

Arroyo Colorado
Flow-Nutrient Relationships by
Season

Metadata

- Period of record for Port of Harlingen water quality data: 1977 to 2010.
- Flow gauge data for Arroyo Colorado at Harlingen
- Plotted instantaneous parameter values against 5-day flow average
 - 5-day average flow gave slightly higher r^2 value than daily and 3-day average flow values for nitrate ($r^2_{\text{NO}_3} = .0038$)

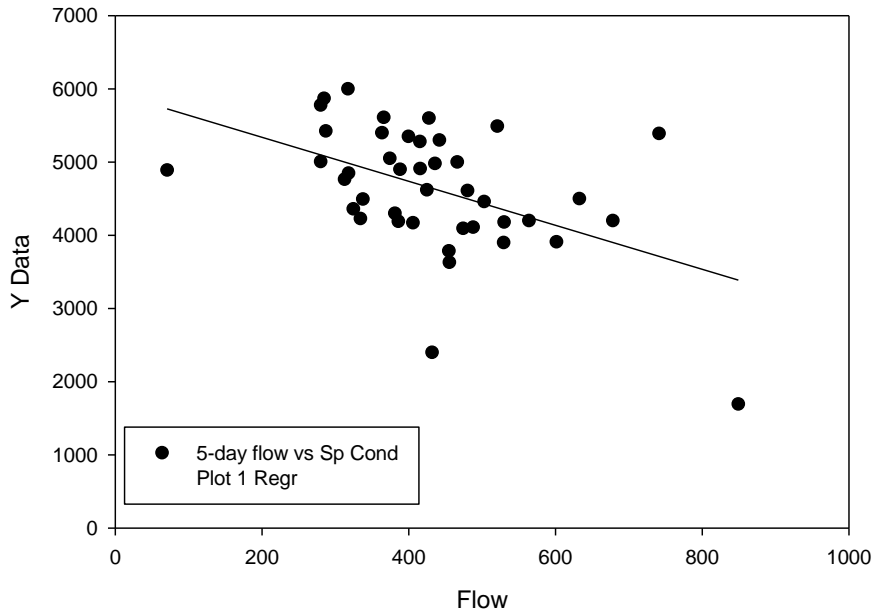
	Column	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
Winter	Total NH4	46	7	0.711	0.463	0.0741	0.150
	Total NO3	46	26	3.154	1.926	0.431	0.901
	Total Kjehl	46	26	1.460	0.371	0.0829	0.174
	Total PO4	46	35	2.521	1.177	0.355	0.791
	Ortho PO4	46	37	1.988	0.585	0.195	0.450
	Chl a	46	12	26.679	15.811	2.711	5.517
	Sp Cond	46	4	4639.738	851.375	131.370	265.307
	5-day flow	46	0	431.935	131.013	19.317	38.906

	Column	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
Spring	Total NH4	55	9	0.391	0.273	0.0402	0.0810
	Total NO3	55	34	2.901	0.913	0.199	0.416
	Total Kjehl	55	24	1.586	0.520	0.0933	0.191
	Total PO4	55	48	2.351	0.449	0.170	0.415
	O PO4	55	48	1.299	0.467	0.177	0.432
	Chl a	55	16	34.870	25.320	4.054	8.208
	Sp Cond	55	2	4190.377	918.312	126.140	253.118
	5day flow	55	0	568.625	481.066	64.867	130.050

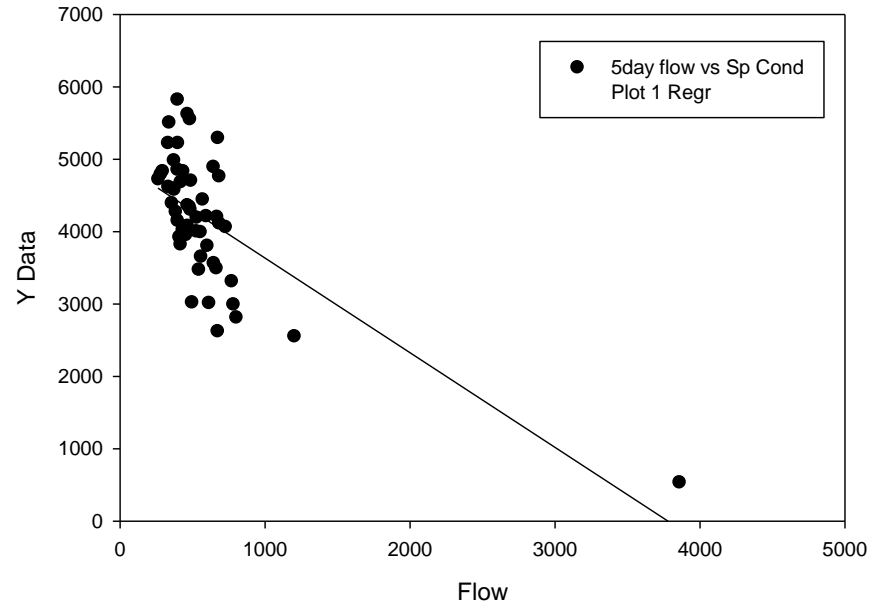
	Column	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
Summer	Tot NH4	59	13	0.713	2.539	0.374	0.754
	Tot NO3	59	37	2.034	0.937	0.200	0.415
	Tot Kjehl	59	30	1.584	0.475	0.0882	0.181
	Tot PO4	59	49	1.708	0.270	0.0854	0.193
	O PO4	59	49	1.014	0.312	0.0986	0.223
	Chl a	59	22	36.219	18.888	3.105	6.298
	Sp Cond	59	2	4511.632	2102.529	278.487	557.876
	5 day flow	59	0	448.861	144.724	18.841	37.715

	Column	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
Fall	Tot NH4	35	5	0.413	0.234	0.0428	0.0875
	Tot NO3	35	22	2.462	0.955	0.265	0.577
	Tot Kjehl	35	17	1.434	0.319	0.0753	0.159
	Tot PO4	35	27	2.840	2.404	0.850	2.009
	O PO4	35	27	1.311	0.341	0.120	0.285
	Chl a	35	9	37.602	25.307	4.963	10.222
	Sp Cond	35	2	4442.455	1462.546	254.597	518.596
	5 day flow	35	0	543.509	330.863	55.926	113.655

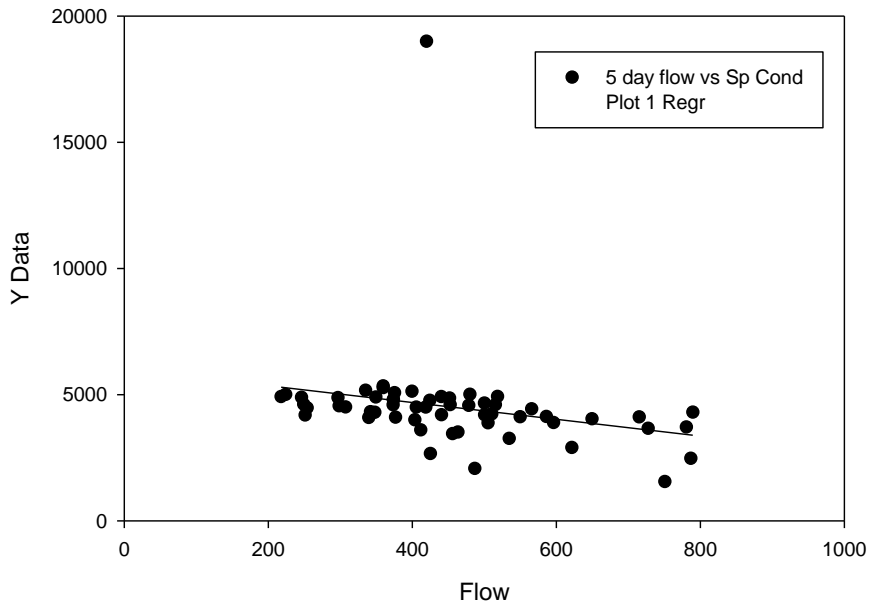
Winter (Dec-Feb)



Spring (Mar-May)

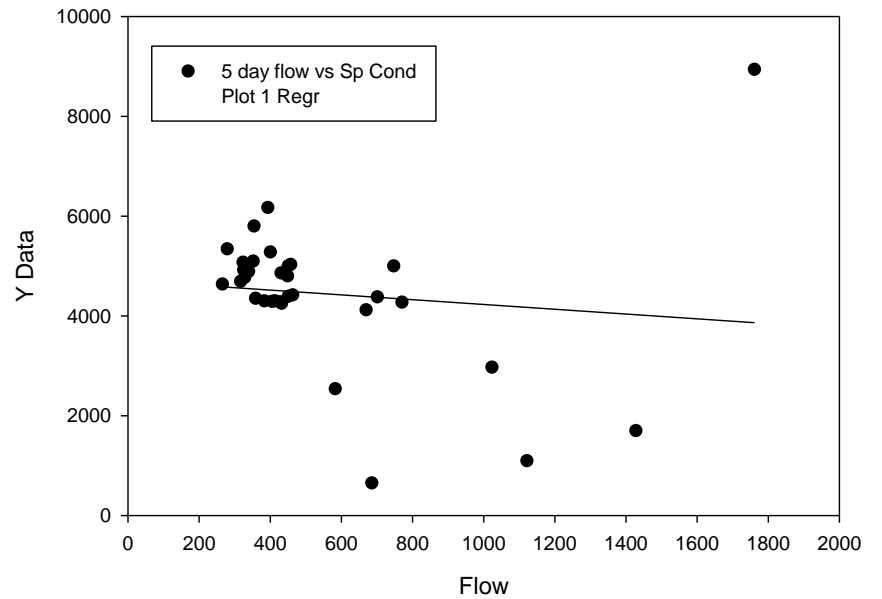


Summer

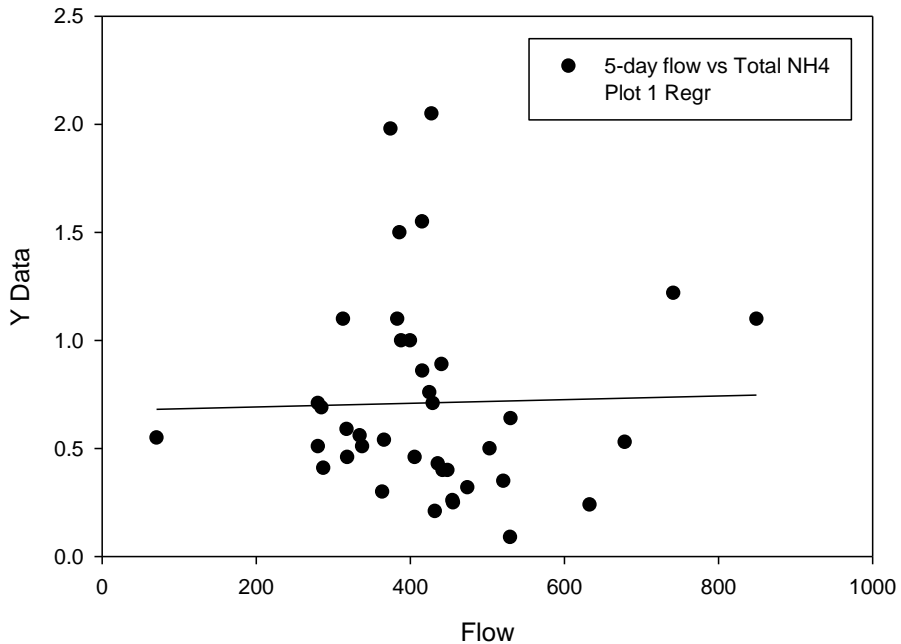


Specific conductivity

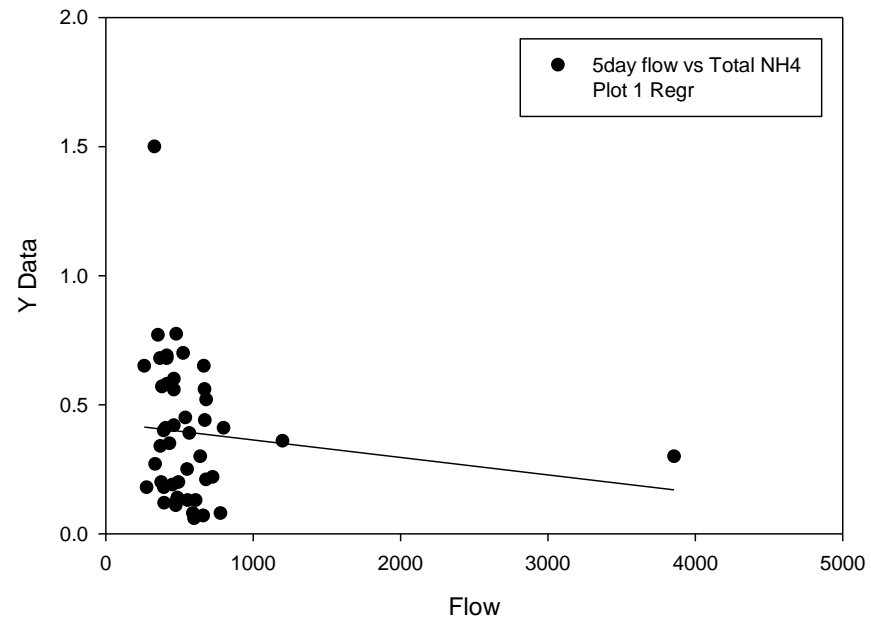
Fall (Sept-Nov)



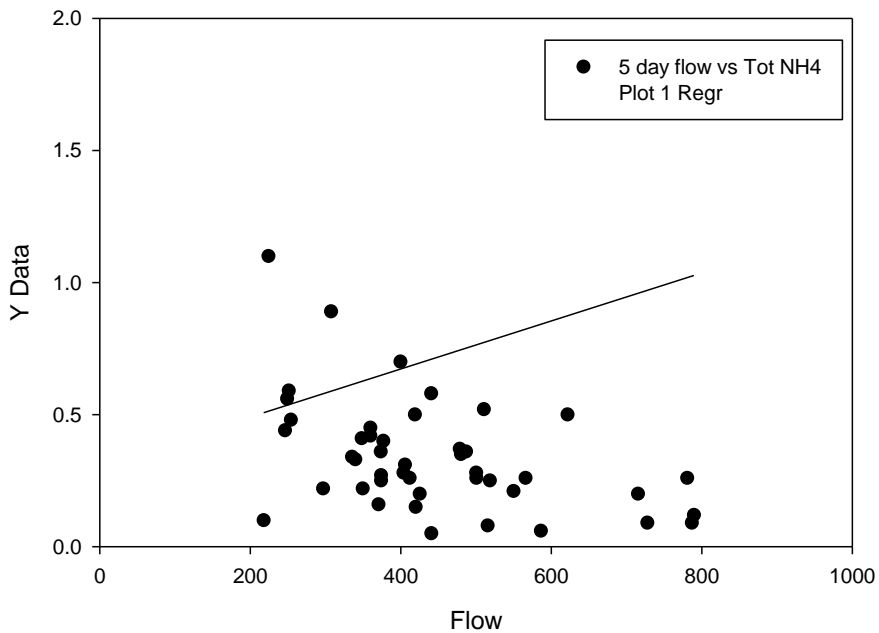
Winter



Spring

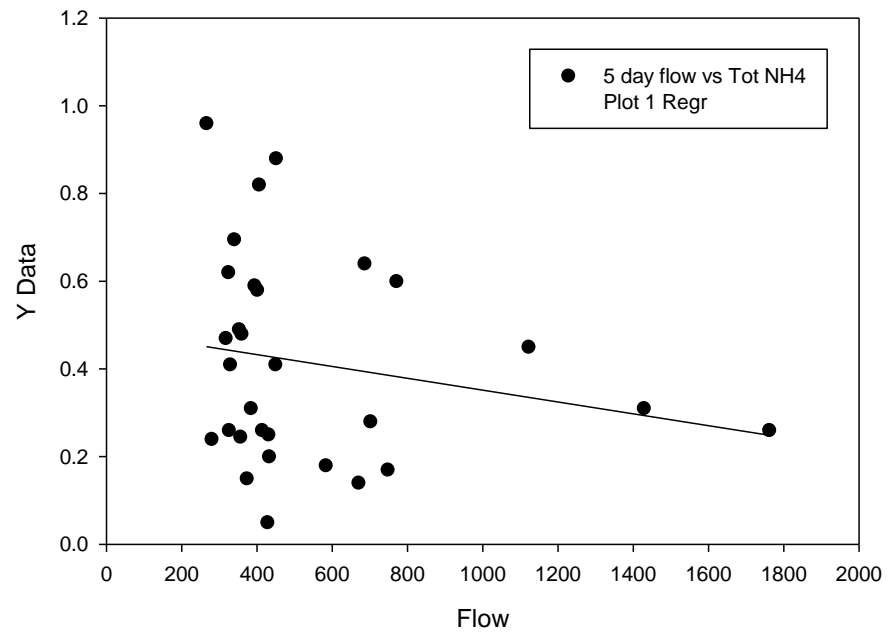


Summer

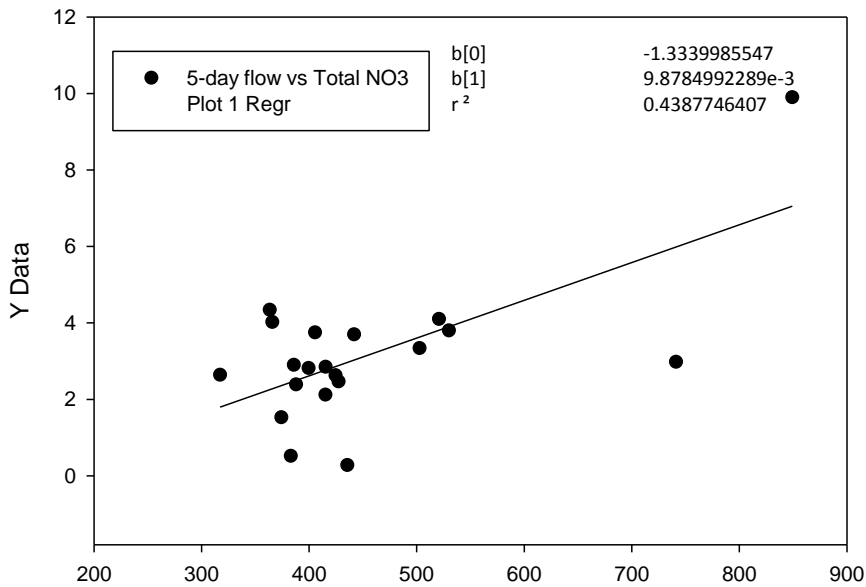


Total Ammonia

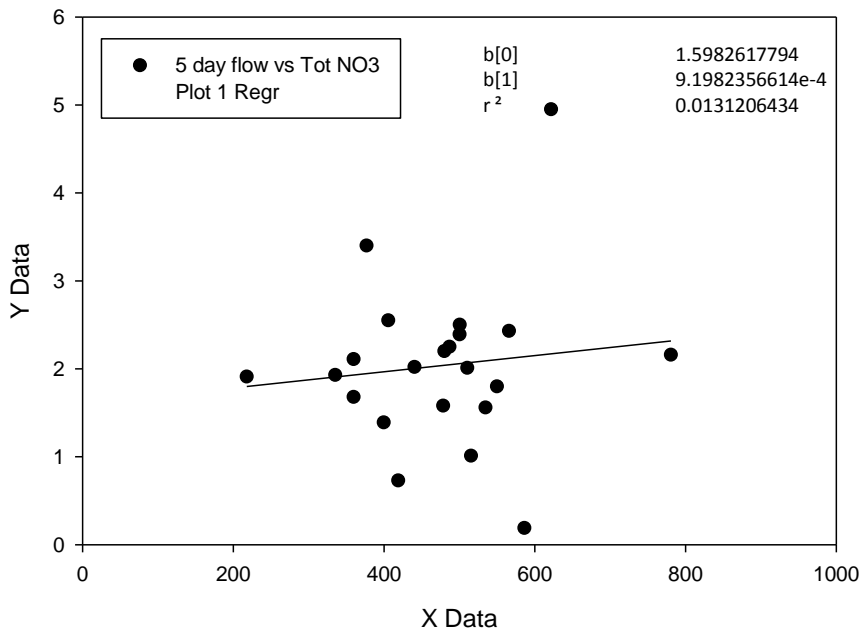
Fall



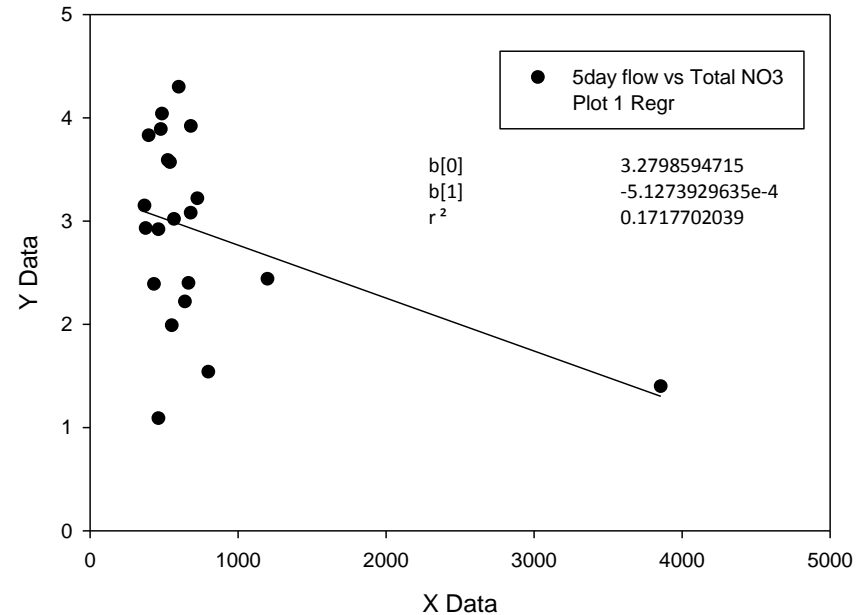
Winter



Summer

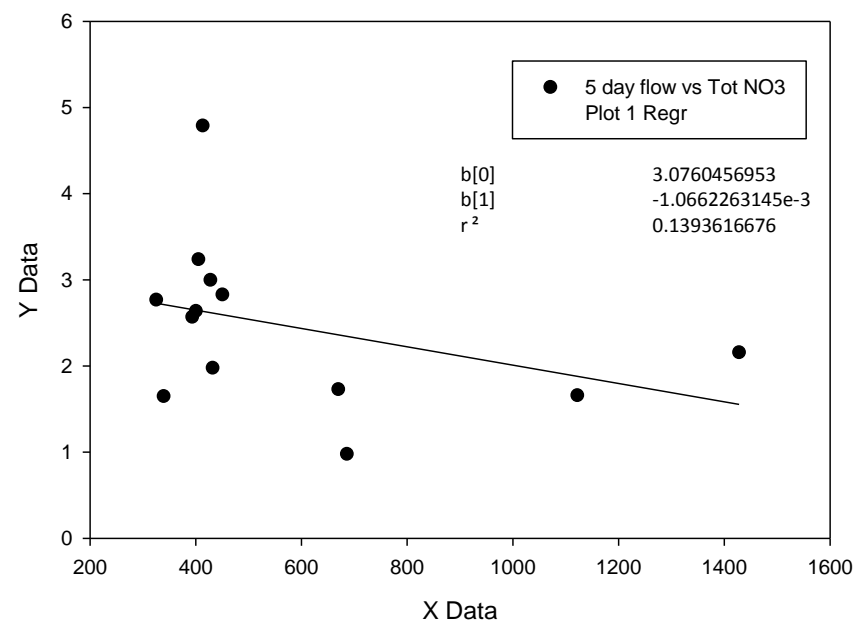


Spring

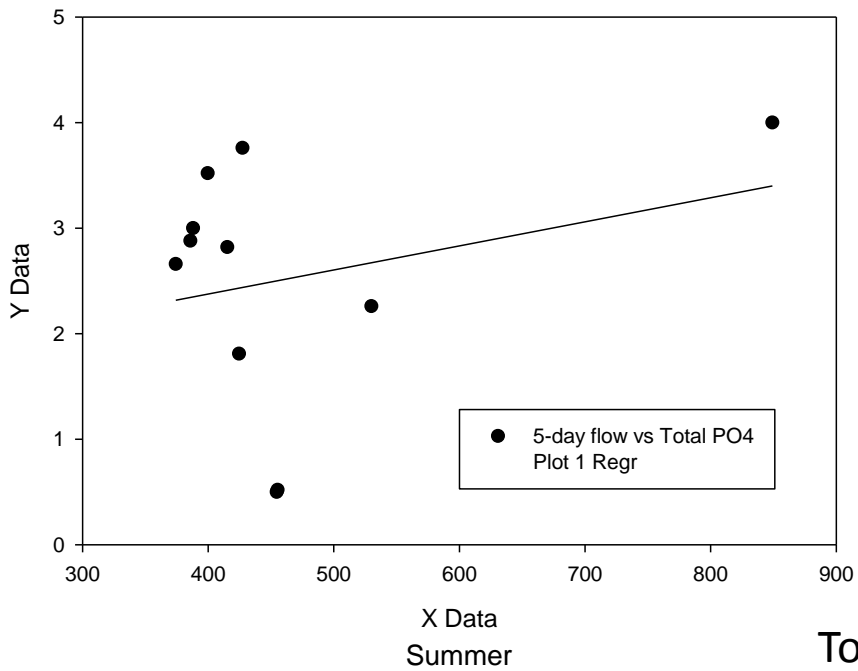


Fall

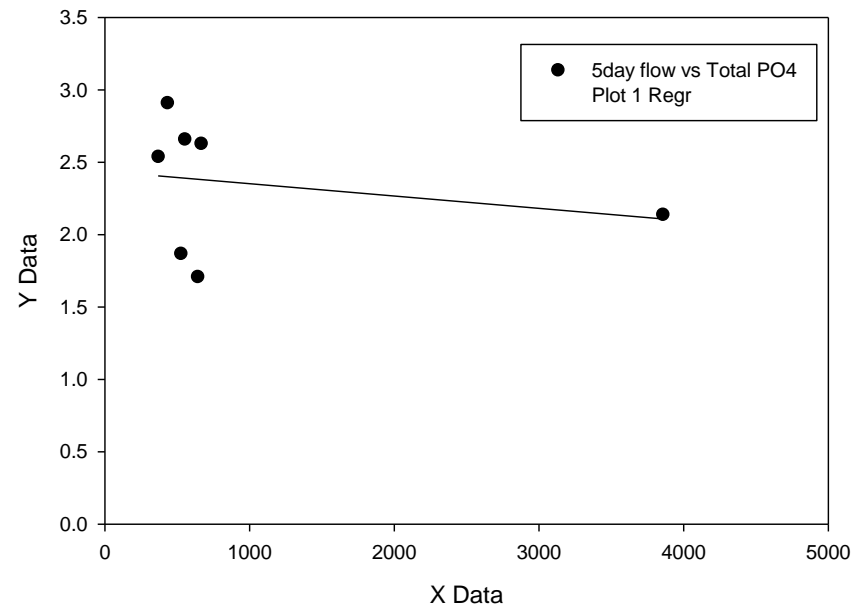
Total Nitrate



Winter

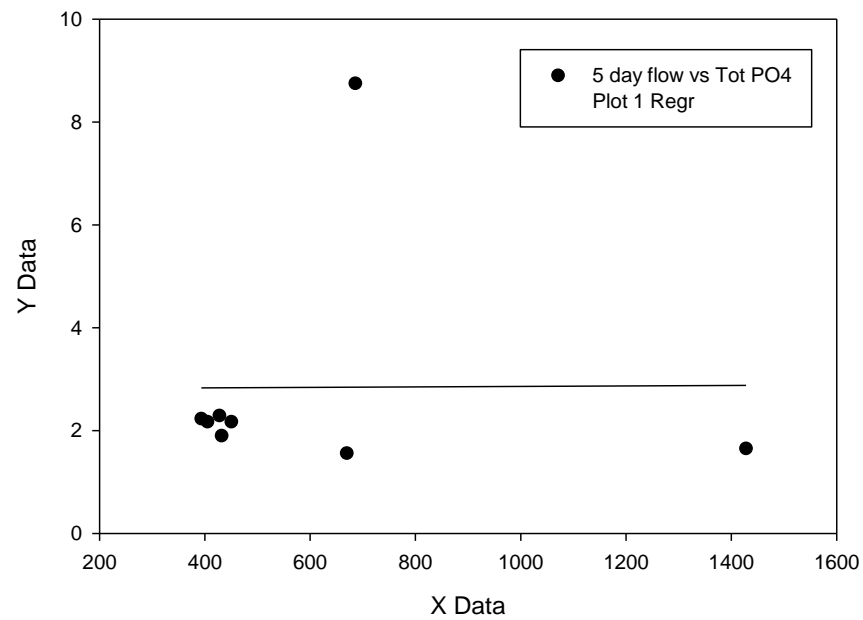
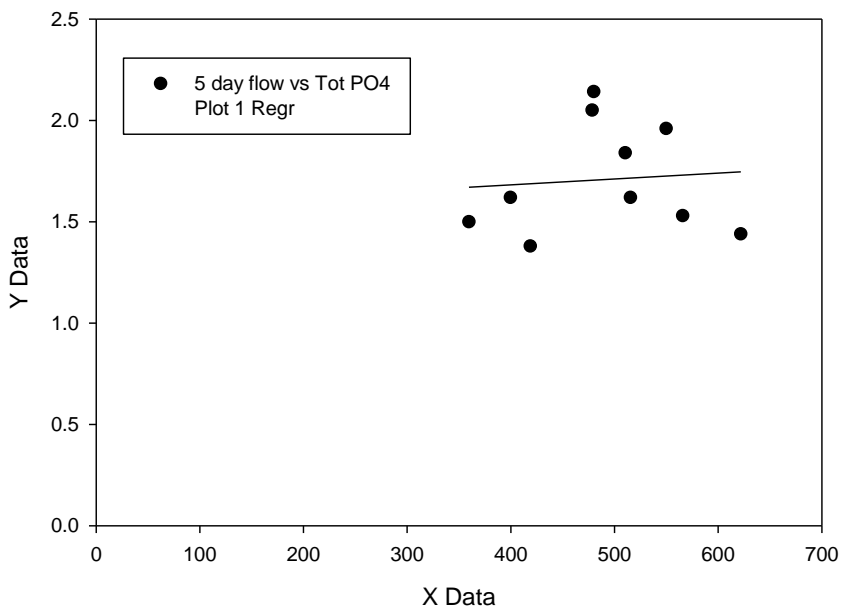


Spring

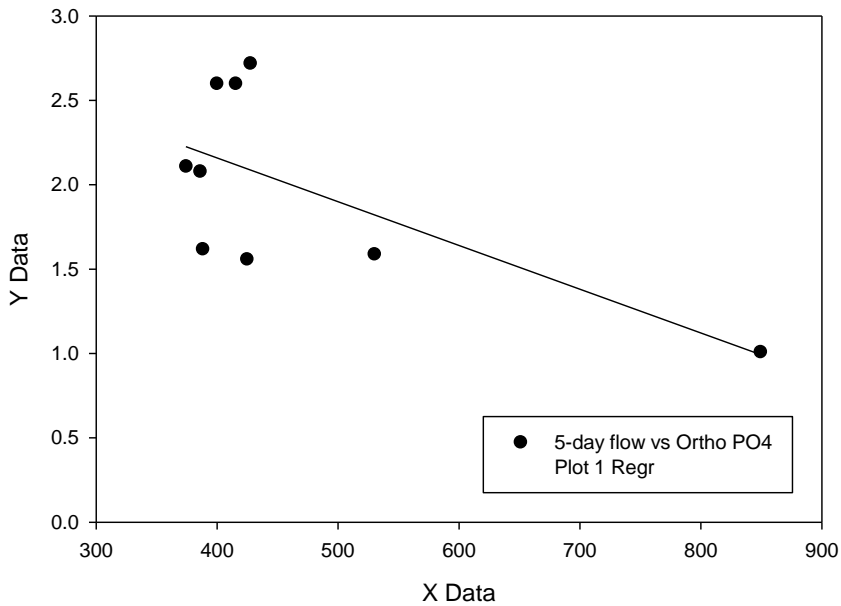


Total Phosphate

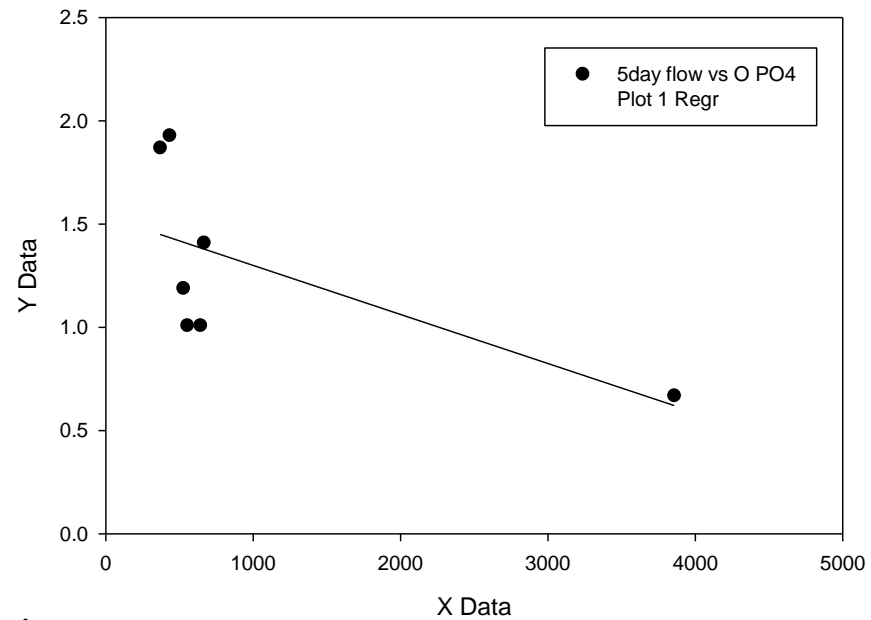
Fall



Winter

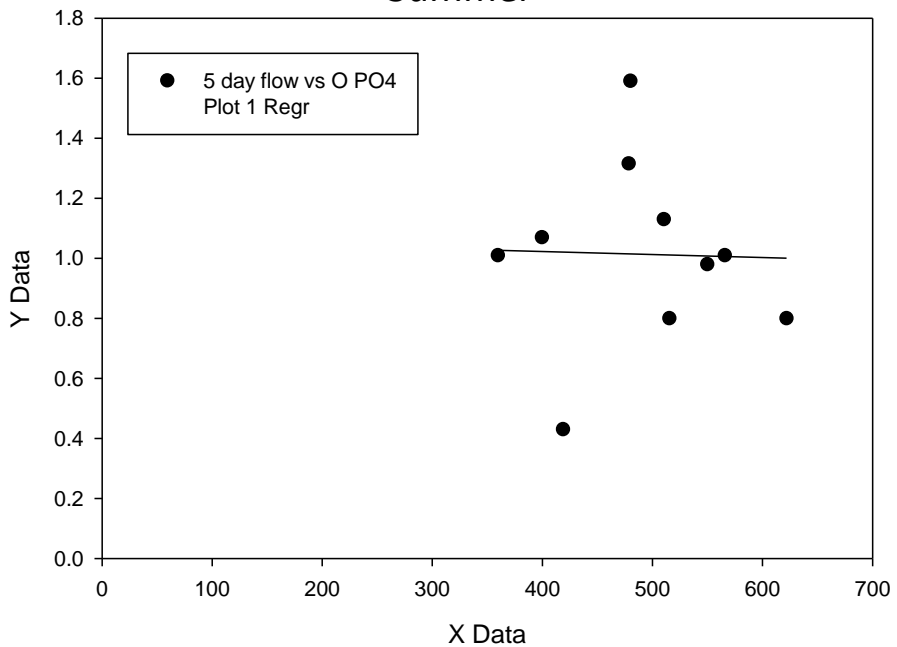


Spring

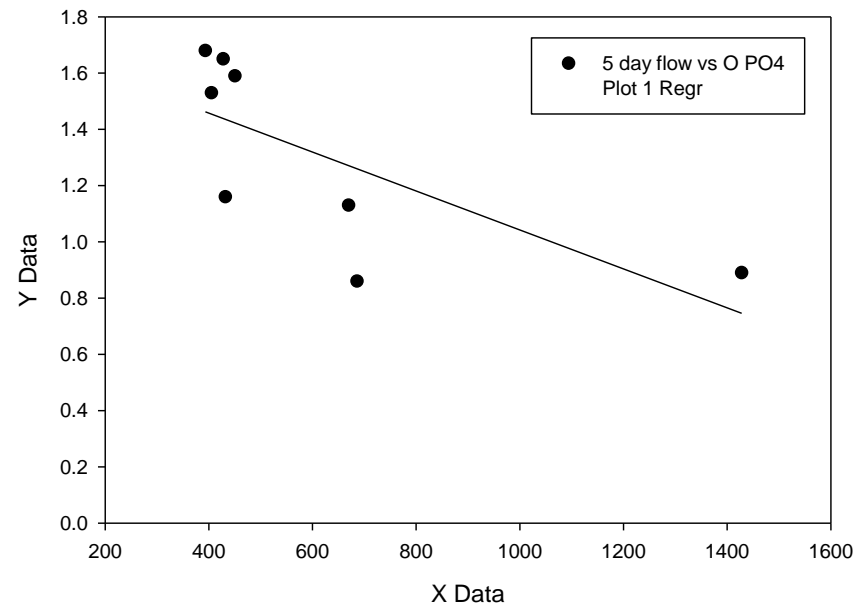


Orthophosphate

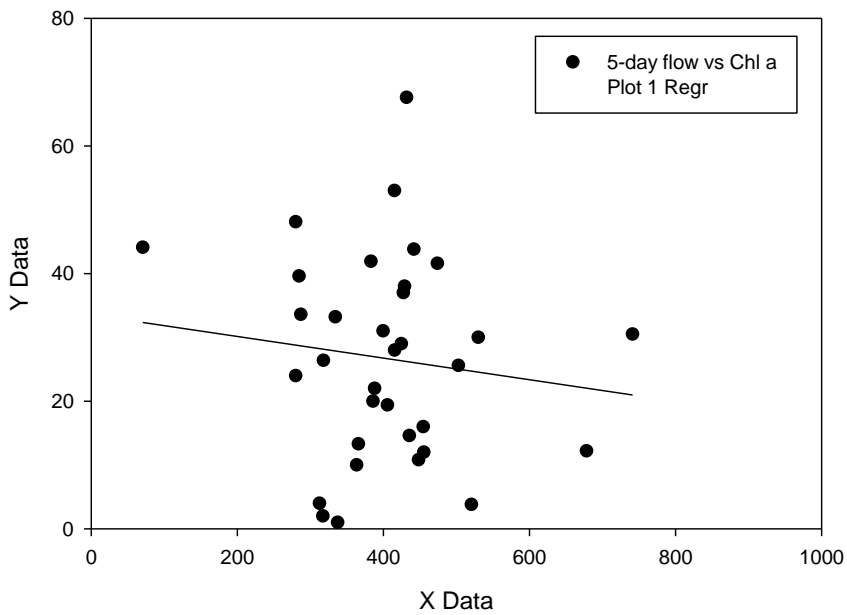
Summer



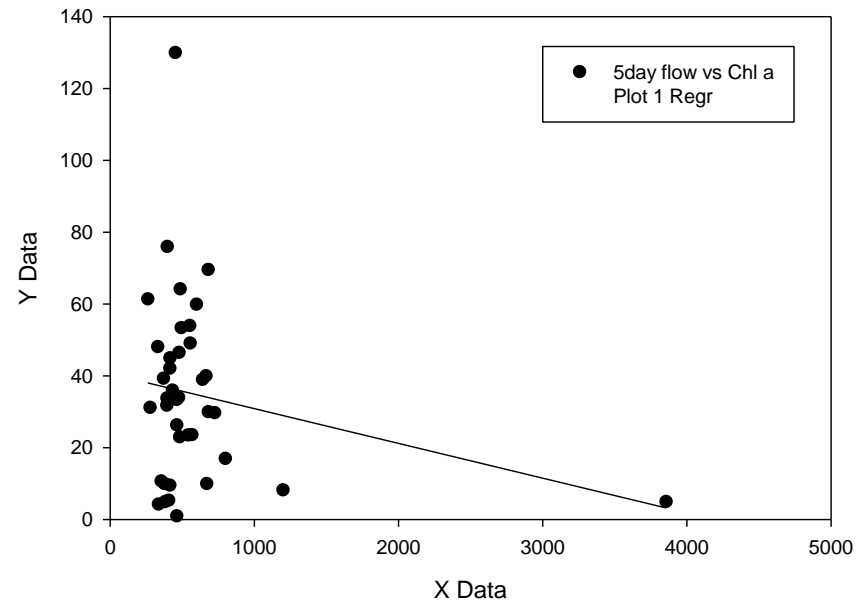
Fall



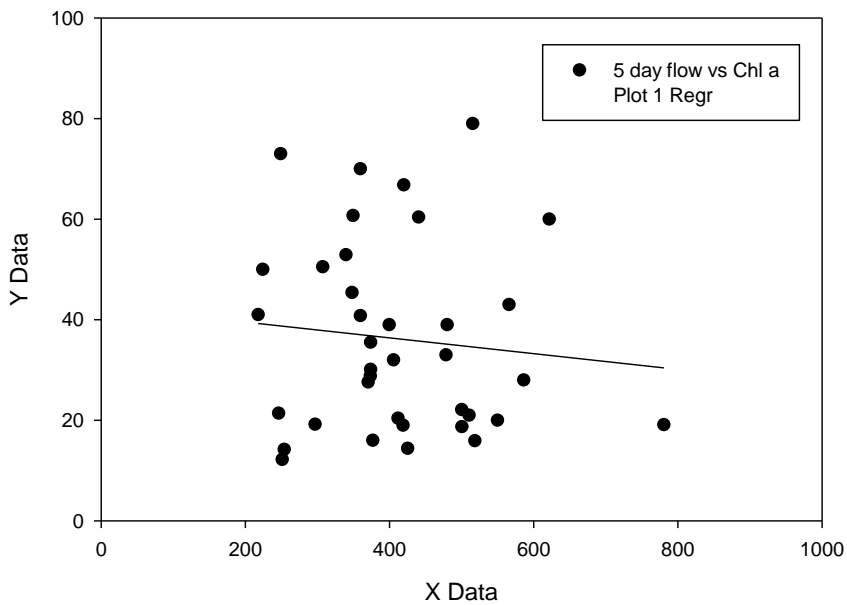
Winter



Spring

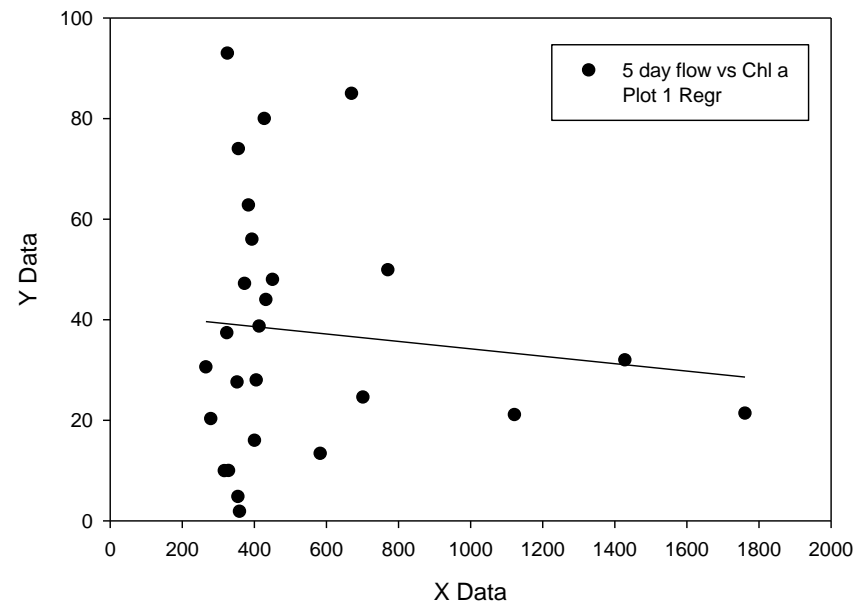


Summer



Chlorophyll

Fall



Seasonal N and P loading rates

1 acft/day=
1233.4818
m3/day=1233
481.8 L/day

	Avg	Avg	Avg	Avg	Avg	Avg	Avg
	5-day flow	5-day flow	Tot NO3	Tot NH4	DIN	DIN Load	DIN Load
	acft/day	L/day	mg N/L	mg N/L	mg N/L	mg N/day	kg/day
Winter	431.935	532783961	3.154	0.0711	3.2251	1718281554	1718.282
Spring	568.625	701388589	2.901	0.391	3.292	2308971233	2308.971
Summer	448.861	553661874	2.034	0.713	2.747	1520909169	1520.909
Fall	543.509	670408460	2.462	0.413	2.875	1927424321	1927.424
	Avg	Avg	Avg	Avg	Avg	Avg	Avg
	5-day flow	5-day flow	O-PO4	O-PO4	P load	P load	N/P ratio
	acft/day	L/day	mg PO4/L	mg P/L	mg P/day	kg/day	load
Winter	431.935	532783961	1.988	0.648088	345290892	345.2908919	11.37447
Spring	568.625	701388589	1.299	0.423474	297019831	297.0198311	17.76867
Summer	448.861	553661874	1.014	0.330564	183020684	183.0206838	18.99437
Fall	543.509	670408460	1.311	0.427386	286523190	286.5231899	15.37586