	0.073			1	30.8			1	37.9		
	2	0.582	0.584	106.8	2	0.577	0.576	85.7	2	2.34	2.340	85.6	2	0.071	0.072	104.3	2	30.5	30.650	99.3	2	37.7	37.800	104.6
7 days	1	0.1			1	0.095			1	2.35			1	0.076			1	30.3			1	37.3		
	2	0.103	0.102	111.6	2	0.1	0.098	110.7	2	2.35	2.350	85.7	2	0.078	0.077	110.9	2	30.3	30.300	102.9	2	37.2	37.250	98.7
28 days	1	0.098			1	0.098			1	2.36			1	0.078			1	29			1	36.3		
	2	0.099	0.099	100.1	2	0.098	0.098	103.1	2	2.35	2.355	85.5	2	0.08	0.079	110.9	2	29	29.000	99.4	2	36.1	36.200	114.3

Table C16. Matrix Spike Results for Nitrate+Nitrite samples that were refrigerated.

Time	Tahoe Sites				San Joaquin River				Sacramento River				Central Coast Sites			
	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)
<48 Hours	1	0.148			1	2.28			1	0.077			1	36.7		
	2	0.152	0.150	107.1	2	2.27	2.275	78.1	2	0.077	0.077	120.9	2	37	36.850	89.0
4 days	1	0.583			1	2.34			1	0.074			1	38.4		
	2	0.586	0.585	107.8	2	2.33	2.335	85.1	2	0.076	0.075	110.6	2	36.6	37.500	110.0
7 days	1	0.1			1	2.35			1	0.076			1	37.3		
	2	0.1	0.100	109.1	2	2.37	2.360	86.4	2	0.076	0.076	108.6	2	37.3	37.300	94.9
28 days	1	0.099			1	2.38			1	0.08			1	35.2		
	2	0.099	0.099	100.0	2	2.38	2.380	87.4	2	0.078	0.079	111.1	2	35.4	35.300	90.6

Table C17. Field Blank Results for Total Nitrogen refrigerated.

Time	Upper Truckee River		West Fork Carson River		San Joaquin River		Sacramento River		Franklin Creek		Orcutt Creek	
	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)
<48 Hours	1	0.019	1	-0.002	1	-0.183	1	-0.008	1	0	1	0.448
	2	0.004	2	-0.021	2	-0.023	2	-0.008	2	0	2	0.448
	3	-0.008	3	-0.008	3	-0.167	3	-0.004	3	0	3	0.448
4 days	1	-0.013	1	-0.016	1	-0.178	1	-0.005	1	-0.23	1	0.334
	2	-0.01	2	-0.01	2	-0.194	2	-0.003	2	-0.169	2	0.379
	3	-0.013	3	-0.013	3	-0.21	3	0	3	-0.245	3	0.288
7 days	1	-0.008	1	-0.011	1	-0.064	1	0.002	1	-0.128	1	0.428
	2	0.001	2	-0.017	2	-0.064	2	0.011	2	-0.144	2	0.428
	3	-0.005	3	-0.008	3	-0.064	3	0.084	3	-0.128	3	0.382
28 days	1	0	1	0	1	-0.082	1	-0.007	1	-0.202	1	0.432
	2	0.003	2	0.003	2	-0.082	2	-0.007	2	-0.202	2	0.515
	3	0.003	3	0	3	-0.082	3	-0.007	3	-0.202	3	0.415

Table C18. Matrix Spike Results for Total Nitrogen samples that were refrigerated.

Time	Upper Truckee River				West Fork Carson River				San Joaquin River				Sacramento River				Franklin Creek				Orcutt Creek			
	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)
<48 Hours	1	0.189			1	0.207			1	3.11			1	0.173			1	30.5			1	36.7		
	2	0.238	0.214	101.3	2	0.235	0.221	114.6	2	3.21	3.160	100.6	2	0.173	0.173	-6.6	2	29.9	30.200	114.0	2	37	37.000	81.0
4 days	1	0.2			1	0.193			1	3.33			1	0.207			1	30.5			1	38.2		
	2	0.203	0.202	101.0	2	0.21	0.202	111.6	2	3.15	3.240	109.4	2	0.207	0.207	86.3	2	30.3	30.400	101.7	2	39	38.600	83.7
7 days	1	0.248			1	0.195			1	3.04			1	0.234			1	29.9			1	38.7		
	2	0.229	0.239	121.9	2	0.217	0.206	107.4	2	3.04	3.040	96.1	2	0.227	0.231	90.4	2	30.1	30.000	92.9	2	39.2	38.950	93.3
28 days	1	0.315			1	0.216			1	3.2			1	0.229			1	37.3			1	42		
	2	0.285	0.300	192.6	2	0.186	0.201	91.7	2	3.11	3.155	104.8	2	0.226	0.228	117.0	2	35.8	36.550	193.9	2	40.5	41.250	128.1

Table C19. Field Blank Results for Total Phosphorous refrigerated.

Time	Upper Truckee River		West Fork Carson River		San Joaquin River		Sacramento River		Franklin Creek		Orcutt Creek	
	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)	Replicate	Result (mg/L)
<48 Hours	1	0.01	1	-0.022	1	0	1	0	1	0.002	1	0.002
	2	-0.002	2	-0.002	2	ND	2	ND	2	0	2	0.002
	3	-0.002	3	-0.002	3	ND	3	ND	3	0.002	3	0.004
4 days	1	0.004	1	0.008	1	-0.009	1	-0.001	1	-0.01	1	-0.012
	2	0	2	0.004	2	-0.009	2	0.004	2	-0.008	2	-0.01
	3	0.004	3	-0.002	3	-0.009	3	0.001	3	-0.01	3	-0.01
7 days	1	0.001	1	-0.003	1	0.002	1	0	1	-0.002	1	-0.002
	2	0	2	-0.003	2	0.002	2	0	2	-0.002	2	-0.002
	3	0.001	3	-0.003	3	0.002	3	0	3	-0.002	3	0
28 days	1	0.005	1	0	1	-0.001	1	0.003	1	-0.006	1	-0.008
	2	0.005	2	0.002	2	0.003	2	0.003	2	-0.008	2	-0.006
	3	0.005	3	0.002	3	0.003	3	0.003	3	-0.006	3	-0.006

Table C20. Matrix Spike Results for Total Phosphorous samples that were refrigerated.

Time	Upper Truckee River				West Fork Carson River				San Joaquin River				Sacramento River				Franklin Creek				Orcutt Creek			
	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)	Replicate	Result (mg/L)	Mean	Percent Recovery (%)
<48 Hours	1	0.086			1	0.081			1	0.206			1	0.103			1	0.07			1	0.755		
	2	0.09	0.088	104.9	2	0.078	0.080	96.7	2	0.241	0.224	90.7	2	0.116	0.110	113.3	2	0.061	0.066	61.3	2	0.802	0.802	-86.7
4 days	1	0.087			1	0.084			1	0.248			1	0.111			1	0.053			1	1.86		
	2	0.089	0.088	95.1	2	0.087	0.086	109.6	2	0.236	0.242	119.4	2	0.116	0.114	119.1	2	0.043	0.048	72.0	2	1.85	1.855	430.0
7 days	1	0.115			1	0.087			1	0.206			1	0.093			1	0.063			1	2.16		
	2	0.091	0.103	116.6	2	0.087	0.087	107.1	2	0.206	0.206	99.4	2	0.095	0.094	95.1	2	0.07	0.067	66.7	2	2.05	2.105	184.3
28 days	1	0.097			1	0.085			1	0.209			1	0.079			1	0.064			1	2.88		
	2	0.095	0.096	103.7	2	0.081	0.083	94.3	2	0.209	0.209	102.6	2	0.079	0.079	80.6	2	0.066	0.065	66.6	2	2.58	2.730	337.1