

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY**

WORKING PAPER SERIES



REPORT
ON
STOCKTON RESERVOIR
DADE, POLK, AND CEDAR COUNTIES
MISSOURI
EPA REGION VII
WORKING PAPER No. 549

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

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WITH THE COOPERATION OF THE
MISSOURI DEPARTMENT OF NATURAL RESOURCES
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REPORT ON STOCKTON RESERVOIR
DADE, POLK, AND CEDAR 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. 549

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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 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 MISSOURILAKE NAMECOUNTY

Clearwater Lake

Reynolds

Pomme de Terre Reservoir

Polk, Hickory

Stockton Reservoir

Dade, Polk, Cedar

Lake Taneycomo

Taney

Thomas Hill Reservoir

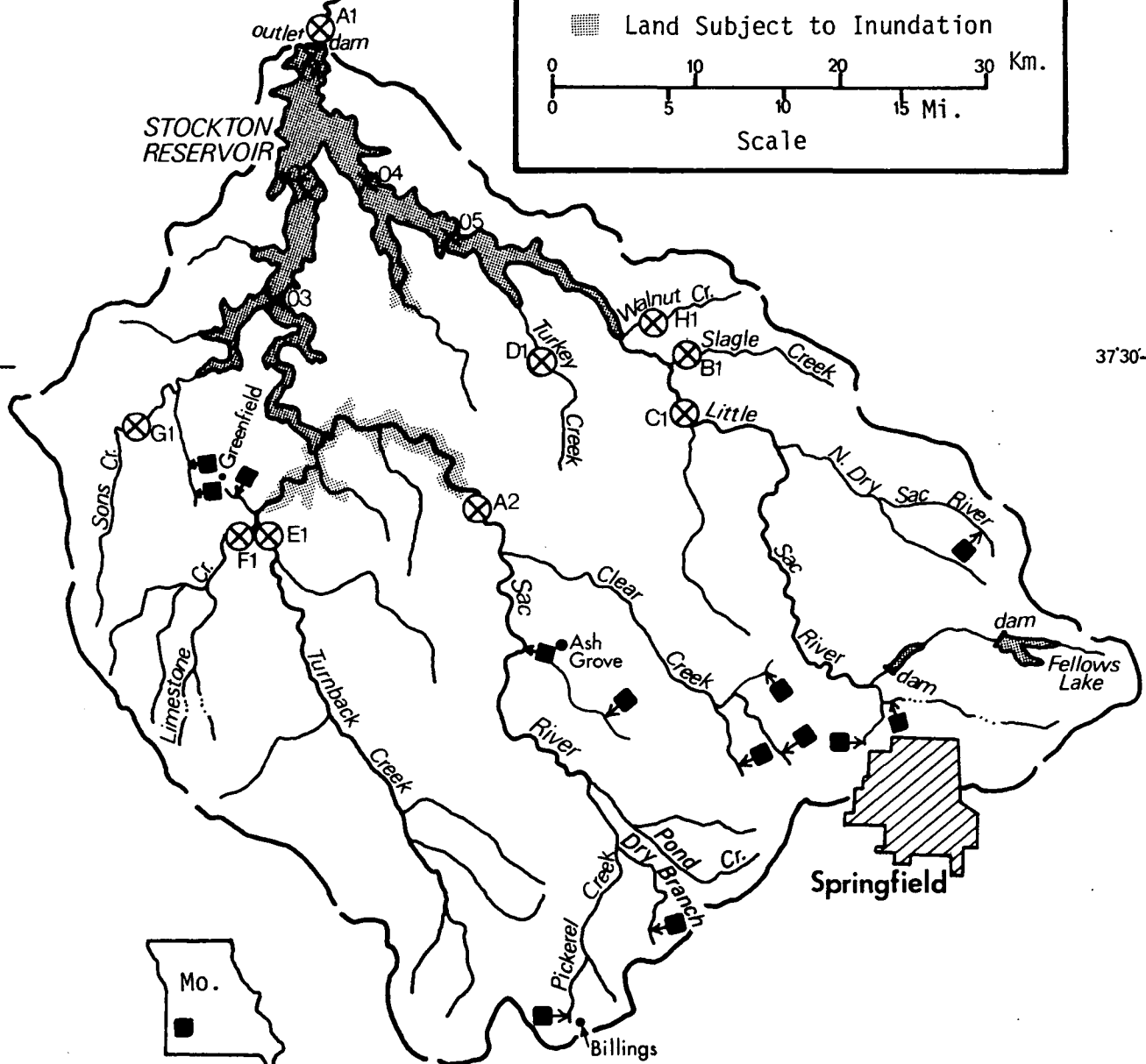
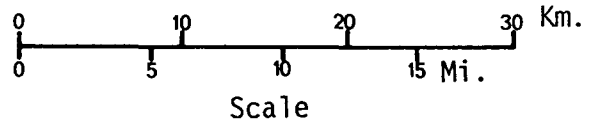
Macon, Randolph

Lake Wappapello

Wayne, Butler

STOCKTON RESERVOIR

- ⊗ Tributary Sampling Site
- × Lake Sampling Site
- Sewage Treatment Facility
- Drainage Area Boundary
- ▨ Land Subject to Inundation



Map Location

REPORT ON STOCKTON RESERVOIR, MISSOURI

STORET NO. 2903

I. CONCLUSIONS

A. Trophic Condition:*

Based upon field observations and Survey data, Stockton Reservoir is considered early eutrophic. Chlorophyll a values ranged from a low of 1.3 $\mu\text{g/l}$ in the summer to a high of 29.2 $\mu\text{g/l}$ in the spring with a mean of 9.0 $\mu\text{g/l}$. Low Secchi disc visibility (mean of 180 cm) and low potential for primary productivity as measured by algal assay control yield were reported. There were oxygen depletion and hydrogen sulfide production noted at Stations 03 and 04 during the summer sampling season and at Station 04 during the fall. Of the six Missouri lakes sampled in 1974, four had greater median total phosphorus levels, one had greater median inorganic nitrogen values, and three had greater median dissolved orthophosphorus levels than Stockton Reservoir. It should be noted that although phosphorus levels in the lake were similar throughout the seasons, the spring chlorophyll a values observed were an order of magnitude higher than summer values and approximately 4-5 times those observed in the fall. This same spring phenomenon can be observed in the algal counts for the similar centric diatom-based communities found in the lake all three sampling dates.

*See Appendix E.

Survey limnologists reported no problem conditions in the lake during the sampling year.

B. Rate-Limiting Nutrient:

Algal assay results indicate that Stockton 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 substantiate phosphorus limitation.

C. Nutrient Controllability:

1. Point sources -

Point sources were estimated to contribute 42.0% of the total phosphorus load to Stockton Reservoir during the sampling year. The Springfield Northwest wastewater treatment plant contributed 25.6% of the total load and the city of Ash Grove contributed 7.7%. The remaining 12 plants were estimated to contribute 8.7% of the phosphorus load. There are a number of small private facilities and four industrial plants (Kerr-McGee Chemical Corporation; Conco Quarries, Inc.; Greismer Stone Company; Advanced Circuiting - a Division of Litton Inc.) which are not included in the nutrient budgets for Stockton Reservoir (Missouri Department of Natural Resources, manuscript). It is not known at this time how much these unmeasured sources contributed to nutrient loadings in the reservoir.

The calculated phosphorus loading of $0.49 \text{ g P/m}^2/\text{yr}$ to Stockton Reservoir is twice the loading proposed by Vollenweider (1975) for an oligotrophic lake, and less than Vollenweider's eutrophic loading figure. However, spring chlorophyll a values in the lake ($9.7 - 29.2 \text{ } \mu\text{g/l}$) as well as excessively high spring algal counts indicate a much higher biological response to existing nutrient levels than would typically be expected. In light of this demonstrated increase in spring lake productivity it would be desirable to substantially reduce phosphorus contributions from known point sources in order to improve lake water quality and decrease the likelihood of problem algal blooms or macrophyte growths in the reservoir.

2. Nonpoint sources -

The total phosphorus load from nonpoint sources accounted for 58.0% of the total load reaching Stockton Reservoir. Measured tributaries contributed 23.2%, while ungaged drainage areas were estimated to have contributed 31.2%.

The phosphorus export rates of the three gaged tributaries to Stockton Reservoir (range of $2 \text{ to } 13 \text{ kg P/km}^2/\text{yr}$, mean of $7 \text{ kg/km}^2/\text{yr}$) were comparable to the rates of the gaged tributaries surveyed in nearby Pomme de Terre Reservoir* (see Section IV-D).

*Working Paper No. 548

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: 100.77 km².
2. Mean depth: 7.3 meters.
3. Maximum depth: >30.5 meters.
4. Volume: 735.621 x 10⁶ m³.
5. Mean hydraulic retention time: 386 days (1.06 yrs).

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 Sac River	587.9	4.39
C-1 Little Sac River	606.1	4.64
E-1 Turnback Creek	525.8	3.88
Minor tributaries and immediate drainage -	<u>1,183.8</u>	<u>9.74</u>
Totals	2,903.6	22.65
2. Outlet - A-1 Sac River	3,004.4	21.97

C. Precipitation:

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

III. LAKE WATER QUALITY SUMMARY

Stockton 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 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 30.5 meters at Station 01, 24.4 meters at Station 02, 20.7 meters at Station 03, 22.9 meters at Station 04, and 16.8 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.

STOCKTON RESERVOIR
STATION CODE 2903

PHYSICAL AND CHEMICAL CHARACTERISTICS

PARAMETER	N*	(4/ 8/74)				N*	(6/24/74)				N*	(10/ 8/74)			
		RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	*** S		RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	*** S		RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	*** S
TEMPERATURE (DEG CENT)															
0.-1.5 M DEPTH	10	9.7- 10.5	9.9	0.0- 1.5	10	22.2- 24.5	22.6	0.0- 1.5	9	17.8- 18.2	18.1	0.0- 1.5			
MAX DEPTH**	5	9.8- 10.3	9.9	16.8- 30.5	5	13.4- 21.3	17.9	16.5- 27.4	5	15.0- 18.1	17.7	13.7- 25.9			
DISSOLVED OXYGEN (MG/L)															
0.-1.5 M DEPTH	5	10.4- 11.2	10.8	1.5- 1.5	10	7.0- 8.6	7.4	0.0- 1.5	9	5.8- 7.6	6.4	0.0- 1.5			
MAX DEPTH**	5	10.6- 10.8	10.8	16.8- 30.5	5	0.2- 4.4	0.6	16.5- 27.4	5	0.0- 7.0	5.8	13.7- 25.9			
CONDUCTIVITY (UMHOS)															
0.-1.5 M DEPTH	10	205.- 210.	209.	0.0- 1.5	10	288.- 294.	290.	0.0- 1.5	9	222.- 307.	227.	0.0- 1.5			
MAX DEPTH**	5	206.- 210.	209.	16.8- 30.5	5	262.- 304.	288.	16.5- 27.4	5	224.- 279.	229.	13.7- 25.9			
PH (STANDARD UNITS)															
0.-1.5 M DEPTH	10	8.3- 8.4	8.3	0.0- 1.5	10	8.2- 8.6	8.3	0.0- 1.5	9	7.9- 8.1	7.9	0.0- 1.5			
MAX DEPTH**	5	8.3- 8.3	8.3	16.8- 30.5	5	7.5- 8.0	7.9	16.5- 27.4	5	7.5- 8.0	7.9	13.7- 25.9			
TOTAL ALKALINITY (MG/L)															
0.-1.5 M DEPTH	10	130.- 134.	132.	0.0- 1.5	10	129.- 135.	132.	0.0- 1.5	9	122.- 131.	130.	0.0- 1.5			
MAX DEPTH**	5	130.- 135.	134.	16.8- 30.5	5	131.- 160.	150.	16.5- 27.4	5	121.- 174.	129.	13.7- 25.9			
TOTAL P (MG/L)															
0.-1.5 M DEPTH	10	0.018-0.036	0.027	0.0- 1.5	10	0.014-0.024	0.020	0.0- 1.5	9	0.014-0.034	0.019	0.0- 1.5			
MAX DEPTH**	5	0.020-0.047	0.029	16.8- 30.5	5	0.019-0.068	0.043	16.5- 27.4	5	0.014-0.206	0.038	13.7- 25.9			
DISSOLVED ORTHO P (MG/L)															
0.-1.5 M DEPTH	10	0.004-0.006	0.005	0.0- 1.5	7	0.006-0.017	0.010	0.0- 1.5	9	0.003-0.007	0.004	0.0- 1.5			
MAX DEPTH**	5	0.004-0.011	0.006	16.8- 30.5	5	0.012-0.042	0.023	16.5- 27.4	5	0.004-0.015	0.006	13.7- 25.9			
NO2+NO3 (MG/L)															
0.-1.5 M DEPTH	10	0.620-0.930	0.725	0.0- 1.5	10	0.480-0.610	0.575	0.0- 1.5	9	0.210-0.350	0.270	0.0- 1.5			
MAX DEPTH**	5	0.650-0.880	0.700	16.8- 30.5	5	0.340-0.970	0.500	16.5- 27.4	5	0.020-0.310	0.270	13.7- 25.9			
AMMONIA (MG/L)															
0.-1.5 M DEPTH	10	0.030-0.060	0.040	0.0- 1.5	10	0.050-0.100	0.065	0.0- 1.5	9	0.060-0.100	0.080	0.0- 1.5			
MAX DEPTH**	5	0.030-0.060	0.050	16.8- 30.5	5	0.070-0.680	0.480	16.5- 27.4	5	0.050-1.980	0.080	13.7- 25.9			
KJELDAHL N (MG/L)															
0.-1.5 M DEPTH	10	0.300-0.600	0.400	0.0- 1.5	10	0.300-0.600	0.400	0.0- 1.5	9	0.200-0.600	0.300	0.0- 1.5			
MAX DEPTH**	5	0.300-0.500	0.400	16.8- 30.5	5	0.300-1.100	0.800	16.5- 27.4	5	0.200-2.900	0.400	13.7- 25.9			
SECCHI DISC (METERS)															
	5	0.9- 1.7	1.3			5	1.8- 2.7	2.7				5	1.2- 2.0	1.8	

* 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>
04/08/74	1. <u>Melosira</u>	16,515
	2. <u>Stephanodiscus</u>	3,398
	3. <u>Chroomonas</u>	430
	4. <u>Ankistrodesmus</u>	387
	5. <u>Cryptomonas</u>	258
	Other genera	<u>688</u>
	Total	21,676
06/24/74	1. <u>Fragilaria</u>	599
	2. <u>Melosira</u>	436
	3. <u>Chroomonas</u>	381
	4. <u>Cryptomonas</u>	381
	5. <u>Tetraedron</u>	163
	Other genera	<u>328</u>
	Total	2,288
10/08/74	1. <u>Melosira</u>	879
	2. <u>Dactylococcopsis</u>	778
	3. <u>Chroomonas</u>	744
	4. <u>Stephanodiscus</u>	271
	5. <u>Cryptomonas</u>	237
	Other genera	<u>779</u>
	Total	3,688

2. Chlorophyll a -

<u>Sampling Date</u>	<u>Station Number</u>	<u>Chlorophyll <u>a</u> (μg/l)</u>
04/08/74	01	9.7
	02	25.8
	03	29.2
	04	13.0
	05	21.8
06/24/74	01	2.7
	02	1.5
	03	1.3
	04	1.3
	05	3.0
10/08/74	01	4.1
	02	4.4
	03	6.5
	04	3.2
	05	7.2

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

a. 04/08/74 - Stations 01-03

<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	0.663	0.1
0.05 P	0.055	0.663	1.6
0.05 P + 1.0 N	0.055	1.663	2.3
1.00 N	0.005	1.663	0.1

b. 04/08/74 - Stations 04-05

Control	0.005	0.606	1.2
0.05 P	0.055	0.606	15.4
0.05 P + 1.0 N	0.055	1.606	27.6
1.00 N	0.005	1.606	1.8

c. 10/08/74 - Stations 01-03

Control	0.005	0.290	0.3
0.05 P	0.055	0.290	1.8
0.05 P + 1.0 N	0.055	1.290	10.8
1.00 N	0.005	1.290	0.1

d. 10/08/74 - Stations 04-05

Control	0.005	0.395	0.3
0.05 P	0.055	0.395	6.7
0.05 P + 1.0 N	0.055	1.395	5.2
1.00 N	0.005	1.395	0.3

2. Discussion -

The control yields of the assay alga, Selenastrum capricornutum, indicate that the potential for primary production in Stockton Reservoir was low at the times of sampling except at Stations 04 and 05 during the spring, when it was high. Increased growth of the test alga in response to an addition of orthophosphorus indicates that the lake was limited by phosphorus during both the spring and fall. Spikes with nitrogen and orthophosphorus simultaneously generally resulted in maximum yield. Additions of nitrogen alone did not stimulate growth significantly beyond the control yields.

The N/P ratios in the lake samples were 157/1 in the spring, 54/1 in the summer, and 75/1 in the fall, further indicating 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 $\text{kg}/\text{km}^2/\text{yr}$, in Turnback Creek, at Station E-1, and multiplying the means by the ZZ area in km^2 .

The operators of the Ash Grove, Springfield Northwest, and Greenfield (three plants) wastewater treatment plants provided monthly effluent samples and corresponding flow data. Nutrient loads for the Ash Grove and Willard High Schools were estimated

at 0.567 kg P and 1.701 kg N/Capita/yr (180 days). Nutrient loads for the Republic, Billings, and the remaining small private wastewater treatment plants were estimated at 1.134 kg P and 3.401 kg N/Capita/yr.

A. Waste Sources:

1. Known municipal -

<u>Name</u>	<u>Population Served*</u>	<u>Treatment*</u>	<u>Mean Flow (m³/d x 10³)</u>	<u>Receiving Water</u>
Ash Grove	1,100	Trickling filter	0.725	Sac River
Springfield Northwest	20,000	Activated sludge	8.732	Little Sac River
Greenfield Southwest	50	Stabilization pond	0.116	Whetzel Branch/Sons Creek
Greenfield Northwest	150	Stabilization pond	0.107	Whetzel Branch/Sons Creek
Greenfield Southeast	850	Stabilization pond	0.071	Wilson Branch/Turnback Creek
Republic Lagoon B***	1,000	Stabilization pond	0.378**	Branch of Pickerel Creek/Sac River
Springfield Municipal Airport†	300	Sand filter	0.114**	Clear Creek
Billings†	760	Stabilization pond	0.288**	Pickerel Creek/Sac River
Lakewood Mobile Home Park†	245	Extended aeration	0.093**	Little Sac River
Springfield "44" Auto Truck Stop Inc.	294	Extended aeration	0.111**	North Dry Sac River
Willard R-2 High School	141	Stabilization pond	0.053**	Losing Stream/Clear Creek
Chalet City	450	Extended aeration	0.170**	Branch of Pond Creek/Sac River
Sunshine Acres Nursing Home	240	Stabilization pond	0.091**	Clear Creek
Ash Grove R-4 School	103	Stabilization pond	0.039**	Sac River

2. Known industrial - See discussion, page 2.

*Treatment plant questionnaires.

**Estimated at 0.3785 m³/capita/day.

***U.S.EPA, 1971.

†Missouri Department of Natural Resources (manuscript).

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 Sac River	930	1.9
C-1 Little Sac River	3,810	7.7
E-1 Turnback Creek	6,695	13.6
b. Minor tributaries and immediate drainage (nonpoint load) -	15,390	31.2
c. Known municipal STP's -		
Ash Grove	3,815	7.7
Springfield Northwest	12,630	25.6
Greenfield Southwest	280	0.6
Greenfield Northwest	30	0.1
Greenfield Southeast	75	0.1
Republic Lagoon B	1,135	2.3
Springfield Municipal Airport	340	0.7
Billings	860	1.7
Lakewood Mobile Home Park	280	0.6
Springfield "44" Auto Truck Stop Inc.	335	0.7
Willard R-2 High School	80	0.2
Chalet City	510	1.0
Sunshine Acres Nursing Home	270	0.6
Ash Grove R-4 School	60	0.1
d. Septic tanks* -	5	<0.1
e. Known industrial - See discussion, page 2.		
f. Direct precipitation** -	<u>1,765</u>	<u>3.6</u>
Totals	49,295	100.0

2. Output - A-1 Sac River 10,740

3. Net annual P accumulation - 38,555

*Estimate based on 20 lakeside residences.

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

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 Sac River	363,860	20.3
C-1 Little Sac River	343,730	19.2
E-1 Turnback Creek	282,340	15.8
b. Minor tributaries and immediate drainage (nonpoint load) -	635,700	35.5
c. Known municipal STP's -		
Ash Grove	5,710	0.3
Springfield Northwest	38,295	2.1
Greenfield Southwest	615	<0.1
Greenfield Northwest	130	<0.1
Greenfield Southeast	225	<0.1
Republic Lagoon B	3,400	0.2
Springfield Municipal Airport	1,020	0.1
Billings	2,585	0.1
Lakewood Mobile Home Park	835	<0.1
Springfield "44" Auto Truck Stop Inc.	1,000	0.1
Willard R-2 High School	240	<0.1
Chalet City	1,530	0.1
Sunshine Acres Nursing Home	815	0.1
Ash Grove R-4 School	175	<0.1
d. Septic tanks* -	215	<0.1
e. Known industrial - See discussion, page 2.		
f. Direct precipitation** -	108,790	6.1
Totals	1,791,210	100.0
2. Output - A-1 Sac River	1,106,085	
3. Net annual N accumulation -	685,125	

*Estimate based on 20 lakeside 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>
Sac River	2	619
Little Sac River	6	567
Turnback Creek	13	537

E. Mean Nutrient Concentrations in Ungaged Streams:

<u>Tributary</u>	<u>Mean Total P (mg/l)</u>	<u>Mean Total N (mg/l)</u>
B-1 Slagle Creek	0.027	1.090
D-1 Turkey Creek	0.019	0.826
F-1 Limestone Creek	0.034	0.945
G-1 Sons Creek	0.054	1.005
H-1 Walnut Creek	0.026	0.984

Mean phosphorus values in tributary G-1, Sons Creek, are higher than those found in ungaged tributaries to Stockton Reservoir. The reason for this phosphorus inflation is not known.

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 <u>(g/m²/yr)</u>	
Estimated loading for Stockton Reservoir	0.49
Vollenweider's eutrophic loading	0.52
Vollenweider's oligotrophic loading	0.26

V. LITERATURE REVIEWED

Missouri Department of Natural Resources, manuscript. Water Quality Management Basin Plan for Osage - Gasconade River Basin. Water Quality Program, Division of Environmental Quality, Jefferson City, Missouri.

U.S. Environmental Protection Agency. 1971. Inventory of Municipal Waste Facilities. EPA Publication #OWP-1, Vol. 7. Office of Media Programs, Office of Water Programs, U.S. Gov't. Printing Office, Washington, D.C.

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.

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

LAKE CODE 2903 STOCKTON RESERVOIR

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 3004.4

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS)												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
2903A1	3004.4	16.79	28.88	12.57	28.15	48.70	33.13	32.56	11.84	15.72	10.96	19.62	5.64	21.97
2903A2	587.9	3.48	5.10	7.31	8.10	8.86	5.52	3.85	1.56	2.21	2.46	2.27	2.10	4.39
2903C1	606.1	3.68	5.49	7.76	8.41	9.43	5.80	4.62	1.67	2.35	2.58	2.38	2.24	4.64
2903E1	525.8	3.06	4.59	6.48	7.19	7.90	4.93	3.45	1.39	1.59	2.21	1.98	1.87	3.88
2903ZZ	1284.6	7.70	11.44	16.25	17.87	19.77	12.26	8.55	3.48	4.64	5.47	5.01	4.67	9.74

SUMMARY

 TOTAL DRAINAGE AREA OF LAKE = 3004.4
 SUM OF SUB-DRAINAGE AREAS = 3004.4

 TOTAL FLOW IN = 272.38
 TOTAL FLOW OUT = 264.56

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
2903A1	9	74	30.582	14	2.662				
	10	74	5.918	19	0.878				
	11	74	19.171	2	1.303				
	12	74	39.077	14	1.416				
	1	75	59.465	11	7.447				
	2	75	68.527	1	1.416				
	3	75	117.232	1	93.446				
	4	75	107.604	20	1.274				
	5	75	43.891	4	5.635	18	3.710		
	6	75	21.011	8	1.133	22	1.048		
	7	75	12.318	13	1.218				
	8	75	8.042	3	1.926				
2903A2	9	74	4.814	14	2.124				
	10	74	1.557	19	2.832				
	11	74	3.681	2	3.398				
	12	74	1.841	14	7.929				
	1	75	4.955	11	9.911				
	2	75	16.424	1	45.307				
	3	75	23.220	1	28.317				
	4	75	7.929	20	5.522				
	5	75	16.565	4	5.663	18	3.115		
	6	75	5.012	8	2.265	22	3.540		
	7	75	1.926	13	1.274				
	8	75	0.878	3	0.708				

TRIBUTARY FLOW INFORMATION FOR MISSOURI

02/24/77

LAKE CODE 2903 STOCKTON RESERVOIR

MEAN MONTHLY FLOWS AND DAILY FLOWS (CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
2903C1	9	74	5.480	14	1.614				
	10	74	2.379	19	2.718				
	11	74	20.954	2	7.192				
	12	74	6.909	14	9.430				
	1	75	14.328	11	19.114				
	2	75	25.542	2	44.457				
	3	75	32.281	1	41.626				
	4	75	8.410	20	4.644				
	5	75	3.228	4	4.927	18	1.727		
	6	75	9.656	8	1.331	22	6.286		
	7	75	0.765	13	0.538				
	8	75	0.396	3	0.193				
2903E1	9	74	3.058	14	2.549				
	10	74	1.161	19	2.265				
	11	74	3.879	2	3.398				
	12	74	2.067	14	7.079				
	1	75	3.908	11	5.663				
	2	75	12.941	1	28.034				
	3	75	17.840	1	20.388				
	4	75	6.400	20	3.681				
	5	75	3.964	3	4.672	18	3.256		
	6	75	4.276	8	3.115	22	3.398		
	7	75	1.897	13	1.416				
	8	75	1.076	3	0.793				
2903ZZ	9	74	10.024						
	10	74	3.851						
	11	74	21.577						
	12	74	8.155						
	1	75	17.500						
	2	75	41.343						
	3	75	55.218						
	4	75	17.160						
	5	75	17.925						
	6	75	14.300						
	7	75	3.455						
	8	75	1.784						

APPENDIX C
PHYSICAL AND CHEMICAL DATA

290301
37 41 23.0 093 45 54.0 3
STOCKTON RESERVOIR
29039 MISSOURI

091491

/TYP/AMBNT/LAKE

11EPAL2S 04001002
0105 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
74/04/08	09 40	0000	9.9		65	210	8.30	132	0.030	0.500	0.730	0.005
	09 40	0005	9.9	10.6		210	8.30	132	0.040	0.300	0.720	0.005
	09 40	0015	9.9	10.8		210	8.30	131	0.030	0.300	0.700	0.005
	09 40	0050	10.0	10.6		210	8.30	135	0.060	0.300	0.710	0.005
	09 40	0100	9.9	10.6		210	8.30	134	0.040	0.300	0.700	0.006
74/06/24	10 45	0000	22.3	7.0	106	290	8.40	134	0.080	0.500	0.560	0.008
	10 45	0005	22.2	7.0		288	8.30	135	0.080	0.300	0.590	
	10 45	0028	22.0	6.8		289	8.30	137	0.070	0.300	0.590	
	10 45	0045	21.8	4.8		288	8.20	137	0.060	0.300	0.620	0.008
	10 45	0055	21.8	5.6		290	8.10	138	0.070	0.300	0.630	0.007
	10 45	0090	21.3	4.4		288	8.00	131	0.070	0.400	0.580	0.012
74/10/08	10 45	0000	18.2	6.8	78	222	8.10	131	0.080	0.600	0.210	0.007
	10 45	0005	18.2	7.6		231	8.05	130	0.060	0.300	0.220	0.005
	10 45	0015	18.2	7.0		228	8.05	129	0.050	0.300	0.220	0.004
	10 45	0030	18.2	6.8		230	8.05	129	0.060	0.300	0.220	0.004
	10 45	0045	18.2	7.2		230	8.05	128	0.050	0.400	0.220	0.004
	10 45	0060	18.1	7.0		230	8.00	129	0.060	0.300	0.230	0.004
	10 45	0075	18.1	7.0		230	8.00	128	0.050	0.300	0.220	0.004
	10 45	0085	18.1	7.0		229	8.00	128	0.050	0.400	0.220	0.004

STORET RETRIEVAL DATE 77/02/74

290301
37 41 23.0 093 45 54.0 3
STOCKTON RESERVOIR
29039 MISSOURI

091491

/TYP/A/AMNT/LAKE

11EPALES 04001002
0105 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCOT LT REMNING PERCENT
74/04/08	09 40	0000	0.021	9.7	
	09 40	0005	0.023		
	09 40	0015	0.022		
	09 40	0050	0.022		
	09 40	0100	0.022		
74/06/24	10 45	0000	0.014	2.7	
	10 45	0005	0.016		
	10 45	0028	0.016		
	10 45	0045	0.018		
	10 45	0055	0.015		
	10 45	0090	0.019		
74/10/08	10 45	0000	0.016	4.1	
	10 45	0003			50.0
	10 45	0005	0.014		
	10 45	0011			5.0
	10 45	0015	0.013		1.0
	10 45	0030	0.013		
	10 45	0045	0.013		
	10 45	0060	0.013		
	10 45	0075	0.013		
	10 45	0085	0.014		

STORE RETRIEVAL DATE 7/7/02/24

290302
37 36 36.0 093 45 52.0 3
STOCKTON RESERVOIR
29039 MISSOURI

091491

/TYPA/AMBNT/LAKE

11EPALES 04001002
0070 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
74/04/08	10 15	0000	9.7		50	208	8.30	134	0.050	0.500	0.800	0.006
	10 15	0005	9.7	10.8		209	8.30	134	0.060	0.400	0.800	0.005
	10 15	0015	9.7	10.8		209	8.30	133	0.050	0.400	0.780	0.005
	10 15	0040	9.7	10.8		209	8.30	133	0.050	0.400	0.800	0.006
	10 15	0065	9.8	10.8		209	8.30	131	0.050	0.400	0.790	0.006
74/06/24	12 40	0000	22.6	7.2	108	290	8.20	132	0.080	0.500	0.600	0.011
	12 40	0005	22.6	7.0		290	8.30	131	0.070	0.400	0.610	
	12 40	0025	21.8	5.4		287	8.10	130	0.080	0.300	0.660	0.011
	12 40	0035	20.6	3.4		283	8.00	132	0.080	0.400	0.730	0.009
	12 40	0047	18.1	0.6		275	7.80	138	0.100	0.400	0.830	0.014
	12 40	0065	14.6	0.2		263	7.80	143	0.230	0.500	0.690	0.013
	12 40	0080	13.6	0.2		262	7.60	150	0.480	0.800	0.500	0.017
74/10/08	11 30	0000	18.1	6.0	72	225	8.00	131	0.080	0.400	0.300	0.003
	11 30	0005	17.9	6.6		225	7.90	130	0.060	0.200	0.300	0.003
	11 30	0015	17.8	5.8		224	7.90	128	0.060	0.200	0.310	0.003
	11 30	0030	17.8	5.8		224	7.90	129	0.060	0.200	0.310	0.004
	11 30	0045	17.8	5.8		225	7.90	128	0.060	0.300	0.310	0.004
	11 30	0052	17.7	5.8		224	7.90	129	0.060	0.200	0.310	0.004

STORET RETRIEVAL DATE 7/7/24

290302
37 36 36.0 093 45 52.0 3
STOCKTON RESERVOIR
29039 MISSOURI

091491

/ATPA/AMBNT/LAKE

11EPALES 04001002
0070 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	10 15	0000	0.032	25.8	
	10 15	0005	0.024		
	10 15	0015	0.026		
	10 15	0040	0.026		
	10 15	0065	0.029		
74/06/24	12 40	0000	0.016	1.5	
	12 40	0005	0.021		
	12 40	0025	0.022		
	12 40	0035	0.025		
	12 40	0047	0.031		
	12 40	0065	0.026		
	12 40	0080	0.052		
74/10/08	11 30	0000	0.015	4.4	
	11 30	0002			50.0
	11 30	0005	0.014		
	11 30	0006			5.0
	11 30	0010			1.0
	11 30	0015	0.014		
	11 30	0030	0.015		
	11 30	0045	0.016		
	11 30	0052	0.019		

STORET RETRIEVAL DATE 11/02/24

290303
37 32 08.0 093 47 36.0 3
STOCKTON RESERVOIR
29057 MISSOURI

091491

/TYPA/AMNT/LAKE

11EPALES 04001002
0071 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
74/04/08	12 05	0000	10.4		35	210	8.30	132	0.050	0.600	0.930	0.005
	12 05	0005	10.4	10.8		210	8.30	132	0.040	0.400	0.930	0.006
	12 05	0015	10.4	10.8		210	8.30	131	0.060	0.500	0.920	0.007
	12 05	0040	10.3	10.8		210	8.30	132	0.040	0.500	0.900	0.006
	12 05	0065	10.3	10.8		210	8.30	134	0.030	0.400	0.880	0.011
74/06/24	13 05	0000	22.5	7.4	72	290	8.20	133	0.060	0.500	0.590	0.006
	13 05	0005	22.5	7.4		289	8.40	132	0.050	0.400	0.590	0.006
	13 05	0015	22.4	6.8		289	8.00	130	0.060	0.500	0.610	0.007
	13 05	0035	21.3	4.6		284	8.00	134	0.080	0.400	0.810	0.010
	13 05	0050	18.8	1.8		286	7.50	144	0.100	0.300	0.930	0.051
	13 05	0068	18.2	1.4		293	7.90	146	0.130	0.300	0.970	0.042
74/10/08	12 10	0000	18.0	6.4	48	227	8.00	130	0.060	0.300	0.340	0.004
	12 10	0005	17.8	6.2		225	7.90	131	0.060	0.200	0.350	0.004
	12 10	0015	17.7	6.4		224	7.90	131	0.110	0.200K	0.380	0.004
	12 10	0035	17.7	5.8		224	7.90	130	0.060	0.300	0.330	0.006
	12 10	0050	17.5	5.6		223	7.90	131	0.090	0.300	0.340	0.005
	12 10	0062	17.5	4.0		229	7.80	134	0.290	0.400	0.290	0.006

K VALUE KNOWN TO BE
LESS THAN INDICATED

STOKET RETRIEVAL DATE 77/02/24

290303
37 32 08.0 093 47 36.0 3
STOCKTON RESERVOIR
29057 MISSOURI

091491

/TYPA/AMHNT/LAKE

11EPALES 04001002
0071 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	12 05	0000	0.033	29.2	
	12 05	0005	0.036		
	12 05	0015	0.036		
	12 05	0040	0.044		
	12 05	0065	0.047		
74/06/24	13 05	0000	0.021	1.3	
	13 05	0005	0.022		
	13 05	0015	0.021		
	13 05	0035	0.027		
	13 05	0050	0.050		
	13 05	0068	0.043		
74/10/08	12 10	0000	0.023	6.5	
	12 10	0005	0.023		
	12 10	0015	0.020		
	12 10	0035	0.027		
	12 10	0050	0.030		
	12 10	0062	0.049		

STORET RETRIEVAL DATE 77/02/26

290304
37 36 15.0 093 42 58.0 3
STOCKTON RESERVOIR
29039 MISSOURI

091491

/TYPA/AMBN/LAKE

11EPALES 04001002
0000 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 ORTH0 MG/L P
74/04/08	12 50	0000	9.9		60	206	8.30	132	0.040	0.400	0.640	0.004
	12 50	0005	9.9	10.4		206	8.30	132	0.030	0.400	0.620	0.004
	12 50	0015	9.9	10.8		207	8.30	134	0.040	0.300	0.630	0.004
	12 50	0040	9.8	10.4		208	8.30	134	0.060	0.300	0.650	0.004
	12 50	0075	9.8	10.6		208	8.30	135	0.060	0.300	0.650	0.004
74/06/24	10 05	0000	23.7	8.4	108	293	8.40	131	0.100	0.400	0.520	0.012
	10 05	0005	23.7	8.4		294	8.40	134	0.050	0.300	0.520	
	10 05	0023	23.1	7.6		293	8.40	134	0.030	0.400	0.540	0.008
	10 05	0040	19.4	1.0		283	7.90	139	0.080	0.300	0.750	0.010
	10 05	0055	14.4	0.2		262	7.90	147	0.230	0.400	0.740	0.010
	10 05	0071	13.4	0.4		266	7.90	154	0.590	0.900	0.340	0.032
74/10/08	09 55	0000	18.1	5.8	72	233	7.90	123	0.090	0.400	0.250	0.004
	09 55	0005	18.1	6.0		307	7.90	124	0.100	0.300	0.250	0.004
	09 55	0015	18.1	6.0		236	7.90	125	0.090	0.300	0.240	0.006
	09 55	0035	18.1	5.8		236	7.20	128	0.060	0.300	0.250	0.007
	09 55	0050	18.0	5.6		232	7.90	127	0.080	0.500	0.240	0.009
	09 55	0060	15.6	0.1		276	7.60	159	1.660	1.800	0.030	0.010
	09 55	0067	15.0	0.0		279	7.55	174	1.980	2.900	0.020K	0.015

K VALUE KNOWN TO BE
LESS THAN INDICATED

STOCKTON RESERVOIR DATE 77/02/24

290304
37 36 15.0 093 42 58.0 3
STOCKTON RESERVOIR
29039 MISSOURI

091491

/TYPE/AMOUNT/LAKE

11EPALES 04001002
0040 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	12 50	0000	0.018	13.0	
	12 50	0005	0.020		
	12 50	0015	0.021		
	12 50	0040	0.022		
	12 50	0075	0.020		
74/06/24	10 05	0000	0.019	1.3	
	10 05	0005	0.015		
	10 05	0023	0.016		1.0
	10 05	0040	0.019		
	10 05	0055	0.018		
	10 05	0071	0.042		
74/10/08	09 55	0000	0.020	3.2	
	09 55	0005	0.019		
	09 55	0015	0.024		
	09 55	0035	0.023		
	09 55	0050	0.027		
	09 55	0060	0.117		
	09 55	0067	0.206		

STORE RETRIEVAL DATE 77/02/24

290305
37 34 08.0 093 39 22.0 3
STOCKTON RESERVOIR
29057 MISSOURI

091491

/TYPE/AMBNT/LAKE

11EPALES 04001002
0060 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
74/04/08	13 25	0000	10.5		50	205	8.40	131	0.040	0.600	0.690	0.004
	13 25	0005	10.5	11.2		205	8.40	130	0.040	0.400	0.700	0.004
	13 25	0015	10.5	10.8		205	8.30	130	0.060	0.400	0.720	0.005
	13 25	0030	10.4	10.8		205	8.30	129	0.050	0.500	0.700	0.004
	13 25	0055	10.3	10.8		206	8.30	130	0.060	0.500	0.700	0.006
74/06/24	09 30	0000	24.5	8.6	96	294	8.60	129	0.060	0.600	0.480	0.017
	09 30	0005	24.4	8.6		294	8.30	129	0.050	0.300	0.480	0.010
	09 30	0010	24.0	3.6		296	8.30	133	0.080	0.300	0.540	0.011
	09 30	0035	20.7	0.8		300	7.60	144	0.180	0.400	0.680	0.014
	09 30	0054	17.9	0.6		304	7.50	160	0.680	1.100	0.390	0.023
74/10/08	09 15	0000	18.0	6.6	48	233	7.95	122	0.080	0.300	0.270	0.006
	09 15	0015	18.0	6.2		231	7.95	122	0.080	0.200K	0.280	0.006
	09 15	0030	18.0	6.6		232	8.00	124	0.120	0.300	0.280	0.007
	09 15	0045	18.0	6.4		233	7.90	121	0.080	0.400	0.270	0.007

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	13 25	0000	0.026	21.8	
	13 25	0005	0.032		
	13 25	0015	0.032		
	13 25	0030	0.029		
	13 25	0055	0.031		
74/06/24	09 30	0000	0.024	3.0	
	09 30	0005	0.021		
	09 30	0010	0.017		1.0
	09 30	0035	0.027		
	09 30	0054	0.068		
74/10/08	09 15	0000	0.034	7.2	
	09 15	0015	0.030		
	09 15	0030	0.030		
	09 15	0045	0.038		

K VALUE KNOWN TO BE
LESS THAN INDICATED

APPENDIX D
TRIBUTARY AND WASTEWATER
TREATMENT PLANT DATA

STORET RETRIEVAL DATE 77/02/24

2903A1
37 42 03.0 093 45 20.0 4
SAC RIVER
29 7.5 STOCKTON
0/STOCKTON RESERVOIR 091491
MO HWY 32 BRDG 2 MI E OF STOCKTON
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&N03 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	15 30		0.056	0.300	0.072	0.005K	0.020
74/10/19	14 30		0.272	0.900	0.030	0.010	0.015
74/11/02	13 45		0.304	0.600	0.050	0.015	0.020
74/12/14	12 20		0.400	1.100	0.015	0.005K	0.020
75/01/11	10 30		0.368	1.600	0.136	0.005K	0.010K
75/02/01	11 00		0.352	1.400	0.032	0.016	0.040
75/03/01	11 50		0.432	1.650	0.032	0.008K	0.020
75/04/20	13 45		0.035	0.150	0.010	0.005K	0.010K
75/05/04	14 45		0.735	1.680	0.025	0.005	0.020
75/05/18	12 15		0.670	0.350	0.025	0.005K	0.010K
75/06/08	11 50		0.575	0.650	0.030	0.005K	0.020
75/06/22	10 10		0.530	0.350	0.010	0.005K	0.010
75/07/13	12 30		0.440	0.550	0.030		0.010
75/08/03	10 00		0.960	0.900	0.040	0.010	0.090

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

2903A2
37 23 52.0 093 38 00.0 4
SAC RIVER
29 7.5 DADEVILLE
T/STOCKTON RESERVOIR 091491
SEC RD BRDG AT COMET
11EPALES 04001004
0900 FEET DEPTH CLASS 00

/TYP4/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 25		1.700	0.700	0.030	0.035	0.050
74/10/19	11 10		1.600	0.800	0.025	0.025	0.045
74/11/02	08 45		1.400	0.600	0.050	0.040	0.040
74/12/14	14 20		1.920	0.600	0.010	0.010	0.020
75/01/11	13 25		1.880	1.000	0.136	0.020	0.040
75/02/01	09 40		1.780	1.800	0.690	0.032	0.100
75/03/01	14 25		1.950	1.400	0.016	0.024	0.070
75/04/20	10 40		1.720	1.050	0.155	0.005K	0.020
75/05/04	16 08		1.800	0.700	0.035	0.010	0.020
75/05/18	13 45		1.950	1.150	0.040	0.015	0.030
75/06/08	14 35		2.000	0.450	0.035	0.040	0.100
75/06/22	09 00		1.800	1.250	0.030	0.045	0.100
75/07/13	11 00		1.800	0.550	0.020	0.040	0.060
75/08/03	09 45		1.650	0.850	0.030	0.055	0.120

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORED RETRIEVAL DATE 77/02/24

2903B1
37 30 02.0 093 28 29.0 4
SLAGLE CREEK
29 7.5 BOLIVAR
T/STOCKTON RESERVOIR 091491
SEC RD BRDG 1 MI SW OF WISHART
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STREAM

DATE	TIME	DEPTH	00630 NO2&N03	00625 TOT KJEL	00610 NH3-N	00671 PHOS-DIS	00665 PHOS-TOT
FROM	OF		N-TOTAL	N	TOTAL	ORTHO	
TO	DAY	FEET	MG/L	MG/L	MG/L	MG/L P	MG/L P
74/09/14	10	50	0.672	0.100	0.010	0.010	0.015
74/10/19	10	20	0.256	1.400	0.035	0.010	0.020
74/11/02	09	30	0.336	1.600	0.050	0.020	0.020
74/12/14	10	30	1.000	0.700	0.010	0.010	0.020
75/01/11	11	15	0.810	2.000	0.376	0.015	0.060
75/02/02	09	15	1.060	1.000	0.112	0.032	0.040
75/03/01	11	00	1.200	2.100	0.048	0.032	0.080
75/04/20	13	00	0.290	0.750	0.030	0.005K	0.010
75/05/04	12	32	0.175	1.400	0.020	0.010	0.010
75/05/18	09	45	0.210	0.650	0.075	0.010	0.010
75/06/08	10	20	0.210	0.150	0.020	0.010	0.020
75/06/22	09	05	0.190	0.700	0.020	0.020	0.030
75/07/13	08	40	0.095	0.800	0.020	0.015	0.020

K VALUE KNOWN TO BE
LESS THAN INDICATED

STOREY RETRIEVAL DATE 77/02/24

2903C1
37 27 33.0 093 28 10.0 4
LITTLE SAC RIVER
29 7.5 MORRISVILLE
T/STOCKTON RESERVOIR 100391
SEC RD BRDG 3.8 MI SW OF MORRISVILLE
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 20		1.760	0.600	0.015	0.140	0.170
74/10/19	10 00		1.320	1.000	0.045	0.130	0.155
74/11/02	09 03		1.120	1.200	0.055		0.160
74/12/14	11 00		1.360	1.200	0.035	0.050	0.070
75/01/11	11 00		1.180	2.300	0.232	0.063	0.100
75/02/02	08 50		0.425	3.000	0.120	0.048	0.050
75/03/01	10 30		1.150	1.200	0.056	0.032	0.070
75/04/20	11 27		1.300	0.750	0.025	0.040	0.070
75/05/04	10 19		1.500	0.950	0.085	0.080	0.090
75/05/18	09 30		1.700	0.550	0.085	0.095	0.120
75/06/08	10 00		1.700	0.350	0.035	0.170	0.220
75/06/22	08 50		1.800	0.750	0.015	0.110	0.160
75/07/13	09 45		1.720	0.500	0.020	0.140	0.160
75/08/03	09 00		1.150	2.500	0.065	0.135	0.230

STORED RETRIEVAL DATE 77/02/24

290301
 37 29 40.0 093 34 50.0 4
 TURKEY CREEK
 29 7.5 WALNUT GROVE
 T/STOCKTON RESERVOIR 091491
 SEC RD BRUG 2.5 MI NW OF EUDORA
 11EPALES 04001004
 0000 FEET DEPTH CLASS 00

/TYP/AMBNT/STREAM

DATE	TIME	DEPTH	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
FROM TO	OF DAY	FEET					
74/09/14	11 35		0.900	0.100K	0.015	0.010	0.015
74/10/19	13 30		0.672	0.600	0.030	0.015	0.020
74/11/02	14 30		0.432	0.300	0.020	0.015	0.015
74/12/14	11 35		0.960	0.700	0.007	0.010	0.010
75/01/11	09 45		0.890	1.700	0.224	0.012	0.020
75/02/01	10 20		1.140	2.100	0.048	0.024	0.040
75/03/01	10 15		0.830	0.900	0.024	0.008K	0.030
75/04/20	11 50		0.610	1.300	0.040	0.010	0.010
75/05/04	11 30		0.530	0.700	0.125	0.010	0.010
75/05/18	10 40		0.680	0.450	0.020	0.010	0.010
75/06/08	10 40		0.680	0.600	0.025	0.010	0.010
75/06/22	09 55		0.750	0.450	0.082	0.025	0.030
75/07/13	09 50		0.790	0.800	0.040	0.015	0.015
75/08/03	09 00		0.790	0.950	0.025		0.030

K VALUE KNOWN TO BE
 LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

2903E1
 37 23 03.0 093 47 56.0 4
 TURNBACK CREEK
 29 7.5 GREENFIELD
 T/STOCKTON RESERVOIR 091491
 UNIMPROVED RD XING AT FIDDLERS FORK
 11EPALES 04001004
 0000 FEET DEPTH CLASS 00

/TYPA/AMHNT/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		1.320	0.700	0.035	0.035	0.070
74/10/19	10 45		1.240	0.400	0.020	0.015	0.030
74/11/02	09 35		0.900	0.500	0.065	0.015	0.040
74/12/14	11 45		1.600	1.000	0.015	0.010	0.020
75/01/11	12 45		1.260	2.100	0.216	0.012	0.050
75/02/01	10 30		1.410	1.100	0.168	0.032	0.120
75/03/01	10 55		1.350	1.300	0.256	0.024	0.070
75/04/20	09 00		1.350	1.900	0.035	0.005	0.030
75/05/03	13 35		1.350	0.250	0.035	0.010	0.020
75/05/18	12 45		1.570	1.150	0.050	0.010	0.030
75/06/08	13 55		1.400	0.450	0.035	0.040	0.090
75/06/22	13 20		1.400	0.750	0.040	0.030	0.070
75/07/13	10 20		1.200	0.450	0.015	0.025	0.050
75/08/03	11 00		1.150	1.400	0.490	0.025	0.080

STORET RETRIEVAL DATE 77/02/24

2903F1
 37 23 05.0 093 49 09.0 4
 LIMESTONE CREEK
 29 7.5 GREENFIELD
 T/STOCKTON RESERVOIR 091491
 SEC RD BRDG 1.4 MI NE OF S GREENFIELD
 11EPALES 04001004
 0000 FEET DEPTH CLASS 00

/TYPA/AVGNT/STREAN

DATE	TIME	DEPTH	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
FROM TO	OF DAY	FEET					
74/09/14	13 45		1.600	0.200	0.010	0.020	0.035
74/10/19	10 30		1.080	0.800	0.035	0.020	0.035
74/11/02	09 30		1.320	0.600	0.020	0.020	0.030
74/12/14	11 30		1.520	1.100	0.025	0.015	0.020
75/01/11	12 25		1.420	1.700	0.060	0.010	0.010
75/02/01	10 15		1.630	1.200	0.352	0.024	0.060
75/03/01	10 45		1.400	1.100	0.112	0.008	0.040
75/04/20	09 15		0.010	1.350	0.060	0.015	0.030
75/05/03	11 45		1.100	0.200	0.025	0.012	0.020
75/05/18	13 20		1.250	0.350	0.035	0.015	0.030
75/06/08	13 45		1.300	1.180	0.065	0.025	0.065
75/06/22	12 40		1.250	0.650	0.030	0.030	0.060
75/07/13	10 15		0.840	1.300	0.095	0.025	0.030
75/08/03	10 30		0.840	0.500	0.145	0.030	0.080

STORET RETRIEVAL DATE 7/7/02/24

293361
 37 27 19.0 093 53 56.0 4
 SONS CREEK
 24 1.5 LOCKWOOD
 T/STOCKTON RESERVOIR 091492
 CU RD 88 BRDG 4.1 MI NW OF GREENFIELD
 11EPALES 04001004
 0000 FEET DEPTH CLASS 00

/TYPA/AMBNT/STORM

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 40		0.440	0.700	0.020	0.015	0.035
74/10/19	11 35		0.490	0.800	0.070	0.020	0.040
74/11/02	10 15		0.576	0.600	0.040	0.030	0.060
74/12/14	12 30		1.160	1.300	0.010	0.015	0.030
75/01/11	12 00		0.842	2.000	0.219	0.040	0.127
75/02/01	11 00		1.150	1.500	0.176	0.032	0.080
75/03/01	10 30		0.720	1.400	0.040	0.024	0.070
75/04/19	09 45		0.390	1.500	0.055	0.010	0.030
75/05/03	10 02		0.410	0.050	0.030	0.010	0.020
75/05/18	13 40		0.315	0.425	0.030	0.010	0.030
75/06/08	13 20		0.170	0.350	0.030	0.010	0.050
75/06/22	11 00		0.450	0.850	0.350	0.035	0.080
75/07/13	09 20		0.015	0.487	0.037	0.010	0.045

STORET RETRIEVAL DATE 77/02/24

2903H1
37 32 05.0 093 30 05.0 4
WALNUT CREEK
29 7.5 ALDRICH
T/STOCKTON RESERVOIR 091491
SEC RD BRDG JUST SE OF CAMPGROUND CHURCH
11EPALES 04001004
0000 FEET DEPTH CLASS 00

/TYPE/AMNT/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 05		0.044	0.600	0.020	0.005K	0.010
74/10/19	10 45		0.016	1.300	0.020	0.005K	0.005
74/11/02	10 00		0.016	0.700	0.025	0.005K	0.010K
74/12/14	10 00		0.192	0.550	0.005	0.005	0.010
75/01/12	11 30		0.176	3.100	0.024	0.005K	0.010K
75/02/02	09 35		0.250	1.700	0.040	0.008	0.010
75/03/01	10 00		1.200	1.050	0.192	0.032	0.090
75/04/20	14 30		0.690	0.350	0.015	0.005K	0.020
75/05/03	13 15		0.020	0.350	0.015	0.005	0.010
75/05/18	10 00		0.045	0.250	0.145	0.005K	0.010K
75/06/08	11 10		0.075	0.100	0.015	0.005K	0.020
75/06/22	09 25		0.045	0.450	0.130	0.010	0.010
75/07/13	09 10		0.080	1.000	0.030	0.005K	0.010K
75/08/03	11 00		0.960	1.250	0.343	0.010	0.080

K VALUE KNOWN TO BE
LESS THAN INDICATED

/AMBNT/STREAM

2903WA AS2903WA P020000
37 16 20.0 093 18 45.0 4
SPRINGFIELD NW
29 7.5 SPRINGFIELD
T/STOCKTON RES. 091491
LITTLE DRY SAC CREEK
11EPALES 0000100+
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&N03 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTH0 MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/11/30	00	00							
CP(T)-			0.800	11.000	0.930	2.700	3.350	1.900	3.500
74/11/30	24	00							
74/12/31	00	00							
CP(T)-			1.760	7.700	0.320	2.500	3.000	5.000	2.100
74/12/31	24	00							
75/01/30	24	00							
CP(T)-			2.400	6.700	0.088	1.630	2.100	5.300	2.300
75/01/31	24	00							
75/02/27	24	00							
CP(T)-			2.960	5.000	0.110	2.000	2.600	3.400	2.900
75/02/28	24	00							
75/03/30	24	00							
CP(T)-			2.640	6.600	0.098	1.520	2.300	3.100	3.700
75/03/31	24	00							
75/04/29	24	00							
CP(T)-			2.600	12.500	0.310	4.000	5.400	2.700	2.200
75/04/30	24	00							
75/05/14	24	00							
CP(T)-			0.550	19.500	5.200	4.800	5.100	1.700	2.200
75/05/15	24	00							
75/05/30	24	00							
CP(T)-			1.150	14.000	2.000	6.400	6.600	1.300	1.900
75/05/31	24	00							
75/06/17	24	00							
CP(T)-			2.000	3.800		1.300	1.400	3.100	1.900
75/06/18	24	00							
75/06/29	24	00							
CP(T)-			1.500	7.300	3.150	5.800	6.640	1.640	2.200
75/06/30	24	00							
75/07/20	24	00							
CP(T)-			3.300	18.000	3.900	7.100	7.800	1.360	2.400
75/07/21	24	00							
75/07/31	24	00							
CP(T)-			3.400	22.000	5.750	7.700	8.900	1.540	1.290
75/08/01	24	00							

STOPE: RETRIEVAL DATE '77/02/24

2903WA AS2903WA P020000
37 16 20.0 993 18 45.0 4
SPRINGFIELD NW
29 7.5 SPRINGFIELD
T/STOCKTON RES. 091491
LITTLE DRY SAC CREEK
11EPALES 00001004
0000 FEET DEPTH CLASS 00

/AMBNT/STREAM

DATE	TIME	DEPTH	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
FROM	OF								
TO	DAY	FEET							
75/08/14	24	00							
CP(T)-			1.500	22.000	7.100	7.900	9.000	1.400	
75/08/15	24	00							

STORET RETRIEVAL DATE 77/02/24

2903AA PD2903AA P000050
 37 25 50.0 093 50 45.0 4
 GREENFIELD SW
 29 7.0 S GREENFIELD
 T/STOCKTON RES. 091491
 SAC - USAGE
 11EPALES 00001004
 0000 FEET DEPTH CLASS 00

/AMBNT/STREAM

DATE	TIME	DEPTH	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
FROM TO	OF DAY	FEET							
75/01/17	09 30		0.080	7.000	0.068	2.700	3.800	0.040	0.040
75/02/14	09 35		0.160	5.700	0.080K	2.500	3.200		0.040
75/03/17	09 45		0.320	1.500	0.080K	1.680	1.900	0.066	0.050
75/04/18	09 25		0.050	7.800	0.170	3.200	4.900	0.013	0.030
75/05/08	08 40		0.050	21.000	0.077	5.400		0.019	0.026
75/05/20	09 35		0.050	20.000	0.110	7.600	9.200	0.090	0.047
75/06/04	09 05		0.050	26.000	0.076	7.250	10.500	0.032	0.032
75/07/01	08 40		0.075	19.500	0.025K	7.000	9.800	0.032	0.032
75/07/21	09 00		0.050	23.000	0.050K	6.900	9.400	0.019	0.020
75/08/08	08 00		0.025	34.000	0.069	6.800	9.900		0.013
75/09/29	09 00		0.175	14.500	0.025	4.300	6.000	0.032	0.028
75/10/24	08 40		0.050	8.300	0.035	5.600	6.500	0.013	0.022
75/11/14	09 10		0.150	19.000	0.225	5.500	7.700	0.019	0.019

K VALUE KNOWN TO BE
 LESS THAN INDICATED

SECRET RETRIEVAL DATE 77/02/24

2903YA PD2903YA P000150
 37 25 15.0 093 51 20.0 4
 GREENFIELD NW
 29 7.5 GREENFIELD
 T/STOCKTON RES. 091491
 SAC - OSAGE
 11EPALES 00001004
 0000 FEET DEPTH CLASS 00

/AMBNT/STREAM

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 N02&N03 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
75/01/17	09 20		1.360	1.300	0.050K		0.360	0.034	0.030
75/02/14	09 20		1.840	1.000K	0.080K	0.210	0.280		0.030
75/03/17	09 30		0.880	1.000K	0.100	0.240	0.299	0.073	0.050
75/04/18	09 35		0.500	1.600	0.081	0.220	0.730	0.013	0.030
75/05/08	08 25		0.050	1.300	0.050K	0.303	0.380	0.019	0.017
75/05/20	09 25		0.050	3.000	0.050K	0.660	1.200	0.019	0.023
75/06/04	08 55		0.050	2.100	0.050K	0.930	1.700	0.013	0.078
75/07/01	08 30		0.100	4.000	0.025K	0.620	1.200	0.013	0.022
75/07/21	08 50		0.050	3.000	0.050K	0.680	1.300	0.013	0.013
75/08/08	08 00		0.150	6.800	0.067	0.870	1.600		0.013
75/09/29	08 50		0.950	4.200	0.025K	0.310	0.960	0.075	0.028
75/10/24	08 30		0.120	6.000	0.050	0.380	0.600	0.013	0.021
75/11/14	09 00		0.467	3.300	0.060	0.275	0.450	0.013	0.013

K VALUE KNOWN TO BE
 LESS THAN INDICATED

STORET RETRIEVAL DATE 77/02/24

2903ZA PD2903ZA P000850
 37.24 30.0 093 50 00.0 4
 GREENFIELD SE
 29 7.5 GREENFIELD
 T/STOCKTON RES. 091491
 SAC - OSAGE
 11EPALES 00001004
 0000 FEET DEPTH CLASS 00

/AMBNT/STREAM

DATE	TIME	DEPTH	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
FROM TO	OF DAY	FEET							
75/01/17	09 45		0.880	9.500	0.086	2.200	3.900	0.032	0.010
75/02/14	09 45		1.360	5.000	0.080K	1.200	2.100	0.032	0.010
75/03/17	10 00		1.680	1.200	0.240	0.770	0.850	0.047	0.030
75/04/18	09 05		0.050	7.000	0.110	1.750	2.700	0.013	0.025
75/05/08			0.050	8.000	0.100	1.500	2.000	0.020	0.020
75/05/20	09 45		0.050	6.500	0.050K	1.450	1.900	0.019	0.003
75/06/04	09 25		0.100	5.900	0.050K	1.750	2.800	0.020	0.020
75/07/01	08 50		0.100	14.000	0.125	2.750	3.900	0.032	0.032
75/07/21	09 10		0.050	9.500	0.050K	2.300	3.400	0.026	0.027
75/08/08	08 00		0.050	16.300	1.150	3.750	4.800	0.006	0.013
75/09/29	09 10		0.825	10.000	0.075	2.400	3.500	0.015	0.019
75/10/24	08 50		0.125	14.000	0.100	2.500	4.400	0.013	0.021
75/11/14	09 20		0.125	15.000	0.081	3.700	5.400	0.013	0.013

K VALUE KNOWN TO BE
 LESS THAN INDICATED

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	449.928	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 CHLOR A	15- MIN DO	MEDIAN DISS ORTHO P
2901	CLEARWATER LAKE	100 (5)	80 (4)	60 (3)	100 (5)	100 (5)	90 (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)