

Spy Lake

Location

Pond Number: 050232

Watershed: Upper Hudson River

County: Hamilton

Topographic Quadrangle: Piseco Lake

Sample Site

Latitude: 43° 23.910'

Longitude: 74° 30.728'

Morphometry

Surface Area: 374 Ac.

Mean Depth: 17 Ft.

Maximum Depth: 30 Ft.

Volume: 6,358 Ac./Ft.

Watershed Area: 2,234 Ac.

Hydraulic Retention Time: 1.0 Yr.

Shoreline Length: 4.6 Mi.

Elevation: 1,657 Ft.

Water Quality Classification: C

Trophic State: Mesotrophic



Temperature and Dissolved Oxygen

Spy Lake had a minimum DO of 0.1 mg/L (August 2003), with a minimum temperature of 7.5°C and a maximum temperature of 25.3°C. In general, the lowest DO values occurred during the months of July through August.

pH

Figure 214 presents the seasonal mean pH trend in Spy Lake, while Table 169 presents descriptive statistics for pH in Spy Lake. The pH in Spy Lake exhibited an increasing trend from 1996 to 1997 followed by relatively stable values from 1997 to 2003. The pH in Spy Lake was slightly lower than the county average, though this difference may not be statistically significant for all years.

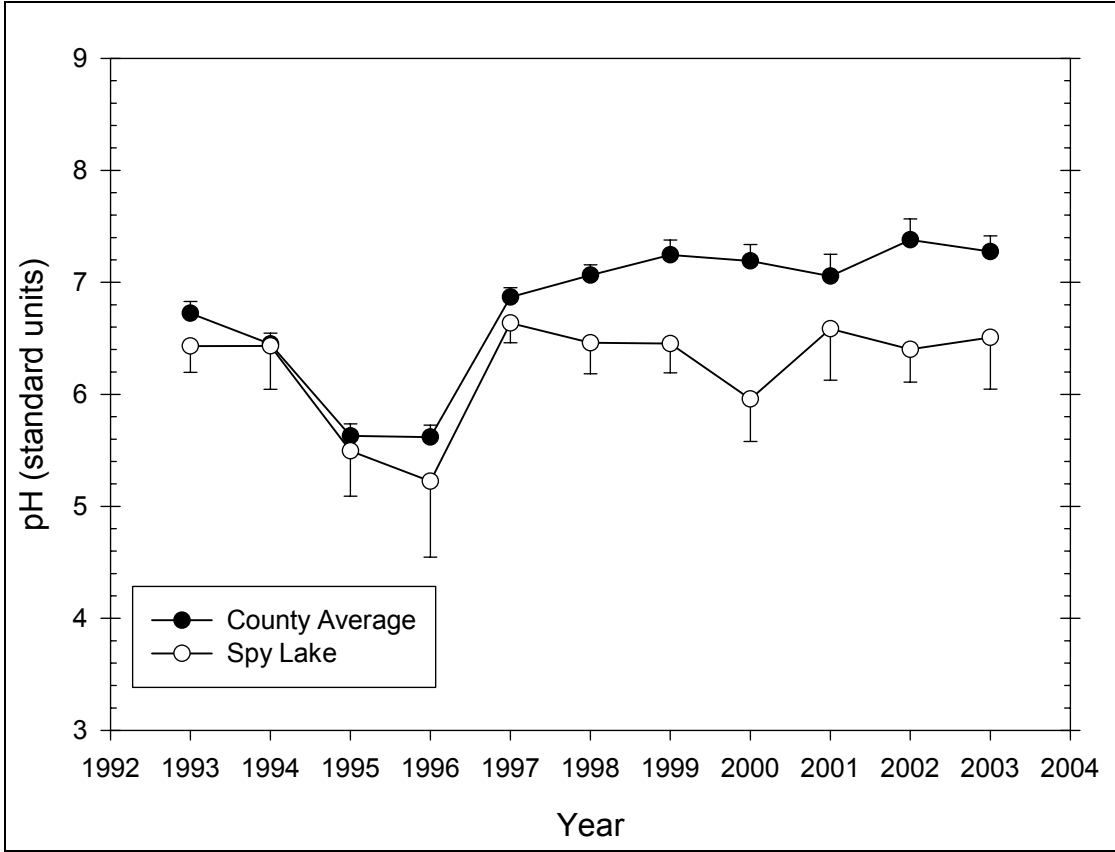


Figure 214 Seasonal mean pH trend in Spy Lake

Table 169 – Descriptive Statistics for pH in Spy Lake

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1993	6	1	6.432	0.189	0.0847	0.235
1994	6	0	6.433	0.369	0.151	0.387
1995	6	0	5.495	0.385	0.157	0.404
1996	6	0	5.225	0.646	0.264	0.677
1997	6	0	6.637	0.168	0.0687	0.177
1998	5	0	6.460	0.222	0.0995	0.276
1999	5	0	6.454	0.210	0.0941	0.261
2000	6	0	5.958	0.362	0.148	0.380
2001	5	0	6.586	0.370	0.165	0.459
2002	4	0	6.402	0.185	0.0924	0.294
2003	4	0	6.508	0.290	0.145	0.461
Year	Range	Max	Min	Median	25%	75%
1993	0.390	6.600	6.210	6.500	6.240	6.600
1994	1.080	7.080	6.000	6.390	6.200	6.540
1995	1.040	6.090	5.050	5.470	5.210	5.680
1996	1.700	6.360	4.660	4.950	4.820	5.610
1997	0.470	6.930	6.460	6.595	6.530	6.710
1998	0.500	6.790	6.290	6.340	6.290	6.640
1999	0.480	6.610	6.130	6.590	6.295	6.595
2000	0.850	6.380	5.530	5.960	5.670	6.250
2001	0.880	7.070	6.190	6.600	6.243	6.875

2002	0.410	6.570	6.160	6.440	6.260	6.545
2003	0.690	6.870	6.180	6.490	6.295	6.720
Year	Skewness	Kurtosis	K-S Dist.	K-S Prob.	Sum	Sum of Squares
1993	-0.440	-3.006	0.240	0.398	32.160	206.997
1994	1.056	1.810	0.220	0.432	38.600	249.007
1995	0.527	-0.666	0.212	0.476	32.970	181.911
1996	1.361	1.116	0.285	0.133	31.350	165.888
1997	1.150	1.257	0.197	0.560	39.820	264.414
1998	1.006	-0.846	0.305	0.134	32.300	208.856
1999	-1.177	-0.0862	0.341	0.058	32.270	208.448
2000	-0.0136	-2.686	0.257	0.240	35.750	213.665
2001	0.229	-1.781	0.211	0.546	32.930	217.425
2002	-0.846	-0.818	0.238	0.487	25.610	164.071
2003	0.324	0.134	0.165	0.706	26.030	169.642

Alkalinity

Figure 215 presents the seasonal mean alkalinity trend in Spy Lake, while Table 170 presents descriptive statistics for alkalinity in Spy Lake. The alkalinity in Spy Lake did not exhibit any strong trends, although the overall trend from 1993 to 2003 was for slightly decreasing alkalinity. The alkalinity in Spy Lake was significantly lower than the county average.

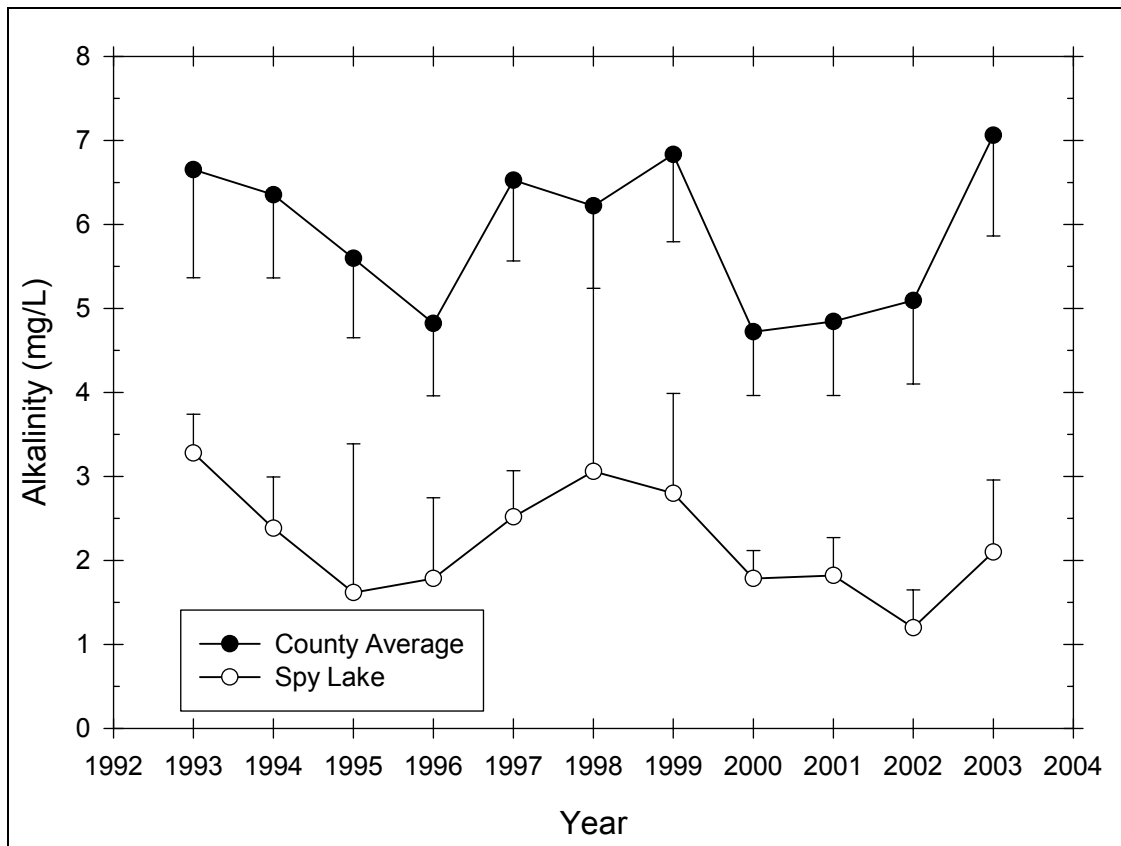


Figure 215 Seasonal mean alkalinity trend in Spy Lake

Table 170 – Descriptive Statistics for Alkalinity in Spy Lake

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1993	6	1	3.280	0.370	0.166	0.460
1994	6	0	2.383	0.581	0.237	0.610
1995	6	0	1.617	1.688	0.689	1.772
1996	6	0	1.783	0.917	0.375	0.963
1997	6	0	2.517	0.527	0.215	0.553
1998	5	0	3.060	2.548	1.140	3.164
1999	6	1	2.800	0.957	0.428	1.188
2000	6	0	1.783	0.319	0.130	0.335
2001	6	1	1.820	0.363	0.162	0.451
2002	6	2	1.200	0.283	0.141	0.450
2003	6	1	2.100	0.689	0.308	0.856
Year	Range	Max	Min	Median	25%	75%
1993	1.000	3.700	2.700	3.400	3.075	3.475
1994	1.700	3.000	1.300	2.500	2.300	2.700
1995	4.400	2.600	-1.800	2.200	2.000	2.500
1996	2.300	3.000	0.700	1.500	1.200	2.800
1997	1.300	3.000	1.700	2.650	2.100	3.000
1998	6.300	7.100	0.800	2.200	1.175	4.700
1999	2.300	3.400	1.100	3.200	2.600	3.250
2000	0.800	2.200	1.400	1.750	1.500	2.100
2001	0.900	2.200	1.300	2.000	1.525	2.050
2002	0.600	1.600	1.000	1.100	1.000	1.400
2003	1.900	2.900	1.000	2.200	1.825	2.450
Year	Skewness	Kurtosis	K-S Dist.	K-S Prob.	Sum	Sum of Squares
1993	-0.970	1.639	0.227	0.465	16.400	54.340
1994	-1.533	3.158	0.276	0.162	14.300	35.770
1995	-2.357	5.652	0.423	0.001	9.700	29.930
1996	0.513	-1.531	0.246	0.291	10.700	23.290
1997	-0.755	-0.888	0.205	0.516	15.100	39.390
1998	1.232	0.987	0.232	0.439	15.300	72.790
1999	-2.162	4.752	0.423	0.004	14.000	42.860
2000	0.226	-1.626	0.173	0.676	10.700	19.590
2001	-0.736	-0.940	0.290	0.182	9.100	17.090
2002	1.414	1.500	0.260	0.387	4.800	6.000
2003	-1.031	2.390	0.300	0.149	10.500	23.950

Total Phosphorus

Figure 216 presents the seasonal mean total phosphorus trend in Spy Lake, while Table 171 presents descriptive statistics for total phosphorus in Spy Lake. The total phosphorus in Spy Lake exhibited a decreasing trend from 1997 to 2003. The total phosphorus in Spy Lake was slightly lower than the county average, though this difference was not statistically significant.

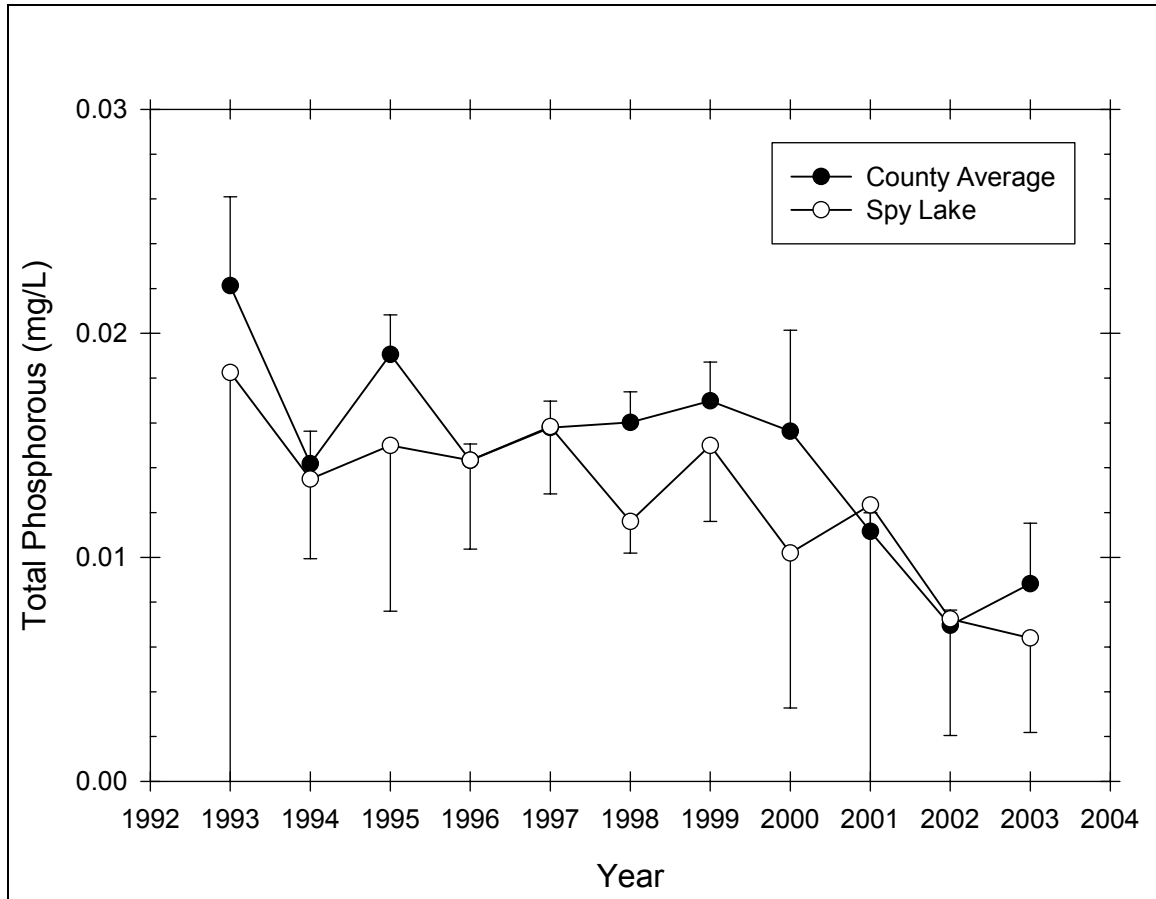


Figure 216 Seasonal mean total phosphorus trend in Spy Lake

Table 171 – Descriptive Statistics for Total Phosphorus in Spy Lake

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1993	6	2	0.0182	0.0177	0.00887	0.0282
1994	6	0	0.0135	0.00339	0.00138	0.00356
1995	6	1	0.0150	0.00596	0.00266	0.00740
1996	6	0	0.0143	0.00378	0.00154	0.00396
1997	6	0	0.0158	0.00286	0.00117	0.00300
1998	5	0	0.0116	0.00114	0.000510	0.00142
1999	6	1	0.0150	0.00274	0.00122	0.00340
2000	6	0	0.0102	0.00660	0.00269	0.00692
2001	6	1	0.0123	0.0110	0.00492	0.0137
2002	6	2	0.00725	0.00327	0.00164	0.00520
2003	6	1	0.00640	0.00340	0.00152	0.00422
Year	Range	Max	Min	Median	25%	75%
1993	0.0410	0.0430	0.00200	0.0140	0.00600	0.0305
1994	0.00900	0.0190	0.01000	0.0125	0.0110	0.0160
1995	0.0140	0.0250	0.0110	0.0120	0.0110	0.0183
1996	0.01000	0.0190	0.00900	0.0150	0.0110	0.0170
1997	0.00800	0.0190	0.0110	0.0160	0.0150	0.0180
1998	0.00300	0.0130	0.01000	0.0120	0.0108	0.0123
1999	0.00700	0.0180	0.0110	0.0150	0.0133	0.0173
2000	0.0180	0.0210	0.00300	0.00960	0.00500	0.0130

2001	0.0289	0.0299	0.001000	0.00850	0.00573	0.0187
2002	0.00790	0.0111	0.00320	0.00735	0.00495	0.00955
2003	0.00790	0.0112	0.00330	0.00480	0.00383	0.00933
Year	Skewness	Kurtosis	K-S Dist.	K-S Prob.	Sum	Sum of Squares
1993	1.230	1.612	0.256	0.407	0.0730	0.00228
1994	0.923	-0.172	0.225	0.400	0.0810	0.00115
1995	1.667	2.508	0.293	0.172	0.0750	0.00127
1996	-0.354	-1.211	0.170	0.687	0.0860	0.00130
1997	-0.907	0.794	0.219	0.437	0.0950	0.00154
1998	-0.405	-0.178	0.237	0.414	0.0580	0.000678
1999	-0.609	-0.133	0.167	0.713	0.0750	0.00116
2000	0.776	0.109	0.186	0.615	0.0612	0.000842
2001	1.186	1.601	0.236	0.417	0.0617	0.00125
2002	-0.174	0.750	0.183	0.678	0.0290	0.000242
2003	0.795	-1.543	0.281	0.214	0.0320	0.000251

Nitrate

Figure 217 presents the seasonal mean nitrate trend in Spy Lake, while Table 172 presents descriptive statistics for nitrate in Spy Lake. The nitrate in Spy Lake exhibited decreasing trend from 1997 to 2003. The nitrate in Spy Lake was lower than the county average, though this difference was not statistically significant for most years.

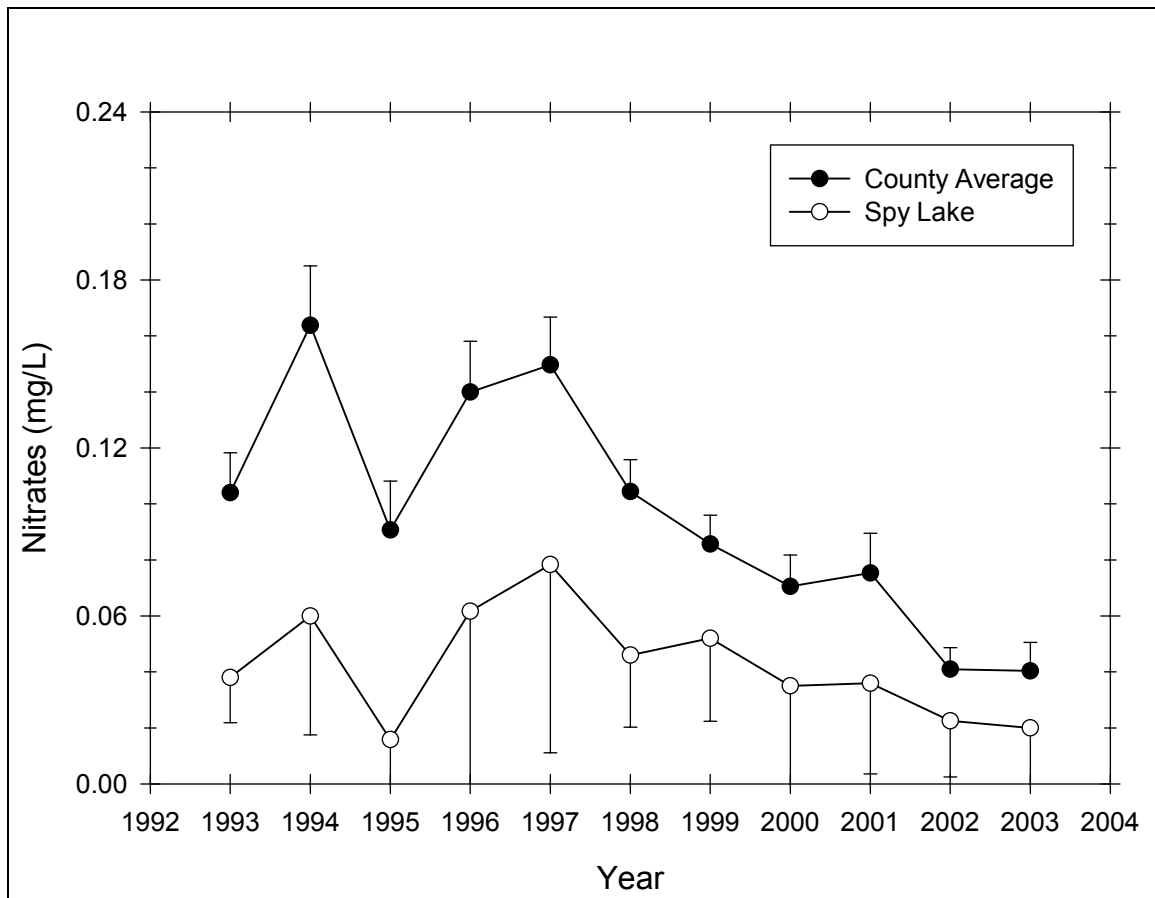


Figure 217 Seasonal mean nitrate trend in Spy Lake

Table 172 – Descriptive Statistics for Nitrate in Spy Lake

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1993	6	1	0.0380	0.0130	0.00583	0.0162
1994	6	0	0.0600	0.0405	0.0165	0.0425
1995	6	0	0.0158	0.0267	0.0109	0.0280
1996	6	0	0.0617	0.0605	0.0247	0.0635
1997	6	0	0.0783	0.0640	0.0261	0.0672
1998	5	0	0.0460	0.0207	0.00927	0.0257
1999	6	1	0.0520	0.0239	0.0107	0.0296
2000	6	0	0.0350	0.0418	0.0171	0.0439
2001	6	1	0.0360	0.0261	0.0117	0.0324
2002	6	2	0.0225	0.0126	0.00629	0.0200
2003	6	1	0.0200	0.0173	0.00775	0.0215
Year	Range	Max	Min	Median	25%	75%
1993	0.0300	0.0500	0.0200	0.0400	0.0275	0.0500
1994	0.110	0.140	0.0300	0.0450	0.0400	0.0600
1995	0.0700	0.0700	0.000	0.00500	0.00500	0.01000
1996	0.160	0.180	0.0200	0.0350	0.0300	0.0700
1997	0.160	0.190	0.0300	0.0500	0.0300	0.120
1998	0.0500	0.0800	0.0300	0.0400	0.0300	0.0575
1999	0.0600	0.0900	0.0300	0.0400	0.0375	0.0675
2000	0.110	0.120	0.01000	0.0200	0.0200	0.0200
2001	0.0600	0.0800	0.0200	0.0200	0.0200	0.0500
2002	0.0300	0.0400	0.01000	0.0200	0.0150	0.0300
2003	0.0400	0.0500	0.01000	0.01000	0.01000	0.0275
Year	Skewness	Kurtosis	K-S Dist.	K-S Prob.	Sum	Sum of Squares
1993	-0.541	-1.488	0.221	0.494	0.190	0.00790
1994	2.114	4.707	0.333	0.036	0.360	0.0298
1995	2.373	5.709	0.420	0.001	0.0950	0.00508
1996	2.051	4.290	0.307	0.081	0.370	0.0411
1997	1.365	0.870	0.338	0.031	0.470	0.0573
1998	1.447	1.931	0.224	0.483	0.230	0.0123
1999	1.264	1.099	0.292	0.174	0.260	0.0158
2000	2.397	5.817	0.473	<0.001	0.210	0.0161
2001	1.714	2.664	0.330	0.079	0.180	0.00920
2002	1.129	2.227	0.329	0.138	0.0900	0.00250
2003	1.925	3.667	0.318	0.101	0.1000	0.00320

Chlorophyll *a*

Figure 218 presents the seasonal mean chlorophyll *a* trend in Spy Lake, while Table 173 presents descriptive statistics for chlorophyll *a* in Spy Lake. The chlorophyll *a* in Spy Lake exhibited a slight decreasing trend from 1998 to 2003. The chlorophyll *a* in Spy Lake was slightly higher than the county average, though this difference was not statistically significant.

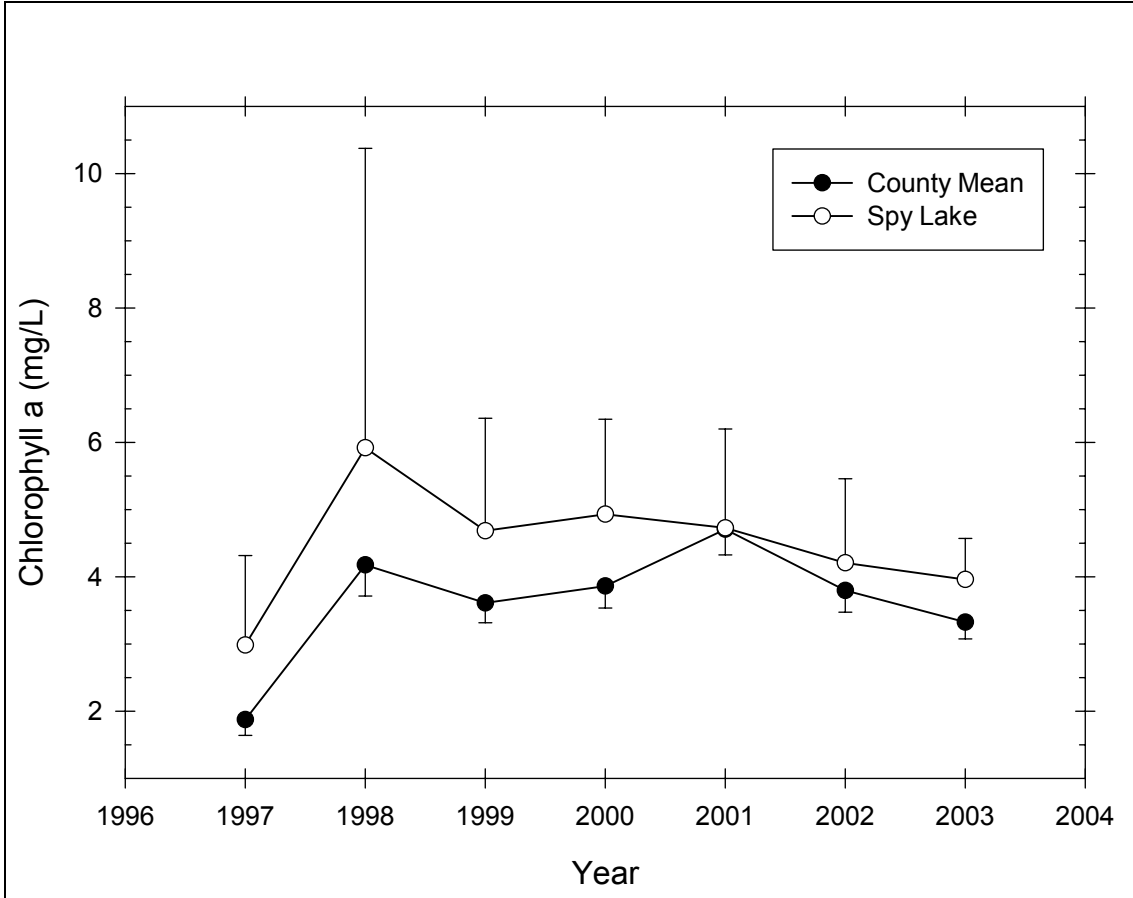


Figure 218 Seasonal mean chlorophyll a trend in Spy Lake

Table 173 – Descriptive Statistics for Chlorophyll a in Spy Lake

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1997	6	0	2.983	1.269	0.518	1.331
1998	5	0	5.918	3.590	1.605	4.457
1999	6	1	4.684	1.348	0.603	1.674
2000	6	0	4.930	1.346	0.550	1.413
2001	6	1	4.726	1.186	0.530	1.472
2002	6	2	4.207	0.787	0.393	1.252
2003	6	2	3.960	0.384	0.192	0.611
Year	Range	Max	Min	Median	25%	75%
1997	3.590	4.980	1.390	2.985	2.010	3.550
1998	6.950	8.970	2.020	7.580	2.043	8.970
1999	2.860	6.210	3.350	4.040	3.657	6.098
2000	3.200	6.440	3.240	5.035	3.850	5.980
2001	2.680	6.020	3.340	4.520	3.752	5.900
2002	1.640	5.380	3.740	3.855	3.755	4.660
2003	0.830	4.280	3.450	4.055	3.665	4.255
Year	Skewness	Kurtosis	K-S Dist.	K-S Prob.	Sum	Sum of Squares
1997	0.467	0.0678	0.161	0.721	17.900	61.448
1998	-0.501	-3.214	0.278	0.225	29.590	226.661
1999	0.464	-3.052	0.284	0.205	23.420	116.969

2000	-0.119	-2.548	0.273	0.173	29.580	154.895
2001	0.0924	-2.536	0.231	0.447	23.630	117.298
2002	1.927	3.734	0.383	0.041	16.830	72.669
2003	-0.952	-0.667	0.259	0.391	15.840	63.168

Transparency

Figure 219 presents the seasonal mean transparency trend in Spy Lake, while Table 174 presents descriptive statistics for transparency in Spy Lake. The transparency in Spy Lake exhibited no discernible trend. The transparency in Spy Lake was slightly lower than the county average, though this difference was not statistically significant.

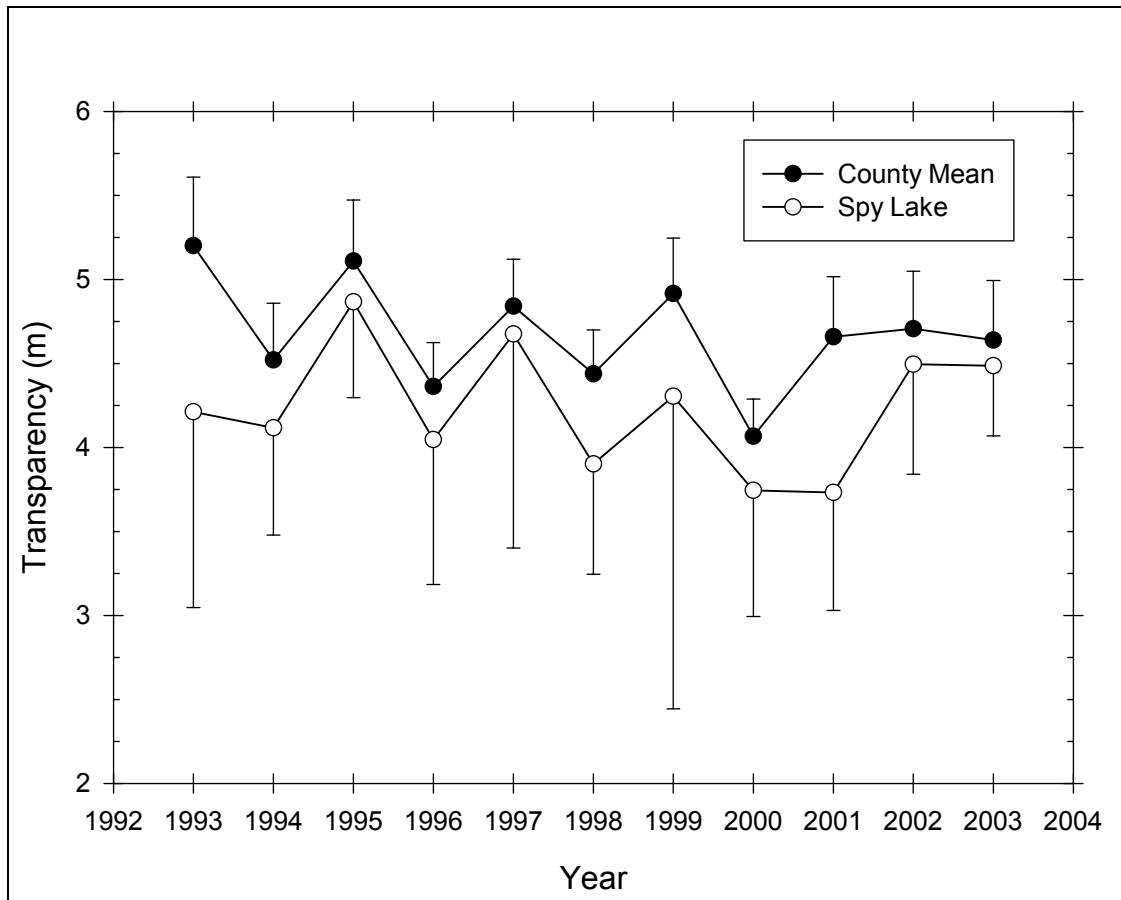


Figure 219 Seasonal mean transparency trend in Spy Lake

Table 174 – Descriptive Statistics for Transparency in Spy Lake

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1993	6	1	4.212	0.938	0.419	1.164
1994	6	0	4.117	0.608	0.248	0.638
1995	6	0	4.867	0.543	0.222	0.570
1996	6	0	4.047	0.821	0.335	0.862
1997	6	0	4.675	1.213	0.495	1.273
1998	5	0	3.902	0.529	0.237	0.657

1999	5	0	4.304	1.498	0.670	1.860
2000	6	0	3.745	0.716	0.292	0.751
2001	5	0	3.732	0.565	0.253	0.701
2002	4	0	4.495	0.412	0.206	0.655
2003	5	0	4.486	0.336	0.150	0.417
Year	Range	Max	Min	Median	25%	75%
1993	2.430	5.760	3.330	4.090	3.563	4.620
1994	1.800	4.900	3.100	4.150	3.900	4.500
1995	1.600	5.800	4.200	4.750	4.600	5.100
1996	1.950	4.830	2.880	4.230	3.310	4.800
1997	3.520	6.400	2.880	4.845	3.820	5.260
1998	1.350	4.700	3.350	3.930	3.462	4.197
1999	3.610	6.910	3.300	3.700	3.383	4.878
2000	2.020	4.520	2.500	3.825	3.500	4.300
2001	1.340	4.500	3.160	3.800	3.190	4.125
2002	0.900	5.100	4.200	4.340	4.240	4.750
2003	0.830	4.880	4.050	4.550	4.200	4.745
Year	Skewness	Kurtosis	K-S Dist.	K-S Prob.	Sum	Sum of Squares
1993	1.432	2.436	0.288	0.188	21.060	92.222
1994	-0.699	1.273	0.194	0.574	24.700	103.530
1995	0.948	1.531	0.216	0.454	29.200	143.580
1996	-0.514	-1.757	0.234	0.352	24.280	101.623
1997	-0.176	0.177	0.181	0.638	28.050	138.494
1998	0.779	0.362	0.204	0.577	19.510	77.248
1999	1.953	3.898	0.328	0.085	21.520	101.596
2000	-1.062	1.380	0.199	0.545	22.470	86.713
2001	0.312	-1.369	0.227	0.466	18.660	70.916
2002	1.768	3.193	0.341	0.108	17.980	81.328
2003	-0.273	-1.562	0.176	0.691	22.430	101.072

TSI

Figure 220 presents the Carlson trophic state index trend in Spy Lake. Transparency TSI was at the lower mesotrophic range, while chlorophyll *a* TSI was in the eutrophic range with the exception of 1997. Total phosphorus TSI was in the mesotrophic range except for 1993, 2000, 2002 and 2003.

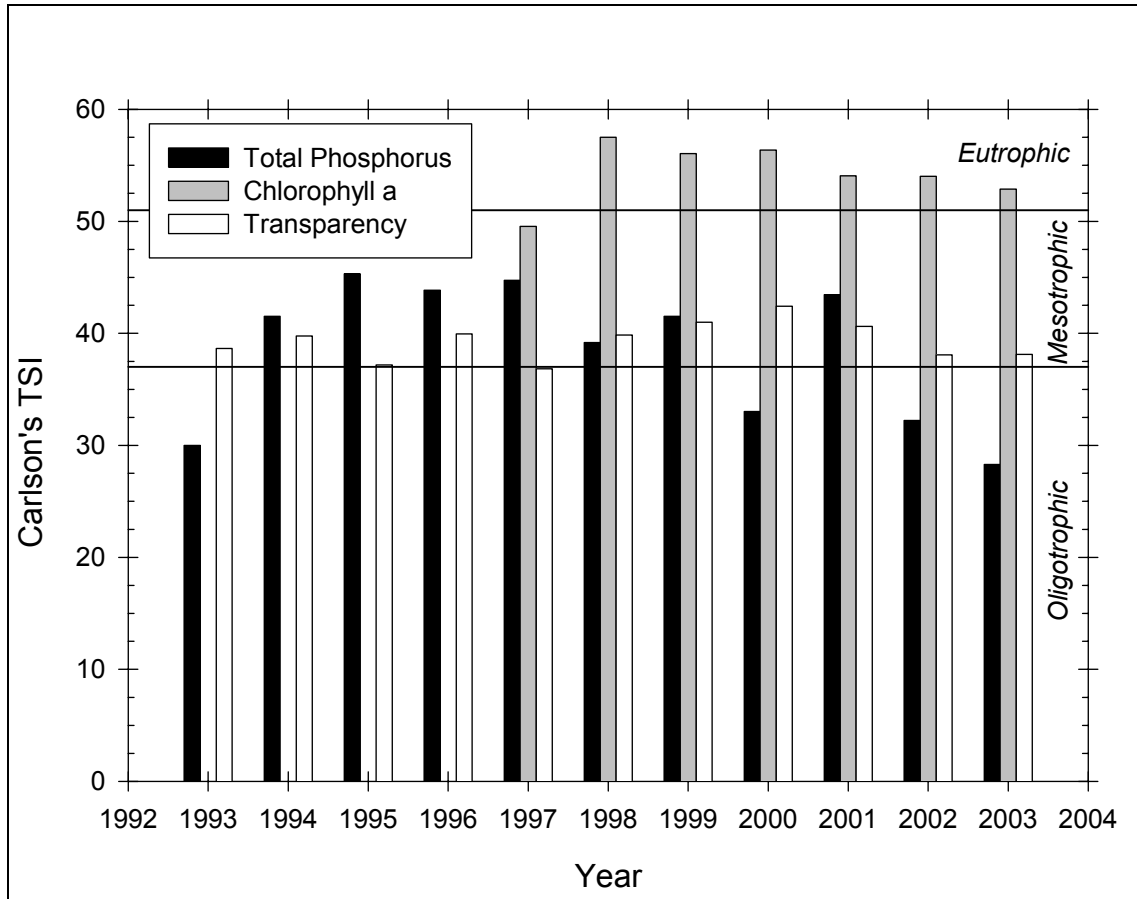


Figure 220 Carlson TSI trend in Spy Lake

Aluminum

Figure 221 presents the seasonal mean aluminum trend in Spy Lake, while Table 175 presents descriptive statistics for aluminum in Spy Lake. The aluminum in Spy Lake was low and relatively constant. The aluminum in Spy Lake was generally slightly lower than the county average, though this difference was not statistically significant.

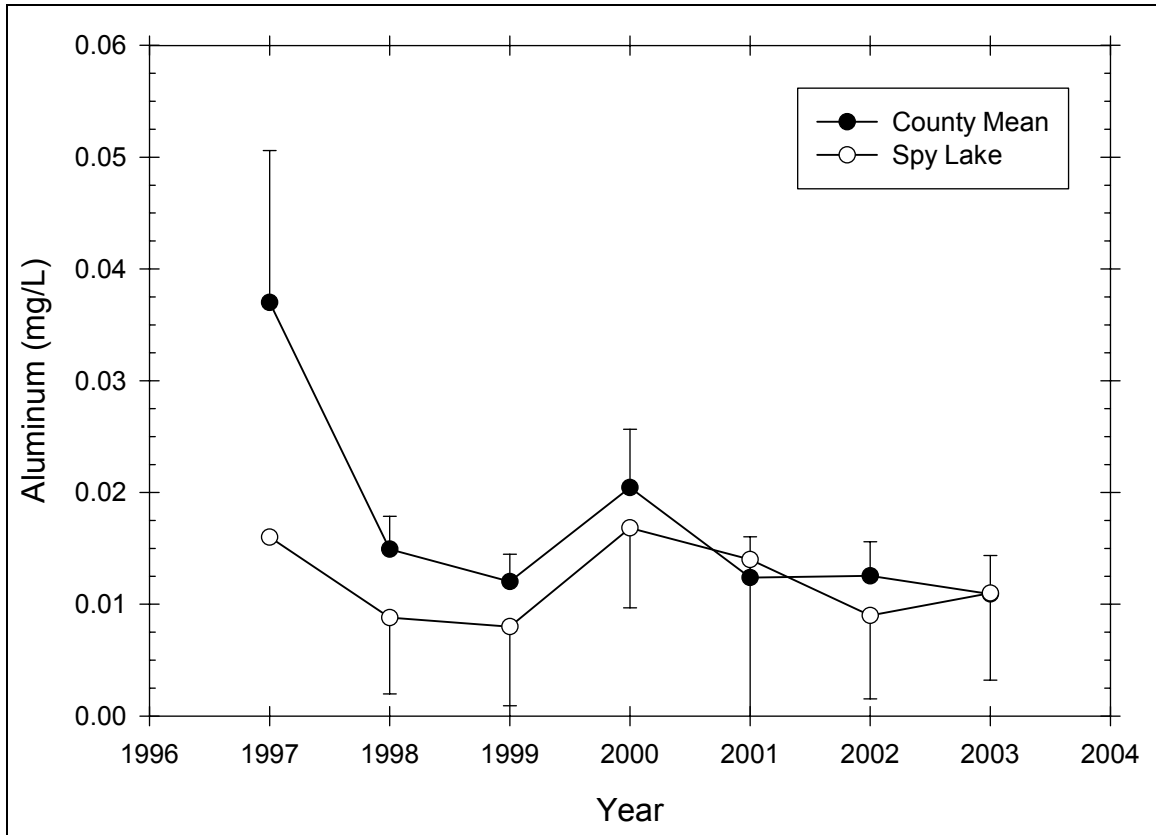


Figure 221 Seasonal mean aluminum trend in Spy Lake

Table 175 – Descriptive Statistics for Aluminum in Spy Lake

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1997	6	5	0.0160	--	--	--
1998	5	0	0.00880	0.00550	0.00246	0.00682
1999	6	1	0.00800	0.00570	0.00255	0.00708
2000	6	0	0.0168	0.00682	0.00279	0.00716
2001	6	1	0.0140	0.0128	0.00573	0.0159
2002	6	2	0.00900	0.00469	0.00235	0.00746
2003	6	2	0.0110	0.00490	0.00245	0.00780
Year	Range	Max	Min	Median	25%	75%
1997	0.000	0.0160	0.0160	0.0160	0.0160	0.0160
1998	0.0120	0.0130	0.001000	0.0120	0.00400	0.0130
1999	0.0140	0.0160	0.00200	0.00900	0.00275	0.0115
2000	0.0180	0.0250	0.00700	0.0170	0.0120	0.0230
2001	0.0330	0.0360	0.00300	0.00900	0.00750	0.0187
2002	0.00900	0.0140	0.00500	0.00850	0.00500	0.0130
2003	0.01000	0.0150	0.00500	0.0120	0.00700	0.0150
Year	Skewness	Kurtosis	K-S Dist.	K-S Prob.	Sum	Sum of Squares
1997	--	--	--	--	0.0160	0.000256
1998	-0.875	-1.644	0.320	0.098	0.0440	0.000508
1999	0.405	-0.859	0.210	0.552	0.0400	0.000450
2000	-0.265	-1.142	0.150	0.750	0.101	0.00193
2001	1.799	3.626	0.331	0.077	0.0700	0.00164

2002	0.155	-5.112	0.303	0.215	0.0360	0.000390
2003	-0.544	-2.944	0.293	0.252	0.0440	0.000556

Calcium

Figure 222 presents the seasonal mean calcium trend in Spy Lake, while Table 176 presents descriptive statistics for calcium in Spy Lake. The calcium in Spy Lake was low and relatively constant throughout the period of record. The calcium in Spy Lake was significantly lower than the county average.

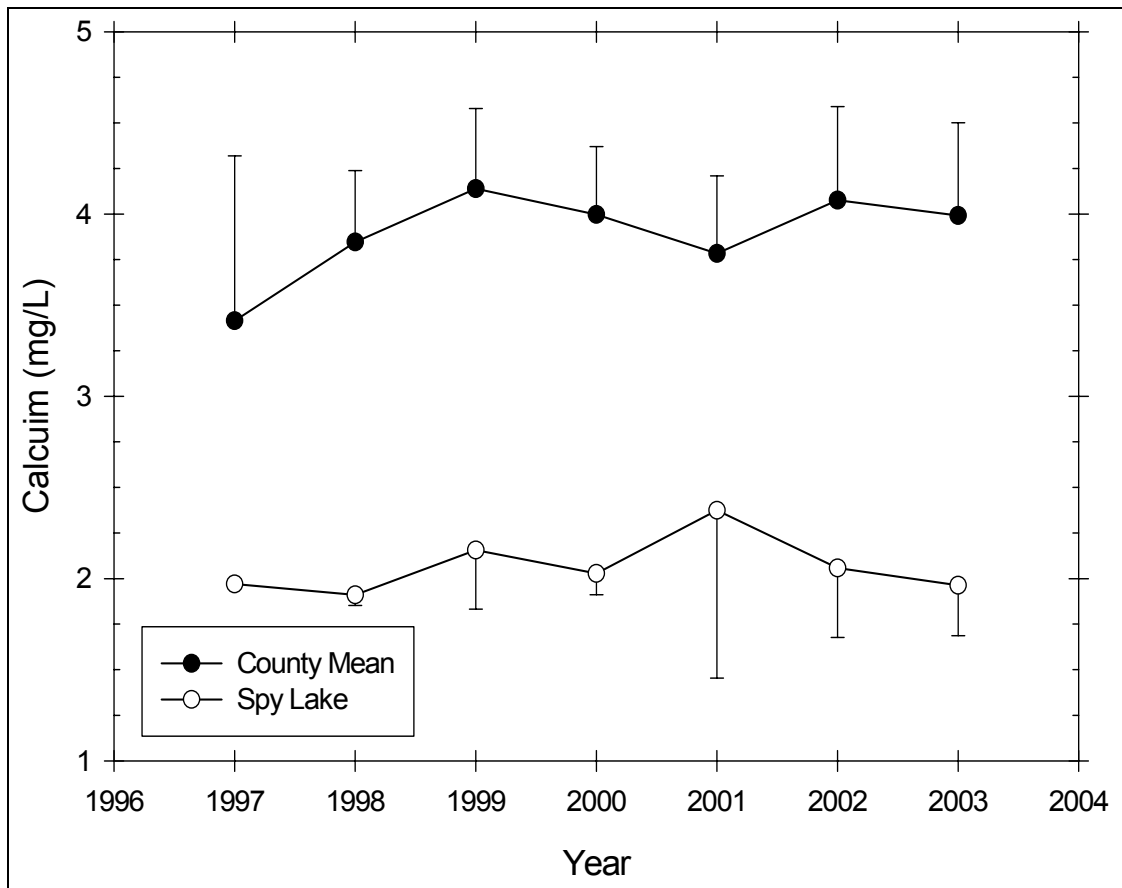


Figure 222 Seasonal mean calcium trend in Spy Lake

Table 176 – Descriptive Statistics for Calcium in Spy Lake

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1997	6	5	1.970	--	--	--
1998	6	0	1.910	0.0548	0.0224	0.0575
1999	6	1	2.156	0.260	0.116	0.323
2000	6	0	2.028	0.111	0.0454	0.117
2001	6	1	2.374	0.740	0.331	0.919
2002	6	2	2.058	0.239	0.119	0.380
2003	6	2	1.962	0.173	0.0866	0.276

Year	Range	Max	Min	Median	25%	75%
1997	0.000	1.970	1.970	1.970	1.970	1.970
1998	0.140	1.990	1.850	1.905	1.870	1.940
1999	0.610	2.420	1.810	2.140	1.960	2.405
2000	0.300	2.220	1.920	1.995	1.950	2.090
2001	1.850	3.670	1.820	2.150	1.962	2.583
2002	0.550	2.290	1.740	2.100	1.880	2.235
2003	0.350	2.140	1.790	1.960	1.815	2.110
Year	Skewness	Kurtosis	K-S Dist.	K-S Prob.	Sum	Sum of Squares
1997	--	--	--	--	1.970	3.881
1998	0.405	-1.532	0.267	0.195	11.460	21.904
1999	-0.275	-1.663	0.226	0.471	10.780	23.512
2000	1.160	0.838	0.200	0.542	12.170	24.747
2001	1.995	4.210	0.382	0.016	11.870	30.372
2002	-0.863	0.113	0.196	0.645	8.230	17.105
2003	0.0312	-5.018	0.260	0.387	7.850	15.496

Calcite Saturation Index

Figure 223 presents the calcite saturation index trend in Spy Lake. The CSI in Spy Lake remained relatively stable within the very vulnerable to acid deposition range. The CSI in Spy Lake was significantly higher than the county average.

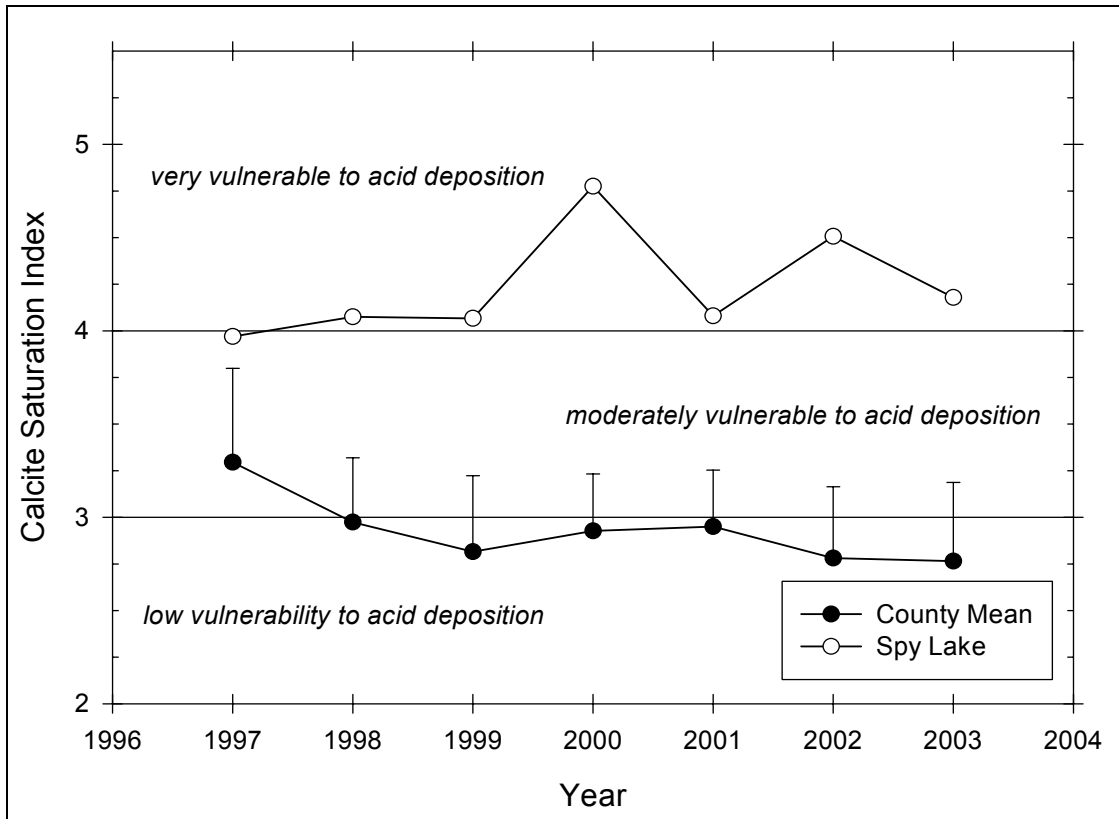


Figure 223 Seasonal mean CSI trend in Spy Lake