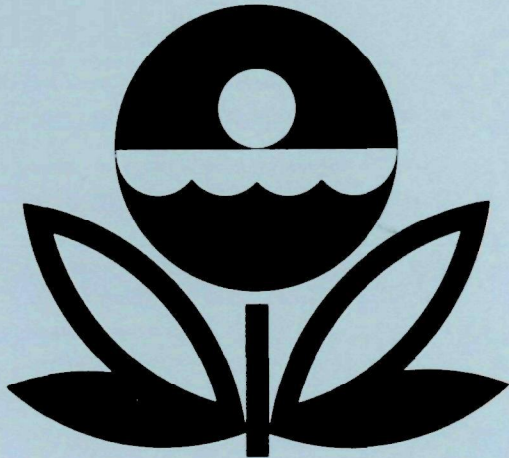


**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY
WORKING PAPER SERIES**



REPORT
ON
MAYFIELD LAKE
LEWIS COUNTY
WASHINGTON
EPA REGION X
WORKING PAPER No. 870

**CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY - CORVALLIS, OREGON
and
ENVIRONMENTAL MONITORING & SUPPORT LABORATORY - LAS VEGAS, NEVADA**

REPORT
ON
MAYFIELD LAKE
LEWIS COUNTY
WASHINGTON
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WORKING PAPER No. 870

WITH THE COOPERATION OF THE
WASHINGTON DEPARTMENT OF ECOLOGY
AND THE
WASHINGTON NATIONAL GUARD
JULY, 1977

REPORT ON MAYFIELD LAKE
LEWIS COUNTY, WASHINGTON
EPA REGION X

by

National Eutrophication Survey

Water and Land Quality Branch
Monitoring Operations Division
Environmental Monitoring & Support Laboratory
Las Vegas, Nevada

and

Special Studies Branch
Corvallis Environmental Research Laboratory
Corvallis, Oregon

Working Paper No. 870

OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY

July 1977

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point source discharge reduction and nonpoint source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

- a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.
- b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.
- c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's freshwater lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by the U.S. Environmental Protection Agency and to augment plans implementation by the states.

ACKNOWLEDGMENTS

The staff of the National Eutrophication Survey (Office of Research and Development, U.S. Environmental Protection Agency) expresses sincere appreciation to the Washington Department of Ecology for professional involvement, to the Washington National Guard for conducting the tributary sampling phase of the Survey, and to those Washington wastewater treatment plant operators who provided effluent samples and flow data.

Ms. Barbara Blau, Lake Restoration Program, and the staff of the Washington Department of Ecology, Lake Restoration Program, provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports and provided critiques most useful in the preparation of this Working Paper Series.

Major General Howard S. McGee, Adjutant General of Washington, and Project Officer Colonel Clinton C. Johnson, who directed the volunteer efforts of the Washington National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF WASHINGTONLAKE NAMECOUNTY

American Lake

Pierce

Banks Lake

Grant, Douglas

Chelan Lake

Chelan

Diamond Lake

Pend Oreille

Green Lake

King

Keechelus Lake

Kittitas

Mayfield Lake

Lewis

Medical Lake

Spokane

Moses Lake

Grant

Ozette Lake

Clallam

Sammamish Lake

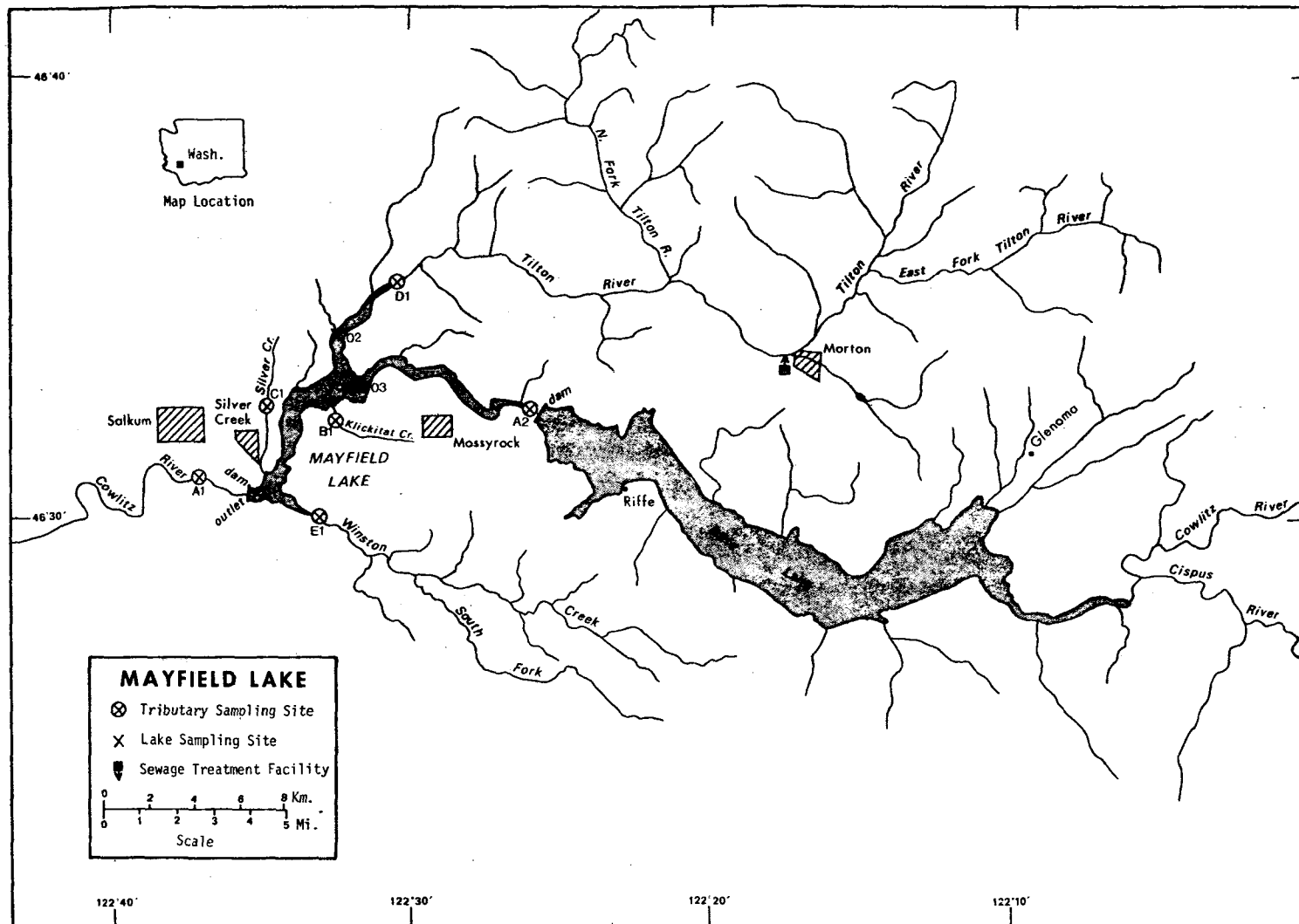
King

Lake Whatcom

Whatcom

Lower Granite Reservoir

Garfield, Whatcom



REPORT ON MAYFIELD LAKE, WASHINGTON

STORET NO. 5307

I. CONCLUSIONS

A. Trophic Condition:*

Survey data indicate Mayfield Lake is mesotrophic.

Chlorophyll a values ranged from 0.5 $\mu\text{g/l}$ to 18.0 $\mu\text{g/l}$, with a mean of 4.2 $\mu\text{g/l}$. The potential for primary productivity as measured by algal assay control yields was low. Of the 13 Washington Lakes sampled in 1975, 7 had higher median total phosphorus and median inorganic nitrogen values, and 8 had greater median dissolved orthophosphorus levels.

Survey limnologists did not report any problem conditions during their visits to the lake.

*See Appendix E.

B. Rate-Limiting Nutrient:

Algal assay results indicate that Mayfield Lake was limited by available phosphorus levels during the sample collection times (03/28/75, 10/30/75). Lake data suggest nitrogen limitation during the spring and summer sample collection times and phosphorus limitation during fall.

C. Nutrient Controllability:

1. Point sources -

Point sources were estimated to have contributed 0.9% of the total phosphorus load to Mayfield Lake. The city of Morton contributed this entire load. In addition, a fish hatchery discharges to the northeastern end of the lake, but nutrient contributions from this source are not known.

The loading calculations for Mayfield Lake indicate a net export of phosphorus from the lake. This apparent export may be attributable to lack of information on the nutrient input from unknown or unmeasured point sources, to failure to adequately depict annual nutrient loadings from ungaged tributaries with available estimation means, or to sampling error. As is, the calculated phosphorus loading for Mayfield Lake is $11.36 \text{ g P/m}^2/\text{yr}$; additional sampling is needed to determine the true nutrient budget of Mayfield Lake and the significance of the annual phosphorus loading to the trophic state of the lake.

2. Nonpoint sources -

The mean annual phosphorus load from nonpoint sources accounted for 99.1% of the total load reaching Mayfield Lake. The Cowlitz River contributed 75.5%, Tilton River contributed 16.7%, Klickitat Creek contributed 0.6%, and minor tributaries and immediate drainage were estimated to have contributed 6.1% of the total phosphorus load.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS

Lake and drainage basin characteristics are itemized below. Lake morphometry data were provided by Wolcott (1965). Tributary flow data were provided by the Washington District Office of the U.S. Geological Survey (USGS). Outlet drainage area includes the lake surface area. Mean hydraulic retention time was obtained by dividing the lake volume by mean flow of the outlet. Precipitation values are estimated by methods as outlined in National Eutrophication Survey (NES) Working Paper No. 175. A table of metric/English conversions is included as Appendix A.

A. Lake Morphometry:

1. Surface area: 8.90 km^2 .
2. Mean depth: 17.6 meters.
3. Maximum depth: 56.4 meters.
4. Volume: $156.653 \times 10^6 \text{ m}^3$.
5. Mean hydraulic retention time: 9 days.

B. Tributary and Outlet:
(See Appendix B for flow data)

1. Tributaries -

<u>Name</u>	<u>Drainage area (km²)</u>	<u>Mean flow (m³/sec)</u>
A-2 Cowlitz River	2,988.9	155.86
B-1 Klickitat Creek	26.9	0.66
D-1 Tilton River	365.2	23.98
Minor tributaries and immediate drainage -	<u>236.1</u>	<u>7.85</u>
Totals	3,617.1	188.35
2. Outlet - A-1 Cowlitz River	3,626.0	194.19

C. Precipitation:

1. Year of sampling: 133.7 cm.
2. Mean annual: 116.2 cm.

III. LAKE WATER QUALITY SUMMARY

Mayfield Lake was sampled three times during the open-water season of 1975 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from three stations on the lake and from a number of depths at each station (see map, page v). During each visit, depth-integrated samples were collected from each station for chlorophyll a analysis and phytoplankton identification and enumeration. During the first and last visits, 18.9-liter depth-integrated samples were composited for algal assays. Maximum depths sampled were 53.3 meters at Station 01, 30.8 meters at Station 02, and 18.0 meters at Station 03. For a more detailed explanation of NES methods, see NES Working Paper No. 175.

The results obtained are presented in full in Appendix C and are summarized in III-A for waters at the surface and at the maximum depth for each site. Results of the phytoplankton counts and chlorophyll a determinations are included in III-B. Results of the limiting nutrient study are presented in III-C.

MAYFIELD LAKE
STORET CODE 5307

PHYSICAL AND CHEMICAL CHARACTERISTICS

PARAMETER	N*	(3/28/75)				N*	(7/17/75)				N*	(10/30/75)			
		S*** = 3	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)		S*** = 3	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)		S*** = 3	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)
TEMPERATURE (DEG CENT)															
0.-1.5 M DEPTH	6	5.3-	6.9	5.6	0.0- 1.5	6	6.8-	13.7	9.9	0.0- 1.5	6	12.1-	12.7	12.2	0.0- 1.5
MAX DEPTH**	3	5.2-	6.9	5.4	18.0- 51.8	3	4.8-	7.2	6.8	17.1- 44.8	3	9.9-	12.5	10.7	16.2- 53.3
DISSOLVED OXYGEN (MG/L)															
0.-1.5 M DEPTH	6	11.8-	12.2	12.1	0.0- 1.5	6	7.0-	11.2	10.4	0.0- 1.5	6	9.2-	9.8	9.8	0.0- 1.5
MAX DEPTH**	3	11.8-	12.0	11.8	18.0- 51.8	3	9.8-	10.6	10.4	17.1- 44.8	3	4.4-	11.2	9.4	16.2- 53.3
CONDUCTIVITY (UMHOS)															
0.-1.5 M DEPTH	6	29.-	46.	33.	0.0- 1.5	6	6.-	41.	27.	0.0- 1.5	6	15.-	18.	16.	0.0- 1.5
MAX DEPTH**	3	32.-	46.	32.	18.0- 51.8	3	29.-	33.	32.	17.1- 44.8	3	9.-	25.	16.	16.2- 53.3
PH (STANDARD UNITS)															
0.-1.5 M DEPTH	6	7.2-	7.5	7.3	0.0- 1.5	6	7.1-	9.4	8.1	0.0- 1.5	6	6.7-	6.9	6.8	0.0- 1.5
MAX DEPTH**	3	7.3-	7.3	7.3	18.0- 51.8	3	7.2-	7.4	7.3	17.1- 44.8	3	6.6-	6.9	6.8	16.2- 53.3
TOTAL ALKALINITY (MG/L)															
0.-1.5 M DEPTH	6	13.-	25.	23.	0.0- 1.5	6	21.-	28.	25.	0.0- 1.5	6	24.-	26.	26.	0.0- 1.5
MAX DEPTH**	3	17.-	23.	21.	18.0- 51.8	3	25.-	25.	25.	17.1- 44.8	3	20.-	36.	23.	16.2- 53.3
TOTAL P (MG/L)															
0.-1.5 M DEPTH	6	0.014-0.020	0.015	0.015	0.0- 1.5	6	0.009-0.020	0.013	0.013	0.0- 1.5	6	0.011-0.021	0.013	0.013	0.0- 1.5
MAX DEPTH**	3	0.012-0.026	0.015	0.015	18.0- 51.8	3	0.011-0.053	0.012	0.012	17.1- 44.8	3	0.014-0.060	0.015	0.015	16.2- 53.3
DISSOLVED ORTHO P (MG/L)															
0.-1.5 M DEPTH	6	0.005-0.022	0.008	0.008	0.0- 1.5	6	0.006-0.014	0.010	0.010	0.0- 1.5	6	0.003-0.007	0.005	0.005	0.0- 1.5
MAX DEPTH**	3	0.005-0.014	0.009	0.009	18.0- 51.8	3	0.011-0.013	0.012	0.012	17.1- 44.8	3	0.002-0.005	0.004	0.004	16.2- 53.3
NO2+NO3 (MG/L)															
0.-1.5 M DEPTH	6	0.090-0.170	0.120	0.120	0.0- 1.5	6	0.020-0.060	0.030	0.030	0.0- 1.5	6	0.040-0.060	0.050	0.050	0.0- 1.5
MAX DEPTH**	3	0.080-0.190	0.120	0.120	18.0- 51.8	3	0.050-0.090	0.050	0.050	17.1- 44.8	3	0.100-0.200	0.120	0.120	16.2- 53.3
AMMONIA (MG/L)															
0.-1.5 M DEPTH	6	0.020-0.030	0.025	0.025	0.0- 1.5	6	0.020-0.060	0.030	0.030	0.0- 1.5	6	0.020-0.020	0.020	0.020	0.0- 1.5
MAX DEPTH**	3	0.020-0.030	0.020	0.020	18.0- 51.8	3	0.020-0.020	0.020	0.020	17.1- 44.8	3	0.020-0.020	0.020	0.020	16.2- 53.3
KJELDAHL N (MG/L)															
0.-1.5 M DEPTH	6	0.200-0.500	0.250	0.250	0.0- 1.5	6	0.200-0.700	0.300	0.300	0.0- 1.5	6	0.200-0.200	0.200	0.200	0.0- 1.5
MAX DEPTH**	3	0.200-0.200	0.200	0.200	18.0- 51.8	3	0.200-0.200	0.200	0.200	17.1- 44.8	3	0.200-0.200	0.200	0.200	16.2- 53.3
SECCHI DISC (METERS)															
	3	1.9-	2.9	2.1		3	2.1-	3.4	2.4		3	2.4-	2.7	2.4	

* N = NO. OF SAMPLES

** MAXIMUM DEPTH SAMPLED AT EACH SITE

*** S = NO. OF SITES SAMPLED ON THIS DATE

B. Biological Characteristics:

1. Phytoplankton -

<u>Sampling Date</u>	<u>Dominant Genera</u>	<u>Algal Units per ml</u>
03/28/75	1. <u>Melosira</u>	297
	2. <u>Cryptomonas</u>	81
	3. <u>Chroomonas</u>	27
	4. Pennate Diatom	27
	Other genera	---
	Total	432
07/17/75	1. <u>Asterionella</u>	1,223
	2. <u>Tabellaria</u>	100
	3. <u>Cryptomonas</u>	25
	Other genera	---
	Total	1,348
10/30/75	1. <u>Asterionella</u>	145
	2. <u>Chroomonas</u>	29
	Other genera	---
	Total	174

2. Chlorophyll a -

<u>Sampling Date</u>	<u>Station Number</u>	<u>Chlorophyll <u>a</u> (μg/l)</u>
03/28/75	01	1.8
	02	1.4
	03	1.7
07/17/75	01	18.0
	02	0.9
	03	---
10/30/75	01	0.8
	02	0.5
	03	8.9

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

a. 03/28/75

<u>Spike (mg/l)</u>	<u>Ortho P Conc. (mg/l)</u>	<u>Inorganic N Conc. (mg/l)</u>	<u>Maximum yield (mg/l-dry wt.)</u>
Control	0.006	0.088	0.1
0.05 P	0.056	0.088	2.8
0.05 P + 1.0 N	0.056	1.088	25.2
1.00 N	0.006	1.088	0.1

b. 10/30/75

<u>Spike (mg/l)</u>	<u>Ortho P Conc. (mg/l)</u>	<u>Inorganic N Conc. (mg/l)</u>	<u>Maximum yield (mg/l-dry wt.)</u>
Control	0.005	0.140	0.2
0.05 P	0.055	0.140	7.2
0.05 P + 1.0 N	0.055	1.140	24.4
1.00 N	0.005	1.140	0.2

2. Discussion -

The control yields of the assay alga, Selenastrum capricornutum, indicate that the potential for primary productivity in Mayfield Lake during both sample collection times (03/28/75, 10/30/75) was low. A significant increase in growth over that of the control occurred when phosphorus was added alone and in combination with nitrogen, indicating phosphorus limitation. Spikes of nitrogen alone did not produce an increase in yield beyond that of the control.

Lake data show a mean inorganic nitrogen to orthophosphorus ratio (N/P) of 13/1, 6/1, and 28/1 in the spring, summer and fall, respectively, suggesting nitrogen limitation in the spring and summer, and phosphorus limitation in the fall (a mean N/P ratio of 14/1 or greater generally reflects phosphorus limitation).

IV. NUTRIENT LOADINGS (See Appendix D for data)

For the determination of nutrient loadings, the Washington National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff month of January when two samples were collected. Sampling was begun in September 1974, and was completed in August 1975.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Washington District Office of the USGS for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a USGS computer program for calculating stream loadings. Nutrient loads indicated for tributaries are those measured minus known point source loads, if any.

Nutrient loadings for unsampled "minor tributaries and immediate drainage" ("ZZ" of USGS) were estimated by using the mean annual nutrient loads, in $\text{kg}/\text{km}^2/\text{yr}$, in Cowlitz River at Station A-2 and multiplying the means by the ZZ area in km^2 .

The operator of the Morton wastewater treatment plant provided monthly effluent samples and corresponding flow data.

A. Waste Sources:

1. Known municipal -

<u>Name</u>	<u>Pop.* Served</u>	<u>Treatment*</u>	<u>Mean Flow (m³/d x 10³)</u>	<u>Receiving Water</u>
Morton	1,250	Trickling Filter	1.536	Tilton River

2. Known industrial - None

*Provided by treatment plant operator.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

<u>Source</u>	<u>kg P/yr</u>	<u>% of total</u>
a. Tributaries (nonpoint load) -		
A-2 Cowlitz River	76,340	75.5
B-1 Klickitat Creek	645	0.6
D-1 Tilton River	16,855	16.7
b. Minor tributaries and immediate drainage (nonpoint load) -	6,140	6.1
c. Known municipal STP's -		
Morton	935	0.9
d. Septic tanks* -	10	<0.1
e. Known industrial - None		
f. Direct precipitation** -	<u>155</u>	<u>0.2</u>
Total	101,080	100.0
2. Outputs - A-1 Cowlitz River	102,690	
3. Net annual P export *** -	1,610	

*Estimate based on 30 lakeshore residences.

**Estimated (See NES Working Paper No. 175).

***Export probably due to unknown sources and/or sampling error.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

<u>Source</u>	<u>kg N/yr</u>	<u>% of total</u>
a. Tributaries (nonpoint load) -		
A-2 Cowlitz River	1,144,155	71.7
B-1 Klickitat Creek	33,600	2.1
D-1 Tilton River	312,715	19.6
b. Minor tributaries and immediate drainage (nonpoint load) -	90,425	5.7
c. Known municipal STP's -		
Morton	4,105	0.3
d. Septic tanks* -	320	<0.1
e. Known industrial - None		
f. Direct precipitation** -	<u>9,610</u>	<u>0.6</u>
Total	1,594,930	100.0
2. Outputs - A-1 Cowlitz River	1,548,220	
3. Net annual N accumulation -	46,710	

*Estimate based on 30 lakeshore residences.

**Estimated (See NES Working Paper No. 175).

D. Mean Annual Nonpoint Nutrient Export by Subdrainage Area:

<u>Tributary</u>	<u>kg P/km²/yr</u>	<u>kg N/km²/yr</u>
Cowlitz River	26	383
Klickitat Creek	24	1,249
Tilton River	46	856

E. Mean Nutrient Concentrations in Ungaged Streams:

<u>Tributary</u>	<u>Mean Total P (mg/l)</u>	<u>Mean Total N (mg/l)</u>
C-1 Silver Creek	0.032	0.892
E-1 Winston Creek	0.038	0.750

F. Yearly Loadings:

In the following table, the existing phosphorus annual loading is compared to the relationship proposed by Vollenweider (1975). Essentially, his "eutrophic" loading is that at which the receiving waters would become eutrophic or remain eutrophic; his "oligotrophic" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A "mesotrophic" loading would be considered one between "eutrophic" and "oligotrophic".

Note that Vollenweider's model may not apply to lakes with short hydraulic retention times or in which light penetration is severely restricted by high concentrations of suspended solids in the surface waters.

Total Yearly Phosphorus Loading (g/m²/yr)	
Estimated loading for Mayfield Lake	11.36
Vollenweider's "eutrophic" loading	5.54
Vollenweider's "oligotrophic" loading	2.77

V. LITERATURE REVIEWED

U.S. Environmental Protection Agency. 1975. National Eutrophication Survey Methods 1973-1976. Working Paper No. 175. National Environmental Research Center, Las Vegas, Nevada, and Pacific Northwest Environmental Research Laboratory, Corvallis, Oregon.

Vollenweider, R. A. 1975. Input-Output Models With Special Reference to the Phosphorus Loading Concept in Limnology. Schweiz. Z. Hydrol. 37:53-84.

Wolcott, E. E. 1965. Lakes of Washington, Volume I. Washington Division of Water Resources, Water Supply Bulletin, 14 and 15.

VI. APPENDICES

APPENDIX A CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX B
TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR WASHINGTON

11/16/76

LAKE CODE 5307 MAYFIELD LAKE

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 3626.0

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS)												MEAN
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
5307A1	3626.0	307.80	235.71	261.73	188.93	175.96	195.22	130.17	93.22	97.86	145.41	219.03	290.79	194.19
5307A2	2988.9	213.79	173.87	202.75	147.25	143.57	176.13	119.78	88.07	84.95	126.29	178.96	215.49	155.86
5307B1	26.9	1.756	1.331	1.019	0.821	0.453	0.227	0.057	0.023	0.042	0.170	0.765	1.331	0.663
5307D1	365.2	47.71	40.10	32.62	30.07	21.07	11.04	5.21	3.54	5.58	13.99	34.01	43.86	23.98
5307Z7	245.0	18.12	15.01	11.33	10.19	5.95	3.11	1.13	0.57	0.99	3.11	10.48	14.72	7.85

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 3626.0
SUM OF SUB-DRAINAGE AREAS = 3626.0

TOTAL FLOW IN = 2262.41
TOTAL FLOW OUT = 2331.83

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
5307A1	9	74	87.499	22	86.650				
	10	74	102.507	29	92.596				
	11	74	168.768						
	12	74	259.099	4	211.810				
	1	75	376.614	5	294.495	31	362.456		
	2	75	311.485	14	300.158				
	3	75	237.578	5	262.780				
	4	75	213.226	17	262.780				
	5	75	81.836	22	60.315				
	6	75	161.406						
	7	75	190.289	10	359.624				
	8	75	70.226	21	59.182				
5307A2	9	74	72.774	22	62.439				
	10	74	98.543	29	141.584				
	11	74	137.054						
	12	74	190.006	4	177.547				
	1	75	254.852	5	194.537	31	336.970		
	2	75	254.568	14	175.281				
	3	75	188.024	5	188.590				
	4	75	184.909	17	182.360				
	5	75	50.970	22	0.0				
	6	75	144.982						
	7	75	180.945	10	314.317				
	8	75	59.465	21	48.988				

TRIBUTARY FLOW INFORMATION FOR WASHINGTON

11/16/76

LAKE CODE 5307 MAYFIELD LAKE

MEAN MONTHLY FLOWS AND DAILY FLOWS (CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
5307B1	9	74	0.0	22	0.0				
	10	74	0.006	20	0.048				
	11	74	0.481						
	12	74	1.218	4	0.481				
	1	75	2.124	5	1.642	31	1.048		
	2	75	0.906	14	1.019				
	3	75	0.821	5	0.850				
	4	75	0.340	17	0.255				
	5	75	0.340	22	0.193				
	6	75	0.079						
	7	75	0.023	10	0.028				
	8	75	0.011	21	0.001				
5307D1	9	74	2.515	22	2.209				
	10	74	2.101	29	3.681				
	11	74	18.293						
	12	74	46.156	4	12.459				
	1	75	81.269	5	58.050	31	26.533		
	2	75	33.980	14	59.465				
	3	75	31.149	5	40.776				
	4	75	17.330	17	13.309				
	5	75	23.956	22	16.311				
	6	75	8.665						
	7	75	4.417	10	4.786				
	8	75	4.191	21	2.973				
5307Z2	9	74	0.368						
	10	74	0.283						
	11	74	4.531						
	12	74	15.857						
	1	75	33.980						
	2	75	12.176						
	3	75	10.760						
	4	75	5.239						
	5	75	7.929						
	6	75	2.265						
	7	75	0.850						
	8	75	0.708						

APPENDIX C
PHYSICAL AND CHEMICAL DATA

530701
46 30 15.0 122 34 50.0 3
MAYFIELD LAKE
53041 WASHINGTON

131292

11EPALES 2111202
0175 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CONDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CAC03 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/03/28	14 55	0000	5.8	11.8	74	29	7.20	16	0.030	0.500	0.120	0.009
	14 55	0005	5.5	12.2		31	7.25	13	0.030	0.300	0.120	0.006
	14 55	0020	5.5	12.0		32	7.25	23	0.020	0.200	0.110	0.005
	14 55	0060	5.4	12.2		32	7.30	23	0.030	0.300	0.120	0.009
	14 55	0100	5.4	12.0		32	7.30	23	0.020	0.200	0.130	0.006
	14 55	0135	5.4	12.0		30	7.30	20	0.020K	0.200	0.130	0.005
	14 55	0170	5.4	12.0		32	7.30	17	0.020K	0.200	0.120	0.005
75/07/17	13 15	0000	13.6	7.0	96	6	9.40	26	0.060	0.500	0.030	0.014J
	13 15	0005	13.7	10.4		27	9.20	25	0.030	0.200	0.020K	0.010K
	13 15	0015	7.6	10.2		28	9.30	25	0.020	0.200K	0.040	0.013K
	13 15	0040	7.3	10.2		29	9.20	24	0.020	0.200K	0.050	0.010K
	13 15	0090	7.1	9.6		31	7.60	25	0.030	0.200K	0.050	0.013K
	13 15	0147	4.8	9.8		29	7.30	25	0.020	0.200K	0.090	0.012
	09 20	0000	12.1	9.8	108	17	6.80	26	0.020	0.200K	0.050	0.005
75/10/30	09 20	0005	12.1	9.8		16	6.85	24	0.020K	0.200K	0.040	0.007
	09 20	0020	12.1	9.8		16	6.85	25	0.020K	0.200K	0.050	0.005
	09 20	0055	11.8	10.0		17	6.90	26	0.020K	0.200K	0.080	0.003
	09 20	0090	11.0	10.0		16	6.80	23	0.020K	0.200K	0.300	0.002
	09 20	0130	10.1	7.0		22	6.70	31	0.020K	0.200K	0.110	0.002
	09 20	0175	9.9	4.4		25	6.60	36	0.020K	0.200K	0.100	0.002K

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLPPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/03/28	14 55	0000	0.020	1.8	
	14 55	0005	0.014		
	14 55	0020	0.014		
	14 55	0060	0.016		
	14 55	0100	0.013		
	14 55	0135	0.015		
	14 55	0170	0.015		
75/07/17	13 15	0000	0.014	18.0	
	13 15	0005	0.009		
	13 15	0015	0.009		
	13 15	0040	0.009		
	13 15	0090	0.008		
	13 15	0147	0.053		
	09 20	0000	0.020	0.8	
75/10/30	09 20	0005	0.012		
	09 20	0020	0.013		
	09 20	0055	0.013		
	09 20	0090	0.019		
	09 20	0130	0.010		
	09 20	0175	0.015		

K VALUE KNOWN TO BE LESS
THAN INDICATED

J VALUE KNOWN TO BE ESTIMATED

STORET RETRIEVAL DATE 76/11/16
 NATL EUTROPHICATION SURVEY
 EPA-LAS VEGAS

530702
 46 33 22.0 122 32 01.0 3
 MAYFIELD LAKE
 53041 WASHINGTON

131292

11EPALES 2111202
 0108 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CONDUCTVY FIELD MICROMHO	00400 PH SIJ	00410 T ALK CAC03 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/03/28	15 15	0000	6.9	12.2	114	46	7.50	25	0.030	0.200K	0.170	0.022K
	15 15	0005	6.7	12.2		44	7.40	24	0.020	0.200K	0.160	0.016K
	15 15	0025	6.6	12.2		45	7.40	25	0.020K	0.200K	0.120	0.015K
	15 15	0050	6.2	11.8		45	7.40	25	0.020	0.200K	0.120	0.013J
	15 15	0075	6.0	12.0		46	7.30	25	0.020	0.200K	0.200	0.014J
	15 15	0101	6.0	11.8		46	7.30	21	0.030	0.200K	0.190	0.009
75/07/17	14 00	0000	11.9	10.6	84	41	8.70	28	0.030	0.400	0.020	0.012J
	14 00	0005	7.9	11.2		34	8.10	25	0.030	0.200	0.030	0.011J
	14 00	0015	7.7	11.0		31	7.85	25	0.020K	0.200K	0.030	0.011K
	14 00	0025	7.4	10.2		31	7.60	25	0.020	0.200K	0.050	0.015K
	14 00	0050	7.4	9.8		12	7.90	28	0.020	0.200K	0.050	0.005
	14 00	0091	7.2	10.6		32	7.40	25	0.020	0.200K	0.050	0.011
75/10/30	09 40	0000	12.2	9.8	96	18	6.80	24	0.020K	0.200K	0.060	0.003
	09 40	0005	12.2	9.8		15	6.90	26	0.020K	0.200K	0.060	0.006
	09 40	0020	12.2	10.0		14	6.90	25	0.020K	0.200K	0.050	0.005
	09 40	0050	11.2	11.0		13	6.90	20	0.020K	0.200K	0.150	0.005
	09 40	0083	10.7	11.2		9	6.90	20	0.020K	0.200K	0.200	0.005

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/03/28	15 15	0000	0.019	1.4	
	15 15	0005	0.015		
	15 15	0025	0.014		
	15 15	0050	0.015		
	15 15	0075	0.018		
	15 15	0101	0.026		
75/07/17	14 00	0000	0.020	0.9	
	14 00	0005	0.012		
	14 00	0015	0.010		
	14 00	0025	0.010		
	14 00	0050	0.029		
	14 00	0091	0.012		
75/10/30	09 40	0000	0.013	0.5	
	09 40	0005	0.013		
	09 40	0020	0.014		
	09 40	0050	0.059		
	09 40	0083	0.060		

K VALUE KNOWN TO BE LESS
 THAN INDICATED

J VALUE KNOWN TO BE ESTIMATED

STORET RETRIEVAL DATE 76/11/16
 NATL EUTROPHICATION SURVEY
 EPA-LAS VEGAS

530703
 46 32 40.0 122 31 30.0 3
 MAYFIELD LAKE
 53041 WASHINGTON

11EPALES 760109 2111202
 0063 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CONDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CAC03 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/03/28	15 44	0000	5.4	12.0	82	32	7.30	22	0.020K	0.300	0.090	0.007
	15 44	0005	5.3	11.8		33	7.30	23	0.020K	0.200	0.090	0.005
	15 44	0015	5.3	11.8		33	7.30	23	0.020K	0.200	0.080	0.013K
	15 44	0035	5.2	11.8		32	7.30	23	0.020K	0.200	0.080	0.015K
	15 44	0059	5.2	11.8		32	7.35	23	0.020K	0.200	0.080	0.014K
75/07/17	13 40	0000	6.9	10.0	132	27	7.40	22	0.020K	0.700	0.060	0.007
	13 40	0005	6.8	10.4		24	7.10	21	0.020	0.200K	0.060	0.006
	13 40	0021	6.8	10.4		30	7.30	22	0.020	0.200K	0.060	0.022K
	13 40	0040	6.7	10.4		30	7.25	21	0.020K	0.200K	0.060	0.007
	13 40	0056	6.8	10.4		33	7.20	25	0.020	0.200K	0.050	0.013K
75/10/30	10 00	0000	12.6	9.4	96	15	6.70	26	0.020K	0.200K	0.050	0.005
	10 00	0005	12.7	9.2		16	6.70	26	0.020K	0.200K	0.050	0.005
	10 00	0020	12.6	9.0		15	6.80	23	0.020K	0.200	0.050	0.004
	10 00	0053	12.5	9.4		16	6.80	23	0.020K	0.200K	0.120	0.004

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/03/28	15 44	0000	0.015	1.7	
	15 44	0005	0.014		
	15 44	0015	0.013		
	15 44	0035	0.012		
	15 44	0059	0.012		
75/07/17	13 40	0000	0.014		
	13 40	0005	0.009		
	13 40	0021	0.009		
	13 40	0040	0.009		
	13 40	0056	0.011		
75/10/30	10 00	0000	0.021	8.9	
	10 00	0005	0.011		
	10 00	0020	0.012		
	10 00	0053	0.014		

K VALUE KNOWN TO BE LESS
 THAN INDICATED

APPENDIX D
TRIBUTARY AND WASTEWATER
TREATMENT PLANT DATA

STORET RETRIEVAL DATE 74/11/16
 NATL EUTROPHICATION SURVEY
 EPA- LAS VEGAS

530741
 46 30 40.0 122 37 00.0 4
 COWLITZ RIVER
 53 15 ONALASKA
 0/MAYFIELD LAKE 131292
 RNK 400 FT E END SEC RD 2 M S HWY 5 JCT
 11EPALES 2111204
 0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/22	09 50		0.012	0.200	0.010	0.005K	0.010
74/10/29	16 55			0.100K	0.020	0.010	0.015
74/12/04	16 15		0.072	0.700	0.025	0.005K	0.060
75/01/05	12 40		0.128	0.100	0.016	0.010	0.020
75/01/31	15 10		0.121	0.100	0.008K	0.008K	0.010
75/02/14	12 55		0.120	0.100K	0.016	0.008	0.020
75/03/05	10 15		0.128	0.250	0.024	0.008	0.020
75/04/17	16 50		0.055	0.150	0.020	0.005	0.010K
75/05/22	15 25		0.020	0.050K	0.010	0.007	0.010K
75/07/10	13 50		0.040	0.050K	0.005	0.005K	0.010K
75/08/21	14 30		0.035	0.150	0.005K	0.005K	0.010K

K VALUE KNOWN TO BE LESS
 THAN INDICATED

STORET RETRIEVAL DATE 76/11/16
 NATL EUTROPHICATION SURVEY
 EPA- LAS VEGAS

5307A2
 46 32 06.0 122 25 20.0 4
 COWLITZ RIVER
 53 15 MORTON
 T/MAYFIELD LAKE 131093
 BELOW MOSSYROCK DAM 3 MI E OF MOSSTOCK
 11EPALES 2111204
 0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/22	12 30		0.040	0.100K	0.005	0.005K	0.010
74/10/29	16 00		0.400	0.100K	0.050	0.005	0.010
74/12/04	11 50		0.022	0.500	0.010	0.005K	0.030
75/01/05	14 30		0.048	0.100K	0.016	0.005	0.040
75/01/31	14 00		0.072	0.100K	0.008K	0.008K	0.010
75/02/14	12 00		0.072	0.200	0.016	0.008	0.010
75/03/05	11 10		0.072	0.100K	0.016	0.008	0.010K
75/04/17	15 20		0.050	0.200	0.020	0.005K	0.010K
75/05/22	14 00		0.045	0.050K	0.010	0.005	0.010K
75/07/10	12 25		0.050	0.050K	0.005K	0.005K	0.020
75/08/21	15 35		0.045	0.050	0.005K	0.007	0.010

K VALUE KNOWN TO BE LESS
 THAN INDICATED

STORET RETRIEVAL DATE 76/11/16
 NATL EUTROPHICATION SURVEY
 EPA- LAS VEGAS

530781
 46 32 00.0 122 32 15.0 4
 KLUICKITAT CREEK
 53 15 ONALASKA
 T/MAYFIELD LAKE 131292
 BRDG ON HWY 5 2.8 MI W OF MOSSYROCK
 11EPALES 2111204
 0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/10/29	16 20		1.520	0.800	0.375	0.045	0.080
74/12/04	15 15		0.640	1.100	0.030	0.025	0.030
75/01/05	14 45		1.010	0.500	0.024	0.015	0.040
75/01/31	14 20		1.430	0.200	0.016	0.016	0.020
75/02/14	12 20		1.010	0.400	0.032	0.016	0.030
75/03/05	11 25		1.160	0.200	0.016	0.008	0.040
75/04/17	15 50		0.660	0.550	0.025	0.010	0.030
75/05/22	14 25		0.340	0.200	0.025	0.020	0.030
75/07/10	12 50		0.360	1.150	0.055	0.045	0.080
75/08/21	15 10		0.400	0.850	0.025	0.070	0.150

STORET RETRIEVAL DATE 76/11/16
 NATL EUTROPHICATION SURVEY
 EPA- LAS VEGAS

5307C1
 46 32 00.0 122 34 35.0 4
 SILVER CREEK
 53 15 ONALASKA
 T/MAYFIELD LAKE 131292
 SEC RD BRDG 1 MI NE OF TOWN OF SILVER CK
 11EPALES 2111204
 0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/22	10 30		0.012	0.400	0.060	0.015	0.060
74/10/29	15 30		0.104	0.300	0.020	0.020	0.040
74/12/04	14 30		0.336	1.100	0.020	0.015	0.030
75/01/05	13 05		0.900	0.300	0.016	0.010	0.020
75/01/31	13 10		1.010	0.200	0.024	0.008	0.010
75/02/14	11 30		0.840	0.400	0.024	0.008	0.060
75/03/05	11 35		0.820	0.200	0.008K	0.016	0.020
75/04/17	14 50		0.375	0.400	0.025	0.010	0.020
75/05/22	13 25		0.180	0.150	0.025	0.020	0.030

K VALUE KNOWN TO BE LESS
 THAN INDICATED

STORET RETRIEVAL DATE 76/11/16
 NATL EUTROPHICATION SURVEY
 EPA- LAS VEGAS

5307D1
 46 35 04.0 122 30 10.0 4
 TILTON RIVER
 53 15 ONALASKA
 T/MAYFIELD LAKE 131292
 1000 FT FRM DRT RD 3.2 MI SE OF CINERAR
 11EPALES 2111204
 0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/22	11 20		0.060	0.200	0.015	0.010	0.020
74/10/29	14 40		0.152	0.100K	0.010	0.020	0.020
74/12/04	14 00		0.240	0.900	0.020	0.010	0.050
75/01/05	13 35		0.336	0.400	0.032	0.010	0.060
75/01/31	12 40		0.296	0.100K	0.008	0.008	0.010
75/02/14	10 45		0.192	0.200	0.032	0.008	0.020
75/03/05	11 55		0.168	0.100K	0.016	0.008	0.010
75/04/17	14 15		0.100	0.250	0.035	0.005	0.010K
75/05/22	12 45		0.040	0.050K	0.015	0.010	0.010
75/07/10	11 30		0.065	0.300	0.035	0.010	0.040
75/08/21	16 20		0.065	0.150	0.005	0.015	0.025

K VALUE KNOWN TO BE LESS
 THAN INDICATED

STORET RETRIEVAL DATE 76/11/16
 NATL EUTROPHICATION SURVEY
 EPA- LAS VEGAS

5307E1
 46 33 30.0 122 30 10.0 4
 WINSTON CREEK
 53 LEWIS CO HWY MAP
 T/MAYFIELD LAKE 131292
 MED DTY RD BRDG 6 MI WSW OF MOSSYROCK
 11EPALES 2111204
 0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/22	13	10	0.036	0.100	0.010	0.005K	0.015
74/10/29	16	30	0.384	0.300	0.200	0.020	0.020
74/12/04	15	40	0.384	1.100	0.005	0.005K	0.170
75/01/05	15	00	0.800	0.600	0.048	0.020	0.030
75/01/31	14	40	0.720	0.200	0.008K	0.008K	0.010
75/02/14	12	35	0.720	0.300	0.024	0.008K	0.030
75/03/05	10	40	0.600	0.100	0.008K	0.008	0.020
75/04/17	16	15	0.300	0.150	0.015	0.005K	0.010K
75/05/22	14	45	0.160		0.015	0.005K	0.010K
75/07/10	13	15	0.095	0.350	0.025	0.005	0.020
75/08/21	15	00	0.060	0.200	0.005K	0.010	0.030

K VALUE KNOWN TO BE LESS
 THAN INDICATED

STORET RETRIEVAL DATE 76/11/16
 NATL EUTROPHICATION SURVEY
 EPA- LAS VEGAS

5307DA TF5307DA P001250
 46 33 37.0 122 17 08.0 4
 MORTON
 53 15 MORTON
 7/MAYFIELD LAKE 131093
 TILTON RIVER TO MAYFIELD LAKE
 11EPALES 2141204
 0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/12/11	09 30		3.200	3.350	1.380	0.735	1.500	0.472	0.320
75/01/13			3.040	1.000K	0.100	0.420	0.530	0.740	0.650
75/02/13	09 30		1.880	2.380	0.840	0.760	1.100	0.969	0.550
75/03/17	11 00		2.080	4.500	2.800	1.600	2.200	0.345	0.363
75/04/10	09 00		1.200	5.900	0.160	0.540	1.900	0.230	0.240
75/05/12	09 30		3.100	7.100	2.500	1.650	2.100	0.218	0.260
75/06/11	09 00		8.400	6.600	3.550	3.900	4.800	0.170	0.190
75/07/11	09 00		6.600	3.800	3.800	3.100	3.890	0.110	0.125
75/08/12	09 00		9.200	11.000	6.000	4.100	4.900	0.120	0.126
75/09/11	09 30		5.400	6.400	4.100	2.400	2.700	0.132	0.132
75/10/14	10 30		6.500	14.000	6.500	4.000	5.100	0.162	0.145
75/11/11	09 30		3.700	4.200	1.150	0.880	1.600	0.440	0.375
75/12/08	09 00		2.400	3.900	0.325	0.430	0.720	0.750	1.800

STORET RETRIEVAL DATE 76/11/16
 NATL EUTROPHICATION SURVEY
 EPA- LAS VEGAS

5307DA TF5307DA P001250
 46 33 37.0 122 17 08.0 4
 MORTON
 53 15 MORTON
 T/MAYFIELD LAKE 131093
 TILTON RIVER TO MAYFIELD LAKE
 11EPALES 2141204
 0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/12/11	09 30		3.200	3.350	1.380	0.735	1.500	0.472	0.320
75/01/13			3.040	1.000K	0.100	0.420	0.530	0.740	0.650
75/02/13	09 30		1.880	2.380	0.840	0.760	1.100	0.969	0.550
75/03/17	11 00		2.080	4.500	2.800	1.600	2.200	0.345	0.363
75/04/10	09 00		1.200	5.900	0.160	0.540	1.900	0.230	0.240
75/05/12	09 30		3.100	7.100	2.500	1.650	2.100	0.218	0.260
75/06/11	09 00		8.400	6.600	3.550	3.900	4.800	0.170	0.190
75/07/11	09 00		6.600	3.800	3.800	3.100	3.890	0.110	0.125
75/08/12	09 00		9.200	11.000	6.000	4.100	4.900	0.120	0.126
75/09/11	09 30		5.400	6.400	4.100	2.400	2.700	0.132	0.132
75/10/14	10 30		6.500	14.000	6.500	4.000	5.100	0.162	0.145
75/11/11	09 30		3.700	4.200	1.150	0.880	1.600	0.440	0.375
75/12/08	09 00		2.400	3.900	0.325	0.430	0.720	0.750	1.800

APPENDIX E

PARAMETRIC RANKINGS OF LAKES
SAMPLED BY NES IN 1975

STATE OF WASHINGTON

Mean or median values for six of the key parameters evaluated in establishing the trophic conditions of Washington lakes sampled are presented to allow direct comparison of the ranking, by parameter, of each lake relative to the others. Median total phosphorus, median inorganic nitrogen and median dissolved orthophosphorus levels are expressed in mg/l. Chlorophyll a values are expressed in $\mu\text{g/l}$. To maintain consistent rank order with the preceding parameters, the mean Secchi disc depth, in inches, is subtracted from 500. Similarly, minimum dissolved oxygen values are subtracted from 15 to create table entries.

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500- MEAN SEC	MEAN CHLORA	15- MIN DO	MEDIAN DISS ORTHO P
5301	AMERICAN LAKE	0.027	0.105	343.000	4.822	15.000	0.007
5302	BANKS LAKE	0.021	0.040	364.533	7.373	10.800	0.007
5303	CHELAN LAKE	0.005	0.070	111.900	0.905	6.400	0.003
5304	DIAMOND LAKE	0.014	0.060	303.667	14.537	14.200	0.010
5305	GREEN LAKE	0.027	0.050	415.000	2.983	10.600	0.009
5306	KEECHELUS LAKE	0.007	0.040	280.250	1.400	9.200	0.002
5307	MAYFIELD LAKE	0.014	0.100	402.000	4.250	10.600	0.007
5308	MEDICAL LAKE	0.275	0.225	401.714	16.425	15.000	0.166
5309	MOSES LAKE	0.115	0.150	463.600	29.060	14.600	0.038
5310	OZETTE LAKE	0.010	0.110	403.333	1.225	7.200	0.009
5311	SAMMAMISH LAKE	0.015	0.210	374.000	7.290	14.600	0.006
5312	WHATCOM LAKE	0.009	0.320	288.000	3.422	10.800	0.009
5313	LOWER GRANITE RESERVOIR	0.033	0.150	435.500	4.875	7.200	0.022

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500- MEAN SEC	MEAN CHLORA	15- MIN DO	MEDIAN DISS ORTHO P
5301	AMERICAN LAKE	29 (3)	50 (6)	67 (8)	50 (6)	4 (0)	58 (7)
5302	BANKS LAKE	42 (5)	100 (12)	58 (7)	25 (3)	46 (5)	71 (8)
5303	CHELAN LAKE	100 (12)	67 (8)	100 (12)	100 (12)	100 (12)	92 (11)
5304	DIAMOND LAKE	62 (7)	75 (9)	75 (9)	17 (2)	33 (4)	25 (3)
5305	GREEN LAKE	29 (3)	83 (10)	17 (2)	75 (9)	62 (7)	46 (5)
5306	KEECHELIUS LAKE	92 (11)	92 (11)	92 (11)	83 (10)	75 (9)	100 (12)
5307	MAYFIELD LAKE	62 (7)	58 (7)	33 (4)	58 (7)	62 (7)	71 (8)
5308	MEDICAL LAKE	0 (0)	8 (1)	42 (5)	8 (1)	4 (0)	0 (0)
5309	MOSES LAKE	8 (1)	29 (3)	0 (0)	0 (0)	21 (2)	8 (1)
5310	OZETTE LAKE	75 (9)	42 (5)	25 (3)	92 (11)	87 (10)	33 (4)
5311	SAMMAMISH LAKE	50 (6)	17 (2)	50 (6)	33 (4)	21 (2)	83 (10)
5312	WHATCOM LAKE	83 (10)	0 (0)	83 (10)	67 (8)	46 (5)	46 (5)
5313	LOWER GRANITE RESERVOIR	17 (2)	29 (3)	8 (1)	42 (5)	87 (10)	17 (2)