

THE LAKE GEORGE LAY MONITOIRING PROGRAM 1981

Completed by

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FWI #82-3

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ABSTRACT

The Lake George Lay Monitoring Program completed its second season during 1981. Thirteen lake shore residents, many of whom had participated in the program during 1980, monitored air and water temperature and secchi depth on a weekly basis and at 30 sites from June to October. In addition, water sampling intensives were conducted on three dates during the summer. Lake monitors collected water samples from various sites along the lake, which were analyzed for chlorophyll content by the Rensselaer Fresh Water Institute. This years program encompassed a longer time span, involved local businesses and communities groups and further extended the data base initiated by the 1980 program.

The Lake George Lay Monitoring Program, sponsored by the Lake George Association and the Rensselaer Fresh Water Institute, was started during the summer of 1980 to involve lake shore residents in a concerted effort to record the lake's water quality throughout the summer season. The program was continued throughout the 1981 season. A much longer span of data was obtained during 1981 because most of the monitors has been involved during the first year. Monitors returned to the sites sampled during 1980 in order that a continuous record of data be obtained over the years.

Figure 1 shows the locations of the monitored sites. Three new sites were added in the vicinity of the narrows region. Lake monitors were provided with a thermometer, to measure air and water temperatures, and a weighted secchi disk, to record water clarity in terms of secchi depth, the depth at which the black and white disk disappears from view. Each monitor was responsible for from two to four sites which he or she attempted to visit at least once a week. At each site monitors recorded, on the data sheets, the time and date of the visit, temperatures, secchi depth, and five ordinal variables ranking sky, light, wind and water conditions.

Table 1 lists the monthly averages for secchi depth recorded at each site. There appears to be no clearly defined trend towards decreasing secchi depths as one proceeds from south to north. The lowest secchi depths were recorded in Huddle Bay and at the three northernmost sites, near the lake's outfall. The mean secchi depth recorded for the whole lake was 9.6 meters. From Table 2, a comparison of the two years of results, mean secchi depths appear to be greater during 1981 than 1980.

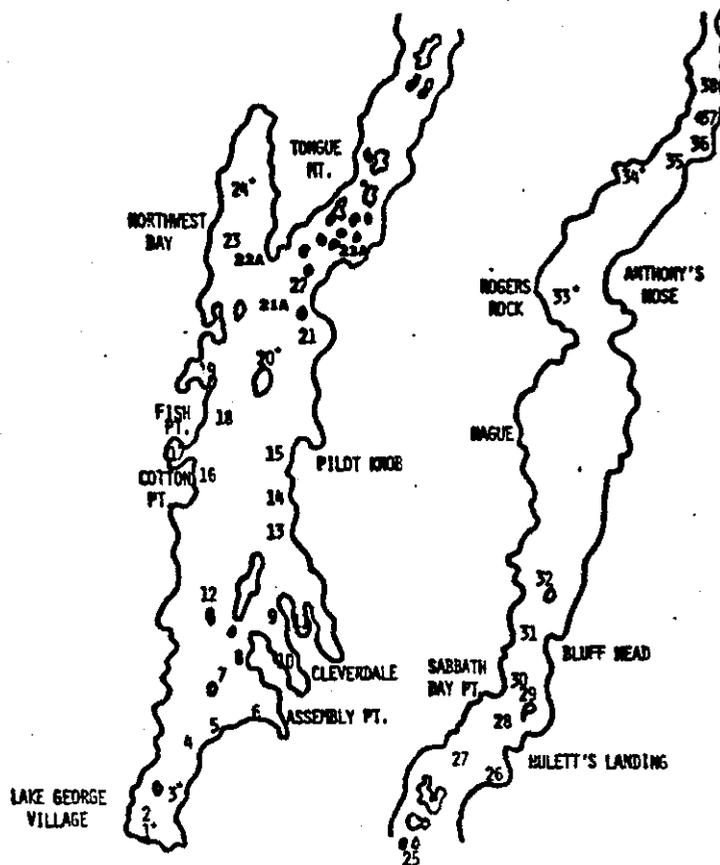


Figure 1. Locations of sampling sites in the north basin (right) and south basin (left) of Lake George.

Table 1. Average secchi disk readings in meters

Site Number	Station Brief description of site	June	July Mean Value (# of reading)	August	September	October	Average
1	Off Sheppard Park		8.2 (3)	8.9 (4)	9.0 (1)		8.6
2	Mid Lake between Tea Is. and Sheppard Park		8.7 (3)	10.5 (4)	11.0 (1)		9.9
3	25 yards off Tea Island		9.2 (3)	9.5 (5)	9.5 (1)		9.4
4	Plus Point		9.5 (1)				
7	Between Diamond and South Isles		7.5 (1)	11.0 (1)			9.2
8	Off the West Side of Assembly Pt.	10.0 (1)	-	9.0 (5)	9.2 (4)	8.9 (4)	9.1
10	Mid Harris Bay		7.4 (1)				
13	Mouth of Echo Bay		9.8 (3)	9.4 (5)	10.3 (1)		9.6
14	Mouth of Isom Bay		9.4 (3)	9.3 (5)	10.8 (1)		9.5
15	Half mile off Pilot Knob		9.2 (3)	9.5 (4)			9.4
16A	Andrews Bay		8.2 (3)	8.4 (4)			8.3
18	Off Madame Homer Point		10.3 (3)	10.4 (4)	9.0 (2)		10.1
19	Mid Muddle Bay		7.3 (3)	7.4 (4)	7.6 (3)		7.4
20	200 yards North of Dome Isle	12.4 (2)	8.8 (4)	8.6 (4)	8.8 (3)		9.3
21	Shelving Rock Bay		11.1 (4)	11.0 (4)	11.5 (1)		11.1
21A	Mid Lake between Crown Is. and Shelving Rock			9.0 (3)	9.0 (1)		9.0
22	Off 14 Mile Isle		11.0 (5)	11.1 (5)	11.3 (1)		11.1
22A	Mid Lake between Tongue Mt. and West Shore			9.6 (4)	10.3 (2)		9.8
23	Mouth of Northwest Bay		11.3 (5)	10.9 (4)	9.0 (2)		10.6
23A	Between Junnita Is. and East Shore			9.5 (4)	9.5 (2)		9.5
24	Mid Northwest Bay	11.9 (2)	9.7 (4)	8.6 (4)	9.3 (3)		9.6
25	100 yards of S.W. end of Harbor Is.			12.5 (2)	11.0 (2)	10.8 (2)	11.4
26	Sunset Bay between Loon & Narrow Is.			11.5 (2)	11.5 (2)	10.7 (2)	11.5
30	Mid Lake at Sabbath Day Pt.		10.9 (4)	9.5 (3)	11.0 (1)		10.4
31	Mid Lake at Bluff Head		9.6 (4)	9.3 (3)	10.5 (1)		9.6
32	Mid Lake off Odell Isle and W. Shore		11.1 (4)	10.2 (3)	12.0 (1)		10.9
33	Mid Lake off Rogers Rock		10.6 (5)	9.3 (4)	10.1 (4)		9.9
34	Mid Heart Bay		7.9 (3)	8.5 (4)	8.3 (4)		8.3
35	Mid Channel Black Pt. (Tiroga Pt.)		6.9 (3)	7.5 (1)			7.0
36	Off North Shore of Black Pt.		7.7 (3)	8.0 (4)	9.1 (4)		8.3

Table 2. A comparison of 1980, 1981 Lake George lay monitoring data

Secchi Depth							
		July		August		September	
		1980	1981	1980	1981	1980	1981
Mean	-		9.4	8.6	9.5	8.9	9.6
S.D.	-		1.48	2.90	1.19	2.98	1.23
Range	-		6.5-12.5	5.9-11.4	7.3-12.5	6.5-11.4	7.0-12.5
Surface Water Temperature							
Mean	-		22.7	21.7	22.3	19.0	19.3
S.D.	-		1.32	3.75	1.39	2.70	1.71

During 1981 a new aspect was added to the monitoring program. Three times during the summer season water sampling intensives were conducted. On these days monitors collected approximately four liters of water from the surface of one of their sites in polyethylene containers provided to them. They delivered them to specified collection stations, which provided refrigerated storage for the samples, until they were picked up by members of the Fresh Water Institute staff and transported to a laboratory for chlorophyll analysis. These collection stations, the Cleverdale Country Store, the Lake George Steamboat Company and the Bolton Chamber of Commerce, also served as equipment and information distribution stations. The results of these water sampling intensives are reported in Table 3.

Table 3. Mean chlorophyll concentrations during water sampling intensives

Concentrations reported in $\mu\text{g/l}$			
	July 12	August 1	August 22
Number of samples	9	8	6
\bar{x}	0.65	0.69	0.73
S.D.	0.20	0.11	0.29

There were lay monitor sites located within a few hundred yards of all but one of the Fresh Water Institute deepwater sites, which were monitored on a triweekly basis throughout the summer. These proximate sites are starred on the map in Figure 1. Data taken by the lake monitors and the FWI staff were coded into an IBM 3033 computer at Rensselaer Polytechnic Institute. Data taken, at the proximate sites, by the lake monitors and the FWI staff were compared only if they were taken no more than three days apart. Table 4 lists the standard correlation coefficients between similar measurements. There is a good correlation between the chlorophyll concentrations and the surface water temperatures recorded by the FWI staff and those recorded by the lay monitors, however, a poor correlation between secchi depths recorded. This could be due to the small number of data points used in the correlation and the variability in weather conditions on successive days, which would have less effect upon chlorophyll concentrations and temperatures than on secchi depths.

Table 4. Correlation between FWI staff measurements and Lay Monitor measurements for proximate sites.

(N = 10 - 13)

		FWI Staff		
		Secchi	Chl a	Temp.
Lay Monitors	Secchi	-.497		
	Chl a		.754	
	Temp.			.783

On the IBM computer a multisample analysis of variance was conducted on the secchi depths recorded by the lay monitors, based on the ordinal variables they also recorded for sky, light and water conditions. Secchi depths appear to be unaffected by the various sky conditions (cloud cover), however, there are statistically significant differences amongs the mean secchi depths for each classification of lighting and water condition. Lower secchi depths were recorded when the lighting was bright or the water choppy.

Continued computer correlation between measurements made by the lake monitors and those made by the FWI staff would be useful as this program continues. If a reasonable validity may be given to the monitors results, a program of this type would be a useful tool to a lake community which wished to monitor water quality after, for example, a restoration program had been completed upon their lake. The community would be able to take direct responsibility in maintaining water quality without the need for an expensive private consulting firm.

ACKNOWLEDGEMENTS

We wish to again thank the Lake George Association Fund for its financial support which made this monitoring program possible. Thanks also go to the Lake George Association and its members and leadership for their moral and financial support of our efforts to monitor and study Lake George. Finally the lay monitors have again given us valuable data which has helped us to better understand Lake George. Many thanks to all of you.

DISCUSSION

Question - Is there a specific time of day that Secchi depth should be measured?

Clifford - Between 9-11 a.m. and 2-4 p.m. because the sun is at the best angle.

Question - Is there a wide age distribution of monitors?

Clifford - They range from 13-70.

Question - The standard deviation for results of 1981 is one-half of that for 1980

Clifford - That is because the lay monitors were better trained in 1981.

Question - What is chlorophyll a?

Clifford - It is the pigment of algae.

Question - Why is there a large decrease in transparency in the North end of the lake?

Clifford - There is an accumulation of gray glacial clay that can be easily flocculated.