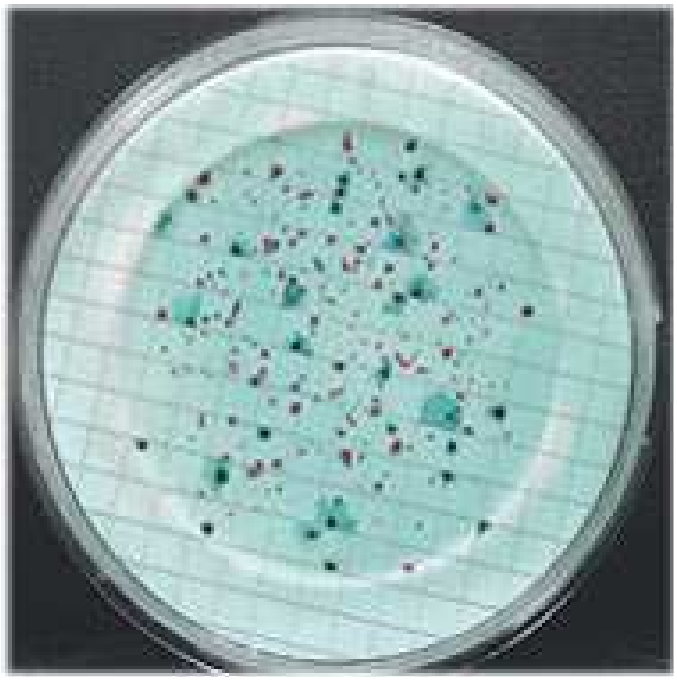
A COLIFORM ASSESSMENT OF SELECTED STREAMS IN HAMILTON COUNTY, NY

Final Report of the 2004 Monitoring Program



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Providing Today……...Protecting Tomorrow

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Coliform Assessment
of
Selected Streams
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Final Report of the 2004 Monitoring Program

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Summary

The Hamilton County Soil and Water Conservation District (SWCD) has had an extensive water monitoring program on 21 different lakes through out the county since 1993. The economy of Hamilton County is directly related to the numerous lakes due tourism. It is for this reason why the SWCD took the initiative to monitor selective streams that enter our pristine lakes.

During the 2004 monitoring season 42 different sites were tested for coliforms throughout the entire county. The sites were determined by accessibility and relative distance from development. Out of the 42 sites that were tested, 90 % came back with a low coliform count, 3% with a medium coliform count, and 7% with a high coliform count. However all the results fall well below the New York State Department of Health standards.

There are several factors that need to be taken in to consideration when looking at the results. These factors may be as simple as the current weather or if a is dead animal upstream. Over all the results are low and fall far within their respective parameters. Subsequent years of testing will need to be performed to confirm poor water quality at a sampled stream site as well as the investigation of possible sources for high readings.

Hamilton County Soil & Water Conservation District
Coliform Stream Assessment
2004

INTRODUCTION

Hamilton County

Hamilton County is located in the center of the Adirondack Park. It is the third largest county in the state with an area of 1,118,080 acres. It is also the least populated county in the state (5,379 people – 2000 census). Approximately three-quarters of the county is state owned land. This area is mandated by the State Constitution to be left unaltered by man. Approximately 89% of the county is forested and over 5% of the land area is water, which includes 77 lakes. The remaining 6% includes open areas, hamlets, rivers, streams and ponds.

The soils of the county are predominantly shallow, poorly drained, and highly acidic. Peat and muck soils are also prevalent. The topography of the county ranges from a low elevation of approximately 780 feet in the southern end of the county to its highest point, Snowy Mountain, with an elevation of 3,899 feet.

The main enterprises are tourism and forestry. Tourism is generally confined to areas adjacent to highways, hamlets, and those lakes accessible by road. The forests on private lands are periodically harvested for timber and pulp. State owned timber land is not available for harvest (Krawiecki 1982).

What is Coliform ?

Coliform is a family of bacteria common in soils, plants and animals. They are defined as gram negative, non spore forming rods which ferment lactose with the production of gas and acids. The coliform family is made up of several groups, one of which is the fecal coliform group.

Escherichia coli (E.coli) is a type of fecal coliform that lives in the lower intestines of humans and other warm-blooded animals. This bacteria is necessary for the proper digestion of food. In an average day a single person will have 10^{11}(=1 with eleven zeroes after it) E.coli bacteria pass through their body. However despite the excessively large numbers of E.coli present it is generally considered harmless, but it is due to that large number that makes E.coli a good indicator of fecal matter contamination. The presence of fecal coliform in drinking water or at swimming sites is evidence that human or animal waste has been or is present. This may be cause for concern because many diseases can be spread through fecal transmission. The presence of some fecal material in lakes, ponds and rivers is to be expected as part of the environment in which we live. However, when elevated levels of coliform are found, further investigation is needed to locate and remedy the problem.

Scientific classification for E.coli	
Kingdom:	Bacteria
Phylum:	Proteobacteria
Class:	Gamma Proteobacteria
Order:	Enterobacteriales
Family:	Enterobatceriaceae
Genus:	*Escherichia*
Species:	***E.coli***
Binomial name	
Escherichia coli T. Escherich, 1885	

PURPOSE

The major goal of this project was to quickly and economically collect base line stream water quality data throughout the county. Since 1993, the Hamilton County Soil & Water Conservation District has been monitoring 21 lakes in the county. Priority was given to streams that lead into these lakes and/or have substantial impacts by humans, and are easily accessible.

The purpose of this report is to focus on the data that was collected throughout the study period. This information will be presented in detail so that future water monitoring technicians can go back to the same sites, collect in the same manner and compare results.

METHODOLOGY

Equipment

The method of the coliform assessment used in this study involves the following equipment: a 4 oz sterile cup, stainless steel field vacuum with syringe, 100 ml funnels, sterile grid membrane filter, m-ColiBlue24 growing media, bunsen burner (flame and heat source), incubator, forceps, sterile petri dishes with sterile absorbent pads, microscope, tally counter, cooler with ice packs, field data sheets equipment to write with and record results, and waders.

Field Procedure

Before entering the field, potential monitoring sites are chosen by using a Geographic Information System (GIS) to cross reference streams that flow through or are nearby developed areas . After arriving at the site be sure the water depth is adequate enough to allow complete submersion of sample cup to collect the water sample. Using the sterile 4 oz cup, make a half moon sweep into and out of the water with complete submersion of cup, in a continuous movement. Seal and label and date

the sample appropriately to the site. After the sample is collected place it in the cooler until the lab work is preformed.

Record all the appropriate information that is relative to the site such as site ID, date and time, local stream name, description of location, Geographic Positing System (GPS) points and etc. onto the field data sheet.

Multiple sites were selected on the same stream to receive a comparative analysis. In those select cases the stream names were recorded twice with an “A” or a “B” after the name. “A” representing upstream from the development and “B” representing downstream from the development.

Site ID	Sample Location	Total Coliform Count	E. Coli Count
100	Stream Name "A"	#	#
101	Stream Name "B"	#	#

Lab Procedure

Good laboratory technique is essential, particularly in microbiological laboratory procedures. Care in sample collection and preservation, a clean work area and proper sterilization helps insure accurate results and less chance of contamination.

Preparation before Incubation

1) turn the incubator on, check settings
2) flame sterilize the top of the stainless steel vacuum
3) attach the syringe to the vacuum with the support tubing
4) use sterile forceps to place the membrane filter on to the center of the vacuum
   ** note to sterilize forceps dip in to alcohol and flame with Bunsen burner (let forceps cool before using)*
5) snap the 100 ml funnel onto the vacuum support
   **do not touch the inside of the funnel*
6) pour sample into funnel
7) pull on the syringe to draw the sample through the membrane filter
8) snap the vile of m-ColiBlue24 and pure into pee-tree dish
9) remove and dispose of funnel
10) use sterile forceps to remove the filter membrane and place in the to pee-tree dish
11) place pee-tree dish in to incubator and incubate for 24 hours @ 35 degrees centigrade

Analyses after Incubation

1) remove pee-tree dish from incubator
2) place under microscope
3) count the number of coliform colonies in the pee-tree dish and record results

**use the tally counter to keep tract*

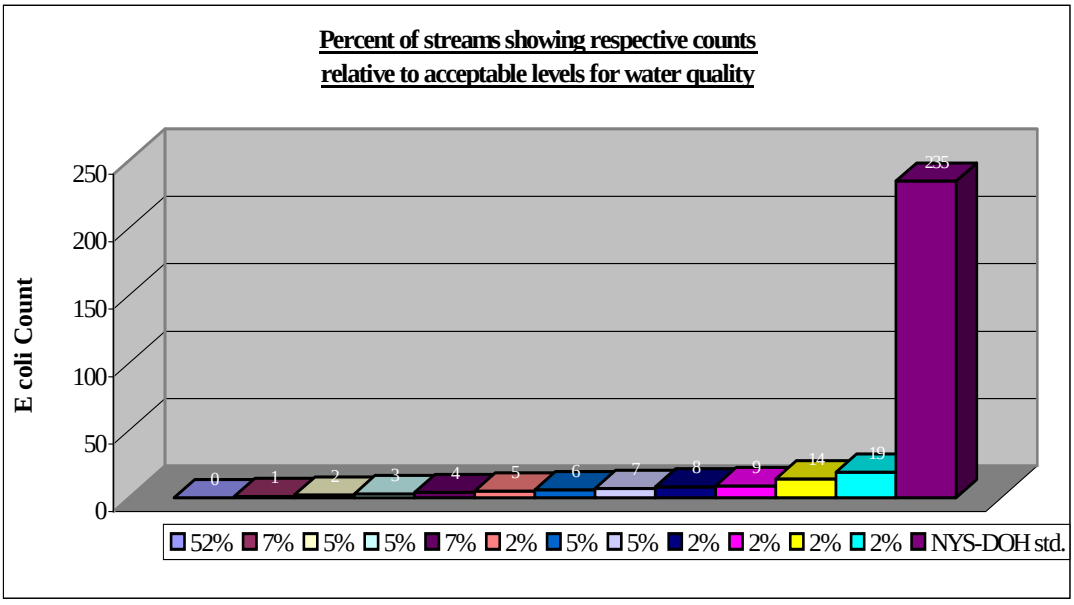
4) count the number of E. Coli colonies and record the results

RESULTS

Refer to appendixes:

Figure 1– county map of the site location
Figure 2– site list with detail site description
Figure 3– stream site list with GPS coordinates
Figure 4– coliform tallied count of Total Coliform and E.Coli count

Due to the unique circumstances of Hamilton County, the coliform results are modified to allow the true numbers to have mean-full and weighted values. When comparing Figure 4 results from the appendixes to the New York State Health Department standards, they all fall well below the regulations. For an example when E. coli density of one sample exceeds 235 organisms per 100 ml (single test was done at site), consideration will be taken to close the beach and further testing may be performed.



A few acceptable levels for Fecal Coliform colonies (E coli is a subdivision of Fecal) for a 100 ml sample according to Earth Force (an educational organization for youth to learn and help the environment) are as follows:

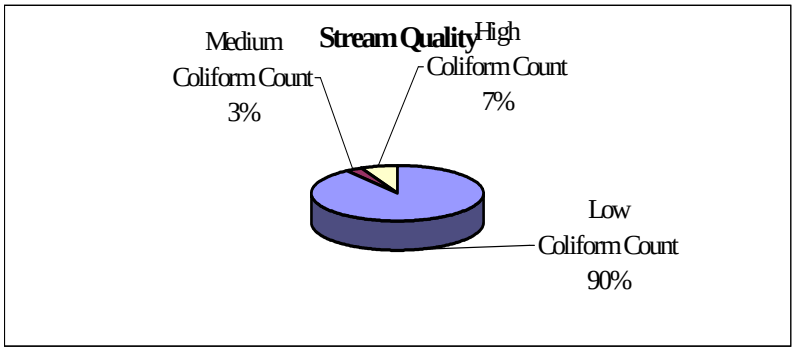
Drinking Water	0 colonies
Total Body Contact (Swimming)	200 colonies
Partial Body Contact (Boating)	1000 colonies
Treated Sewage Effluent	<200 colonies

The guidelines for the total coliform samples taken in Hamilton County are:

Total Coliform Count	County Ranking Priority
<350	Low
350-700	Medium
>700	High

The stream quality is a comparison of the number of total coliform in a stream against all streams tested in Hamilton County. With this comparison Hamilton County has

- 90 percent of the streams tested have low coliform counts
- 3 percent of the streams tested have medium coliform counts
- 7 percent of the streams tested have high coliform counts



DISCUSSION

The 2004 sampling season was conducted as a new coliform assessment of selected streams within Hamilton County. Sampling was conducted to collect baseline data to be compared with future years. The results of this study are not meant to represent the county as a whole, because each site has different variables that interact with it.

There are several factors that need to be taken in to consideration when looking at the results. Factors can be as simple as the current weather or if there is a dead animal just upstream. Over all the results are low and fall far within their respective parameters.

Subsequent years of testing will need to be performed to confirm poor water quality at a particular stream site and evaluate possible sources for high readings.

This years data is just a small piece of the "big picture" for quality and condition of Hamilton County's streams.

REFERENCES

Wikipedia, the free encyclopedia, Escherichia coli, Retrieved on December 30, 2004, from http://en.wikipedia.org/wiki/Eschericia_coli

Hach Company, Analytical Procedure, Method 10029 m-ColiBlue24 broth, September 22, 1997

Earth Force, Global river enviromential edcuation network, Retrieved on January 25, 2004, from http:/www.green.org/files.cgi/435_Chem_Parameters_Background.html

APPENDIX

Figures 1-4

Figure 1
Stream Locations

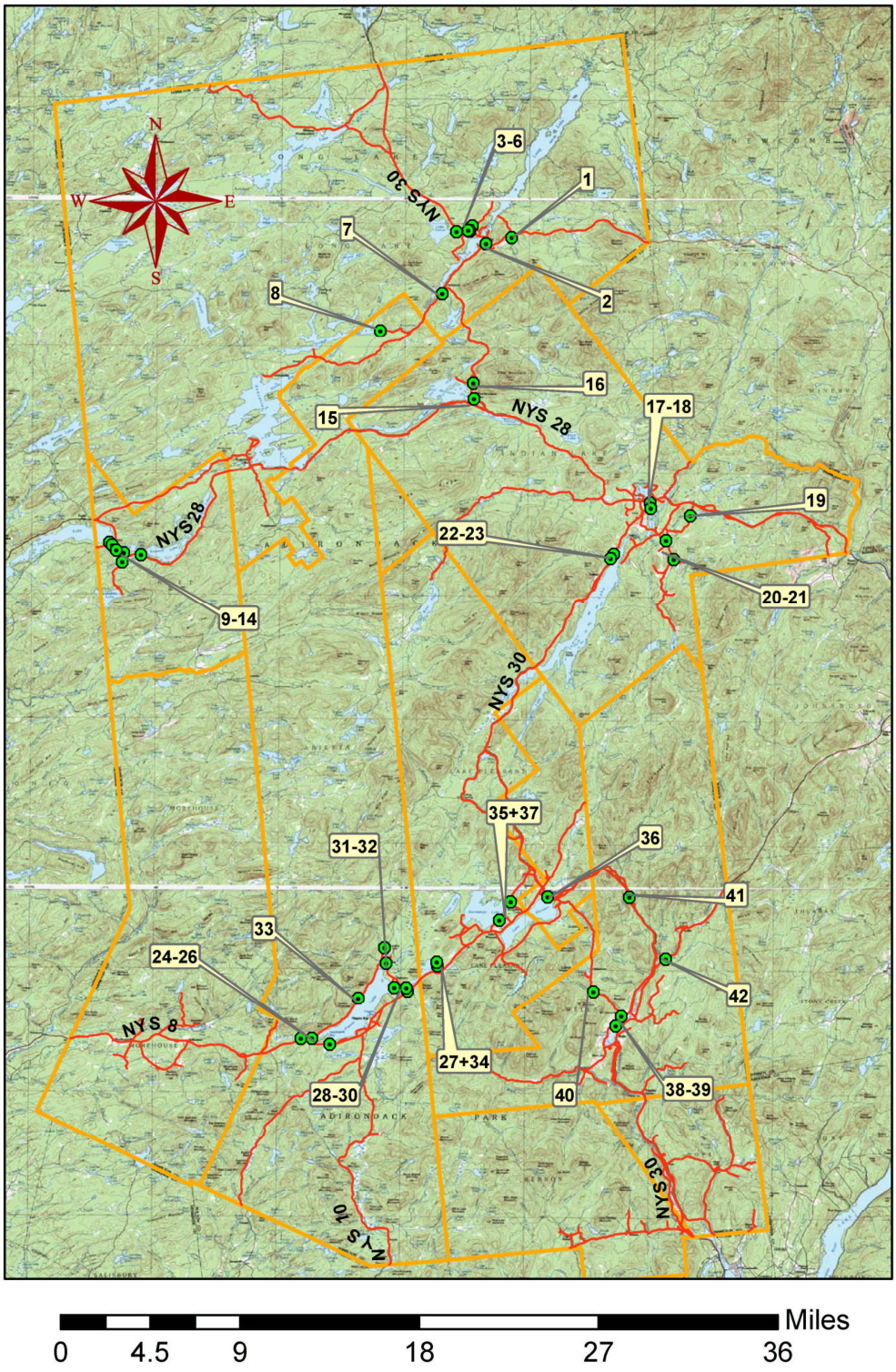


Figure 2
Detailed Site Location

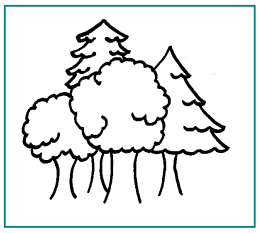
Site ID	Sample Location	Town	Site Location
1	Shaw Brook A	Long Lake	1 1/2 miles on 28N after splits from 30N in Long Lake, 1/4 mile on trail
2	Shaw Brook B	Long Lake	20' downstream after Shaw Brook crosses 30N
3	Kickerville Rd. Stream A	Long Lake	1/4 mile up Kickerville Rd about 300' on left
4	Kickerville Rd. Stream B	Long Lake	culvert outlet after crossing 30N
5	Lake Eaton Outlet A	Long Lake	just below the damn of Lake Eaton
6	Lake Eaton Outlet B	Long Lake	20' downstream after crossing Edion Rd
7	South Pond Outlet	Long Lake	1/2 mile down North Point Rd, 100' downstream from the road
8	Forked Lake Outlet	Arietta	at the end of Forked Lake Rd
9	6th Lake Outlet	Inlet	just below the damn of Sixth Lake
10	4th Lake Inlet A	Inlet	underneath the South Shore Rd bridge
11	4th Lake Inlet B	Inlet	Fourth Lake Inlet from Fifth Lake
12	5th Lake Inlet	Inlet	Fifth Lake Inlet
13	Bottle Brook A	Inlet	downstream of where Bottle Brook crossed Limekiln Rd
14	Bottle Brook B	Inlet	200' downstream of where Bottle Brook crossed 28
15	Marian River	Indian Lake	20" downstream of where it crosses 28
16	Blue Mt Museum Stream	Indian Lake	50' upstream before crossing Maple Lodge Drive
17	Lake Adirondack Outlet	Indian Lake	just blow the damn of Lake Adirondack
18	Lake Abankee Inlet	Indian Lake	100' upstream from Lake Abankee from the Lake Adirondack outlet
19	Lake Snow Outlet	Indian Lake	upstream of Parkerville Rd
20	Big Brook A	Indian Lake	at the junction of Starbuck Rd and Big Brook Rd
21	Big Brook B	Indian Lake	700' before the junction of Chamberlain Rd and Big Brook Rd, on right
22	Sabael Stream	Indian Lake	30' downstream after crossing 30
23	Squaw Brook	Indian Lake	20' upstream after crossing 30
24	Evergreen Lake Outlet	Arietta	just below the damn of Evergreen Lake
25	Old Flow	Arietta	10' downstream from Piseco Lake Rd
26	Piseco Outlet	Arietta	just downstream after Piseco Outlet crosses 8
27	Oxbow Lake Inlet	Lake Pleasant	first stream the crosses oxbow rd
28	Oxbow Lake Outlet A	Arietta	900' from 8 on Piseco Lake Rd
29	Oxbow Lake Outlet B	Arietta	end of Parrish Rd
30	Piseco School Stream	Arietta	10' after crossing 8
31	Cold Brook A	Arietta	end of Haskell Rd
32	Cold Brook B	Arietta	at culvert outlet of where Cold brook crosses Piseco Lake Rd
33	Warner Brook	Arietta	100' downstream after crossing Piseco Lake Rd
34	Dump Stream	Lake Pleasant	second stream that crosses oxbow rd
35	Echo Lake Outlet	Lake Pleasant	50' upstream before crossing Page St
36	Lake Pleasant Outlet	Lake Pleasant	just downstream of 30
37	Sacandaga Outlet	Lake Pleasant	at the end of Golf Coarse Rd
38	Elbow Creek A	Wells	just before crossing the bridge of the Gilmantown Rd
39	Elbow Creek B	Wells	beside the town of Wells Highway Dept
40	Elbow Creek C	Wells	just before the bridge of Algonquin Dr.
41	Sacandaga River	Wells	at the end of Old Rt 30
42	East Branch Sacandaga River	Wells	1 mile east of junction 8 and 30 on left

Figure 3
Stream Site GPS Coordinates

Site ID	Sample Location	X coordinate	Y coordinate
1	Shaw Brook A	548620.5681210	4869127.4306500
2	Shaw Brook B	546542.5065630	4868607.4246800
3	Kickerville Rd Stream A	545453.1536500	4870038.7828700
4	Kickerville Rd Stream B	545248.5783100	4869614.2189800
6	Lake Eaton Outlet B	545094.4462050	4869657.6562100
5	Lake Eaton Outlet A	544150.0367600	4869561.6739400
7	South Pond Outlet	543030.8386450	4864574.1384400
8	Forked Lake Outlet	538048.9497170	4861553.8162600
9	Sixth Lake Outlet	517467.9953170	4843572.5225900
11	Fourth Lake Inlet B	516307.7349660	4844389.9091700
10	Fourth Lake Inlet A	516528.1538190	4844193.9813000
12	Fifth Lake inlet	516861.8434710	4843777.6345800
14	Bottle Brook B	518867.0427600	4843428.6380600
13	Bottle Brook A	517330.2335340	4842837.7930800
15	Marian River B	545657.1175300	4856127.2131000
16	Blue Mt Stream A	545598.9514440	4857370.1305200
17	Lake Adirondack Outlet	559904.7472840	4847821.7082600
18	Lake Abanakee Inlet	559959.8519980	4847365.5636900
19	Lake Snow Outlet	563162.0481140	4846790.0255700
20	Big Brook A	561851.6782490	4843293.3309400
22	Sabael Stream	556995.5059980	4843676.7129600
23	Squaw Brook	556758.1742720	4843323.7580900
39	Elbow Creek B	557838.7347750	4806454.2611400
38	Elbow Creek A	557397.1443050	4805667.1241400
27	Oxbow Inlet	542974.6778460	4810456.3566800
30	Piseco School Stream	540570.9334370	4808411.6525700
32	Cold Stream B	538848.7570620	4810651.0904000
31	Cold Stream A	538702.7067690	4811874.2616100
33	Warner Brook	536603.2338030	4807827.4514000
24	Evergreen Outlet	531991.1730630	4804520.4614100
41	Sacandaga River	558429.4223340	4816023.1563400
25	Old Flow	532883.6919150	4804537.8172500
28	Oxbow Outlet A	540477.7737930	4808689.2145500
36	Lake Pleasant Outlet	551835.6662380	4816010.1462300
42	East Branch Sacandaga River	561378.2304710	4811088.5628400
34	Dump Stream	542921.6905780	4810751.6093600
35	Echo Lake Outlet	548873.3334110	4815589.9455500
26	Piseco Outlet	534321.9616000	4804059.2328800
29	Oxbow Outlet B	539503.5720040	4808707.4422100
37	Sacandaga Outlet	547949.0889610	4814130.3531000
21	Big Brook B	561211.2101520	4844808.0849700
40	Elbow Creek C	555575.5329770	4808463.8114100

Figure 4
Coliform Tally Counts

Site ID	Sample Location	Total Coliform Count	E. Coli Count
1	Shaw Brook A	158	4
2	Shaw Brook B	146	0
3	Kickerville Rd. Stream A	87	1
4	Kickerville Rd. Stream B	220	0
5	Lake Eaton Outlet A	156	2
6	Lake Eaton Outlet B	178	1
7	South Pond Outlet	58	0
8	Forked Lake Outlet	35	0
9	6th Lake Outlet	55	0
10	4th Lake Inlet A	115	0
11	4th Lake Inlet B	123	0
12	5th Lake Inlet	199	0
13	Bottle Brook A	70	0
14	Bottle Brook B	228	19
15	Marian River	272	0
16	Blue Mt Museum Stream	246	0
17	Lake Adirondack Outlet	145	0
18	Lake Abankee Inlet	229	0
19	Lake Snow Outlet	42	0
20	Big Brook A	222	7
21	Big Brook B	99	4
22	Sabael Stream	279	0
23	Squaw Brook	167	0
24	Evergreen Lake Outlet	955	7
25	Old Flow	55	6
26	Piseco Outlet	950	1
27	Oxbow Lake Inlet	403	9
28	Oxbow Lake Outlet A	49	0
29	Oxbow Lake Outlet B	134	14
30	Piseco School Stream	281	4
31	Cold Brook A	782	0
32	Cold Brook B	252	9
33	Warner Brook	259	0
34	Dump Stream	296	6
35	Echo Lake Outlet	119	2
36	Lake Pleasant Outlet	105	3
37	Sacandaga Outlet	58	0
38	Elbow Creek A	168	0
39	Elbow Creek B	198	0
40	Elbow Creek C	164	8
41	Sacandaga River	92	5
42	East Branch Sacandaga River	162	3



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