

LCRA

Basin-wide Water Quality Summary

December 2010



Purpose

Water Resource Protection routinely collects water quality information at 69 sites throughout the lower Colorado River basin. The data we collect is used for trend detection and monitoring water quality standards compliance. Data collection frequency is bimonthly (usually during even-numbered months) for most sites. This document is produced bimonthly and is intended to provide a general summary of water quality conditions and give the user the ability to look at spatial trends in an individual water body. If you have specific questions about any of the results presented here, please call Dave Bass at (800) 776-5272 extension 2112.

Water Quality Variables

This report examines eight of the 26 separate measurements collected during a routine sampling event. These eight constituents provide a general overview of water quality conditions at the time samples were collected. Additional data can be found at: waterquality.lcra.org.

<u>Water Quality Variable</u>	<u>Provides information about...</u>
Temperature	Physical environment
Dissolved Oxygen	Physical and biological environments
Secchi Depth	Water clarity
<i>E. coli</i>	Human health
Nitrite+Nitrate Nitrogen	Nutrients
Total Phosphorus	Nutrients
Chlorophyll	Physical and biological environments
Chloride	Ionic content

Sites

Sites are representative of the water body in which they are located, and where possible, multiple sites are shown for each water body. The following table lists the sites covered in this summary. This report reviews data for 37 of the 71 locations sampled by the LCRA. These sites are distributed throughout the LCRA's monitoring area.

Part of the Watershed	Site Description
Colorado River Below Austin	Bay City Wharton Columbus LaGrange Smithville Bastrop Webberville
Streams Downstream of Austin	Bull Creek at FM 2222 Onion Creek at US 183 Gilleland Creek at FM 969 Cedar Creek at SH 304 Cummins Creek at FM 109
Lakes Austin and Travis	Lake Austin at the Dam Lake Austin at the Headwaters Lake Travis at the Dam Lake Travis at Pace Bend Lake Travis at the Headwaters
Lakes Marble Falls and LBJ	Lake Marble Falls at the Dam Lake Marble Falls at the Headwaters Lake LBJ at the Dam Lake LBJ at Kingsland Lake LBJ at the Headwaters
Middle Basin Rivers and Streams	Sandy Creek at SH 71 Llano River at the Slab Llano River at Llano Pedernales River at FM 962 Pedernales River at Johnson City Pedernales River at Sandy
Lakes Inks and Buchanan	Inks Lake at the Dam Inks Lake at the Headwaters Lake Buchanan at the Dam Lake Buchanan at Beaver Creek Lake Buchanan at the Headwaters
Upstream Rivers	Colorado River at Red Bluff San Saba River at San Saba Colorado River at Winchell Pecan Bayou at FM 573

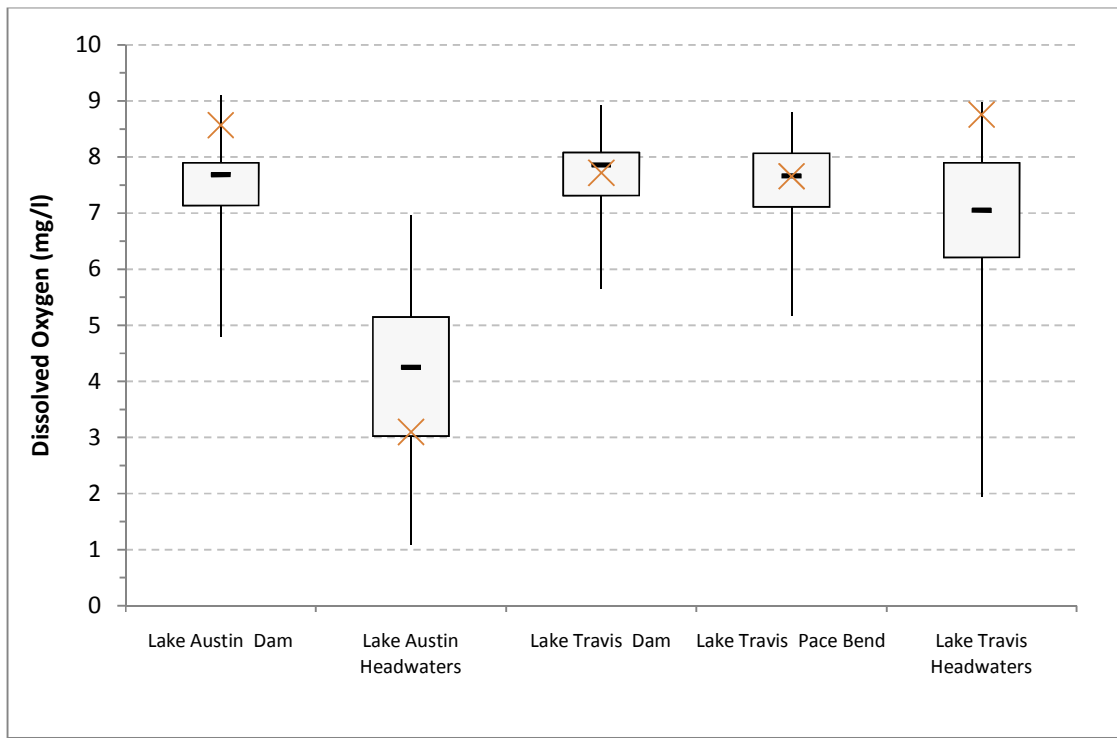
Format and Interpretation

The data collected during the most recent bimonthly sampling effort is presented in both tabular and graphic form. A sample graph is located on the next page. Measurements above the standard or screening criteria are highlighted, and possible explanations will be provided in a short discussion. Data reported below

laboratory detection limits are reported as the detection limit. This document compares the most recent set of water quality measurements to the historical median, maximum, minimum, and the first and third quartiles of data collected during that same month. For instance, the water quality information collected during February will only be compared to the median, maximum and minimum of all February data in our database.

Sample Graph

In these graphs, the red X marks this month's value for the site. The vertical lines show the range of the data, and the box in the middle represents middle half of the data for the site. For example, at Lake Austin at the Dam, the current reading is approximately 8.6 mg/l, the maximum value recorded in August is about 9.1 mg/l, while the minimum is about 4.8 mg/l. Half of the data recorded for August at this site was between 7.1 and 7.9 mg/l, and the median value for dissolved oxygen was about 7.8 mg/l.



In addition to the graphs mentioned above, there are also a series of graphs showing the profile measurements of temperature, pH, dissolved oxygen and specific conductance for each of the Highland Lakes. These graphs lend insight into the changing environment through the water column.

Discussion

Water Temperature

For the most part, water temperatures were on the low to normal end of the spectrum this month. The lower end of Lake LBJ and a couple of the Austin area streams were a little bit warmer than expected.

Dissolved Oxygen

The majority of locations were within or above expected values for this time of year. Of the 37 sites covered in this report, only one reported dissolved oxygen lower than is expected in December (Inks Lake at the Dam), but the value was above 8 mg/l.

Secchi Depth

Overall, water transparency was lower than expected across the basin. Secchi depths in the reservoirs were generally around typical values expected for the month. Inks Lake and Lake Buchanan values were a little shallower than expected.

E. coli

E. coli values were mostly typical or lower than is typical for this month. Only two locations (Inks Lake at its headwaters and the Llano River in Llano) were above their expected ranges. One site, Lake Marble Falls at its headwaters, violated the state water quality standard for the month.

Nitrogen

With the exception of the Colorado River downstream of Austin and Gilleland Creek, nitrogen levels were mostly lower than expected in December. All of the seven locations on the Colorado exceeded the state screening criterion, as did Gilleland Creek. These exceedances are due to the relatively high proportion of wastewater effluent in the streams.

Phosphorus

Phosphorus values were within or lower than expected values at all but two locations. The Colorado River at Bastrop and Webberville both exceeded the state screening criterion this month.

Chlorophyll

As with most of the other parameters this month, chlorophyll concentrations were generally within or below expected values. Of the five sites with higher than expected readings, four were in reservoirs (Lake Austin, Lake LBJ and Lake Buchanan).

Chloride

Two sites reported chloride above the state water quality standard - Gilleland Creek and Cummins Creek. This is a common feature of Gilleland Creek due to it being effluent dominated. The Llano River and Sandy Creek chloride content was higher than expected – this may be a function of low rainfall in this part of the basin. As for the rest of the sites, the large majority were at or below concentrations typically seen.

Profiles

Oddly, Lake Travis is the only reservoir that remains stratified this month. Usually, all the lakes have turned over by this time of the year

December 2010 Values									
Watershed	Location	Water Temperature °C	Dissolved Oxygen mg/L	Secchi Depth m	E. coli MPN/dL	NO ₂ +NO ₃ Nitrogen mg/L	Total Phosphorus mg/L	Chlorophyll a µg/L	Chloride mg/L
Colorado below Austin	Bay City	12.41	10.67	0.25	36	2.620	0.373	2.2	60
	Wharton	12.53	10.35	0.20	59	3.060	0.411	1.1	55
	Columbus	11.94	10.83	0.70	66	2.820	0.420	0.5	50
	LaGrange	11.40	12.07	1.60	24	3.490	0.555	0.6	51
	Smithville	11.50	11.81	0.65	43	4.190	0.674	0.8	53
	Bastrop	11.79	11.34	0.70	7	4.790	0.697	0.6	51
	Webberville	12.93	9.90	0.45	44	4.280	0.733	2.1	50
Lake Austin	Dam	13.24	10.24	1.58	1	0.028	0.008	2.9	28
	Headwaters	16.11	7.97	2.30	4	0.045	0.008	1.0	27
Lake Travis	Dam	17.83	8.03	3.17	1	0.008	0.008	1.2	27
	Pace Bend	16.98	8.20	0.88	1	0.109	0.008	2.4	25
Lake Marble Falls	Headwaters	15.13	14.56	0.60	4	0.032	0.008	3.8	32
	Dam	14.83	9.17	1.48	4	0.008	0.032	7.1	33
Lake LBJ	Headwaters	15.08	9.34	0.83	1050	0.077	0.048	5.4	29
	Dam	16.32	9.01	1.09	5	0.069	0.019	8.5	28
Inks Lake	Kingsland	15.09	8.93	0.97	2	0.019	0.023	8.3	30
	Headwaters	14.80	8.29	1.08	26	0.097	0.030	11.3	44
Lake Buchanan	Dam	13.73	8.41	1.09	10	0.056	0.040	15.3	44
	Headwaters	13.93	9.72	1.18	11	0.073	0.037	7.4	49
Upstream Rivers	Dam	15.59	8.86	0.92	1	0.097	0.018	9.2	48
	Beaver Creek	15.33	9.14	0.40	1	0.012	0.031	12.6	50
	Headwaters	11.53	10.30	0.38	1	0.008	0.046	15.9	64
Llano River	Col at US 190	8.70	11.90	0.33	34	0.084	0.008	2.0	35
	Col at US 377	8.07	11.25	0.30	8	0.008	0.017	5.0	254
	San Saba	8.78	11.31	0.30	179	0.356	0.008	1.6	16
	Pecan Bayou	8.05	11.36	0.28	53	0.008	0.060	9.9	43
Pedernales River	Sandy Creek	15.23	11.97	0.10	71	0.008	0.008	0.6	33
	The Slab	9.66	11.68	0.30	10	0.008	0.008	0.2	25
	Llano	11.16	11.55	0.30	57	0.008	0.008	0.2	24
Austin Area	Hammetts	10.86	11.36	0.90	10	0.008	0.008	0.2	46
	Sandy	8.32	11.70	0.30	21	0.953	0.008	0.3	68
	Johnson City	10.03	12.18	0.80	8	0.209	0.008	0.7	59
	Bull Creek	14.00	10.89	0.20	7	0.048	0.008	0.2	43
	Onion Creek	14.13	11.65	1.00	5	0.054	0.008	0.7	73
Austin Area	Gilleland Ck	13.43	10.25	0.30	26	9.590	0.031	2.4	203
	Cedar Creek	9.13	9.25	0.30	8	0.008	0.017	1.3	61
	Cummins Ck	11.26	10.30	0.35	36	0.008	0.008	0.4	119

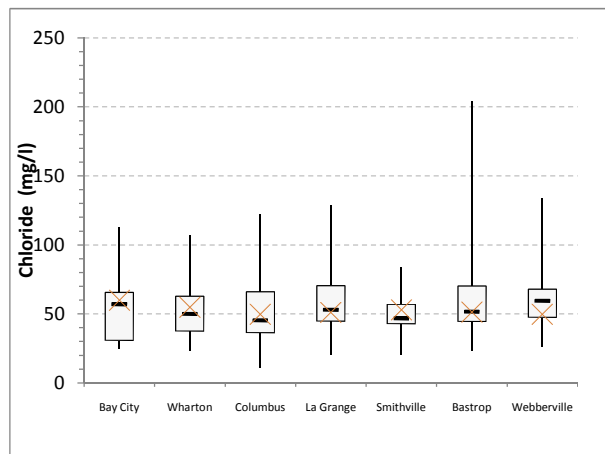
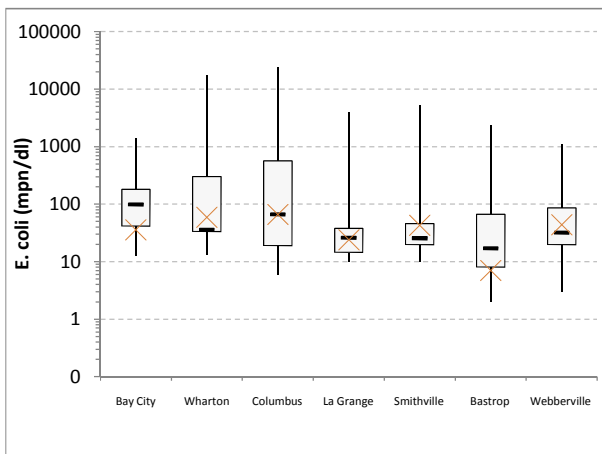
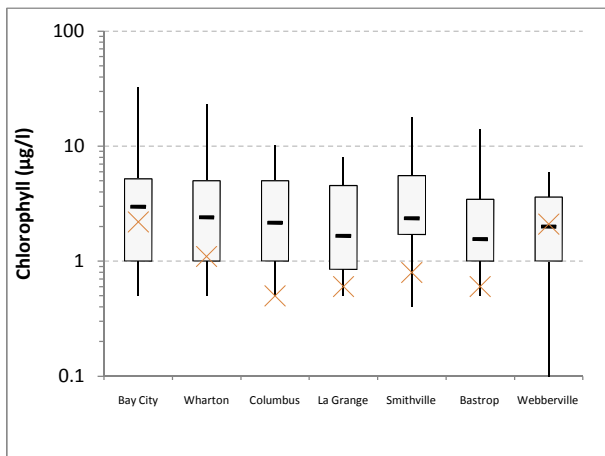
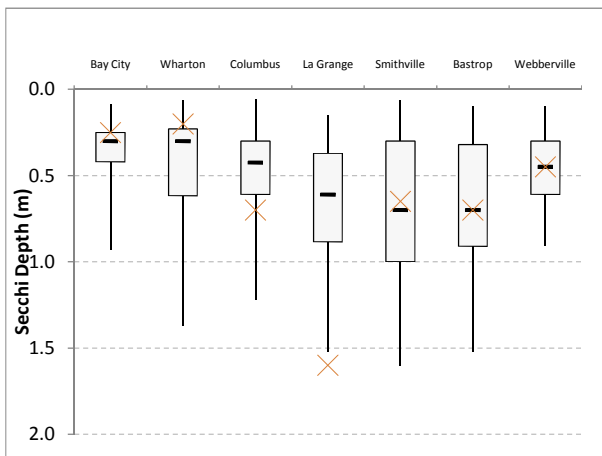
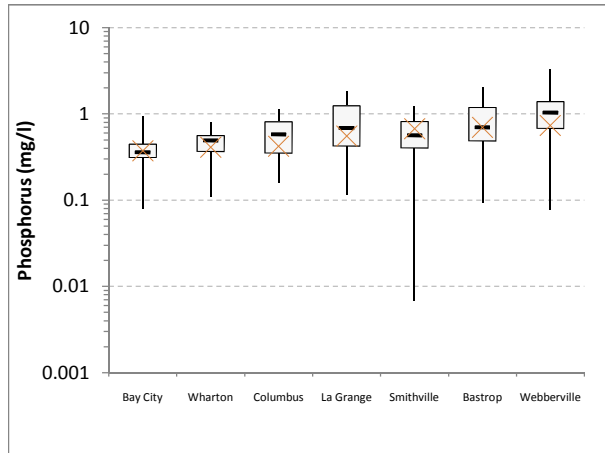
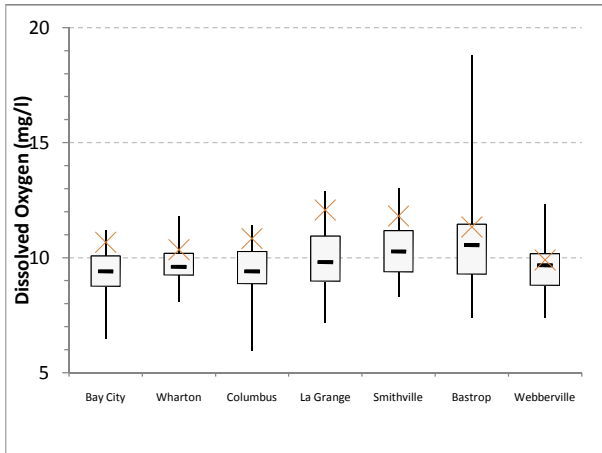
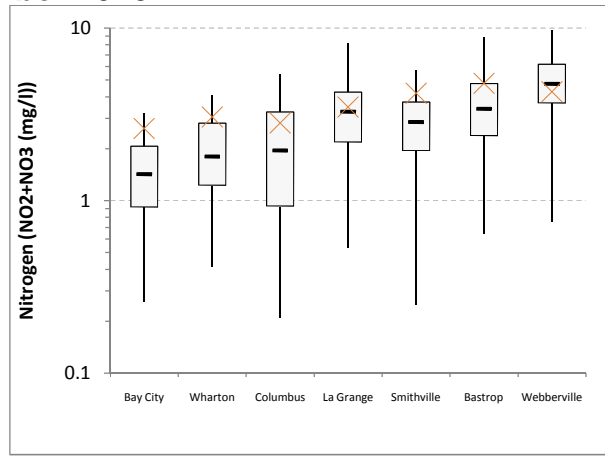
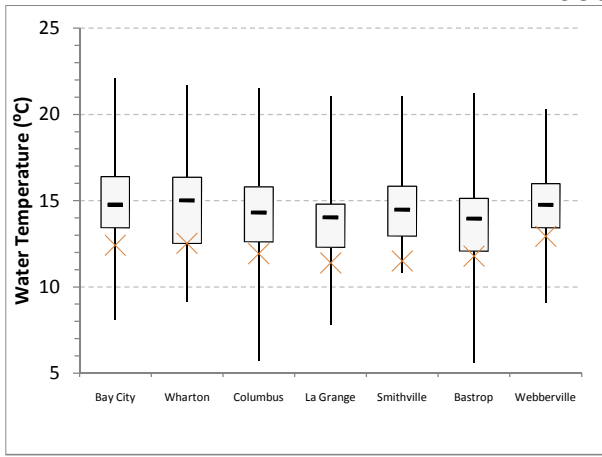
December 2010 Quick Summary										
Watershed	Location	Water Temperature °C	Dissolved Oxygen mg/L	Secchi Depth m	E. coli MPN/dL	NO ₂ +NO ₃ Nitrogen mg/L	Total Phosphorus mg/L	Chlorophyll a µg/L	Chloride mg/L	
Colorado below Austin	Bay City	Low	High	Normal	Low	Criterion	Normal	Normal	Normal	
	Wharton	Normal	High	Low	Normal	Criterion	Normal	Normal	Normal	
	Columbus	Low	High	High	Normal	Criterion	Normal	Low	Normal	
	LaGrange	Low	High	Record High	Normal	Criterion	Normal	Low	Normal	
	Smithville	Low	High	Normal	Normal	Criterion	Normal	Low	Normal	
	Bastrop	Low	Normal	Normal	Normal	Low	Criterion	Criterion	Low	Normal
	Webberville	Low	Normal	Normal	Normal	Normal	Criterion	Criterion	Normal	Normal
Lake Austin	Dam	Low	High	Low	Low	Low	Low	High	Low	
	Headwaters	Normal	Normal	High	Normal	Low	Low	Normal	Low	
Lake Travis	Dam	Normal	High	Normal	Normal	Low	Low	Normal	Low	
	Pace Bend	Normal	Normal	Low	Normal	Low	Low	Normal	Low	
Lake Marble Falls	Headwaters	Normal	High	Normal	Low	Low	Low	Normal	Low	
	Dam	Normal	Normal	Normal	Normal	Low	Normal	Normal	Low	
Lake LBJ	Dam	High	Normal	Normal	Normal	Low	Normal	High	Low	
	Kingsland	High	Normal	Normal	Normal	Low	Normal	Normal	Low	
Inks Lake	Headwaters	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Low	
	Dam	Normal	Low	Low	Normal	Normal	Normal	Normal	Low	
Lake Buchanan	Headwaters	Normal	High	Low	High	Low	Normal	High	Low	
	Dam	Normal	Normal	Low	Normal	Normal	Low	High	Low	
Upstream Rivers	Beaver Creek	Normal	Normal	Low	Normal	Low	Normal	Normal	Normal	
	Headwaters	Normal	Normal	Normal	Low	Low	Normal	Normal	Normal	
Llano River	Col at US 190	Low	High	Normal	Normal	Low	Low	Low	Low	
	Col at US 377	Low	High	Normal	Normal	Low	Low	High	Normal	
	San Saba	Low	High	Normal	Normal	Low	Low	Normal	Low	
	Pecan Bayou	Low	Normal	Low	Normal	Low	Low	Normal	Low	
Pedernales River	Sandy Creek	Normal	High	Low	Normal	Low	Low	Low	High	
	The Slab	Low	High	Low	Normal	Low	Low	Low	High	
	Llano	Normal	Normal	Low	High	Low	Low	Low	High	
Austin Area	Hammetts	Low	Normal	Normal	Normal	Low	Low	Low	Normal	
	Sandy	Low	High	Normal	Normal	Normal	Low	Low	Normal	
	Johnson City	Low	High	High	Low	Low	Low	Low	Normal	
Austin Area	Bull Creek	High	Normal	Low	Low	Normal	Low	Low	Normal	
	Onion Creek	High	Normal	High	Low	Low	Low	Normal	High	
	Gilleland Ck	High	Normal	Normal	Low	Criterion	Low	Normal	Criterion	
	Cedar Creek	Low	Normal	Normal	Low	Low	Low	Low	Normal	
	Cummins Ck	Low	High	Normal	Normal	Low	Low	Low	Criterion	

Explanation:

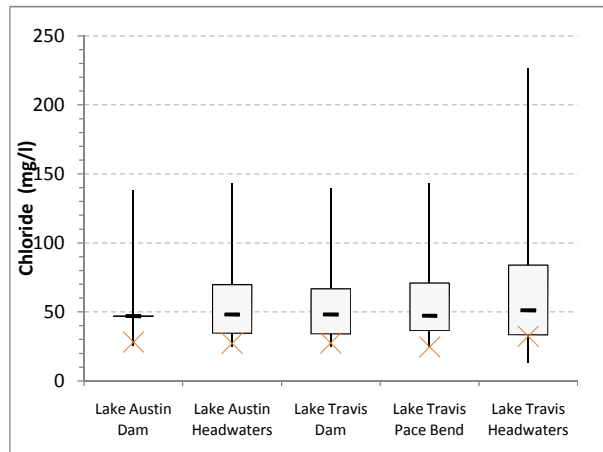
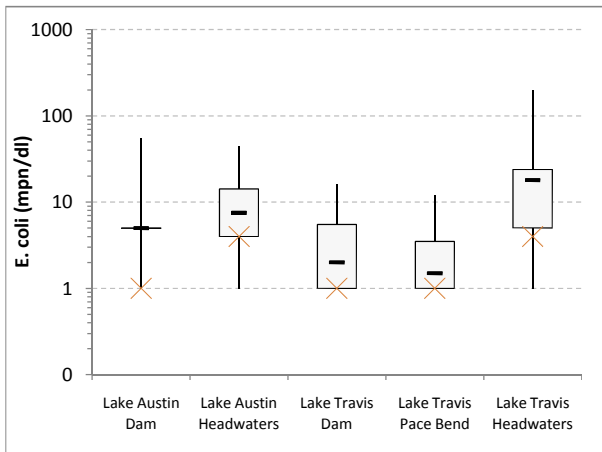
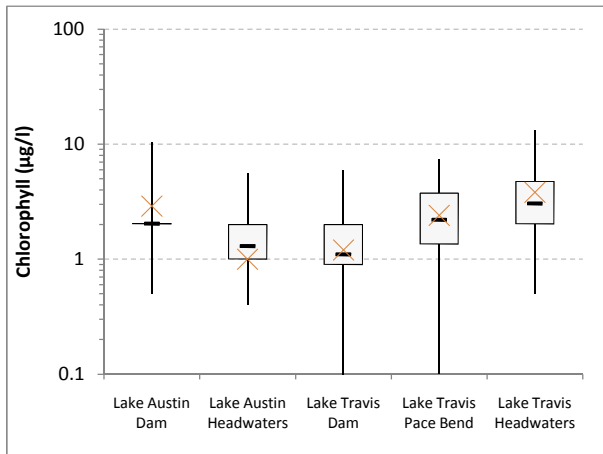
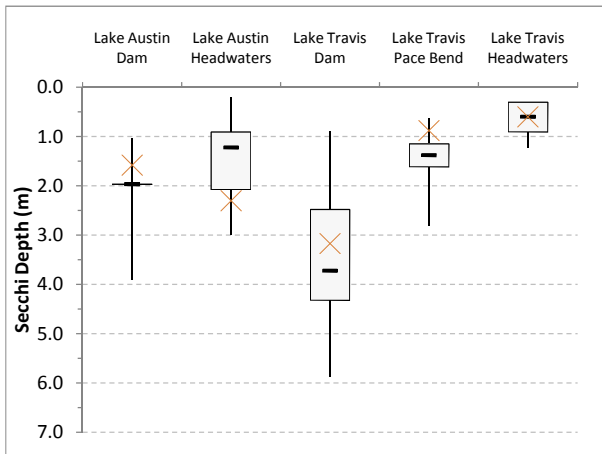
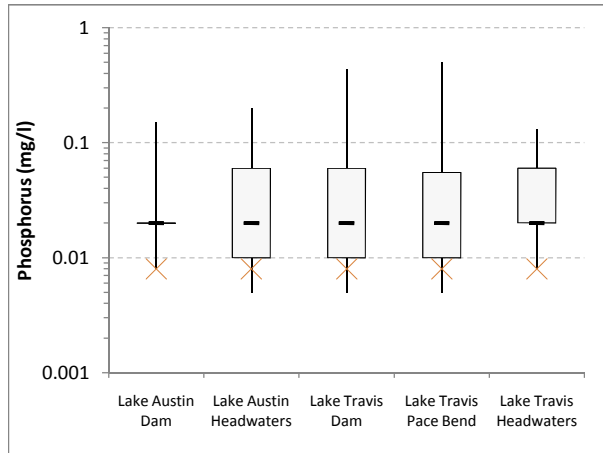
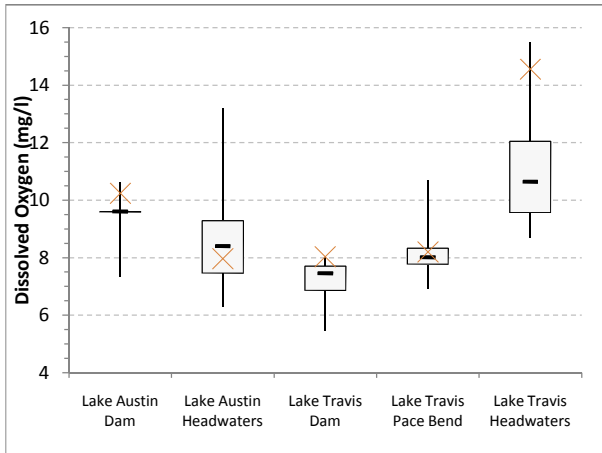
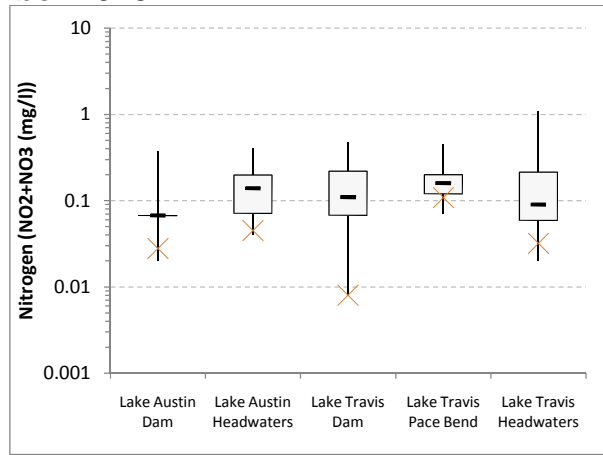
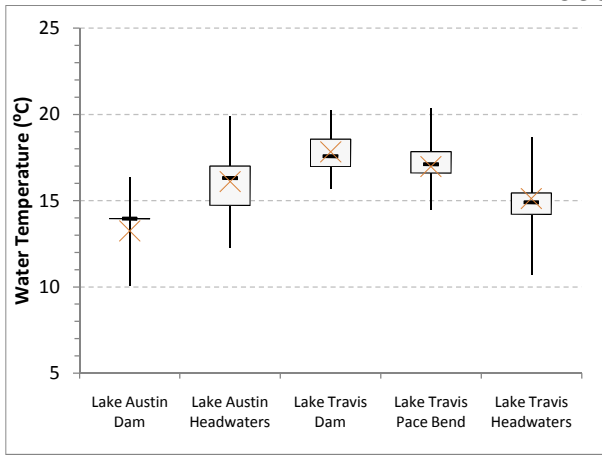
Low = this month's value was below the expected range for the month
Record Low = New low measurement for the month of February
Normal = this month's value was within the expected range for February
High = this month's value was above the expected range for the month
Record High = New high measurement for the month of February
Criterion = state water quality criterion or screening level was violated

	Criterion	Month Record		Outside of Normal		Within
	Exceeded	High	Low	High	Low	Range
Water Temperature:	0	0	0	5	17	15
Dissolved Oxygen:	0	0	0	17	1	19
Secchi Depth:	N/A	1	0	5	12	19
E. coli:	1	0	0	2	10	24
NO ₂ +NO ₃ Nitrogen:	8	0	0	0	24	5
Total Phosphorus:	2	0	0	0	21	14
Chlorophyll a:	0	0	0	5	14	18
Chloride:	2	0	0	4	16	15

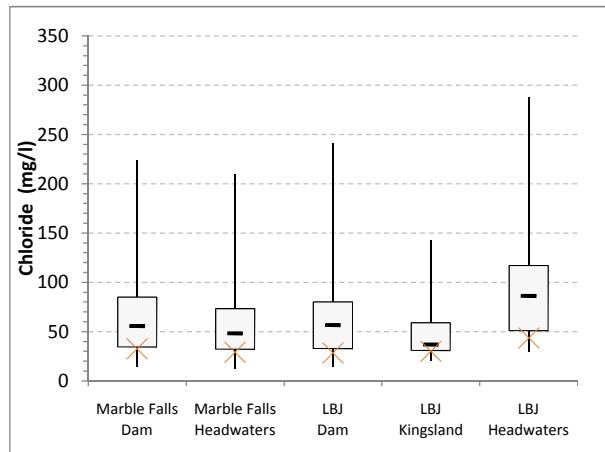
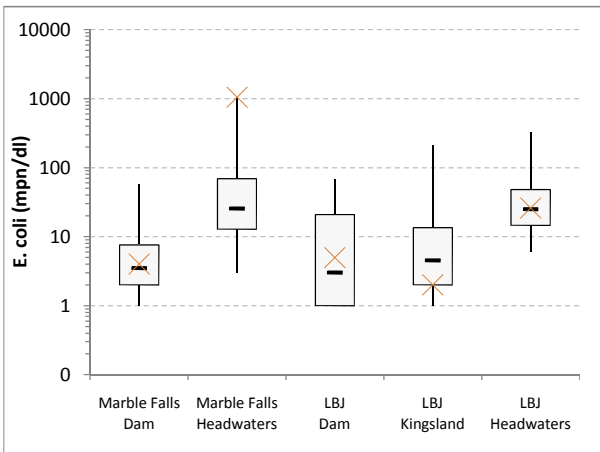
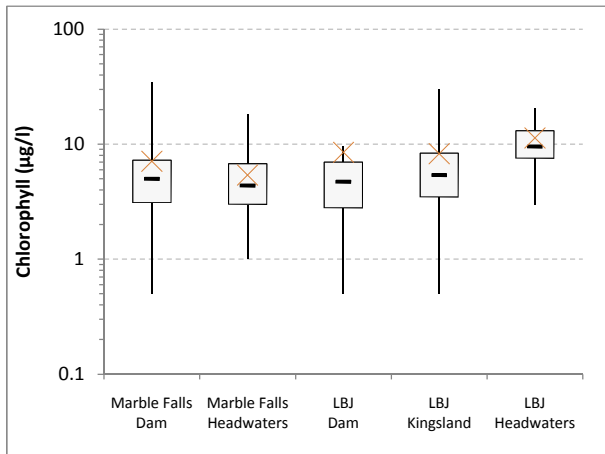
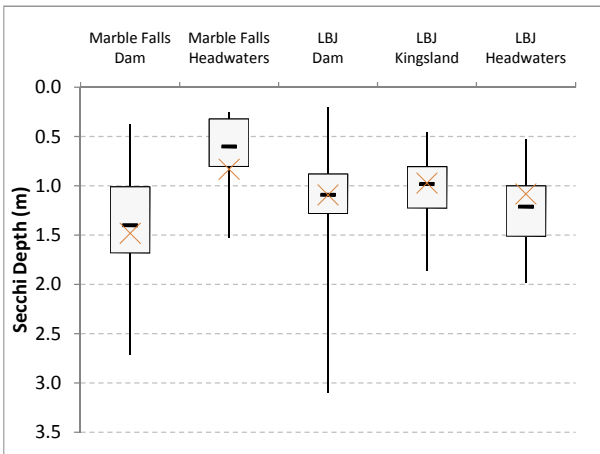
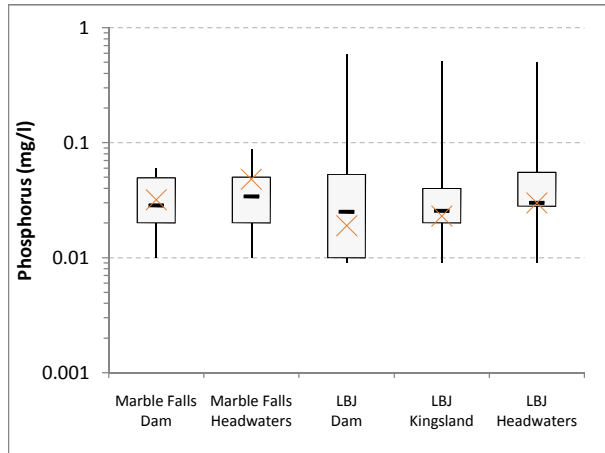
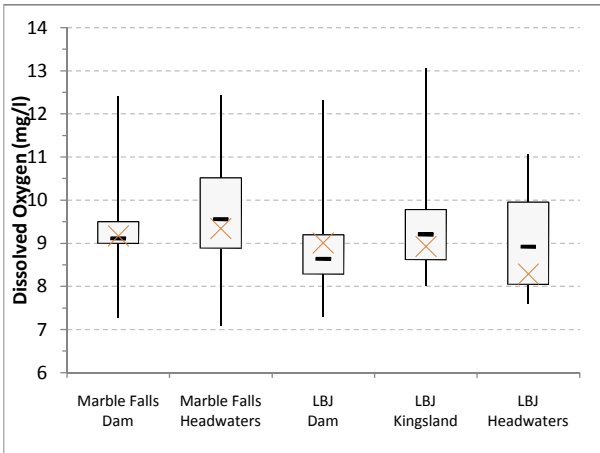
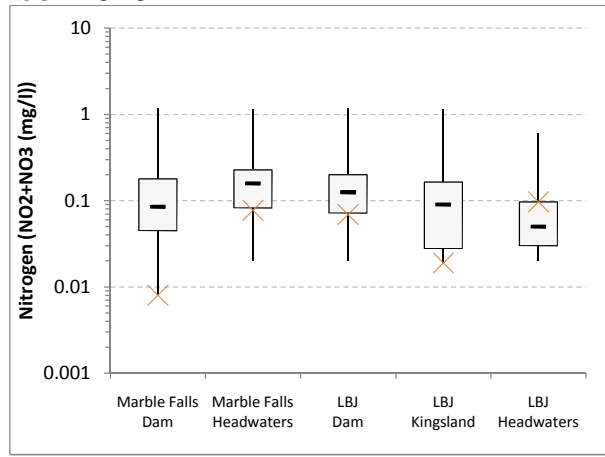
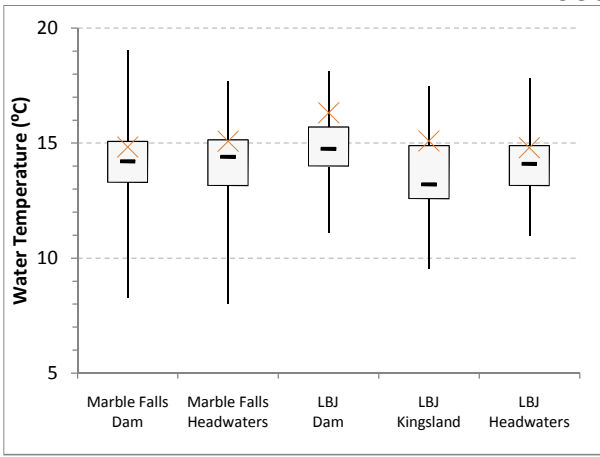
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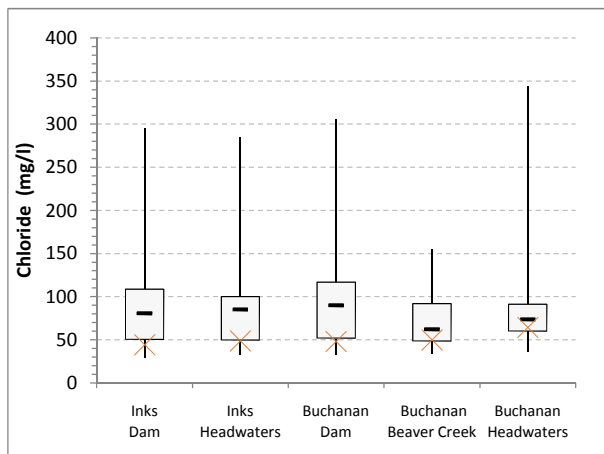
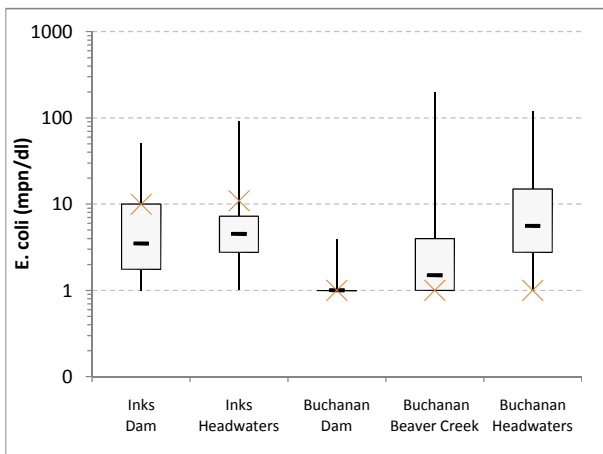
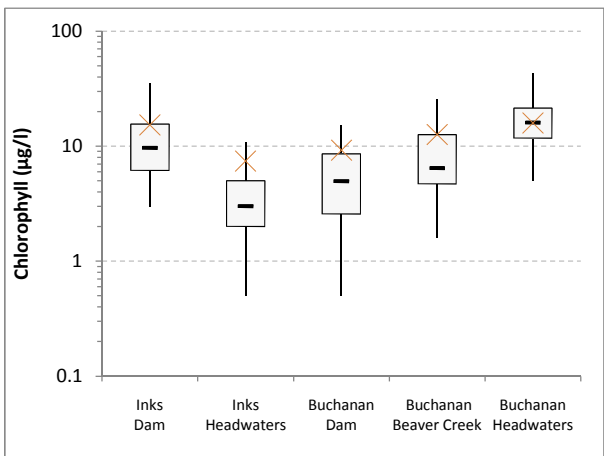
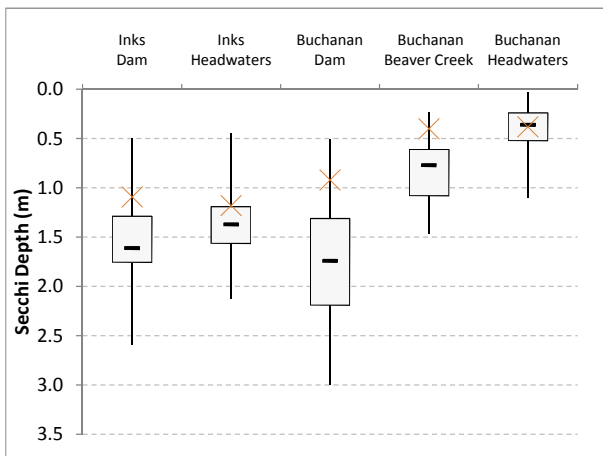
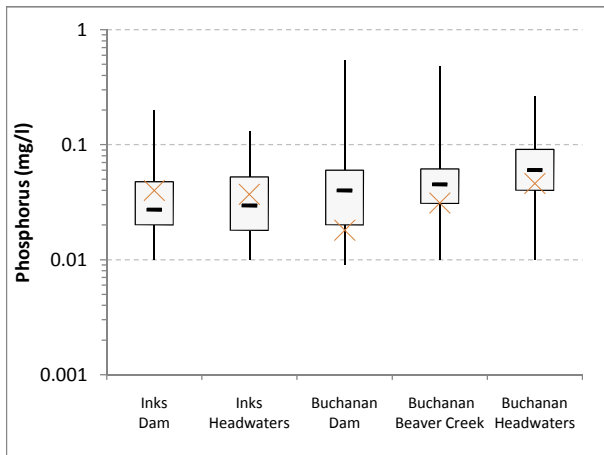
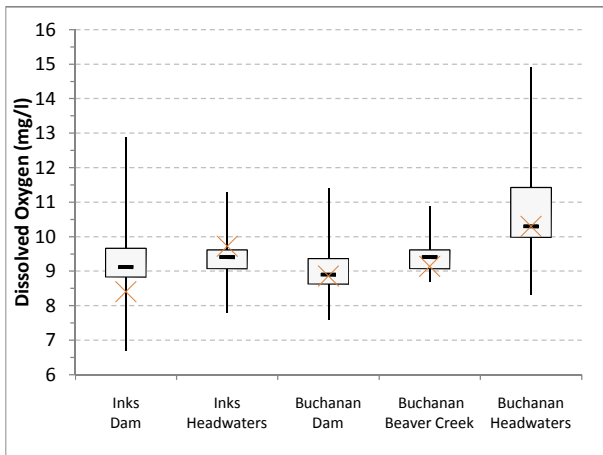
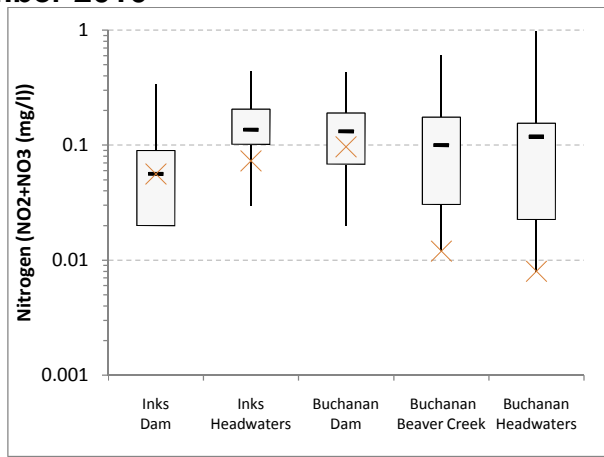
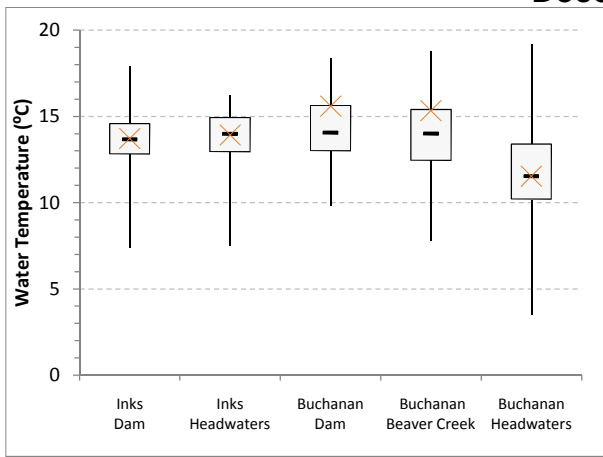
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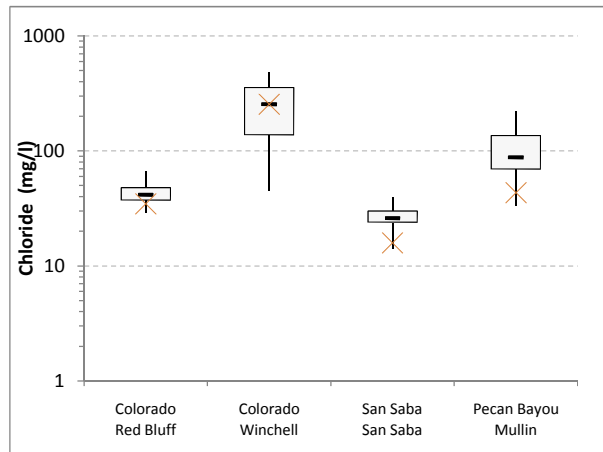
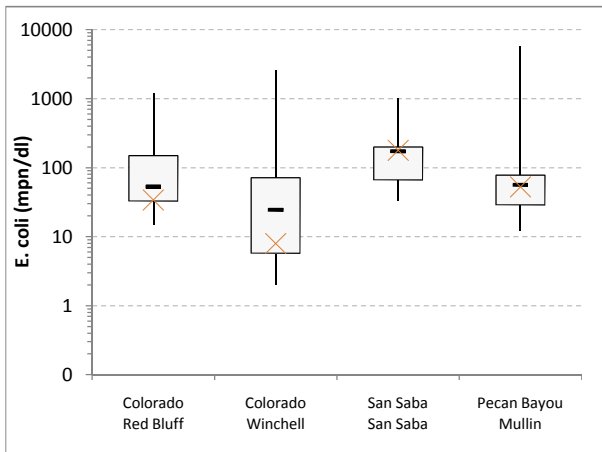
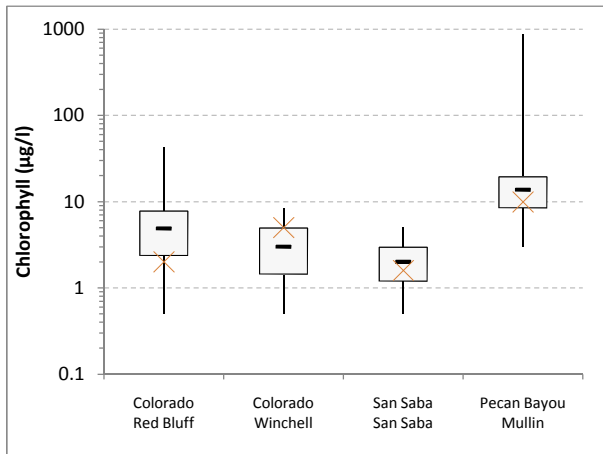
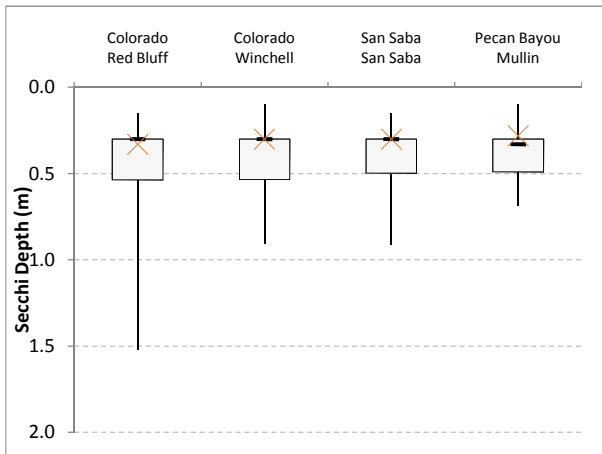
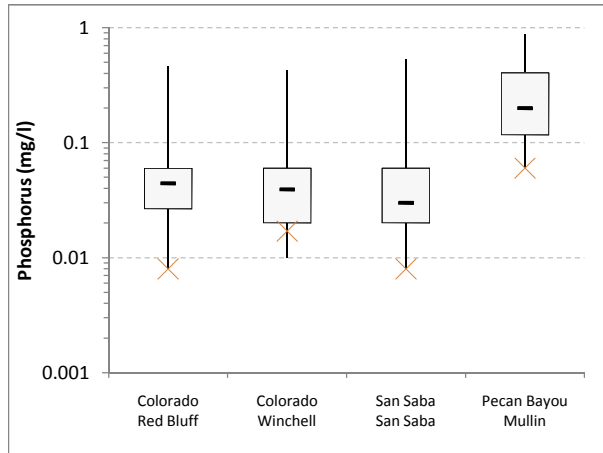
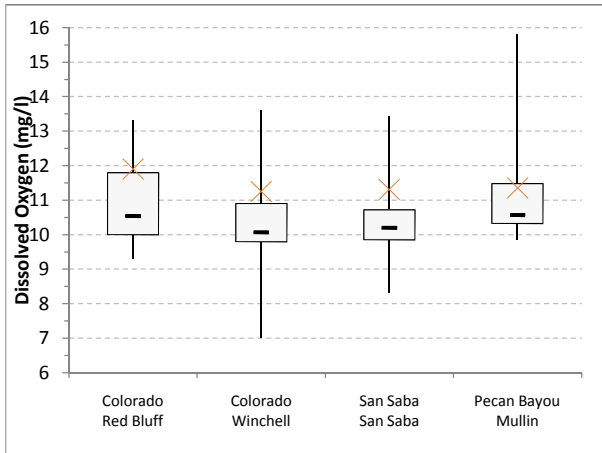
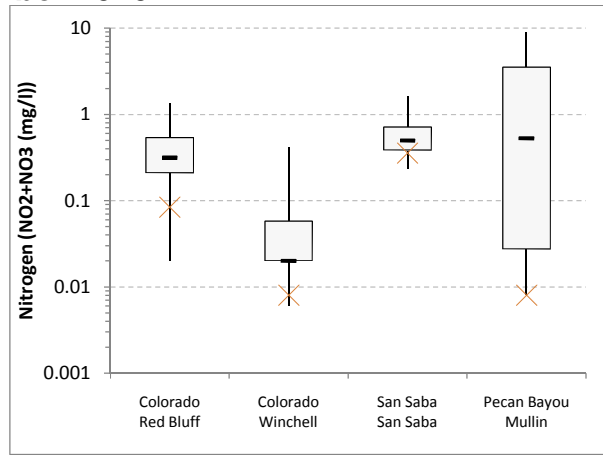
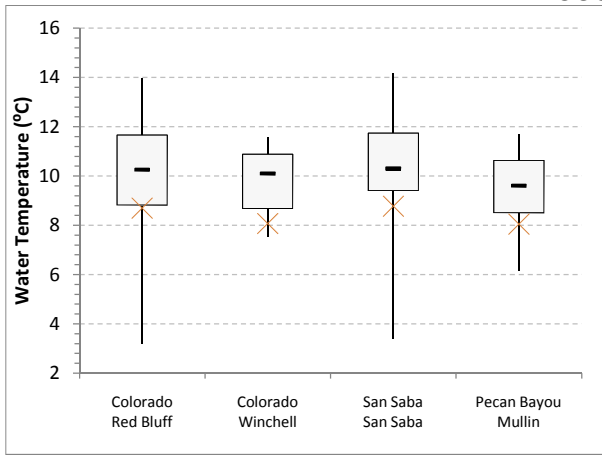
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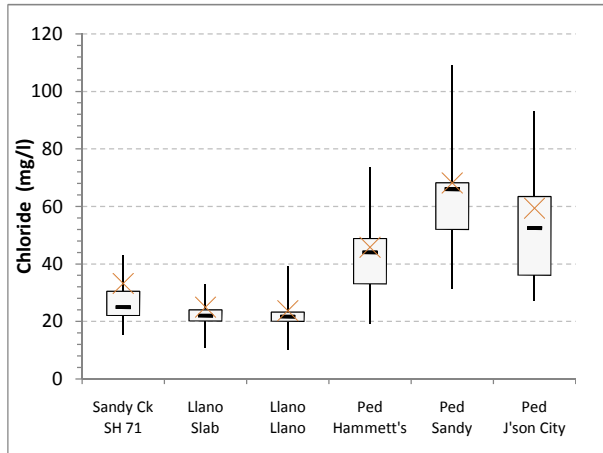
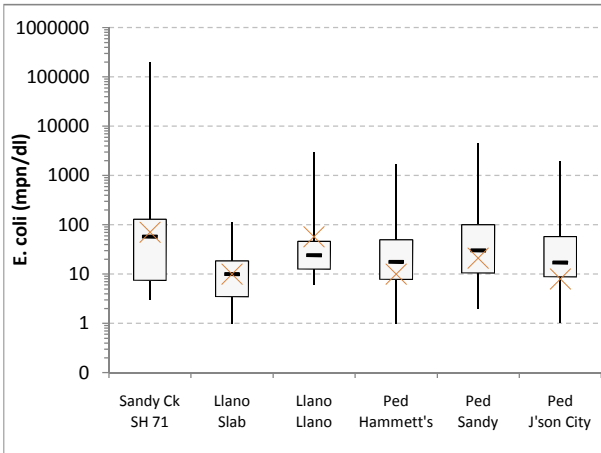
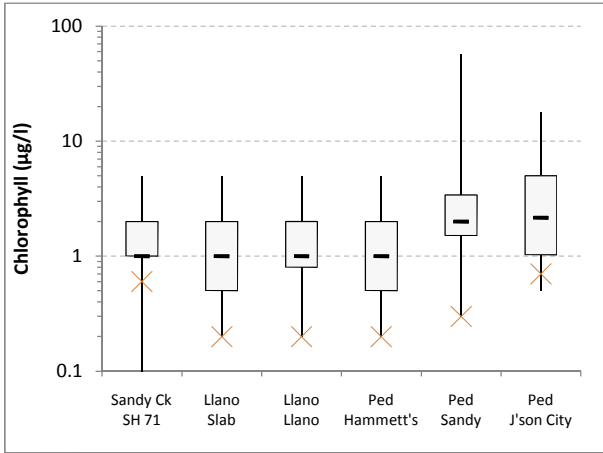
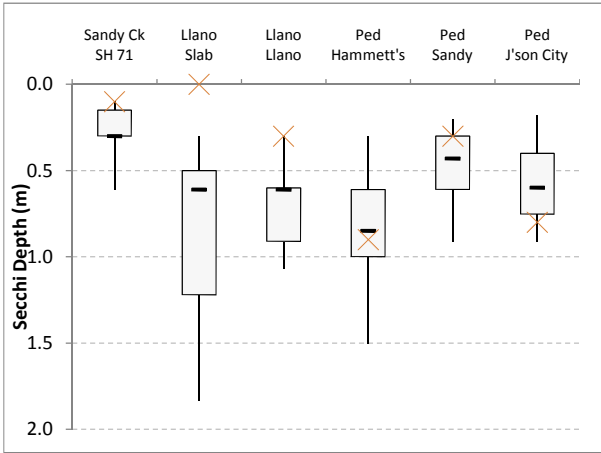
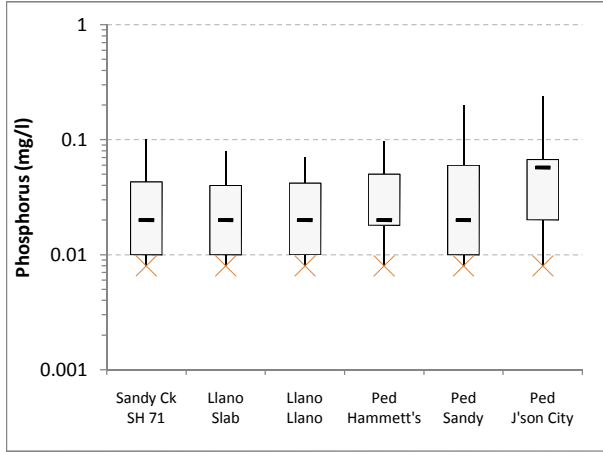
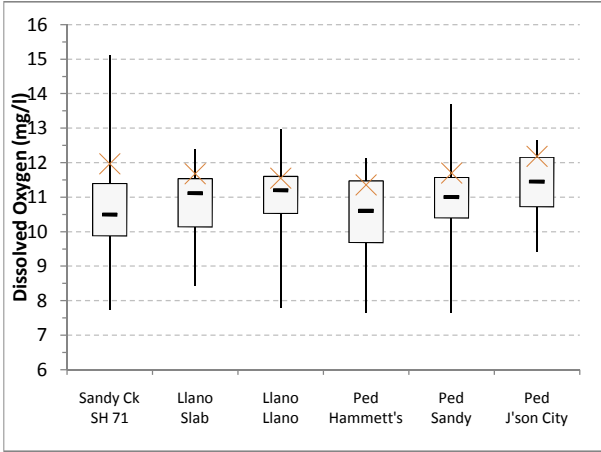
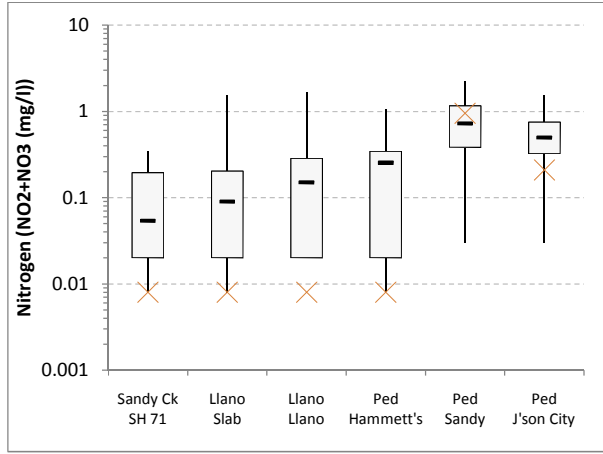
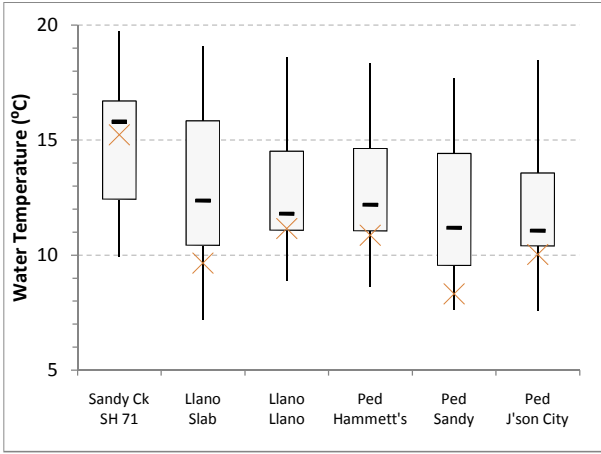
December 2010



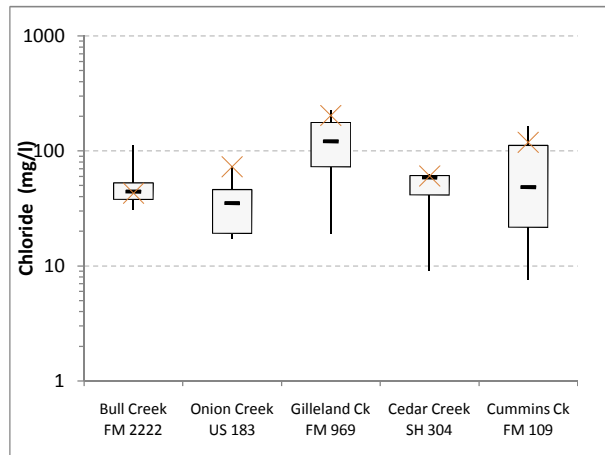
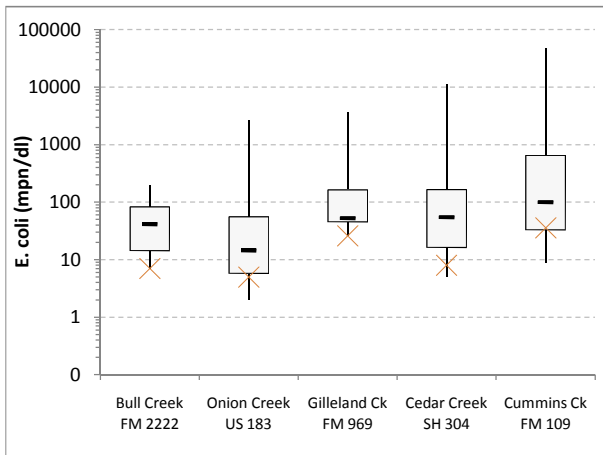
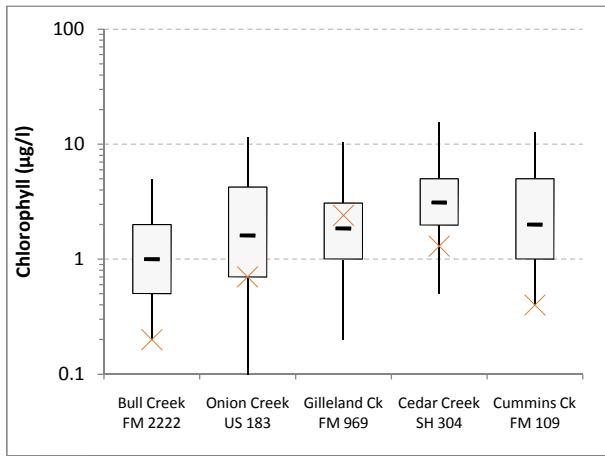
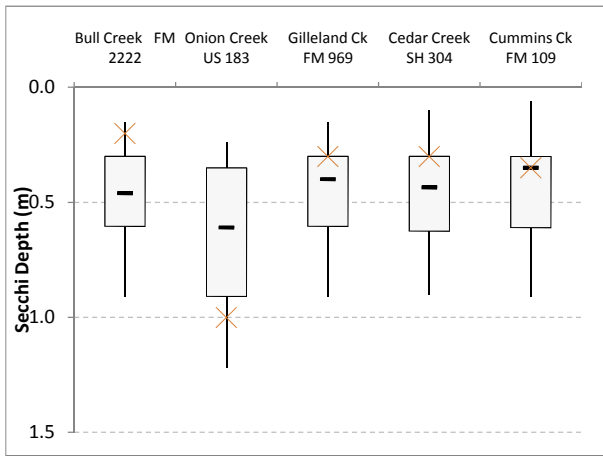
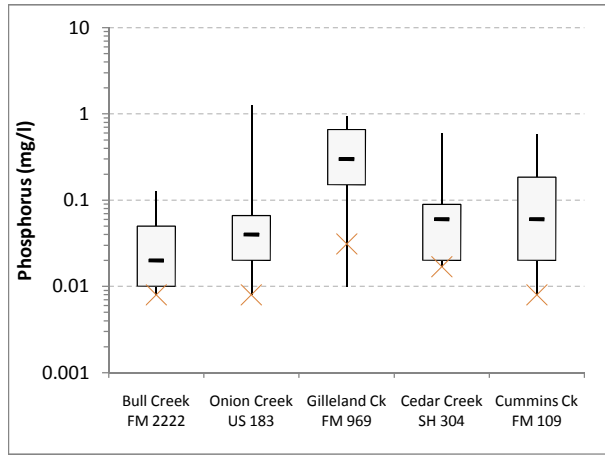
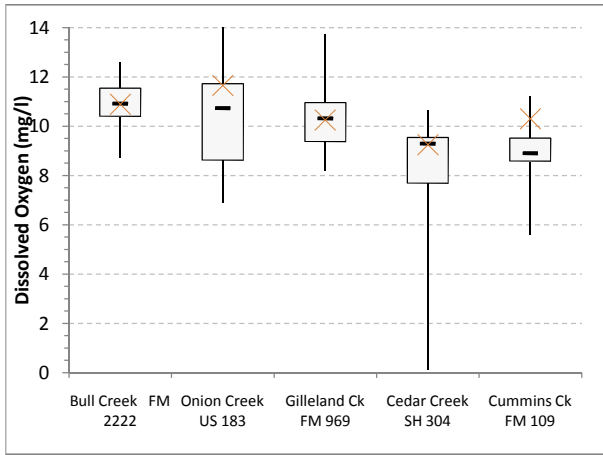
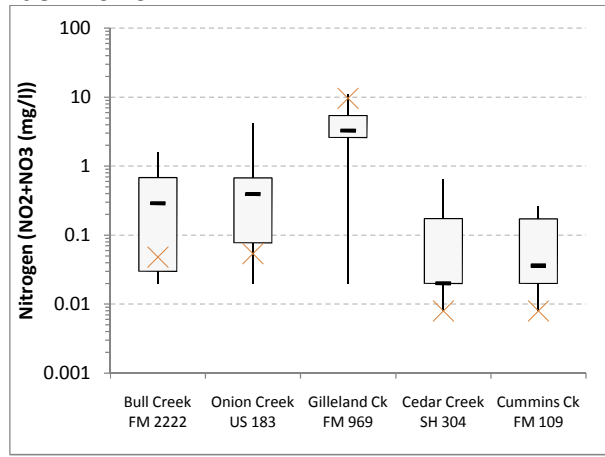
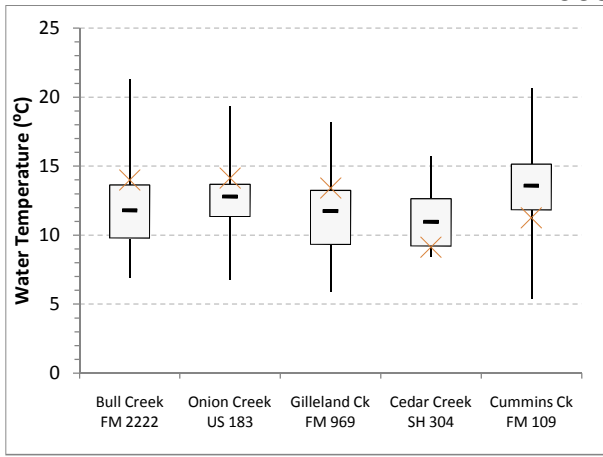
December 2010



December 2010



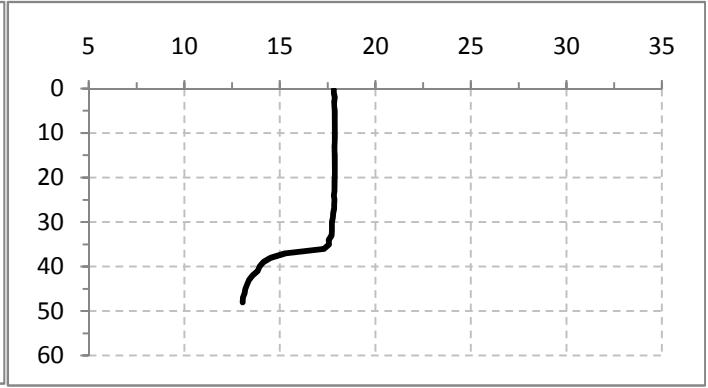
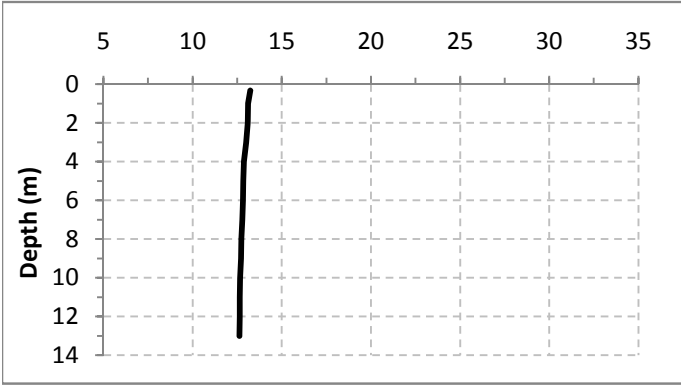
December 2010



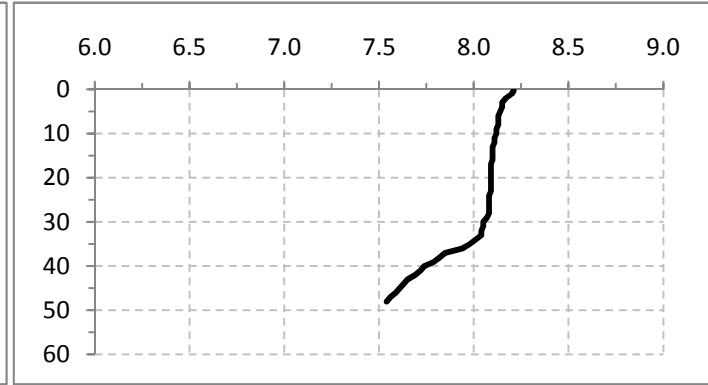
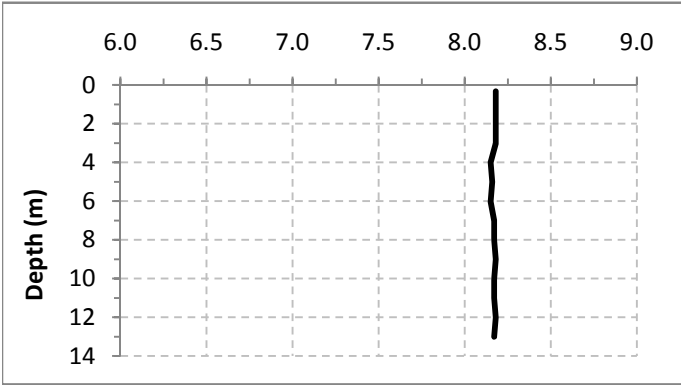
Lake Austin

Lake Travis

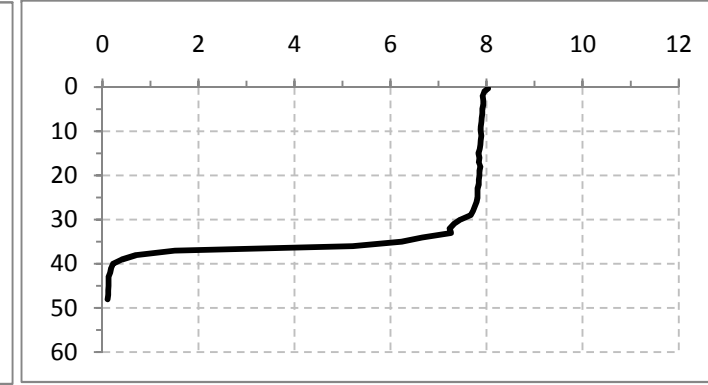
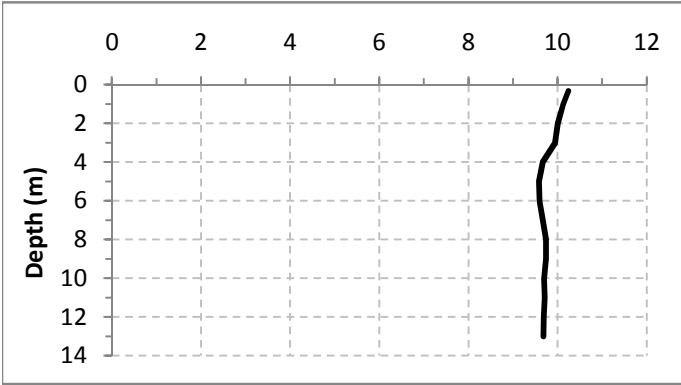
Water Temperature (°C)



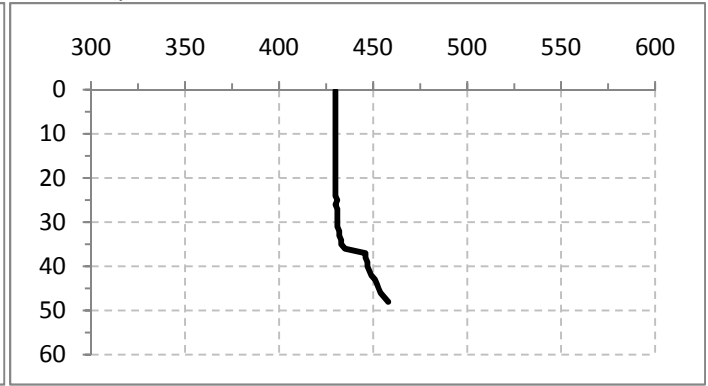
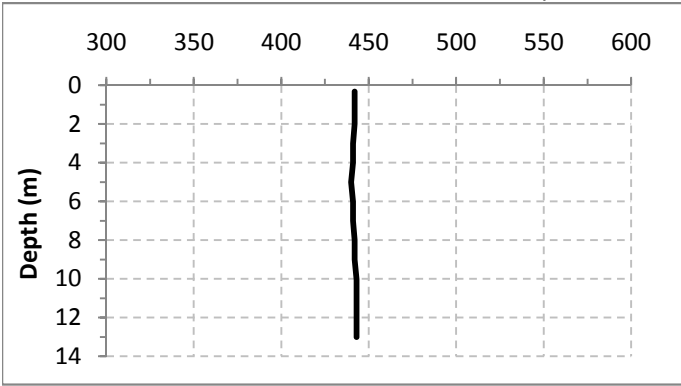
pH (Std Units)



Dissolved Oxygen (mg/L)



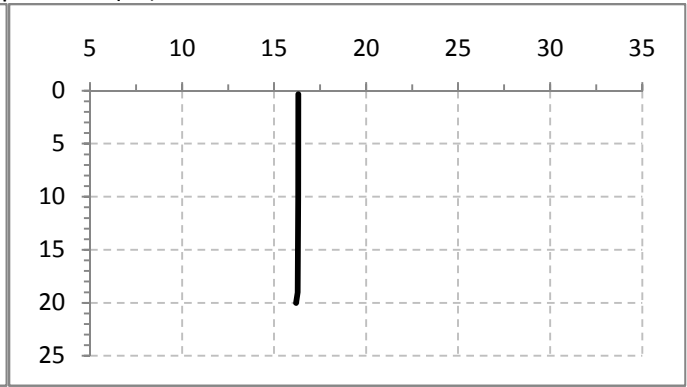
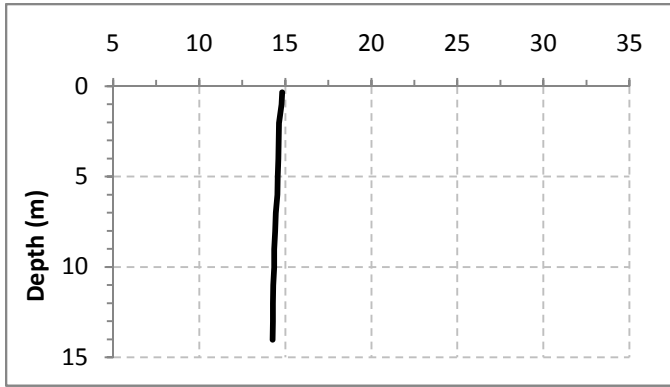
Specific Conductance (µS/cm)



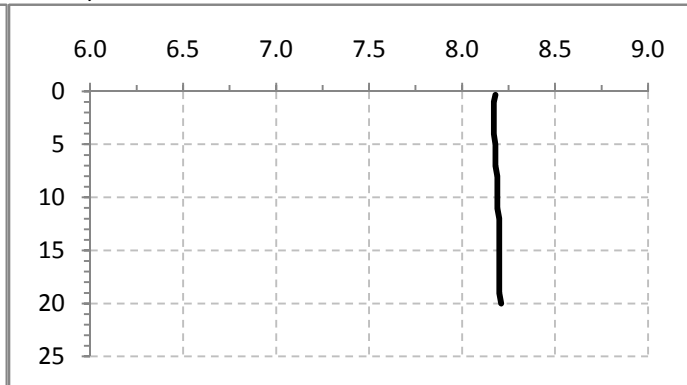
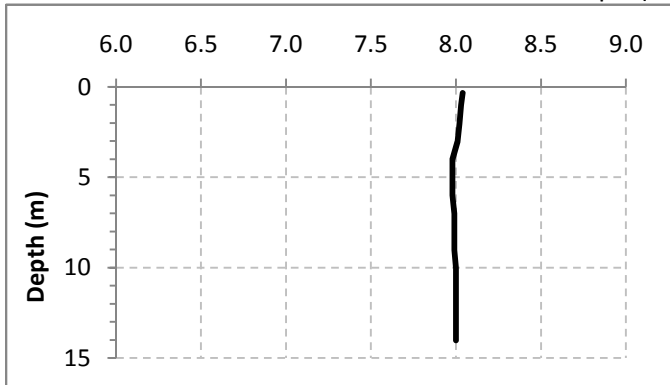
Lake Marble Falls

Lake LBJ

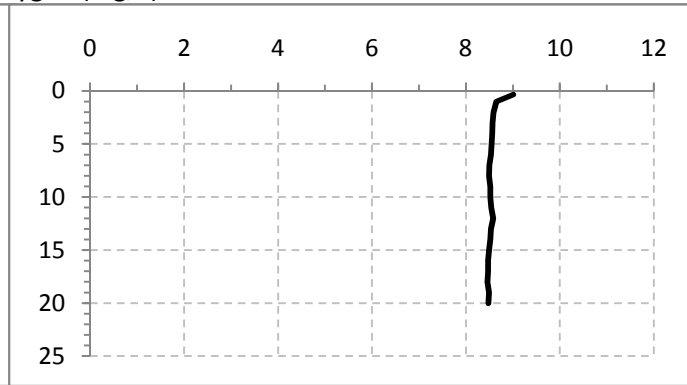
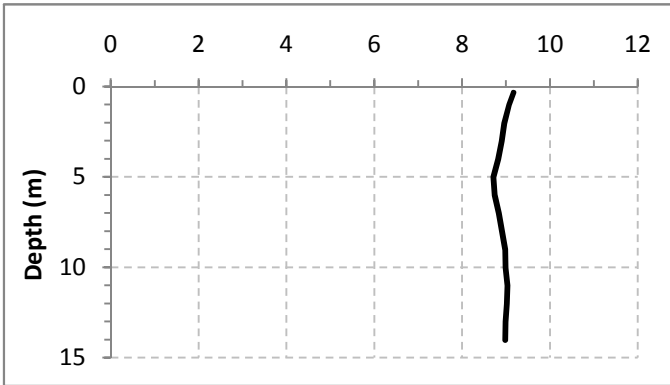
Water Temperature (°C)



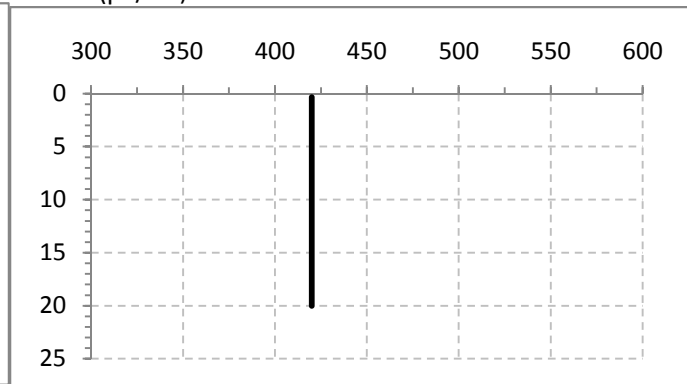
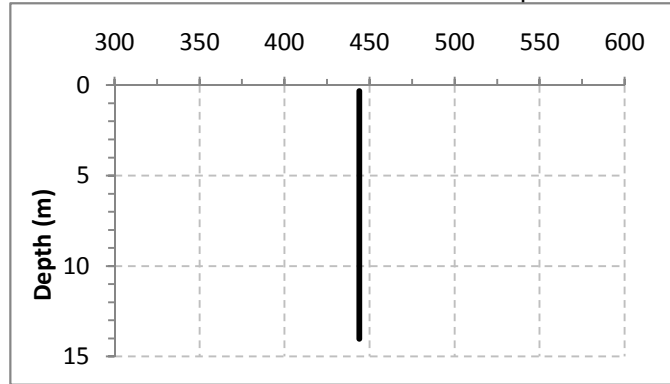
pH (Std Units)



Dissolved Oxygen (mg/L)



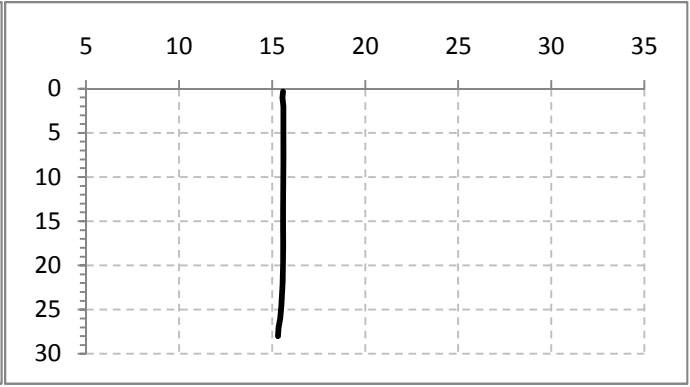
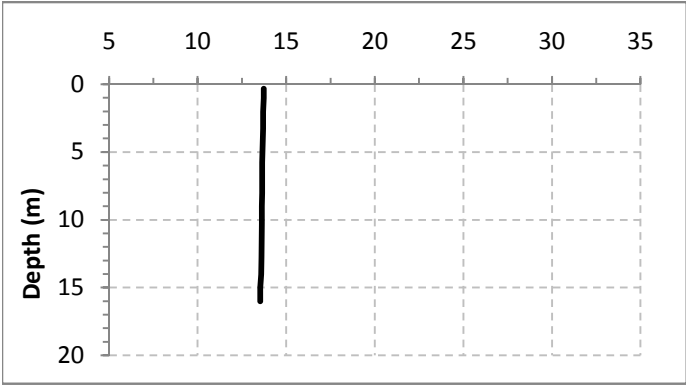
Specific Conductance (µS/cm)



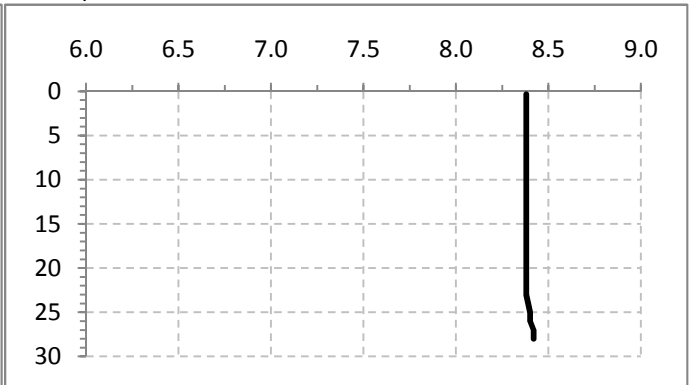
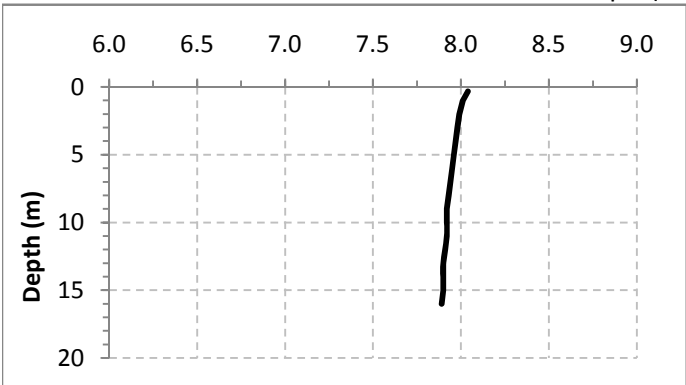
Inks Lake

Lake Buchanan

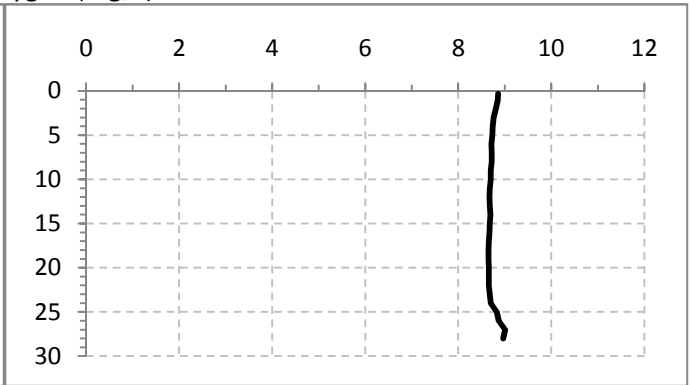
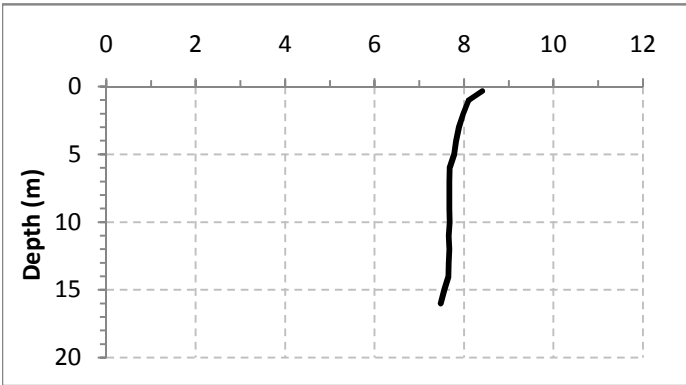
Water Temperature (°C)



pH (Std Units)



Dissolved Oxygen (mg/L)



Specific Conductance (µS/cm)

