

Appendix A
Background Water Quality Information

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At each sample site a one liter sample of water was collected to be analyzed for background information. Unlike samples used for the evaluation of the holding times, the background samples were not filtered in the field and were immediately placed on wet ice. An aliquot of each background sample was filtered in the laboratory with a 0.2 µm polycarbonate filter for dissolved nutrient analyses. The background samples taken at West Fork Carson River (WFCR) and Upper Truckee River (UTR) were not spiked so that accurate background information could be obtained.

Table A1 summarizes the historic nutrient data for many of the constituents that were available through SWAMP Monitoring Programs in each region. Table A2 summarizes the historic data for other constituents that were available through regional SWAMP Monitoring Programs. Historically, water bodies in the Lahontan Region show low nutrient levels for nitrogen and phosphorous analyses. Specific conductance and turbidity are also historically low in this region while pH, DO, and temperature measurements have also stayed within ranges considered healthy for fish habitat. Nutrient levels, as well as SC, DO, and pH, in the Central Valley Region have historically been in the low- to mid-level ranges. In the Central Coast Region the water bodies have historically shown high nutrient levels.

Table A3 shows the field measurements that were taken at each sample site for water temperature, pH, DO, SC, and turbidity. Samples in the Lahontan region had low temperature, turbidity and SC measurements; Central Valley samples showed midrange SC measurements, higher turbidity at the SJR site and lower turbidity at the SRF site; Central Coast sites showed high SC at both sites, low turbidity at the FC site and high turbidity at the OC site. The pH at all sites ranged between 7.19 and 8.64. The DO at all sites ranged between 8.67 mg/L and 12.14 mg/L. The temperature at the Central Valley and Central Coast sites ranged from 19.25 °C and 23.39 °C.

Table A4 summarizes the background data for WFCR. Table A5 summarizes the background data for UTR. Unlike the samples used for the holding time evaluation the background samples were neither spiked nor filtered in the field. Similar to the historical data, the background data for both water bodies have low levels of nutrients, minerals, and carbon.

Table A6 summarizes the background data for SJR. Table A7 summarizes the background data for SRF. Results from these two sites are similar to the historical data. Both sites show mid-range levels for nutrients and minerals. SJR did show elevated TSS and turbidity measurements.

Table A8 summarizes the background data for OC. Table A9 summarizes the background data for FC. The historic data for this site was similar to the background sample results with lower levels of most nutrient analyses but with high levels of nitrogen and lower levels for phosphorous nutrients. OC showed the highest level of turbidity of all the sites visited in this study (1470 ntu) while FC had the lowest turbidity measurement of all the sites visited in this study (0.9 ntu).

Table A1. Historic Ranges in Nutrient Concentrations for Holding Time Study											
	Orthophosphate (mg/L)	NO ₂ -N (mg/L)	TP (mg/L)	TKN (mg/L)	NO ₂ +NO ₃ (mg/L)	Nitrate	NH ₃ as N	Total N (mg/L)	Dissolved PO ₄ (mg/L-P)	Phosphorus as P (mg/L) EPA- 365.4	Phosphates P (mg/L) EPA- 365.4
Lahontan Region*											
West Fork Carson River (WFCR)		< .008	0.012 to 0.061	0.04 to 0.43	0.001 to 0.084				0.004		
Upper Truckee River (UTR)	0.004 to 0.023		0.011 to 0.047		0.006 to 0.046		ND to 0.011				
Central Valley Region											
Sacramento River at Freeport (SRF)	about 0.02		0.31		0.04 to 0.50	ND to 12.4	0.05 to 0.19				
San Joaquin River at Vernalis (SJR)	0.06 to 0.48	0.01 to 0.04	0.1 to 12.12	ND to 3.4	0.04 to 3.0	ND to 2.22	ND to 0.5	0.46 to 3			
Central Coast Region											
Orcutt Creek (OC)	0.0198 to 0.84	ND to 1.1		ND to 5.8		24 to 35	ND to 2.8	19.6 to 43	0.76 to 4.1	0.3 to 1.18	0.35 to 1.4
Franklin Creek (FC)	ND to 1.9	ND to 0.33		ND to 2.6		22 to 24	ND to 0.3116	2.1 to 28	0.68 to 5.55	0.08 to 0.42	0.02 to 2.3

*Lahontan sites were spiked 25 ug/L SRP, NO₃, NO₂, NH₄ (providing 50-ug/L NO₃+NO₂ and 75-ug/L TN)

Table A2. Historic Ranges in Constituent Concentrations for Holding Time Study						
	Specific Conductance (uS/cm)	pH (field)	Turbidity (NTU)	DO (mg/L)	Temp Water °C	Diss. Ca (mg/L)
Tahoe Region						
West Fork Carson River	36 to 88	6.9 to 7.9	2 to 31	8 to 12.2	0 to 16.5	
Upper Truckee River	about 240	7.5 to 8.4			0 to 14.0	
Central Valley Region						
Sacramento River at Freeport	100 to 125	5.4 to 9.1	1.2 to 148	9.1 to 10.6	1.5 to 24.5	8 to 14.29
San Joaquin River at Vernalis	270 - 800	6.2 to 10.7	0.5 to 474	5.6 to 22.3	2 to 28	8 to 73
Central Coast Region						
Orcutt Creek	1800 to 3300	6.75 to 7.96			11.47 to 22.46	
Franklin Creek	1500 to 1800	7.43 to 8.99			10.91 to 26.69	

Table A3. Field Measurements

Site Name	Sample Date	Sample Time	Water Temperature (°C)	pH	Dissolved Oxygen (mg/L)	Specific Conductivity (µS/cm)	Turbidity (ntu)
WFCR	6/23/2008	10:09	11.54	7.46	10.28	50	1.53
UTR	6/23/2008	12:10	10.28	7.19	10.54	30	0.96
SJR	7/24/2008	9:22	23.11	8.64	10.64	576	24.4
SRF	7/24/2008	11:27	22.35	8.12	8.67	142	8.86
FC	7/10/2008	8:55	19.25	8.11	12.14	1749	1.71
OC	7/10/2008	12:15	23.39	7.81	9.12	2714	>2000

Analyte	Result	Units	Qualifier
TN	0.101	mg/L	
TDN	0.100	mg/L	
NO3+NO2 - N	0	mg/L	<MDL
NO2 - N	0.004	mg/L	<MDL
NH3 - N	0.006	mg/L	<RL
DIN	0.006	mg/L	<RL
DON	0.100	mg/L	
TP	0.005	mg/L	<MDL
TDP	0.003	mg/L	<MDL
SRP	0	mg/L	<MDL
SiO ₂	10.8	mg/L	
Na	1.863	mg/L	
K	0.565	mg/L	<RL
Mg	1.801	mg/L	
Ca	11.127	mg/L	
Cl	0.491	mg/L	<RL
SO ₄	1.439	mg/L	<RL
HCO ₃ titration	18	mg/L	
DOC	1.22	mg/L	
Turbidity	1.22	mg/L	
TSS	1	mg/L	<RL
VSS	0.2	mg/L	<MDL
NVSS	0.8	mg/L	<MDL

Analyte	Result	Units	Qualifier
TN	0.800	mg/L	
TDN	0.800	mg/L	
NO3+NO2 - N	0	mg/L	<MDL
NO2 - N	0.004	mg/L	<MDL
NH3 - N	0.006	mg/L	<RL
DIN	0.006	mg/L	<MDL
DON	0.800	mg/L	
TP	0.01	mg/L	<RL
TDP	0.005	mg/L	<MDL
SRP	0	mg/L	<MDL
SiO ₂	15.9	mg/L	
Na	1.233	mg/L	
K	0.808	mg/L	<RL
Mg	1.596	mg/L	
Ca	6.982	mg/L	
Cl	0.148	mg/L	<RL
SO ₄	0.209	mg/L	<RL
HCO ₃ titration	14.9	mg/L	
DOC	1.23	mg/L	
Turbidity	1.33	mg/L	
TSS	0.4	mg/L	<MDL
VSS	0	mg/L	
NVSS	0.4	mg/L	<MDL

Analyte	Result	Unit	Qualifier
TN	2.2	mg/L	
TDN	1.7	mg/L	
NO3+NO2 - N	1.48	mg/L	
NO2 - N	0.036	mg/L	
NH3 - N	0.008	mg/L	
DIN	1.488	mg/L	
DON	0.222	mg/L	
TP	0.186	mg/L	
TDP	0.076	mg/L	
SRP	0.052	mg/L	
SiO ₂	12.5	mg/L	
Na	64.6	mg/L	
K	2.56	mg/L	<RL
Mg	25.795	mg/L	
Ca	67.28	mg/L	
Cl	77.4	mg/L	
SO ₄	58.7	mg/L	
HCO ₃ titration	116	mg/L	
Turbidity	21.2	ntu	
TSS	40	mg/L	
VSS	12	mg/L	
NVSS	28	mg/L	

Analyte	Result	Units	Qualifier
TN	0.3	mg/L	
TDN	0.1	mg/L	
NO3+NO2 - N	0.017	mg/L	
NO2 - N	0.007	mg/L	
NH3 - N	0.016	mg/L	
DIN	0.033	mg/L	
DON	0.112	mg/L	
TP	0.071	mg/L	
TDP	0.051	mg/L	
SRP	0.027	mg/L	
SiO ₂	18.5	mg/L	
Na	8.876	mg/L	
K	1.029	mg/L	
Mg	7.976	mg/L	
Ca	18.647	mg/L	
Cl	4.47	mg/L	
SO ₄	5.82	mg/L	
HCO ₃ titration	67.6	mg/L	
Turbidity	5.24	ntu	
TSS	5.4	mg/L	
VSS	1.6	mg/L	<RL
NVSS	3.8	mg/L	<RL

Analyte	Result	Units	Qualifier
TN	33.1	mg/L	
TDN	31.0	mg/L	
NO3+NO2 - N	32.5	mg/L	
NO2 - N	0.237	mg/L	
NH3 - N	0.12	mg/L	
DIN	32.62	mg/L	
DON	-1.620	mg/L	
TP	0.834	mg/L	
TDP	0.346	mg/L	
SRP	0.453	mg/L	
SiO ₂	28.8	mg/L	
Na	185.05	mg/L	
K	5.9	mg/L	<RL
Mg	191.15	mg/L	
Ca	588.65	mg/L	
Cl	222	mg/L	
SO ₄	963	mg/L	
HCO ₃ titration	339	mg/L	
DOC	5.81	mg/L	
Turbidity	1470		
TSS	1637	mg/L	
VSS	181	mg/L	
NVSS	1456	mg/L	

Analyte	Result	Units	Qualifier
TN	24.7	mg/L	
TDN	25.5	mg/L	
NO3+NO2 - N	25.8	mg/L	
NO2 - N	0.134	mg/L	
NH3 - N	0.019	mg/L	
DIN	25.819	mg/L	
DON	-0.319	mg/L	
TP	0.033	mg/L	
TDP	0.018	mg/L	
SRP	0.015	mg/L	
SiO ₂	16.9	mg/L	
Na	127.1	mg/L	
K	1.46	mg/L	<RL
Mg	158.9	mg/L	
Ca	219.88	mg/L	
Cl	89.7	mg/L	
SO ₄	314.5	mg/L	
HCO ₃ titration	470	mg/L	
DOC	3.29	mg/L	
Turbidity	0.9		<RL
TSS	3.6	mg/L	
VSS	2.6	mg/L	
NVSS	1	mg/L	