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Cossayuna Lake Water Quality Study
Summary of Results for June 7 – August 29, 2001

Introduction

Cossayuna Lake is a small 776 acre lake in Washington County of New York State. Its watershed of approximately 7,467 acres (12 square miles) is located primarily in the town of Argyle, with additional acreage in the towns of Greenwich, Hebron, and Salem. Land use within the watershed is a mixture of agricultural and residential, and the lake is used primarily for recreation (swimming, boating, and fishing).

As an apparent result of sedimentation and nutrient loading that has occurred over an extended period of time, Cossayuna Lake has experienced an increase in the population of a variety of species of aquatic plants. Of particular concern is the expansive growth of *Myriophyllum spicatum* (Eurasian watermilfoil), a non-native plant species introduced into the lake in the mid-1970s. To better control the growth of this and other aquatic plants, an attempt has been made to identify the sites at which inorganic plant nutrients, specifically phosphate and nitrate, are entering the lake.

As an outcome of a study conducted last year in which baseline levels of these substances were determined, it was concluded that an assessment of the major streams that flow into the lake was in order. Several streams were sampled, and our results indicate that runoff carried from agricultural areas of the watershed may be contributing significant amounts of inorganic nutrients to the lake.

Method

Once a week for approximately 10 weeks, water samples were obtained from several streams that flow into the lake. The sampling sites included two streams that enter the lake in the vicinity of the State Boat Launch, a location on the east side of the lake where a significant delta has formed, and two streams on the west side of the lake (see Appendix A). Additional samples were taken from the outlet of the lake. In each case, the water samples were "grab" samples taken from just below the surface of the water. In some cases, samples were obtained at two sites along the stream; one at the convergence of the stream and lake, and a second sample further upstream.

The water samples were assayed to determine the concentration of ortho-phosphate, nitrate-nitrogen, and total chlorine (an indicator of septic system pollution). In addition, the temperature, pH, and conductivity were determined. A sample was also obtained in a sterile plastic sampling bottle and transported on ice to the laboratory at Adirondack Community College, where bacterial counts for fecal coliform and fecal streptococci were performed. The data was maintained in a spreadsheet and analyzed at the end of the sampling season.

Results and Discussion

Relatively high concentrations of phosphate (>100μg/L) were observed in several of the streams over the course of the summer, most notably those sites represented as "Boat Launch Mouth" (site 6), and "Delta" (site 4). Higher than average concentrations were also obtained from the stream site at Kilmer Road (site 1), which was only tested for three weeks toward the end of the summer at the suggestion of lake resident Bob Baldwin (see Appendix A). It is apparent from the land use map of the Cossayuna Lake watershed (Appendix B) that these streams travel through properties that are primarily agricultural.

The concentration of phosphate detected at sites 5 and 6 (the boat launch) showed two peaks; one at the beginning of June when the study began, and again in mid-to-late July. As shown in the graphs in Appendix C, a corresponding set of peaks was observed at site 4 (the delta and the culvert that channels the stream through the delta), although the concentration of phosphate is not as high. The early peak may be related to the runoff of melting snow, while it may be possible to correlate the later peak with a particular storm event or rainy period.

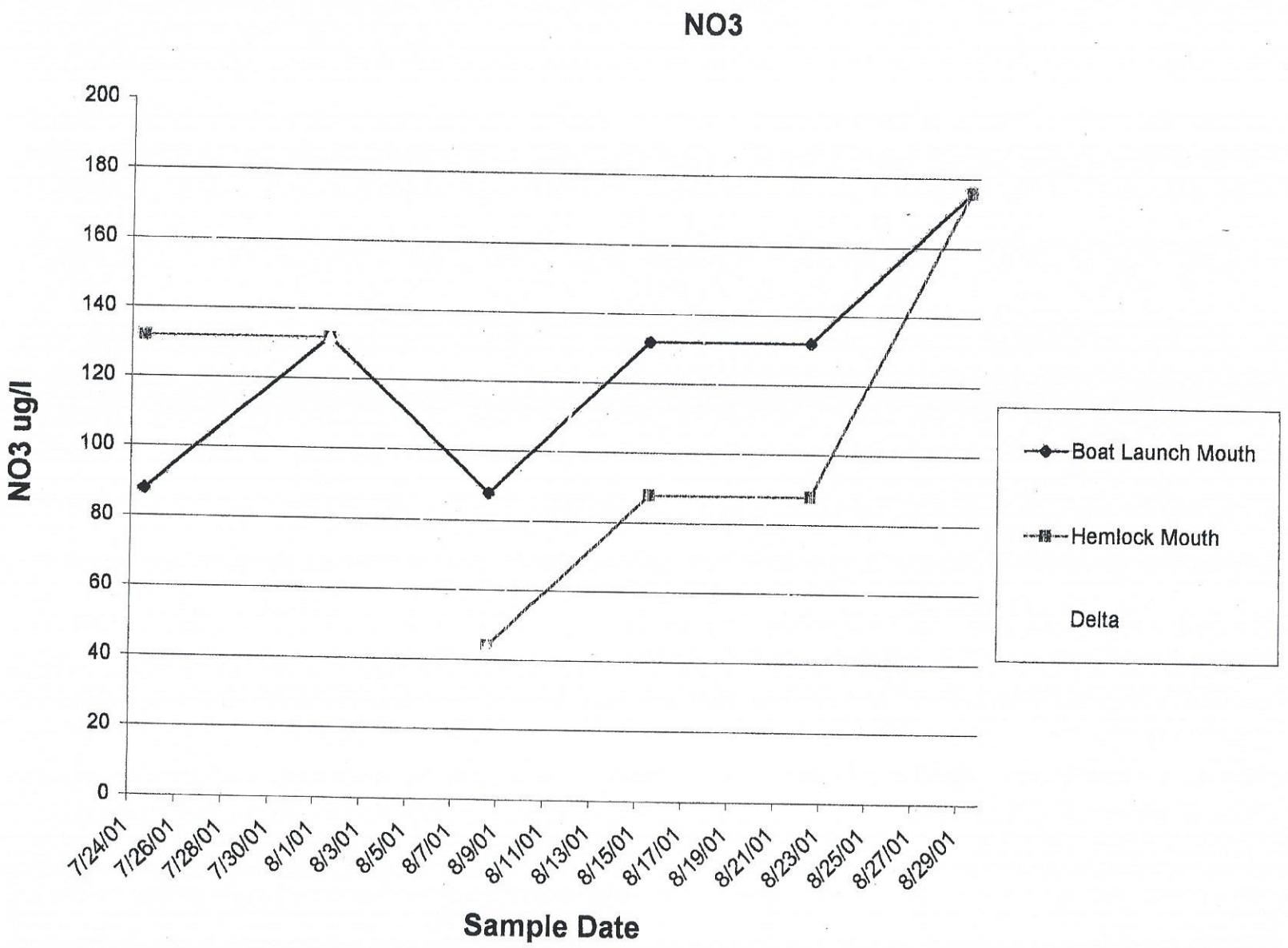
The concentration of nitrate was also noticeably high, particularly at sites 6 and 4, at the beginning of the sampling period. At site 4 (the delta), there was an additional peak at the beginning of August. The highest concentration of nitrate was actually observed during the last week of testing at sites 6 and 7. Again, it would be interesting to determine if these peaks in nitrate concentration could be correlated to rain events.

Fecal coliform and fecal streptococci were detected on numerous occasions at many of the sites over the course of the summer. The concentration of organisms varied widely, and there were no detectable patterns. The majority of the bacterial colonies were fecal streptococci, and on the occasion that fecal coliforms were detected, the ratio of fecal coliform to streptococci (FC/FS) never exceeded 1, which indicates that the fecal bacteria detected were of animal, and not human origin. The most likely source of these bacteria is waterfowl, and in her report, ACC Water Quality Intern Michelle Schwab noted the large duck population present on the lake.

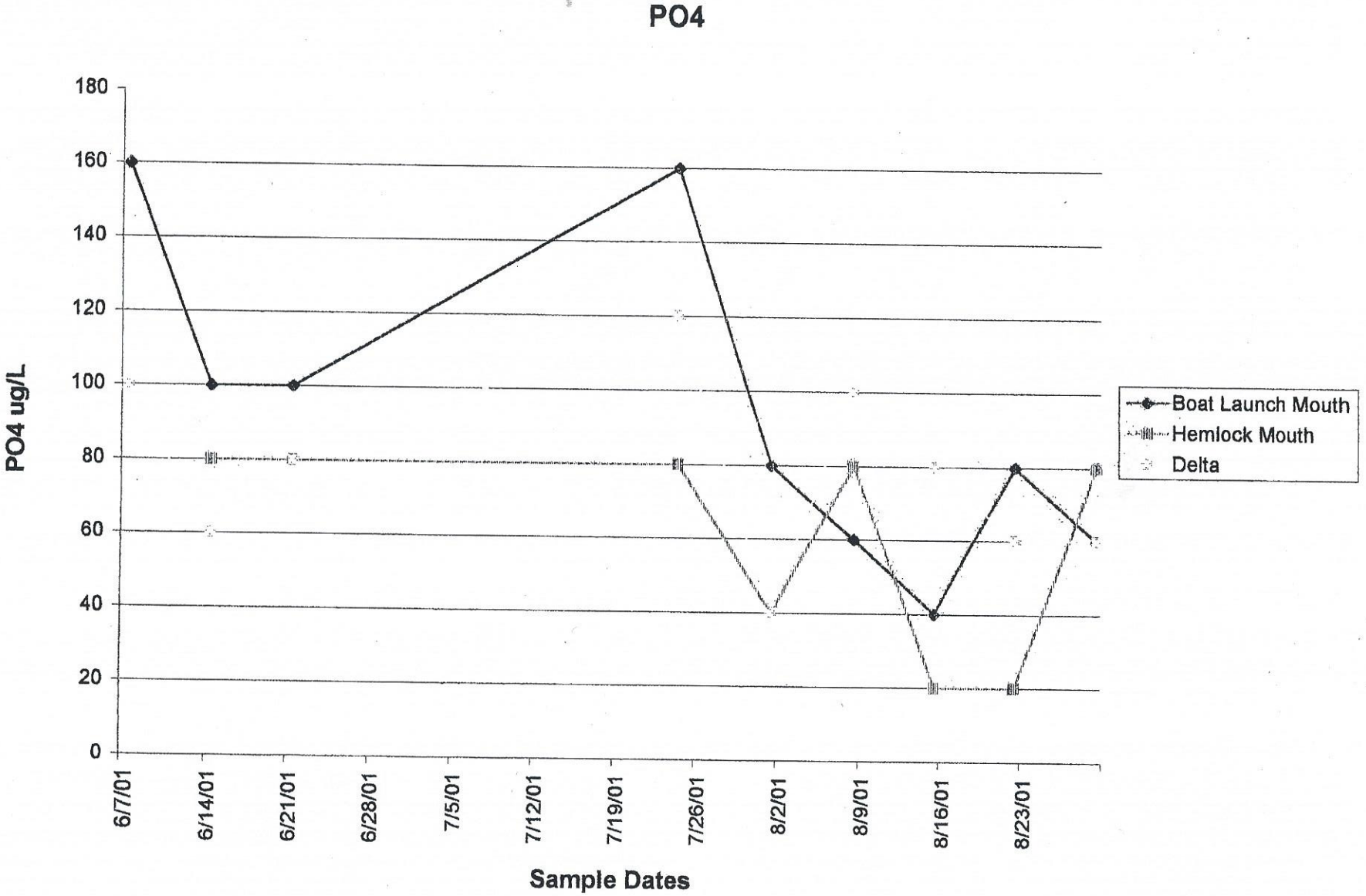
It would appear from this data that there is a considerable input of inorganic nutrients from the streams that flow into Cossayuna Lake, particularly those streams at the north end of the lake and at the "delta" site. It would appear also that the stream at the Kilmer road (site 1) may be contributing to the nutrient load, but this should be confirmed with additional tests since the site was only sampled for three weeks at the end of the summer.

My interpretation of this data essentially mirrors the conclusions reached by David Smith in his lake study of 1984-1987. It would therefore appear that the problem of nutrient loading as a result of runoff is not new but ongoing, and should be addressed in order to stave off further eutrophication of Cossayuna Lake.

Nitrate Concentrations



Phosphate Concentrations



Cossayuna Lake Water Quality Study
June – August 2001

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Cossayuna Lake Water Quality Study
June - August 2001

Introduction

Cossayuna Lake is a small, 776 acre lake, with a watershed of approximately 7,467 acres (Appendix A). The land use within this region includes agriculture and residential, (Appendix B), and the lake is primarily used for recreation (swimming, boating, and fishing).

A large amount of research has been done on this lake involving its water quality. This current research was a follow-up to the water quality study of 2000 done at Adirondack Community College. In the conclusion of that study, it was suggested that the inlets of Cossayuna Lake be examined for their contribution to the lake's nutrients, specifically nitrate and phosphate, because these nutrients could encourage plant growth, and therefore contribute to eutrophication.

Method

Samples were taken at nine sites around Cossayuna Lake. These sites were chosen based on possible phosphate contamination carried by streams. Samples were taken from five streams flowing into the lake. Samples were also taken at the mouths of three of the streams. A final sample was taken at the outlet of the lake.

The following water quality indicators were examined at each sampling location: water temperature, pH, conductivity, nitrate, ortho-phosphate, phosphorus, and chlorine. Additional 500 mL samples were collected in sterile plastic sampling bottles and transported on ice to the laboratory at Adirondack Community College, where bacterial counts for fecal coliform and fecal streptococci were preformed.

In addition, a visual assessment of the population of aquatic plants was made at each site during water sampling. This information was considered in an attempt to correlate the results of the biological and chemical tests with areas showing increases in weed population.

Results and Discussion

Throughout this investigation, the only unusual plant growth was found at the boat launch mouth site, the hemlock mouth site, and at the outlet. At the boat launch mouth site, there was no noticeable amount of plant growth during the first sampling, but within a month of that, a large amount of plant growth appeared. During this time, the temperature of the water increased 6°C, the pH increased from 7.7-8.3, and the

conductivity increased by 50ppm, but the nitrate concentration decreased from 0.22ppm to .088 ppm while the phosphate concentration stayed the same (Appendix C).

At the hemlock mouth site, there was also no noticeable plant growth during the first sampling, but within a month of that sampling, a large amount of plant growth appeared. During this time the pH increased from 7.6 - 8.5, but the temperature remained the same, the conductivity remained the same, the nitrate concentration only increased from 0.11ppm to 0.132ppm and the phosphate level stayed the same. The fecal coliform and fecal streptococci counts did increase over this time, from an FC/FS ratio of 0 to an FC/FS ratio of 0.42 (Appendix C).

At the outlet, there was some noticeable plant growth at the first sampling, but it increased substantially by the end of sampling. Throughout this time, the temperature decreased 3°C, the pH rose from 7.6 - 8.3, the conductivity also rose from 110 - 170 ppm, there was no change in the concentration of nitrate, and the phosphate level decreased from .08 - .06 mg/L, and throughout the entire time, the FC/FS ratio was never more than 1 (Appendix C).

As a whole, the sites tested where there was a noticeable amount of plant growth had higher temperatures and had much larger ranges of pH than the sites where plant growth was less, but none of the tested sites had a considerably higher phosphate or nitrate level than any of the other sites. Lake samples were not taken during this testing period for comparison of the levels of these nutrients in the lake to the amounts leaving and coming into the lake, but the phosphate levels in the inlets of the lake seemed to be slightly higher than the phosphate levels found in the lake in 1984. More testing should be done, however, to see if the levels of these nutrients in the lake are in fact, being affected by the levels in the streams flowing into the lake.

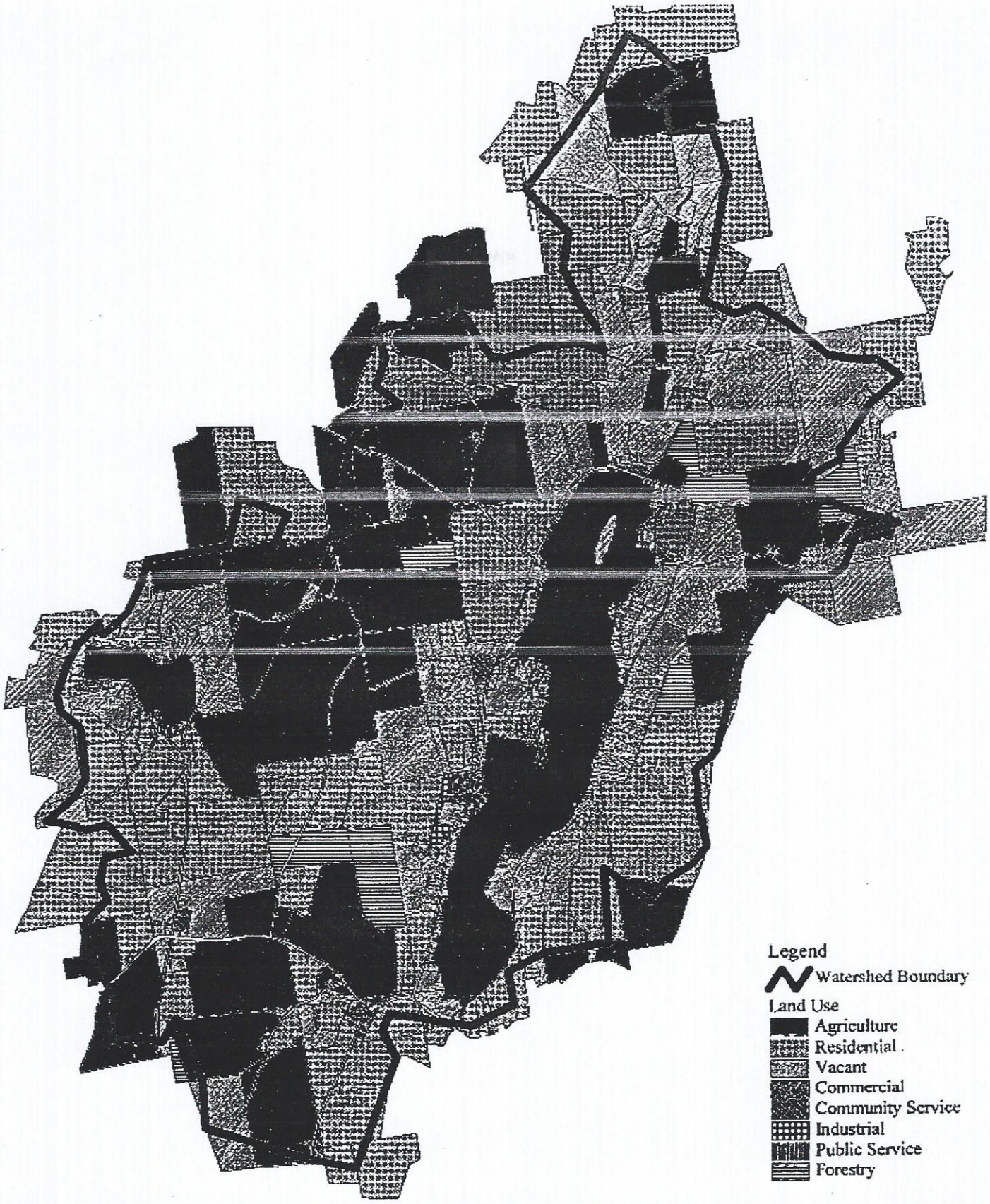
For all sampling sites, the fecal coliform counts did not exceed the safe use standards set by NYS, except in three occasions. The first two occasions were at the Hemlock sites. At these sites, the levels were above what is considered safe for swimming. On the third occasion, this high level of coliform occurred at the Delta site, and the levels were over twice what is considered safe for Boating and Fishing, but the site tends to be highly populated with ducks, and the FC/FS ratio at this time was only .58, suggesting that this contamination was probably due to the ducks.

Future research into this problem should include testing for possible pollution by agents that would cause the pH of the lake to become more basic, since the lake seems to slowly increase in pH throughout the summer months when the lake is used most for recreation. Also, future testing should be done of the lake inlets and the lake itself to find a correlation between the amount of phosphate entering in the streams and the amount of phosphate found in the lake.

Appendix A
(Cossayuna Lake Watershed)


Argyle
Goose Island
ARGYLE
Argyle
Barlow Mtn
Murdock Mtn
Cossayuna Lake
Cossayuna
South Argyle
Browns Mtn
McDougall Lake
CARTERS POND STATE WMA
Carter Pond
North Greenwich
East Greenwich
Watershed Boundry
0 2Km
0 1Mi
sampling sites

Appendix B
(Cossayuna Lake Landuse Map)



Land Use Map

Cossayuna Lake
Washington County, NY

Appendix C
(Detailed tables of Results)

Cossayuna Lake Summer 2001

SAMPLE LOCATION FIELD WORK SHEETS

Actual Sample Site	Boat Launch Mouth	Boat Launch Stream	Culvert	Delta		
Actual Sample Date	7-Jun-01	7-Jun	7-Jun	7-Jun		
Time	11:00am	11:00am	11:45am	11:45am		
Weather	60oF and cloudy	60oF and cloudy	60oF and cloudy	60oF and cloudy		
Appearance of Water	clear	clear	clear	clear		
Temp. C	17	8	13	14		
pH	7.7	7.3	7.7	7.6		
Conductivity PPM	130	230	130	100		
NO_3 mg/L	0.22	0.132	0.088	0.264		
PO4 reading	8	6	6	5		
PO4 mg/L	0.16	0.12	0.12	0.1		
P mg/L	2.66666667	2	2	1.66666667		
FC cp100ml	no data	no data	no data	no data		
FS cp100ml	no data	no data	no data	no data		
FC/FS ratio	no data	no data	no data	no data		

Cossayuna Lake Summer 2001

SAMPLE LOCATION FIELD WORK SHEETS

Actual Sample Site	Boat Launch Mouth	Boat Launch Stream	Culvert	Delta	Hemlock Stream	Hemlock Mouth
Actual Sample Date	14-Jun-01	14-Jun	14-Jun	14-Jun	14-Jun	14-Jun
Time	11:00am	11:00am	11:30am	11:30am	11:45am	11:45am
Weather	warm and clear	warm and clear	warm and clear	warm and clear	warm and clear	warm and clear
Appearance of Water	green with growth	green with growth	clear and calm	clear and calm	clear and calm	clear and calm
Temp. C	15	18	13	13	14	24
pH	7.1	7.1	7.3	7.2	7.2	7.6
Conductivity PPM	220	290	150	150	170	130
NO3 mg/L	no data	no data	0.044	0.11	0.088	0.11
PO4 reading	5	4	4	3	8	4
PO4 mg/L	0.1	0.08	0.08	0.06	0.16	0.08
P mg/L	1.66666667	1.33333333	1.33333333	1	2.66666667	1.33333333
FC cp100ml	0	0	0	0	150	0
FS cp100ml	480	150	20	30	120	90
FC/FS ratio	0	0	0	0	1.25	0

Cossayuna Lake Summer 2001

SAMPLE LOCATION FIELD WORK SHEETS

Actual Sample Site	Boat Launch Mouth	Boat Launch Stream	Culvert	Delta	Hemlock Stream	Hemlock Mouth
Actual Sample Date	21-Jun-01	21-Jun	21-Jun	21-Jun	21-Jun	21-Jun
Time	9:30am	9:30am	9:00am	9:00am	9:15am	9:15am
Weather	cold and rainy	cold and rainy	cold and rainy	cold and rainy	cold and rainy	cold and rainy
Appearance of Water	green with duckweed	clear	clear	clear	clear	clear
Temp. C	13	10	15	15	22	12
pH	7.4	7.2	7.3	7.4	7.9	7.7
Conductivity PPM	230	230	160	160	110	180
NO3 mg/L	no data	no data	no data	no data	no data	no data
PO4 reading	5	4	3	4	4	4
PO4 mg/L	0.1	0.08	0.06	0.08	0.08	0.08
P mg/L	1.66666667	1.33333333	1	1.33333333	1.33333333	1.33333333
FC cp100ml	no data	no data	no data	no data	no data	no data
FS cp100ml	no data	no data	no data	no data	no data	no data
FC/FS ratio	no data	no data	no data	no data	no data	no data

Actual Sample Site	Outlet				
Actual Sample Date	21-Jun				
Time	8:50am				
Weather	cold and rainy				
Appearance of Water	green with duckweed				
Temp. C	24				
pH	7.6				
Conductivity PPM	110				
NO3 mg/L	no data				
PO4 reading	4				
PO4 mg/L	0.08				
P mg/L	1.33333333				
FC cp100ml	no data				
FS cp100ml	no data				
FC/FS ratio	no data				

Cossayuna Lake Summer 2001

SAMPLE LOCATION FIELD WORK SHEETS

Actual Sample Site	Boat Launch Mouth	Boat Launch Stream	Culvert	Delta	Hemlock Stream	Hemlock Mouth
Actual Sample Date	24-Jul-01	24-Jul	24-Jul	24-Jul	24-Jul	24-Jul
Time	7:45am	7:45am	7:30am	7:30am	7:55am	7:55am
Weather	warm	warm	warm	warm	warm	warm
Appearance of Water	duckweed	clear	clear	clear	clear	mucky with growth
Temp. C	23	11	19	18	14	24
pH	8.3	7.5	8	8.1	8	8.5
Conductivity PPM	180	230	170	170	190	130
NO3 mg/L	0.088	0.132	0.176	0.176	0.132	0.132
PO4 reading	8	3	3	6	3	4
PO4 mg/L	0.16	0.06	0.06	0.12	0.06	0.08
P mg/L	2.66666667	1	1	2	1	1.33333333
FC cp100ml	0	0	20	100	0	480
FS cp100ml	2070	430	160	400	850	1150
FC/FS ratio	0	0	0.13	0.25	0	0.42

Actual Sample Site	Outlet				
Actual Sample Date	24-Jul				
Time	7:15am				
Weather	warm				
Appearance of Water	mucky with growth				
Temp. C	26				
pH	8.3				
Conductivity PPM	100				
NO3 mg/L	0.132				
PO4 reading	5				
PO4 mg/L	0.1				
P mg/L	1.66666667				
FC cp100ml	0				
FS cp100ml	790				
FC/FS ratio	0				

Cossayuna Lake Summer 2001

SAMPLE LOCATION FIELD WORK SHEETS

Actual Sample Site	Boat Launch Mouth	Boat Launch Stream	Culvert	Delta	Hemlock Stream	Hemlock Mouth
Actual Sample Date	1-Aug-01	1-Aug-01	1-Aug-01	1-Aug-01	1-Aug-01	1-Aug-01
Time	8:05am	7:55am	7:25am	7:25am	7:45am	7:40am
Weather	warm	warm	warm	warm	warm	warm
Appearance of Water	duckweed	clear	clear	clear	clear	mucky with growth
Temp. C	20	8	16	16	13	23
pH	8	7.7	8.2	8.1	8.3	8.5
Conductivity PPM	200	220	160	160	190	140
NO_3 mg/L	0.132	0.132	0.176	0.132	0.132	0.132
PO4 reading	4	3	3	2	4	2
PO4 mg/L	0.08	0.06	0.06	0.04	0.08	0.04
P mg/L	1.33333333	1	1	0.66666667	1.33333333	0.66666667
total chlorine mg/L	0.08	0.07	0.05	0	0	0.03
FC cp100ml	0	0	20	100	150	0
FS cp100ml	300	20	160	400	2180	300
FC/FS ratio	0	0	0.13	0.25	0.069	0

Actual Sample Site	Outlet				
Actual Sample Date	1-Aug-01				
Time	7:20am				
Weather	warm				
Appearance of Water	mucky with growth				
Temp. C	22				
pH	8.2				
Conductivity PPM	150				
NO_3 mg/L	0.176				
PO4 reading	4				
PO4 mg/L	0.08				
P mg/L	1.33333333				
total chlorine mg/L	0.19				
FC cp100ml	10				
FS cp100ml	20				
FC/FS ratio	0.5				

Cossayuna Lake Summer 2001

SAMPLE LOCATION FIELD WORK SHEETS

Actual Sample Site	Boat Launch Mouth	Boat Launch Stream	Culvert	Delta	Hemlock Stream	Hemlock Mouth
Actual Sample Date	8-Aug-01	8-Aug-01	8-Aug-01	8-Aug-01	8-Aug-01	8-Aug-01
Time	8:05am	8:00am	7:30am	7:30am	7:55am	7:45am
Weather	warm	warm	warm	warm	warm	warm
Appearance of Water	duckweed	clear	clear	clear	clear	mucky with growth
Temp. C	27	9	20	20	16	26
pH	8.8	7.4	8.2	7.8	7.7	8.4
Conductivity PPM	130	220	160	160	190	120
NO3 mg/L	0.088	0.044	0.088	0.044	0.044	0.044
PO4 reading	3	4	4	5	2	4
PO4 mg/L	0.06	0.08	0.08	0.1	0.04	0.08
P mg/L	1	1.33333333	1.33333333	1.66666667	0.66666667	1.33333333
total chlorine mg/L	0.23	0.09	0.13	0.02	0	0
FC cp100ml	0	0	120	0	210	0
FS cp100ml	90	90	890	>3000	560	620
FC/FS ratio	0	0	0.13	0	0.38	0

Actual Sample Site	Outlet	Kilmer Rd	Quack Ups		
Actual Sample Date	8-Aug-01	8-Aug-01	8-Aug-01		
Time	7:20am	8:35am	8:50am		
Weather	warm	warm	warm		
Appearance of Water	mucky with growth	clear	clear		
Temp. C	26	21	21		
pH	8.4	8.5	8.3		
Conductivity PPM	140	140	190		
NO3 mg/L	0.044	0.044	0.044		
PO4 reading	4	6	4		
PO4 mg/L	0.08	0.12	0.08		
P mg/L	1.33333333	2	1.33333333		
total chlorine mg/L	0.08	0	0.38		
FC cp100ml	0	0	0		
FS cp100ml	50	470	270		
FC/FS ratio	0	0	0		

Cossayuna Lake Summer 2001

SAMPLE LOCATION FIELD WORK SHEETS

Actual Sample Site	Boat Launch Mouth	Boat Launch Stream	Culvert	Delta	Hemlock Stream	Hemlock Mouth
Actual Sample Date	15-Aug-01	15-Aug-01	15-Aug-01	15-Aug-01	15-Aug-01	15-Aug-01
Time	7:30am	7:35am	7:20am	7:20am	7:45am	7:40am
Weather	warm	warm	warm	warm	warm	warm
Appearance of Water	duckweed	clear	clear	clear	clear	mucky with growth
Temp. C	22	8	16	16	12	22
pH	8.8	7.7	8.6	8.3	8.1	8.6
Conductivity PPM	130	200	140	160	190	130
NO_3 mg/L	0.132	0.088	0.182	0.176	0.132	0.088
PO4 reading	2	2	2	4	1	1
PO4 mg/L	0.04	0.04	0.04	0.08	0.02	0.02
P mg/L	0.66666667	0.66666667	0.66666667	1.33333333	0.33333333	0.33333333
total chlorine mg/L	0.04	0.04	0.13	0.04	0.06	0.16
FC cp100ml	20	0	40	2090	10	0
FS cp100ml	40	130	80	3610	520	130
FC/FS ratio	0.5	0	0.5	0.58	0.02	0

Actual Sample Site	Outlet	Kilmer Rd	Quack Ups		
Actual Sample Date	15-Aug-01	15-Aug-01	15-Aug-01		
Time	7:10am	7:00am	7:05am		
Weather	warm	warm	warm		
Appearance of Water	mucky with growth	clear	clear		
Temp. C	22	15	16		
pH	8	8.4	8.4		
Conductivity PPM	150	150	200		
NO_3 mg/L	0.132	0.132	0.088		
PO4 reading	4	3	3		
PO4 mg/L	0.08	0.06	0.06		
P mg/L	1.33333333	1	1		
total chlorine mg/L	0.24	0.03	0.07		
FC cp100ml	10	0	20		
FS cp100ml	10	280	320		
FC/FS ratio	1	0	0.06		

Cossayuna Lake Summer 2001

SAMPLE LOCATION FIELD WORK SHEETS

Actual Sample Site	Boat Launch Mouth	Boat Launch Stream	Culvert	Delta	Hemlock Stream	Hemlock Mouth
Actual Sample Date	22-Aug-01	22-Aug-01	22-Aug-01	22-Aug-01	22-Aug-01	22-Aug-01
Time	8:05am	8:05am	7:30am	7:30am	7:45am	7:40am
Weather	warm	warm	warm	warm	warm	warm
Appearance of Water	duckweed	clear	clear	clear	clear	mucky with growth
Temp. C	20	8	18	18	12	22
pH	8	7.7	8.3	8.2	8	8.6
Conductivity PPM	190	200	170	150	190	140
NO_3 mg/L	0.132	0.088	0.088	0.044	0.132	0.088
PO4 reading	4	3	4	3	2	1
PO4 mg/L	0.08	0.06	0.08	0.06	0.04	0.02
P mg/L	1.33333333	1	1.33333333	1	0.66666667	0.33333333
total chlorine mg/L	0.07	0.04	0.04	0.04	0.06	0.18
FC cp100ml	0	0	0	390	10	0
FS cp100ml	250	100	610	1380	400	150
FC/FS ratio	0	0	0	0.28	0.025	0

Actual Sample Site	Outlet	Kilmer Rd	Quack Ups		
Actual Sample Date	22-Aug-01	22-Aug-01	22-Aug-01		
Time	7:20am	7:05am	7:10am		
Weather	warm	warm	warm		
Appearance of Water	mucky with growth	clear	clear		
Temp. C	22	17	18		
pH	8	8.4	8.6		
Conductivity PPM	150	150	210		
NO_3 mg/L	0.132	0.044	0.088		
PO4 reading	4	5	4		
PO4 mg/L	0.08	0.1	0.08		
P mg/L	1.33333333	1.66666667	1.33333333		
total chlorine mg/L	0.08	0.07	0.06		
FC cp100ml	50	0	20		
FS cp100ml	250	510	490		
FC/FS ratio	0.2	0	0.04		

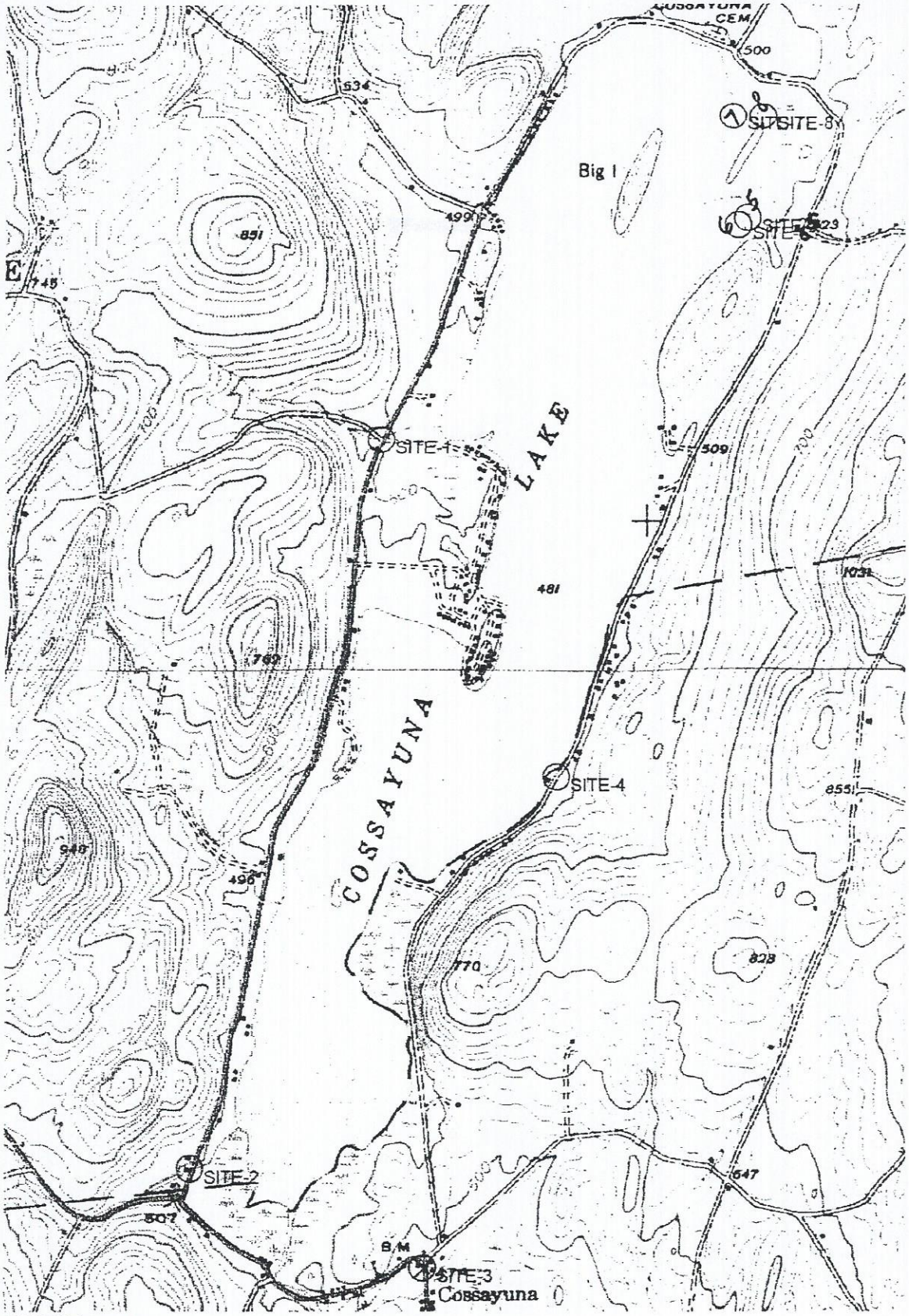
Cossayuna Lake Summer 2001

SAMPLE LOCATION FIELD WORK SHEETS

Actual Sample Site	Boat Launch Mouth	Boat Launch Stream	Culvert	Delta	Hemlock Stream	Hemlock Mouth
Actual Sample Date	29-Aug-01	29-Aug-01	29-Aug-01	29-Aug-01	29-Aug-01	29-Aug-01
Time	9:05am	9:05am	8:50am	8:55am	9:25am	9:15am
Weather	warm	warm	warm	warm	warm	warm
Appearance of Water	duckweed	clear	clear	clear	clear	mucky with growth
Temp. C	23	9	17	17	15	22
pH	8.7	7.7	8.3	7.9	7.9	8
Conductivity PPM	130	230	170	190	200	100
NO_3 mg/L	0.176	0.132	0.088	0.088	0.132	0.176
PO4 reading	3	4	4	3	2	4
PO4 mg/L	0.06	0.08	0.08	0.06	0.04	0.08
P mg/L	1	1.33333333	1.33333333	1	0.66666667	1.33333333
total chlorine mg/L	0.16	0.06	0.05	0.04	0.07	0.07
FC cp100ml	0	0	0	0	70	0
FS cp100ml	260	80	1100	520	1060	540
FC/FS ratio	0	0	0	0	0.07	0

Actual Sample Site	Outlet	Kilmer Rd	Quack Ups		
Actual Sample Date	29-Aug-01	29-Aug-01	29-Aug-01		
Time	8:40am	8:25am	8:35am		
Weather	warm	warm	warm		
Appearance of Water	mucky with growth	clear	clear		
Temp. C	21	17	17		
pH	8.3	8.6	8.5		
Conductivity PPM	170	160	240		
NO_3 mg/L	0.132	0.132	0.088		
PO4 reading	3	4	3		
PO4 mg/L	0.06	0.08	0.06		
P mg/L	1	1.33333333	1		
total chlorine mg/L	0.16	0.05	0.07		
FC cp100ml	0	0	0		
FS cp100ml	100	1100	100		
FC/FS ratio	0	0	0		

Appendix D
(Exact Site Locations With Coordinates)



GPS Printout

SITE #	SITE NAME	LATITUDE(N)			LONGITUDE(W)			UTM
		Deg.	Min.	Sec.	Deg.	Min.	Sec.	
1	Kilmer Rd	43	12	40.5	73	25	42.9	18-0627649-4785251
2	Quack-Ups	43	11	14	73	26	14.4	18-0626989-4782545
3	Outlet	43	11	0.9	73	25	36.3	18-0627856-4782189
4	Culvert & Delta	43	12	0.4	73	25	14.1	18-0628324-4784032
5	Boat Launch Stream	43	13	7.5	73	24	42.9	18-0628986-4786118
6	Boat Launch Mouth	43	13	6.6	73	24	44.4	18-0628953-4786087
7	Hemlock Mouth	43	13	19.8	73	24	45.3	18-0628924-4786494
8	Hemlock Stream	43	13	19.8	73	24	40.4	18-0629037-4786497