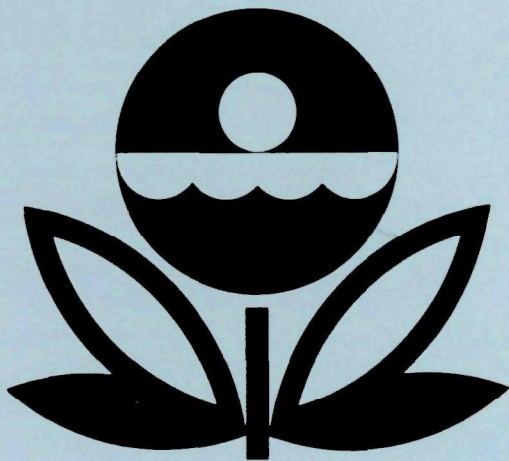


**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY
WORKING PAPER SERIES**



REPORT
ON
TIBER RESERVOIR
LIBERTY AND TOOLE COUNTIES
MONTANA
EPA REGION VIII
WORKING PAPER No. 802

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

REPORT
ON
TIBER RESERVOIR
LIBERTY AND TOOLE COUNTIES
MONTANA
EPA REGION VIII
WORKING PAPER No. 802

WITH THE COOPERATION OF THE
MONTANA DEPARTMENT OF HEALTH & ENVIRONMENTAL SCIENCES
AND THE
MONTANA NATIONAL GUARD
MAY, 1977

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F O R E W O R D

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 non-point 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 fresh water 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 EPA and to augment plans implementation by the states.

ACKNOWLEDGEMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U.S. Environmental Protection Agency) express sincere appreciation to the Montana Department of Health and Environmental Sciences for professional involvement, to the Montana National Guard for conducting the tributary sampling phase of the Survey, and to those Montana wastewater treatment plant operators who voluntarily provided effluent samples.

The staff of the Water Quality Bureau 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.

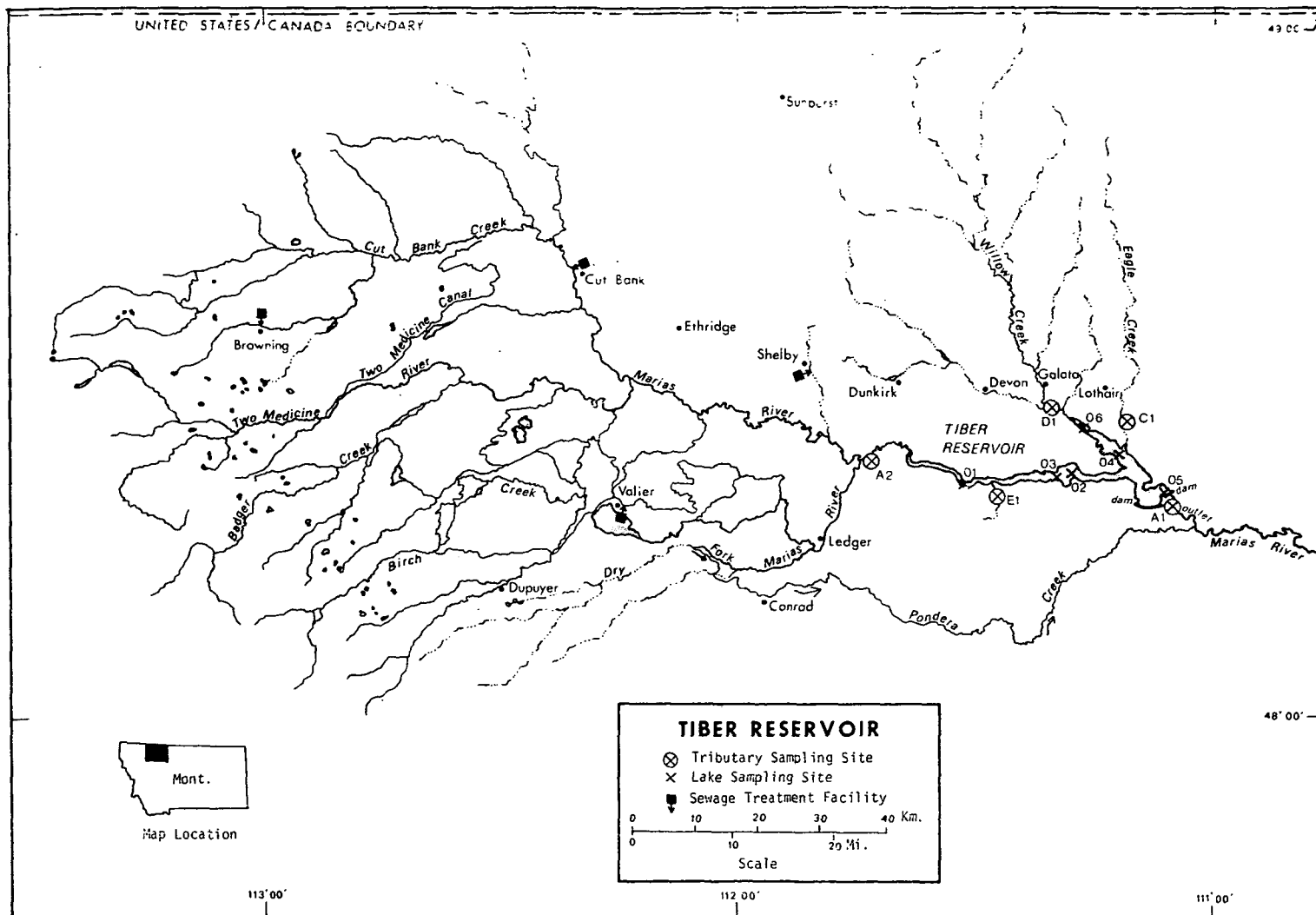
Major General John J. Womack, the Adjutant General of Montana, and Project Officer Major William Yeager, who directed the volunteer efforts of the Montana National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES AND RESERVOIRS

STATE OF MONTANA

<u>LAKE NAME</u>	<u>COUNTY</u>
Canyon Ferry	Broadwater, Lewis and Clark
Clark Canyon	Beaverhead
Flathead	Flathead, Lake
Georgetown	Deer Lodge, Granite
Hebgen	Gallatin
Koocanusa	Lincoln, MT; British Columbia, Can.
Mary Ronan	Lake
McDonald	Flathead
Nelson	Phillips
Seeley	Missoula
Swan	Lake
Tally	Flathead
Tiber	Liberty, Toole
Tongue River	Big Horn
Whitefish	Flathead
Yellowtail	Carbon, Bighorn, MT; Bighorn, WY



TIBER RESERVOIR

STORET NO. 3013

I. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Tiber Reservoir is meso-eutrophic. It ranked eighth in overall trophic quality when the 15 Montana lakes and reservoirs sampled in 1975 were compared using a combination of six water-quality parameters*. Six of the water bodies had less median total phosphorus, two had less and three had the same median dissolved orthophosphorus, 13 had less and one had the same median inorganic nitrogen, seven had less mean chlorophyll a, and 12 had greater mean Secchi disc transparency. Dissolved oxygen was not significantly depressed at depths as great as 42.7 meters.

Survey limnologists did not observe nuisance aquatic plants or surface concentrations of algae during their visits but noted that the water at times was quite turbid. Turbidity appears to be a major problem in this water body; it is noted in another study that the shores are steep, soft, and easily eroded, and because of the resulting turbidity, phytoplankton numbers are low (Stober, 1963).

* See Appendix A.

B. Rate-Limiting Nutrient:

The algal assay results indicate that Tiber Reservoir was limited by phosphorus at the time the sample was taken (09/09/75). The reservoir data indicate phosphorus limitation in July and September (with the exception of station 6 in September) and a combination of limiting nutrients in May. However, because of turbidity (Stober, op. cit.), primary productivity may be light-limited at times.

C. Nutrient Controllability:

1. Point sources--During the sampling year, the wastewater treatment facility at Shelby contributed 13.7% of the total phosphorus input to Tiber Reservoir. In addition, three other facilities of unknown significance at Valier, Cut Bank, and Browning were not included since they are beyond the 40-kilometer Survey limit* (see map, page v). Further investigation is needed to determine the significance of nutrient contributions from those sources; however, the nutrient export rates of the Marias River indicate minimal impact (see below).

The present phosphorus loading of $0.64 \text{ g/m}^2/\text{year}$ is more than that proposed by Vollenweider (Vollenweider and Dillon, 1974) as an oligotrophic loading but less than his eutrophic loading (see page 14). Since the reservoir is phosphorus limited during much of the year, minimization of point-source loads could be considered as a means to maintain the present water quality, particularly if soil-conservation practices are initiated to reduce erosion in the drainage basin and the resulting

* See Working Paper No. 175, "...Survey Methods, 1973-1976".

turbidity in the reservoir.

2. Non-point sources--Non-point sources accounted for 86.3% of the total phosphorus load during the sampling year. The Marias River contributed 67.9% and Willow Creek contributed 10.3%. The ungaged minor tributaries and immediate drainage were estimated to have contributed 5.4%.

The phosphorus export rate of the Marias River was a low 2 kg/m^2 during the sampling year as was that of unpacted Willow Creek. This indicates the distant point sources noted above probably were not significant contributors of phosphorus during the sampling year.

II. RESERVOIR AND DRAINAGE BASIN CHARACTERISTICS[†]

A. Morphometry^{††}:

1. Surface area: 50.59 kilometers².
2. Mean depth: 15.3 meters.
3. Maximum depth: >42.7 meters.
4. Volume: 774.632×10^6 m³.
5. Mean hydraulic retention time: 318 days.

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

1. Tributaries -

<u>Name</u>	<u>Drainage area (km²)*</u>	<u>Mean flow (m³/sec)*</u>
Marias River	9,665.9	27.180
Willow Creek	2,177.2	0.383
Minor tributaries & immediate drainage -	<u>867.2</u>	<u>0.607</u>
Totals	12,710.3	28.170**

2. Outlet -

Marias River	12,760.9***	28.170
--------------	-------------	--------

C. Precipitation****:

1. Year of sampling: 42.8 centimeters.
2. Mean annual: 26.4 centimeters.

[†] Table of metric conversions--Appendix B.

^{††} Aycock, 1976.

* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".

** Sum of inflows adjusted to equal outflow.

*** Includes area of reservoir.

**** See Working Paper No. 175.

III. WATER QUALITY SUMMARY

Tiber Reservoir was sampled three times during the open-water season of 1975 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from one or more depths at six stations on the reservoir (see map, page v). During each visit, a single depth-integrated (4.6 m or near bottom to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the last visit, two 18.9-liter depth-integrated samples were composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 1.5 meters at station 1, 25.9 meters at station 2, 18.6 meters at station 3, 19.8 meters at station 4, 42.7 meters at station 5, and 7.3 meters at station 6.

The sampling results are presented in full in Appendix D and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR TIBER RESERVOIR
STORET CODE 3013

PARAMETER	1ST SAMPLING (5/30/75)				2ND SAMPLING (7/25/75)				3RD SAMPLING (9/ 9/75)			
	6 SITES				6 SITES				6 SITES			
	RANGE	MEAN	MEDIAN		RANGE	MEAN	MEDIAN		RANGE	MEAN	MEDIAN	
TEMP (C)	5.9 - 13.3	9.4	9.0		6.7 - 21.1	16.2	17.7		4.1 - 13.7	11.8	12.7	
DISS OXY (MG/L)	9.0 - 11.0	9.9	10.0		6.0 - 10.0	7.2	7.2		5.4 - 9.4	8.0	8.2	
CNDCTVY (MCROMO)	280. - 521.	368.	368.		350. - 498.	409.	407.		392. - 718.	484.	464.	
PH (STAND UNITS)	8.3 - 8.5	8.3	8.3		7.9 - 8.4	8.1	8.2		7.9 - 8.5	8.3	8.3	
TOT ALK (MG/L)	121. - 158.	134.	134.		115. - 155.	132.	132.		123. - 192.	141.	136.	
TOT P (MG/L)	0.017 - 0.062	0.032	0.026		0.009 - 0.051	0.022	0.013		0.011 - 0.050	0.020	0.015	
ORTHO P (MG/L)	0.012 - 0.029	0.017	0.017		0.002 - 0.011	0.004	0.002		0.002 - 0.008	0.003	0.002	
NO2+NO3 (MG/L)	0.040 - 0.250	0.174	0.210		0.050 - 0.270	0.146	0.120		0.020 - 0.280	0.136	0.145	
AMMONIA (MG/L)	0.020 - 0.070	0.048	0.050		0.020 - 0.070	0.040	0.040		0.020 - 0.030	0.020	0.020	
KJEL N (MG/L)	0.200 - 0.700	0.358	0.350		0.200 - 0.400	0.261	0.250		0.200 - 0.600	0.350	0.400	
INORG N (MG/L)	0.060 - 0.320	0.222	0.250		0.070 - 0.340	0.187	0.150		0.040 - 0.300	0.156	0.165	
TOTAL N (MG/L)	0.240 - 0.780	0.532	0.540		0.250 - 0.570	0.407	0.420		0.300 - 0.720	0.486	0.470	
CHLRPYL A (UG/L)	0.8 - 5.9	2.1	1.6		0.7 - 4.1	2.1	1.7		1.7 - 12.1	4.2	2.3	
SECCHI (METERS)	0.3 - 1.0	0.5	0.4		0.3 - 4.3	2.4	2.5		0.2 - 2.1	1.0	0.9	

B. Biological Characteristics:

1. Phytoplankton -

<u>Sampling Date</u>	<u>Dominant Genera</u>	<u>Algal Units per ml</u>
05/30/75	1. <u>Chroomonas sp.</u>	417
	2. <u>Ankistrodesmus sp.</u>	179
	3. <u>Synedra sp.</u>	89
	4. <u>Cryptomonas sp.</u>	30
	5. <u>Trachelomonas sp.</u>	30
	Total	774
07/25/75	1. <u>Nitzschia sp.</u>	1,390
	2. <u>Fragilaria sp.</u>	348
	3. <u>Chroomonas sp.</u>	139
	4. <u>Schroederia sp.</u>	139
	5. <u>Cryptomonas sp.</u>	70
	Other genera	69
	Total	2,155
09/09/75	1. <u>Synedra sp.</u>	214
	2. <u>Chroomonas sp.</u>	143
	3. <u>Oscillatoria sp.</u>	107
	Total	464

2. Chlorophyll a -

<u>Sampling Date</u>	<u>Station Number</u>	<u>Chlorophyll a (µg/l)</u>
05/30/75	1	1.6
	2	0.8
	3	1.0
	4	1.6
	5	1.7
	6	5.9
07/25/75	1	3.8
	2	0.7
	3	0.8
	4	4.1
	5	1.6
	6	1.9
09/09/75	1	4.8
	2	1.7
	3	1.8
	4	2.9
	5	1.7
	6	12.1

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

a. Stations 1, 2, and 3-

<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	0.195	0.3
0.050 P	0.055	0.195	8.0
0.050 P + 1.0 N	0.055	1.195	8.4
1.0 N	0.005	1.195	0.2

b. Stations 4, 5, and 6 -

<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	0.190	0.3
0.050 P	0.055	0.190	8.4
0.050 P + 1.0 N	0.055	1.190	11.0
1.0 N	0.005	1.190	0.3

2. Discussion -

The control yields of the assay alga, Selenastrum capricornutum, indicate that the potential primary productivity of Tiber Reservoir was moderate at the time the samples were taken (09/09/75). Also, the increases in yields with the addition of phosphorus alone indicate the reservoir was phosphorus limited at that time. Note that increased yields did not result with the addition of nitrogen alone.

The reservoir data indicate phosphorus limitation in July and September, with the exception of station 6, and a combination of limiting nutrients is indicated in May. Following is a tabulation of the mean inorganic nitrogen/

orthophosphorus ratios at each sampling station and time
with the indicated limiting nutrient in parentheses.

<u>Station</u>	<u>05/06/75</u>	<u>07/25/75</u>	<u>09/09/75</u>
1	8/1 (N)	35/1 (P)	55/1 (P)
2	12/1 (N)	44/1 (P)	75/1 (P)
3	13/1 (N?)	38/1 (P)	90/1 (P)
4	14/1 (P)	30/1 (P)	86/1 (P)
5	17/1 (P)	70/1 (P)	68/1 (P)
6	6/1 (N)	55/1 (P)	11/1 (N)

IV. NUTRIENT LOADINGS (See Appendix E for data)

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

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Montana District Office of the U.S. Geological Survey for the tributary sites nearest the reservoir.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. Nutrient loads shown are those measured minus point-source loads, if any.

Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the nutrient loads at station D-1, in $\text{kg}/\text{km}^2/\text{year}$, and multiplying by the ZZ area in km^2 .

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

* See Working Paper No. 175.

A. Waste Sources:

1. Known municipal* -

<u>Name</u>	<u>Pop. Served</u>	<u>Treatment</u>	<u>Mean Flow (m³/d)</u>	<u>Receiving Water</u>
Shelby	3,200	stab. pond	2,561.0	Marias River

2. Known industrial - None

*Treatment plant questionnaire.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

<u>Source</u>	<u>kg P/ yr</u>	<u>% of total</u>
a. Tributaries (non-point load) -		
Marias River	21,810	67.9
Willow Creek	3,305	10.3
b. Minor tributaries & immediate drainage (non-point load) -	1,735	5.4
c. Known municipal STP's -		
Shelby	4,390	13.7
d. Septic tanks* -	<5	<0.1
e. Known industrial - None	-	-
f. Direct precipitation** -	<u>885</u>	<u>2.8</u>
Total	32,125	100.0

2. Outputs -

Reservoir outlet - Marias River 13,855

3. Net annual P accumulation - 18,270 kg.

* Estimate based on 1 campground; see Working Paper No. 175.

** See 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 (non-point load) -		
Marias River	1,610,980	92.1
Willow Creek	46,480	2.7
b. Minor tributaries & immediate drainage (non-point load) -	18,210	1.0
c. Known municipal STP's -		
Shelby	18,755	1.1
d. Septic tanks* -	70	<0.1
e. Known industrial - None	-	-
f. Direct precipitation** -	<u>54,615</u>	<u>3.1</u>
Total	1,749,110	100.0

2. Outputs -

Reservoir outlet - Marias River 740,560

3. Net annual N accumulation - 1,008,550 kg.

D. Mean Annual Non-point Nutrient Export by Subdrainage Area:

<u>Tributary</u>	<u>kg P/km²/yr</u>	<u>kg N/km²/yr</u>
Marias River	2	167
Willow Creek	2	21

* Estimate based on 1 campground; see Working Paper No. 175.

** See Working Paper No. 175.

E. Yearly Loads:

In the following table, the existing phosphorus loadings are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" loading is one at which the receiving water would become eutrophic or remain eutrophic; his "permissible" 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 "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m ² /yr	0.64	0.36	34.6	19.9

Vollenweider phosphorus loadings
(g/m²/yr) based on mean depth and mean
hydraulic retention time of Tiber Reservoir:

"Dangerous" (eutrophic loading)	0.80
"Permissible" (oligotrophic loading)	0.40

V. LITERATURE REVIEWED

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Vollenweider, R. A., and P. J. Dillon, 1974. The application of the phosphorus loading concept to eutrophication research. Natl. Res. Council of Canada Publ. No. 13690, Canada Centre for Inland Waters, Burlington, Ontario.

VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500- MEAN SEC	MEAN CHLOR A	15- MIN DO	MEDIAN DISS-OXYGEN P
3001	CANYON FERRY RESERVOIR	0.047	0.170	442.800	5.816	14.400	0.029
3002	CLARK CANYON RESERVOIR	0.044	0.160	398.750	2.375	12.000	0.027
3003	FLATHEAD LAKE	0.008	0.050	267.833	1.273	9.000	0.004
3004	GEORGETOWN RESERVOIR	0.022	0.040	367.333	6.983	10.200	0.011
3005	HEHGEN RESERVOIR	0.022	0.040	367.700	4.083	13.800	0.020
3006	KUOCANUSA RESERVOIR	0.045	0.100	337.643	2.669	10.400	0.044
3007	MARY RONAN LAKE	0.020	0.040	371.091	4.673	14.200	0.006
3008	MC DONALD LAKE	0.006	0.180	190.667	0.467	6.400	0.002
3009	NELSON RESERVOIR	0.029	0.075	456.750	7.233	11.400	0.007
3010	SEELEY LAKE	0.015	0.040	362.857	2.171	13.200	0.010
3011	SWAN LAKE	0.010	0.050	282.750	3.289	9.600	0.004
3012	TALLY LAKE	0.011	0.050	339.167	2.083	9.200	0.004
3013	TIBER RESERVOIR	0.018	0.180	448.555	2.806	9.600	0.004
3014	TONGUE RIVER RESERVOIR	0.051	0.050	474.111	16.878	13.600	0.008
3016	WHITEFISH LAKE (LOWER)	0.003	0.040	290.000	1.400	7.000	0.003

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	INDEX NO
3001	CANYON FERRY RESERVOIR	14 (2)	14 (2)	21 (3)	21 (3)	0 (0)	7 (1)	77
3002	CLARK CANYON RESERVOIR	7 (1)	21 (3)	29 (4)	64 (9)	36 (5)	14 (2)	171
3003	FLATHEAD LAKE	89 (12)	61 (8)	93 (13)	93 (13)	86 (12)	75 (9)	497
3004	GEORGETOWN RESERVOIR	39 (5)	79 (10)	50 (7)	14 (2)	57 (8)	29 (4)	268
3005	HERGEN RESERVOIR	39 (5)	79 (10)	43 (6)	36 (5)	14 (2)	21 (3)	232
3006	KOOCANUSA RESERVOIR	21 (3)	29 (4)	71 (10)	57 (8)	50 (7)	0 (0)	228
3007	MARY RONAN LAKE	50 (7)	96 (13)	36 (5)	29 (4)	7 (1)	57 (8)	275
3008	MC DONALD LAKE	100 (14)	4 (0)	100 (14)	100 (14)	100 (14)	100 (14)	504
3009	NELSON RESERVOIR	29 (4)	36 (5)	7 (1)	7 (1)	43 (6)	50 (7)	172
3010	SEELEY LAKE	64 (9)	96 (13)	57 (8)	71 (10)	29 (4)	36 (5)	353
3011	SWAN LAKE	79 (11)	46 (6)	86 (12)	43 (6)	68 (9)	75 (9)	397
3012	TALLY LAKE	71 (10)	61 (8)	64 (9)	79 (11)	79 (11)	75 (9)	429
3013	TIBER RESERVOIR	57 (8)	4 (0)	14 (2)	50 (7)	68 (9)	75 (9)	268
3014	TONGUE RIVER RESERVOIR	0 (0)	46 (6)	0 (0)	0 (0)	21 (3)	43 (6)	110
3016	WHITEFISH LAKE (LOWER)	89 (12)	79 (10)	79 (11)	86 (12)	93 (13)	93 (13)	519

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	3016	WHITEFISH LAKE (LOWER)	519
2	3008	MC DONALD LAKE	504
3	3003	FLATHEAD LAKE	497
4	3012	TALLY LAKE	429
5	3011	SWAN LAKE	397
6	3010	SEELEY LAKE	353
7	3007	MARY RONAN LAKE	275
8	3013	TIBER RESERVOIR	268
9	3004	GEORGETOWN RESERVOIR	268
10	3005	HEBGEN RESERVOIR	232
11	3006	KOOCANUSA RESERVOIR	228
12	3009	NELSON RESERVOIR	172
13	3002	CLARK CANYON RESERVOIR	171
14	3014	TONGUE RIVER RESERVOIR	110
15	3001	CANYON FERRY RESERVOIR	77

APPENDIX B

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 C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR MONTANA

08/05/76

LAKE CODE 3013 TIBER RESERVOIR

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 12760.9

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS)												MEAN
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
3013A1	12760.9	8.86	13.05	15.38	25.80	38.09	61.70	39.47	39.42	34.15	28.74	21.10	11.75	28.17
3013A2	9665.9	6.80	8.78	16.71	33.98	82.12	93.45	31.15	11.33	9.91	12.18	11.04	8.21	27.18
3013D1	2177.2	0.0	0.0	0.0	0.142	2.832	1.416	0.142	0.028	0.0	0.0	0.0	0.0	0.383
3013ZZ	917.9	0.0	0.0	0.057	0.113	1.416	0.142	0.028	0.0	0.0	0.0	0.0	0.0	0.148

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 12760.9
SUM OF SUB-DRAINAGE AREAS = 12760.9

TOTAL FLOW IN = 331.96
TOTAL FLOW OUT = 337.51

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
3013A1	10	74	8.467	6	8.325				
	11	74	8.212	2	8.269				
	12	74	8.212	8	8.099				
	1	75	8.495	4	8.325				
	2	75	7.929	2	8.467				
	3	75	7.646	2	7.674				
	4	75	11.468	16	7.646				
	5	75	65.129						
	6	75	96.560	10	72.774	27	154.327	30	154.327
	7	75	150.929						
	8	75	65.129	30	60.032				
	9	75	51.253	8	59.749				
3013A2	10	74	6.541	6	6.173				
	11	74	6.088	2	6.343				
	12	74	4.332	6	5.947				
	1	75	4.191	4	4.248				
	2	75	4.049	18	4.106				
	3	75	7.051	1	5.097				
	4	75	33.839	19	84.951				
	5	75	95.145	4	34.830				
	6	75	273.625	5	163.671	26	226.535		
	7	75	89.793						
	8	75	29.733	4	35.396				
	9	75	12.516	3	19.997				

TRIBUTARY FLOW INFORMATION FOR MONTANA

08/05/76

LAKE CODE 3013 TIBER RESERVOIR

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
301301	10	74	0.0	6	0.0				
	11	74	0.0	3	0.0				
	12	74	0.0	8	0.0				
	1	75	0.0	4	0.0				
	2	75	0.0	2	0.0				
	3	75	0.0	2	0.0				
	4	75	0.227	16	0.0				
	5	75	4.672	27	0.0				
	6	75	2.888	10	0.566	30	1.416		
	7	75	0.198						
	8	75	0.003	30	0.003				
	9	75	0.003	8	0.003				

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 76/08/05

301301
48 21 19.0 111 32 47.0 3
TIBER RESERVOIR
30101 MONTANA

090191

11EPALES 2111202
0006 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 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
75/05/30	10 45	0000	13.3	9.0	11	285	8.35	121	0.030	0.500	0.060	0.018
	10 45	0005	13.2	9.0		280	8.30	121	0.020	0.300	0.040	0.017
75/07/25	11 00	0000	21.1	7.6	13	498	8.45	155	0.020K	0.200K	0.050	0.002
75/09/09	11 35	0000	13.7	8.2	9	716	8.30	182	0.020K	0.200	0.100	0.002K
	11 35	0005	13.2	8.0		718	8.35	192	0.020K	0.500	0.080	0.002K

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/05/30	10 45	0000	0.046		1.6
	10 45	0005	0.062		
75/07/25	11 00	0000	0.026		3.8
75/09/09	11 35	0000	0.023		4.8
	11 35	0005	0.023		

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/08/05

301302
48 21 00.0 111 18 25.0 3
TIBER RESERVOIR
30101 MONTANA

090191

11EPALES 2111202
0056 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CONDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CAC03 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/05/30	11 15	0000	9.1	9.0	17	368	8.40	123	0.030	0.200	0.040	0.016
	11 15	0005	9.1	9.6		368	8.30	125	0.060	0.300	0.210	0.029K
	11 15	0015	9.0	9.6		361	8.30	126	0.050	0.400	0.210	0.019
	11 15	0025	8.8	10.0		363	8.30	134	0.060	0.400	0.240	0.018
	11 15	0052	7.2	9.8		382	8.30	132	0.060	0.400	0.240	0.017
75/07/25	11 45	0000	19.5	7.2	168	421	8.30	135	0.030	0.200	0.110	0.002
	11 45	0005	19.6	7.4		408	8.30	131	0.030	0.200	0.110	0.002K
	11 45	0015	19.0	7.4		397	8.40	131	0.040	0.300	0.110	0.002K
	11 45	0028	16.3	6.6		382	7.95	124	0.050	0.200	0.220	0.007
	11 45	0060	11.5	7.2		356	7.95	127	0.050	0.300	0.220	0.007
75/09/09	11 45	0085	11.2	6.0		350	7.90	132	0.070	0.300	0.270	0.011
	10 50	0000	12.7	9.4	60	464	8.50	147	0.020	0.400	0.020K	0.003
	10 50	0005	12.7	8.0		464	8.35	136	0.020	0.200	0.160	0.002
	10 50	0024	12.2	8.0		464	8.20	136	0.020K	0.200	0.160	0.002
	10 50	0051	11.8	7.8		464	8.30	139	0.020K	0.200	0.180	0.002K

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/05/30	11 15	0000	0.041	0.8	
	11 15	0005	0.028		
	11 15	0015	0.032		
	11 15	0025	0.022		
	11 15	0052	0.023		
75/07/25	11 45	0000	0.009	0.7	
	11 45	0005	0.011		
	11 45	0015	0.016		
	11 45	0028	0.013		
	11 45	0060	0.018		
75/09/09	11 45	0085	0.051		
	10 50	0000	0.048	1.7	
	10 50	0005	0.013		
	10 50	0024	0.012		
	10 50	0051	0.015		

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/08/05

301303
48 20 45.0 111 24 45.0 3
THER RESERVOIR
30101 MONTANA

090191

11EPALES 2111202
0040 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 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
75/05/30	15 30	0000	10.5	10.0	13	295	8.45	128	0.040	0.500	0.130	0.019
	15 30	0005	10.5	9.2		299	8.40	125	0.040	0.300	0.120	0.017
	15 30	0015	10.2	9.8		305	8.40	127	0.050	0.300	0.130	0.017
	15 30	0025	8.8	10.0		355	8.30	131	0.060	0.300	0.220	0.012
	15 30	0036	7.9	9.8		373	8.30	134	0.070	0.400	0.250	0.019
75/07/25	11 15	0000	18.8	7.8	72	471	8.30	133	0.030	0.200	0.110	0.002
	11 15	0005	11.7			410	8.05	134	0.020	0.200	0.110	0.002
	11 15	0021	17.7	6.0		398	8.00	133	0.040	0.300	0.130	0.007
	11 15	0040	13.2	6.6		358	7.95	127	0.050	0.200	0.190	0.005
	11 15	0061	11.6	6.2		357	7.90	126	0.060	0.300	0.220	0.007
75/09/09	11 10	0000	12.8	8.4	18	505	8.30	146	0.020K	0.200	0.160	0.002K
	11 10	0005	12.8	8.2		506	8.30	146	0.020K	0.200	0.160	0.002K
	11 10	0017	12.7	8.6		501	8.30	147	0.020K	0.200	0.160	0.002K
	11 10	0041	11.9	7.6		558	8.30	146	0.020K	0.200	0.160	0.002K

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/05/30	15 30	0000	0.045	1.0	
	15 30	0005	0.043		
	15 30	0015	0.044		
	15 30	0025	0.039		
	15 30	0036	0.033		
75/07/25	11 15	0000	0.010	0.8	
	11 15	0005	0.013		
	11 15	0021	0.014		
	11 15	0040	0.018		
	11 15	0061	0.036		
75/09/09	11 10	0000	0.014	1.8	
	11 10	0005	0.012		
	11 10	0017	0.012		
	11 10	0041	0.018		

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/08/05

301304
48 22 55.0 111 12 50.0 3
TIBER RESERVOIR
30051 MONTANA

090191

11EPALES 2111202
0062 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
75/05/30	14 50	0000	8.9	10.0	30	397	8.35	133	0.050	0.400	0.210	0.023K
	14 50	0005	8.9	10.2		385	8.35	135	0.040	0.400	0.210	0.017
	14 50	0015	8.8	10.0		385	8.35	135	0.040	0.400	0.210	0.014
	14 50	0025	8.6	10.0		391	8.30	136	0.050	0.500	0.210	0.019
	14 50	0058	6.8	10.8		365	8.35	134	0.060	0.400	0.210	0.018
75/07/25	14 10	0000	20.2	7.2	108	447	8.30	129	0.030	0.200	0.100	0.002K
	14 10	0005	20.2	7.6		441	8.25	133	0.040	0.300	0.100	0.006
	14 10	0015	19.1	7.2		429	8.20	128	0.040	0.200	0.110	0.002
	14 10	0030	15.7	6.0		395	8.00	128	0.040	0.200	0.110	0.002
	14 10	0045	12.5	6.2		371	7.90	125	0.060	0.300	0.190	0.011
	14 10	0058	11.5	6.6		357	7.95	123	0.050	0.300	0.220	0.010
75/09/09	10 00	0000	12.8	8.6	55	416	8.30	131	0.020K	0.400	0.140	0.002K
	10 00	0005	12.9	8.8		455	8.35	132	0.020K	0.400	0.120	0.002K
	10 00	0023	12.7	8.3		453	8.30	135	0.020K	0.600	0.120	0.003
	10 00	0045	12.5	8.2		449	8.20	133	0.020K	0.500	0.130	0.002K
	10 00	0065	4.1	5.4		396	8.00	132	0.020K	0.400	0.250	0.002K

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/05/30	14 50	0000	0.020	1.6	
	14 50	0005	0.022		
	14 50	0015	0.023		
	14 50	0025	0.027		
	14 50	0058	0.021		
75/07/25	14 10	0000	0.010	4.1	
	14 10	0005	0.012		
	14 10	0015	0.010		
	14 10	0030	0.010		
	14 10	0045	0.016		
	14 10	0058	0.017		
75/09/09	10 00	0000	0.015	2.9	
	10 00	0005	0.012		
	10 00	0023	0.013		
	10 00	0045	0.014		
	10 00	0065	0.019		

STORET RETRIEVAL DATE 75/09/05

301305
48 19 25.0 111 06 15.0 3
TIHEK RESERVOIR
30051 MONTANA

090191

11EPALES 2111202
0130 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CONDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CAC03 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/05/30	14 45	0000	10.0	10.0	40	387	8.30	138	0.060	0.200	0.210	0.016
	14 45	0005	10.0	10.0		389	8.30	136	0.040	0.200K	0.210	0.015
	14 45	0015	9.2	11.0		380	8.30	139	0.050	0.200	0.220	0.016
	14 45	0045	8.4	10.8		373	8.40	139	0.060	0.200K	0.210	0.016
	14 45	0075	7.3	10.4		357	8.30	141	0.050	0.200K	0.190	0.013
	14 45	0100		10.5		347	8.30	141	0.050	0.200	0.190	0.013
	14 45	0126	5.9	9.8		355	8.40	139	0.050	0.300	0.190	0.014
75/07/25	11 30	0000	20.3	7.6	90	440	8.30	133	0.040	0.300	0.120	0.002K
	11 30	0005	20.1	7.6		429	8.30	136	0.020K	0.300	0.120	0.002K
	11 30	0015	20.2	6.2		433	8.30	134	0.030	0.300	0.120	0.002K
	11 30	0030	17.8	6.8		406	8.20	131	0.050	0.200K	0.140	0.002
	11 30	0060	11.6	7.2		353	8.00	115	0.040	0.200	0.210	0.003
	11 30	0100	9.6	10.0		352	8.00	120	0.040	0.200	0.230	0.007
	11 30	0140	6.7	7.4		360	8.00	134	0.040	0.200	0.270	0.009
75/09/09	09 30	0000	13.0	8.2	84	438	8.50	128	0.020K	0.400	0.140	0.002K
	09 30	0005	13.0	8.4		446	8.40	129	0.020K	0.400	0.140	0.002K
	09 30	0030	12.9	8.2		445	8.30	129	0.020K	0.400	0.150	0.002K
	09 30	0065	11.9	7.7		428	8.00	123	0.020K	0.400	0.230	0.002
	09 30	0090	8.0	6.4		392	7.90	123	0.020K	0.400	0.280	0.008
	09 30	0126	4.1	5.8		406	8.20	130	0.020K	0.400	0.160	0.002K

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/05

301305
48 19 25.0 111 06 15.0 3
TIBEX RESERVOIR
30051 MONTANA

090191

11EPALES 2111202
0130 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLORPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/05/30	14 45	0000	0.026	1.7	
	14 45	0005	0.026		
	14 45	0015	0.026		
	14 45	0045	0.025		
	14 45	0075	0.017		
	14 45	0100	0.017		
	14 45	0126	0.020		
75/07/25	11 30	0000	0.010	1.6	
	11 30	0005	0.013		
	11 30	0015	0.012		
	11 30	0030	0.009		
	11 30	0060	0.013		
	11 30	0100	0.017		
	11 30	0140	0.022		
75/09/09	09 30	0000	0.018	1.7	
	09 30	0005	0.011		
	09 30	0030	0.011		
	09 30	0065	0.012		
	09 30	0090	0.018		
	09 30	0126	0.023		

STORET RETRIEVAL DATE 76/03/05

301306
48 25 30.0 111 17 55.0 3
TIBER RESERVOIR
30101 MONTANA

090191

11EPALES 2111202
0011 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CONDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CAC03 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/05/30	15 10	0000	11.8	9.8	11	521	8.45	158	0.040	0.700	0.080	0.018
	15 10	0007	11.7	9.8		514	8.50	158	0.040	0.700	0.080	0.019
75/07/25	12 10	0000	19.8	7.8	115	477	8.30	142	0.040	0.400	0.080	0.002
	12 10	0005	19.8	7.8		478	8.30	140	0.040	0.400	0.070	0.003
	12 10	0024	16.8	8.0		470	8.30	143	0.040	0.400	0.060	0.002
75/09/09	11 25	0000	13.3	8.2	12	510	8.40	145	0.020	0.400	0.020K	0.003
	11 25	0005	13.3	8.2		512	8.50	146	0.030	0.400	0.020	0.006
	11 25	0009	13.3	8.4		510	8.50	147	0.020K	0.400	0.020	0.003

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/05/30	15 10	0000	0.055	5.9	
	15 10	0007	0.059		
75/07/25	12 10	0000	0.016	1.9	
	12 10	0005			
	12 10	0024	0.022		
75/09/09	11 25	0000	0.040	12.1	
	11 25	0005	0.050		
	11 25	0009	0.040		

K VALUE KNOWN TO BE
LESS THAN INDICATED

APPENDIX E

TRIBUTARY AND WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 76/08/05

3013A1
 48 18 25.0 111 05 28.0 4
 MARIAS RIVER
 30 7.5 TIBER DAM
 0/TIBER RESERVOIR 090191
 BNK END OF RD .3 M SW OF TIBER DAM CAMP
 11EPALES 2111204
 0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/10/06	12 15		0.064	0.800	0.035	0.005K	0.010
74/11/02	10 12		0.064	0.600	0.020	0.005K	0.010K
74/12/08	10 46		0.056	0.100	0.015	0.005K	0.010K
75/01/04	11 49		0.056	0.600	0.005	0.005K	0.010K
75/02/02	11 20		0.072	0.100K	0.016	0.008K	0.010K
75/03/02	13 05		0.080	1.000	0.016	0.008K	0.010K
75/04/16	12 15		0.075	1.100	0.025	0.010	0.010
75/06/10	20 00		0.175	1.500	0.050	0.010	0.020
75/06/27	08 15		0.150	1.450	0.040	0.005K	0.020
75/06/30	20 00		0.065	0.300	0.080	0.040	0.040
75/08/30	19 00		0.050	0.600	0.025	0.005	0.020
75/09/08	20 00		0.135	0.500	0.015	0.005	0.010K

K VALUE KNOWN TO BE
 LESS THAN INDICATED

STORET RETRIEVAL DATE 76/08/05

3013A2
 48 23 02.0 111 43 04.0 4
 MARIAS RESERVOIR
 30 7.5 DUNKIRK
 T/TIER RESERVOIR 090191
 FOOT BRDG 2.4 MI W OF MT PRINPL MERIDIAN
 11EPALES 2111204
 0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2-N N-TOTAL MG/L	00625 TOT KJEL N MG/L	03610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/10/06	16 15		0.052	0.800	0.030	0.005K	0.010
74/11/02	07 30		0.080	0.300	0.010	0.005K	0.010K
74/12/06	16 08		0.104	0.300	0.020	0.005K	0.010K
75/01/04	15 30		0.064	1.800	0.005K	0.005K	0.010K
75/02/18	17 30		0.096	0.500	0.024	0.008K	0.010K
75/03/01	16 50		0.950	0.720	0.048	0.024	0.040
75/04/19	22 00		0.720	3.600	0.120	0.055	
75/05/04	15 00		0.400	1.150	0.035	0.015	
75/06/05	17 00		0.030	1.700	0.020	0.007	
75/06/26	18 00		0.155		0.105	0.010	
75/08/04	14 00		0.020	1.400	0.070	0.015	0.030
75/09/03	14 00		0.110	0.800	0.025	0.005K	0.020

K VALUE KNOWN TO BE
 LESS THAN INDICATED

STORET RETRIEVAL DATE 76/08/05

301301
48 26 55.0 111 20 40.0 4
WILLOW CREEK
30 7.5 GALATA
T/TIBER RESERVOIR 090191
BRDG ON BOOTLEGGER TRL RD 1.7 M S GALATA
11EPALES 2111204
0000 FEET DEPTH CLASS 00

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	OF						
TO	DAY	FEET					
75/06/10	09	00	0.010	1.450	0.530	0.015	0.015
75/06/30	09	00	0.160	1.450	0.080	0.115	0.350
75/08/30	21	00	0.005	1.800	0.015	0.010	0.070
75/09/08	09	00	0.020	2.600	0.050	0.020	0.125

STORET RETRIEVAL DATE 76/08/05

3013AA PU3013AA P003200
 48 30 00.0 111 51 00.0 4
 SHELBY
 30 7.5 SHELBY
 T/TIBER RES. 090191
 MARIAS RIVER
 11EPALES 2141204
 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 ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/01/29	08 30		0.080	16.000	0.450	4.900	6.300	0.300	
75/02/19	08 45		0.080	17.700	10.800	2.300	9.500	0.210	0.260
75/03/19	09 00		0.080	20.000	16.000	5.300	10.000	0.430	0.390
75/04/23	08 30			29.000	23.000		9.100	0.400	0.370
75/05/21	08 45		0.050	31.500	0.640	4.100	5.200	3.500	3.840
75/06/18	08 30		0.350	3.500	0.360	1.800	2.200	0.607	0.293
75/07/23	09 00		0.350	3.100	0.140	2.400	2.600	0.187	0.450
75/08/20	09 00		0.150	4.100	0.160	1.150	1.300	1.200	0.580
75/09/24	09 00		0.050	3.900	0.056	0.940	1.100	0.252	0.347
75/10/22	09 00		0.400	4.800	0.240	1.570	1.800	0.252	0.050
75/11/26	08 45		0.175	8.100	0.400	2.750	2.600	0.446	0.373
75/12/23	09 00		0.025	15.000	2.600	5.000	6.000	0.937	1.090
76/04/21	13 00			6.000			5.000	0.103	0.452