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

REPORT

ON

POMME DE TERRE RESERVOIR

POLK AND HICKORY COUNTIES

MISSOURI

EPA REGION VII

WORKING PAPER No. 548

CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY - CORVALLIS, OREGON

and

ENVIRONMENTAL MONITORING & SUPPORT LABORATORY - LAS VEGAS, NEVADA

☆G.P.O. 699-440

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WITH THE COOPERATION OF THE

MISSOURI DEPARTMENT OF NATURAL RESOURCES

AND THE

MISSOURI NATIONAL GUARD

FEBRUARY, 1977

REPORT ON POMME DE TERRE RESERVOIR

POLK AND HICKORY COUNTIES, MISSOURI

EPA REGION VII

by

National Eutrophication Survey

Water and Land Monitoring Branch
Monitoring Applications Laboratory
Environmental Monitoring & Support Laboratory
Las Vegas, Nevada

and

Eutrophication Survey Branch
Corvallis Environmental Research Laboratory
Corvallis, Oregon

Working Paper No. 548

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U.S. ENVIRONMENTAL PROTECTION AGENCY

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CONTENTS

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 Missouri Department of Natural Resources for professional involvement, to the Missouri National Guard for conducting the tributary sampling phase of the Survey, and to those Missouri wastewater treatment plant operators who provided effluent samples and flow data.

The staff of the Missouri Department of Natural Resources, James Wilson, Director; the Division of Environmental Quality, Ken Karch, Director; and the Water Quality Program, James Odendahl, Director, 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.

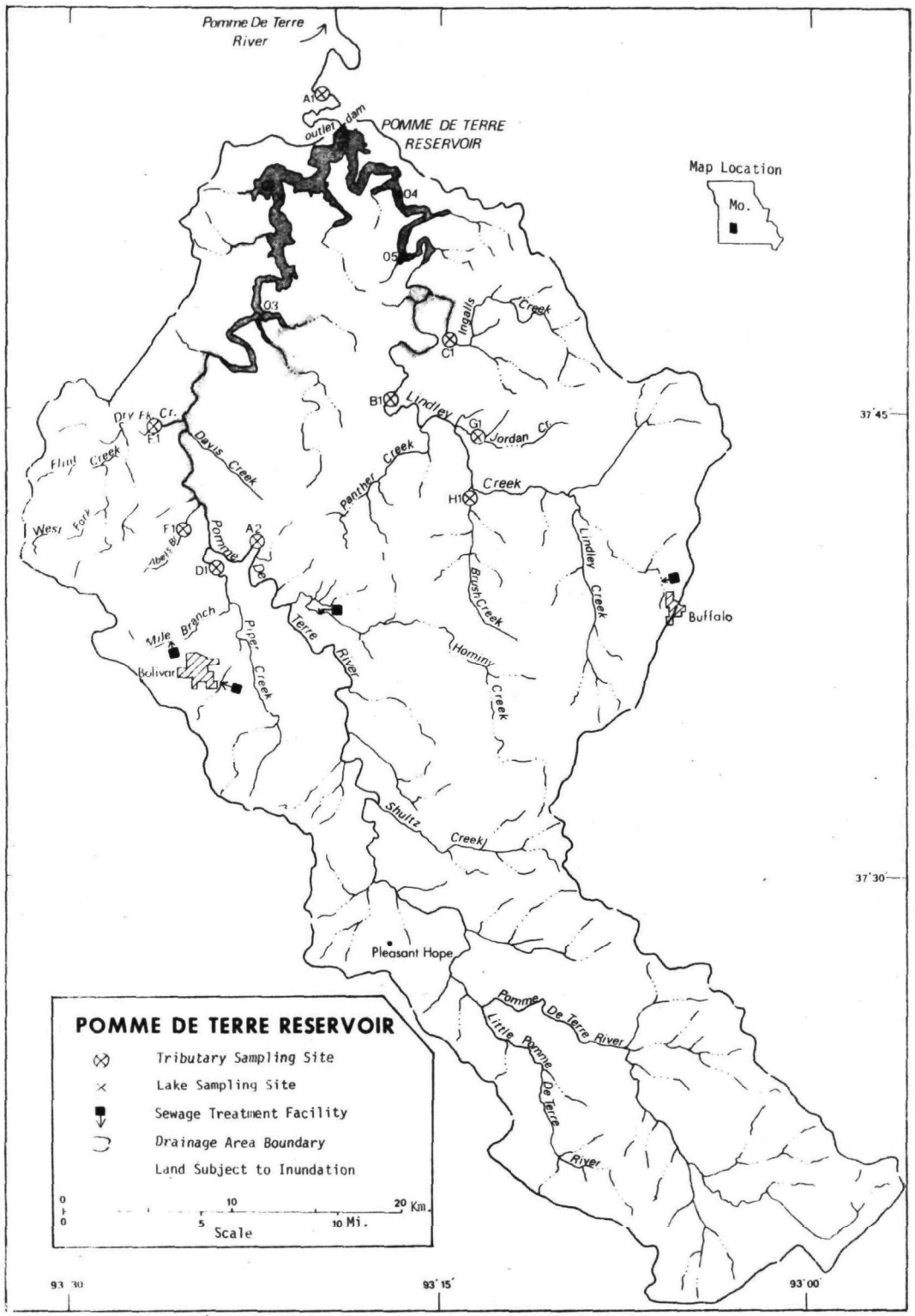
Major General Charles M. Kiefner, the Adjutant General of Missouri, and Project Officer Captain Donald L. Wellen, who directed the volunteer efforts of the Missouri National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF MISSOURI

LAKE NAME	COUNTY
Clearwater Lake	Reynolds
Pomme de Terre Reservoir	Polk, Hickory
Stockton Reservoir	Dade, Polk, Cedar
Lake Taneycomo	Taney
Thomas Hill Reservoir	Macon, Randolph
Lake Wappapello	Wayne, Butler


Pomme De Terre River
A1
outlet dam
POMME DE TERRE RESERVOIR
Map Location
Mo.
O4
O5
O3
Ingalls Creek
C1
B1
Lindley
G1
Jordan Cr.
37°45
Dry Fk. Cr.
F1
Davis Creek
Flint Creek
Panther Creek
H1
Creek
West Fork
F1
Abel Br.
Pomme
A2
D1
De
Lindley Creek
Buffalo
Brush Creek
Mule Branch
Piper Creek
Terre River
Hominy Creek
Bolivar
K
Shultz Creek
37°30
Pleasant Hope
Pomme De Terre River
Little Pomme De Terre River
POMME DE TERRE RESERVOIR
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
Drainage Area Boundary
Land Subject to Inundation
0
10
20 Km
0
5
10 Mi.
Scale
93°30
93°15
93°00

REPORT ON POMME DE TERRE RESERVOIR, MISSOURI

STORET NO. 2902

I. CONCLUSIONS

A. Trophic Condition:*

Based upon field observations and Survey data, Pomme de Terre Reservoir is considered eutrophic, i.e., nutrient rich and highly productive. Whether such nutrient enrichment is to be considered beneficial or deleterious is determined by its actual or potential impact upon designated beneficial water uses of each lake.

Chlorophyll a values ranged from a low of 2.2 µg/l to a high of 20.9 µg/l in the summer with a mean of 11.0 µg/l. Low Secchi disc visibility (mean 127 cm) and high potential for primary productivity, as measured by algal assay control yield, were reported. Of the six Missouri lakes sampled in 1974, one had greater median total phosphorus levels, three had greater median inorganic nitrogen values, and one had greater median dissolved orthophosphorus levels than Pomme de Terre Reservoir.

The Missouri Department of Natural Resources (manuscript) reports that the dissolved oxygen in Pomme de Terre Reservoir often depletes in the hypolimnion during summer stratification, resulting in production of hydrogen sulfide in the lower reaches

*See Appendix E.

of the lake. Survey limnologists reported no problem algal blooms or macrophyte growths during their visits to the lake.

B. Rate-Limiting Nutrient:

Algal assay results indicate that Pomme de Terre Reservoir was limited by available phosphorus levels. Spikes with phosphorus or nitrogen and phosphorus simultaneously resulted in increased assay yields. Addition of nitrogen alone did not stimulate a growth response. The ratios of available nitrogen to orthophosphorus (N/P) in sampled waters further substantiate phosphorus limitation.

C. Nutrient Controllability:

1. Point sources -

Point sources contributed 34.3% of the total phosphorus load to Pomme de Terre Reservoir. The city of Bolivar wastewater treatment plant contributed 23.6% of the total load, and the city of Buffalo contributed 6.7%.

The calculated phosphorus loading of 0.66 g $P/m^2/yr$ to Pomme de Terre Reservoir is about twice the loading proposed by Vollenweider (1975) for an oligotrophic lake and slightly above the eutrophic load. Reduction of phosphorus loading from known point sources would drop loading to below Vollenweider's eutrophic loading and be expected to improve the water quality of Pomme de Terre Reservoir.

2. Nonpoint sources -

The total phosphorus load from nonpoint sources accounted for 65.7% of the load reaching Pomme de Terre Reservoir. The Pomme de Terre River contributed 46.5% while minor tributaries and immediate drainage contributed 4.5% of the total.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS

Lake and drainage basin characteristics are itemized below. Lake morphometric data were provided by the Missouri Clean Water Commission. Tributary flow data were provided by the Missouri 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 the 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: 31.65 km^2.
2. Mean depth: 9.5 meters.
3. Maximum depth: 24.1 meters.
4. Volume: 300.675 x 10^6 m^3.
5. Mean hydraulic retention time: 314 days.

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

1. Tributaries -

Name	Drainage area(km^2)	Mean flow (m^3/sec)
A-2 Pomme de Terre River	714.8	4.97
B-1 Lindley River	297.8	2.60
E-1 Dry Fork Creek	77.7	0.45
Minor tributaries and immediate drainage -	470.8	3.79
Totals	1,561.1	11.81
2. Outlet - A-1 Pomme de Terre River	1,592.8	11.07

C. Precipitation:

1. Year of sampling: 110.8 cm.
2. Mean annual: 99.8 cm.

III. LAKE WATER QUALITY SUMMARY

Pomme de Terre Reservoir was sampled three times during the open-water season of 1974 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from five stations on the lake (Station 05 was sampled only twice) 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 22.9 meters at Station 01, 19.5 meters at Station 02, 9.1 meters at Station 03, 12.2 meters at Station 04, and 3.0 meters at Station 05. 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.

POMME DE TERRE RESERVOIR
STOREY CODE 2902

PHYSICAL AND CHEMICAL CHARACTERISTICS

PARAMETER	(4/ 8/74) S*** = 4 N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	(6/20/74) S*** = 5 N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	(10/ 8/74) S*** = 5 N*	RANGE	MEDIAN	MAX DEPTH RANGE (METERS)
TEMPERATURE (DEG CENT)												
0.-1.5 M DEPTH	8	10.6- 11.7	10.8	0.0- 1.5	10	22.5- 26.4	25.4	0.0- 1.5	10	17.0- 19.0	18.1	0.0- 1.5
MAX DEPTH**	4	10.4- 11.4	10.6	7.6- 22.9	5	13.9- 25.7	20.4	3.0- 19.5	5	17.0- 18.1	17.4	1.5- 19.5
DISSOLVED OXYGEN (MG/L)												
0.-1.5 M DEPTH	4	9.4- 10.0	9.5	1.5- 1.5	10	4.6- 10.4	8.3	0.0- 1.5	10	6.2- 9.2	7.4	0.0- 1.5
MAX DEPTH**	4	9.2- 10.0	9.5	7.6- 22.9	5	0.6- 7.0	1.6	3.0- 19.5	5	3.6- 8.8	7.2	1.5- 19.5
CONDUCTIVITY (UMHOS)												
0.-1.5 M DEPTH	8	10.- 229.	168.	0.0- 1.5	10	247.- 273.	264.	0.0- 1.5	10	201.- 241.	210.	0.0- 1.5
MAX DEPTH**	4	89.- 226.	167.	7.6- 22.9	5	193.- 262.	229.	3.0- 19.5	5	203.- 239.	211.	1.5- 19.5
PH (STANDARD UNITS)												
0.-1.5 M DEPTH	8	7.7- 8.2	7.8	0.0- 1.5	10	8.2- 9.0	8.7	0.0- 1.5	10	7.7- 8.5	8.0	0.0- 1.5
MAX DEPTH**	4	7.7- 8.1	7.8	7.6- 22.9	5	7.3- 8.3	8.0	3.0- 19.5	5	7.7- 8.4	7.8	1.5- 19.5
TOTAL ALKALINITY (MG/L)												
0.-1.5 M DEPTH	8	79.- 140.	99.	0.0- 1.5	10	119.- 137.	123.	0.0- 1.5	10	113.- 148.	126.	0.0- 1.5
MAX DEPTH**	4	76.- 140.	98.	7.6- 22.9	5	105.- 136.	122.	3.0- 19.5	5	120.- 145.	126.	1.5- 19.5
TOTAL P (MG/L)												
0.-1.5 M DEPTH	8	0.052-0.073	0.063	0.0- 1.5	10	0.027-0.081	0.036	0.0- 1.5	10	0.024-0.056	0.033	0.0- 1.5
MAX DEPTH**	4	0.054-0.073	0.063	7.6- 22.9	5	0.023-0.076	0.056	3.0- 19.5	5	0.030-0.063	0.050	1.5- 19.5
DISSOLVED ORTHO P (MG/L)												
0.-1.5 M DEPTH	8	0.013-0.035	0.026	0.0- 1.5	10	0.003-0.026	0.007	0.0- 1.5	10	0.004-0.015	0.006	0.0- 1.5
MAX DEPTH**	4	0.014-0.036	0.023	7.6- 22.9	5	0.003-0.014	0.009	3.0- 19.5	5	0.004-0.014	0.010	1.5- 19.5
NO2+NO3 (MG/L)												
0.-1.5 M DEPTH	8	0.540-0.710	0.680	0.0- 1.5	10	0.020-0.260	0.125	0.0- 1.5	10	0.030-0.170	0.095	0.0- 1.5
MAX DEPTH**	4	0.620-0.710	0.650	7.6- 22.9	5	0.020-0.540	0.330	3.0- 19.5	5	0.030-0.170	0.110	1.5- 19.5
AMMONIA (MG/L)												
0.-1.5 M DEPTH	8	0.050-0.110	0.075	0.0- 1.5	10	0.020-0.150	0.060	0.0- 1.5	10	0.030-0.120	0.095	0.0- 1.5
MAX DEPTH**	4	0.050-0.130	0.085	7.6- 22.9	5	0.020-0.270	0.100	3.0- 19.5	5	0.060-0.360	0.120	1.5- 19.5
KJELDAHL N (MG/L)												
0.-1.5 M DEPTH	8	0.400-0.700	0.550	0.0- 1.5	10	0.500-1.200	0.650	0.0- 1.5	10	0.200-1.000	0.500	0.0- 1.5
MAX DEPTH**	4	0.400-0.600	0.500	7.6- 22.9	5	0.400-0.800	0.600	3.0- 19.5	5	0.300-0.600	0.500	1.5- 19.5
SECCHI DISC (METERS)												
	4	0.5- 0.9	0.6		5	0.4- 2.7	1.8		5	0.6- 2.1	1.2	

* N = NO. OF SAMPLES
** MAXIMUM DEPTH SAMPLED AT EACH SITE
*** S = NO. OF SITES SAMPLED ON THIS DATE

B. Biological Characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera		Algal Units per ml
04/08/74	1.	Melosira	1,524
	2.	Stephanodiscus	1,001
	3.	Cryptomonas	334
	4.	Euglena	333
	5.	Chlamydomonas	238
		Other genera	285
		Total	3,715
06/20/74	1.	Aphanizomenon	887
	2.	Cyclotella	887
	3.	Carteria	493
	4.	Cryptomonas	444
	5.	Chroomonas	394
		Other genera	1,677
		Total	4,782
10/08/74	1.	Melosira	1,233
	2.	Dactylococcopsis	596
	3.	Chroomonas	340
	4.	Crucigenia	256
	5.	Scenedesmus	170
		Other genera	596
		Total	3,191

2. Chlorophyll *a* -

Sampling Date	Station Number	Chlorophyll *a* (µg/l)
04/08/74	01	6.8
	02	6.8
	03	14.2
	04	6.6
	05	----
06/20/74	01	13.2
	02	11.9
	03	2.2
	04	4.5
	05	20.9
10/08/74	01	6.8
	02	5.0
	03	8.3
	04	6.4
	05	18.6

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

a. 04/08/74 - Stations 01-04

Spike(mg/l)	Ortho P Conc.(mg/l)	Inorganic N Conc.(mg/l)	Maximum Yield (mg/l-dry wt.)
Control	0.020	0.645	8.1
0.05 P	0.070	0.645	18.8
0.05 P + 1.0 N	0.070	1.645	21.7
1.00 N	0.020	1.645	8.7

b. 10/08/74 - Stations 01, 04, 05

Control	0.020	0.156	2.1
0.05 P	0.070	0.156	6.1
0.05 P + 1.0 N	0.070	1.156	16.7
1.00 N	0.020	1.156	1.7

c. 10/08/74 - Stations 02, 03

Control	0.033	0.131	1.8
0.05 P	0.083	0.131	4.1
0.05 P + 1.0 N	0.083	1.131	16.2
1.00 N	0.033	1.131	1.6

2. Discussion -

The control yields of the assay alga, Selenastrum capricornutum, indicate that the potentials for primary production at the times of sampling were high on Pomme de Terre Reservoir. Increased growth of the test alga in response to an addition of orthophosphorus indicates that the lake was limited by phosphorus during the spring and fall sampling. Spikes with nitrogen and orthophosphorus simultaneously resulted in maximum yield. The addition of nitrogen alone did not stimulate a growth beyond the control yield.

The N/P ratios in sampled waters of 30/1 in the spring, 16/1 in the summer, and 29/1 in the fall further indicate phosphorus limitation (an 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 Missouri 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 months of May and June 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 Missouri 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 $kg/km^2/yr$, in Dry Creek Fork at Station E-1, and multiplying the means by the ZZ area in km^2.

The operator of the Bolivar wastewater treatment plant provided monthly effluent samples and corresponding flow data. Nutrient loads for the Buffalo, Prairie Height Subdivision, and Quail Creek Mobile Home Park wastewater treatment plants were estimated at 1.134 kg P and 3.401 kg N/Capita/yr.

A. Waste Sources:

1. Known municipal -

Name	Population Served	Treatment	Mean Flow ($m^3/d \times 10^3$)	Receiving Water
Bolivar	5,300	Trickling filter†	2.598	Piper Creek
Buffalo*	1,220	Trickling filter	0.462**	Lindley Creek
Prairie Heights Subdivision***	397	Stabilization pond	0.150**	Mile Branch/ Piper Creek
Quail Creek Mobile Home Park***	333	Stabilization pond	0.126**	Hominy Creek/ Pomme de Terre River

2. Known industrial - None

*U.S.EPA, 1971.
**Estimated at 0.3785 m^3/capita/day.
***Missouri Department of Natural Resources (manuscript).
†Trickling filter first three months, oxidation ditch after that time.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/yr	% of total
a. Tributaries (nonpoint load) -		
A-2 Pomme de Terre River	9,670	46.5
B-1 Lindley River	2,295	11.0
E-1 Dry Fork Creek	175	0.8
b. Minor tributaries and immediate drainage (nonpoint load) -	940	4.5
c. Known municipal STP's -		
Bolivar	4,905	23.6
Buffalo	1,385	6.7
Prairie Heights Subdivision	450	2.2
Quail Creek Mobile Home Park	380	1.8
d. Septic tanks* -	25	0.1
e. Known industrial - None		
f. Direct precipitation** -	555	2.7
Totals	20,780	100.0

2. Output - A-1 Pomme de Terre River 12,680

3. Net annual P accumulation - 8,100

*Estimate based on 50 lakeside residences, 1 park, and 6 camps.
**Estimated (see NES Working Paper No. 175).

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/yr	% of total
a. Tributaries (nonpoint load) -		
A-2 Pomme de Terre River	289,920	47.8
B-1 Lindley River	132,930	21.9
E-1 Dry Fork Creek	18,630	3.1
b. Minor tributaries and immediate drainage (nonpoint load) -	112,990	18.6
c. Known municipal STP's -		
Bolivar	10,775	1.8
Buffalo	4,150	0.7
Prairie Heights Subdivision	1,350	0.2
Quail Creek Mobile Home Park	1,130	0.2
d. Septic tanks* -	990	0.2
e. Known industrial - None		
f. Direct precipitation** -	34,170	5.6
Totals	607,035	100.0

2. Output - A-2 Pomme de Terre River 433,540

3. Net annual N accumulation - 173,495

*Estimate based on 50 lakeside residences, 1 park, and 6 camps.
**Estimated (see NES Working Paper No. 175).

D. Mean Annual Nonpoint Nutrient Export by Subdrainage Area:

Tributary	kg P/km^2/yr	kg N/km^2/yr
Pomme de Terre River	14	406
Lindley River	8	446
Dry Fork Creek	2	240

E Mean Nutrient Concentrations in Ungaged Streams:

Tributary	Mean Total P (mg/l)	Mean Total N (mg/l)
C-1 Ingalls Creek	0.019	1.209
D-1 Piper Creek	0.727	1.767
F-1 Abels Branch	0.038	1.334
G-1 Jordan Creek	0.019	1.137
H-1 Brush Creek	0.021	1.297

Nutrient concentrations in tributary D-1, Piper Creek, appear greatly inflated when compared to the other ungaged tributaries to Pomme de Terre Reservoir. This inflation is probably a result of impaction from the Bolivar and Prairie Heights Subdivision sewage treatment plants upstream.

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 ($g/m^2/yr$)
Estimated loading for Pomme de Terre Reservoir	0.66
Vollenweider's eutrophic loading	0.64
Vollenweider's oligotrophic loading	0.32

V. LITERATURE REVIEWED

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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 MISSOURI 02/24/77

LAKE CODE 2902 POMME DE TERRE RESERVOIR

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 1592.8

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
2902A1	1592.8	9.51	14.22	16.48	16.00	24.92	7.48	9.88	2.75	4.02	7.59	8.64	11.38	11.07
2902A2	714.8	4.08	6.23	8.50	8.78	9.34	4.25	3.96	2.41	3.40	3.31	3.09	2.44	4.97
2902B1	297.8	2.38	2.41	5.35	4.39	4.45	1.73	1.50	0.34	1.30	2.55	2.15	2.63	2.60
2902E1	77.7	0.28	0.51	0.85	0.79	1.02	0.51	0.51	0.12	0.27	0.25	0.17	0.18	0.45
2902ZZ	502.5	3.17	4.45	6.91	6.57	6.97	3.06	2.80	1.36	2.35	2.89	2.55	2.46	3.79

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 1592.8
SUM OF SUB-DRAINAGE AREAS = 1592.8

TOTAL FLOW IN = 141.95
TOTAL FLOW OUT = 132.86

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
2902A1	9	74	12.828	14	29.733				
	10	74	3.171	19	3.115				
	11	74	69.659	9	3.200				
	12	74	18.123	14	29.450				
	1	75	17.698	26	3.540				
	2	75	58.899	22	15.801				
	3	75	69.376	15	69.376				
	4	75	23.588	19	1.444				
	5	75	1.246	3	1.218	17	1.303		
	6	75	3.738	7	1.189	21	2.124		
	7	75	4.021	19	1.444				
	8	75	1.303	23	1.303				
2902A2	9	74	3.115	14	1.699				
	10	74	1.614	19	1.642				
	11	74	19.227	9	10.421				
	12	74	7.646	14	11.213				
	1	75	18.378	26	3.511				
	2	75	27.269	22	110.436				
	3	75	31.715	15	31.149				
	4	75	9.599	19	4.248				
	5	75	6.343	3	8.778				
	6	75	2.577	7	1.416	21	1.133		
	7	75	0.481	19	0.368				
	8	75	1.019	23	0.201				

LAKE CODE 2902 POMME DE TERRE RESERVOIR

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
2902B1	9	74	1.472	15	0.246				
	10	74	0.453	19	0.368				
	11	74	4.644	9	1.671				
	12	74	2.832	14	3.256				
	1	75	7.674	26	1.982				
	2	75	7.277	22	47.572				
	3	75	7.136	15	6.796				
	4	75	2.690	19	1.444				
	5	75	0.793	3	2.010	17	0.283		
	6	75	0.340	7	0.122	21	0.142		
	7	75	0.079	19	0.0				
	8	75	0.481	23	0.0				
2902E1	9	74	0.311	14	0.023				
	10	74	0.042	19	0.057				
	11	74	0.368	9	0.127				
	12	74	0.193	14	0.224				
	1	75	0.906	26	0.229				
	2	75	1.529	22	9.911				
	3	75	1.133	15	1.133				
	4	75	0.481	19	0.255				
	5	75	0.173	3	0.453	17	0.057		
	6	75	0.096	7	0.037	21	0.040		
	7	75	0.025	19	0.003				
	8	75	0.176	23	0.006				
2902ZZ	9	74	2.294						
	10	74	0.991						
	11	74	11.412						
	12	74	5.012						
	1	75	12.686						
	2	75	16.990						
	3	75	18.802						
	4	75	6.003						
	5	75	3.426						
	6	75	1.416						
	7	75	0.283						
	8	75	0.793						

APPENDIX C

PHYSICAL AND CHEMICAL DATA

STORET RETRIEVAL DATE 77/02/24

290201
37 53 50.0 093 18 50.0 3
POMME DE TERRE RESERVOIR
29085 MISSOURI

091491

/TYPA/AMBNT/LAKE

11EPALES 04001002
0081 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 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 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
74/04/08	15 00	0000	10.8		35	168	7.90	130	0.110	0.600	0.690	0.024
	15 00	0005	10.8	9.4		168	7.90	100	0.070	0.500	0.650	0.023
	15 00	0015	10.4	9.6		166	7.80	100	0.100	0.500	0.680	0.024
	15 00	0040	10.4	9.6		166	7.80	98	0.070	0.500	0.640	0.022
	15 00	0075	10.4	9.2		166	7.80	97	0.070	0.400	0.630	0.022
74/06/20	15 10	0000	26.3	10.4	108	250	8.90	120	0.150	1.200	0.140	0.026
	15 10	0005	26.4	10.2		247	8.90	120	0.060	0.500	0.110	0.010
	15 10	0015	25.6	10.4		244	8.90	108	0.050	0.500	0.090	0.007
	15 10	0020	25.3	9.6		242	8.80	108	0.040	0.400	0.090	0.007
	15 10	0025	24.1	3.4		242	7.70	108	0.050	0.400	0.290	0.004
	15 10	0030	21.6	3.0		225	7.60	110	0.060	0.400	0.390	0.014
	15 10	0040	20.4	2.0		228	7.60	110	0.050	0.300	0.560	0.007
	15 10	0045	17.1	0.2		211	7.10	108	0.080	0.400	0.650	0.008
	15 10	0060	13.9	0.6		193	7.30	105	0.020K	0.400	0.540	0.003
74/10/08	15 10	0000	19.0	6.8	84	212	8.05	119	0.090	0.500	0.170	0.007
	15 10	0005	18.9	6.8		208	8.00	116	0.060	0.200K	0.160	0.005
	15 10	0015	18.8	6.4		207	7.95	116	0.070	0.200K	0.150	0.006
	15 10	0025	18.3	6.2		206	7.90	114	0.070	0.200K	0.160	0.005
	15 10	0040	18.3	6.4		206	7.90	115	0.070	0.200K	0.160	0.005
	15 10	0052	18.3	6.2		206	7.90	115	0.060	0.200K	0.160	0.006
	15 10	0064	17.4	3.6		211	7.70	121	0.360	0.600	0.110	0.014

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

290201
37 53 50.0 093 18 50.0 3
POMME DE TERRE RESERVOIR
29085 MISSOURI
091491

/TYPA/AMBNT/LAKE

11EPALES 04001002
00681 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/04/08	15 00	0000	0.057	6.8	
	15 00	0005	0.052		
	15 00	0015	0.051		
	15 00	0040	0.053		
	15 00	0075	0.054		
74/06/20	15 10	0000	0.030	13.2	
	15 10	0001			50.0
	15 10	0005	0.030		
	15 10	0009			1.0
	15 10	0015	0.025		
	15 10	0020	0.027		
	15 10	0025	0.020		
	15 10	0030	0.021		
	15 10	0040	0.022		
	15 10	0045	0.031		
	15 10	0060	0.023		
74/10/08	15 10	0000	0.024	6.8	
	15 10	0005	0.025		
	15 10	0015	0.022		
	15 10	0025	0.027		
	15 10	0040	0.026		
	15 10	0052	0.020		
	15 10	0064	0.055		

STORET RETRIEVAL DATE 77/02/24

290202
37 52 10.0 093 21 29.0 3
POMME DE TERRE RESERVOIR
29065 MISSOURI

091491

/TYPA/AMBNT/LAKE

11EPALES 04001002
0061 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 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 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
74/04/08	15 30	0000	10.6		25	167	7.80	98	0.080	0.600	0.690	0.035
	15 30	0005	10.6	9.4		167	7.80	95	0.110	0.400	0.710	0.034
	15 30	0015	10.6	9.6		167	7.80	93	0.100	0.400	0.710	0.035
	15 30	0035	10.5	9.8		167	7.80	94	0.100	0.400	0.700	0.034
	15 30	0055	10.5	9.2		167	7.80	98	0.100	0.600	0.710	0.036
74/06/21	10 50	0000	24.1	8.2	72	267	8.70	130	0.060	0.600	0.130	0.005
	10 50	0005	24.0	8.4		266	8.70	133	0.040	0.600	0.160	0.003
	10 50	0015	23.1	7.8		261	8.20	129	0.040	0.600	0.160	0.011
	10 50	0040	18.8	0.6		236	7.90	130	0.040	0.500	0.440	0.007
	10 50	0050	15.5	0.2		230	7.80	135	0.300	0.800	0.350	0.014
	10 50	0064	14.6	1.2		223	8.00	136	0.270	0.800	0.360	0.014
74/10/07	15 30	0000	18.3	7.6	84	223	7.73	129	0.030	0.700	0.160	0.006
	15 30	0005	18.2	7.4		221	7.75	129	0.030	0.500	0.160	0.005
	15 30	0015	18.2	7.2		221	7.73	131	0.020	0.400	0.160	0.005
	15 30	0030	18.2	7.2		221	7.71	129	0.040	0.400	0.180	0.006
	15 30	0048	18.1	7.2		221	7.71	132	0.060	0.500	0.170	0.010

STORET RETRIEVAL DATE 77/02/24

290202
37 52 10.0 093 21 29.0 3
POMME DE TERRE RESERVOIR
29095 MISSOURI

091491

/TYPA/AMBNT/LAKE

11EPALES 04001002
0061 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/04/08	15	30 0000	0.073	6.8	
	15	30 0005	0.072		
	15	30 0015	0.072		
	15	30 0035	0.074		
	15	30 0055	0.073		
74/06/21	10	50 0000	0.037	11.9	
	10	50 0001			50.0
	10	50 0005	0.035		
	10	50 0008			1.0
	10	50 0015	0.029		
	10	50 0040	0.041		
	10	50 0050	0.088		
	10	50 0064	0.070		
74/10/07	15	30 0000	0.034	5.0	
	15	30 0005	0.025		
	15	30 0010			1.0
	15	30 0015	0.023		
	15	30 0030	0.026		
	15	30 0048	0.030		

STORET RETRIEVAL DATE 77/02/24

290203
37 48 11.0 093 22 11.0 3
POMME DE TERRE RESERVOIR
29167 MISSOURI

091491

/TYPA/AMBNT/LAKE

11EPALES 04001002
0031 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 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 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
74/04/08	16 05	0000	11.7		25	229	8.20	137	0.070	0.700	0.700	0.014
	16 05	0005	11.5	10.0		229	8.10	140	0.050	0.400	0.670	0.013
	16 05	0015	11.4	10.0		227	8.10	140	0.060	0.500	0.680	0.013
	16 05	0025	11.4	10.0		226	8.10	140	0.050	0.500	0.670	0.014
74/06/21	11 45	0000	23.3	5.2	60	270	8.20	137	0.140	0.800	0.260	0.009
	11 45	0005	22.5	4.6		273	8.20	124	0.120	0.600	0.240	0.008
	11 45	0010	22.2	4.0		262	7.90	123	0.110	0.600	0.260	0.008
	11 45	0015	20.4	1.6		256	8.00	122	0.140	0.600	0.330	0.009
74/10/07	16 00	0000	17.3	7.6	24	239	7.87	148	0.110	1.000	0.070	0.008
	16 00	0005	17.3	7.4		241	7.89	145	0.100	0.600	0.060	0.015
	16 00	0015	17.2	7.4		239	7.87	149	0.120	0.600	0.060	0.008
	16 00	0030	17.0	7.2		239	7.85	145	0.120	0.600	0.050	0.010

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/04/08	16 05	0000	0.053	14.2	
	16 05	0005	0.053		
	16 05	0015	0.048		
	16 05	0025	0.055		
74/06/21	11 45	0000	0.040	2.2	
	11 45	0005	0.046		
	11 45	0008			1.0
	11 45	0010	0.046		
	11 45	0015	0.056		
74/10/07	16 00	0000	0.045	8.3	
	16 00	0001			50.0
	16 00	0005	0.047		1.0
	16 00	0015	0.054		
	16 00	0030	0.063		

STORET RETRIEVAL DATE 77/02/24

290204
37 51 50.0 093 16 40.0 3
POMME DE TERRE RESERVOIR
29085 MISSOURI
091491

/TYPA/AMBNT/LAKE

11EPALES 04001002
0043 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 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 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
74/04/08	16	15 0000	10.9		18	68	7.70	80	0.100	0.700	0.600	0.028
	16	15 0005	10.8	9.6		10	7.70	79	0.060	0.500	0.540	0.028
	16	15 0015	10.8	9.4		70	7.70	79	0.080	0.500	0.570	0.029
	16	15 0035	10.8	9.8		89	7.70	76	0.130	0.500	0.620	0.025
74/06/21	09	25 0000	25.5	10.0	72	252	9.00	119	0.070	0.700	0.120	0.005
	09	25 0005	25.4	10.0		252	9.00	120	0.040	0.600	0.030	0.005
	09	25 0014	24.4	11.4		249	8.90	120	0.050	0.600	0.050	0.005
	09	25 0020	23.5	7.4		246	8.40	120	0.070	0.500	0.080	0.005
	09	25 0023	21.1	6.0		229	7.30	116	0.100	0.400	0.240	0.005
74/10/08	15	55 0000	18.2	6.8	48	201	8.20	114	0.100	0.300	0.100	0.007
	15	55 0005	18.1	6.2		201	8.00	113	0.120	0.300	0.090	0.007
	15	55 0015	18.1	6.4		202	7.95	113	0.120	0.200	0.090	0.007
	15	55 0027	18.0	6.4		202	7.90	115	0.140	0.200	0.080	0.008
	15	55 0040	17.9	6.4		203	7.90	120	0.230	0.500	0.120	0.006

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/04/08	16	15 0000	0.073	6.6	
	16	15 0005	0.070		
	16	15 0015	0.069		
	16	15 0035	0.071		
74/06/21	09	25 0000	0.027	4.5	
	09	25 0003			50.0
	09	25 0005	0.031		
	09	25 0014	0.036		1.0
	09	25 0020	0.026		
	09	25 0023	0.025		
74/10/08	15	55 0000	0.030	6.4	
	15	55 0003			50.0
	15	55 0005	0.033		
	15	55 0008			5.0
	15	55 0015	0.034		
	15	55 0017			1.0
	15	55 0027	0.038		
	15	55 0040	0.050		

STORET RETRIEVAL DATE 77/02/24

290205
37 49 55.0 093 16 33.0 3
POMME DE TERRE RESERVOIR
29085 MISSOURI

091491

/TYPA/AMBNT/LAKE

11EPALES 04001002
0014 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 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 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
74/06/21	10 02	0000	26.2	7.6	16	265	8.50	125	0.050	1.000	0.060	0.006
	10 02	0005	25.9	7.4		262	8.50	122	0.020	0.800	0.020	0.016
	10 02	0010	25.7	7.0		262	8.30	124	0.040	0.600	0.020	0.009
74/10/08	16 45	0000	17.6	9.2	30	206	8.50	125	0.100	0.500	0.040	0.005
	16 45	0005	17.0	8.8		204	8.40	126	0.070	0.300	0.030	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
74/06/21	10 02	0000	0.081	20.9	
	10 02	0005	0.071		1.0
	10 02	0010	0.076		
74/10/08	16 45	0000	0.056	18.6	
	16 45	0001			50.0
	16 45	0004			5.0
	16 45	0005	0.050		
	16 45	0008			1.0

APPENDIX D

TRIBUTARY AND WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 77/02/24

2902A1
37 55 05.0 093 19 45.0 4
POMME DE TERRE RIVER
29 15 HERMITAGE
O/POMME DE TERRE RES 091491
BRDG 1.5 MI BELOW POMME DE TERRE DAM
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

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
74/09/14	11	30	0.048	2.000	0.450	0.055	0.115
74/10/19	11	25	0.176	1.200	0.035	0.005	0.020
74/11/09	09	35	0.208	0.700	0.055	0.005	0.010
74/12/14	11	15	0.272	0.900	0.020	0.010	0.030
75/02/22	11	00	0.008	1.000	0.008K	0.016	0.030
75/03/15	11	50	0.480	1.400	0.032	0.024	0.060
75/04/19	11	15	0.410	1.800	0.080	0.010	0.050
75/05/03	10	45	0.200	0.450	0.015	0.005K	0.025
75/05/17	11	35	0.220	0.500	0.040	0.005K	0.010
75/06/07	12	00	0.140	1.550	0.280	0.010	0.050
75/06/21	12	00	0.105	0.500	0.050	0.005	0.035
75/07/19	12	00	0.065	0.350	0.035	0.005K	0.020
75/08/23	12	30	0.020	0.550	0.015	0.005	0.050

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

2902A2
37 40 57.0 093 22 14.0 4
POMME DE TERRE RIVER
29 7.5 POLK
T/POMME DE TERRE RES 091491
JEFFERSON BRDG ON HWY D 7.1 M NE BOLIVAR
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

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
74/09/14	14	13	0.136	0.900	0.010	0.010	0.035
74/10/19	13	15	0.096	0.900	0.085	0.025	0.050
74/11/09	10	25	1.120	1.100	0.345	0.025	0.030
74/12/14	11	10	0.736	1.700	0.015	0.010	0.030
75/01/26	11	00	0.256	1.070	0.048	0.005	0.010
	13	30	0.570	0.930	0.024	0.005	0.010K
75/02/22	11	20	0.490		0.080	0.072	
75/03/15	12	40	0.900	0.900	0.056	0.016	0.040
75/04/19	11	15	0.230	1.900	0.070	0.005K	0.020
75/05/03	11	15	1.720	0.550	0.075	0.350	0.350
75/05/17	13	20	0.195	0.500	0.080	0.005	0.020
75/06/07	11	30	0.240	2.200	0.080	0.035	0.070
75/06/21	12	30	0.470	0.700	0.178	0.050	0.110
75/07/19	11	30	0.010	0.650	0.025	0.015	0.040
75/08/23	13	45	0.030	1.300	0.015	0.015	0.110

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

2902B1
37 45 25.0 093 17 10.0 4
LINDLEY RIVER
29 15 HERMITAGE
T/POMME DE TERRE RES 091491
BRDG ON HWY 64 3.4 MI SE OF SENTINEL
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

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
74/09/15	10	30	0.100	1.100	0.010	0.020	0.040
74/10/19	13	30	0.032	1.100	0.025	0.045	0.080
74/11/09	10	30	0.810	0.700	0.080	0.035	0.040
74/12/14	11	25	0.720	0.900	0.020	0.025	0.050
75/01/26	11	00	0.504	0.600	0.016	0.025	0.030
75/02/22	11	04	0.384		0.072	0.080	
75/03/15	12	45	0.248	0.400	0.072	0.008K	0.010
75/04/19	11	30	0.020	0.700	0.045	0.010	0.030
75/05/03	10	15	0.140	0.450	0.030	0.020	0.040
75/05/17	10	00	0.090	1.900	0.210	0.010	0.040
75/06/07	11	00	0.165	3.900	0.095	0.035	0.060
75/06/21	13	30	0.300	0.750	0.130	0.055	0.100
75/07/19	14	00	0.010	1.150	0.060	0.010	0.050
75/08/23	14	15	0.115	2.300	0.055	0.040	0.280

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

2902C1
37 47 23.0 093 14 45.0 4
INGALLS CREEK
29 7.5 URBANA
T/POMME DE TERRE RES 091491
BRDG ON HWY AC .2 MI E OF HUCKABY
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

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
74/09/15	11	05	0.040	1.100	0.010	0.010	0.015
74/10/19	11	00	0.016	0.850	0.015	0.010	0.012
74/11/09	10	00	0.384	1.100	0.150	0.010	0.010
74/12/14	11	40	0.336	1.300	0.025	0.010	0.010
75/01/26	11	30	0.112	0.700	0.016	0.005	0.010K
75/02/22	11	15	0.320	1.900	0.040		
75/03/15	12	30	0.240	0.450	0.016	0.008K	0.010
75/04/19	11	45	0.015	1.050	0.025	0.005K	0.010K
75/05/03	10	30	0.020	1.800	0.220	0.010	0.030
75/05/17	10	50	0.045	0.950	0.330	0.006	0.010
75/06/07	11	15	0.035	2.800	0.250	0.010	0.030
75/06/21	14	00	0.060	0.300	0.015	0.010	0.020
75/07/19	14	10	0.010	0.700	0.085	0.005	0.020
75/08/23	13	45	0.015	0.700	0.025	0.015	0.040

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

290201
37 40 10.0 093 23 56.0 4
PIPER CREEK
29 7.5 CLIQUOT
T/POMME DE TERRE RES 091491
BRDG ON DIRT RD 5.2 MI N OF BOLIVAR
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

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
74/09/14	14 00		1.920	1.500	0.100	0.375	0.390
74/10/19	13 00		1.120	0.800	0.180	0.750	0.820
74/11/09	10 00		1.840	1.000	0.260	0.145	0.150
74/12/14	11 50		1.600	1.000	0.040	0.070	0.110
75/01/26	13 15		1.465	1.300	0.168	0.213	0.260
75/02/22	11 40		0.480	3.200	0.104		0.670
75/03/15	12 20		1.720	1.100	0.072	0.096	0.150
75/04/19	13 00		1.500	1.350	0.025	0.490	0.500
75/05/03	11 30		0.095	0.700	0.050	0.005	0.020
75/05/17	13 00		1.570	0.850	0.050	0.560	0.560
75/06/07	12 00		2.300	1.150	0.080	0.960	0.960
75/06/21	12 50		2.100	0.550	0.095	0.640	0.690
75/07/19	13 45		4.300	1.350	0.030	2.300	2.400
75/08/23	14 00		5.600	7.600	0.060	2.500	2.500

STORET RETRIEVAL DATE 77/02/24

2902E1
37 44 35.0 093 26 30.0 4
DRY FORK CREEK
29 7.5 CLIQUOT
T/POMME DE TERRE RES 091491
ST HWY 83 BRDG 2.5 MI S OF RONDO
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

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
74/09/14	12	15	0.012	0.500	0.015	0.005K	0.020
74/10/19	12	15	0.016	0.700	0.045	0.010	0.010
74/11/09	10	20	0.352	1.100	0.315	0.010	0.010
74/12/14	12	00	0.280	2.200	0.005K	0.005	0.020
75/01/26	11	45	0.112	0.300	0.015	0.009	0.010K
75/02/22	11	45	0.304	1.900	0.048		
75/03/15	12	25	0.190	0.900	0.024	0.008K	0.020
75/04/19	12	30	0.017	0.750	0.050	0.005K	0.010K
75/05/03	11	30	0.015	0.500	0.050	0.005K	0.010K
75/05/17	12	30	0.015	1.150	0.220	0.005K	0.010K
75/06/07	12	30	0.010	1.900	0.270	0.010	0.030
75/06/21	13	00	1.200	0.700	0.195	0.050	0.050
75/07/19	12	30	0.005	0.450	0.025	0.005	0.050
75/08/23	13	00	0.010	1.130	0.020	0.010	0.060

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

2902F1
37 41 07.0 093 25 22.0 4
ABELS BRANCH
29 7.5 CLIQUOT
T/POMME DE TERRE RES 091491
BRDG ON DIRT RD 5.3 MI N OF BOLIVAR
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

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
74/09/14	12	45	1.680	0.500	0.025	0.015	0.015
74/10/19	12	25	0.368	0.800	0.165	0.015	0.020
74/11/09	10	40	2.400	0.600	0.190	0.025	0.025
74/12/14			1.920	0.800	0.020	0.015	0.020
75/01/26	14	15	1.520	0.500	0.032	0.007	0.010K
75/02/22	12	05	0.528	3.700	0.080		
75/03/15	12	55	1.450	1.100	0.088	0.016	0.030
75/04/19	13	00	1.450	1.950	0.055	0.010	0.020
75/05/03	11	55	0.800	2.000	0.155	0.045	0.060
75/05/17	12	45	0.750	1.000	0.165	0.015	0.020
75/06/07	12	45	0.240	2.100	0.315	0.045	0.080
75/06/21	13	00	0.030	0.550	0.140	0.005	0.030
75/07/19	12	45	0.150	0.625	0.070	0.020	0.030
75/08/23	13	30	0.025	0.900	0.050	0.035	0.100

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

2902G1
37 44 15.0 093 13 25.0 4
JORDAN CREEK
29 7.5 BUFFALO NW
T/POMME DE TERRE RES 091491
SEC RD BRDG 1.3 MI N JCT WITH HWY P
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

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
74/09/14	10 00		0.052	1.100	0.020	0.010	0.010
74/10/19	12 30		0.048	0.700	0.105	0.010	0.015
74/11/09	09 30		0.590	1.050	0.445	0.017	0.020
74/12/14	11 00		0.528	1.200	0.020	0.015	0.030
75/01/26	12 00		0.325	1.000	0.016	0.005K	0.010
75/02/22	11 30		0.336	1.300	0.040		
75/03/15	12 00		0.410	1.900	0.048	0.008	0.030
75/04/19	11 00		0.155	1.200	0.035	0.005K	0.010K
75/05/03	09 45		0.100	0.850	0.170	0.010	0.010
75/05/17	10 30		0.090	0.875	0.200	0.005	0.015
75/06/07	10 20		0.055	1.000	0.070	0.010	0.030
75/06/21	13 15		0.065	0.300	0.075	0.010	0.020

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

2902H1
37 42 10.0 093 13 50.0 4
BRUSH CREEK
29 7.5 BUFFALO NW
T/POMME DE TERRE RES 091491
AT CO HWY DD BRDG
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

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
74/09/14	14 50		0.152	1.100	0.015	0.005	0.010
74/10/19	13 40		0.040	1.100	0.080	0.005	0.015
74/11/09	10 45		0.810	1.200	0.345	0.015	0.020
74/12/14	11 25		0.570	1.400	0.020	0.010	0.020
75/01/26	14 00		0.272	0.500	0.016	0.009	0.010
75/02/22	11 00		0.320	2.300	0.064		
75/03/15	13 10		0.470	0.900	0.072	0.008K	0.020
75/04/19	11 45		0.075	1.800	0.035	0.005K	0.020
75/05/03	13 00		0.060	0.500	0.035	0.005	0.010
75/05/17	13 50		0.055	0.700	0.050	0.005K	0.020
75/06/07	11 00		0.025	2.100	0.100	0.005	0.020
75/06/21	13 30		0.065	0.800	0.030	0.010	0.020
75/07/19	13 00		0.020	0.850	0.050	0.010	0.030
75/08/23	13 00		0.060	1.850	0.150	0.010	0.060

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

2902DA TF2902DA P005300
37 36 50.0 093 23 40.0 4
BOLIVAR
29 7.5 BOLIVAR
T/POMME DE TERRE RES. 091491
PIPER CREEK
11EPALES 00001004
0000 FEET DEPTH CLASS 00

/AMBNT/STREAM

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
74/12/10	00	00							
CP(T)-			0.960	12.500	0.310	2.400	4.250	1.060	0.828
74/12/10	24	00							
75/01/15	00	00							
CP(T)-			1.360	2.000	0.365	2.700	4.200	0.675	0.700
75/01/15	24	00							
75/02/12	11	30							
CP(T)-			1.440	1.400	0.370	2.350	2.600	0.820	0.780
75/02/13	11	30							
75/03/05	09	30							
CP(T)-			4.640	4.600	0.080K	2.200	3.000	1.200	0.950
75/03/06	09	30							
75/04/08	09	00							
CP(T)-			1.440	2.090	0.260		4.700	0.900	0.915
75/04/09	09	00							
75/05/08	09	00							
CP(T)-			3.700	2.400	0.050K	6.520	6.700	0.670	0.643
75/05/09	09	00							
75/06/03	10	00							
CP(T)-			21.000	1.500	0.082	8.700	9.000	0.622	0.592
75/06/04	09	00							
75/08/05	10	00							
CP(T)-			21.000	2.300	0.050K	8.400	8.400	0.515	0.500
75/08/06	10	00							
75/09/04	10	30							
CP(T)-			6.000	7.300	0.025	6.900	7.200	0.590	0.588
75/09/05	10	30							
75/10/09	00	00							
CP(T)-			13.000	3.000	0.075	4.350	4.450	0.563	0.575
75/10/09	24	00							
75/11/04	10	30							
CP(T)-			22.000	2.500	0.025K	8.800	8.900	0.557	0.575
75/11/05	10	30							
75/12/04	10	00							
CP(T)-			12.600	1.700	0.025K	4.600	5.100	0.700	0.550
75/12/04	10	00							

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

2902DA TF2902DA P005300
37 36 50.0 093 23 40.0 4
BOLIVAR
29 7.5 BOLIVAR
T/POMME DE TERRE RES. 091491
PIPER CREEK
11EPALES 00001004
0000 FEET DEPTH CLASS 00

/AMBNT/STREAM

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
75/12/30	10 00								
CP(T)-			5.400	0.750	0.050	5.300	3.200	0.575	0.728
75/12/31	10 00								

APPENDIX E

PARAMETRIC RANKINGS OF LAKES SAMPLED BY NES IN 1974

STATE OF MISSOURI

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
2901	CLEARWATER LAKE	0.017	0.150	445.000	3.567	10.400	0.004
2902	POMME DE TERRE RESERVOIR	0.043	0.275	449.926	9.443	14.800	0.008
2903	STOCKTON RESERVOIR	0.022	0.670	428.800	8.973	15.000	0.006
2904	LAKE TANEYCOMO	0.023	0.530	420.250	9.825	11.200	0.007
2905	THOMAS HILL RESERVOIR	0.082	1.040	487.889	5.787	11.200	0.011
2906	WAPPAPELLO RESERVOIR	0.033	0.105	459.667	9.642	11.000	0.004

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
2901	CLEARWATER LAKE	100 (5)	80 (4)	60 (3)	100 (5)	100 (5)	80 (4)
2902	POMME DE TERRE RESERVOIR	20 (1)	60 (3)	40 (2)	40 (2)	20 (1)	20 (1)
2903	STOCKTON RESERVOIR	80 (4)	20 (1)	80 (4)	60 (3)	0 (0)	60 (3)
2904	LAKE TANEYCOMO	60 (3)	40 (2)	100 (5)	0 (0)	50 (2)	40 (2)
2905	THOMAS HILL RESERVOIR	0 (0)	0 (0)	0 (0)	80 (4)	50 (2)	0 (0)
2906	WAPPAPELLO RESERVOIR	40 (2)	100 (5)	20 (1)	20 (1)	80 (4)	90 (4)