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12-8-6

0273896-23
ESD 0273896-23 ✓

Dragon

April 15, 1980



Dragon Lake Improvement District

s.22

Attention: Mr. J. McKelvie, Secretary

Dear Sir:

Re: Dragon Lake Water Quality

Regarding the proposed water quality monitoring program to be undertaken by the Dragon Lake Improvement District under the direction of this office, please be advised that we are in agreement to reimburse the Dragon Lake Improvement District in the amount of \$10 per sampling trip. This money will be used to cover some of your costs such as the ice required for the shipping coolers and gasoline.

In order that we may reimburse you, may we ask that you sign this letter where indicated and return it to this office.

The procedure for reimbursement would be as follows: The enclosed form (a number are enclosed) should be completed and mailed to this office for the attention of Mr. L.A. Bergman.

The procedure for sampling would be as follows:

1. Mr. Colin McKean of this office will supply you with all the required coolers, sample bottles and forms. He has already instructed you on the proper sampling technique. Should you have any questions, please contact Mr. McKean at 387-5321 Local 280.
2. Sampling Streams - frequency of sampling should be once per week during the snowmelt runoff period after which a less frequent sampling will be adopted. We will advise on this desired rate of sampling after the snowmelt period has passed. See attached map illustrating sampling stations.

... /2

3. Sampling Lake - frequency of sampling should be every three weeks commencing as soon as the lake becomes free of ice. See attached map for location of the sampling sites and the appropriate depths.

Sampling of the lakes and streams would continue until December, 1980.

Yours truly,



R. J. Buchanan, Ph.D.
Chief
Environmental Studies

On behalf of the Dragon Lake Improvement District
I agree with the above proposal

Mr. J. McKelvie, Secretary

Enclosures

BERGMAN:bs

LRB



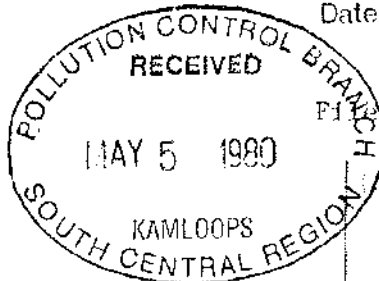
MEMORANDUM

DRAGON LAKE - GENERAL

From: Water Rights Branch
Prince George

F17: 0216639

12-8-6



Subject - Dragon Lake

On April 8, 1980, I met with John McKelvie, trustee of the Dragon Lake Improvement District to review his concerns regarding pollutants entering the lake and its continued eutrophication. Mr. McKelvie's concerns are outlined in the attached letter of April 3, 1980. I mentioned to Mr. McKelvie that there was not much that we could do regarding the manure piles draining into the lake, but asked him to contact the Ministry of Agriculture to see if they could persuade the farmers to either move the piles or construct ditches to intercept the runoff. Mr. McKelvie is taking water samples on Polly, Holly, and Dragon Creeks as well as in Dragon Lake, to give some base data to work with.

The golf course dumping gravel on the foreshore to create a beach and boat launch area, and also s.22 doing the same to enlarge s.22 property, is within our jurisdiction and I believe a strong letter should be sent to the offenders as well as an inspection made of the violations to ascertain damages and remedial measures required.

Although there has not been much residential development along the lakeshore, there is a possibility that the existing sewage system discharges are getting into Dragon Lake.

Mr. Colin McKean from Ministry of Environment in Victoria is participating in the development of a "super snoopers" to measure septic tank infiltration to the lake. This will be tested this summer and ready for use next year. A request from our ministry to do a survey of Dragon Lake using this equipment would be of great benefit to any planning objectives contemplated.

As I have not attended any of the T.P.C. meetings of the Regional District in Williams Lake, I am unaware of what planning there has been for Dragon Lake or what is contemplated. I believe though that efforts should be taken to

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- 2 -

ensure that Dragon Lake's water quality does not deteriorate any further. If not already done so, some planning objectives should be instituted for Dragon Lake and guidelines formulated for controlling development in the area.

Would you please investigate these problems and keep the trustees of the Dragon Lake Improvement District informed as to what is being done. If I can be of any assistance to you, please call.

D. W. Roberts, P. Eng.
Regional Manager

per:

B. Jamieson
B. Jamieson, C.E.T.
Community Water Supply Technician

BJ:wc

cc: J. McKelvie

s.22

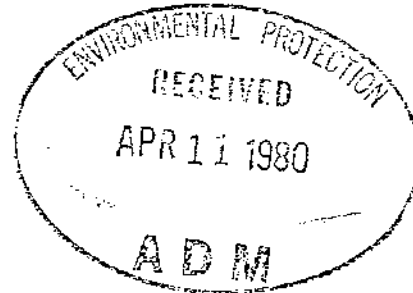
APR 1 1980

Dragon

M.O. 0846

0273896-23
ESD 0273896-23 ✓

Dragon Lake Improvement District,
P.O. Box 4573,
Quesnel, British Columbia
V2J 3J3



Attention: John McKelvie, Secretary

Dear Sir:

Thank you for your letter of February 8, 1980, enquiring whether or not the Ministry of Environment could (1) undertake an investigation into the quality of water and nutrient loadings to Dragon Lake, near Quesnel, British Columbia and (2) provide advice on measures which should be undertaken to help maintain the quality of this lake.

May I advise that Dr. R.N. Nordin, a freshwater biologist with this Ministry, will meet with you shortly to discuss your concerns and perhaps make arrangements with you for gathering water quality information on this lake.

Yours truly,

ORIGINAL SIGNED
BY MINISTER

Stephen Rogers,
Minister of Environment
APR 08 1980

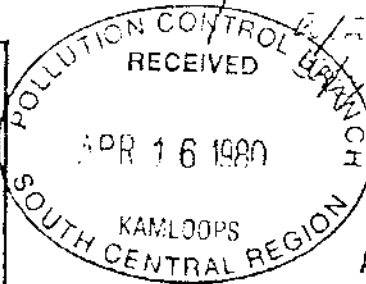
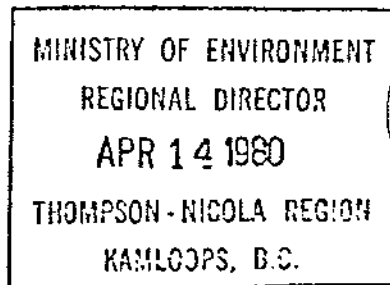
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BERGMAN:bs

cc: Deputy Minister's Office

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26-III-80
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sent March 26/80.

Dragon Lk. - General



April 8, 1980

YOUR FILE
OUR FILE0273896-23
ESD 0273896-23

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Dragon Lake Improvement District
c/o Mr. J. McKelvie, Secretary

s.22

Dear Sir:

Re: Dragon Lake Water Quality

This letter is to confirm arrangements made by Colin McKean of this Ministry on Monday, March 31, 1980, regarding the development of a better information base on the water quality of Dragon Lake and the nutrient loading to it.

It has been agreed that the Improvement District will gather lake and water samples, and certain water quality field measurements, under our direction, during this coming runoff year. We will analyze this information and produce our interpretation of the results in the form of a preliminary report by February, 1981 (tentative target date). From the information gathered, the trophic condition of the lake should be apparent plus some indication of the main nutrient loadings to it. A decision on a course of action should be able to be made at that time.

Regarding the objectionable farming practices observed by Mr. McKean during his field inspection, we are enclosing a set of complaint forms which we would ask you to complete and send to the Agricultural Environmental Control Committee of the B.C. Federation of Agriculture.

Regarding the possibility of increasing the flushing rate of Dragon Lake by diversion of the runoff from the Spruce Lake drainage area, the necessary forms to initiate the legality of this proposal were forwarded to you earlier this week.

Yours truly,

R. J. Buchanan, Ph.D.
Chief
Environmental Studies

Enc:

cc: Mr. Bill Kastelen

s.22

1980 04 03

Mr. Bruce Jamison
1011 4th Ave.
Water Rights Dept.
Prince George, B.C.

Dear Sir:

Re: Dragon Lake Improvement District

Further to our phone conversation this morning regarding problems developing on Dragon Lake at Quesnel.

I had mentioned several areas of concern including a cattle feed lot of recent origin for about 200 head (estimated) on property owned by a s.22 . borders on Holley Creek and draining into Dragon Lake, south end. Legal description - D.L. 3954.

Also, a long established ranch owned presently by s.22 and before by a s.22 . wherein a large manure pile and stock feeding pens, together with a various and sundry mess, drains immediately into Dragon Creek and thence to Dragon Lake. Legal description - D.L. 715 - Cariboo L.D.

Also, a golf course in the process of construction presently dumping sand and gravel on the ice obviously with intent to develop a beach and rumours that a camp ground will also be established adjacent. We have no request or permits or communication.

Legal description - 28.63 acres - N $\frac{1}{2}$ A, D.L. 3965 & 3971 except Plan #'s 11378, 12521, 12699, 14161, 14966, 15676, 16061, 16062, 16554. Owned by a s.22

Also, a property owned by a s.22 , wherein gravel or soil materials have been dumped into a marshy area of the lake, obviously extending his holdings into lake area for personal benefit. No request or permit was issued to our knowledge or information. Legal description - Lot 4, D.L. 3965, Plan 20859.

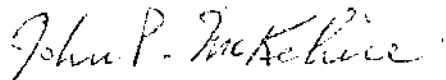
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We object to these mentioned areas of trespass and potential deterioration of the lake, along with several other areas, where I will show you when we meet on Thursday, April 10, 1980.

Trusting we can meet as planned, I am

Sincerely yours,



John P. McKelvie, Secretary
Dragon Lake Improvement Dist.

s.22

Office Address: P.O. Box 4573, Quesnel, B.C. V2J 2E6

JPM/sh

c.c. Glen Smith
Cariboo Health Unit
511 Reid St.
Quesnel, B.C.

DRAGON LAKE IMPROVEMENT DISTRICT
P. O. Box 4573
QUESNEL, B. C.
V 3J8

Dragon

1980 02 08

MINISTER'S OFFICE

FEB 13 1980
0846

Mr. Stephen Rodgers
Minister of the Environment
VICTORIA, B. C.

Dear Sir:

At a recent meeting of the Trustees of the above-noted district, it was agreed that steps must be taken to prevent further decline, where possible, in the water quality and quantity of the watershed area of Dragon Lake, and including Dragon Lake.

Continual development within the Improvement District Boundaries, and within the watershed area, together with obvious decline in the condition of the Lake, indicate that it is imperative that a survey be taken to identify and retard all possible and various causes of decline in the water quality.

Dragon Lake is a recreational lake, surrounded by subdivisions, areas of increasing density, and farm establishments as well as limited commercial development. The lake is known far and wide as one of the best fly fishing lakes in B. C., is used by boaters for water sports, swimmers and home owners generally as a supply of domestic water as well as an irrigational reservoir. Within five miles of Quesnel, it gets heavy use from the local district as well as the 500 plus members of the immediate area of the Dragon Lake Improvement District.

It should be noted that there are many high value homes surrounding the lake and within the Improvement District many taking water from the Lake and dependent on the Lake for real estate values. A noticeable decline in the Lake quality generally could have a very negative effect on land and home values reflected by tax assessment.

The Trustees of the Dragon Lake Improvement District request that a survey be taken this spring and summer of the entire watershed and Lake to determine what steps should be taken to reverse the decline in the Lake condition.

...2

2

Mr. Stephen Rodgers
VICTORIA, B. C.

1990 02 07

We understand that a survey for similar reasons was conducted or is being conducted at San Jose River and Williams Lake, probably with at least some of the same type of problems as we have.

Your Ministry will know which department has the ability and expertise necessary to conduct a suitable survey, interpret the results, and assist us in the solutions required to preserve, and where possible, improve the water quality of the Lake and catchment area.

Trust we may hear from you favourably and soon enough to take advantage of the coming seasonal conditions required for a suitable effective survey.

There is approximately 15 inches of ice on the Lake at present and possibly some of the action necessary for a survey could be commenced while able to use the ice as an advantage.

I am sending a copy of this request to our M. L. A. Alex Fraser for his information.

Thanking you for an early and favourable reply, I am,

Sincerely yours,

DRAGON LAKE IMPROVEMENT DISTRICT

John McKelvie
John McKelvie
Secretary

JM:pj

c.c. M. L. A. Alex Fraser



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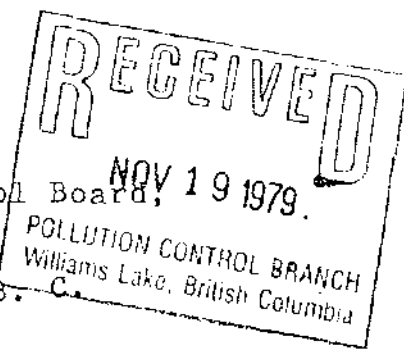
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22/11/89

Do we have some
baseline info on this
lake? If so, we have
me that we have
on Dragon Creek. Can
we afford to undertake
a study here - certainly
we should attempt to
keep any study of the
Sycamore area

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12-8-76



Dragon Lake Improvement District
P. O. Box 4573
Quesnel, B. C.
V2J 3J8
Nov. 8th 1979.

Pollution Control Board,
Suite 104
235 Oliver St.
Williams Lake, B. C.

Dear Sirs -

At a meeting of the trustees for the Dragon Lake Improvement District held Nov. 7th./79, it was regularly moved and approved, that we apply to the Pollution Control Board for a meeting, to discuss the increasing problems of pollution on Dragon Lake, and within the Improvement District.

Dragon Lake serves a large number of water users, and provides recreational facilities for a large District population.

A meeting to discuss the problems, and possibly result in a survey of the pollution potential of the area; would be in the best interest of all concerned.

Annual report from the Cariboo Health Unit also indicates that we should pursue alternatives, if we are to maintain a minimum pollution condition on Dragon Lake.

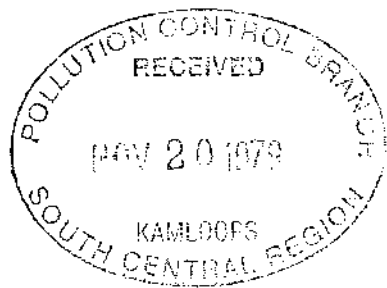
Trust we will be favoured with an early reply, we would arrange a meeting of the five trustees together with representatives from your department, preferably in Quesnel area, at your convenience.

We Remain
Sincerely Yours

John P. McKelvie

Secretary John P. McKelvie

Copy - Cariboo Health Unit,
113 North 4th Ave.,
Williams Lake,
B.C..



DISTRIBUTION:	
DMH	✓
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LM	
DWH	✓
DJB	
RTL	
CJP	
W/LAKE	

Development ban suggested for local lake

GENERAL

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MEMORANDUM

IN REPLY REFER TO FILE NO.

TO

F.C. Ainley,
Chief Public Health Inspector
Cariboo Health Unit

FROM

Vanessa Penner
Public Health Inspector Trainee
Cariboo Health Unit

August 31, 1978

INTRODUCTION

Dragon Lake is a shallow lake located 8 miles south of Quesnel. There are 4 subdivisions located on the North and Northwest side of the lake with approximately 90 residential lots, most of which are already developed, fronting on the lakeshore. Each of the lots is served by an on site sewage disposal system and water supply, the majority of which take their water from the lake. The South and East sides of the lake are farm land.

Every year the Dragon Lake Water Users Community request the Cariboo Health Unit to carry out a water quality survey of Dragon Lake, as they are concerned about the possibility of sewage and animal waste polluting their drinking water source.

This year the survey was carried out by the undersigned from July 4 to August 8, 1978. During this time water samples were collected once a week from 7 sampling points around the lake (see Map I for locations). All the points were sampled within 10 feet of shore and at a depth of no greater than 3 feet. The samples were then sent in a cooler to the Provincial Health Lab in Vancouver the same day for bacterial analysis.

The tests used by the Lab were to detect the presence and concentrations of fecal coliforms.

These organisms are used as an indicator of fecal pollution by warm blooded animals. They are found in abundance in fecal matter and sewage.

When fecal coliforms enter the water there is also a chance that a number of different enteric pathogens may enter with them. While only a small proportion of the population are apt to excrete enteric pathogens there is always a danger that they could be present especially when concentrations of fecal coliform are high.

Generally, surface waters are considered unsafe for human consumption unless treated before use (e.g. by chlorination, boiling etc.) There are however, some lakes that will yield safe drinking water except near shores, inlets and outlets.

RESULTS

Test results show that the highest concentrations of fecal coliform were found at site 5 and 7 on Hallis Creek.

This is not unexpected. Just prior to entering the lake, Hallis Creek passes through agricultural land used primarily for cattle grazing. The fecal pollution is very likely coming from the washing of pasture lands by rain.

The attached graph II shows a relationship between rainfall and fecal counts. It was noted that 10 to 20 days after a heavy rainfall counts are higher than compared to the counts after a dry spell.

All other points around the lake had very low fecal coliform counts except for sites #4 and 6 on days when large numbers of water fowl and dogs were observed in the area.

CONCLUSIONS

1. The water in the areas sampled is not acceptable for drinking purposes when compared with the Canadian Drinking Water Standards which require that at least 90% of samples in any consecutive 30 - day period should be "negative" for total coliform organisms, and none of the samples that were "positive" for total coliform organisms should have an MPN index greater than 10 per 100 ml.
2. The water from all areas sampled is suitable as a raw water source.

The maximum permissible limit set by the Canadian Drinking Water Standards is at least 90% of the samples in any consecutive 30 - day period should have a fecal coliform density of less than 1000 per 100 ml. None of the above samples exceeded this limit.

3. The water in sites 1,2,4, and 6 is suitable for recreational use.

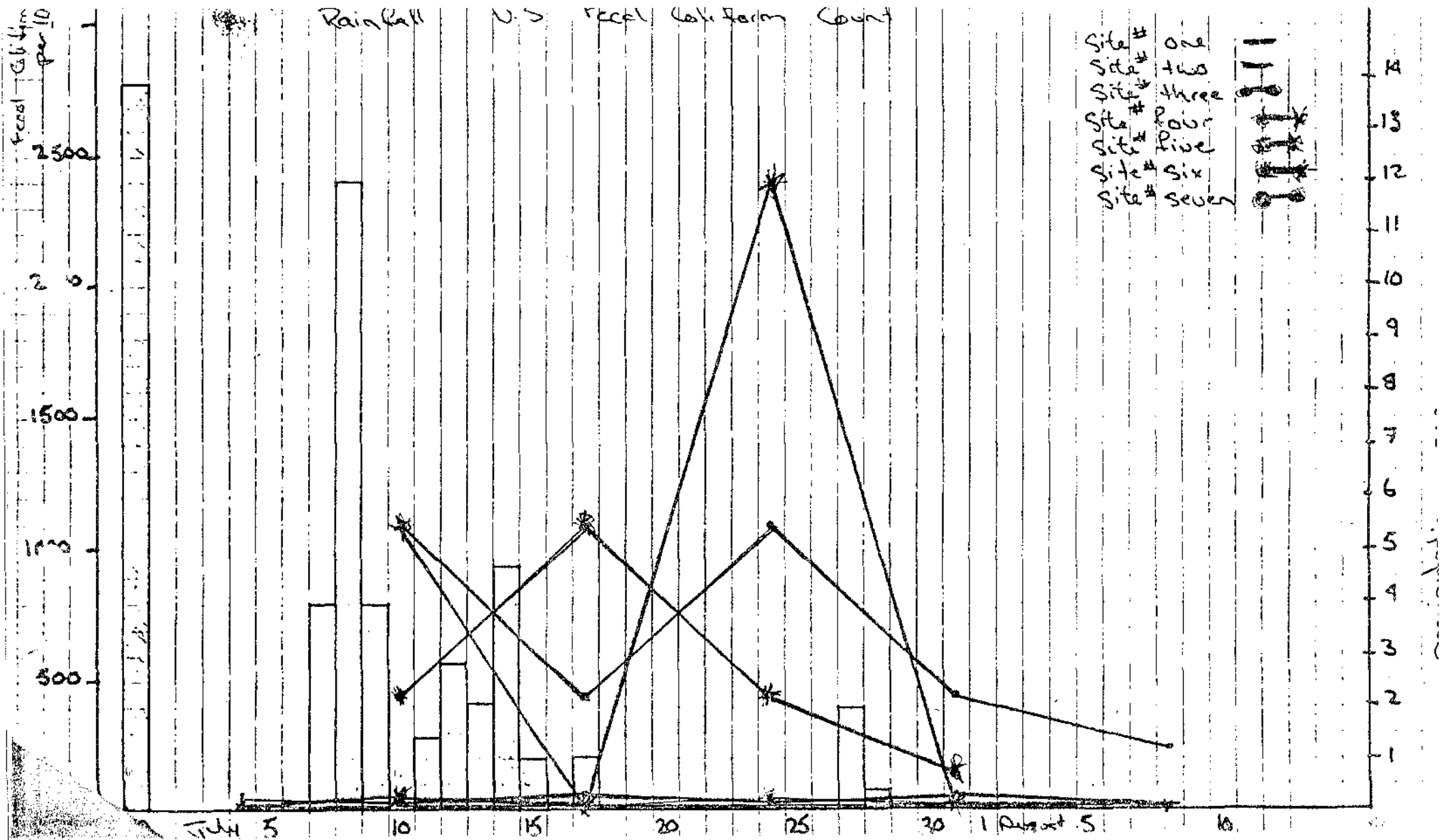
The fecal coliform values did not exceed a running log mean of 200/100 ml, nor did any exceed 400/100 ml in more than 10% of total samples.

RECOMMENDATIONS

1. It is recommended that drinking water not be taken directly from the lake unless:
 - a) some form of treatment is used, e.g. chlorination, boiling, etc.
 - b) the Inlet of the water intake be placed far enough out in the lake so that it is approximately 5 feet below the surface and 5 feet above the bottom.
2. It is recommended that future surveys should collect samples that are more representative of the water being used in residences located around the lake perimeter. The samples should be collected directly from the house hold taps that are connected to the water inlet pipe.
3. It is also recommended that home owners that are obtaining water from the lake, take their own samples throughout the year on an intermittent basis.

Vanessa Penner
Public Health Inspector Trainee

VP/df



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STATISTICAL DATA SHEET (Horizontal)

	JULY 4	JULY 10	JULY 17	JULY 24	JULY 31	AUGUST 8			
LAB #	26477	27396	28615	30028	31326	32539			
SITE #	ONE	ONE	ONE	ONE	ONE	ONE			
FECAL COLIFORM MPN	4	4	9	4	<3	<3			
LOG	.60206	.60206	.95424	.60206	.47712	.47712			
AVERAGE OF LOGS FOR 30 DAY PERIOD					.64751	.62252			
LOG MEAN OF SAMPLES WITHIN 30 DAYS					4.4413	4.1929			
LAB #	26478	27397	28616	30029	31327	32540			
SITE #	TWO	TWO	TWO	TWO	TWO	TWO			
FECAL COLIFORM MPN	4	4	<3	9	<3	4			
LOG	.60206	.60206	.47712	.95424	.47712	.60206			
AVERAGE OF LOGS FOR 30 DAY PERIOD					.62252	.62252			
LOG MEAN OF SAMPLES WITHIN 30 DAYS					4.1929	4.1929			
LAB #	26479	27398	28617	30030	31328	32541			
SITE #	THREE	THREE	THREE	THREE	THREE	THREE			
FECAL COLIFORM MPN	23	23	43	23	43	15			
LOG	1.36173	1.36173	1.63347	1.36173	1.63347	1.17609			
AVERAGE OF LOGS FOR 30 DAY PERIOD					1.47043	1.4333			
LOG MEAN OF SAMPLES WITHIN 30 DAYS									

	JULY 4	JULY 10	JULY 17	JULY 24	JULY 31	AUGUST 8			
LAB #	26480	27399	28618	30031	31329	32542			
SITE #	FOUR	FOUR	FOUR	FOUR	FOUR	FOUR			
FECAL COLIFORM MPN		1100	15	43	<3	9			
LOG		3.04139	1.17609	1.63347	.47712	.95424			
AVERAGE OF LOGS FOR 30 DAY PERIOD						1.45646			
LOG MEAN OF SAMPLES WITHIN 30 DAYS						28.606			
LAB #	26481	27400	28619	30032	31330	32543			
SITE #	FIVE	FIVE	FIVE	FIVE	FIVE	FIVE			
FECAL COLIFORM MPN		460	1100	460	150	DRY			
LOG		2.66276	3.04139	2.66276					
AVERAGE OF LOGS FOR 30 DAY PERIOD									
LOG MEAN OF SAMPLES WITHIN 30 DAYS									
LAB #	26482	27401	28620	30033	31331	32544			
SITE #	SIX	SIX	SIX	SIX	SIX	SIX			
FECAL COLIFORM MPN	<3	43	14	> 2400	<3	<3			
LOG	.47712	1.63347	1.14613	3.38021	.47712	.47712			
AVERAGE OF LOGS FOR 30 DAY PERIOD					1.42281	1.42281			
LOG MEAN OF SAMPLES WITHIN 30 DAYS									

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