

FINAL REPORT

on

WARREN COUNTY BATHING BEACH SURVEY

Submitted to

Warren County Lake George Affairs Committee
Warren County Municipal Center
Lake George, New York

by

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October 20, 1988

FWI #88-9

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EXECUTIVE SUMMARY

New regulations concerning safety and water quality at public bathing facilities were released in the Spring of 1988 by the New York State Department of Health. These new regulations coupled with the lack of water quality data from public bathing facilities within the Lake George basin prompted the Rensselaer Fresh Water Institute to propose an assessment of bacterial water quality at bathing beaches. This proposal was accepted with funding by the Warren County Lake George Affairs Committee and testing of bathing beaches was initiated in July of 1988.

During the 1988 beach sampling program, 108 water samples were collected and analysed for both total and fecal coliform bacteria. Although the bulk of the samples were well within state bacterial guidelines for bathing areas, a number of samples contained unacceptable levels of coliform bacteria. Of these samples, 10 exceeded allowable average levels and 2 exceeded allowable single sample levels of fecal coliform bacteria. None of the samples collected exceeded either the single sample or average maximum level of total coliform bacteria. Since fecal coliform standards were only instituted in 1988, none of the beaches closed during the summer of 1988 for excessive fecal coliform bacterial levels would have been closed in previous years.

INTRODUCTION

Lake George has long been known for its clear, clean waters making it a most desirable location for water based recreation. In 1980, an estimated 137 public bathing beaches were present on the lakeshore. Although the bulk of these are commercial in nature, being present at motels, hotels and other commercial establishments, a number are maintained by state (NYSDEC), county and local governments. In addition, a number of sheltered bays, e.g. Sandy Bay and Log Bay, and picnic sites (e.g. Speaker Heck Island) serve as anchorages and swimming areas for the boating public.

New guidelines concerning water safety and water quality at public bathing facilities have recently been released. New York State Department of Health has determined certain minimum standards for water quality relative to the usage of the body of water. As regards bathing beaches, bacterial water quality is the principle means for qualifying waters for recreational use. Standards for contact recreation are based on the number of total and/or fecal coliform bacteria present in the body of water. Coliform bacteria are found in the digestive tract of all warm-blooded animals, and used as indicators of contamination of waters by sewage. Although coliform bacteria are generally not pathogenic, i.e. disease causing, they indicate the presence of fecal materials which frequently contain disease causing organisms.

The total number of coliform bacteria in a water sample is enumerated via the total coliform test. Since some members of the coliform group of bacteria are free living, that is normally present in soils and water, the total coliform test is not specific for bacteria derived from sewage. A more specific test, the fecal coliform test, is used to measure bacteria specifically derived from sewage. The total coliform test, even though it is not as specific, is still the principle test used to detect sewage; and around which most regulations are centered.

Prior to 1980, the New York State Department of Health, as part of the state mandated bacteriological examination of water used for public bathing, tested a number of public bathing beaches within the Lake George basin. In almost all instances, the bacterial levels at the bathing beaches were within acceptable ranges. Since that time, sampling of bacterial water quality at bathing beaches has been sporadic, with the bulk of the samples collected and analysed by the Rensselaer Fresh Water Institute. Results of these samplings generally showed the public bathing facilities to be within acceptable ranges for coliform bacteria, with three notable exceptions. In 1986, beaches in Bolton Landing

and Glenburnie were closed due to bacterial levels in excess of acceptable limits. In the summer of 1987, the Lake Avenue Beach in Lake George Village was the site of several investigations following the discovery of bacterial contamination problems. These three incidents indicated the need for a more thorough examination of the public bathing facilities within the Lake George basin.

In order to meet this need, the Rensselaer Fresh Water Institute designed a beach testing program which was accepted and funded by the Warren County, Lake George Affairs Committee. The following report describes the results of the bathing beach testing program.

Methods

Twenty bathing areas in the Lake George basin and within the borders of Warren County were selected for study. The sites selected were the most heavily used public bathing areas. Most are easily accessible by road, however a number of locations were chosen as areas receiving heavy use by the boating public. A list of sampling sites is included as Table 1.

Each beach was sampled at least five times over the course of the summer season. The only exception being Diamond Point Beach, where due to the lack of a lifeguard, the beach was closed prior to the completion of the sampling program. Each site was sampled biweekly. Sampling sites in the southern and northern basins of the lake were sampled on alternate weeks. Samples were collected by the Warren County Sanitary Inspector, Mr. Daniel Olsen; or his designated agent. During the initial sampling site visits, Mr. Olsen was accompanied by a member of the Fresh Water Institute staff. An appropriate sampling location at each site was discussed and sample collection techniques reviewed. For each site visit the following information was recorded: 1) the date and time of collection, 2) a verbal description of each location including comments on water clarity, level of use and presence of waterfowl and 3) a sketch map showing sampling location relative to shoreline reference points.

All samples were collected in sterile containers provided by the Rensselaer Fresh Water Institute. Samples were collected by immersing the sample container, open side down, and inverting it once completely under water. While filling, care was taken to avoid collection of surface film and the collectors hand was kept as far from the mouth of the bottle as possible. Care was also taken to avoid stirring up bottom sediments when wading to the sampling location. All samples were collected in water depth of no less than 0.5 meters (1.5 feet) nor more than 1.0 meters (3.0 feet). Samples were collected in a centrally located portion of the beach area. Once collected, all samples were stored in a cooler and

returned to the Rensselaer Fresh Water Institute Laboratory within six hours of collection.

Table 1. Beach Sampling Sites

Name	Town or Village
Cruiser Bay (Log Bay)	Bolton
Huddle Bay Association	Bolton
Northwest Bay Boat Launch	Bolton
Paradise Bay	Bolton
Rogers Memorial	Bolton
Veterans Park	Bolton
Hague	Hague
Rogers Rock Campsite	Hague
Sabbath Day Point	Hague
Silver Bay Association	Hague
Diamond Point	Lake George
Hearthstone Campground	Lake George
Lake Avenue	Lake George
Million Dollar	Lake George
Shepherds Park	Lake George
Still Bay	Lake George
Ushers Park	Lake George
Dunhams Bay Lodge	Queensbury
Sandy Bay	Queensbury
Speaker Heck Island	Queensbury

Once at the laboratory, each sample was analysed for total and fecal coliform bacteria by the membrane filtration method. The Rensselaer Fresh Water Institute currently holds a New York State certification for bacterial examination of both potable and non-potable waters (Lab ID #10719). Results of each of the tests performed were released weekly to the Warren County Sanitary Inspector and reported to the Warren County Lake George Affairs Committee at their monthly meetings.

Any bacterial results exceeding acceptable levels for bathing as defined by the New York State Department of Health, see Table 2, were reported to the:

- * Warren County Sanitary Inspector,
- * New York State Department of Health,

- * New York State Department of Environmental Conservation,
and
- * the operator of the beach in question.

The location where the elevated bacteria were reported was then resampled within 48 hours.

Follow-up samples to locate specific shoreline problems were not within the guidelines of this program and were directed to the appropriate regulatory agencies. The Fresh Water Institute did provide technical assistance upon request, however the cost of additional sampling and analysis fell to the local, county or state agency responsible for water quality complaints.

Table 2. MAXIMUM ALLOWABLE LEVELS OF COLIFORM BACTERIA
IN WATERS USED FOR CONTACT RECREATION
(NYS Dept. of Health Regulations)

Bacterial Test	Maximum 5 Sample Mean	Maximum Single Result
Total Coliform	2400 per 100 ml	5000 per 100 ml
Fecal Coliform	200 per 100 ml	1000 per 100 ml

Results and Discussion

During the 1988 beach sampling program, 108 water samples were collected and analysed for both total and fecal coliform bacteria. Although the bulk of the samples were well within state bacterial guidelines for bathing areas, a number of samples contained unacceptable levels of coliform bacteria. Of these samples, 10 exceeded allowable average levels and 2 exceeded allowable single sample levels of fecal coliform bacteria. None of the samples collected exceeded either the single sample or average maximum level of total coliform bacteria. Since fecal coliform standards were only instituted in 1988, none of the beaches closed during the summer of 1988 for excessive fecal coliform bacterial levels would have been closed in previous years.

Peak numbers of coliform bacteria were observed at most sites in the latter part of July, including samples collected on July 19th thru 28th. Whether this phenomena is due to climactic

conditions such as rainfall or elevated water temperatures which allow the coliform bacteria to survive for longer periods, is unknown at the present time.

Two public beaches were closed due to bacterial levels in excess of state standards during the course of this investigation, Million Dollar Beach in Lake George and Veterans Park Beach in Bolton Landing. Waste materials generated by the large numbers of seagulls roosting on these beaches were suspected of being responsible for the elevated bacterial levels. Remedial efforts took the form of fish lines and flagging strung above the beach to keep the gulls from landing. In addition, more intensive beach cleaning was implemented to remove the debris on the beaches, a source of food which most likely attracted the gulls. After completion of these activities, a reduction in bacterial levels at the Million Dollar Beach was observed although whether directly attributable to the remedial actions can not be ascertained.

In addition to a large seagull population, physical characteristics of Veterans Park Beach were also suspected to be contributing to the problem. Solid crib docks were present at either end of the beach, resulting in very little water circulation in the beach area thus creating a stagnant condition. This condition would be expected to magnify any problems by containing any bacteria released in this area by waterfowl, bathers or any number of other sources. Removal of one of the two docks, thus improving circulation in the beach area, appeared to yield improved bacterial water quality.

The Hague Town Beach and Rogers Memorial Beach in Bolton also displayed elevated levels of fecal coliform bacteria during the early portion of the summer (mid-July). A number of samples at these sites exceeded average allowable fecal coliform bacterial levels, although the condition was not of sufficiently long duration to force closing of the beaches. At both sites, seagull exclusion devices similar to the ones at Veterans Park and Million Dollar Beach were installed.

In general, beaches displaying elevated levels of coliform bacteria were confined to the more urbanized portions of the lake basin. Whether this condition is the result of more intensive use of these beaches, the presence of more contamination from intense shoreline development, restricted circulation in these areas due to the abundance of docks and piers, or encouragement of large waterfowl populations due to feeding is not currently apparent. What is apparent from the beach closings is that Lake George is not pristine, and steps must be taken to evaluate and maintain water quality.

Recommendations

Although the bathing beach sampling program conducted during the summer of 1988 went a long way toward reducing the level of complacency in regard to Lake George water quality, continuation of this program is necessary. A review of the sampling sites, in order to focus future efforts in areas with more likely contamination, should be expedited. Beach operators should also be more involved, so that they can gain from the experiences at other beaches in coping with contamination problems. Warren County may also wish to expand this program to encompass bathing beaches in other parts of the county. Both Washington and Essex counties should also be encouraged to develop similar programs for their beaches.

APPENDIX I. Bacterial Water Quality Data

LIST OF ABBREVIATIONS

- TNTC Bacteria of Interest are Too Numerous to Count
- MAT Confluent Growth of Bacteria Other Than Those of Interest
- CONF Confluent Growth of Target Bacteria
- ? Background Growth of Bacteria Other Than Those of Interest
This Condition May Cause Problems in Counting Other Bacteria
- > Greater Than the Number Listed
- < Less Than the Number Listed

WARREN COUNTY BATHING BEACH STUDY
1988

SITE	DATE	Total Coliform /100ml	Fecal Coliform /100ml
Town of Bolton			
Cruiser Bay (Log Bay)	07/12/88	30	4
Cruiser Bay (Log Bay)	07/26/88	10	1
Cruiser Bay (Log Bay)	08/10/88	30	7
Cruiser Bay (Log Bay)	08/23/88	<10	<1
Cruiser Bay (Log Bay)	09/08/88	<10	<10
Huddle Bay Association Beach	07/06/88	94	16
Huddle Bay Association Beach	07/19/88	250	39
Huddle Bay Association Beach	08/01/88	90	33
Huddle Bay Association Beach	08/16/88	610	84
Huddle Bay Association Beach	08/30/88	130	20
Northwest Bay Boat Launch	07/06/88	158?	7
Northwest Bay Boat Launch	07/26/88	270	27
Northwest Bay Boat Launch	08/09/88	190	47
Northwest Bay Boat Launch	08/23/88	10	<10
Northwest Bay Boat Launch	09/07/88	170	29
Paradise Bay	07/12/88	30	2
Paradise Bay	07/26/88	60	2
Paradise Bay	08/10/88	20	6
Paradise Bay	08/23/88	30	3
Paradise Bay	09/08/88	10	<10
Rogers Memorial Beach	07/06/88	339?	211?
Rogers Memorial Beach	07/08/88	120	20
Rogers Memorial Beach	07/19/88	560	160
Rogers Memorial Beach	08/01/88	170	40
Rogers Memorial Beach	08/16/88	270	40
Rogers Memorial Beach	08/30/88	130	40
Veterans Park Beach	07/06/88	TNTC	224?
Veterans Park Beach	07/08/88	350	180
Veterans Park Beach	07/19/88	910	270
Veterans Park Beach	07/26/88	810	320
Veterans Park Beach	07/28/88	590	300
Veterans Park Beach	08/01/88	210	70
Veterans Park Beach	08/16/88	90	10
Veterans Park Beach	08/30/88	130	40

WARREN COUNTY BATHING BEACH STUDY
1988

SITE	DATE	Total Coliform /100ml	Fecal Coliform /100ml
Town of Hague			
Hague Town Beach	07/12/88	600	312?
Hague Town Beach	07/14/88	260	280
Hague Town Beach	07/26/88	270	70
Hague Town Beach	08/09/88	70	<10
Hague Town Beach	08/23/88	30	10
Hague Town Beach	09/07/88	50	5
Rogers Rock Campsite Beach	07/12/88	50	19
Rogers Rock Campsite Beach	07/26/88	30	25
Rogers Rock Campsite Beach	08/09/88	50	34
Rogers Rock Campsite Beach	08/23/88	20	3
Rogers Rock Campsite Beach	09/07/88	20	2
Sabbath Day Point Beach	07/12/88	160	41
Sabbath Day Point Beach	07/26/88	90	35
Sabbath Day Point Beach	08/09/88	100	23
Sabbath Day Point Beach	08/23/88	10	2
Sabbath Day Point Beach	09/07/88	20	1
Silver Bay Association Beach	07/12/88	10	1
Silver Bay Association Beach	07/26/88	70	6
Silver Bay Association Beach	08/09/88	20	9
Silver Bay Association Beach	08/23/88	10	3
Silver Bay Association Beach	09/07/88	20	<1

WARREN COUNTY BATHING BEACH STUDY
1988

SITE	DATE	Total Coliform /100ml	Fecal Coliform /100ml
Town of Lake George			
Diamond Point Beach	07/06/88	12	3
Diamond Point Beach	07/19/88	80	9
Diamond Point Beach	08/01/88	20	2
Diamond Point Beach	08/16/88	50	4
Hearthstone Campground Beach	07/06/88	45	3
Hearthstone Campground Beach	07/19/88	180	34
Hearthstone Campground Beach	08/01/88	210	14
Hearthstone Campground Beach	08/16/88	20	7
Hearthstone Campground Beach	08/30/88	80	10
Lake Avenue Beach	07/06/88	86?	38
Lake Avenue Beach	07/19/88	380	142
Lake Avenue Beach	08/01/88	110	59
Lake Avenue Beach	08/16/88	230	90
Lake Avenue Beach	08/30/88	2360	160
Million Dollar Beach	07/06/88	233?	251?
Million Dollar Beach	07/08/88	1170	710
Million Dollar Beach	07/13/88	380	330
Million Dollar Beach	07/19/88	710	300
Million Dollar Beach	07/20/88	2040	1060
Million Dollar Beach	08/01/88	110	59
Million Dollar Beach	08/16/88	180	30
Million Dollar Beach	08/30/88	240	20
Shepherds Park Beach	07/06/88	89	33
Shepherds Park Beach	07/19/88	230	27
Shepherds Park Beach	08/01/88	50	10
Shepherds Park Beach	08/16/88	50	50
Shepherds Park Beach	08/30/88	110	10
Still Bay Beach	07/06/88	120	96
Still Bay Beach	07/19/88	70	29
Still Bay Beach	08/01/88	90	19
Still Bay Beach	08/16/88	360	98
Still Bay Beach	08/30/88	190	14
Ushers Park Beach	07/06/88	63	1
Ushers Park Beach	07/19/88	40	18
Ushers Park Beach	08/01/88	30	7
Ushers Park Beach	08/16/88	250	31
Ushers Park Beach	08/30/88	180	22

WARREN COUNTY BATHING BEACH STUDY
1988

SITE	DATE	Total Coliform /100ml	Fecal Coliform /100ml
Town of Queensbury			
Dunhams Bay Lodge Beach	07/06/88	9	1
Dunhams Bay Lodge Beach	07/19/88	270	6
Dunhams Bay Lodge Beach	08/01/88	220	14
Dunhams Bay Lodge Beach	08/16/88	150	34
Dunhams Bay Lodge Beach	08/30/88	160	26
Sandy Bay	07/19/88	110	4
Sandy Bay	08/01/88	30	8
Sandy Bay	08/16/88	50	10
Sandy Bay	08/30/88	140	26
Speaker Heck Island	07/12/88	40	48
Speaker Heck Island	07/26/88	820	363
Speaker Heck Island	07/28/88	1520?	4780
Speaker Heck Island	08/01/88	150	50
Speaker Heck Island	08/10/88	100	30
Speaker Heck Island	08/23/88	120	60
Speaker Heck Island	09/08/88	40	50

Purchase Order No. -----

Voucher No. -----

WARREN COUNTY VOUCHER

Code No. -----

Ordered for Warren Co. Lake George Affairs Comm.

Purpose -----

CLAIMANT'S
NAME
AND
ADDRESS

Rensselaer Fresh Water Institute
202 MRC
Rensselaer Polytechnic Inst.
Troy, New York 12180

Terms -----

Vendor's
Ref. No.

5568

Dates	Quantity	Description of Materials or Services	Unit Price	Total Amount
July thru September 1988		Warren County Bathing Beach Survey, a proposal funded by the Warren County Lake George Affairs Committee. Resolution #258		2445 00
County of Warren is Exempt from all State and Federal Taxes (See Instructions on Reverse Side)			TOTAL	2445 00

CLAIMANT'S CERTIFICATION

I, Lawrence Eichler, certify that the above account in the amount of \$ 2445.00 is true and correct; that the items, services and disbursements charged were rendered to or for the municipality on the dates stated; that no part has been paid or satisfied; that taxes, from which the municipality is exempt, are not included; and that the amount claimed is actually due.

October 31, 1988

Lawrence Eichler

Laboratory Supervisor

DATE

SIGNATURE

TITLE

(Space Below for Municipal Use)

DEPARTMENT APPROVAL

The above services or materials were rendered or furnished to the municipality on the dates stated and the charges are correct.

DATE

AUTHORIZED OFFICIAL

APPROVAL FOR PAYMENT

This claim is approved and ordered paid from the appropriations indicated above.

Date

County Auditor