WILLIAMS LAKE

Lemhi County

Data Collected 1979 and 1980

Final Summary March 1981

Department of Health and Welfare
Division of Environment
Statehouse
Boise, Idaho 83720

Water Quality Summary
No. 25

WATER QUALITY SUMMARY REPORT

WILLIAMS LAKE

By

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March, 1981

INTRODUCTION

Williams Lake is a deep, oligotrophic lake located in North Central Lemhi County. Inlet water to the Lake consists of one permanent stream (Lake Creek), one small spring, and several intermittent streams. The east end of the lake is privately owned and is lined with cabins and a commercial resort. The western two-thirds of the shoreline is part of the Salmon National Forest.

METHODS AND MATERIALS

This study was designed to assess water quality and trophic status, and to quantify impacts from private land. We chose five lake stations, one inlet stream and one outlet stream station (Figure 1). Sampling was conducted six times during 1979 and 1980. Sampling at lake stations consisted of oxygen and temperature measurements at 1 metre intervals throughout the upper 18 metres; secchi disc measurements, chlorophyll a at subsurface depth, and water chemistry/bacteriology at three depths.

DATA ANALYSIS

Water chemistry consisted of 18 different variables, measured on most samples. Data analysis relied upon 3-way analysis of variance; with station, time of year, and depth as the independent variables. Since we do not have an adequate number of multiple observations per cell, we have no assessment of interraction affects among the independent variables. The data analysis results are presented in the last section.

RESULTS AND CONCLUSIONS

The results of this study do not show a clear impact on the lake from recreation or home development. There are moderate to severe erosional facies in the north and west sides of the watershed, and these are probably the source of the deltaic sediments near the mouth of Lake Creek. Additional sediments are delivered by the creek itself. These sediments provide shallow areas where rooted macrophytes excel. Home construction and recreation along the east shore may cause deposition of materials, and expansion of the shallow litteral zone along the shore. This would also provide a place for rooted macrophytes to excel. Planktonic algal concentrations are low most of the year, with a peak in October. This is apparently the period when water temperatures are conducive to peak algal growth. The annual mean chlorophyll a (10.9 ug/l) indicates that the lake should be considered mesotrophic. However, that is biased by a high detection limit

(5 ug/l) and a large number of samples collected at peak production (61% of all samples were collected in October). Thus, it appears that Williams Lake is an oligotrophic lake, with rather high chlorophyll a at one time of the year, and with accelerated macrophyte growth in isolated areas. There is not sufficient evidence to indicate that recreational homes place any undue impacts on the lake other than increasing macrophyte footholds. Impacts from sanitary wastes were evident only once, and were inconsequential to total lake volumes.

DATA ANALYSIS RESULTS

In this section, we present a summary of data analysis results for each variable. In each case, we present variable name, grand mean, overall standard deviation, and correlation coefficient r^2 for the 3-way Anova model. The correlation coefficient is an indication of the percent variation in the dependent variable explained by the model. Statistical significance of the model is summarized as: NSD=no significant difference, *=$p \leq 0.05$, **=$p \leq 0.01$. Where effect of an independent variable was reported as significant, we also present mean, standard deviation, and sample size for each category of that variable.

VARIABLE NAME Ortho Phosphate (as P)

Grand Mean 0.04 S. d. 0.03

r^2 for 3-way model 0.71

Statistical significance of independent variables.

Station **

#	$\bar{X}$	s.d.	n
L1	.03	.03	6
L2	.04	.04	14
L3	.05	.03	16
L4	.04	.03	14
L5	.04	.04	16
S1	.08	.02	7
S2	.03	.02	5

Time of Year **

Date	$\bar{X}$	s.d.	n
Nov.	.03	.02	8
Feb.	.07	.02	8
May	.07	.02	16
July	.03	.03	15
Aug.	.02	.03	16
Oct.	.05	.05	15

Depth **

	$\bar{X}$	s.d.	n
E	.04	.03	44
M	.03	.03	17
H	.08	.03	17

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Total Phosphorus

Grand Mean 0.08 mg/l S. d. 0.04

r^2 for 3-way model 0.62

Statistical significance of independent variables.

Station *

#	$\bar{X}$	s.d.	n
L1	.07	.05	6
L2	.07	.04	14
L3	.08	.04	16
L4	.08	.04	14
L5	.08	.05	16
S1	.11	.03	7
S2	.06	.03	5

Time of Year **

Date	$\bar{X}$	s.d.	n
Nov.	.11	.03	8
Feb.	.11	.01	8
May	.09	.02	16
July	.06	.03	15
Aug.	.07	.05	16
Oct.	.07	.05	15

Depth **

	$\bar{X}$	s.d.	n
E	.07	.04	44
M	.06	.03	17
H	.12	.02	17

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Ammonia as N

Grand Mean 0.08 mg/l S. d. 0.05

r^2 for 3-way model 0.52

Statistical significance of independent variables.

Station *

#	$\bar{X}$	s.d.	n
L1	.12	.06	6
L2	.08	.04	14
L3	.09	.08	16
L4	.07	.04	14
L5	.08	.05	16
S1	.05	.03	7
S2	.04	.02	5

Time of Year **

Date	$\bar{X}$	s.d.	n
Nov.	.13	.06	8
Feb.	.15	.09	8
May	.06	.04	16
July	.06	.03	15
Aug.	.04	.02	16
Oct.	.08	.03	15

Depth NSD

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Nitrate plus Nitrite (as N)

Grand Mean 0.05 mg/l S. d. 0.07

r^2 for 3-way model 0.61

Statistical significance of independent variables.

Station **

#	$\bar{X}$	s.d.	n
L1	.08	.10	6
L2	.05	.06	14
L3	.02	.02	16
L4	.03	.03	14
L5	.02	.03	16
S1	.07	.08	7
S2	.23	.10	5

Time of Year **

Date	$\bar{X}$	s.d.	n
Nov.	.10	.08	8
Feb.	.09	.11	8
May	.05	.08	16
July	.03	.03	15
Aug.	.05	.06	16
Oct.	.03	.05	15

Depth NSD

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Chlorophyll a

Grand Mean 10.9 ug/l S. d. 8.5

r^2 for 3-way model NA

Statistical significance of independent variables.

Station NSD Time of Year ** Depth **

#	$\bar{X}$	s.d.	n
L1			
L2			
L3			
L4			
L5			
S1			
S2			

Date	$\bar{X}$	s.d.	n
Nov.	----	N.A.	-----
Feb.	-----	N.A.	-----
May	-----	N.A.	-----
July	6.0	2.2	5
Aug.	5.0	0	4
Oct.	14.3	9.4	14

	$\bar{X}$	s.d.	n
E	12.5	9.0	18
M	5	0	2
H	5	0	3

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Total Coliform Bacteria

Grand Mean 20 S. d. 75

r^2 for 3-way model NA

Statistical significance of independent variables.

Station _____ Time of Year ** Depth NSD

#	$\bar{X}$	s.d.	n
L1	133	265	4
L2	3	3	9
L3	4	5	11
L4	5	2	21
L5	7	7	9
S1	43	43	5
S2	27	21	3

Date	$\bar{X}$	s.d.	n
Nov.	106	191	7
Feb.	0	0	9
May	-----	NA---	-----
July	7	6	15
Aug.	14	13	5
Oct.	5	12	15

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Fecal Strep Bacteria

Grand Mean 10 S. d. 39

r^2 for 3-way model NA

Statistical significance of independent variables.

Station **

#	$\bar{X}$	s.d.	n
L1	1	1	5
L2	2	2	12
L3	2	2	14
L4	2	3	13
L5	8	14	12
S1	73	118	6
S2	3	2	4

Time of Year *

Date	$\bar{X}$	s.d.	n
Nov.	14	17	7
Feb.	0	0	9
May	3	5	15
July	66	137	5
Aug.	5	9	15
Oct.	6	15	15

Depth NSD

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Fecal Coliform Bacteria

Grand Mean <1 colony/100 ml S. d. ~~0~~

r^2 for 3-way model _____

Statistical significance of independent variables.

Station NSD

#	$\bar{X}$	s.d.	n
L1			
L2			
L3			
L4			
L5			
S1			
S2			

Time of Year NSD

Date	$\bar{X}$	s.d.	n
Nov.			
Feb.			
May			
July			
Aug.			
Oct.			

Depth NSD

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Secchi Disc Transparency

Grand Mean 3.0 metres S. d. 0.9

r^2 for 3-way model NA

Statistical significance of independent variables.

Station NSD Time of Year NSD Depth NA

#	$\bar{X}$	s.d.	n
L1			
L2			
L3			
L4			
L5			
S1			
S2			

Date	$\bar{X}$	s.d.	n
Nov.			
Feb.			
May			
July			
Aug.			
Oct.			

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Kjeldahl Nitrogen

Grand Mean 0.92 mg/l S. d. 0.52

r^2 for 3-way model 0.72

Statistical significance of independent variables.

Station NSD Time of Year ** Depth NSD

#	$\bar{X}$	s.d.	n
L1			
L2			
L3			
L4			
L5			
S1			
S2			

Date	$\bar{X}$	s.d.	n
Nov.	.49	.18	8
Feb.	.51	.03	8
May	1.60	.46	16
July	1.23	.35	15
Aug.	.61	.19	16
Oct.	.64	.23	15

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Total Hydrolyzable Phosphorus

Grand Mean 0.03 mg/l S. d. 0.02

r^2 for 3-way model 0.50

Statistical significance of independent variables.

Station NSD Time of Year ** Depth NSD

#	$\bar{X}$	s.d.	n
L1			
L2			
L3			
L4			
L5			
S1			
S2			

Date	$\bar{X}$	s.d.	n
Nov.	.05	.02	8
Feb.	.02	.01	8
Mav	.02	.01	16
July	.02	.01	15
Aug.	.04	.02	16
Oct.	.02	.01	15

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Specific Conductivity

Grand Mean 110.93 umho/cm S. d. 21.15

r^2 for 3-way model 0.34

Statistical significance of independent variables.

Station NSD

#	$\bar{X}$	s.d.	n
L1			
L2			
L3			
L4			
L5			
S1			
S2			

Time of Year **

Date	$\bar{X}$	s.d.	n
Nov.	122.5	8.3	8
Feb.	120.2	7.8	8
May	108.4	15.1	16
July	95.1	39.1	15
Aug.	108.5	8.3	16
Oct.	120.9	5.2	15

Depth NSD

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME COD

Grand Mean 8.18 mg/l S. d. 3.76

r^2 for 3-way model 0.69

Statistical significance of independent variables.

Station * Time of Year NSD Depth NSD

#	$\bar{X}$	s.d.	n
L1	7.9	3.0	2
L2	9.6	1.4	4
L3	10.2	4.0	6
L4	9.8	0.8	4
L5	11.1	1.8	4
S1	7.3	3.4	7
S2	2.2	0.5	5

Date	$\bar{X}$	s.d.	n
Nov.			
Feb.			
May			
July			
Aug.			
Oct.			

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Sodium

Grand Mean 6.1 mg/l S. d. 1.1

r^2 for 3-way model 0.51

Statistical significance of independent variables.

Station ** Time of Year ** Depth

#	$\bar{X}$	s.d.	n
L1	6.3	0.7	5
L2	6.2	0.5	11
L3	6.5	0.7	10
L4	6.3	0.7	8
L5	5.8	1.8	10
S1	5.1	1.1	6
S2	6.8	0.1	4

Date	$\bar{X}$	s.d.	n
Nov.	6.2	0.6	8
Feb.	7.4	0.6	8
May	5.8	0.9	16
July	6.1	0.3	15
Aug.	5.6	2.0	7
Oct.	-----	NA	-----

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Magnesium

Grand Mean 3.9 mg/l S. d. 0.4

r^2 for 3-way model 0.58

Statistical significance of independent variables.

Station **

#	$\bar{X}$	s.d.	n
L1	4.1	0.6	6
L2	3.8	.3	14
L3	3.8	.3	16
L4	3.8	.2	14
L5	3.8	.3	16
S1	4.3	.6	7
S2	4.0	.1	5

Time of Year **

Date	$\bar{X}$	s.d.	n
Nov.	4.2	4.1	8
Feb.	4.3	.4	8
May	3.6	.3	16
Julv	3.8	.3	15
Aug.	3.7	.3	16
Oct.	4.0	.2	15

Depth NSD

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Bicarbonate Alkalinity as $CaCO_3$

Grand Mean 51.6 mg/l S. d. 5.75

r^2 for 3-way model 0.39

Statistical significance of independent variables.

Station NSD Time of Year ** Depth NSD

#	$\bar{X}$	s.d.	n
L1			
L2			
L3			
L4			
L5			
S1			
S2			

Date	$\bar{X}$	s.d.	n
Nov.	53.9	3.3	8
Feb.	58.6	4.0	8
May	48.9	8.6	16
July	49.3	3.9	15
Aug.	50.3	3.9	16
Oct.	53.3	2.7	15

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Sulfate (as SO_4)

Grand Mean 10.1 S. d. 0.57

r^2 for 3-way model 0.25 (NSD)

Statistical significance of independent variables.

Station NSD

#	$\bar{X}$	s.d.	n
L1			
L2			
L3			
L4			
L5			
S1			
S2			

Time of Year NSD

Date	$\bar{X}$	s.d.	n
Nov.			
Feb.			
May			
July			
Aug.			
Oct.			

Depth NSD

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Total Hardness as $CaCO_3$

Grand Mean 46.0 mg/l S. d. 5.92

r^2 for 3-way model 0.24 (NSD)

Statistical significance of independent variables.

Station NSD Time of Year NSD Depth NSD

#	$\bar{X}$	s.d.	n
L1			
L2			
L3			
L4			
L5			
S1			
S2			

Date	$\bar{X}$	s.d.	n
Nov.			
Feb.			
May			
July			
Aug.			
Oct.			

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Calcium

Grand Mean 11.8 mg/l S. d. 2.0

r^2 for 3-way model 0.24

Statistical significance of independent variables.

Station NSD Time of Year ** Depth NSD

#	$\bar{X}$	s.d.	n
L1			
L2			
L3			
L4			
L5			
S1			
S2			

Date	$\bar{X}$	s.d.	n
Nov.	12.5	0.9	8
Feb.	13.4	0.5	8
May	10.7	1.8	16
July	11.8	1.2	15
Aug.	12.6	1.4	16
Oct.	11.1	3.2	15

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Potassium

Grand Mean 1.5 mg/l S. d. 0.30

r^2 for 3-way model 0.70

Statistical significance of independent variables.

Station NSD Time of Year ** Depth NSD

#	$\bar{X}$	s.d.	n
L1			
L2			
L3			
L4			
L5			
S1			
S2			

Date	$\bar{X}$	s.d.	n
Nov.	1.4	0.1	8
Feb.	1.6	0.2	8
May	1.8	0.3	16
July	1.3	0.2	15
Aug.	1.2	0.2	6
Oct.	-----	NA---	-----

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Chloride

Grand Mean 5.4 S. d. 2.2

r^2 for 3-way model 0.76

Statistical significance of independent variables.

Station NSD Time of Year ** Depth NSD

#	$\bar{X}$	s.d.	n
L1			
L2			
L3			
L4			
L5			
S1			
S2			

Date	$\bar{X}$	s.d.	n
Nov.	5.0	2.3	8
Feb.	7.1	1.4	8
May	6.8	1.5	16
July	4.6	0.5	15
Aug.	2.3	0.3	15
Oct.	7.2	1.0	15

	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME pH

Grand Mean 7.8 SU S. d. 0.5

r^2 for 3-way model 0.56

Statistical significance of independent variables.

Station NSD Time of Year ** Depth **

#	$\bar{X}$	s.d.	n
L1			
L2			
L3			
L4			
L5			
S1			
S2			

Date	$\bar{X}$	s.d.	n
Nov.	7.7	0.1	8
Feb.	7.3	0.2	8
May	7.9	0.6	16
July	8.4	0.5	7
Aug.	8.0	0.2	16
Oct.	7.5	0.4	15

	$\bar{X}$	s.d.	n
E	7.9	0.6	44
M	7.4	0.4	13
H	7.5	0.2	13

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Silica (as SiO_2)

Grand Mean 15.6 mg/l S. d. 5.4

r^2 for 3-way model 0.76

Statistical significance of independent variables.

Station **

#	$\bar{X}$	s.d.	n
L1	16.3	7.2	6
L2	14.4	4.6	14
L3	14.4	3.3	16
L4	13.6	3.1	14
L5	13.4	2.8	16
S1	26.6	4.6	7
S2	18.9	5.1	5

Time of Year **

Date	$\bar{X}$	s.d.	n
Nov.	16.4	4.5	8
Feb.	22.2	6.6	8
May	14.8	3.6	16
July	12.1	5.3	15
Aug.	15.7	5.2	16
Oct.	15.9	4.3	15

Depth **

	$\bar{X}$	s.d.	n
E	16.5	6.8	44
M	13.1	2.4	17
H	15.8	1.6	17

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

VARIABLE NAME Total Solids

Grand Mean 81.5 mg/l S. d. 11.3

r^2 for 3-way model 0.66

Statistical significance of independent variables.

Station * Time of Year ** Depth

#	$\bar{X}$	s.d.	n
L1	84.0	11.9	6
L2	80.7	12.9	14
L3	80.1	9.4	16
L4	80.4	10.2	14
L5	79.0	8.9	16
S1	94.4	16.5	7
S2	81.6	10.3	5

Date	$\bar{X}$	s.d.	n
Nov.	89.0	5.1	8
Feb.	93.2	10.9	8
May	75.4	3.6	16
July	69.2	81.2	15
Aug.	88.3	11.5	16
Oct.	82.9	6.1	15

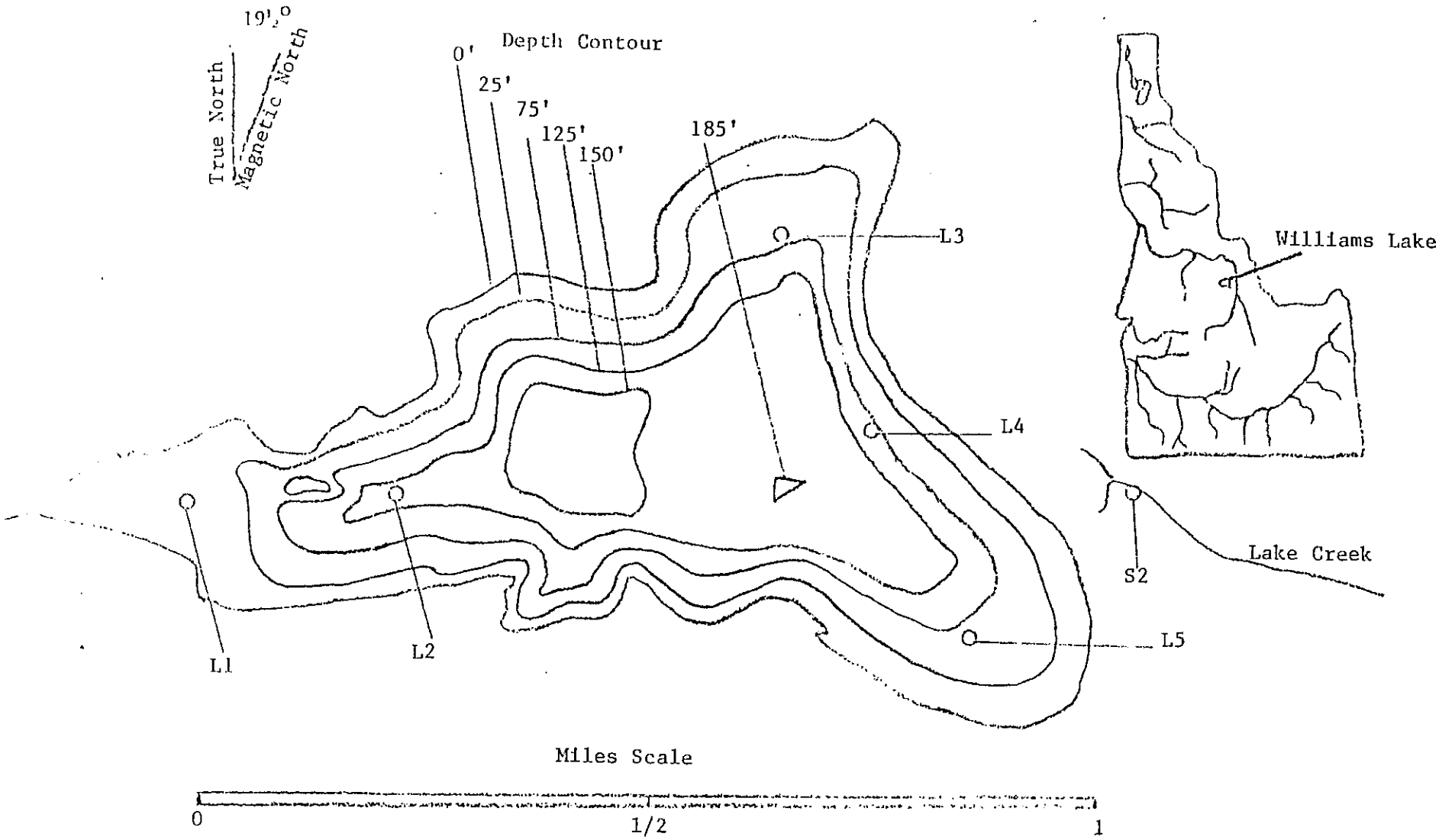
	$\bar{X}$	s.d.	n
E			
M			
H			

Station Numbers: See Figure 1

Time of Year: Month Collected

Depth: Epilimnion, Metalimnion, Hypolimnion

Figure 1. Bathymetric Map of Williams Lake



WATERSHED CHARACTERISTICS - WILLIAMS LAKE

	Miles	Kilometers	
Total Shoreline	3.03	4.88	
Public (USFS)	1.83	2.95	60.5%
Private	1.20	1.93	39.6%

BATHMETRIC AREAS

Depth	Mi^2	Km^2	ha	acres
Surface when full	0.36	0.93	92.7	229.1
> 10'	0.29	0.74	74.3	183.6
>25'	0.26	0.67	67.1	165.8
>50'	0.22	0.57	56.7	140.1
>75'	0.17	0.43	43.0	106.3
>100'	0.14	0.35	35.2	87.0
>125'	0.11	0.28	28.2	69.7
>150'	0.02	0.05	5.2	12.8
	Mean Depth		75.02 feet	22.86 M

INLET ZONE*

* Depositional zone on west end, near inlet stream
Mean depth 2 metres, from inlet to 25' contour

Area: 0.004 mi^2, 0.011 Km^2, 1.1 ha, 2.7 acres
1.1% of lake surface area

Mean volume	7.44 X 10^8 ft^3
Influent Volume	3.15 X 10^8 ft^3/year
Hydraulic Residence Time	2.36 years

EROSIONAL FEATURES SURROUNDING

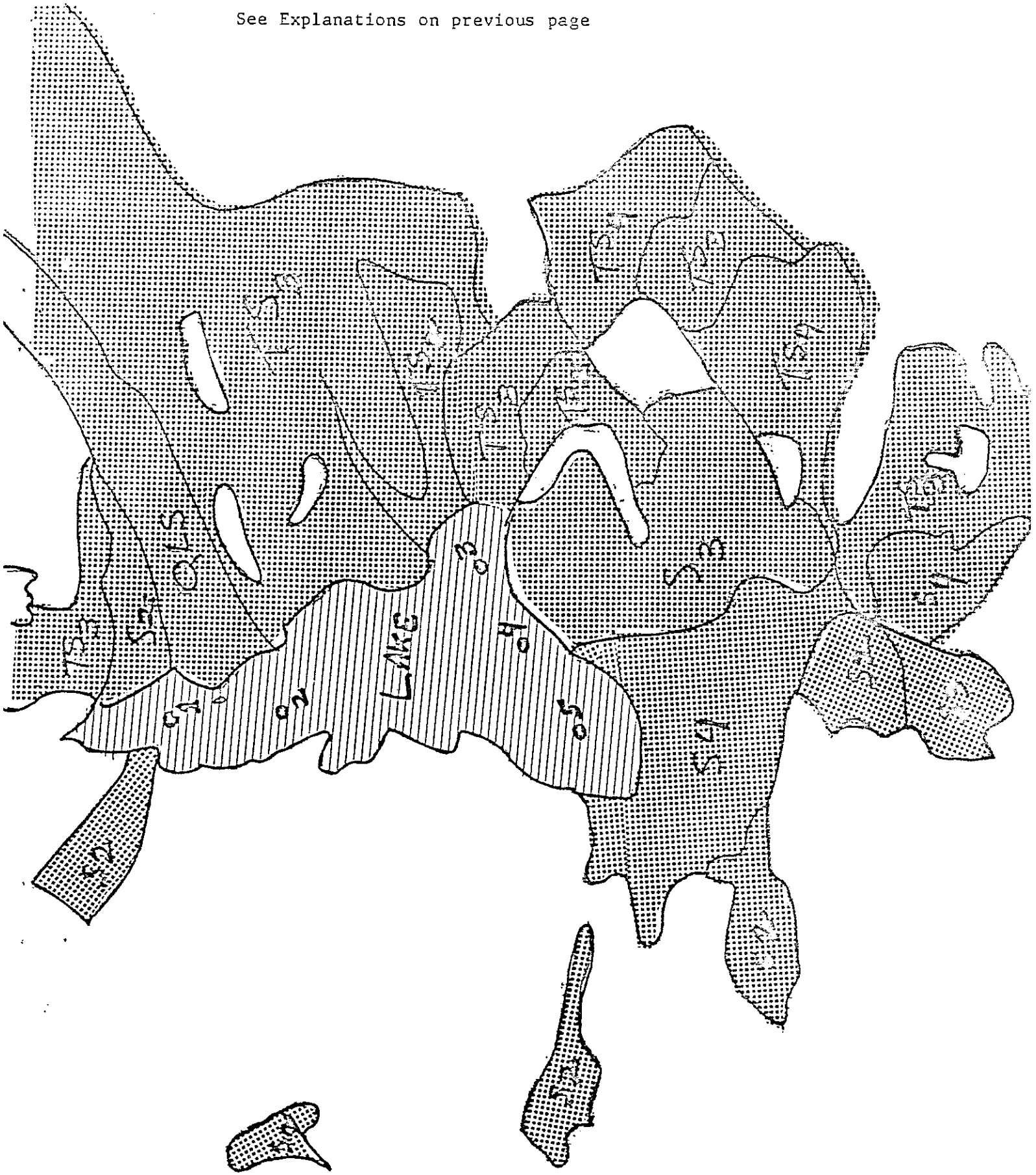
WILLIAMS LAKE, IDAHO *
SEE MAP ON NEXT PAGE

CODE		FEATURE
TS		Talus and Sheet erosion
S		Sheet Erosion
	S_2	Moderate erosion
	S_3	Moderate to severe erosion
	S_4	Severe to extreme erosion
QLS		Quarternary and Pleistocene Landslides

Note that un-stippled areas have land-forms with no significant erosion.

* Data courtesy of Paul Krupin, BLM, Salmon

See Explanations on previous page



VOLLENWEIDER LOADING MODEL

Mean depth ($\bar{Z}$) = 22.86 metres

Hydraulic Residence Time (T_W) = 2.36 years

$q_s = \bar{Z}/T_W = 9.69$

Phosphorus Loading (g $P.m^{-2}$ yr^{-1}) = 0.011

- $\bar{X}$ Total P = 0.11 mg/l
- $\bar{X}$ Influent Q = 0.283 m^3/sec (=8.9 X 10^6 m^3/yr)
- $\bar{X}$ Precipitation P = neglible
- Total P supplied per lake = 981.72 grams/year
- Area = 92,700 m^2

L (P) = mg P. m^{-2} year $^{-1}$ = 0.106

Normalized areal phosphorus loading =

$$(L(P)/q_s)/(1 + \sqrt{T_W}) = .004$$

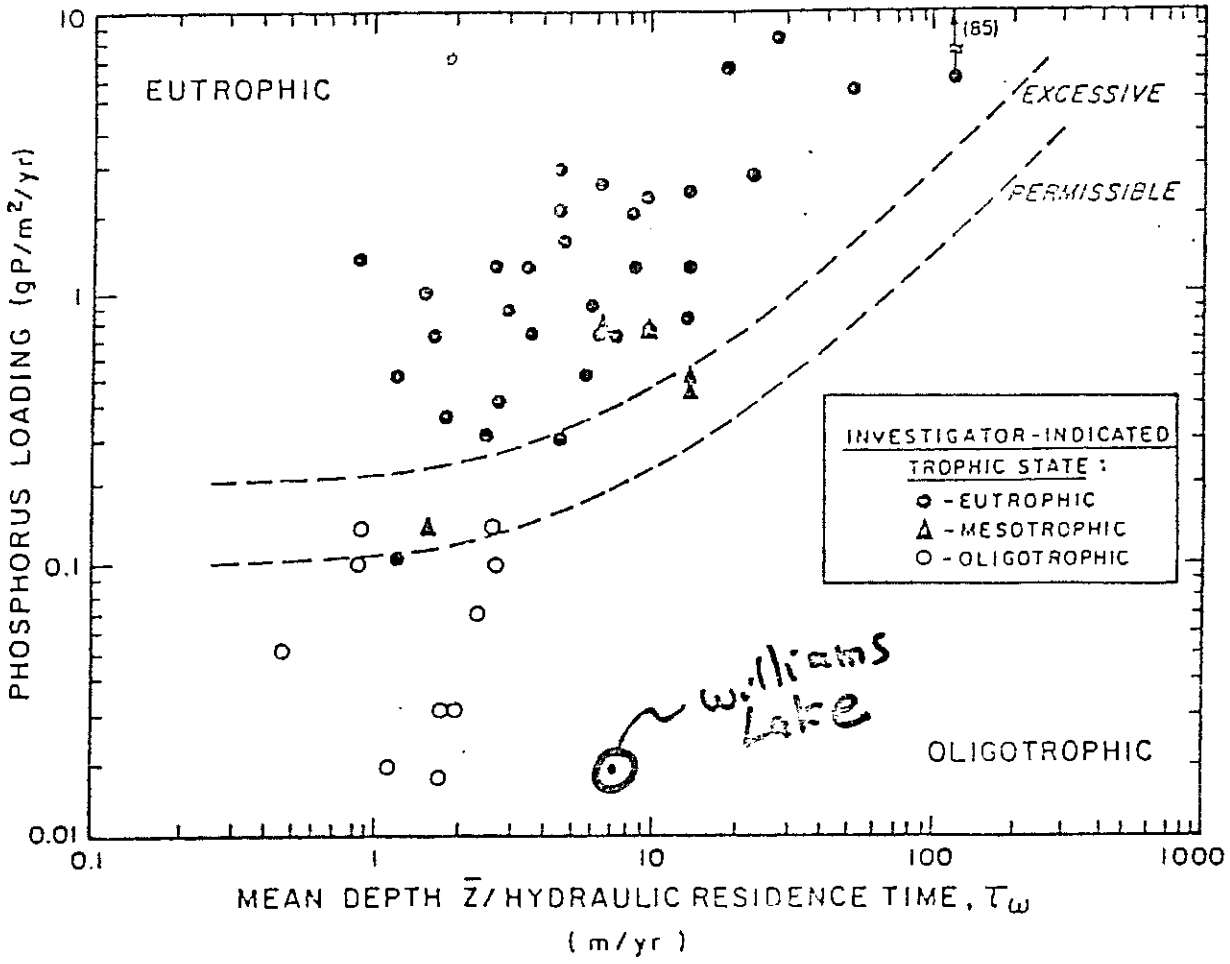
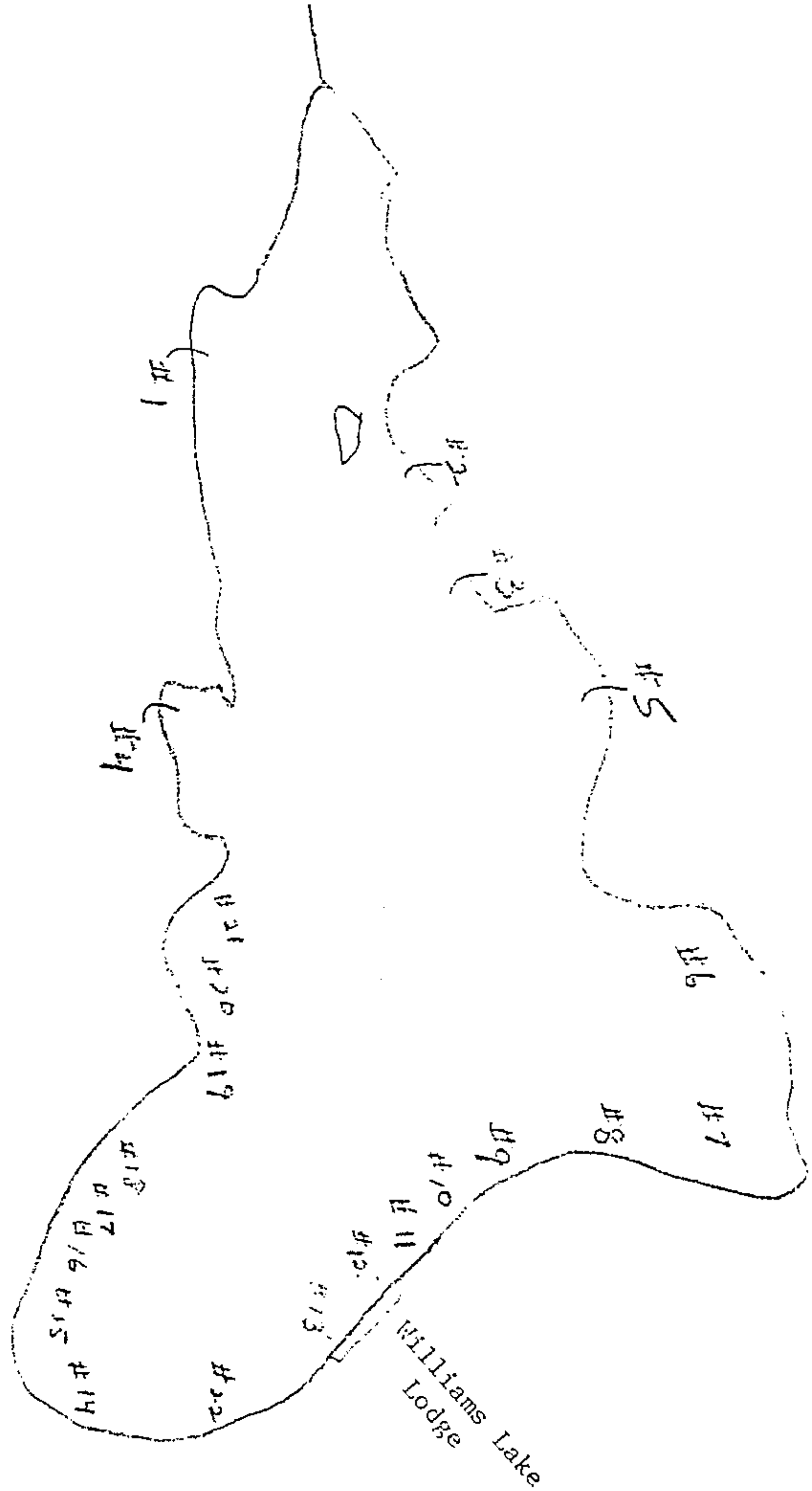


Figure 1. US OECD Data Applied to Vollenweider P Loading - Mean Depth/Hydraulic Residence Time Relationship (After Rast and Lee[7]).

BACTERIAL DENSITIES July 24, 1980

Location (See Map)	Colonies/100ml		
	Total Coliform	Fecal Coliform	Fecal Strep
#1	<1	<1	2
#2	<1	4	2
#3	4	3	4
#4	4	2	<1
#5	<1	<1	2
#6	6	1	4
#7	4	1	8
#8	1	<1	2
#9	<1	<1	<1
#10	<1	<1	<1
#11	1	<1	8
#12	<1	<1	<1
#13	1	<1	4
#14	22	13	<1
#15	1	<1	<1
#16	1	1	<1
#17	<1	<1	<1
#18	<1	<1	2
#19	<1	<1	14
#20	<1	<1	<1
#21	<1	<1	4
#22	1	1	4


Williams Lake
Lodge