

## Morehouse Lake

### Location

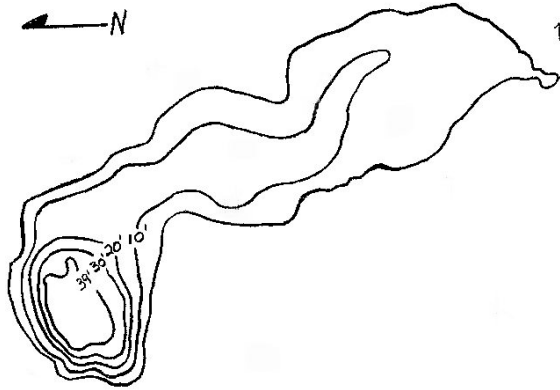
Pond Number: 070786  
Watershed: Mohawk River  
County: Hamilton  
Topographic Quadrangle: Piseco Lake

### Sample Site

Latitude: 43° 21.993'  
Longitude: 74° 40.990'

### Morphometry

Surface Area: 122 Ac.  
Mean Depth: 17 Ft.  
Maximum Depth: 37 Ft.  
Volume: 2,072 Ac./Ft.  
Watershed Area: 2,319 Ac.  
Hydraulic Retention Time: Yr.  
Shoreline Length: 2.6 Mi.  
Elevation: 1,975 Ft.



## Temperature and Dissolved Oxygen

Morehouse Lake had a minimum DO of 0.2 mg/L (July 1993), with a minimum temperature of 4.6°C and a maximum temperature of 24.8°C. In general, the lowest DO values occurred during the months of June through October.

## pH

Figure 144 presents the seasonal mean pH trend in Morehouse Lake, while Table 113 presents descriptive statistics for pH in Morehouse Lake. The pH in Morehouse Lake exhibited an increasing trend from 1996 to 2000 followed by stable conditions. The pH in Morehouse Lake was lower than the county average, though this difference may not be statistically significant for some years.

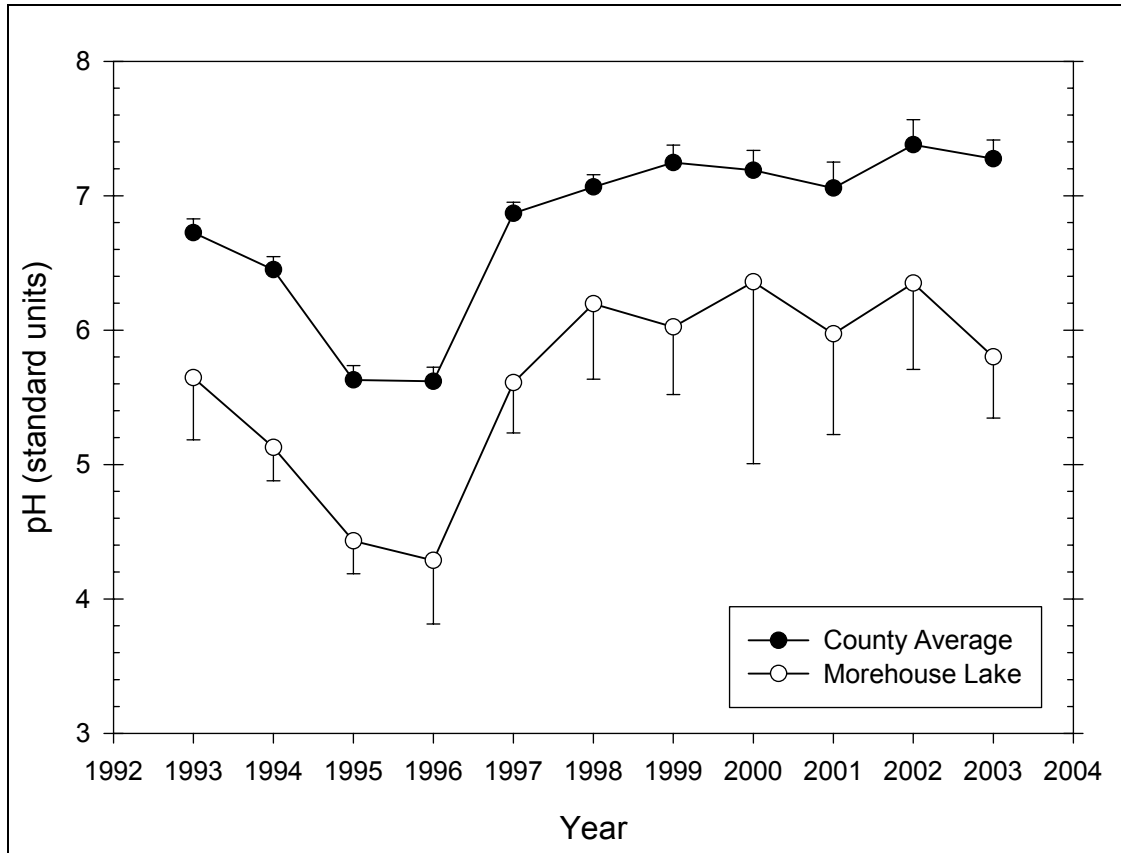


Figure 144 Seasonal mean pH trend in Morehouse Lake

Table 113 – Descriptive Statistics for pH in Morehouse Lake

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1993	6	1	5.646	0.373	0.167	0.463
1994	6	0	5.128	0.237	0.0969	0.249
1995	6	0	4.432	0.233	0.0950	0.244
1996	6	0	4.287	0.451	0.184	0.474
1997	6	0	5.610	0.357	0.146	0.374
1998	6	0	6.197	0.536	0.219	0.562
1999	5	0	6.024	0.405	0.181	0.503
2000	6	0	6.360	1.290	0.527	1.354
2001	5	0	5.972	0.603	0.270	0.749
2002	4	0	6.350	0.404	0.202	0.643
2003	4	0	5.800	0.285	0.143	0.454
Year	Range	Max	Min	Median	25%	75%
1993	0.980	6.030	5.050	5.770	5.433	5.873
1994	0.580	5.500	4.920	5.015	4.970	5.350
1995	0.690	4.760	4.070	4.445	4.310	4.560
1996	1.230	5.000	3.770	4.310	3.840	4.490
1997	0.990	6.080	5.090	5.575	5.410	5.930
1998	1.620	6.840	5.220	6.290	6.140	6.400
1999	0.900	6.440	5.540	6.000	5.675	6.425
2000	3.250	8.120	4.870	6.110	5.320	7.630
2001	1.420	6.930	5.510	5.680	5.533	6.383

2002	0.920	6.720	5.800	6.440	6.055	6.645
2003	0.610	6.010	5.400	5.895	5.595	6.005
Year	Skewness	Kurtosis	K-S Dist.	K-S Prob.	Sum	Sum of Squares
1993	-1.195	1.658	0.230	0.449	28.230	159.942
1994	1.040	-0.874	0.343	0.026	30.770	158.080
1995	-0.276	0.729	0.164	0.712	26.590	118.109
1996	0.471	0.0202	0.172	0.680	25.720	111.272
1997	-0.0802	-0.463	0.189	0.601	33.660	189.469
1998	-1.277	2.960	0.291	0.116	37.180	231.827
1999	-0.0463	-2.537	0.236	0.421	30.120	182.100
2000	0.406	-1.599	0.171	0.685	38.160	251.015
2001	1.305	0.810	0.286	0.196	29.860	179.779
2002	-1.064	0.603	0.211	0.597	25.400	161.779
2003	-1.342	1.162	0.258	0.395	23.200	134.804

## Alkalinity

Figure 145 presents the seasonal mean alkalinity trend in Morehouse Lake, while Table 114 presents descriptive statistics for alkalinity in Morehouse Lake. The alkalinity in Morehouse Lake was low and relatively stable throughout the period of record. The alkalinity in Morehouse Lake was significantly lower than the county average.

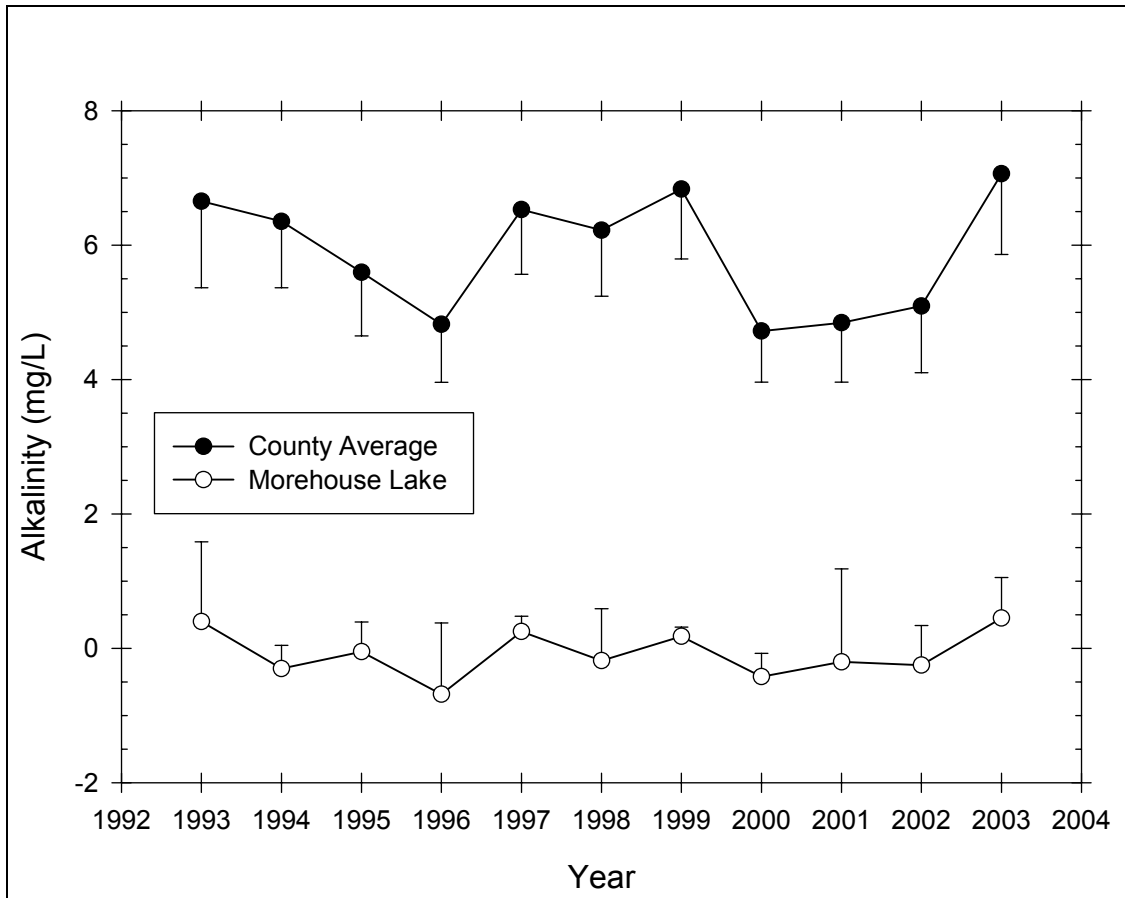


Figure 145 Seasonal mean alkalinity trend in Morehouse Lake

**Table 114 – Descriptive Statistics for Alkalinity in Morehouse Lake**

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1993	6	1	0.400	0.954	0.427	1.184
1994	6	0	-0.300	0.329	0.134	0.345
1995	6	0	-0.0500	0.423	0.173	0.444
1996	6	0	-0.683	1.011	0.413	1.061
1997	6	0	0.250	0.217	0.0885	0.228
1998	6	0	-0.183	0.736	0.300	0.772
1999	6	1	0.180	0.110	0.0490	0.136
2000	6	1	-0.420	0.277	0.124	0.345
2001	6	3	-0.200	0.557	0.321	1.383
2002	6	2	-0.250	0.370	0.185	0.588
2003	6	2	0.450	0.379	0.189	0.602
Year	Range	Max	Min	Median	25%	75%
1993	2.500	2.000	-0.500	0.300	-0.200	0.725
1994	0.800	0.000	-0.800	-0.200	-0.600	0.000
1995	1.100	0.300	-0.800	0.150	-0.300	0.200
1996	2.900	0.500	-2.400	-0.650	-1.000	0.1000
1997	0.500	0.500	0.000	0.300	0.000	0.400
1998	1.800	0.700	-1.100	-0.300	-0.700	0.600
1999	0.200	0.300	0.1000	0.1000	0.1000	0.300
2000	0.700	-0.1000	-0.800	-0.500	-0.575	-0.175
2001	1.100	0.300	-0.800	-0.1000	-0.625	0.200
2002	0.800	0.300	-0.500	-0.400	-0.450	-0.0500
2003	0.800	1.000	0.200	0.300	0.200	0.700
Year	Skewness	Kurtosis	K-S Dist.	K-S Prob.	Sum	Sum of Squares
1993	1.555	2.978	0.342	0.057	2.000	4.440
1994	-0.811	-1.029	0.286	0.130	-1.800	1.080
1995	-1.426	1.257	0.305	0.085	-0.300	0.910
1996	-0.857	1.149	0.210	0.484	-4.100	7.910
1997	-0.265	-2.214	0.255	0.246	1.500	0.610
1998	0.147	-1.970	0.214	0.461	-1.100	2.910
1999	0.609	-3.333	0.367	0.026	0.900	0.210
2000	-0.243	-0.882	0.213	0.534	-2.100	1.190
2001	-0.782	--	0.238	0.537	-0.600	0.740
2002	1.900	3.709	0.408	0.020	-1.000	0.660
2003	1.659	2.615	0.303	0.217	1.800	1.240

## Total Phosphorus

Figure 146 presents the seasonal mean total phosphorus trend in Morehouse Lake, while Table 115 presents descriptive statistics for total phosphorus in Morehouse Lake. The total phosphorus in Morehouse Lake exhibited a decreasing trend from about 1995 to 2003. The total phosphorus in Morehouse Lake was similar to the county average.

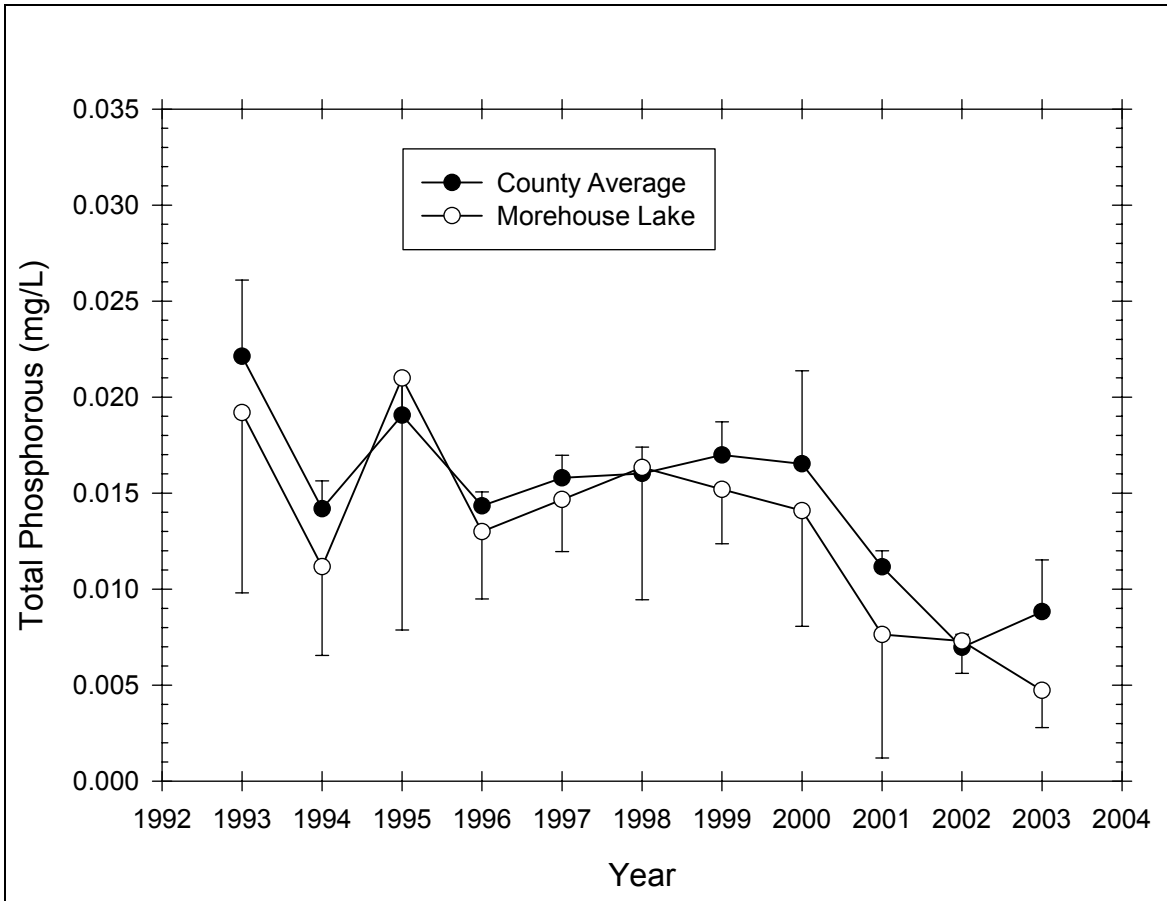


Figure 146 Seasonal mean total phosphorus trend in Morehouse Lake (outlier in 2000 replaced, 0.117 to 0.017)

Table 115 – Descriptive Statistics for Total Phosphorus in Morehouse Lake

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1993	6	1	0.0192	0.00756	0.00338	0.00939
1994	6	0	0.0112	0.00440	0.00180	0.00462
1995	6	0	0.0210	0.0125	0.00511	0.0131
1996	6	0	0.0130	0.00335	0.00137	0.00351
1997	6	0	0.0147	0.00258	0.00105	0.00271
1998	6	0	0.0163	0.00656	0.00268	0.00689
1999	6	1	0.0152	0.00228	0.00102	0.00283
2000	6	0	0.0308	0.0426	0.0174	0.0447
2001	6	1	0.00764	0.00519	0.00232	0.00644
2002	6	2	0.00730	0.00106	0.000531	0.00169
2003	6	2	0.00473	0.00122	0.000609	0.00194
Year	Range	Max	Min	Median	25%	75%
1993	0.0160	0.0260	0.01000	0.0240	0.0115	0.0245
1994	0.0110	0.0170	0.00600	0.0120	0.00600	0.0140
1995	0.0330	0.0420	0.00900	0.0160	0.0130	0.0300
1996	0.01000	0.0190	0.00900	0.0120	0.0120	0.0140
1997	0.00700	0.0180	0.0110	0.0145	0.0130	0.0170
1998	0.0150	0.0260	0.0110	0.0135	0.0110	0.0230
1999	0.00600	0.0180	0.0120	0.0160	0.0135	0.0165

2000	0.111	0.117	0.00600	0.0165	0.00800	0.0205
2001	0.0140	0.0160	0.00200	0.00660	0.00463	0.0101
2002	0.00230	0.00880	0.00650	0.00695	0.00655	0.00805
2003	0.00270	0.00650	0.00380	0.00430	0.00395	0.00550
<b>Year</b>	<b>Skewness</b>	<b>Kurtosis</b>	<b>K-S Dist.</b>	<b>K-S Prob.</b>	<b>Sum</b>	<b>Sum of Squares</b>
1993	-0.594	-3.014	0.337	0.065	0.0960	0.00207
1994	-0.188	-1.307	0.242	0.312	0.0670	0.000845
1995	1.146	0.258	0.292	0.114	0.126	0.00343
1996	1.201	2.433	0.284	0.137	0.0780	0.00107
1997	-0.0775	-0.867	0.150	0.750	0.0880	0.00132
1998	0.862	-1.464	0.247	0.285	0.0980	0.00182
1999	-0.405	-0.178	0.237	0.414	0.0760	0.00118
2000	2.356	5.651	0.428	<0.001	0.185	0.0148
2001	1.177	2.229	0.265	0.282	0.0382	0.000399
2002	1.405	1.500	0.250	0.432	0.0292	0.000217
2003	1.679	2.901	0.323	0.152	0.0189	0.0000938

## Nitrate

Figure 147 presents the seasonal mean nitrate trend in Morehouse Lake, while Table 116 presents descriptive statistics for nitrate in Morehouse Lake. The nitrate in Morehouse Lake exhibited a decreasing trend from 1997 to 2003. The nitrate in Morehouse Lake was similar to but more variable than the county average.

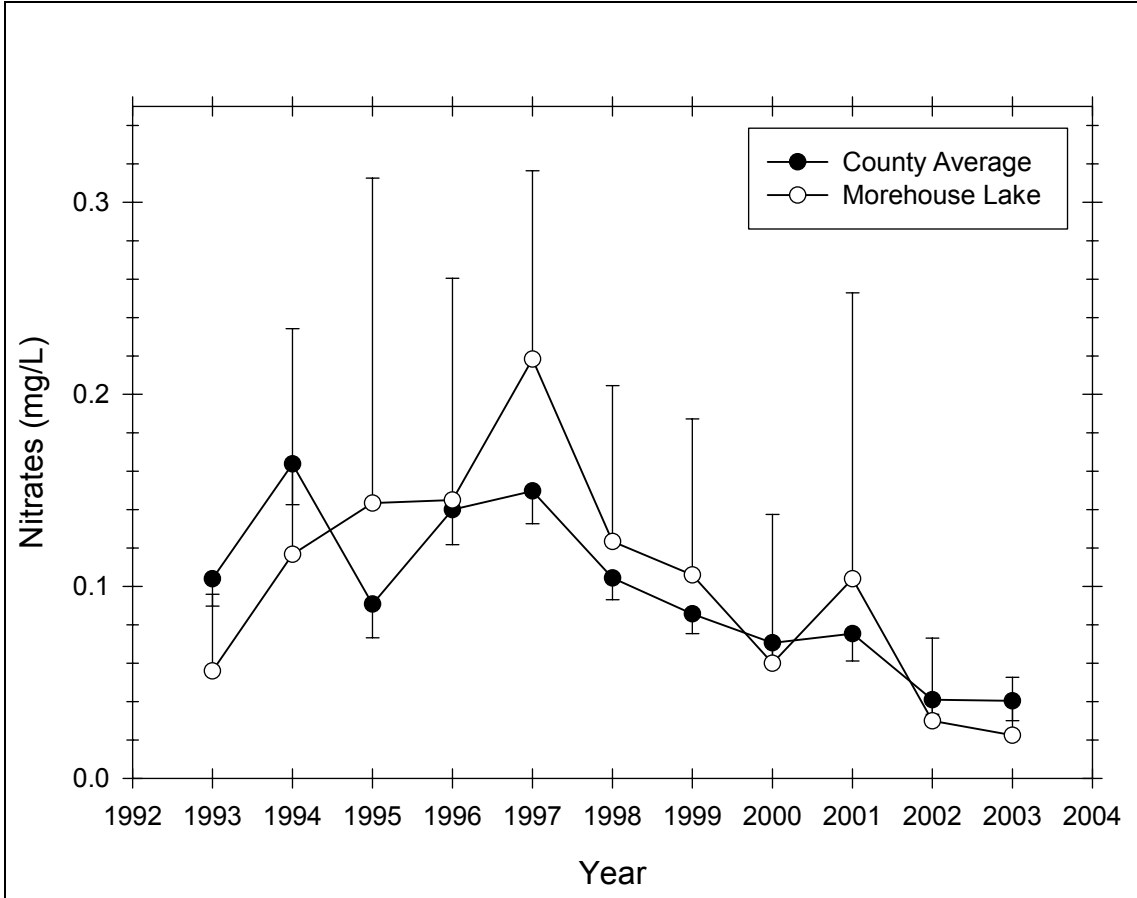


Figure 147 Seasonal mean nitrate trend in Morehouse Lake

Table 116 – Descriptive Statistics for Nitrate in Morehouse Lake

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1993	6	1	0.0560	0.0321	0.0144	0.0398
1994	6	0	0.117	0.112	0.0457	0.118
1995	6	0	0.143	0.161	0.0659	0.169
1996	6	0	0.145	0.110	0.0449	0.115
1997	6	0	0.218	0.0935	0.0382	0.0981
1998	6	0	0.123	0.0774	0.0316	0.0812
1999	6	1	0.106	0.0654	0.0293	0.0812
2000	6	0	0.0600	0.0738	0.0301	0.0774
2001	6	1	0.104	0.120	0.0536	0.149
2002	6	2	0.0300	0.0271	0.0135	0.0431
2003	6	2	0.0225	0.0189	0.00946	0.0301
Year	Range	Max	Min	Median	25%	75%
1993	0.0800	0.110	0.0300	0.0400	0.0375	0.0725
1994	0.270	0.300	0.0300	0.0650	0.0300	0.210
1995	0.410	0.440	0.0300	0.0650	0.0400	0.220
1996	0.290	0.360	0.0700	0.1000	0.0800	0.160
1997	0.230	0.370	0.140	0.180	0.150	0.290
1998	0.180	0.250	0.0700	0.0800	0.0700	0.190
1999	0.160	0.210	0.0500	0.0700	0.0650	0.150
2000	0.190	0.210	0.0200	0.0300	0.0300	0.0400

2001	0.280	0.310	0.0300	0.0400	0.0300	0.160
2002	0.0600	0.0700	0.01000	0.0200	0.0150	0.0450
2003	0.0400	0.0500	0.01000	0.0150	0.01000	0.0350
<b>Year</b>	<b>Skewness</b>	<b>Kurtosis</b>	<b>K-S Dist.</b>	<b>K-S Prob.</b>	<b>Sum</b>	<b>Sum of Squares</b>
1993	1.661	2.712	0.291	0.178	0.280	0.0198
1994	1.150	-0.320	0.328	0.042	0.700	0.144
1995	1.639	2.174	0.319	0.056	0.860	0.253
1996	2.034	4.236	0.291	0.115	0.870	0.187
1997	1.006	-0.410	0.268	0.194	1.310	0.330
1998	1.206	-0.383	0.379	0.007	0.740	0.121
1999	1.294	0.906	0.309	0.124	0.530	0.0733
2000	2.409	5.847	0.440	<0.001	0.360	0.0488
2001	1.853	3.350	0.303	0.140	0.520	0.112
2002	1.813	3.483	0.394	0.030	0.120	0.00580
2003	1.659	2.615	0.303	0.217	0.0900	0.00310

## Chlorophyll *a*

Figure 148 presents the seasonal mean chlorophyll *a* trend in Morehouse Lake, while Table 117 presents descriptive statistics for chlorophyll *a* in Morehouse Lake. The chlorophyll *a* in Morehouse Lake did not exhibit any discernible trend. The chlorophyll *a* in Morehouse Lake was generally lower than or similar to the county average, though any difference was not statistically significant.

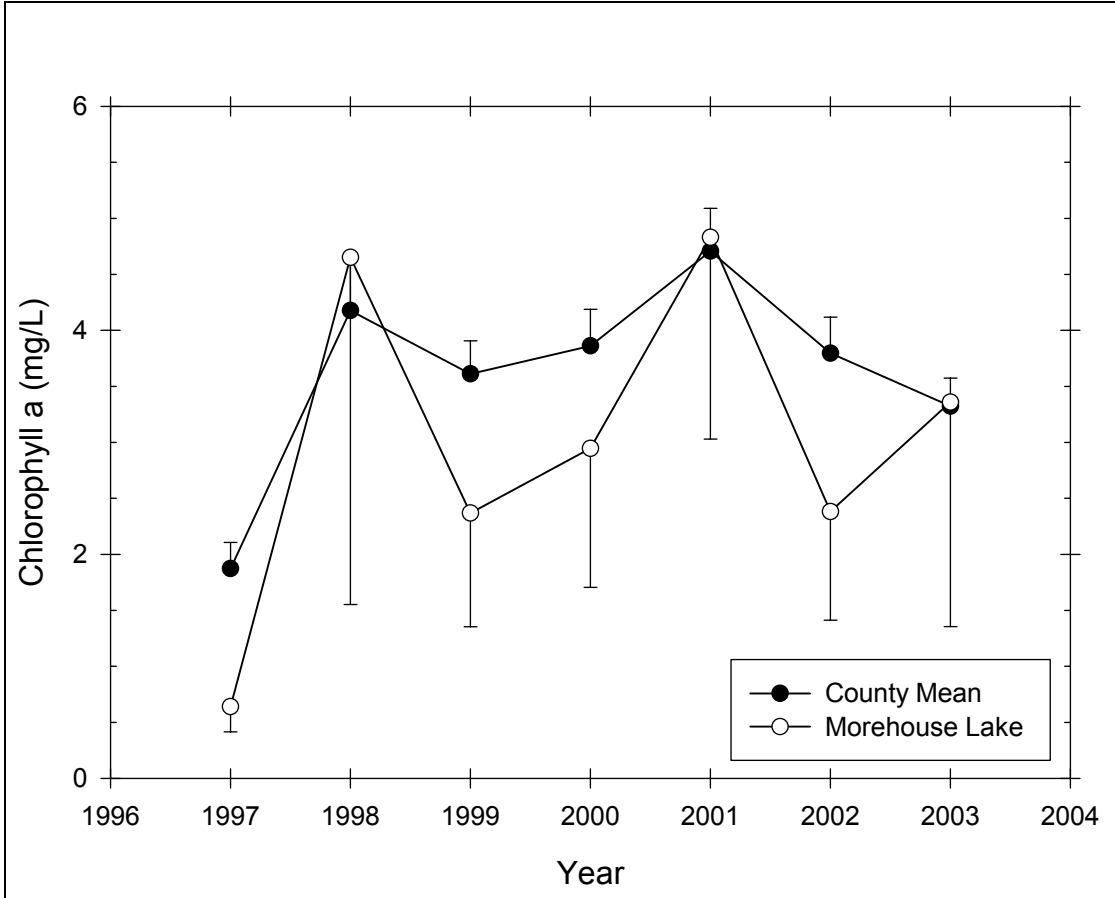


Figure 148 Seasonal mean chlorophyll a trend in Morehouse Lake

Table 117 – Descriptive Statistics for Chlorophyll a in Morehouse Lake

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1997	6	0	0.640	0.214	0.0872	0.224
1998	6	0	4.652	2.954	1.206	3.100
1999	6	1	2.368	0.817	0.365	1.014
2000	6	0	2.947	1.183	0.483	1.241
2001	6	1	4.830	1.449	0.648	1.799
2002	6	2	2.382	0.610	0.305	0.971
2003	6	3	3.360	0.809	0.467	2.009
Year	Range	Max	Min	Median	25%	75%
1997	0.570	1.040	0.470	0.570	0.500	0.690
1998	6.630	8.880	2.250	3.170	2.510	7.930
1999	1.970	3.760	1.790	1.940	1.880	2.770
2000	3.150	5.010	1.860	2.710	2.020	3.370
2001	3.400	6.450	3.050	4.760	3.620	6.173
2002	1.310	3.030	1.720	2.390	1.875	2.890
2003	1.470	3.900	2.430	3.750	2.760	3.862
Year	Skewness	Kurtosis	K-S Dist.	K-S Prob.	Sum	Sum of Squares
1997	1.672	2.877	0.241	0.317	3.840	2.686
1998	0.925	-1.630	0.315	0.064	27.910	173.459
1999	1.780	3.065	0.300	0.150	11.840	30.707

2000	1.173	1.091	0.219	0.433	17.680	59.090
2001	-0.0680	-2.204	0.206	0.570	24.150	125.045
2002	-0.0395	-3.840	0.226	0.535	9.530	23.823
2003	-1.665	--	0.352	0.157	10.080	35.177

## Transparency

Figure 149 presents the seasonal mean transparency trend in Morehouse Lake, while Table 118 presents descriptive statistics for transparency in Morehouse Lake. The transparency in Morehouse Lake generally exhibited an increasing trend from 1994 to 2002. The transparency in Morehouse Lake was slightly higher than the county average, though this difference was not statistically significant.

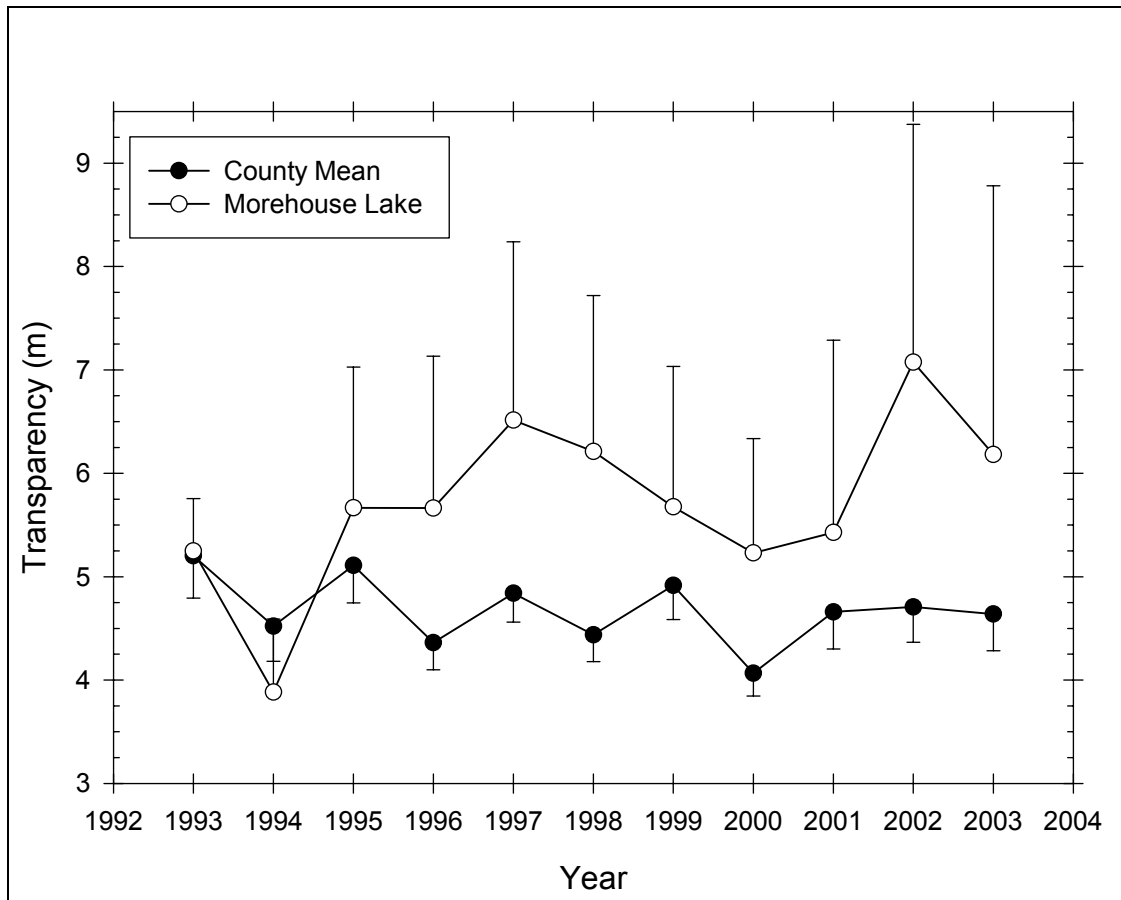


Figure 149 Seasonal mean transparency trend in Morehouse Lake

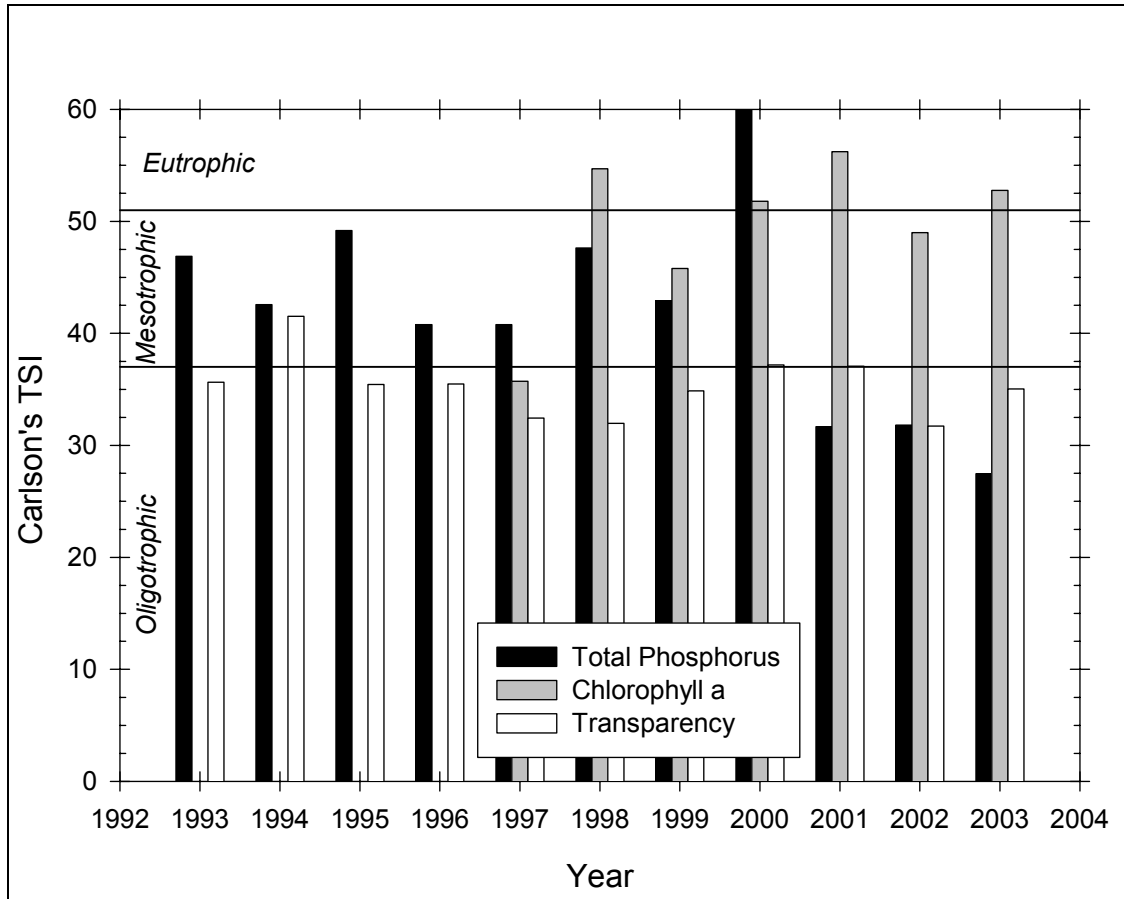
Table 118 – Descriptive Statistics for Transparency in Morehouse Lake

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1993	6	1	5.248	0.408	0.182	0.507
1994	6	0	3.883	0.674	0.275	0.707
1995	6	0	5.667	1.296	0.529	1.360
1996	6	0	5.663	1.400	0.571	1.469
1997	6	0	6.515	1.644	0.671	1.725
1998	6	0	6.212	1.437	0.587	1.508

1999	5	0	5.676	1.094	0.489	1.358
2000	6	0	5.230	1.054	0.430	1.106
2001	5	0	5.428	1.497	0.670	1.859
2002	4	0	7.075	1.445	0.723	2.300
2003	4	0	6.183	1.633	0.817	2.599
<b>Year</b>	<b>Range</b>	<b>Max</b>	<b>Min</b>	<b>Median</b>	<b>25%</b>	<b>75%</b>
1993	1.090	5.940	4.850	5.150	5.075	5.348
1994	1.900	4.600	2.700	3.950	3.700	4.400
1995	3.250	7.500	4.250	5.275	4.700	7.000
1996	3.550	7.420	3.870	5.500	4.550	7.140
1997	4.220	8.340	4.120	7.130	4.870	7.500
1998	3.570	7.420	3.850	6.850	5.050	7.250
1999	2.690	6.970	4.280	5.980	4.707	6.467
2000	3.030	7.130	4.100	5.075	4.500	5.500
2001	3.440	7.940	4.500	4.500	4.500	6.260
2002	3.500	8.700	5.200	7.200	6.100	8.050
2003	3.350	7.800	4.450	6.240	4.800	7.565
<b>Year</b>	<b>Skewness</b>	<b>Kurtosis</b>	<b>K-S Dist.</b>	<b>K-S Prob.</b>	<b>Sum</b>	<b>Sum of Squares</b>
1993	1.628	3.481	0.395	0.010	26.240	138.374
1994	-1.127	1.570	0.226	0.395	23.300	92.750
1995	0.641	-1.433	0.263	0.212	34.000	201.065
1996	0.161	-1.478	0.188	0.608	33.980	202.235
1997	-0.721	-1.209	0.297	0.102	39.090	268.180
1998	-1.137	-0.231	0.300	0.099	37.270	241.834
1999	-0.269	-1.693	0.209	0.553	28.380	165.872
2000	1.291	2.240	0.232	0.362	31.380	169.669
2001	1.672	2.457	0.332	0.074	27.140	156.284
2002	-0.500	1.273	0.229	0.523	28.300	206.490
2003	-0.0854	-4.724	0.259	0.393	24.730	160.894

## TSI

Figure 150 presents the Carlson trophic state index trend in Morehouse Lake. Transparency TSI was generally oligotrophic near the oligotrophic-mesotrophic boundary. Chlorophyll *a* TSI was variable, between the upper mesotrophic and eutrophic ranges. Total phosphorus TSI values were mesotrophic from 1993 to 1999, eutrophic in 2000 (data outlier), and oligotrophic in 2001 to 2003.



**Figure 150** Carlson TSI trend in Morehouse Lake

### Aluminum

Figure 151 presents the seasonal mean aluminum trend in Morehouse Lake, while Table 119 presents descriptive statistics for aluminum in Morehouse Lake. The aluminum in Morehouse Lake exhibited no discernible trend. The aluminum in Morehouse Lake was higher than the county average, though this difference may not be statistically significant for all years.

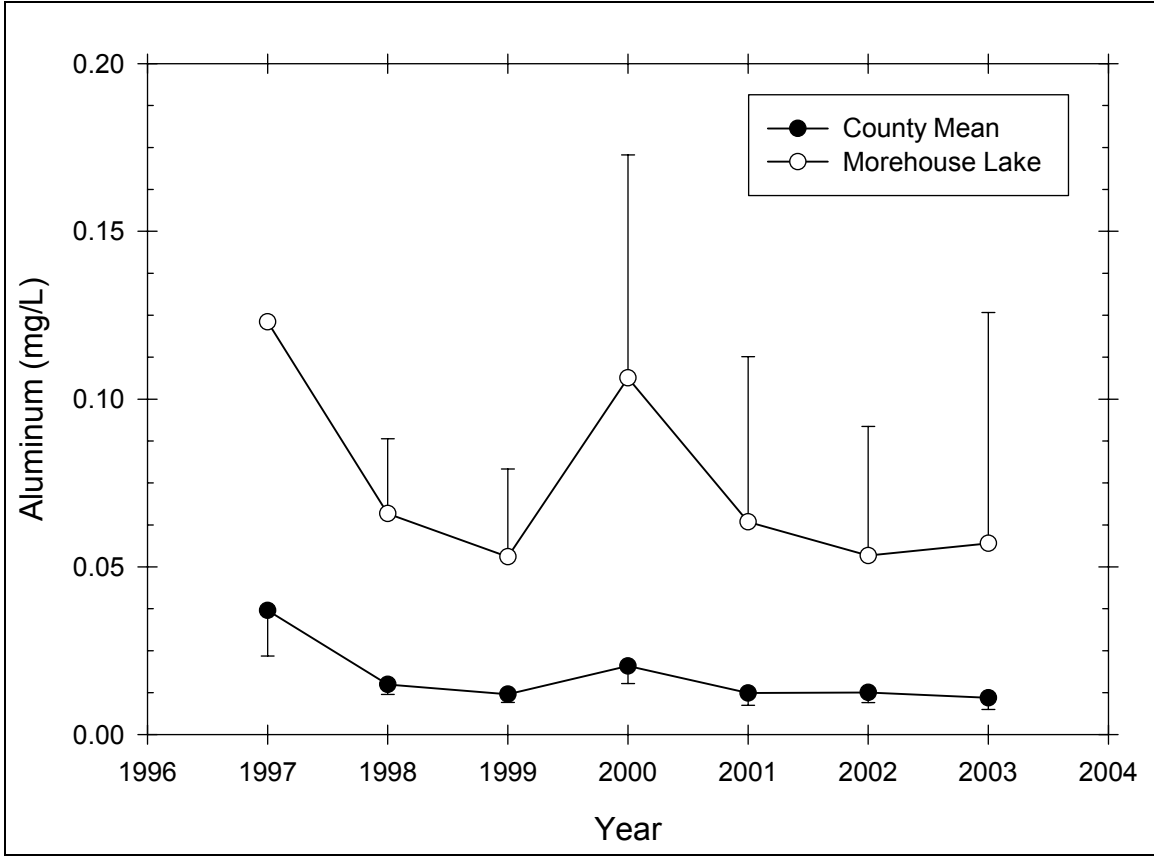


Figure 151 Seasonal mean aluminum trend in Morehouse Lake

Table 119 – Descriptive Statistics for Aluminum in Morehouse Lake

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1997	6	5	0.123	--	--	--
1998	6	0	0.0658	0.0213	0.00869	0.0223
1999	6	1	0.0530	0.0211	0.00942	0.0261
2000	6	0	0.106	0.0633	0.0258	0.0664
2001	6	1	0.0634	0.0397	0.0177	0.0493
2002	6	3	0.0533	0.0155	0.00897	0.0386
2003	6	2	0.0570	0.0432	0.0216	0.0688
Year	Range	Max	Min	Median	25%	75%
1997	0.000	0.123	0.123	0.123	0.123	0.123
1998	0.0520	0.0870	0.0350	0.0675	0.0520	0.0860
1999	0.0530	0.0870	0.0340	0.0490	0.0370	0.0645
2000	0.147	0.186	0.0390	0.0935	0.0520	0.174
2001	0.0960	0.110	0.0140	0.0730	0.0275	0.0935
2002	0.0300	0.0660	0.0360	0.0580	0.0415	0.0640
2003	0.0930	0.121	0.0280	0.0395	0.0310	0.0830
Year	Skewness	Kurtosis	K-S Dist.	K-S Prob.	Sum	Sum of Squares
1997	--	--	--	--	0.123	0.0151
1998	-0.402	-1.666	0.232	0.364	0.395	0.0283
1999	1.297	1.646	0.225	0.477	0.265	0.0158
2000	0.349	-2.211	0.228	0.387	0.638	0.0879

2001	-0.231	-1.935	0.196	0.617	0.317	0.0264
2002	-1.230	--	0.285	0.372	0.160	0.00902
2003	1.846	3.453	0.359	0.078	0.228	0.0186

### Calcium

Figure 152 presents the seasonal mean calcium trend in Morehouse Lake, while Table 120 presents descriptive statistics for calcium in Morehouse Lake. The calcium in Morehouse Lake exhibited a very slight increasing trend from 1997 to 2002. The calcium in Morehouse Lake was significantly lower than the county average.

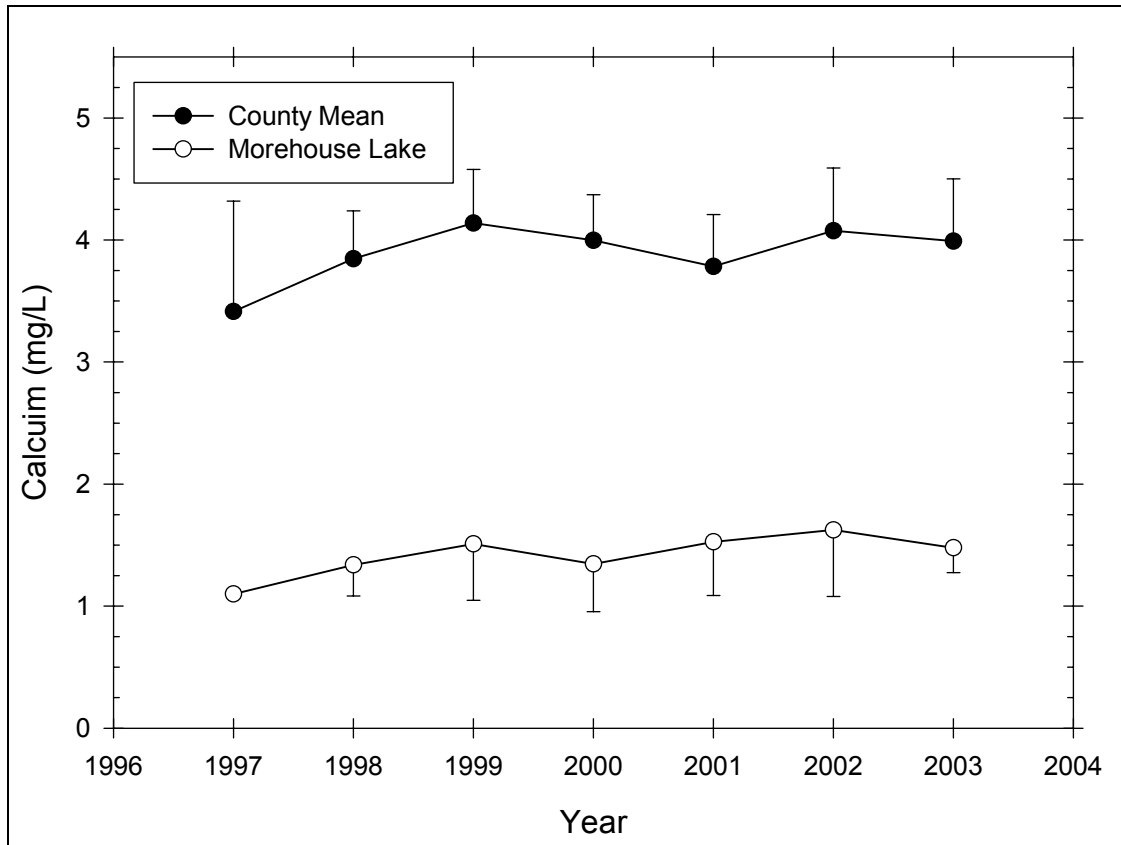


Figure 152 Seasonal mean calcium trend in Morehouse Lake

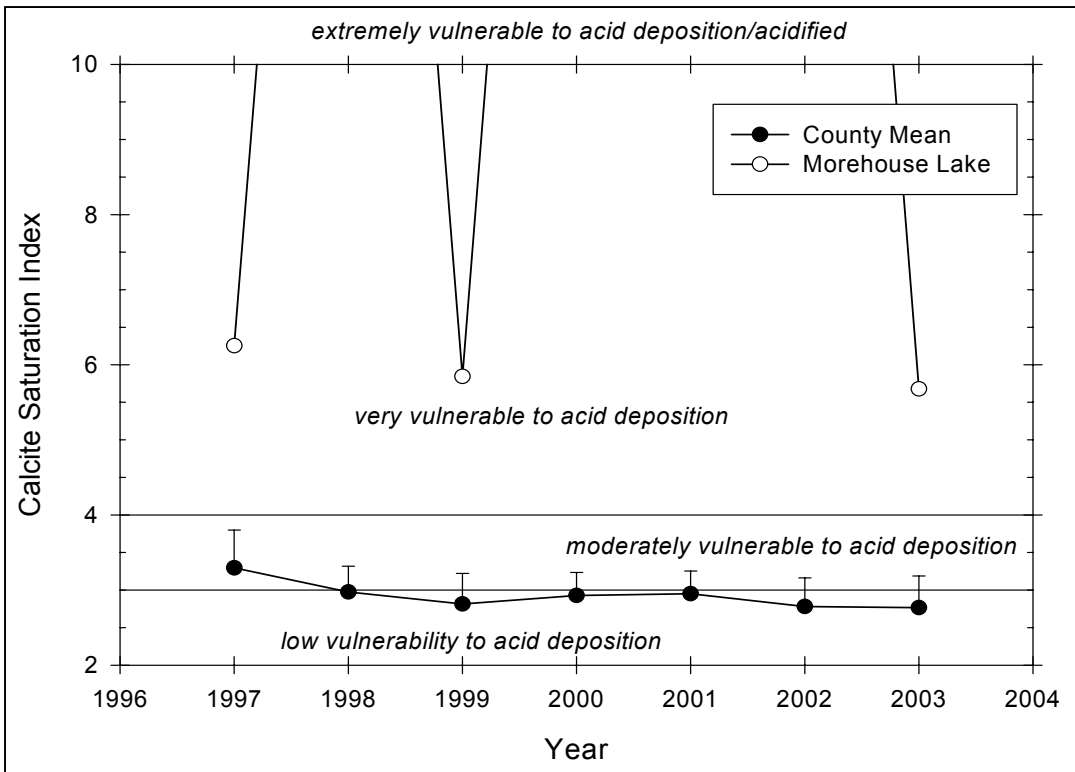
Table 120 – Descriptive Statistics for Calcium in Morehouse Lake

Year	Size	Missing	Mean	Std Dev	Std. Error	C.I. of Mean
1997	6	5	1.100	--	--	--
1998	6	0	1.338	0.243	0.0992	0.255
1999	6	1	1.510	0.372	0.166	0.462
2000	6	0	1.347	0.374	0.152	0.392
2001	6	1	1.526	0.354	0.158	0.439
2002	6	3	1.623	0.219	0.127	0.545
2003	6	2	1.478	0.127	0.0637	0.203
Year	Range	Max	Min	Median	25%	75%
1997	0.000	1.100	1.100	1.100	1.100	1.100
1998	0.610	1.660	1.050	1.320	1.130	1.550

1999	0.980	2.010	1.030	1.470	1.255	1.785
2000	0.970	1.980	1.010	1.260	1.020	1.550
2001	0.860	2.010	1.150	1.390	1.270	1.830
2002	0.420	1.870	1.450	1.550	1.475	1.790
2003	0.250	1.620	1.370	1.460	1.370	1.585
Year	Skewness	Kurtosis	K-S Dist.	K-S Prob.	Sum	Sum of Squares
1997	--	--	--	--	1.100	1.210
1998	0.180	-1.891	0.187	0.612	8.030	11.042
1999	0.133	-0.306	0.143	0.746	7.550	11.955
2000	1.053	0.514	0.191	0.588	8.080	11.579
2001	0.585	-1.534	0.250	0.351	7.630	12.144
2002	1.336	--	0.298	0.325	4.870	8.002
2003	0.255	-4.547	0.301	0.224	5.910	8.781

### Calcite Saturation Index

Figure 153 presents the calcite saturation index trend in Morehouse Lake. The calcium in Morehouse Lake oscillated between very vulnerable to acid deposition to extremely vulnerable to acid deposition (CSI value of infinity due to negative alkalinities). The CSI in Morehouse Lake was significantly higher than the county average.



**Figure 153** Seasonal mean CSI trend in Morehouse Lake