GREAT SACANDAGA LAKE ASSESSMENT PROGRAMS FOR FOR 2008

prepared for

Great Sacandaga Lake Association
&
The Great Sacandaga Lake Advisory Council

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Background

At the request of the Great Sacandaga Lake Association and the Great Sacandaga Lake Advisory Council, the Darrin Fresh Water Institute (DFWI) collected water samples in 2007 and 2008 to evaluate bacterial water quality in Great Sacandaga Lake. The project was a two-year program designed to largely duplicate the five-year lake water quality study of Rowell (1996) conducted in 1991 – 1995. The objective of the Rowell study was to develop a longitudinal baseline assessment of bacterial water quality, determine the concentration of selected metal contaminants in Great Sacandaga Lake gamefish and gather some basic water quality data. The DFWI program was designed to take advantage of other water quality assessments, including water quality and plankton studies by Mills et al. (2004) and the ongoing water chemistry data collections by association volunteers and the Adirondack Watershed Institute (AWI 2006). The analysis of metal contaminants in Great Sacandaga Lake gamefish was conducted by DFWI in 2007 and a final report issued (Eichler & Boylen 2007). The current report focuses on bacterial test results.

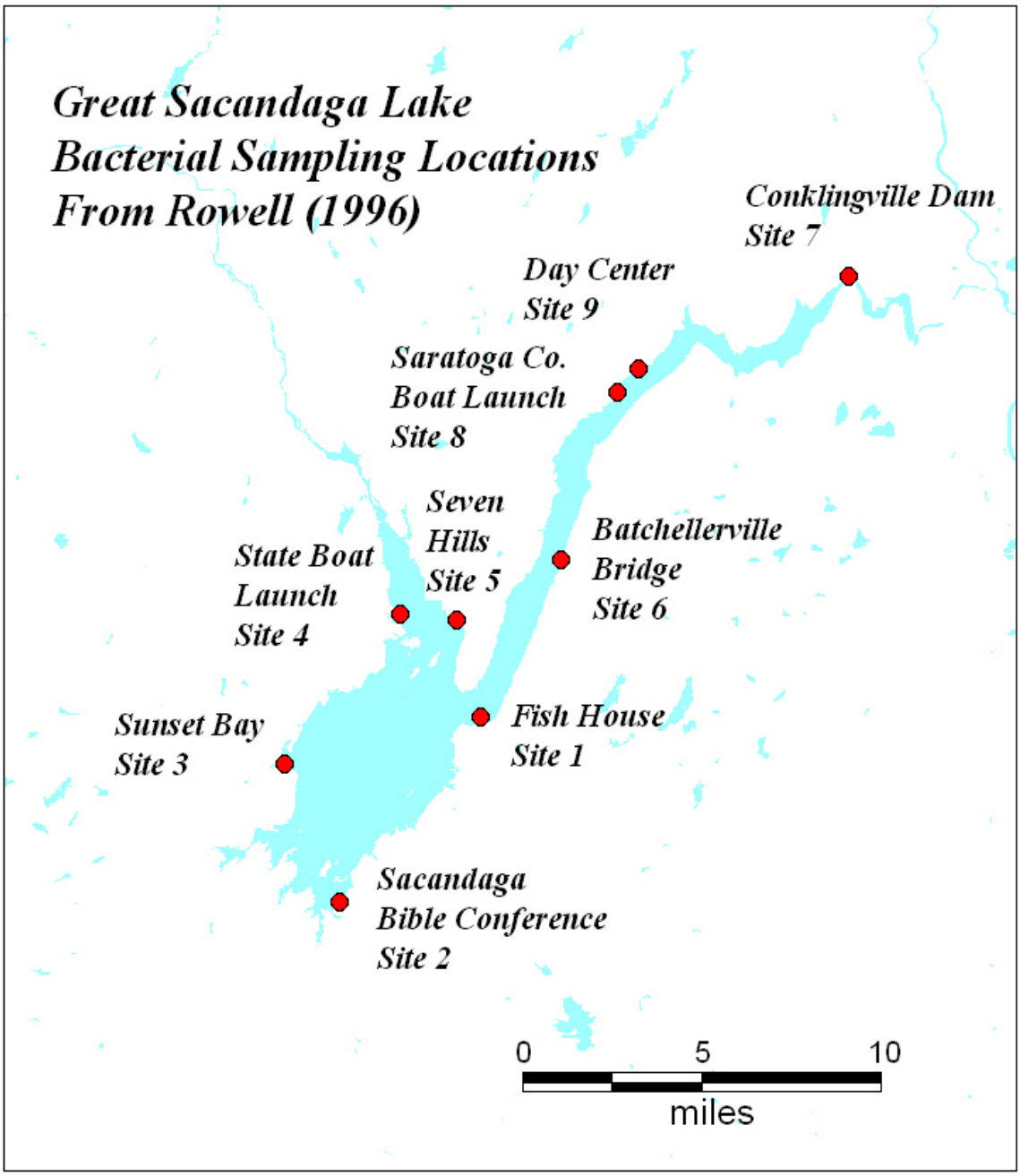
Methods

Bacterial Assessments

The Great Sacandaga Lake Coliform Monitoring Program (GSLCMP) was composed of two activities. Baseline bacterial water quality was sampled at 9 locations (Figure 1) monthly from May thru October of each year. The data was collected for comparison to similar collections taken from 1991 thru 1995 by Rowell (1996). The second component of the GSLCMP collected water samples from suspected contamination sources throughout the lake basin. The purpose of these collections was to locate possible sources of bacterial contamination to Great Sacandaga Lake and provide the information, in a timely fashion, to local and state regulatory agencies for remedial action. Twelve to 15 shoreline locations were sampled during each biweekly sampling cycle. Sample collection began in mid-June and concluded the first week in September, for a total of seven sampling dates each year. The time interval coincides with the period of maximum population density and intensity of recreational use. Two primary measurements were made for each sample: Total Coliform (TC) and Fecal Coliform (FC) Bacteria. These

bacteria serve as indicators of the presence of animal or human waste. The presence of elevated levels of these bacteria indicates potentially disease-causing protozoans, bacteria and other microorganisms may be present in the water.

Figure 1. Bacterial sampling locations from Rowell (1996).



All samples were collected according to NYS DOH protocols for contact recreation sampling. Samples were collected in sterile containers provided by the DFWI laboratory which is certified nationally and by New York State for environmental bacterial testing (NELAC Lab ID # 10719). Samples were collected in water depths of approximately 1 meter. Sample bottles were submerged to a depth of 0.5 meters and inverted to fill with care taken to not collect surface films. All samples were stored on ice and returned to the laboratory within 6 hours of collection. All bacterial analyses were conducted at the DFWI laboratory in Bolton Landing, NY.

Sampling sites were chosen in consultation with the Great Sacandaga Lake Association (GSLA), Great Sacandaga Lake Advisory Council (GSLAC), DEC, towns and villages, other regulatory agencies and citizens groups. DFWI personnel were also prepared to assist local regulatory authorities with location of bacterial sources, working closely with county and local authorities to locate and correct sources of contamination should they occur. Follow-up investigations by the NYS Department of Health, NYS Department of Environmental Conservation and county and local government personnel are encouraged at sites with elevated fecal coliform levels.

New York State Department of Health has determined maximum allowable bacterial levels for contact recreation (swimming, wading, etc.). A table of these bacterial concentrations is included (Table 1). When these maximum bacterial levels are exceeded, the New York State Department of Health is empowered to close the location to bathing until the problem or problems are corrected. These levels are used by the DFWI to determine appropriate responses to various bacterial concentrations found during sampling. A table of these responses is included (Table 2).

Table 1. New York State coliform bacteria standards for bathing beaches.

Maximum Allowable Levels of Coliform Bacteria in Waters Used for Contact Recreation (NYS Dept. of Health)		
Bacterial Test	**Max. 5 Sample Mean**	**Max. Single Result**
Total Coliform	**2400 per 100 mls**	**5000 per 100 mls**
Fecal Coliform	**200 per 100 mls**	**1000 per 100 mls**

Interpretation of data to determine and locate sources of contamination (human or other warm-blooded animal) requires more than just current bacterial levels. Knowledge of past history of the site, weather, geology of the area, drainage patterns, and some information on human activities in the area are also useful. To differentiate between human waste and that produced by other warm-blooded animals, it is sometimes helpful to refer to the ratio of fecal coliform to fecal streptococcus bacteria (FC/FS). An FC/FS ratio of 4 or greater is generally considered indicative of contamination of human origin. Fecal Streptococcus (FS) Bacteria abundance will be determined for any resample locations.

Table 2. Action Levels of the Proposed Coliform Monitoring Program

In order to respond effectively to contamination problems detected during the Coliform Monitoring Program, the following actions will occur:

1. *If 200 or more fecal coliform bacteria per 100 milliliters are reported, the site will be resampled during the next sampling cycle.*

2. *If 400 or more fecal coliform bacteria per 100 milliliters are reported, the site will be resampled within 24 to 48 hours. The data for both samples will be reported to the town or village where the contamination is located.*

Reporting for the GSLCMP took the form of biweekly interim reports provided electronically to project cooperators. Cooperators included state and local regulatory agencies (NYSDEC, HRBRRD), town and village authorities and concerned local citizens. Rapid dissemination of bacterial testing results is key to effective remediation.

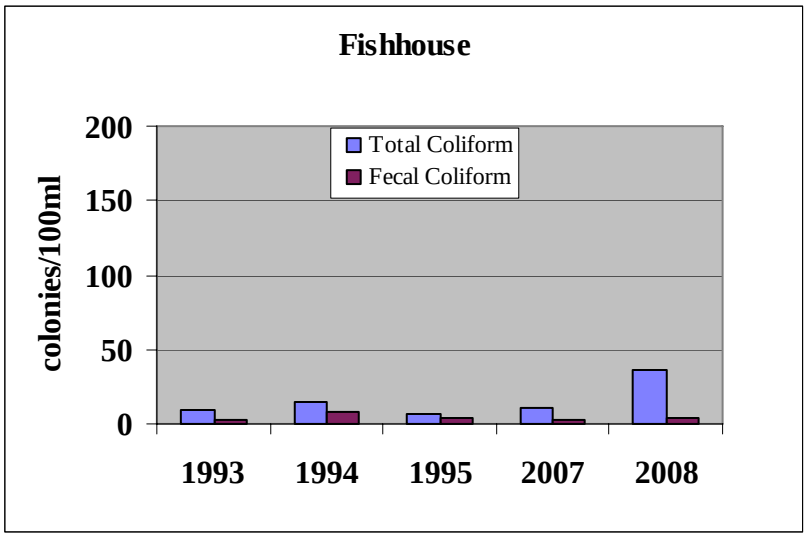
Results and Discussion

Rowell (1996) collected samples over a 5 year period (1991 – 1995), for enumeration of Total and Fecal Coliform bacteria in near-shore waters around the perimeter of Great Sacandaga Lake. Nine (9) sampling locations (Figure 1) were chosen and spaced roughly equidistant around the perimeter of the lake. The sites were sampled at approximately monthly intervals from May thru November, with four to six samples collected from each location annually. The 2007 & 2008 programs duplicated these sites and sampling

frequency, collecting samples at all 9 sites monthly from May thru October, for a total of 54 samples each year. As per recommendations in the Rowell report, only results from 1993 thru 1995 are used for comparison to 2007 - 2008 data. The 2008 bacterial dataset is included in Appendix A with maps showing the locations for all sample sites provided as Appendix B. The 2007 bacterial dataset is available in past reports (Eichler & Boylen 2007)

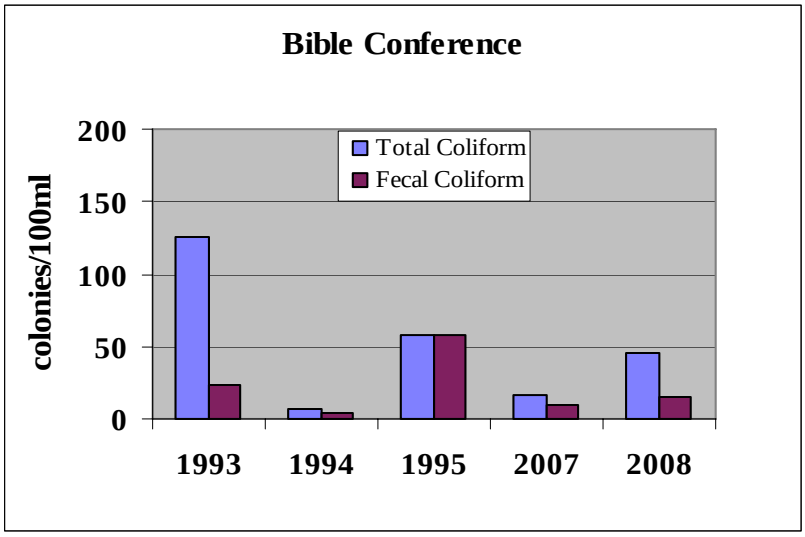
The Fish House sampling site or Site 1 was located in the Town of Northampton adjacent to the cemetery. The levels of total and fecal coliform bacteria at this site were low and typical of background levels observed throughout the region. Total coliform bacterial counts never exceeded 40 colonies/100ml and fecal coliform bacterial counts never exceeded 10 colonies/100ml. Current average levels of total coliform bacteria were somewhat higher than historical data (Figure 2), but within typical ranges for bacterial abundance from unimpacted sites. Fecal coliform bacteria were at or below historical levels.

Figure 2. Comparison of bacterial abundance in 2008 to historical data for the Fish House sampling location.



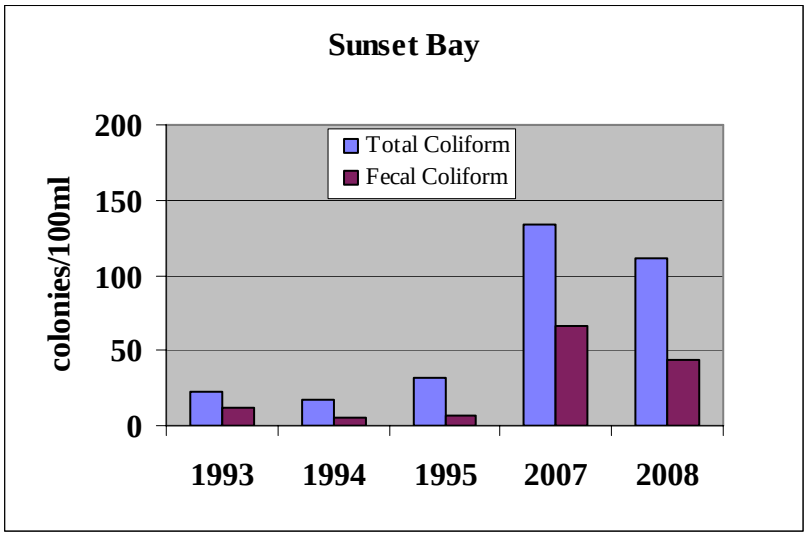
The Sacandaga Bible Conference sampling location or Site 2 was located adjacent to the swimming beach at the Sacandaga Bible Conference in the Town of Broadalbin. All bacterial results for this location were acceptable for contact recreation by NYS DOH standards. Total coliform bacterial counts averaged 46 colonies/100ml and fecal coliform bacterial averaged 15 colonies/100ml. Bacterial results for 2008 were generally comparable to historical levels (Figure 3).

Figure 3. Comparison of bacterial abundance in 2008 to historical data for the Sacandaga Bible Conference sampling location.



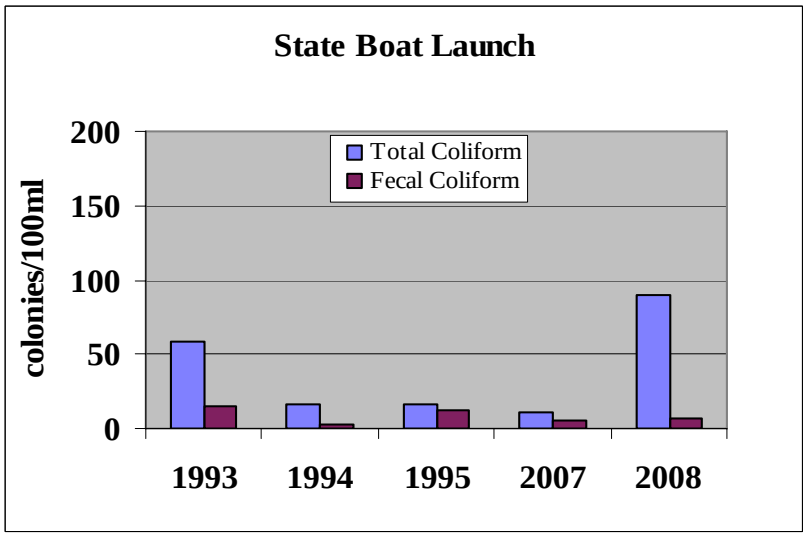
The Sunset Bay sampling location or Site 3 was located at the association swimming area in Sunset Bay in the Town of Mayfield. Sunset Bay mean bacterial levels in 2007 and 2008 were substantially higher than historical values (Figure 4). A single sample in each year however, was responsible for the high average levels of bacteria. In both cases, the samples were collected in the Fall when large numbers of Canada geese were roosting at this location. The short-term effects of migratory waterfowl on bacterial contaminant levels have been well documented. Total coliform bacterial counts averaged 111 colonies/100ml and fecal coliform bacterial averaged 44 colonies/100ml in 2008. Excluding the one elevated result, mean bacterial levels for 2008 were 62 and 13 respectively for total and fecal coliform, and only slightly higher than historical levels.

Figure 4. Comparison of bacterial abundance in 2008 to historical data for the Sunset Bay sampling location.



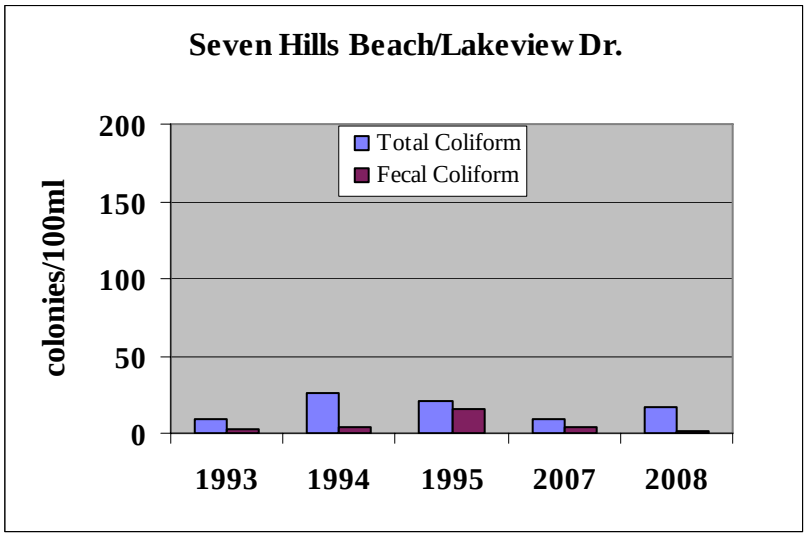
The State Boat Launch (Site 4) was located at the NYS DEC campground in the Town of Northampton. Samples were collected at the foot of a concrete stairway in the picnic area. Total coliform counts averaged 90 colonies/100ml and fecal coliform levels averaged 7 colonies/100ml for 2008 (Figure 5). Total coliform bacterial levels were highest in June of 2008. Extensive rafts of pollen coupled with the tendency of bacteria to attach to particles were probably responsible for elevated bacterial counts. All bacterial results remained acceptable for contact recreation by NYS DOH standards.

Figure 5. Comparison of bacterial abundance in 2008 to historical data for the State Boat Launch sampling location.



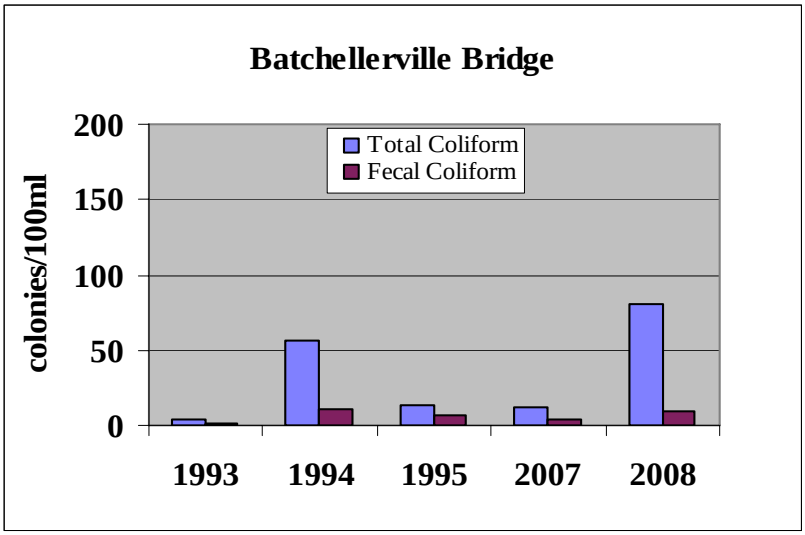
The Seven Hills Beach sampling location (Site 5) was located at the foot of Lakeview Drive in the Town of Northampton. All bacterial results for this location were acceptable for contact recreation by NYS DOH standards. Total coliform bacterial counts averaged 18 colonies/100ml and fecal coliform averaged 2 colonies/100ml for 2008. Bacterial results for 2008 were comparable to or lower than historical levels (Figure 6).

Figure 6. Comparison of bacterial abundance in 2008 to historical data for the Seven Hills Beach sampling location.



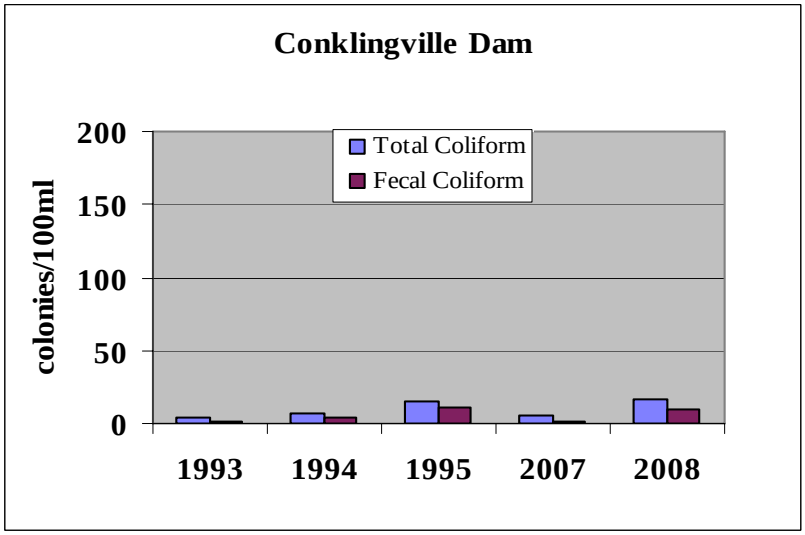
The Batchellerville Bridge sampling location (Site 6) was located at the foot of the bridge in the Town of Edinburgh. All bacterial results for this location were acceptable for contact recreation by NYS DOH standards. Total coliform bacterial counts averaged 81 colonies/100ml and fecal coliform bacterial averaged 10 colonies/100ml for 2008. Total coliform bacterial levels were elevated in May of 2008 (Appendix A). Extensive wave action caused a substantial amount of sediment to be suspended in the water column, and as previously reported, suspended sediments coupled with the tendency of bacteria to attach to particles was probably responsible for elevated bacterial counts. Bacterial results for 2008 were slightly higher than historical levels (Figure 7).

Figure 7. Comparison of bacterial abundance in 2008 to historical data for the Batchellerville Bridge sampling location.



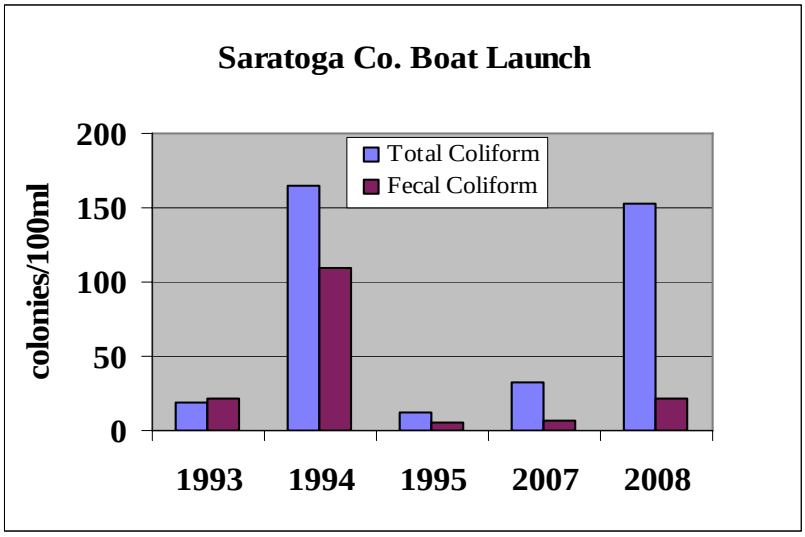
The Conklingville Dam sampling location (Site 7) was located at the public access site adjacent to Conklingville Dam in the Town of Hadley. All bacterial results for this location were acceptable for contact recreation by NYS DOH standards. Total coliform bacterial counts averaged 17 colonies/100ml and fecal coliform averaged 9 colonies/100ml for 2008. Bacterial results for 2008 were comparable to historical levels (Figure 8).

Figure 8. Comparison of bacterial abundance in 2008 to historical data for the Conklingville Dam sampling location.



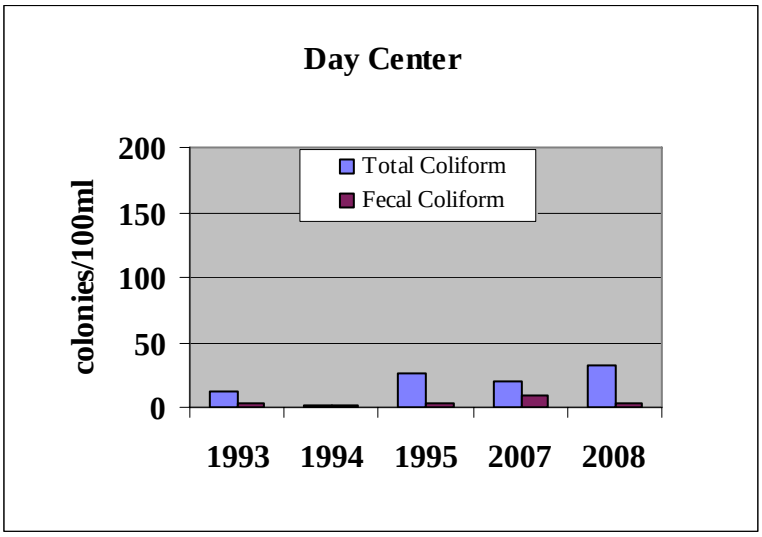
The Saratoga County Boat Launch (Site 8) was located at the public boat launch in the Town of Day. All bacterial results for this location were acceptable for contact recreation by NYS DOH standards. Total coliform bacterial counts averaged 153 colonies/100ml and fecal coliform bacterial averaged 21 colonies/100ml for 2007. Average Total Coliform Bacterial results for 2008 were higher than historical levels (Figure 9), however Spring samples in May and June were largely responsible for the elevated levels and occurred at times of heavy loads of suspended sediments and pollen. Fecal Coliform bacterial levels remained low and comparable to historical levels at all times.

Figure 9. Comparison of bacterial abundance in 2008 to historical data for the Saratoga County Boat Launch sampling location.



The Day Center sampling location (Site 9) was located off a small peninsula approximately 1.5 miles northeast of the Saratoga County Boat Launch in the Town of Day. All bacterial results for this location were acceptable for contact recreation by NYS DOH standards. Total coliform bacterial counts averaged 32 colonies/100ml and fecal coliform bacterial averaged 4 colonies/100ml for 2008. Bacterial results for 2008 were very low and comparable to historical levels (Figure 10).

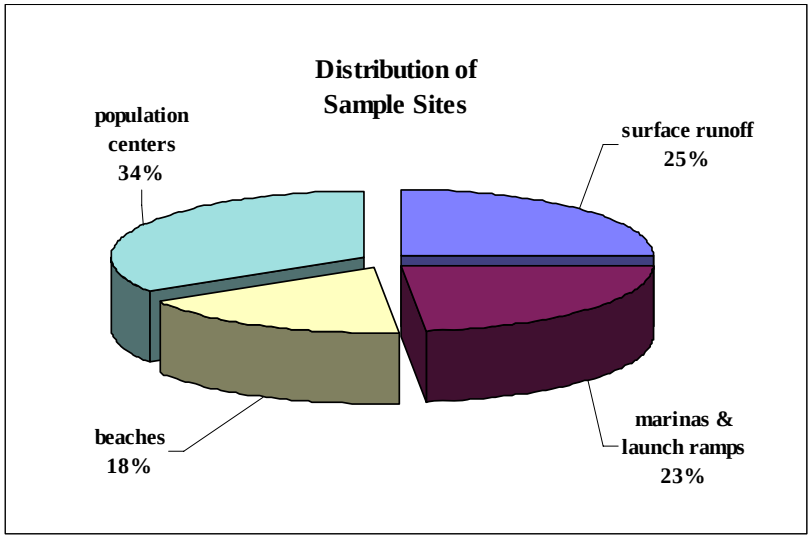
Figure 10. Comparison of bacterial abundance in 2008 to historical data for the Day Center sampling location.



The Great Sacandaga Lake Coliform Monitoring Program (GSLCMP) collected 130 water samples from 64 sample points throughout the lake basin (Appendices A & B). From 12 to 15 shoreline locations were sampled during each biweekly sampling cycle. Sampling efforts focused on locations used for contact recreation (e.g. swimming or wading), marina locations or locations likely to produce bacterial contamination such as population centers, runoff sites or agricultural areas. Sample collection was evenly distributed between these sample types (Figure 11). The GSLCMP began in May and concluded in October 2008. The time interval coincides with the period of maximum population density and intensity of recreational use.

For all samples collected, 43% of samples had fecal coliform levels less than 10 colonies per 100 ml and 72% of samples had fecal coliform levels less than 100 colonies per 100 ml. For total coliform, 64% of samples had levels less than 100 colonies per 100 ml and 74% of samples were less than 200 colonies per 100 ml of sample. None of the samples collected in

Figure 11. Distribution of sampling sites.



2007 and only one sample from one location (Kennyetto Creek) exceeded contact recreation limits for single samples in 2008. Ratios of Fecal Coliform bacteria to Fecal Streptococcus bacteria for Kennyetto Creek in 2008 suggest a non-human source. The Kennyetto Creek drainage includes the Village of Broadalbin as well as livestock pastures, which may account for elevated levels of coliform bacteria. All indications are that the water quality of Great Sacandaga Lake exceeds all standards for swimming or wading.

Summary

The baseline bacterial abundance data were comparable to the results of the Rowell study with few changes in bacterial abundance observed over the past 12 years. At the conclusion of his 5 year study in 1995, Rowell (1996) concluded…"lake water quality overall is good to excellent for all recreational purposes. For a significant proportion of the sample dates, lake water quality met drinking water standards for bacteriological content." Results from the current study continue to support this conclusion, however some elevated bacterial levels were observed in 2008 relative to stormwater runoff events. These were associated with Kennyetto Creek and Sacandaga Park Brook. Additionally, Canada geese were implicated in elevated levels of bacteria in the Fall of the year in Sunset Bay. Only a single result in 2008 for Kennyetto Creek exceeded NYS Dept. of Health standards for swimming or wading. Interim reports on the bacterial testing programs were released approximately weekly throughout the sampling season and triggered an investigation by NYS DEC of possible sources for the Kennyetto. It was concluded that no single source was responsible, but a diffuse group of non-human sources were likely. Overall, bacterial results suggested exceptionally high water quality throughout the Great Sacandaga Lake basin.

Literature Cited

AWI. 2006. Great Sacandaga Lake water quality assessment. Adirondack Watershed Institute, Paul Smiths College, Paul Smiths, NY.

Eichler, L.W. and C.W. Boylen. 2007. Great Sacandaga Lake assessment programs for 2007. DFWI Technical Report 2007-6. Darrin Fresh Water Institute, Bolton Landing, NY.

Mills, E.L., J. Gillette and C Hoffman. 2003. Status of Great Sacandaga Lake: A BioIndexing Approach. Prepared for the Great Sacandaga Lake Advisory Council by Cornell University.

Mills, E.L., J. Gillette and C Hoffman. 2004. Status of Great Sacandaga Lake: A BioIndexing Approach. Prepared for the Great Sacandaga Lake Advisory Council by Cornell University.

Rowell, B.F. 1996. Great Sacandaga Lake Association water quality study summary report. Prepared for the Great Sacandaga Lake Association by Dr. B.F. Rowell, Kutztown University, Kutztown, PA.

USEPA 2001. Mercury Update: Impact on Fish Advisories. EPA-823-F-01-011. June 2001 United States Environmental Protection Agency, Office of Water.

Appendix A.

Great Sacandaga Lake

Coliform Monitoring Program Results for 2008

Results are listed alphabetically by town

Definitions

TC – Total Coliform Bacteria
FC – Fecal Coliform Bacteria
TNTC – Too Numerous to Count
CONF – Confluent growth of target bacteria
MAT – Confluent growth of non-target bacteria
? – High background, referring to non-target growth of bacteria interfering with counts of target bacteria
lt – Less than
LA – Laboratory accident preventing enumeration of bacteria

2008 GREAT SACANDAGA LAKE COLIFORM MONITORING PROGRAM

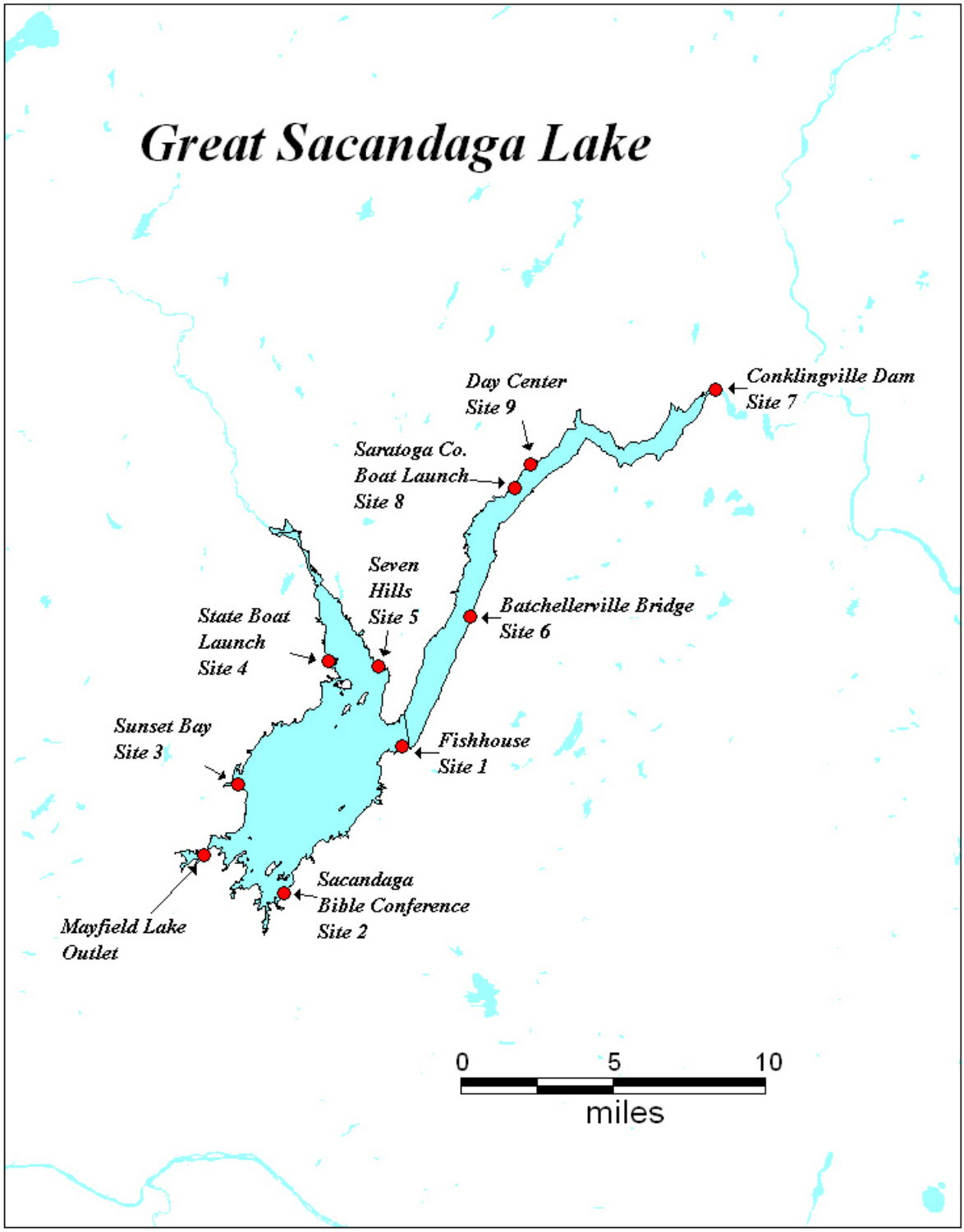
SITE	DATE	TC/100ml	FC/100ml	FS/100ml	FC/FS	NOTES
		Town Of Broadalbin				
Broadalbin Town Beach	08-Jul-08	14	10			Ducks, no bathers
Broadalbin Town Beach	13-Aug-08	6	1			Clear, several bathers
Frenchmans Creek	25-Jun-08	230	50			Moderate flow, Clear
Frenchmans Creek	02-Sep-08	260	43			Cool, moderate flow
Hans Creek	25-Jun-08	40	10			Cold, clear, medium flow
Hans Creek	02-Sep-08	54	16			Cold, moderate flow
McMurray Boat Livery	22-Jul-08	8	2			Clear
NYSDEC Broadalbin Boat Launch	10-Jun-08	35	9			Pollen
Rowell Site 2 - Sacandaga Bible Conference	12-May-08	24	2			Choppy, turbid
Rowell Site 2 - Sacandaga Bible Conference	10-Jun-08	210	86			Pollen
Rowell Site 2 - Sacandaga Bible Conference	08-Jul-08	7	1			Calm, cool
Rowell Site 2 - Sacandaga Bible Conference	06-Aug-08	20	1			Calm, slightly turbid
Rowell Site 2 - Sacandaga Bible Conference	02-Sep-08	3	1			Slightly turbid, calm
Rowell Site 2 - Sacandaga Bible Conference	06-Oct-08	9	1			Rain, slightly turbid
Sacandaga Boating Center	22-Jul-08	76	14			Warm, clear
Sand Island - North End	22-Jul-08	8	3			Calm, clear, bathers
Sand Island - South End	22-Jul-08	13	7			Calm, clear
		Town of Day				
Allentown Creek	25-Jun-08	640	59			low flow, cool
Bell Brook	25-Jun-08	52	7			low flow
Daley Creek	10-Jun-08	110	1			Low flow, brown
Glasshouse Creek	02-Sep-08	30	2			Clear, low flow
Majestic Mountain Marina Boat Launch	25-Jun-08	18	4			clear, cool
Paul Creek	25-Jun-08	39	6			cold, clear
Paul Creek	02-Sep-08	67	2			Cool, low flow
Rowell Site 8 - Saratoga Co. Boat Launch	12-May-08	520	7			Turbid, waves to 1 ft.
Rowell Site 8 - Saratoga Co. Boat Launch	10-Jun-08	330	77			Choppy, pollen
Rowell Site 8 - Saratoga Co. Boat Launch	08-Jul-08	20	6			Choppy, slightly turbid
Rowell Site 8 - Saratoga Co. Boat Launch	06-Aug-08	37?	31			Waves to 1 ft, slightly turbid
Rowell Site 8 - Saratoga Co. Boat Launch	02-Sep-08	12	3			Choppy
Rowell Site 8 - Saratoga Co. Boat Launch	06-Oct-08	1	2			Lt. rain, slightly turbid
Rowell Site 9 - Day Center	12-May-08	49	1			Turbid, waves to 1 ft.
Rowell Site 9 - Day Center	10-Jun-08	100	3			Choppy, pollen
Rowell Site 9 - Day Center	08-Jul-08	4?	2			Choppy, clear
Rowell Site 9 - Day Center	06-Aug-08	27	15			Waves to 1 ft, clear
Rowell Site 9 - Day Center	02-Sep-08	3	lt 1			Cool, clear
Rowell Site 9 - Day Center	06-Oct-08	9	lt 1			Clear, cool
Sacandaga Avenue Brook	08-Jul-08	48	15			Low flow, cold, clear
Sacandaga Campground Boat Launch	25-Jun-08	11	4			Geese
Sand Creek	25-Jun-08	220	2			Moderate flow, Clear
Sand Creek	02-Sep-08	23	1			Cool, moderate flow
Saratoga Biathlon Creek	06-Aug-08	1400	350			Cool, strong flow, am rain
Saratoga Biathlon Creek	02-Sep-08	100	2			Clear, low flow
South Turner Road Creek	06-Aug-08	123?	56			Cool, strong flow, am rain
Turner Road Creek	06-Aug-08	27?	15			Moderate flow, cool, clear
Vly Pond Brook	25-Jun-08	4	1			Suspended debris, clear

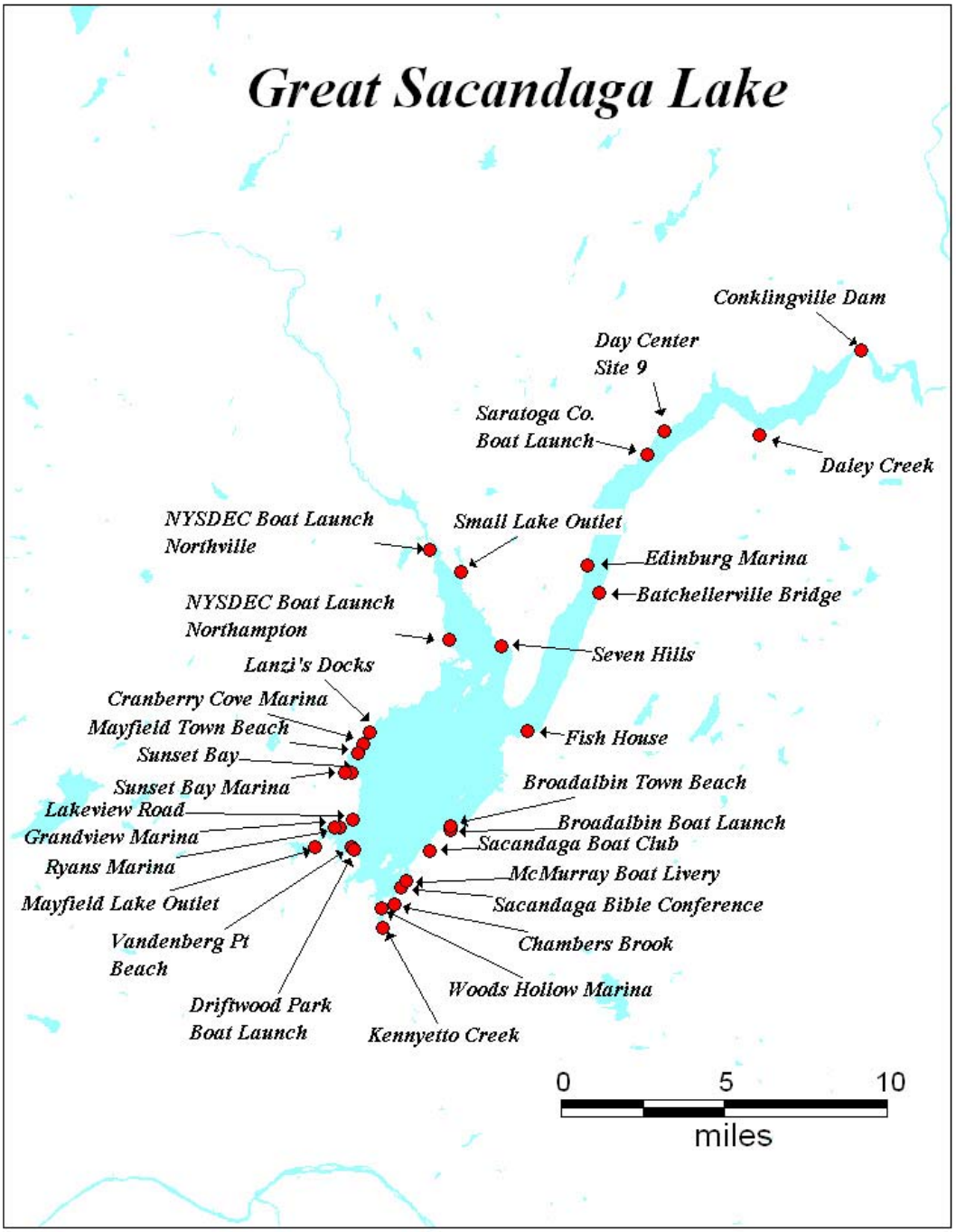
SITE	DATE	TC/100ml	FC/100ml	FS/100ml	FC/FS	NOTES
		Town of Edinburgh				
Batchellerville Creek	25-Jun-08	250	192			Many ducks, Low flow
Batchellerville Creek	08-Jul-08	55	13			Moderate flow, clear, cold
Captain Carls Boat Launch Ramp	06-Aug-08	30	20			Calm, warm, clear
Edinburgh Marina	25-Jun-08	160	1			clear, ducks
Edinburgh Town Beach	08-Jul-08	60	lt 1			Closed, no bathers
Edinburgh Town Beach	13-Aug-08	22	20			Closed, calm
Morgans Creek	06-Aug-08	340	104			Strong flow, clear
Ponderosa Pines Beach	06-Aug-08	72?	12			1 ft. waves, slight turbid, no bathers
Richters Brook	06-Aug-08	440	60			Cool, good flow
Rowell Site 6 - Batchellerville Bridge	12-May-08	300	11			High water, choppy, turbid
Rowell Site 6 - Batchellerville Bridge	10-Jun-08	35	26			Suspended pollen
Rowell Site 6 - Batchellerville Bridge	08-Jul-08	110	1			Clear, cool
Rowell Site 6 - Batchellerville Bridge	06-Aug-08	30?	18			Clear, choppy
Rowell Site 6 - Batchellerville Bridge	02-Sep-08	3	1			Calm, clear
Rowell Site 6 - Batchellerville Bridge	06-Oct-08	7	3			Rain, clear, cool
		Town of Hadley				
Rowell Site 7 - Conklingville Dam	12-May-08	23	lt 1			Cold, clear, high water
Rowell Site 7 - Conklingville Dam	10-Jun-08	5	lt 1			Rafts of pollen
Rowell Site 7 - Conklingville Dam	08-Jul-08	3	lt 1			Clear, cool
Rowell Site 7 - Conklingville Dam	06-Aug-08	62	53			Clear, heavy am rain
Rowell Site 7 - Conklingville Dam	02-Sep-08	3	1			Clear, warm
Rowell Site 7 - Conklingville Dam	06-Oct-08	5	2			Lt. rain, calm, cool
		Town of Mayfield				
Chambers Brook	22-Jul-08	46	50			Calm, turbid, no flow
Cranberry Cove Marina	08-Jul-08	11	8			Ducks, calm
Driftwood Park Boat Launch	22-Jul-08	117	7			Cool, clear
Gordon's Lakeside Marine	22-Jul-08	3	7			Clear, calm
Kennyetto Creek	22-Jul-08	2400?	860			Calm, brown water, slight flow
Kennyetto Creek @ Route 30	24-Jul-08	8500?	5100	8800	0.6	Turbid, strong flow, rain
Kennyetto Creek @ Route 30	06-Aug-08	1200?	760			Low flow, turbid
Kennyetto Creek @ Route 30	13-Aug-08	1200	300	490	0.6	Moderate flow, slightly turbid
Kennyetto Creek @ Route 30	02-Sep-08	620	230			Slightly turbid, low flow
Lakeview Road Farm runoff	22-Jul-08	128	69			Seeping drainage, clear
Lanzi's Restaurant Docks	22-Jul-08	140	40			Warm, clear
Lasky's Marina Boat Launch	06-Aug-08	65?	49?			Warm slightly turbid
Mayfield Lake Spillway	25-Jun-08	30	24			brown, moderate flow, foam
Mayfield Town Beach	08-Jul-08	16	2			Bathers, clear
Mayfield Town Beach	13-Aug-08	48	10			Clear, no bathers
Rowell Site 3 - Sunset Bay	12-May-08	190	7			turbid, waves to 1 ft.
Rowell Site 3 - Sunset Bay	10-Jun-08	20	13			Pollen
Rowell Site 3 - Sunset Bay	08-Jul-08	53	11			Clear, cool
Rowell Site 3 - Sunset Bay	06-Aug-08	32	16			Calm, clear
Rowell Site 3 - Sunset Bay	02-Sep-08	358?	200			Clear, calm
Rowell Site 3 - Sunset Bay	06-Oct-08	13	18			Rain, clear, cool
Sacandaga Marine, Inc. launch ramp	25-Jun-08	22	11			clear
Sunset Bay Marina/Trailer Park	22-Jul-08	78	26			Calm, Clear
Vandenberg Point Swim Area	22-Jul-08	22	11			Clear, calm, no boaters
Woods Hollow Marina	22-Jul-08	70	30			Calm, slightly turbid

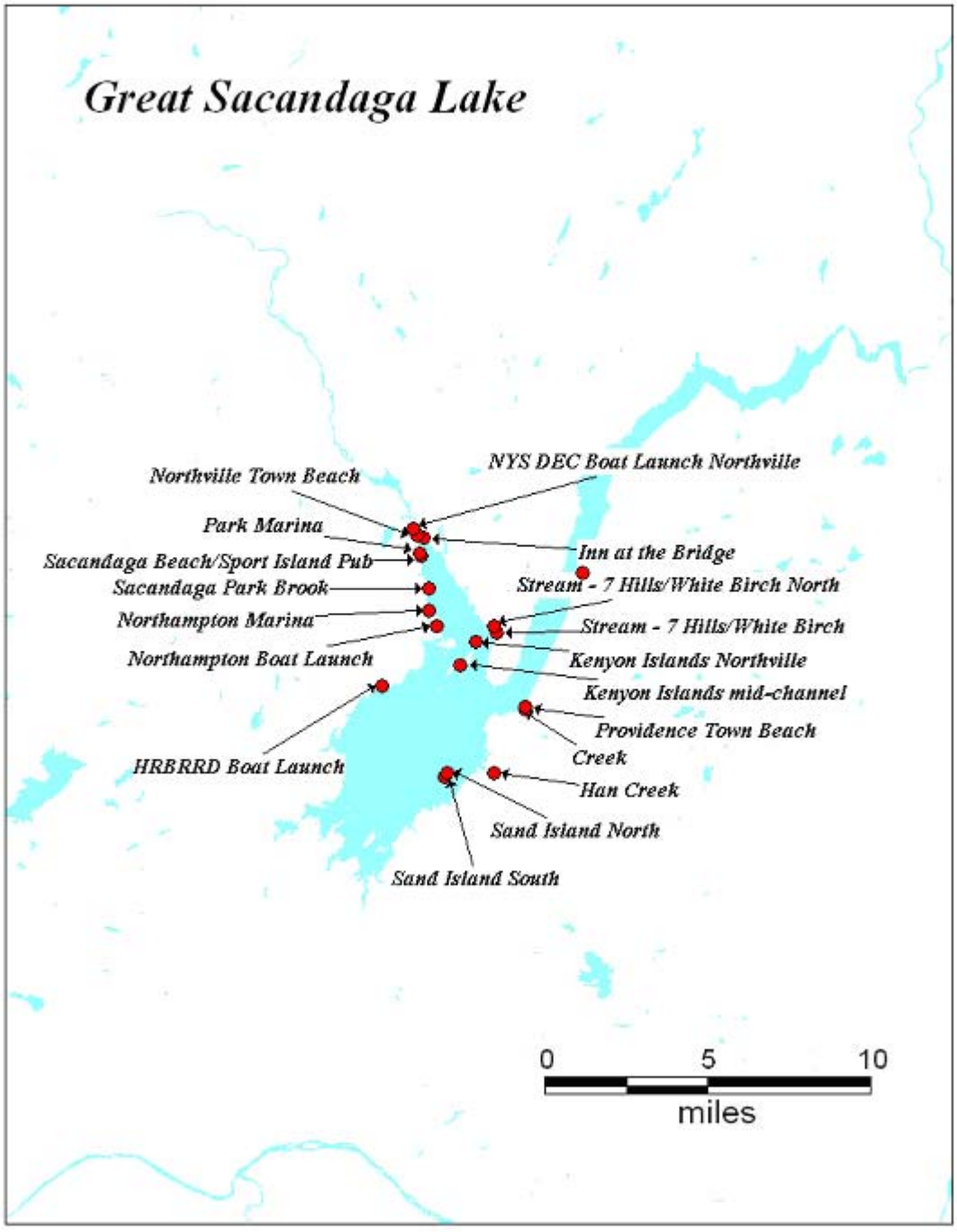
SITE	DATE	TC/100ml	FC/100ml	FS/100ml	FC/FS	NOTES
Town of Northampton						
Inn at the Bridge	22-Jul-08	14	3			No bathers, brown water
Kenyon Islands - Mid Channel	22-Jul-08	3	1			Calm, clear
Kenyon Islands - Northville	22-Jul-08	3	2			Warm, clear
Lakeview Avenue Brook	08-Jul-08	60	38			Low flow, clear, cold
Northampton Marina	06-Aug-08	13	5			Calm, clear
Northville Town Beach	08-Jul-08	80	5			Closed, no bathers
Northville Town Beach	13-Aug-08	29	7			Calm, no bathers, closed
NYSDEC Boat Launch in Northville	25-Jun-08	12	7			clear, cool
NYSDEC Northampton Beach	10-Jun-08	24	9			2 Bathers, pollen
NYSDEC Northampton Beach	13-Aug-08	12	3			Calm, no bathers
Park Marine Base, Inc. launch ramp	08-Jul-08	20	9			Clear, cool
Rowell Site 1 - Fish House	12-May-08	140	1			Choppy, turbid
Rowell Site 1 - Fish House	10-Jun-08	50	3			Heavy pollen
Rowell Site 1 - Fish House	08-Jul-08	20	15			Calm, clear
Rowell Site 1 - Fish House	06-Aug-08	3	lt 1			Calm, clear
Rowell Site 1 - Fish House	02-Sep-08	4	3			Clear, calm
Rowell Site 1 - Fish House	06-Oct-08	1	lt 1			Rain, clear, cool
Rowell Site 4 - State Boat Launch	12-May-08	150	lt 1			Choppy, turbid, brown
Rowell Site 4 - State Boat Launch	10-Jun-08	290	12			Pollen
Rowell Site 4 - State Boat Launch	08-Jul-08	30	18			Calm, clear
Rowell Site 4 - State Boat Launch	06-Aug-08	7	2			Calm, clear
Rowell Site 4 - State Boat Launch	02-Sep-08	42	3			Calm, clear
Rowell Site 4 - State Boat Launch	06-Oct-08	19	4			Rain, clear, 1 ft. waves
Rowell Site 5 - Seven Hills Beach/Lakeview Dr.	12-May-08	41	1			Clear, cold
Rowell Site 5 - Seven Hills Beach/Lakeview Dr.	10-Jun-08	20	1			Clear, Cool
Rowell Site 5 - Seven Hills Beach/Lakeview Dr.	08-Jul-08	10	2			Clear, cool
Rowell Site 5 - Seven Hills Beach/Lakeview Dr.	06-Aug-08	29	6			Clear, choppy
Rowell Site 5 - Seven Hills Beach/Lakeview Dr.	02-Sep-08	4?	lt 1			Clear
Rowell Site 5 - Seven Hills Beach/Lakeview Dr.	06-Oct-08	1	1			Rain, calm, clear
Sacandaga Beach/Sport Island Pub	08-Jul-08	21	8			Bathers, clear
Sacandaga Beach/Sport Island Pub	13-Aug-08	36	7			Calm, no bathers
Sacandaga Park Brook	06-Aug-08	1970?	350			Low flow, clear
Sacandaga Park Brook	02-Sep-08	630	130			Cold, no flow
Sacandaga Park Sewage Outfall Pipe	06-Aug-08	250	84			Choppy, no flow
Small (Northville) Lake Spillway	25-Jun-08	20	2			clear, cool
Small (Northville) Lake Spillway	13-Aug-08	21	11			Calm, clear
Town of Providence						
Cloutler Creek	25-Jun-08	5?	1			Low flow, turbid
Providence Town Beach	08-Jul-08	3	1			Closed, no bathers
Providence Town Beach	13-Aug-08	11	lt 1			No bathers, calm

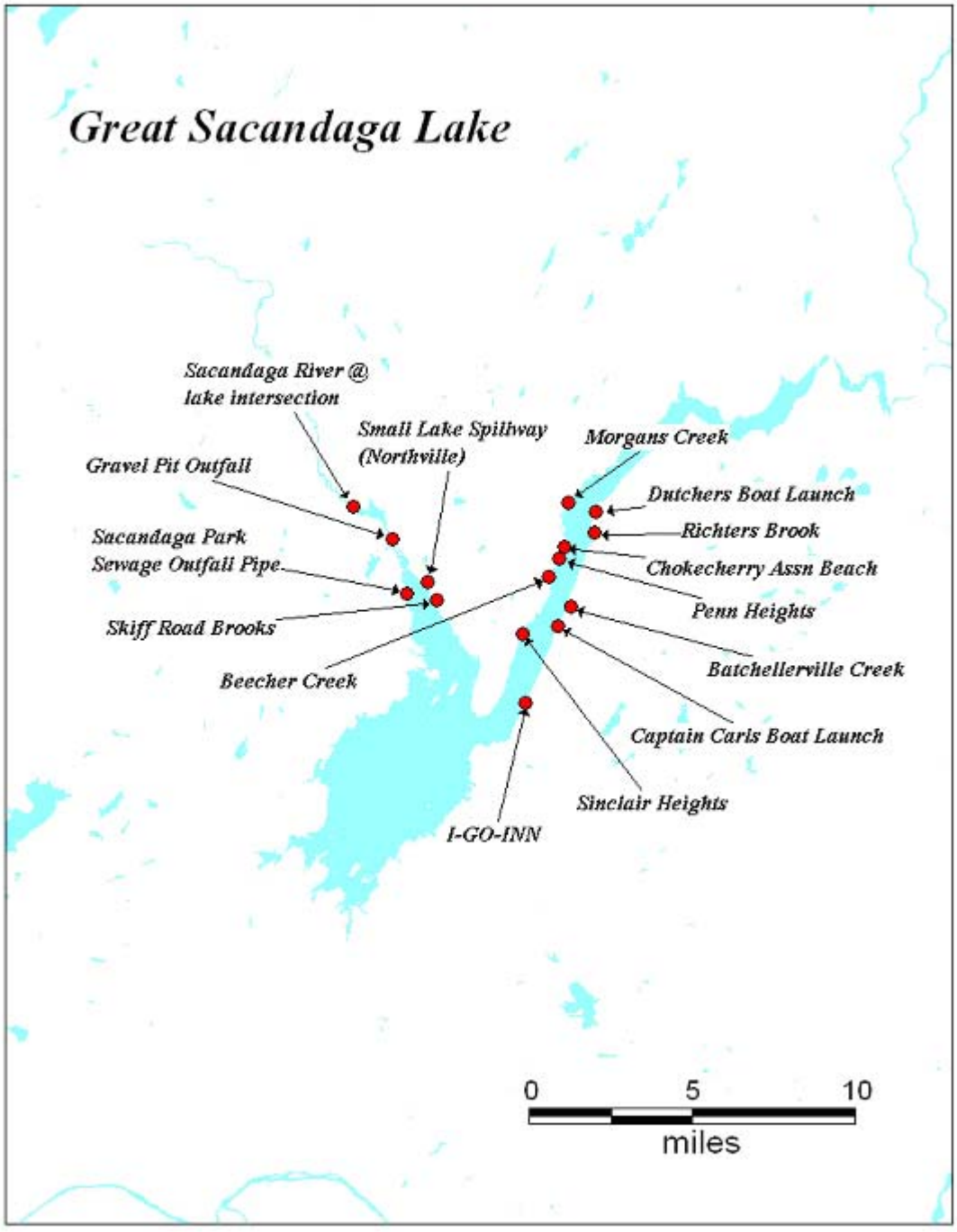
Appendix B.

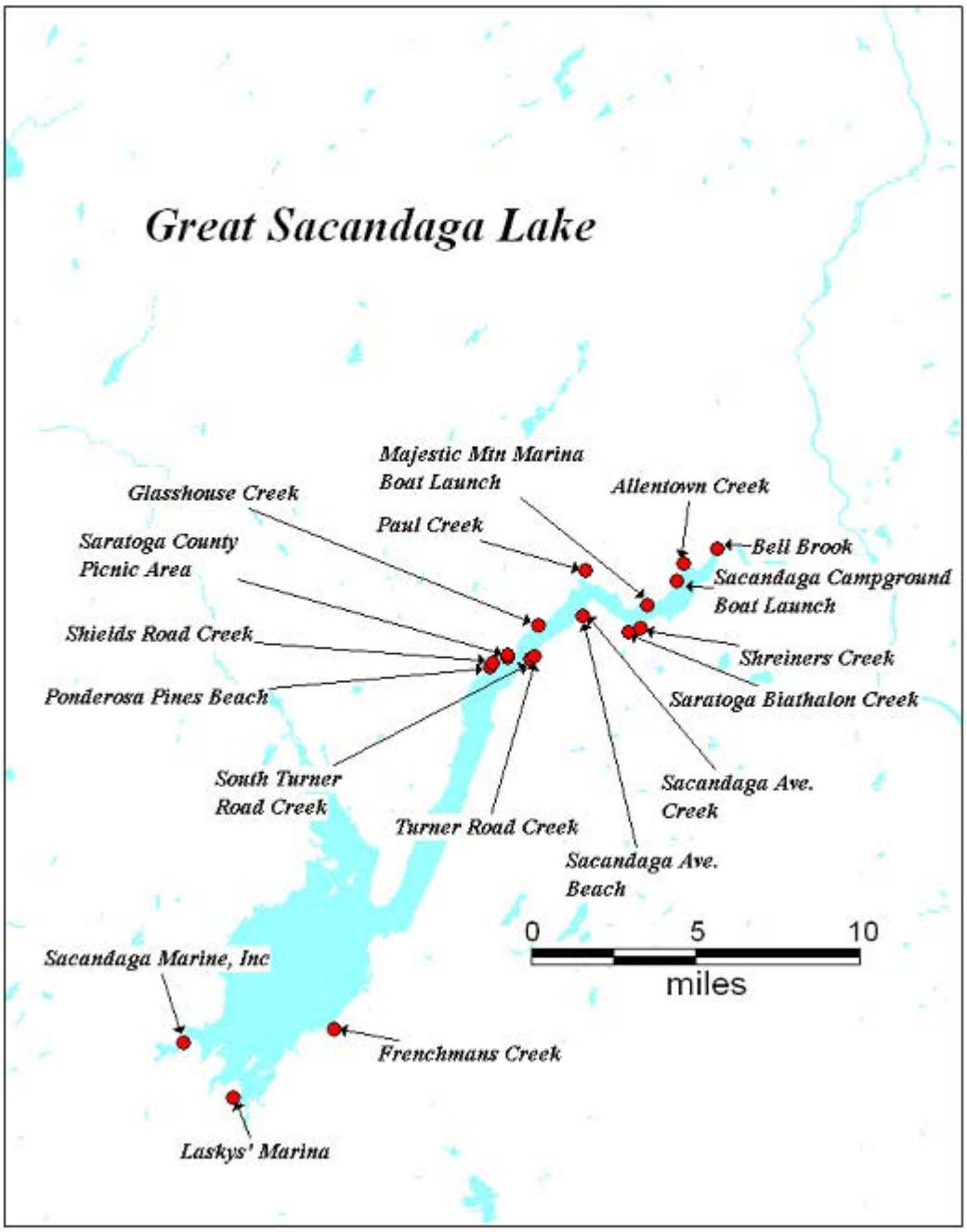
Maps of Bacterial Sampling Locations


Great Sacandaga Lake
Day Center
Site 9
Conklingville Dam
Site 7
Saratoga Co.
Boat Launch
Site 8
Seven
Hills
Site 5
Batchellerville Bridge
Site 6
State Boat
Launch
Site 4
Sunset Bay
Site 3
Fishhouse
Site 1
Sacandaga
Bible Conference
Site 2
Mayfield Lake
Outlet
0
5
10
miles


Great Sacandaga Lake
Conklingville Dam
Day Center
Site 9
Saratoga Co.
Boat Launch
Daley Creek
NYSDEC Boat Launch
Northville
Small Lake Outlet
Edinburg Marina
Batchellerville Bridge
NYSDEC Boat Launch
Northampton
Seven Hills
Lanzi's Docks
Cranberry Cove Marina
Mayfield Town Beach
Sunset Bay
Sunset Bay Marina
Fish House
Broadalbin Town Beach
Lakeview Road
Broadalbin Boat Launch
Grandview Marina
Sacandaga Boat Club
Ryans Marina
McMurray Boat Livery
Mayfield Lake Outlet
Sacandaga Bible Conference
Vandenberg Pt
Beach
Chambers Brook
Woods Hollow Marina
Driftwood Park
Boat Launch
Kennyetto Creek
0
5
10
miles


Great Sacandaga Lake
Northville Town Beach
NYS DEC Boat Launch Northville
Park Marina
Inn at the Bridge
Sacandaga Beach/Sport Island Pub
Stream - 7 Hills/White Birch North
Sacandaga Park Brook
Stream - 7 Hills/White Birch
Northampton Marina
Kenyon Islands Northville
Northampton Boat Launch
Kenyon Islands mid-channel
Providence Town Beach
HRBRRD Boat Launch
Creek
Han Creek
Sand Island North
Sand Island South
0
5
10
miles


Great Sacandaga Lake
Sacandaga River @
lake intersection
Small Lake Spillway
(Northville)
Morgans Creek
Gravel Pit Outfall
Dutchers Boat Launch
Richters Brook
Sacandaga Park
Sewage Outfall Pipe
Chokecherry Assn Beach
Penn Heights
Skiff Road Brooks
Batchellerville Creek
Beecher Creek
Captain Carls Boat Launch
Sinclair Heights
I-GO-INN
0
5
10
miles


Great Sacandaga Lake
Majestic Mtn Marina
Boat Launch
Allentown Creek
Glasshouse Creek
Paul Creek
Bell Brook
Saratoga County
Picnic Area
Sacandaga Campground
Boat Launch
Shields Road Creek
Shreiners Creek
Ponderosa Pines Beach
Saratoga Biathalon Creek
South Turner
Road Creek
Sacandaga Ave.
Creek
Turner Road Creek
Sacandaga Ave.
Beach
0
5
10
miles
Sacandaga Marine, Inc
Frenchmans Creek
Laskys' Marina