

mailed names of
Stein & Freeman to Bill
Aug 15

Keuka Lake Association

Keuka Lake Shore Property Owners, Inc.

Post Office Box 232 * Penn Yan, New York 14527

EXECUTIVE DIRECTOR

Fuller J. Allen
443 E. Lake Road
Penn Yan, N. Y. 14527
Tel.: 315-536-9436

EXECUTIVE SECRETARY

Mrs. Helen S. Lamont
Box 118
Himrod, N.Y. 14842
Tel.: 607-243-7954



PRESIDENT

John W. Kelley

VICE-PRESIDENT

John T. Andrews

SECRETARY

John R. Kuhl, Jr.

TREASURER

Kenneth Taft

CHAIRMAN OF THE BOARD

William A. Weber

Minutes of the annual meeting for the members of KEUKA LAKE SHORE PROPERTY OWNERS, INC. held the 12th day of July, 1986, at the "Barn" on Keuka College Campus.

Executive Director, Fuller J. Allen, announced that out of approximately 2700 property owners listed in the Lake Directory, our last membership mailing was 1399. He urged all members to be cognizant of the many activities of a very busy lake and urged the members to push for more members to cope with the potential problems.

The Directors then met with members of their own townships for 30 minutes to discuss town priorities.

GENERAL MEETING was called to order by Executive Director, Fuller Allen. There were 128 members present and 208 proxies had been filed with the Executive Secretary.

DIRECTORS PRESENT: Urbana - Bill Weeks; Wayne - Pete Fennell; Barrington - Perry Johnson & Ed Phillips; Jerusalem - John T. Andrews, Jr. & Hugh Slawson, Jr.; Milo - John W. Kelley; Pulteney - Bill Weber & Phillip Hunt; Director-at-Large - Everett Kiff; Others Present: Executive Director - Fuller J. Allen; Vice-President - John T. Andrews, Sr.

GUESTS PRESENT: Guest Speaker, Jack Wills, Biology Professor at Corning Community College, and Bill Mahrt, Watershed Inspector.

Fuller Allen turned the meeting over to President John W. Kelley. It was reported that NYSE&G is not willing to shut down the Keuka Power Station, however, they conceded to not run in the summer, unless flooding occurs, they will paint the Station, and they are investigating the possibility of aerating the holding pool to discourage the sludge from being discharged into the Lake. NYSE&G maintains that as small as the Keuka Power Station is, it is still important. The largest priority from last year's meeting was weeds, that is the direct result of having Mr. Wills as guest speaker this year. He then stated the intention of Executive Director, Fuller J. Allen's resignation that has been in file since 1983, this would be his last annual meeting as Executive Director.

President Kelley suggested that the minutes of the last annual meeting held July 13, 1986 not be read as all members had received a copy in the mail. After request for corrections or additions, motion was made, seconded, and passed that these minutes be approved as written.

DIRECTORS

URBANA
Freeman H. Smith
William S. Weeks

WAYNE
Lawrence Tallman
J. Peter Fennell

BARRINGTON
Edward L. Phillips
Perry W. Johnson, Jr.

JERUSALEM
Hugh M. Slawson, Jr.
John T. Andrews, Jr.

MILO
John W. Kelley
Samuel K. Wolcott, Jr.

PULTENEY
F. Phillip Hunt
William A. Weber

AT LARGE
Everett Kiff

TREASURER'S REPORT: This report was read by Fuller J. Allen do to the absence of Treasurer, Kenneth Taft. It showed a balance on hand as of July 1, 1985 of \$10,759.89. Receipts were \$12,189.84; Disbursements were \$8,331.65; Total available funds 6/30/86 were \$14,618.08.

AUDIT COMMITTEE REPORT: Made by Chairman F. Phillip Hunt. He stated that the accounts were examined by the Committee and were approved.

NEW BUSINESS:

REPORT OF THE NOMINATING COMMITTEE: Report was made by Chairman Edward Phillips. The Committee proposed the following slate of Directors for a two-year term: Perry Johnson (Barrington); Hugh Slawson, Jr. (Jerusalem); John W. Kelley (Milo); Larry Tallman (Wayne); William Weeks (Urbana); William Weber (Pulteney); and Everett Kiff a one-year term for Director-at-Large. Motion was made, seconded and unanimously passed that the slate of Directors be accepted.

WATER LEVEL: The level today is 714.25, the target is 714.30.

WATERSHED INSPECTOR'S REPORT: Bill Mahrt, Watershed Inspector, reported the inspections to-date are as follows:

	MILO	BARRINGTON	URBANA	JERUSALEM	VILL. of HSPT.	TOTAL
No. of Inspections	130	131	259	120	80	720
Work in Progress	31	19	49	32	6	137
Violations	1	2	6	2	1	12
Technical Violations	1	3	4	1	1	10
Installations OK	80	105	172	66	37	460
Violations Abated	1	3	7	2	1	14
New Construction	15	7	36	15	3	76
Violations Unabated	0	1	2	0	0	3
Complaints	1	3	8	4	1	17

Question from the floor regarding Mr. Mahrt's report regarding no mention of Pulteney or Wayne. Mr. Mahrt stated he had asked the Inspector's from their respective towns to come and report and neither were present. The Association is meeting with both towns to assist in the watershed inspection in their respective towns.

TOWNSHIP PRIORITIES: They were developed in the town meetings and then reported at the general assembly.

1. was the land development project at the Tip of Bluff Point.
2. was the general membership thought we should have a lawyer on retainer for advise pertinent to our Organization.
3. Lake Profile Study for weed control.

Other priorities discussed at town meetings were NYSG&E Keuka Power Station, speed and noise of boats, and zoning.

The meeting was then adjourned at 11:50 AM.

Carol A. Adams
Adams Apple Bookkeeping/Apple Graphics

JUST IN: The Steuben County Sheriff's Dept. announced a Boater Safety Course at Harbor Lights Marina August 12 & 14th. The Course is open to youth 10-16 years of age. The course will be held from 9 AM - Noon each day. This course is mandatory for any youth to operate a boat alone on the waters of New York State.

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CHAIRMAN OF THE BOARD

William A. Weber

February 20, 1986

Mr. William MacGregor
NYS Dept. of Environmental Conservation
6274 East Avon-Lima Road
Avon, New York 14414

Dear Mr. MacGregor:

As Chairman of this Association, I am most concerned with those activities around Keuka Lake which threaten the ecology and the water quality.

I serve on a Yates County sponsored Committee, which is examining the aquatic weed problem which we see as a threat to Keuka Lake.

When activities such as are described in the accompanying article and photograph go unchecked, our Lake can only suffer.

Would you please examine this situation to ensure the DEC regulations are being adhered to and also please advise me of any action you would suggest KLSP0 undertake to prevent dangerous land use practices?

Very truly yours,

W^m A. Weber

William A. Weber
Chairman of the Board

WAW/caa
Enc. (2)

cc: Mr. Robert Canfield, Town of Wayne Zoning Officer
KLSP0 Directors, Jerusalem
John W. Kelley, Pres., KLSP0
Fuller Allen, Executive Director, KLSP0

DIRECTORS

URBANA

Freeman H. Smith
William S. Weeks

WAYNE

Lawrence Tallman
J. Peter Fennell

BARRINGTON

Edward L. Phillips
Perry W. Johnson, Jr.

JERUSALEM

Hugh M. Slawson, Jr.
John T. Andrews, Jr.

MILO

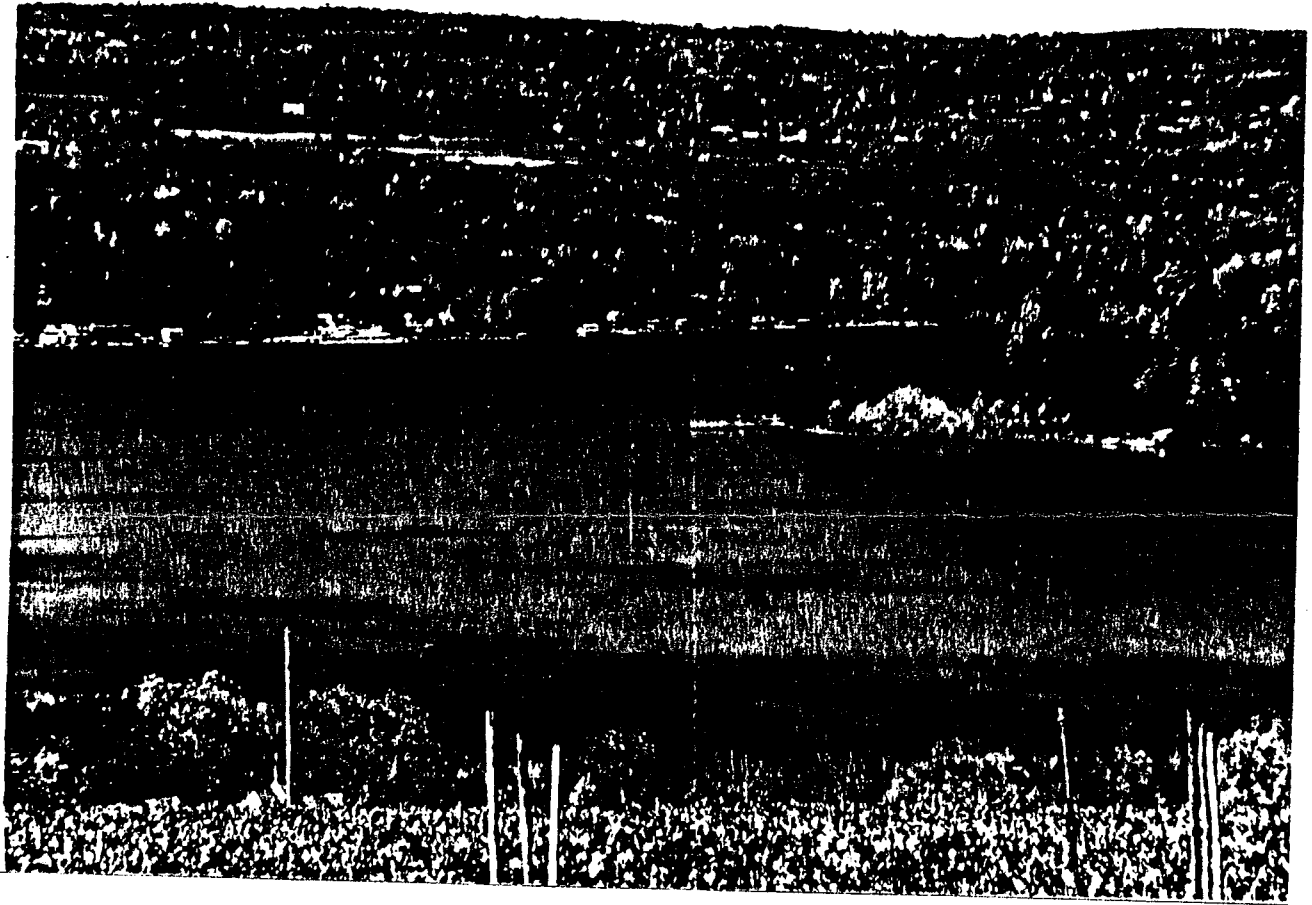
John W. Kelley
Samuel K. Wolcott, Jr.

PULTENEY

F. Philip Hunt
William A. Weber

AT LARGE

Everett Kiff



Established

in

1824

Thursday, February 13, 1986

Complaints heard on private project

By MIKE HIBBARD

JERUSALEM - Members of the town's planning and zoning boards, expressing concerns of their own and by local residents about a development project on West Bluff Drive, addressed the Jerusalem Town Board, at its meeting of Monday, Feb. 10, to find out what can be done to alleviate the situation.

Steve Hulse, chairman of the planning board, was joined by Michael Pallischek of the planning board and Jim Cassata of the town's zoning board, to discuss the issue. All three said that property on West Bluff Drive, owned by former, long-time planning board member John Nicolo, is being developed to some extent, but as of yet, a permit has not been issued by the town building inspector for construction.

Cassata pointed out that he is under the impression that a master development plan is underway, and he, as well as others, would like to know more about it. He also stated that a roadway leading to the edge of the property's lakefront shows erosion, and may be dangerous. He further explained that Nicolo should be alerted to zoning requirements which require a permit.

"We, as a (zoning) board, would like to know about plans for the project," Cassata said. "We have drafted a letter inviting Nicolo to meet with us and discuss his intentions."

Pallischek also stated that the planning board would like to meet with Nicolo also about similar matters. He pointed out, however, that the boards are not condemning the operation, but are just interested in its value to both Nicolo and the town.

"We have no animosity, or interest, in running down Mr. Nicolo," Pallischek maintained. "We just would like to have a plan that insures the safety of citizens and tax-

payers for years to come."

According to Pallischek, 30 to 40 yards of concrete have been poured to form a breakwall on or near the lakefront property. The structure, which is U-shaped, he added, is very evident to people passing by the area. He noted that his group is looking for more support from the town board.

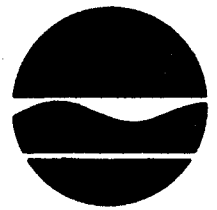
"I would not hesitate to write a letter, but I'm not sure it would help," said Supervisor Joseph Healy, pointing out that since construction is on Nicolo's own property, no wrongdoings have occurred.

Hulse interjected on that note, pointing out that a violation of the town's zoning ordinance has occurred, since Nicolo did not obtain a permit to construct. He mentioned that other violations may be present at the site, but since the town's zoning ordinances are so outdated, they do not cover all aspects of zoning. He added that amendments by the zoning board were made last year, but that no money was allotted to see them through.

"The zoning and planning boards are on the back burners," Hulse said, referring to the town's monetary structure in relation to a hot oven. "While the assessor and highway department are on the other side, with the town board controlling the switch."

Resulting from this debate, an impromptu committee was set up to look at the Nicolo issue, as well as to revise some town zoning ordinances. The committee will consist of members of the town, planning, and zoning boards. Councilman Richard Ackerman offered his time to the committee, while Taylor Fitch, a board member, recommended that councilmen attend zoning and planning board meetings on a rotating basis.

New York State Department of Environmental Conservation
6274 East Avon-Lima Road, Avon, New York 14414
TELEPHONE: 716/226-2466



Henry G. Williams
Commissioner

Eric A. Seiffer
Regional Director

February 24, 1986

Mr. William A. Weber
Keuka Lake Association
P.O. Box 232
Penn Yan, NY 14527

Re: 80-83-1289
John E. Nicolo
Jerusalem (T), Yates (C)

Dear Mr. Weber:

Reference is made to your letter dated February 20, 1986 regarding activities on Keuka Lake.

Mr. Nicolo made application to fill a portion of Keuka Lake on this particular parcel of land. After a series of meetings with him, he agreed to go along with a breakwall generally along the mean high water line of the lake; therefore, a permit was issued for this work. The Department has a policy of allowing breakwalls generally along the mean high to protect upland landowners from erosion. We also allow existing fills to be repaired. This project was advertised in the Environmental Notice Bulletin and no objections were received. The Department does not have any jurisdiction over docks on piles or floats, by the way, except where they involve a protected wetland.

Anyone who issues a permit or has any legal authority over a project must go through the State Environmental Quality Review Act (SEQR) regulations before issuing a permit. Small ministerial actions are excluded out of this act, like the Department issuing fishing licenses. Issuance of a building permit would also be excluded unless it was a special case.

Recommendations:

1. A check-up on the towns to see if they are following zoning codes.
2. See if they are doing SEQR on projects which require it.
3. Recommend that town upgrade their building requirements to include construction of roads, which can be a real erosion problem in your area.
4. Recommend that towns enact erosion control codes.
5. Get members of your association involved in town meetings.

William A. Weber

-2-

February 24, 1986

If you ever have a question about whether or not a landowner has obtained a permit for a project, feel free to contact me at this office.

Sincerely,



William A. MacGregor
Alternate Permit Administrator
Regulatory Affairs

WAM:mm

M E M O R A N D U M

TO: YATES COUNTY AQUATIC VEGETATION COMMITTEE
 FROM: JOHN HERRING, JOSH LIPTON
 DATE: SEPTEMBER 8, 1987
 RE: RESULTS OF FECAL COLIFORM TESTING, KEUKA LAKE

The results of the fecal coliform samples taken on July 29 are as follows:

LOCATION	COLIFORMS (# colonies/100 ml)
Camp Corey (N. end)	0
Camp Corey (S. end)	90
--off water inlet/outlet (?)	
S. of Camp Corey	0
Willow Grove N.	103
Willow Grove S.	0
Off 720 E. Lake Rd.	188
Brandy Bay (middle)	119
Brandy Bay Inlet	0
Penn Yan Channel	0

The above results serve as a strong indication that septic tanks are leaking into the lake at a number of sites. The results, however, do not imply that overall water quality is degraded. The fact that samples were only taken on one day limits the extent to which these results should be generalized. Follow-up sampling of the Branchport branch and much of the Hammondsport branch was performed on September 7. If possible, samples will also be taken by Lakeshore Association volunteers during their routine sampling.

Despite the incomplete coverage so far obtained, the coliform counts do serve as persuasive evidence of septic tank leakage into Keuka Lake. Coliform bacteria are relatively short-lived in fresh water (on the order of several hours to a maximum of a day). The above results therefore indicate recent and probably continuing contamination. Moreover, the fact that stream beds flowing into the lake at the sample sites were uniformly dry at the time of sampling indicates that the coliform source was located on the lakeshore rather than in upland areas.

In addition, the observation that positive coliform counts appeared at several sites implies that the problem of septic tank seepage is relatively widespread.

Although the above conclusions are somewhat tentative, they underline two distinct areas of concern. First, as related to aquatic weed growth, the septic tank seepage indicated by the coliforms could provide a major source of nutrients (particularly phosphorus and nitrogen) for weed growth. While demonstrating the presence of septic tank seepage does not indicate the magnitude of the problem, septic tanks may play a critical role in providing nutrients for weed growth, particularly during the summer months when stream flows are minimal to non-existent.

Second, the evidence of coliform contamination poses a potential public health problem to those residents who obtain drinking water from the lake. Although coliform bacteria themselves are not harmful to humans, they serve as indicators of a wide variety of pathogens found in human excreta. These pathogens can cause a range of waterborne illnesses from amoebic dysentery to typhus.

To place the observed coliform levels in perspective, New York State drinking water regulations (State Sanitary Code 5-1.54) set a maximum coliform bacteria level of four per 100 milliliter sample for community water systems. Title 10 of New York State's Health regulations (170.4) set a standard of 50 coliforms per 100 ml sample for raw water which is to be used for public drinking water systems. This latter standard applies to water which will be treated prior to consumption. New York's contaminant levels are the same as the federal levels set by the U.S. EPA in its National Primary Drinking Water Standards.

As can be seen by the above state and federal standards, the coliform levels measured in several of the Keuka Lake samples far exceed those levels deemed "safe" for direct consumption. It should be noted that Penn Yan's water supply is taken from the middle of the lake and is treated prior to distribution, so that there is little likelihood of microbiological contamination in the municipal drinking water supply. Penn Yan also tests its water regularly (as required by state and federal laws), further reducing the chance of large-scale contamination. However, for those individuals who take their drinking water directly from the lake, the coliform levels may be a cause for concern. Those who use lake water for drinking purposes should follow the watershed inspector's recommendation and use some form of treatment, either chlorination or ozonation.

R & J Laboratories

Biological and Chemical Testing

Dept of Natural Resources
Fernow Hall
Cornell University

ATTN: John Herring

September 10, 1987

RE: Keuka Lake Aquatic Vegetation Study

Dear John,

The following are the results of the 9/7/87 samplings for fecal coliforms:

<u>SAMPLEND.</u>	<u>LOCATION</u>	<u>FECALCOLIFORMS</u> (No. colonies/100ml)
<i>URBANA</i>	1 158 W. Lake Rd (WLR) Hammondsport	194
	2 205 WLR	4
	3 340 WLR	88
	4 611 WLR	15
	5 Vintage Restaurant	0
	6 745 WLR	4
<i>PULTENEY</i>	7 S. of Harbor Light Marina	112
	8 536 WLR Branchport	0
	9 471 WLR	0
	10 400 WLR (off trailer park)	37
	11 311 WLR	42
	12 140 WLR on the flats	57
13 73 WLR	32	
14 360 West Bluff Drive (WBD)		
<i>JERUSALEM</i>	(two *14 samples were submitted they were designated 14A and 14B and tested)	
14A	0
14B	95
	15 433 WBD	251
16 522 WBD	52	
17 760 WBD	197	
18 off Bluff Pt.	1,792	
19 Switzerland Inn	17	
<i>WAYNE</i>	20 1271 East Lake Rd. (ELR)	612
	21 1305 ELR	17
	22 1353 ELR	32
	23 1400 ELR (trailer Park)	5,180
	24 625 ELR	57
	25 560 ELR	39
<i>URBANA</i>	26 392 ELR	748
	27 225 ELR (opposite Snug Harbor)	0
<i>JERUSALEM</i>	28 Guyanoga Valley Inn	553
	29 Isaac Walton League	0
	30 Sugar Creek (mouth)	0

Perth
9/10/87

IT IS A PLEASURE TO SERVE YOU

P.O. Box 654 Penn Yan, New York 14527-0654 (315) 536-9302



FECAL COLIFORM SAMPLING
Report to Districting Committee
09/13/89

SAMPLING DATES: 08/14/89, 08/28/89, 09/05/89, (09/26/89)

SAMPLING METHOD: Forty samples sites are randomly chosen using random numbers table to select a quarter mile segment and then a house number within the segment. (Note: House numbers are used only to choose sites randomly, not to test for failing systems. This method is only meant to indicate the severity of the problem and cannot locate individual system failures.) Forty different samples are taken on each day. Samples are taken close to shore in only a few inches of water. R and J Laboratories of Penn Yan analyzes the samples.

RESULTS:

<u>No. of Colonies/100ml</u>	<i>(RAIN)</i>	<u>% of samples in category</u>	
	<u>08/14/89</u>	<i>Dry</i> <u>08/28/89</u>	<i>Dry</i> <u>09/05/89</u>
<1	8%	74%	27%
1 - 4	0%	21%	34%
5 - 50	28%	5%	32%
51 - 200	46%	0%	7%
201 - 1000	13%	0%	0%
1000+	5%	0%	0%

all pits

To put these numbers in perspective:

- Maximum for community water systems: 4 colonies/100ml
- Maximum for raw water prior to treatment: 50 colonies/100ml
- Allowable Rate for Natural Inland Waters: 200 colonies/100ml
- Maximum for primary contact recreation: 200 colonies/100ml

CONCERNS: On certain days fecal coliform counts may be high enough in certain areas to indicate nutrient loading and, on a limited basis, health concerns.

Nutrient Loading: In certain areas, fecal coliform levels indicate the possibility of failing septic systems which may also be contributing weed promoting nutrients to the lake.

Health Concerns: In some areas, on some days, primary contact recreation may be unsuitable due to high fecal coliform counts. Multiple samples at such sites would be needed to make a final determination. Drinking water is of less concern, since most water intakes are in deeper water and most people treat their water before use. Those risking health problems are those people with very shallow water intakes who do not treat the water before consumption. This is probably a small group.

ree years of data for the Tuesday after Labor Day:

<u>No. of colonies/100ml</u>	<u>09/07/87</u>	<u>% of samples in category</u>	
		<u>09/06/88</u>	<u>09/05/89</u>
<1	26%	51%	27%
1 - 4	6%	0%	34%
5 - 50	23%	32%	32%
50 - 200	31%	10%	7%
201 - 1000	9%	7%	0%
1000+	6%	0%	0%

*all
D
bits*

Statistical significance unknown.

FURTHER ANALYSIS: Several Cornell scientists will be helping us interpret our results and refine our sampling method to better define the problem.

Yates County Soil and Water Conservation District
110 Court Street
Penn Yan, NY 14527
(315)536-6233

December 21, 1989

Enclosed is information concerning the fecal coliform sampling that was conducted on Keuka Lake during 1989.

Four sample runs were performed around the perimeter of the entire lake; @ 60 miles. Each sample run consisted of 40 sites selected randomly for each of the four dates. Two double samples and two control samples were also included for each date. The control samples were distilled water with special codes for our office use. All of these control samples had 0 colonies reported by the lab. These control samples are not included on the following sheets. The double samples are included in the enclosed results and denoted by an (*).

The column identified as "No. Colonies" was taken from the lab reports. The column "Density" refers to the number of residences within the quarter mile segment of shoreline the sample was taken.

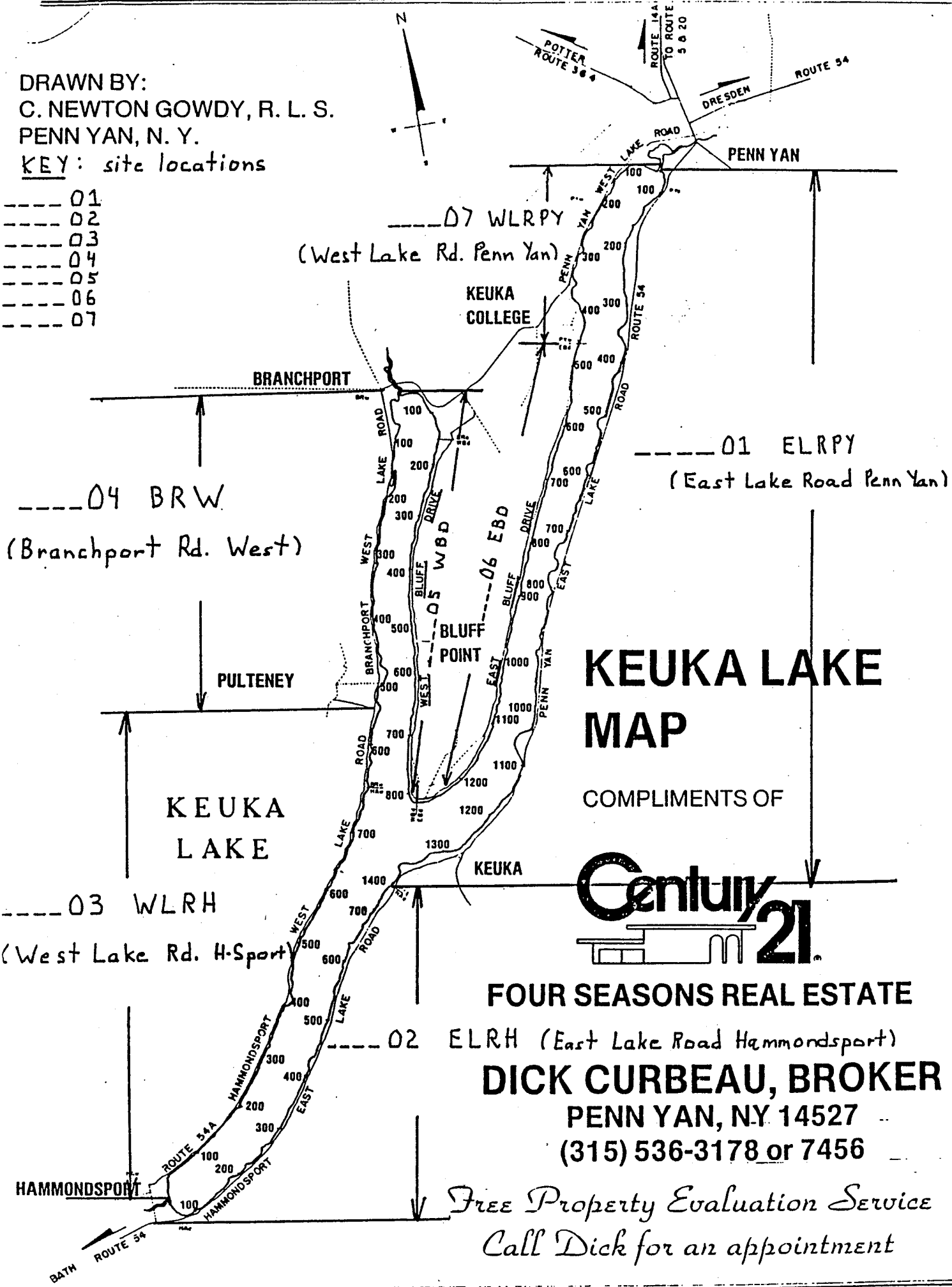
Site codes denote the location of the sample being reported. The last two digits in the code (01 to 07) refer to the lake segment the sample was taken from. (See accompanying sheet). The preceding four digits refers to the house/camp number. The residence numbers were originally established around the lake to reflect mileage along the shoreline. For example, 600 East Lake Road Penn Yan is approximately 6 miles south of Penn Yan.

Two further examples will help to explain site codes. The first site listed under the sample date of 8/14/89 is 033401. This location is 334 East Lake Road Penn Yan. The eighteenth site is 017903. This location is 179 West Lake Road Hammondsport. The sites labeled KSP were taken along the shoreline at Keuka State Park.

DRAWN BY:
 C. NEWTON GOWDY, R. L. S.
 PENN YAN, N. Y.

KEY: site locations

- 01
- 02
- 03
- 04
- 05
- 06
- 07



KEUKA LAKE MAP

COMPLIMENTS OF



FOUR SEASONS REAL ESTATE

DICK CURBEAU, BROKER
 PENN YAN, NY 14527
 (315) 536-3178 or 7456

*Free Property Evaluation Service
 Call Dick for an appointment*

WATERSHED PERIMETER COMMITTEE MEETING
RESULTS OF FECAL COLIFORM TESTING, KEUKA LAKE

Surface grab samples were taken at a variety of locations in Keuka Lake on July 29 and September 7. A total of 35 samples were taken, all in nearshore waters. Samples were analyzed by R & J Laboratories, Penn Yan to determine levels of fecal coliforms. The results are summarized below.

# Coliforms per 100 ml sample	# Samples in Category
0	9
under 5	2
5 to 20	3
21 to 50	5
51 to 100	5
101 to 200	6
201 to 1000	3
over 1000	2

The above results are a strong indication that septic tanks are leaking into the lake at a number of sites. High levels occurred in each of the three branches of the lake, with the greatest proportion of high levels found in the Hammondsport branch. At least a portion of this may be due to the fact that the Penn Yan branch was sampled on a separate day.

Although care must be used in interpreting these results, they seem to provide persuasive evidence that large numbers of septic systems around the lake are failing. Coliform bacteria are relatively short-lived in fresh water (several hours to a day).

To place these observed levels in perspective, New York State drinking water regulations (State Sanitary Code 5-1.54) set a maximum coliform bacteria level of four per 100 milliliter sample for community water systems. Title 10 of New York State's Health regulations (170.4) set a standard of 50 coliforms per 100 milliliter sample for raw water which is to be used for public drinking water systems. This latter standard applies to water which is to be treated before consumption. The observed levels are therefore high enough to merit considerable attention.

The results underline two related areas of concern. First, relating the results to aquatic vegetation growth, the septic tank seepage indicated by the coliform levels could provide a major source of nutrients for weed growth. While demonstrating the existence of septic tank seepage does not indicate the magnitude of the problem, septic tanks may play a critical role in providing nutrients for weed growth, particularly during the summer months when loadings are heaviest and stream flows are minimal.

The second problem posed by these results is one of public health. While coliform bacteria in and of themselves are not harmful to humans, they serve as indicators of a wide variety of pathogens found in human excreta. These pathogens can cause a wide range of waterborne illnesses from amoebic dysentery to typhus.

If in fact the nearshore waters of Keuka Lake are widely contaminated with septic seepage, the public health importance may be considerable. The results of the Watershed Septic System Study indicate nearly half of all residences in the watershed obtain their drinking water from the lake (See attached study, Table 3). While this figure may be somewhat out of date due to the age of the records examined, it would imply that about 1500 residences of the more than 3000 on the lake use the lake as a water supply. Watershed inspector Mahrt has estimated that only 60% of those using the lake as a source chlorinate or otherwise disinfect their supply, which would mean that some 600 residences are using the lake as a water source and not disinfecting it. Further analysis of the data obtained in the Septic System Study and the watershed survey may allow refinement of this estimate.

KEUKA LAKE ASSOCIATION
WATER QUALITY STUDY

prepared by

PROFESSOR JACK WILLS
CORNING COMMUNITY COLLEGE

July 9, 1988

INTRODUCTION

In July of 1986 I was asked to address the annual meeting of the Keuka Lake Property Owners Association. The thrust of my presentation was to particularly direct my remarks to the perceived "weed" problem.

At this time I indicated to the owners that the weeds are only responding to favorable growth conditions provided by the Keuka Lake environment. No one, however, knew exactly what that favorable environment was and is.

It was recommended to the owners that a water quality inventory be conducted of the Keuka Lake waters during the summers of 1987, 1988, and 1989.

At this same time New York State was implementing a Citizens Statewide Lake Assessment program. Following several calls to the Technical Assistance Dept. in Albany it was determined that Keuka Lake was not to be included in the waters to be tested for 1987.

The Board of Directors of the KLPO decided to begin their own testing project and asked for me to coordinate the research.

In the early spring of 1987 three colorimetric water analysis kits were purchased from LaMotte Chemical. During that same spring a training seminar was run for some 37 volunteer testers. John Herring, Marv Bunch and I divided these into three groups representing properties owned in the three branches of Keuka Lake. The owners determined where samples should be taken. The site selected were Willow Grove, Crosby Point and Camp Iroquois in the Penn Yan area, Cold Brook, Gold Seal and Marlina Point from Hammondsport and Branchport Cove, Bluff Point and Stones Point in the west branch.

Sampling and testing began in mid May of 1987.

Methodology

Each week the samplers would collect and test the water from the three sites in their respective arm of Keuka Lake.

Samples were to be taken by lowering a water collecting bottle down 5 meters followed by a metal messenger that would close the sampling device at that depth.

5 meters was selected because that is the mid point between the surface and the point at which plant growth ceases (most probably due to lack of available light at depths below this).

All tests were conducted according to the instruction manual prepared by LaMotte Chemical and included with each testing kit. The tests included:

Alkalinity	PPM
Chloride	PPM
Dissolved Oxygen	PPM
pH	
Nitrate	PPM
Phosphate	PPM
Sulfate	PPM
Temperature °F	
Secchi Depth - meters	

The samplers would complete their analysis and then fill out a pre-addressed card mailing their results to me at Corning Community College.

I would then tabulate, graph, analyze and interpret these results.

This represents over 1200 data points for Keuka Lake. All of these have been computer modeled and are included in the total report.

Why were these specific factors selected for testing?

Alkalinity

This is a measurement of the carbonate, bicarbonate and hydroxide components of a body of water. It may indicate, when contrasted with the pH, the ability of a specific body of water to tolerate the effects of acid rain.

Chloride

The maximum US Public Health Service standard for chloride in drinking water is 250 ppm.

The presence of chlorides in large amounts may be the result of industrial pollution or the passage of water through natural salt formations.

As the roads serving the Keuka Lake properties are heavily salted in the winter and Seneca has natural salt deposits this ion was selected for testing

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Oxygen

Required for life, reproduction and populations. Fish do not live in water low in dissolved oxygen.

Oxygen enters the water through the photosynthetic cycle and by direct absorption from the atmosphere.

Oxygen is depleted through respiration and the decomposition of plant and animal matter.

Waters that are nutrient loaded support algal and plant blooms which upon decomposition greatly lower the dissolved oxygen resulting in fish kills.

Standards for D.O.
Warm water fish 4 ppm
Cold water fish 5 ppm

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pH

This is a measurement of the hydrogen ion concentration. It is represented on a scale from 0 - 14, seven being considered neutral. Most fresh waters have a pH of between 5 and 8.5. Anything lower than 7 being considered acidic - higher than 7 being basic.

Examples:

Vinegar	pH	3.0
Lemon Juice		2.5
Milk		6.8
Seawater		8.0
Distilled water		7.0
Milk of magnesia		10.2
Bleach		12.5

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pH can be an indicator of mine drainage and industrial waste. Acid rains have a pH sometimes lower than 5.0.

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Acid snow is a bigger problem than acid rain in some areas. During spring thaws several months of accumulation can enter a body of water all at once.

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Nitrate

This is essential for plant growth and effective in low amounts. Excessive nitrogen can be an indicator of industrial or agricultural pollution. Concentrations should be below .5 ppm.

Phosphates

Responsible for excessive plant growth. Amounts should not be more than .1 ppm or the result could be eutrophication of the lake- (growth of algae and other "weeds").

Sources of phosphates, waste water and agricultural fertilizers.

Sulfates

Important nutrient element found in all protein.

Most fresh bodies of water have between 3 and 30 ppm sulfate.

Sources of sulfate - mine drainage, pulp mills and municipal wastes.

Lakes and streams low in oxygen undergo a bacterial sulfate reduction leading to the production of hydrogen sulfide - "rotten eggs".

Temperature

Temperature effects vertical movement of the water column and is inversely proportional to the amount of oxygen water can hold.

Cold waters hold more dissolved oxygen than warm waters.

Temperature is also one of the requirements for favorable plant growth.

Secchi Depth

The amount of material suspended in water determines the amount of light penetrating the water and visibility in the water.

The secchi disk is simply a weighted black and white disc which is lowered into the body of water until it just disappears. This depth is recorded as the secchi number in meters.

The amount of algae in the lake may determine the secchi number.

Examples of some lake mid-summer numbers:

Onondaga Lake	1 m
Canandaigua Lake	4 m
Lake George	10 m
Lake Tahoe	30 m

Light transmission through water is one of the determining factors for plant growth.

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SUMMARY

The alkalinity levels in all three testing arms and at all nine testing sites remained fairly constant at between 80 and 120 ppm. The median number would be approximately 110 ppm.

This amount of alkalinity appears to be normal for Keuka Lake as there are no great highs or lows occurring during testing.

This can now serve as a benchmark for future years. There are no government standards for alkalinity.

Chloride

The U.S. Public Health Service recommends that the chloride level not be above 250 ppm for public drinking water.

The Branchport and Hammondsport arms of Keuka Lake had chloride levels consistent at approximately 24 ppm throughout the testing period. These levels were much higher in the Penn Yan branch at 100 and sometimes 200 ppm.

We may wish to check these tests to make certain we did not have faulty chemicals or human errors.

Their consistency, however, would lead me to believe they are indeed high - when compared to Branchport and Hammondsport; but still well below the public health maximum.

Dissolved Oxygen

The levels of dissolved oxygen in Keuka Lake remained at a healthy level all summer long - even when a 4.8 was registered at Branchport Cove on 7/18. It recovered to 5.6 by 7/25.

All data indicates the oxygen levels are healthy, but this is such an important element and indicated if any tests are continued this should be included.

pH

Branchport and Penn Yan showed pH ranges to be slightly basic averaging 7.5-8.5. Most lakes are going to average 5.0-8.5.

Hammondsport pH ranges were usually between 6 and 7.

These numbers are very acceptable.

Nitrate

The nitrate levels were consistently low - actually less than .5 ppm. These do not at this time indicate that nitrates are a contributing factor to excessive plant growth at these levels in Keuka Lake. Nitrates, however, should be monitored.

Phosphates

The phosphate levels in Keuka Lake are generally at or below the acceptable .1 ppm. There do, however, occur spikes at levels of 2.0 - 3.0 in the Penn Yan and Hammondsport arms of the Lake.

I can offer no reason for this other than the first spike occurred on July 11 in the Penn Yan side and July 12 in the Branchport side - just a week after the July 4 celebration.

Sulfate

There are no standards for sulfates - The range expected in fresh water lakes is between 3 and 30 ppm.

Keuka Lake ranges are much higher approximately between 30 and 100.

Temperature

Keuka Lake warmed from approximately 50° in mid May to approximately 80° mid July. If you look at the graphs you can see a gradual increase, a peak and then a gradual decrease in temperature.

The D.O. curve looks like the reverse of this as cold water holds more O₂ than warm water.

Secchi Depth

The secchi depth will vary according to lake usage - algae growth and turbidity.

The average secchi number would appear to be 3.5 - 4.5 meters - good for a highly populated area.

Final Comment

Right now Keuka Lake appears healthy - even with the tremendous human impact it must endure. How much longer it remains healthy falls somewhat on your shoulders - the property owners.

The very fact that you commissioned this water study indicates your sincerity.

STONES POINT

	Alkalinity (PPM)	Chloride (PPM)	D/D (PPM)	pH	Nitrate (PPM)	Phosphate (PPM)	Sulfate (PPM)	Temperature (°F)	Secchi Depth (m)
5/16	110	24	12.0	7.71	0.18	2.67	37.4	52	2.50
5/23	130	24	5.0	7.75	0.00	0.05	35.7	55	2.00
5/30	110	24	6.0	7.80	0.16	0.05	28.7	59	3.00
6/7	110	24	7.0	7.93	0.12	0.15	47.5	61	3.00
6/13	110	24	9.6	7.90	0.12	0.53	39.1	66	3.50
6/20	100	24	6.0	7.90	0.00	0.05	30.4	70	4.00
6/27	100	24	11.4	7.93	0.00	0.05	28.7	70	5.00
7/4	110	22	8.0	7.87	0.00	0.00	27.6	71	3.50
7/12	100	24	6.4	8.00	0.00	0.00	33.9	76	5.00
7/18	110	26	5.5	8.00	0.00	0.00	29.6	75	4.00
7/25	90	24	5.6	7.93	0.00	0.10	28.7	80	2.30
8/2	100	24	7.8	7.97	0.00	0.05	37.4	77	4.00
8/8	80	24	5.7	8.00	0.00	0.05	32.2	76	5.40
8/15	75	22	5.4	8.10	0.00	0.00	33.9	76	5.00
8/30	85	20		8.05	0.08	0.00	33.9	72	5.00

STONES POINT

Alkalinity

