U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY

WORKING PAPER SERIES

REPORT

ON

SOMERVILLE LAKE

BURLESON, LEE AND WASHINGTON COUNTIES

TEXAS

EPA REGION VI

WORKING PAPER No. 659

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

TEXAS WATER QUALITY BOARD

AND THE

TEXAS NATIONAL GUARD

MARCH, 1977

CONTENTS

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) expresses sincere appreciation to the Texas Water Quality Board for professional involvement, to the Texas National Guard for conducting the tributary sampling phase of the Survey, and to those Texas wastewater treatment plant operators who voluntarily provided effluent samples.

Hugh C. Yantis, Jr., Executive Director of the Texas Water Quality Board, and John B. Latchford, Jr., Director, and the staff of the Field Operations Division 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 Thomas Bishop, the Adjutant General of Texas, and Project Officer Colonel William L. Seals, who directed the volunteer efforts of the Texas National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

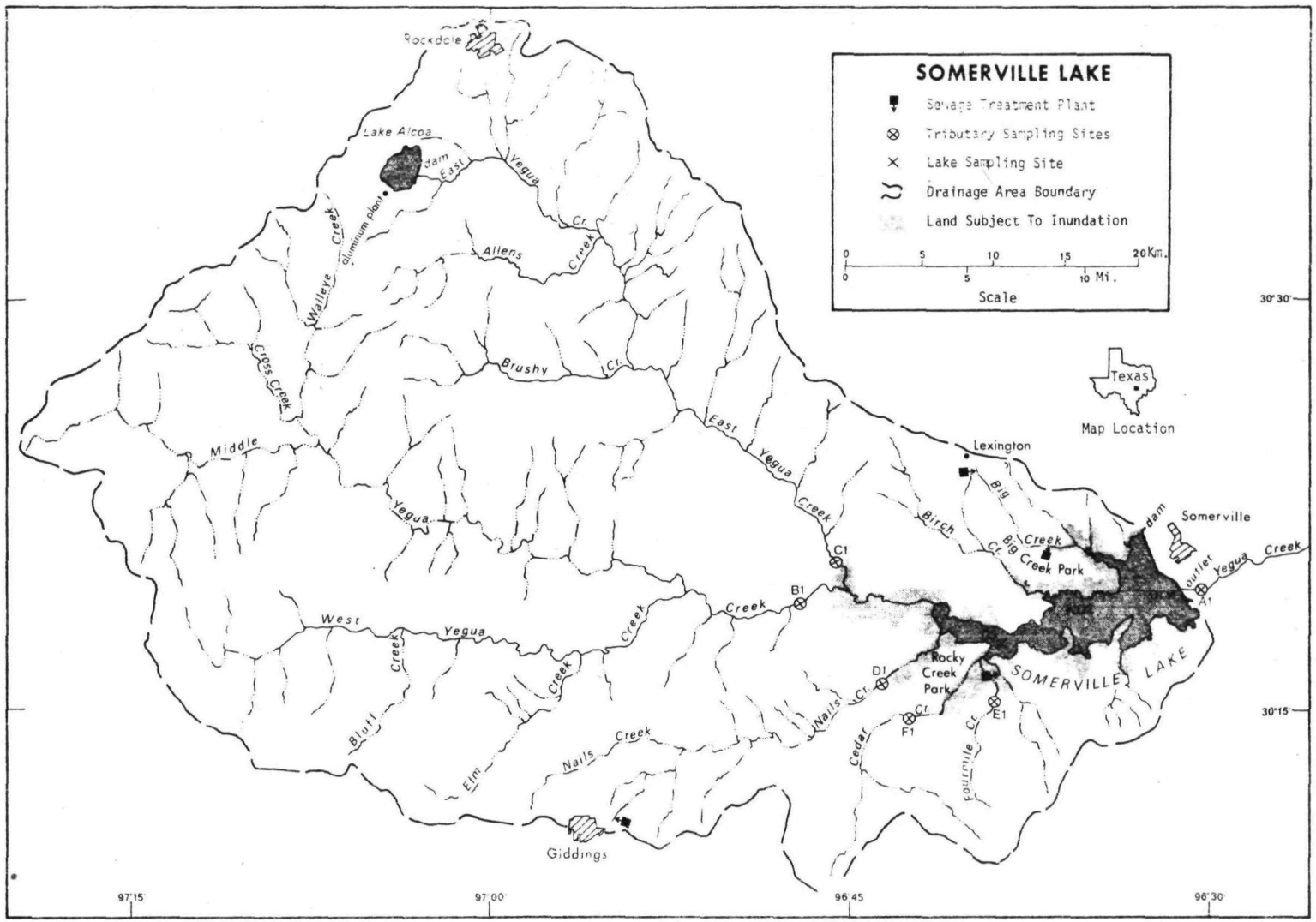
NATIONAL EUTROPHICATION SURVEY

STUDY RESERVOIRS

State of Texas

NAME	COUNTY
Amistad	Val Verde
Bastrop	Bastrop
Belton	Bell, Coryell
Braunig	Bexar
Brownwood	Brown
Buchanan	Burnet, Llano
Caddo	Harrison, Marion, TX; Caddo Parish, LA
Calaveras	Bexar
Canyon	Comal
Colorado City	Mitchell
Corpus Christi	Jim Wells, Live Oak, San Patricio
Diversion	Archer, Baylor
Eagle Mountain	Tarrant, Wise
Fort Phantom Hill	Jones
Houston	Harris
Kemp	Baylor
Lake O'The Pines	Camp, Marion, Morris, Upshur
Lavon	Collin
Lewisville (Garza-Little Elm)	Denton
Livingston	Polk, San Jacinto, Trinity, Walker

Lyndon B. Johnson	Burnet, Llano
Medina	Bandera, Medina
Meredith	Hutchinson, Moore, Potter
O. C. Fisher (San Angelo)	Tom Green
Palestine	Anderson, Cherokee, Henderson, Smith
Possum Kingdom	Palo Pinto, Stephens, Young
Sam Rayburn	Angelina, Jasper Nacogdoches, Sabine, San Augustine
Somerville	Burleson, Lee, Washington
E. V. Spence	Coke
Stamford	Haskell
Stillhouse Hollow	Bell
Tawakoni	Hunt, Rains, Van Zandt
Texoma	Cooke, Grayson TX; Bryan, Johnston, Love, Marshall, OK
Travis	Burnet, Travis
Trinidad	Henderson
Twin Buttes	Tom Green
White River	Crosby
Whitney	Bosque, Hill
Wright Patman (Texarkana)	Bowie, Cass


SOMERVILLE LAKE
Sewage Treatment Plant
Tributary Sampling Sites
Lake Sampling Site
Drainage Area Boundary
Land Subject To Inundation
0 5 10 15 20Km.
0 5 10 Mi.
Scale
Texas
Map Location
Rockdale
Lake Alcoa
dam
East Yegua Cr.
Aluminum plant
Walleye Creek
Allens Creek
Brushy Cr.
Cross Creek
Middle Yegua
East Yegua Creek
Lexington
Big Birch Cr.
Big Creek
Big Creek Park
dam
Somerville
outlet
Yegua Creek
C1
B1
West Yegua Creek
Bluff Creek
Elm Creek
Nails Creek
Rocky Creek Park
D1
E1
F1
Nails Cr.
Cedar Cr.
Fourmile Cr.
SOMERVILLE LAKE
Giddings
97°15
97°00
96°45
96°30
30°30
30°15

SOMERVILLE LAKE

STORET NO. 4829

I. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Somerville Lake is eutrophic; i.e., well supplied with nutrients and quite productive. Whether nutrient enrichment is beneficial or deleterious depends on the actual or potential effect on the uses of the lake. In this regard, no nuisance conditions are known to personnel of the Texas Water Quality Board and there is little or no impairment of the designated beneficial uses of this water body.

Somerville Lake ranked thirty-first when the 39 Texas reservoirs sampled in 1974 were compared using a combination of six parameters*. Twenty-seven of the reservoirs had less median total phosphorus, 25 had less and three had the same median dissolved orthophosphorus, 17 had less median inorganic nitrogen, 37 had less mean chlorophyll a, and 29 had greater mean Secchi disc transparency. Depression of dissolved oxygen with depth occurred at station 2 in May and at station 1 in August.

Survey limnologists observed submerged aquatic plants at stations 1 and 2 in May, and blue-green algae were dominant in the August phytoplankton sample.

B. Rate-Limiting Nutrient:

The results of the algal assay indicate that Somerville Lake was phosphorus limited in March but nitrogen limited in November.

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* See Appendix A.

The lake data indicate phosphorus limitation in March and May and nitrogen limitation in November.

C. Nutrient Controllability:

1. Point sources--The point-source phosphorus contributions amounted to 15.1% of the total load reaching Somerville Lake during the sampling year. Lexington contributed 1.8% of the total; Giddings, 6.4%; Rocky Creek Park, 4.3%, and Big Creek Park added 2.6% of the total. In addition, the City of Rockdale is in the Lake Sommerville drainage (Wyatt, 1976). However, this source is well beyond the 40-kilometer Survey limit*, and phosphorus contributions from this source probably are not significant as indicated by the relatively low export rate of East Yegua Creek (see discussion below).

The present phosphorus loading of 0.54 $g/m^2/yr$ is only a little more than that proposed by Vollenweider (Vollenweider and Dillon, 1974) as a eutrophic loading (see page 16). However, the data indicate that Somerville Lake is eutrophic, and it is possible that the point-source phosphorus contributions directly to the lake were underestimated. Further study is needed to quantify the point-source phosphorus contribution to Somerville Lake.

2. Non-point sources--Non-point sources contributed 84.9% of the total phosphorus load during the sampling year. Middle and East Yegua Creek contributed 30.9% and 12.5% of the load, respectively.

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

The phosphorus export rates of Middle Yegua Creek, East Yegua Creek, Nails Creek, and Cedar Creek were 7, 4, 14, and 10 $kg/km^2/yr$, respectively. The rates of Middle and East Yegua Creek are quite comparable to the rates of tributaries of other reservoirs in the vicinity, but the export rates of Nails Creek and Cedar Creek are significantly higher. These higher rates may be due to unidentified point sources rather than to non-point source inputs.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS†

A. Lake Morphometry††:

1. Surface area: 46.38 kilometers^2.
2. Mean depth: 4.3 meters.
3. Maximum depth: >7.9 meters.
4. Volume: 197.496 x 10^6 m^3.
5. Mean hydraulic retention time: 0.6 years (based on 1972-1976 mean outflow).

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

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
Middle Yegua Creek	1,131.8	2.815
East Yegua Creek	714.8	1.500
Nails Creek	181.6	0.990
Cedar Creek	123.3	0.705
Minor tributaries & immediate drainage -	360.5	1.810
Totals	2,512.0	7.820

2. Outlet -

Brenham aqueduct	0.0	0.060**
Yegua Creek	2,610.7	6.530
Totals	2,610.7***	6.590***

C. Precipitation****:

1. Year of sampling: 119.0 centimeters.
2. Mean annual: 101.4 centimeters.

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† Table of metric conversions--Appendix B.
†† Barrows, 1977.
* For limits of accuracy, see Working Paper No. 175.
** Howard, 1976.
*** Includes area of lake; lesser outflow due to evaporation.
**** See Working Paper No. 175.

III. LAKE WATER QUALITY SUMMARY

Somerville Lake was sampled four times in 1974 by means of a pontoon-equippped Huey helicopter. Each time, samples for physical and chemical parameters were collected from two or more depths at three stations on the lake (see map, page vi). 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 first and last visits, a single 18.9-liter depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was composited from each of the stations for chlorophyll a analysis. The maximum depths sampled were 7.9 meters at station 1, 3.4 meters at station 2, and 1.5 meters at station 3.

The sampling results are presented in full in Appendix D and are summarized in the following table (the August nutrient samples were not preserved properly and were not analyzed).

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR SOMERVILLE LAKE
STORET CODE 4829

PARAMETER	1ST SAMPLING (3/14/74) 3 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (5/23/74) 3 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (8/16/74) 3 SITES RANGE	MEAN	MEDIAN
TEMP (C)	19.4 - 20.2	19.9	20.0	26.5 - 27.9	27.2	27.3	27.5 - 30.4	29.0	28.9
DISS OXY (MG/L)	7.6 - 8.4	7.9	8.0	3.8 - 8.0	6.0	6.0	2.0 - 10.8	7.1	7.4
CNDCTVY (MCROMO)	285. - 570.	354.	293.	390. - 647.	461.	407.	434. - 479.	452.	443.
PH (STAND UNITS)	7.7 - 7.8	7.8	7.8	7.0 - 7.9	7.4	7.5	7.6 - 9.4	8.5	8.4
TOT ALK (MG/L)	45. - 64.	50.	46.	51. - 54.	52.	52.	****** -**********		
TOT P (MG/L)	0.049 - 0.104	0.064	0.055	0.024 - 0.137	0.053	0.039	****** -**********		
ORTHO P (MG/L)	0.013 - 0.029	0.021	0.021	0.003 - 0.015	0.006	0.005	****** -**********		
NO2+NO3 (MG/L)	0.040 - 0.360	0.265	0.330	0.050 - 0.090	0.063	0.060	****** -**********		
AMMONIA (MG/L)	0.040 - 0.070	0.056	0.055	0.040 - 0.160	0.089	0.070	****** -**********		
KJEL N (MG/L)	0.400 - 1.000	0.625	0.550	0.500 - 1.200	0.689	0.600	****** -**********		
INORG N (MG/L)	0.080 - 0.430	0.321	0.390	0.090 - 0.250	0.152	0.140	****** -**********		
TOTAL N (MG/L)	0.750 - 1.050	0.890	0.855	0.570 - 1.270	0.752	0.660	****** -**********		
CHLRPYL A (UG/L)	6.9 - 30.9	20.5	23.6	5.9 - 13.2	8.6	6.8	31.8 - 53.7	41.9	40.1
SECCHI (METERS)	0.3 - 0.5	0.4	0.4	0.0 - 1.2	0.8	1.1	0.3 - 1.0	0.7	0.9

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR SOMERVILLE LAKE
STORET CODE 4829

4TH SAMPLING (11/ 6/74)

PARAMETER	3 SITES RANGE	MEAN	MEDIAN
TEMP (C)	17.8 - 20.7	20.0	20.6
DISS OXY (MG/L)	6.0 - 8.4	7.6	7.6
CNDCTVY (MCROMO)	255. - 276.	262.	258.
PH (STAND UNITS)	6.7 - 7.4	7.2	7.4
TOT ALK (MG/L)	35. - 44.	39.	38.
TOT P (MG/L)	0.046 - 0.126	0.068	0.058
ORTHO P (MG/L)	0.009 - 0.039	0.016	0.013
NO2+NO3 (MG/L)	0.020 - 0.040	0.024	0.020
AMMONIA (MG/L)	0.040 - 0.100	0.062	0.060
KJEL N (MG/L)	0.600 - 1.000	0.711	0.700
INORG N (MG/L)	0.060 - 0.130	0.087	0.090
TOTAL N (MG/L)	0.620 - 1.030	0.736	0.720
CHLRPYL A (UG/L)	23.1 - 33.4	28.2	28.2
SECCHI (METERS)	0.5 - 0.9	0.8	0.9

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
03/14/74	1. Nitzschia sp.	2,688
	2. Melosira sp.	1,613
	3. Chroomas sp.	1,559
	4. Merismopedia sp.	1,236
	5. Microcystis sp.	753
	Other genera	5,428
	Total	13,277
05/23/74	1. Carteria sp.	7,682
	2. Nitzschia sp.	906
	3. Oscillatoria sp.	584
	4. Merismopedia sp.	409
	5. Melosira sp.	380
	Other genera	2,015
	Total	11,976
08/16/74	1. Oscillatoria sp.	35,327
	2. Nitzschia sp.	5,815
	3. Merismopedia sp.	4,615
	4. Anabaenopsis sp.	3,098
	5. Lynbya sp.	2,445
	Other genera	15,441
	Total	66,741
11/06/74	1. Oscillatoria sp.	1,586
	2. Dactylococcopsis sp.	453
	3. Merismopedia sp.	198
	4. Lyngbya sp.	170
	5. Stephanodiscus sp.	170
	Other genera	1,219
	Total	3,796

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (µg/l)
03/14/74	1	30.9
	2	6.9
	3	23.6
05/23/74	1	6.8
	2	13.2
	3	5.9
08/16/74	1	31.8
	2	53.7
	3	40.1
11/06/74	1	23.1
	2	33.4
	3	-

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

a. March sample -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.020	0.359	3.7
0.050 P	0.070	0.359	8.3
0.050 P + 1.0 N	0.070	1.359	15.9
1.0 N	0.020	1.359	4.1

b. November sample -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.021	0.117	2.1
0.050 P	0.071	0.117	1.6
0.050 P + 1.0 N	0.071	1.117	17.4
1.0 N	0.021	1.117	3.5

2. Discussion -

The control yields of the assay alga, Selenastrum capricornutum, indicate that the potential primary productivity of Somerville Lake was high when the samples were collected (03/14/74 and 11/06/74). In the March sample, the increased yield resulting from the addition of orthophosphorus indicates phosphorus limitation at that time. However, in the November sample, the relatively small but significant increase in yield when nitrogen was added and lack of growth response when only orthophosphorus was added indicate nitrogen limitation.

The lake data support the assay findings. The mean inorganic nitrogen to orthophosphorus ratios were 15 to 1 in March, 25 to 1 in May, and 5 to 1 in November.

IV. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the Texas National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page vi), except for the month of April 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 Texas District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were calculated using mean annual concentrations and mean annual flows. 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 mean concentrations in Middle Yegua Creek at station B-1 and the mean annual ZZ flow. Nutrient loads for the Brenham aqueduct were calculated using the mean flow provided by the District office of the U. S. Army Corps of Engineers (Howard, 1976) and the mean nutrient concentrations measured in Yegua Creek at station A-1.

The operators of the Lexington, Giddings, Rocky Creek State Park, and Big Creek State Park treatment plants did not participate; nutrient loads from these sources were estimated at 1.134 kg P and 3.401 kg N/capita/year, and flows were estimated at 0.3785 m^3/capita/day.

A. Waste Sources:

1. Known municipal -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Lexington* (North plant)	400	stab. pond	151.4	Draw to Big Creek
Giddings*	1,400	stab. pond	529.9	Nails Creek
Big Creek State Park**	564	stab. pond	213.5	Somerville Lake
Rocky Creek State Park**	946	stab. pond	358.1	Somerville Lake

2. Known industrial - None

* Anonymous, 1971.
** Rennie, 1976.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
Middle Yegua Creek	7,725	30.9
East Yegua Creek	3,120	12.5
Nails Creek	2,530	10.1
Cedar Creek	1,180	4.7
b. Minor tributaries & immediate drainage (non-point load) -	4,965	19.8
c. Known municipal STP's -		
Lexington	455	1.8
Giddings	1,590	6.4
Rocky Creek State Park	1,075	4.3
Big Creek State Park	640	2.6
d. Septic tanks* -	5	<0.1
e. Known industrial - None	-	-
f. Direct precipitation** -	1,730	6.9
Total	25,015	100.0

2. Outputs -

Lake outlet - Brenham aqueduct	155
Yegua Creek	16,680
Total	16,835

3. Net annual P accumulation - 8,180 kg.

* Estimate based on three campgrounds (Rennie, 1976); see Working Paper No. 175.
** See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/ yr	% of total
a. Tributaries (non-point load) -		
Middle Yegua Creek	113,895	26.0
East Yegua Creek	63,200	14.4
Nail Creek	41,730	9.5
Cedar Creek	28,015	6.4
b. Minor tributaries & immediate drainage (non-point load) -	73,235	16.7
c. Known municipal STP's -		
Lexington	1,360	0.3
Giddings	4,760	1.1
Rocky Creek State Park	3,215	0.7
Big Creek State Park	1,920	0.5
d. Septic tanks* -	210	<0.1
e. Known industrial - None	-	-
f. Direct precipitation** -	106,600	24.4
Total	438,140	100.0

2. Outputs -

Lake outlet -	Brenham aqueduct	2,515
	Yegua Creek	273,885
	Total	276,400

3. Net annual N accumulation - 161,740 kg.

* Estimate based on three campgrounds (Rennie, 1976); see Working Paper No. 175.
** See Working Paper No. 175.

D. Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km^2/yr	kg N/km^2/yr
Middle Yegua Creek	7	101
East Yegua Creek	4	88
Nails Creek	14	230
Cedar Creek	10	227

E. Mean Nutrient Concentrations in Ungaged Stream:

Tributary	Mean Total P Conc. (mg/l)	Mean Total N Conc. (mg/l)
Fourmile Creek	0.031	1.016

F. 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	0.54	0.18	9.4	3.5

Vollenweider phosphorus loadings ($g/m^2/yr$) based on mean depth and mean hydraulic retention time of Somerville Lake:	
"Dangerous" (eutrophic loading)	0.52
"Permissible" (oligotrophic loading)	0.26

V. LITERATURE REVIEWED

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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 CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
4801	AMISTAD LAKE	0.013	0.500	371.474	2.[illegible]2	14.900	0.009
4802	BASTROP LAKE	0.022	0.090	419.917	12.392	15.000	0.007
4803	BELTON RESERVOIR	0.016	0.185	378.312	8.025	15.000	0.007
4804	BRAUNIG LAKE	0.134	0.150	461.625	22.762	14.800	0.062
4805	BROWNWOOD LAKE	0.027	0.100	470.375	4.887	14.400	0.007
4806	LAKE BUCHANAN	0.036	0.250	437.625	8.606	15.000	0.012
4807	CADDO LAKE	0.055	0.070	463.333	14.808	11.400	0.013
4808	CALAVERAS LAKE	0.038	0.060	461.667	22.500	13.000	0.007
4809	CANYON RESERVOIR	0.010	0.450	384.812	2.500	14.800	0.006
4810	LAKE COLORADO CITY	0.042	0.090	473.625	12.675	10.200	0.012
4811	CORPUS CRISTI LAKE	0.113	0.130	475.187	19.756	14.000	0.050
4812	DIVERSION LAKE	0.025	0.080	470.111	15.867	9.000	0.009
4813	EAGLE MOUNTAIN LAKE	0.024	0.070	469.625	5.662	11.000	0.008
4814	FT PHANTOM HILL LAKE	0.060	0.105	474.909	6.317	9.800	0.022
4815	GARZA LITTLE ELM RESERVO	0.045	0.380	475.782	14.156	14.600	0.018
4816	KEMP LAKE	0.023	0.110	455.000	10.217	10.400	0.007
4817	HOUSTON LAKE	0.097	0.260	486.187	16.650	12.400	0.036
4818	LAKE OF THE PINES	0.031	0.090	440.000	12.919	15.000	0.011
4819	LAVON RESERVOIR	0.063	0.180	485.333	5.400	8.800	0.018
4820	LIVINGSTON LAKE	0.196	0.555	465.469	16.112	15.000	0.128
4821	LYNDON B JOHNSON LAKE	0.042	0.420	456.500	8.100	14.900	0.013
4822	MEDINA LAKE	0.010	0.600	403.562	12.944	15.000	0.004
4823	LAKE MEREDITH	0.021	0.070	439.312	3.037	14.900	0.009
4824	PALESTINE LAKE	0.031	0.180	442.625	10.619	14.800	0.010
4825	POSSUM KINGDOM RESERVOIR	0.023	0.070	419.045	9.495	15.000	0.009
4826	SAN ANGELO RESERVOIR	0.098	0.140	481.000	24.675	10.200	0.011
4827	SAM RAYBURN RESERVOIR	0.029	0.150	439.458	6.267	15.000	0.009
4828	E V SPENCE RESERVOIR	0.036	0.080	462.583	11.775	15.000	0.008

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
4829	SOMERVILLE LAKE	0.053	0.115	473.833	24.491	13.000	0.013
4830	STAMFORD LAKE	0.073	0.060	482.714	18.457	10.600	0.012
4831	STILLHOUSE HOLLOW RESERV	0.018	0.160	406.250	3.917	15.000	0.010
4832	TAWAKONI LAKE	0.046	0.100	466.417	18.246	13.200	0.013
4833	TEXARKANA LAKE	0.106	0.120	478.500	19.119	12.400	0.030
4834	TEXOMA LAKE	0.042	0.160	451.321	12.493	15.000	0.018
4835	TRAVIS LAKE	0.018	0.250	389.913	5.595	15.000	0.007
4836	TRINIDAD	0.389	0.110	479.500	24.300	10.000	0.240
4837	TWIN BUTTES RESERVOIR	0.029	0.250	454.917	8.708	14.800	0.009
4838	WHITE RIVER RESERVOIR	0.020	0.110	434.500	4.333	15.000	0.009
4839	WHITNEY LAKE	0.028	0.120	430.500	6.912	15.000	0.008

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
4801	AMISTAD LAKE	95 (36)	5 (2)	100 (38)	100 (38)	39 (14)	63 (21)	402
4802	BASTROP LAKE	79 (30)	76 (28)	82 (31)	47 (18)	17 (0)	92 (34)	393
4803	BELTON RESERVOIR	92 (35)	26 (10)	97 (37)	68 (26)	17 (0)	84 (31)	384
4804	BRAUNIG LAKE	5 (2)	42 (16)	50 (19)	8 (3)	49 (17)	5 (2)	159
4805	BROWNWOOD LAKE	66 (25)	70 (26)	29 (11)	87 (33)	58 (22)	84 (31)	394
4806	LAKE BUCHANAN	47 (18)	21 (7)	74 (28)	63 (24)	17 (0)	39 (14)	261
4807	CADDO LAKE	26 (10)	91 (33)	42 (16)	32 (12)	76 (29)	30 (10)	297
4808	CALAVERAS LAKE	45 (17)	100 (38)	47 (18)	11 (4)	67 (25)	92 (34)	362
4809	CANYON RESERVOIR	99 (37)	8 (3)	95 (36)	97 (37)	49 (17)	97 (37)	445
4810	LAKE COLORADO CITY	39 (14)	76 (28)	26 (10)	42 (16)	88 (33)	39 (14)	310
4811	CORPUS CRISTI LAKE	8 (3)	47 (18)	18 (7)	13 (5)	61 (23)	8 (3)	155
4812	DIVERSION LAKE	68 (26)	83 (31)	32 (12)	29 (11)	97 (37)	63 (21)	372
4813	EAGLE MOUNTAIN LAKE	71 (27)	91 (33)	34 (13)	79 (30)	79 (30)	76 (28)	430
4814	FT PHANTOM HILL LAKE	24 (9)	66 (25)	21 (8)	74 (28)	95 (36)	16 (6)	296
4815	GARZA LITTLE ELM RESERVO	34 (13)	13 (5)	16 (6)	34 (13)	55 (21)	21 (7)	173
4816	KEMP LAKE	76 (29)	61 (22)	55 (21)	55 (21)	84 (32)	92 (34)	423
4817	HOUSTON LAKE	16 (6)	16 (6)	0 (0)	24 (9)	72 (27)	11 (4)	139
4818	LAKE OF THE PINES	54 (20)	76 (28)	66 (25)	39 (15)	17 (0)	46 (17)	298
4819	LAVON RESERVOIR	21 (8)	29 (11)	3 (1)	84 (32)	100 (38)	21 (7)	258
4820	LIVINGSTON LAKE	3 (1)	3 (1)	39 (15)	26 (10)	17 (0)	3 (1)	91
4821	LYNDON B JOHNSON LAKE	39 (14)	11 (4)	53 (20)	66 (25)	39 (14)	30 (10)	238
4822	MEDINA LAKE	99 (37)	0 (0)	89 (34)	37 (14)	17 (0)	100 (38)	342
4823	LAKE MEREDITH	82 (31)	91 (33)	71 (27)	95 (36)	39 (14)	63 (21)	441
4824	PALESTINE LAKE	54 (20)	32 (12)	63 (24)	53 (20)	49 (17)	51 (19)	302
4825	POSSUM KINGDOM RESERVOIR	74 (28)	91 (33)	84 (32)	58 (22)	17 (0)	63 (21)	387
4826	SAN ANGELO RESERVOIR	13 (5)	45 (17)	8 (3)	0 (0)	88 (33)	46 (17)	200
4827	SAM RAYBURN RESERVOIR	59 (22)	39 (15)	68 (26)	76 (29)	17 (0)	63 (21)	322
4828	E V SPENCE RESERVOIR	50 (19)	83 (31)	45 (17)	50 (19)	17 (0)	76 (28)	321

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
4829	SOMERVILLE LAKE	29 (11)	55 (21)	24 (9)	3 (1)	67 (25)	30 (10)	208
4830	STAMFORD LAKE	18 (7)	97 (37)	5 (2)	18 (7)	82 (31)	39 (14)	259
4831	STILLHOUSE HOLLOW RESERV	88 (33)	37 (14)	87 (33)	92 (35)	17 (0)	51 (19)	372
4832	TAWAKONI LAKE	32 (12)	70 (26)	37 (14)	21 (8)	63 (24)	30 (10)	253
4833	TEXARKANA LAKE	11 (4)	51 (19)	13 (5)	16 (6)	72 (27)	13 (5)	176
4834	TEXOMA LAKE	39 (14)	34 (13)	61 (23)	45 (17)	17 (0)	21 (7)	217
4835	TRAVIS LAKE	88 (33)	21 (7)	92 (35)	82 (31)	17 (0)	84 (31)	384
4836	TRINIDAD	0 (0)	61 (22)	11 (4)	5 (2)	92 (35)	0 (0)	169
4837	TWIN BUTTES RESERVOIR	59 (22)	21 (7)	58 (22)	61 (23)	49 (17)	63 (21)	311
4838	WHITE RIVER RESERVOIR	84 (32)	61 (22)	76 (29)	89 (34)	17 (0)	63 (21)	390
4839	WHITNEY LAKE	63 (24)	51 (19)	79 (30)	71 (27)	17 (0)	76 (28)	357

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	4809	CANYON RESERVOIR	445
2	4823	LAKE MEREDITH	441
3	4813	EAGLE MOUNTAIN LAKE	430
4	4816	KEMP LAKE	423
5	4801	AMISTAD LAKE	402
6	4805	BROWNWOOD LAKE	394
7	4802	BASTROP LAKE	393
8	4838	WHITE RIVER RESERVOIR	390
9	4825	POSSUM KINGDOM RESERVOIR	387
10	4835	TRAVIS LAKE	384
11	4803	BELTON RESERVOIR	384
12	4831	STILLHOUSE HOLLOW RESERV	372
13	4812	DIVERSION LAKE	372
14	4808	CALAVERAS LAKE	362
15	4839	WHITNEY LAKE	357
16	4822	MEDINA LAKE	342
17	4827	SAM RAYBURN RESERVOIR	322
18	4828	E V SPENCE RESERVOIR	321
19	4837	TWIN BUTTES RESERVOIR	311
20	4810	LAKE COLORADO CITY	310
21	4824	PALESTINE LAKE	302
22	4818	LAKE OF THE PINES	298
23	4807	CADDO LAKE	297
24	4814	FT PHANTOM HILL LAKE	296
25	4806	LAKE BUCHANAN	261
26	4830	STAMFORD LAKE	259
27	4819	LAVON RESERVOIR	258
28	4832	TAWAKONI LAKE	253

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
29	4821	LYNDON B JOHNSON LAKE	238
30	4834	TEXOMA LAKE	217
31	4829	SOMERVILLE LAKE	208
32	4826	SAN ANGELO RESERVOIR	200
33	4833	TEXARKANA LAKE	176
34	4815	GARZA LITTLE ELM RESERVO	173
35	4836	TRINIDAD	169
36	4804	BRAUNIG LAKE	159
37	4811	CORPUS CRISTI LAKE	155
38	4817	HOUSTON LAKE	139
39	4820	LIVINGSTON LAKE	91

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

LAKE CODE 4829 SOMERVILLE LAKE

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 2610.7

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
4829A1	2610.7	2.49	7.36	10.31	12.09	14.36	10.19	9.20	2.38	2.32	3.14	0.18	4.33	6.53
4829B1	1131.8	2.888	4.191	3.823	3.625	12.374	1.586	0.170	0.014	0.651	0.283	0.991	3.171	2.815
4829C1	714.8	1.557	2.973	2.095	2.492	3.653	2.010	0.680	0.028	0.396	0.181	0.793	1.274	1.500
4829D1	181.6	1.42	1.44	0.91	1.73	2.44	0.76	0.48	0.15	0.37	0.74	0.68	0.85	0.99
4829F1	123.3	1.076	1.076	0.651	1.218	1.699	0.453	0.311	0.099	0.263	0.538	0.510	0.595	0.705
4829ZZ	458.4	2.44	2.80	1.90	2.97	4.96	1.39	0.74	0.19	0.59	1.02	1.13	1.61	1.81

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 2610.7
SUM OF SUB-DRAINAGE AREAS = 2609.9
TOTAL FLOW IN = 94.09
TOTAL FLOW OUT = 78.36

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4829A1	9	74	22.370	8	19.935				
	10	74	39.077	7	74.473				
	11	74	32.281	4	0.096				
	12	74	40.776	9	63.996				
	1	75	8.665	12	14.527				
	2	75	19.425	2	0.142				
	3	75	15.631	27	0.040				
	4	75	2.549	28	0.198				
	5	75	13.620	13	0.133	18	27.751		
	6	75	44.174	28	21.238				
	7	75	33.697	15	26.986				
	8	75	10.506	30	0.023				
4829B1	9	74	19.284	8	0.623				
	10	74	0.283	10	0.051				
	11	74	21.521	9	16.339				
	12	74	5.239	8	2.039				
	1	75	2.973	11	1.784				
	2	75	16.877	9	13.932				
	3	75	0.850	9	0.934				
	4	75	0.651	9	0.991	28	0.566		
	5	75	23.475	19	2.832				
	6	75	8.269						
	7	75	3.625						
	8	75	0.425	20	0.040				

LAKE CODE 4829 SOMERVILLE LAKE

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4829C1	9	74	16.339	8	0.224				
	10	74	0.368	10	0.116				
	11	74	11.497	9	28.600				
	12	74	3.823	8	1.189				
	1	75	1.982	11	1.246				
	2	75	10.222	9	2.435				
	3	75	0.595	9	0.708				
	4	75	0.708	9	1.076	28	0.595		
	5	75	21.181	19	0.510				
	6	75	4.219	7	1.076				
	7	75	1.841						
	8	75	0.538	20	0.040				
4829D1	9	74	5.777	8	0.102				
	10	74	0.102	7	0.008				
	11	74	6.456	4	2.662				
	12	74	0.850	9	0.283				
	1	75	0.481	12	0.481				
	2	75	2.747	2	3.313				
	3	75	0.136	27	0.110				
	4	75	0.108	13	0.093	28	0.093		
	5	75	3.794	18	1.133				
	6	75	1.331	28	6.145				
	7	75	0.595	15	0.906				
	8	75	0.068	30	0.093				
4829F1	9	74	3.851	8	0.0				
	10	74	0.057	7	0.006				
	11	74	4.304	4	1.756				
	12	74	0.566	9	0.193				
	1	75	0.311	12	0.340				
	2	75	1.812	2	2.209				
	3	75	0.091	27	0.074				
	4	75	0.071	13	0.062	28	0.062		
	5	75	2.549	18	0.765				
	6	75	0.906	28	4.106				
	7	75	0.396	15	0.595				
	8	75	0.045	30	0.062				
4829ZZ	9	74	29.761						
	10	74	10.675						
	11	74	13.366						
	12	74	6.400						
	1	75	3.398						
	2	75	2.549						
	3	75	0.510						
	4	75	1.926						
	5	75	5.182						
	6	75	5.720						
	7	75	2.917						
	8	75	0.453						

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 76/02/11

482901
30 16 45.0 096 37 30.0
SOMERVILLE LAKE
48 TEXAS

11EPALES
4

2111202
0027 FEET DEPTH

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
74/03/14	09 50	0000	20.0		18	285	7.80	46	0.070	0.500	0.350	0.025
	09 50	0006	20.0	7.6		285	7.80	45	0.060	0.400	0.350	0.028
	09 50	0015	20.0	8.0		285	7.75	45	0.070	0.500	0.360	0.019
	09 50	0023	19.9	7.6		285	7.70	46	0.070	0.600	0.340	0.029
74/05/23	11 30	0000	26.9		48	396	7.60	52	0.080	0.500	0.070	0.003
	11 30	0005	26.8	6.4		394	7.10	51	0.160	0.600	0.090	0.007
	11 30	0015	26.7	6.0		395	7.00	52	0.160	0.600	0.060	0.005
	11 30	0023	26.5	6.0		390	7.00	54	0.140	0.600	0.060	0.004
74/08/16	15 10	0000	30.4		38	456	9.40					
	15 10	0005	30.0	10.0		452	9.20					
	15 10	0015	27.8	10.8		436	8.20					
	15 10	0023	27.5	2.0		434	7.60					
74/11/06	14 35	0000	20.6	8.4	36	258	7.34	41	0.050	0.600	0.040	0.013
	14 35	0005	20.7	7.6		258	7.38	38	0.050	0.600	0.020	0.009
	14 35	0015	20.6	7.8		257	7.35	37	0.040	0.700	0.020K	0.014
	14 35	0026	20.5	7.6		255	7.38	37	0.040	0.700	0.020	0.015

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/14	09 50	0000	0.057	30.9	
	09 50	0006	0.049		
	09 50	0015	0.050		
	09 50	0023	0.057		
74/05/23	11 30	0000	0.024	6.8	
	11 30	0005	0.030		
	11 30	0007			1.0
	11 30	0015	0.039		
	11 30	0023	0.033		
74/08/16	15 10	0000		31.8	
74/11/06	14 35	0000	0.046	23.1	
	14 35	0004			1.0
	14 35	0005	0.046		
	14 35	0015	0.047		
	14 35	0026	0.055		

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/11

482902
30 16 45.0 096 37 30.0
SOMERVILLE LAKE
48 TEXAS

11EPALES
4

2111202
0012 FEET DEPTH

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
74/03/14	10 40	0000	20.2	8.4	16	300	7.80	47	0.050	0.700	0.320	0.014
	10 40	0008	20.2	8.0		300	7.70	46	0.050	0.500	0.310	0.020
74/05/23	11 15	0000			44		7.80	54	0.050	0.600	0.060	0.005
	11 15	0005	27.9	8.0		420	7.90	51	0.040	0.600	0.050	0.006
	11 15	0010	27.7	3.8		418	7.50	51	0.040	0.600	0.050	0.004
74/08/16	14 40	0000	28.9	7.4	36	443	8.80					
	14 40	0004	28.7	7.4		443	8.70					
	14 40	0008	28.6	6.4		443	8.40					
74/11/06	15 15	0000	20.6	8.2	36	262	7.39	39	0.070	0.700	0.020	0.013
	15 15	0005	20.6	7.6		260	7.38	41	0.070	0.700	0.020	0.012
	15 15	0011	20.6	7.8		257	7.39	44	0.060	0.600	0.020	0.009

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/14	10 40	0000	0.054	6.9	
	10 40	0008	0.053		
74/05/23	11 15	0000	0.037	13.2	
	11 15	0005	0.044		
	11 15	0006			1.0
	11 15	0010	0.040		
74/08/16	14 40	0000		53.7	
	14 40	0005			1.0
74/11/06	15 15	0000	0.061	33.4	
	15 15	0003			1.0
	15 15	0005	0.058		
	15 15	0011	0.058		

STORET RETRIEVAL DATE 76/02/11

482903
30 17 49.0 096 39 41.0
SOMERVILLE LAKE
48287 TEXAS

11EPALES 2111202
3 0008 FEET DEPTH

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
74/03/14	11 15	0000	19.5	8.4	11	525	7.80	62	0.040	1.000	0.050	0.013
	11 15	0004	19.4	7.6		570	7.70	64	0.040	0.800	0.040	0.022
74/05/23	11 00	0000	27.7		1	631	7.60	53	0.070	1.200	0.070	0.008
	11 00	0004	27.7	5.6		647	7.10	53	0.060	0.900	0.060	0.015
74/08/16	14 40	0000	29.4	7.6	12	478	8.00					
	14 40	0003	29.3	5.0		479	8.10					
74/11/06	15 35	0000	17.8	7.2	18	273	6.74	35	0.080	1.000	0.030	0.039
	15 35	0005	17.9	6.0		276	6.78	36	0.100	0.800	0.030	0.022

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/14	11 15	0000	0.088	23.6	
	11 15	0004	0.104		
74/05/23	11 00	0000	0.091	5.9	
	11 00	0003			1.0
	11 00	0004	0.137		
74/08/16	14 40	0000		40.1	
	14 40	0002			1.0
74/11/06	15 35	0000	0.126		
	15 35	0005	0.113		

APPENDIX E

TRIBUTARY DATA

STORET RETRIEVAL DATE 76/03/10

4829A1
30 19 15.0 096 30 25.0 4
YEGUA CREEK
.48061 BURLESON CO MAP
U/SOMERVILLE LAKE
HWY 36 BRDG 0.5 MI SE OF SOMERVILLE
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/08	13 50		0.008	0.925	0.045	0.103	0.132
74/10/07	15 10		0.032	1.100	0.015	0.010	0.050
74/11/04	15 20		0.058	1.500	0.135	0.040	0.150
74/12/09	13 50		0.112	1.400	0.042	0.016	0.050
75/01/12	14 30		0.136	1.000	0.064	0.008	0.050
75/02/02	12 00		0.120	1.000	0.096	0.016	0.060
75/03/27	15 15		0.040	2.400	0.060	0.015	0.100
75/04/13	09 40		0.010	1.950	0.040	0.020	0.110
75/04/28			0.025	1.550	0.270	0.015	0.090
75/05/18			0.020	1.850	0.085	0.025	0.130
75/06/28	09 00		0.035	0.700	0.030	0.010	0.050
75/07/15	10 45		0.005	0.750	0.020	0.005	0.050
75/08/30	10 45		0.010	0.550	0.015	0.005K	0.030

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/03/10

482981
30 19 15.0 096 47 10.0 4
MIDDLE YEGUA CREEK
48 7.5 DIME BOX
T/SOMERVILLE LAKE
HWY 141 BRDG 2.0 MI N JCT W HWY 1697
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/08	09	35	0.096	1.600	0.270	0.030	0.100
74/10/10	10	45	0.080	0.300	0.055	0.035	0.152
74/11/09	15	15	0.072	1.900	0.373	0.045	0.155
74/12/08	16	00	0.072	1.400	0.176	0.008	0.040
75/01/11	15	00	0.056	1.200	0.056	0.008	0.030
75/02/09	09	30	0.032	1.200	0.040	0.024	0.110
75/03/09	13	15	0.030	0.850	0.020	0.010	0.020
75/04/09	14	45	0.180	1.500	0.125	0.015	0.120
75/08/20	15	40	0.080	0.900	0.050	0.010	0.060

STORET RETRIEVAL DATE 76/03/10

4829C1
30 20 39.0 096 45 40.0 4
EAST YEGUA CREEK
48 7 S DIME BOX
T/SOMERVILLE LAKE
2NDRY RD BRDG 1.1 MI SW
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/08	10	00	0.124	1.500	0.195	0.025	0.105
74/10/10	11	00	0.072	0.800	0.035	0.010	0.040
74/11/09	15	40	0.024	1.900	0.195	0.060	0.100
74/12/08	16	00	0.080	1.200	0.088	0.032	0.032
75/01/11	15	20	0.096	1.300	0.048	0.005	0.040
75/02/09	09	50	0.040	1.200	0.048	0.024	0.080
75/03/09	09	45	0.010	1.500	0.095	0.015	0.050
75/04/09	14	30	0.150	1.150	0.080	0.015	0.080
75/06/07	11	20	0.180	0.950	0.130	0.015	0.060
75/08/20	16	05	0.080	1.000	0.150	0.015	0.070

STORET RETRIEVAL DATE 76/03/10

482901
30 16 18.0 096 43 33.0 4
NAILS CREEK
48 7.5 FLAG POND
T/SOMERVILLE LAKE
S FK HWY 1697 BRDG 2 MI SE JCT HWY 1697
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/08	15 40		0.084	0.900	0.135	0.055	0.130
74/10/07	14 00		0.032	0.600	0.025	0.035	0.080
74/11/04	16 30		0.064	3.000	0.165	0.230	0.440
74/12/09	14 30		0.104	1.650	0.080	0.080	0.150
75/01/12	14 00		0.080	1.700	0.088	0.040	0.150
75/02/02	11 30		0.040	0.800	0.040	0.024	0.080
75/03/27	10 15		0.005	1.700	0.035	0.015	0.080
75/04/13	10 40		0.005	1.150	0.035	0.015	0.090
75/04/28			0.040	1.100	0.105	0.025	0.020
75/05/18			0.055	2.500	0.080	0.025	0.100
75/06/28	10 00		0.060	1.250	0.050	0.055	0.150
75/07/15	11 45		0.015	1.150	0.035	0.040	0.130
75/08/30	11 45		0.025	1.250	0.055	0.040	0.120

STORET RETRIEVAL DATE 76/03/10

4829E1
30 15 20.0 096 39 00.0 4
FOUR MILE CREEK
48 7.5 FLAG POND
T/SOMERVILLE LAKE
HWY 1697 BRDG 0.7 MI SE JCT W HWY 1697
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
74/10/07	13	30	0.024	0.400	0.040	0.020	0.020
74/11/04	16	00	0.008	1.500	0.100	0.030	0.040
75/01/12	13	30	0.072	1.100	0.016	0.016	0.080
75/02/02	11	10	0.024	0.700	0.040	0.008	0.010
75/03/27	16	10	0.005	1.600	0.025	0.005K	0.010K
75/04/13	11	15	0.015	0.950	0.040	0.015	0.030
75/04/28			0.015	0.100	0.040		0.010
75/05/18			0.010	1.900	0.025	0.015	0.020
75/06/28	10	30	0.020	0.850	0.030	0.020	0.050
75/07/15	11	30	0.015	0.850	0.040	0.015	0.030
75/08/30	11	30	0.015	1.000	0.115	0.020	0.040

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/03/10

4829F1
30 14 48.0 096 42 05.0 4
CEDAR CREEK
48 7.5 CARMINE
T/SOMERVILLE LAKE
HWY 1697 BRDG 1.4 MI SE POST OAK SCHOOL
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
74/10/07	13 40		0.040	0.800	0.085	0.015	0.020
74/11/04	16 15		0.040	1.800	0.135	0.050	0.110
74/12/09	14 20		0.032	1.000	0.020	0.024	0.040
75/01/12	13 45		0.032	1.100	0.064	0.016	0.090
75/02/02	11 15		0.016	0.400	0.016	0.008	0.030
75/03/27	16 30		0.010	2.500	0.035	0.010	0.020
75/04/13	11 00		0.085	1.350	0.095	0.010	0.030
75/04/28	10 00		0.240	2.400	0.155	0.030	0.040
75/05/18			0.250	0.850	0.125	0.025	0.040
75/06/28	11 00		0.025	0.600	0.065	0.035	0.090
75/07/15	12 00		0.005	0.850	0.025	0.035	0.060
75/08/30	12 10		0.015	0.675	0.030	0.040	0.070