

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



REPORT  
ON  
EAGLE MOUNTAIN LAKE  
TARRANT AND WISE COUNTIES  
TEXAS  
EPA REGION VI  
Working Paper No. 643

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

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ON  
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EPA REGION VI  
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WITH THE COOPERATION OF THE  
TEXAS WATER QUALITY BOARD  
AND THE  
TEXAS NATIONAL GUARD  
FEBRUARY, 1977

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## FOREWORD

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

### OBJECTIVES

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

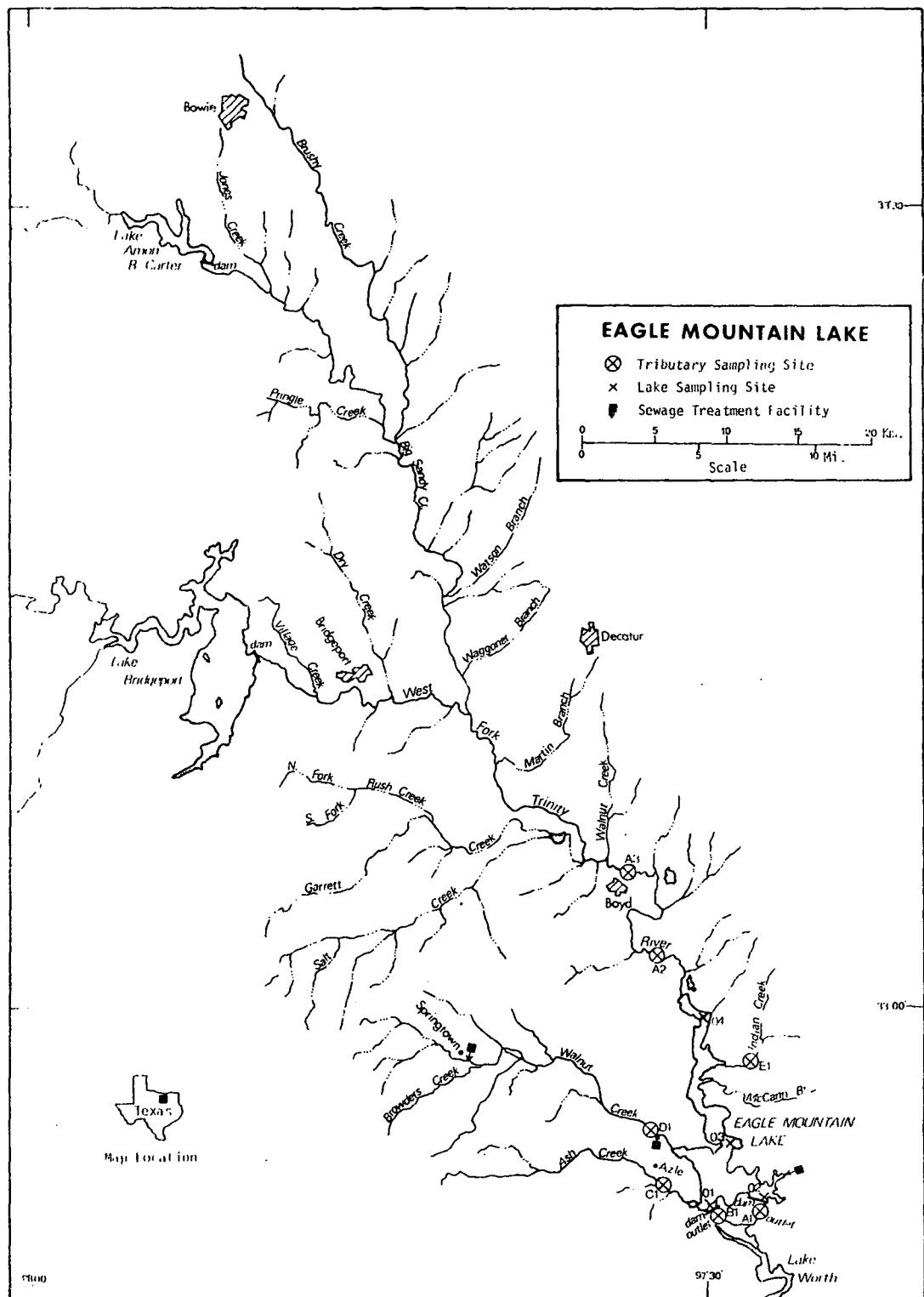
## NATIONAL EUTROPHICATION SURVEY

## STUDY RESERVOIRS

## State of Texas

<u>NAME</u>	<u>COUNTY</u>
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



# EAGLE MOUNTAIN LAKE

STORET NO. 4813

## I. CONCLUSIONS

### A. Trophic Condition:

Survey data indicate that Eagle Mountain Lake is meso-eutrophic; i.e., moderately well supplied with nutrients and 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 lake.

Eagle Mountain Lake ranked third in overall trophic quality when the 39 Texas reservoirs sampled in 1974 were compared using a combination of six lake parameters\*. Eleven of the water bodies had less median total phosphorus, eight had less and two had the same median dissolved orthophosphorus, two had less and three had the same median inorganic nitrogen, eight had less mean chlorophyll a, and 25 had greater mean Secchi disc transparency. Some depression of dissolved oxygen with depth occurred at sampling station 2 in May.

Survey limnologists noted substantial shoreline beds of macrophytes in the upper end of the lake in March. Turbidity due to suspended silt was observed throughout the lake in August.

### B. Rate-Limiting Nutrient:

Due to significant changes in nutrient levels in the samples, the algal assay results are not representative of conditions in the lake at the times the samples were collected.

\* See Appendix A.

The lake data indicate that primary productivity was predominantly nitrogen-limited.

C. Nutrient Controllability:

1. Point sources--It is calculated that point sources contributed only about 3% of the total phosphorus load to Eagle Mountain Lake during the sampling year. The Springtown and Azle municipal wastewater treatment plants were the major contributors.

During the sampling year, the lake received a total phosphorus loading over three times that proposed by Vollenweider (Vollenweider and Dillon, 1974) as a eutrophic loading (see page 14). However, because of the large non-point contribution, it does not seem likely that point-source phosphorus control would result in a significant improvement in the trophic condition of the lake.

2. Non-point sources--It is calculated that non-point sources contributed about 97% of the total phosphorus load to the lake during the sampling year. The West Fork of the Trinity River contributed nearly 83% of the total load, the minor tributaries and immediate drainage contributed about 7%, Walnut Creek 3.5%, and Ash Creek contributed about 2%.

The phosphorus export rates of the Eagle Mountain Lake tributaries (see page 13) were somewhat high as compared to Texas streams sampled elsewhere; e.g., the mean of the export rates of three tributaries of nearby Possum Kingdom Reservoir\* was  $5 \text{ kg/km}^2/\text{yr}$  (range of 3 to  $8 \text{ kg/km}^2/\text{yr}$ ).

\* Working Paper No. 655.

## II. LAKE AND DRAINAGE BASIN CHARACTERISTICS<sup>†</sup>

### A. Lake Morphometry<sup>††</sup>:

1. Surface area: 36.42 kilometers<sup>2</sup>.
2. Mean depth: 6.4 meters.
3. Maximum depth: 15.8 meters.
4. Volume:  $233.775 \times 10^6 \text{ m}^3$ .
5. Mean hydraulic retention time: 363 days (based on outflow).

### B. Tributary and Outlet:

(See Appendix C for flow data)

#### 1. Tributaries -

<u>Name</u>	<u>Drainage area (km<sup>2</sup>)*</u>	<u>Mean flow (m<sup>3</sup>/sec)*</u>
W. Fk. Trinity River (A-2)	4,581.7	6.500
Ash Creek	58.3	0.212
Walnut Creek	187.0	0.618
Minor tributaries & immediate drainage -	<u>238.9</u>	<u>0.770</u>
Totals	5,065.9	8.100

#### 2. Outlets -

West spillway (A-1)	-	1.357
Main dam conduits (B-1)	<u>5,102.3</u>	<u>6.090</u>
Totals	5,102.3**	7.447**

### C. Precipitation\*\*\*:

1. Year of sampling: 99.7 centimeters.
2. Mean annual: 82.2 centimeters.

<sup>†</sup> Table of metric conversions--Appendix B.

<sup>††</sup> Gamble, 1974.

<sup>\*</sup> For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".

<sup>\*\*</sup> Includes area of lake; lesser outflow due to evaporation.

<sup>\*\*\*</sup> See Working Paper No. 175.

### III. LAKE WATER QUALITY SUMMARY

Eagle Mountain Lake was sampled four times in 1974 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from two or more depths at four 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 collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 5.2 meters at station 1, 12.8 meters at station 2, 8.5 meters at station 3, and 1.8 meters at station 4.

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 EAGLE MOUNTAIN LAKE  
STORET CODE 4813

PARAMETER	1ST SAMPLING ( 3/ 7/74)				2ND SAMPLING ( 5/16/74)				3RD SAMPLING ( 8/13/74)			
	4 SITES				4 SITES				4 SITES			
	RANGE	MEAN	MEDIAN	RANGE	MEAN	MEDIAN	RANGE	MEAN	MEDIAN	RANGE	MEAN	MEDIAN
TEMP (C)	12.2 ~ 20.3	15.6	13.9	21.0 ~ 27.1	24.1	24.2	26.2 ~ 28.6	26.9	26.6			
DISS OXY (MG/L)	8.0 ~ 10.2	9.2	9.0	4.0 ~ 7.6	6.7	7.2	5.2 ~ 7.2	6.5	6.7			
CNDCTVY (MCROMO)	300. ~ 494.	349.	306.	428. ~ 526.	457.	447.	372. ~ 438.	418.	429.			
PH (STAND UNITS)	7.9 ~ 8.3	8.1	8.2	7.7 ~ 8.3	8.2	8.3	7.9 ~ 8.7	8.4	8.5			
TOT ALK (MG/L)	135. ~ 170.	142.	137.	134. ~ 147.	138.	136.	129. ~ 137.	133.	133.			
TOT P (MG/L)	0.014 ~ 0.062	0.028	0.022	0.012 ~ 0.094	0.032	0.023	0.021 ~ 0.112	0.044	0.035			
ORTHO P (MG/L)	0.003 ~ 0.010	0.007	0.007	0.003 ~ 0.024	0.008	0.005	0.004 ~ 0.050	0.014	0.008			
N02+N03 (MG/L)	0.020 ~ 0.040	0.024	0.020	0.030 ~ 0.110	0.059	0.050	0.020 ~ 0.120	0.039	0.030			
AMMONIA (MG/L)	0.020 ~ 0.040	0.025	0.020	0.030 ~ 0.060	0.040	0.040	0.050 ~ 0.370	0.143	0.070			
KJEL N (MG/L)	0.200 ~ 0.700	0.436	0.400	0.300 ~ 1.300	0.554	0.500	0.200 ~ 0.400	0.278	0.200			
INORG N (MG/L)	0.040 ~ 0.080	0.049	0.040	0.060 ~ 0.170	0.099	0.090	0.070 ~ 0.400	0.182	0.170			
TOTAL N (MG/L)	0.220 ~ 0.720	0.460	0.420	0.330 ~ 1.410	0.613	0.550	0.220 ~ 0.520	0.317	0.230			
CHLRPYL A (UG/L)	2.6 ~ 5.6	3.8	3.5	1.4 ~ 13.8	5.2	2.9	5.5 ~ 12.9	8.8	8.5			
SECCHI (METERS)	0.4 ~ 0.9	0.7	0.7	0.2 ~ 1.8	0.9	0.8	0.3 ~ 1.2	0.9	0.9			

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR EAGLE MOUNTAIN LAKE  
STORET CODE 4813

4TH SAMPLING (10/30/74)

PARAMETER	4 SITES		
	RANGE	MEAN	MEDIAN
TEMP (C)	19.5 - 21.1	20.2	19.9
DISS OXY (MG/L)	7.4 - 8.6	7.8	7.8
CNDCTVY (MCROMO)	353. - 389.	361.	357.
PH (STAND UNITS)	8.0 - 8.2	8.1	8.1
TOT ALK (MG/L)	117. - 139.	124.	122.
TOT P (MG/L)	0.022 - 0.072	0.034	0.030
ORTHO P (MG/L)	0.015 - 0.024	0.018	0.017
N02+N03 (MG/L)	0.020 - 0.050	0.031	0.030
AMMONIA (MG/L)	0.020 - 0.050	0.035	0.035
KJEL N (MG/L)	0.200 - 0.600	0.364	0.350
INORG N (MG/L)	0.040 - 0.100	0.066	0.065
TOTAL N (MG/L)	0.240 - 0.630	0.395	0.385
CHLRPYL A (UG/L)	1.6 - 8.7	4.7	4.3
SECCHI (METERS)	0.3 - 0.9	0.7	0.7

B. Biological characteristics:

1. Phytoplankton -

<u>Sampling Date</u>	<u>Dominant Genera</u>	<u>Algal Units per ml</u>
03/07/74	1. <u>Stephanodiscus</u> sp. 2. <u>Chroomonas</u> sp. 3. <u>Flagellates</u> 4. <u>Ankistrodesmus</u> sp. 5. <u>Dactylococcopsis</u> sp. Other genera	606 572 337 269 236 <u>1,044</u>
	Total	3,064
05/16/74	1. <u>Nitzschia</u> sp. 2. <u>Chlorophytan</u> filaments 3. <u>Melosira</u> sp. 4. <u>Merismopedia</u> sp. 5. <u>Flagellates</u> Other genera	928 898 210 210 180 <u>898</u>
	Total	3,324
08/13/74	1. <u>Nitzschia</u> sp. 2. <u>Trachelomonas</u> sp. 3. <u>Melosira</u> sp. 4. <u>Anabaenopsis</u> sp. 5. <u>Lyngbya</u> sp. Other genera	207 148 118 89 89 <u>325</u>
	Total	976
10/30/74	1. <u>Melosira</u> sp. 2. <u>Chroomonas</u> sp. 3. <u>CycTotella</u> sp. 4. <u>Nitzschia</u> sp. 5. <u>Merismopedia</u> sp. Other genera	306 275 275 244 183 <u>886</u>
	Total	2,169

2. Chlorophyll a -

<u>Sampling Date</u>	<u>Station Number</u>	<u>Chlorophyll a (<math>\mu\text{g/l}</math>)</u>
03/07/74	1	5.6
	2	2.6
	3	2.6
	4	4.5
05/16/74	1	1.4
	2	1.9
	3	3.9
	4	13.8
08/13/74	1	12.9
	2	9.4
	3	5.5
	4	7.6
10/30/74	1	2.7
	2	1.6
	3	5.9
	4	8.7

## C. Limiting Nutrient Study:

Significant changes in nutrient levels occurred in the assay samples during shipment from the field to the laboratory, and the results are not indicative of conditions in the lake at the times the samples were taken (03/07/74 and 10/30/74).

The lake data indicate that primary productivity was predominately nitrogen-limited each sampling time (the mean inorganic nitrogen to orthophosphorus ratios were less than 14 to 1). Phosphorus limitation occurred only at sampling station 1 in May and

at station 3 in May and August (the N to P ratios were 17 to 1, 15 to 1, and 20 to 1, respectively).

Nitrogen limitation, as indicated by in-lake nitrogen to phosphorus ratios, does not necessarily mean that the trophic condition of the lake can be improved by controlling nitrogen inputs. In many cases, the apparent condition of nitrogen-limitation results from excessive phosphorus input from point sources and is often accompanied by a corresponding increase in primary production. In such cases, the reversal of the enriched condition depends upon phosphorus control, not nitrogen control.

#### 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 high runoff month of April when two samples were collected at most of the sites. 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 for outlet station B-1, which was sampled only four times, were calculated using the mean annual concentrations at outlet station A-1 and the mean annual flow at station B-1. Tributary 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 Ash Creek at station C-1 and the mean annual ZZ flow.

The operators of the Azle, Springtown, and Fort Worth Boat Club wastewater treatment plants provided monthly effluent samples and corresponding flow data.

## A. Waste Sources:

## 1. Known municipal\* -

<u>Name</u>	<u>Pop. Served</u>	<u>Treatment</u>	<u>Mean Flow (m<sup>3</sup>/d)</u>	<u>Receiving Water</u>
Springtown	1,194	stab. pond	690.4	Walnut Creek
Azle	2,500	oxid. ditch	134.4	Walnut Creek
Fort Worth Boat Club	300	act. sludge	21.6	Eagle Mountain Lake

## 2. Known industrial - None

\* Treatment plant questionnaires.

## 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) -		
W. Fk. Trinity River (A-2)	45,505	82.6
Ash Creek	1,105	2.0
Walnut Creek	1,950	3.5
b. Minor tributaries & immediate drainage (non-point load) -	4,005	7.3
c. Known municipal STP's -		
Springtown	1,150	2.1
Azle	530	1.0
Fort Worth Boat Club	75	0.1
d. Septic tanks* -	165	0.3
e. Known industrial - None	-	-
f. Direct precipitation** -	<u>635</u>	<u>1.1</u>
Total	55,120	100.0

## 2. Outputs -

Lake outlet - Main dam conduits	7,680
West spillway	<u>1,710</u>
Total	9,390

## 3. Net annual P accumulation - 45,730 kg.

\* Estimate based on 590 lakeshore dwellings; 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) -		
W. Fk. Trinity River (A-2)	337,405	76.0
Ash Creek	6,365	1.4
Walnut Creek	27,655	6.2
b. Minor tributaries & immediate drainage (non-point load) -	23,115	5.2
c. Known municipal STP's -		
Springtown	2,415	0.6
Azle	1,365	0.3
Fort Worth Boat Club	100	<0.1
d. Septic tanks* -	6,290	1.4
e. Known industrial - None	-	-
f. Direct precipitation** -	<u>39,320</u>	<u>8.9</u>
Total	444,030	100.0

## 2. Outputs -

Lake outlets - Main dam conduits	193,205
West spillway	<u>43,050</u>
Total	236,255

## 3. Net annual N accumulation - 207,775 kg.

## D. Non-point Nutrient Export by Subdrainage Area:

<u>Tributary</u>	<u>kg P/km<sup>2</sup>/yr</u>	<u>kg N/km<sup>2</sup>/yr</u>
W. Fk. Trinity River (A-2)	10	74
Ash Creek	19	109
Walnut Creek	10	148

\* Estimate based on 590 lakeshore dwellings; see Working Paper No. 175.

\*\* See Working Paper No. 175.

## E. Mean Nutrient Concentrations in Ungaged Stream:

<u>Tributary</u>	Mean Total P Conc. (mg/l)	Mean Total N Conc. (mg/l)
Indian Creek	0.042	1.071

## 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 <sup>2</sup> /yr	1.51	1.26	12.2	5.7

Vollenweider phosphorus loadings (g/m<sup>2</sup>/yr) based on mean depth and mean hydraulic retention time of Eagle Mountain Lake:

"Dangerous" (eutrophic loading)	0.50
"Permissible" (oligotrophic loading)	0.25

V. LITERATURE REVIEWED

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Fed. Aid Proj. F-4-R-21, TX Parks & Wildlife Dept., Austin.

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 CHLORA	15- MIN DO	MEDIAN DISS ORTHO P
4801	AMISTAD LAKE	0.013	0.500	371.474	2.442	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	CADDY 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 NU
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	CADDY 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	BASTRUP 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  $8.107 \times 10^{-4}$  = 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 TEXAS

03/16/76

LAKE CODE 4813 EAGLE MOUNTAIN RESERVOIR

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 5102.3

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS)												
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
4813A1	5102.3	3.99	2.92	6.29	7.11	14.07	7.65	5.61	6.14	6.74	4.62	4.19	3.48	6.09
4813A2	4581.7	3.17	2.35	3.60	6.82	16.76	9.34	5.92	7.84	6.88	6.74	4.45	3.74	6.50
4813B1	5102.3	0.040	0.566	0.065	0.453	6.371	4.021	0.680	0.096	0.765	1.303	1.841	0.057	1.357
4813C1	58.3	0.187	0.221	0.159	0.481	0.595	0.187	0.088	0.025	0.173	0.170	0.173	0.096	0.212
4813D1	187.0	0.510	0.623	0.538	1.331	1.727	0.623	0.263	0.088	0.453	0.481	0.491	0.311	0.618
4813ZZ	274.5	0.62	0.68	0.59	1.56	2.12	0.79	0.40	0.24	0.65	0.65	0.59	0.37	0.77

## SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 5102.3  
SUM OF SUB-DRAINAGE AREAS = 5101.5TOTAL FLOW IN = 96.87  
TOTAL FLOW OUT = 89.06

## MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4813A1	9	74	2.747	7	1.416				
	10	74	3.908	7	0.0				
	11	74	3.823	12	0.006				
	12	74	3.115	23	0.006				
	1	75	3.398	25	0.014				
	2	75	2.917	17	0.0				
	3	75	8.467	26	4.559				
	4	75	3.568	15	0.0	30	0.0		
	5	75	12.573	26	7.985				
	6	75	13.451						
	7	75	8.637	26	9.118				
	8	75	4.361	10	0.0				
4813A2	9	74	3.483	7	0.651				
	10	74	10.279	7	0.396				
	11	74	19.425	11	21.662				
	12	74	1.388	23	1.331				
	1	75	1.104	25	0.934				
	2	75	6.654	17	1.982				
	3	75	4.389	26	1.812				
	4	75	5.890	15	3.993	30	1.926		
	5	75	8.750	26	2.520				
	6	75	19.001	21	1.501				
	7	75	13.139	26	68.244				
	8	75	3.002	10	0.623				

## TRIBUTARY FLOW INFORMATION FOR TFX4S

03/16/76

LAKE CODE 4813 EAGLE MOUNTAIN RESERVOIR

## MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4813B1	9	74	0.014	7	0.0				
	10	74	12.771	7	0.0				
	11	74	40.210	12	34.839				
	12	74	0.014	23	0.0				
	1	75	0.014	26	0.0				
	2	75	13.026	17	0.0				
	3	75	0.014	26	0.014				
	4	75	9.231	15	4.049	30	0.0		
	5	75	2.379	26	2.294				
	6	75	12.318	21	0.0				
	7	75	10.251	26	64.562				
	8	75	1.331	10	0.0				
4813C1	9	74	0.765	7	0.136				
	10	74	1.614	7	0.176				
	11	74	2.322	12	1.133				
	12	74	0.283	23	0.170				
	1	75	0.283	26	0.0				
	2	75	1.133	17	0.538				
	3	75	0.566	26	0.147				
	4	75	1.048	15	1.841	30	0.368		
	5	75	0.850	26	0.156				
	6	75	1.076	21	0.453				
	7	75	0.850	26	3.143				
	8	75	0.249	10	0.0				
4813D1	9	74	2.464	7	0.0				
	10	74	5.295	7	0.566				
	11	74	7.617	12	3.681				
	12	74	0.878	23	0.566				
	1	75	0.934	26	0.0				
	2	75	3.710	17	1.727				
	3	75	1.841	26	0.481				
	4	75	3.426	15	6.060	30	1.161		
	5	75	2.747	26	0.510				
	6	75	3.483	21	1.529				
	7	75	2.803	26	10.307				
	8	75	0.821	10	0.184				
4813ZZ	9	74	3.625						
	10	74	7.815						
	11	74	11.185						
	12	74	1.303						
	1	75	1.359						
	2	75	5.465						
	3	75	2.718						
	4	75	5.040						
	5	75	4.049						
	6	75	5.125						
	7	75	4.106						
	8	75	1.189						

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 76/02/21

481301  
 32 52 05.0 097 30 06.0  
 EAGLE MOUNTAIN LAKE  
 48439 TEXAS

11E-SALES  
 3 2111202  
 0022 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	WATER TEMP CENT	00010 DO	00300 TRANSP MG/L	00077 SECCHI INCHES	00094 CONDUCTVY FIELD MICROMHO	00400 PH SU	00410 TALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NU2&NU3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/07	15 35	0000	13.6			24	303	8.00	136	0.020	0.300	0.020	0.004
	15 35	0005	13.5	8.8			303	8.00	137	0.030	0.600	0.030	0.009
	15 35	0017	12.9	9.0			300	7.90	135	0.020	0.600	0.020	0.009
74/05/16	15 20	0000	24.2			30	433	8.10	137	0.050	0.500	0.060	0.005
	15 20	0005	24.2	6.4			430	8.10	136	0.040	0.300	0.050	0.005
	15 20	0015	23.0	5.8			446	7.90	136	0.050	0.400	0.060	0.008
74/08/13	10 15	0000	26.6	6.5		30	434	8.53					
	10 15	0005	26.4	7.0			432	8.47					
74/10/30	15 10	0000	20.0	8.0		25	357	8.13	123	0.040	0.600	0.030	0.018
	15 10	0005	19.9	7.8			357	8.15	121	0.030	0.400	0.030	0.017
	15 10	0016	19.8	7.6			357	8.11	122	0.040	0.300	0.030	0.017

DATE FROM TO	TIME OF DAY	DEPTH FEET	PHOS-TOT MG/L P	32217 CHLORPHYL A UG/L	00031 INC DT LT REMNING PERCENT
74/03/07	15 35	0000	0.023	5.6	
	15 35	0005	0.023		
	15 35	0017	0.032		
74/05/16	15 20	0000	0.024	1.4	
	15 20	0005	0.025		
	15 20	0009			1.0
	15 20	0015	0.022		
74/08/13	10 15	0000		12.9	
	10 15	0006			5.0
	10 15	0007			2.0
74/10/30	15 10	0000	0.029	2.7	
	15 10	0005	0.031		
	15 10	0016	0.029		

STORE1 RETRIEVAL DATE 7/6/02/11

481302  
 32 52 58.0 097 27 38.0  
 EAGLE MOUNTAIN LAKE  
 48439 TEXAS

11EPALES  
 3 2111202  
 0045 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CONDCTVY FIELD MICROMHO	00400 PH SU	00410 TALK CACO3	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
74/03/07	14 50	0000	13.9		36	306	8.20	135	0.040	0.700	0.020	0.005
	14 50	0005	13.9	10.2		302	8.20	135	0.020	0.300	0.020	0.005
	14 50	0015	13.6	10.2		303	8.10	135	0.020	0.200K	0.020	0.003
	14 50	0025	13.3	9.8		301	8.10	135	0.020	0.200K	0.020	0.003
	14 50	0040	12.2	9.0		300	7.90	136	0.020	0.200K	0.030	0.006
74/05/16	15 45	0000	24.6		72	432	8.30	136	0.040	0.500	0.050	0.008
	15 45	0005	24.1	7.6		428	8.30	134	0.030	0.700	0.040	0.005
	15 45	0015	23.1	6.4		465	8.10	136	0.030	0.600	0.050	0.004
	15 45	0040	21.0	4.0		454	7.70	137	0.030	0.500	0.110	0.004
74/08/13	09 25	0000	26.7	6.8	48	435	8.15	131	0.370	0.400	0.030	0.022
	09 25	0015	26.6	6.6		438	8.11	137	0.140	0.200K	0.030	0.008
	09 25	0030	26.5	5.6		435	8.09	136	0.170	0.200K	0.020	0.011
	09 25	0042	26.3	5.2		429	7.89	130	0.310	0.300	0.040	0.050
74/10/30	15 30	0000	19.7	7.6	30	355	8.05	121	0.040	0.500	0.040	0.015
	15 30	0005	19.6	7.4		353	8.05	125	0.040	0.300	0.040	0.016
	15 30	0015	19.5	7.6		353	8.05	124	0.050	0.200	0.050	0.018
	15 30	0030	19.5	7.6		353	8.05	127	0.040	0.200	0.040	0.016
	15 30	0038	19.5	7.4		353	8.05	120	0.040	0.300	0.050	0.019

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL UG/L	00031 INCDT LT PERCENT
74/03/07	14 50	0000	0.018	2.6	
	14 50	0005	0.017		
	14 50	0015	0.014		
	14 50	0025	0.014		
	14 50	0040	0.019		
74/05/16	15 45	0000	0.020	1.9	
	15 45	0005	0.016		
	15 45	0015	0.012		1.0
	15 45	0040	0.023		
74/08/13	09 25	0000	0.026	9.4	
	09 25	0015	0.022		
	09 25	0030	0.021		
	09 25	0042	0.112		
74/10/30	15 30	0000	0.022	1.6	
	15 30	0005	0.023		
	15 30	0015	0.024		
	15 30	0030	0.023		
	15 30	0038	0.025		

K VALUE KNOWN TO BE  
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/02/11

481303  
 32 54 42.0 097 28 57.0  
 EAGLE MOUNTAIN LAKE  
 48439 TEXAS

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 TALK CACO3 MG/L	11EPALES 3		2111202 0032 FEET DEPTH		00671 PHOS-DIS ORTHO MG/L P
									00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L		
74/03/07	15 55 0000	17.8		28	343	8.20	140	0.020	0.400	0.020	0.020	0.007	
	15 55 0005	17.6			341	8.20	139	0.020	0.400	0.020	0.020	0.007	
	15 55 0015	16.3			331	8.20	141	0.020	0.400	0.020	0.020	0.007	
	15 55 0028	15.3			325	8.15	142	0.040	0.600	0.040	0.040	0.009	
74/05/16	15 00 0000	27.1		36	458	8.30	136	0.040	0.500	0.040	0.040	0.005	
	15 00 0005	27.1			458	8.30	135	0.040	0.400	0.030	0.030	0.006	
	15 00 0015	25.9			447	8.30	136	0.030	0.300	0.030	0.030	0.004	
	15 00 0023	25.6			446	8.25	136	0.030	0.400	0.030	0.030	0.003	
74/08/12	16 15 0000	28.6		44	429	8.66	133	0.060	0.400	0.120	0.040	0.004	
	16 15 0010	27.3			422	8.62	134	0.050	0.200K	0.030	0.030	0.004	
	16 15 0020	27.0			413	8.53	129	0.070	0.200K	0.030	0.030	0.007	
	16 15 0024	26.2			402	8.44	132	0.050	0.200K	0.020	0.020	0.007	
74/10/30	15 55 0000	20.7		36	359	8.21	120	0.030	0.500	0.020K	0.016	0.016	
	15 55 0005	20.7			359	8.21	119	0.020	0.400	0.020K	0.017	0.017	
	15 55 0015	20.7			359	8.17	119	0.030	0.400	0.020K	0.016	0.016	
	15 55 0027	20.6			359	8.13	117	0.030	0.400	0.020K	0.024	0.024	
DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL UG/L	00031 INCOT LT PERCENT								
	74/03/07	15 55 0000	0.025		2.6								
		15 55 0005	0.020										
		15 55 0015	0.022										
74/05/16	15 00 0000	0.023		3.9	0.062								
	15 00 0005	0.021											
	15 00 0008				1.0								
	15 00 0015	0.021											
74/08/12	16 15 0000	0.040		5.5	0.023								
	16 15 0010	0.028											
	16 15 0020	0.039											
	16 15 0024	0.035											
74/10/30	15 55 0000	0.033		5.9	0.033								
	15 55 0005	0.034											
	15 55 0015	0.033											
	15 55 0027	0.060											

K VALUE KNOWN TO BE  
LESS THAN INDICATED

STORED RETRIEVAL DATE 76/02/11

481304  
32 59 30.0 097 30 39.0  
EAGLE MOUNTAIN LAKE  
48439 TEXAS

11EPALES  
3  
2111202  
0010 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 TALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-UIS ORTHO MG/L P
74/03/07	16 30	0000	20.3		15	494	8.30	170	0.030	0.600	0.030	0.008
	16 30	0002	20.3	8.4		494						
	16 30	0006	20.2	8.0		490	8.30	170	0.030	0.600	0.030	0.010
74/05/16	14 40	0000	21.4		8	526	8.25	147	0.060	1.300	0.110	0.024
	14 40	0003	21.5	7.4		523	8.25	147	0.050	0.800	0.110	0.021
74/08/12	16 00	0000	27.4	7.2	12	372	8.73	136	0.070	0.400	0.030	0.011
	16 00	0005	26.6			375	8.70					
74/10/30	16 15	0000	21.1	8.0	12	385	8.13	132	0.030	0.300	0.020K	0.023
	16 15	0005	21.1	8.0		389	8.11	139	0.030	0.300	0.020	0.018

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL UG/L	00031 INCOT LT A REMNING PERCENT
74/03/07	16 30	0000	0.055	4.5	
	16 30	0006	0.055		
74/05/16	14 40	0000	0.094	13.8	
	14 40	0003	0.088		
74/08/12	16 00	0000	0.071	7.6	
74/10/30	16 15	0000	0.072	8.7	
	16 15	0005	0.042		

K VALUE KNOWN TO BE  
LESS THAN INDICATED

**APPENDIX E**

**TRIBUTARY AND WASTEWATER  
TREATMENT PLANT DATA**

STORET RETRIEVAL DATE 76/03/10

4H13A1  
32 25 20.0 097 27 35.0 4  
W FORK TRINITY RIVER  
48009 7.5 LAKE WORTH  
0/EAGLE MTN LAKE  
AT DAM ABV STATE FISH HATCHERY  
11EPALES 2111204  
0000 FEET DEPTH CLASS 00

DATE	TIME	DEPTH	N02&N03	00630	00625	00610	00671	00665
FROM	OF		N-TOTAL	TOT	KJEL	NH3-N	PHOS-DIS	PHOS-TOT
TO	DAY	FEET	MG/L	MG/L	MG/L	TOTAL	ORTHO	MG/L P
74/09/07	11	30		0.032	0.400	0.040	0.010	0.030
74/11/12	17	30		0.088	0.800	0.025	0.030	0.070
74/12/23	13	25		0.136	1.100	0.048	0.015	0.050
75/01/25	14	25		0.120	1.200	0.024	0.016	0.030
75/03/26	13	20		0.110	1.430	0.055	0.025	0.040
75/05/26	15	21		0.020	0.600	0.020	0.010	0.020

STORET RETRIEVAL DATE 76/03/10

4813A2  
33 02 32.0 047 32 00.0 4  
W FORK TRI'ITY RIVER  
48 7.5 BOYD  
T/EAGLE MTN LAKE  
2NDRY RD BRDG 1 MI SW JCT w HWY 718  
11EPALES 2111204  
0000 FEET DEPTH CLASS 00

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
74/09/07	10 07		0.048	0.700	0.035	0.075	0.145
74/10/07	14 26		0.024	0.700	0.015	0.065	0.125
74/11/11	12 30		0.304	2.200	0.063	0.125	0.440
74/12/23	14 31		0.048	1.400	0.056	0.010	0.075
75/01/25	16 24		0.032	0.600	0.040	0.024	0.080
75/02/17	09 26		0.352	1.100	0.080	0.032	0.100
75/03/26	15 40		0.490	3.450	0.100	0.095	0.730
75/04/15	13 50		0.270	1.200	0.075	0.035	0.090
75/04/30	16 40		0.330	2.500	0.145	0.085	0.390
75/05/26	14 10		0.360	1.950	0.160	0.060	0.160
75/06/21	11 05		0.160	1.150	0.065	0.035	0.100
75/07/26	15 19		0.030	1.050	0.030	0.230	0.360
75/08/10	14 45		0.155	0.800	0.075	0.025	0.090

STORET RETRIEVAL DATE 76/03/10

4813A3  
33 05 12.0 097 33 30.0 4  
W FORK TRINITY RIVER  
48 7.5 BOYD  
T/EAGLE MTN LAKE  
HWY 730 BRDG 0.5 MI N OF BOYD ABOV STP  
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
74/09/07	09 40		0.064	0.500	0.030	0.060	0.140
74/10/07	14 09		0.048	0.800	0.027	0.090	0.130
74/11/11	13 05		0.160	1.500	0.045	0.105	0.330
74/12/23	14 15		0.048	1.200	0.024	0.030	0.080
75/01/24	16 10		0.008	1.400	0.020	0.040	0.080
75/02/17	09 04		0.368	1.450	0.056	0.056	0.180
75/03/26	15 20		0.165	3.000	0.055	0.065	0.460
75/04/15	13 30		0.240	1.000	0.050	0.055	0.160
75/04/30	16 28		0.310	1.850	0.145	0.090	0.370
75/05/26	13 40		0.290	1.250	0.105	0.060	0.150
75/06/21	10 25		0.175	0.900	0.020	0.035	0.100
75/07/26	15 35		0.030	0.850	0.030	0.110	0.240
75/08/10	15 04		0.055	0.750	0.030	0.025	0.110

STORET RETRIEVAL DATE 76/03/10

4813B1  
32 52 10.0 097 29 47.0 4  
LAKE NORTH  
48 7.5 LAKE NORTH  
0/EAGLE MTN LAKE  
AT BRDG ON TEN MI BRDG RD  
11EHALES 2111204  
0000 FEET DEPTH CLASS 00

DATE	TIME	DEPTH	N02&N03	00625	00610	00671	00665
FROM	OF		N-TOTAL	TOT KJEL	NH3-N	PHOS-DIS	PHOS-TOT
TO	DAY	FEET	MG/L	MG/L	MG/L	MG/L P	MG/L P
74/11/12	17	10		0.072	1.100	0.090	0.025
75/03/26	13	05		0.105	0.950	0.060	0.025
75/04/15	14	55		0.010	0.650	0.015	0.007
75/05/26	15	04		0.005	0.925	0.015	0.005

STORET RETRIEVAL DATE 76/03/10

4813C1  
 32 53 15.0 097 32 15.0 4  
 ASH CREEK  
 48 7.5 AZLE  
 T/EAGLE MTN LAKE  
 AT BRDG H&Y 199 1.0 MI SE OF AZLE  
 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
74/09/07	11 05		0.012	0.300	0.020	0.070	0.170
74/10/07	15 06		0.072	0.500	0.030	0.230	0.360
74/11/12	11 40		0.416	0.550	0.040	0.075	0.165
74/12/23	15 05		0.400	0.400	0.016	0.030	0.050
75/02/17	10 04		0.448	1.300	0.032	0.024	0.050
75/03/26	16 15		0.280	0.350	0.030	0.130	0.290
75/04/15	14 25		0.200	0.500	0.025	0.040	0.085
75/04/30	17 34		0.300	0.700	0.090	0.105	0.160
75/05/26	14 45		0.120	1.400	0.030	0.025	0.090
75/06/21	12 22		0.260	1.050	0.100	0.015	0.040
75/07/26	14 05		0.315	0.600	0.060	0.130	0.360

STORET RETRIEVAL DATE 76/03/10

481301  
32 55 15.0 097 32 35.0 4  
WALNUT CREEK  
48 7.5 AZLE  
T/EAGLE MTN LAKE  
AT BRDG HWY 730 2.0 MI SE OF AZLE  
11E MALES 2111204  
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&N03 N-TOTAL	00625 TOT KJEL N	00610 NH3-N TOTAL	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/10/07	14 55		0.024	0.900	0.020	0.060	0.120
74/11/12	11 55		0.352	1.600	0.050	0.080	0.170
74/12/23	14 54		0.400	1.200	0.040	0.010	0.030
75/02/17	09 45		0.590	1.500	0.056	0.040	0.080
75/03/26	16 00		0.230	1.000	0.035	0.045	0.090
75/04/15	14 10		0.190	1.000	0.030	0.015	0.040
75/04/30	17 16		0.540	1.100	0.110	0.080	0.160
75/05/26	14 35		0.260	3.150	0.135	0.155	0.630
75/06/21	12 05		0.290	1.000	0.035	0.080	0.170
75/07/26	14 01		0.270	0.800	0.070	0.130	0.190
75/08/10	14 00		0.025	0.550	0.015	0.010	0.070

STORED RETRIEVAL DATE 76/03/10

4813E1  
32 57 45.0 097 28 00.0 4  
INDIAN CREEK  
48 7.5 AVONDALE  
T/EAGLE MTN LAKE  
2.0 MI SE OF CTR EAGLE MTN NAT GUARD BAS  
11EPALES 2111204  
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 N02&N03 N-TOTAL	00625 TOT KJEL N	00610 NH3-N TOTAL	00671 PHOS-DIS ORTHO	00665 PHOS-TOT MG/L P
			MG/L	MG/L	MG/L	MG/L P	MG/L P
74/11/12	13 40		0.144	1.000	0.030	0.010	0.020
74/12/23	13 52		0.368	0.600	0.016	0.005K	0.010K
75/01/25	17 38		0.216	0.800	0.128	0.008K	0.010
75/02/17	11 20		0.416	0.600	0.024	0.016	0.040
75/03/26	14 35		0.035	1.350	0.045	0.005	0.040
75/04/15	13 05		0.040	0.650	0.085	0.005K	0.020
75/04/30	16 04		0.080	1.650	0.050	0.010	0.070
75/05/26	13 10		0.050	1.050	0.055	0.015	0.100
75/07/26	16 00		0.105	0.500	0.025	0.015	0.050
75/08/10	15 30		0.005	1.050	0.015	0.005	0.060

K VALUE KNOWN TO BE  
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/03/10

48130A P048130A P002500  
 32 55 00.0 097 32 00.0 4  
 AZLE (WALNUT CREEK)  
 48009 7.5 AZLE  
 T/EAGLE MT  
 WALNUT CREEK  
 11EPALES 2141204  
 0000 FEET DEPTH CLASS 00

DATE	TIME	DEPTH	NO2&N03	00630	00625	00610	00671	00665	50051	50053
FROM	OF		N-TOTAL	TOT KJEL	N	NH3-N	PHOS-DIS	PHOS-TOT	FLOW	CONDUIT
TO	DAY	FEET	MG/L	MG/L	MG/L	TOTAL	ORTHO	MG/L P	RATE	FLOW-MGD
						MG/L	MG/L P	INST MGD	MONTHLY	
74/10/15	10 00		25.100	9.000	0.865	11.800	14.000	0.035	0.035	
75/01/06	10 30		20.800	5.000	0.240	8.750	8.800	0.035	0.030	
75/02/13	10 00		26.200	8.100	1.200	10.900	11.000	0.040	0.035	
75/03/11	10 00		26.000	1.300	0.064	7.800	7.800	0.035	0.055	
75/04/22	14 00		24.000	2.800	0.280	3.650	4.200	0.030	0.035	
75/05/22	15 00		31.000	3.400	0.350	12.500	12.800	0.030	0.030	
75/06/26	15 30		26.000	0.500K	0.100K	1.900	11.000	0.035	0.030	
75/09/11	13 30		14.700	4.700	0.310	8.900	9.600	0.035	0.035	
75/11/05	14 30		20.000	5.200	0.130	10.500	14.000	0.035	0.035	
75/11/18	11 15		21.000	3.500	0.200	12.600	14.000	0.035	0.035	
76/01/27	14 00							0.035	0.030	

K VALUE KNOWN TO BE  
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/03/10

4813DB PD4813DB P001194  
 32 59 00.0 097 43 00.0 4  
 SPRINGTOWN  
 48 7.5 SPRINGTOWN  
 T/EAGLE MT  
 WALNUT CREEK  
 11EPALES 2141204  
 0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3	00625 TOT KJEL N	00610 NH3-N TOTAL	00671 PHOS-DIS ORTHO	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/09/09	09 30		0.040	16.500	0.050K	11.750	14.000	0.106	0.110
74/09/30	13 15		0.100	11.000	0.090	6.750	8.000	0.034	0.051
74/11/04	09 30		0.160	14.000	0.050K	5.300	6.600	0.100	0.100
74/12/02	09 00		0.200	7.300	0.140	2.600	3.600	0.100	0.100
75/01/17	09 00		0.400	17.000	1.550	4.100	7.800		0.068
75/04/10			0.163	10.500	0.050K	1.640	5.000		0.120
75/05/07			0.050	18.000	0.180	3.200	3.700	0.075	0.088
75/05/27	08 45		0.050	4.100	0.082	2.800	2.900	0.740	0.600
75/06/18	13 00		0.050	5.000	0.110	1.550	3.100	0.120	0.085
75/07/07	08 00		0.025	2.750	0.050	2.600	2.900	0.185	0.170
75/07/28	08 30		0.125	18.000	0.025K	2.500	3.400	0.120	0.800
75/08/18			0.025	14.500	0.041	2.600	3.400	0.190	0.077
75/09/08	09 00		0.025	11.000	0.025K	3.700	4.800	0.160	0.160

K VALUE KNOWN TO BE  
LESS THAN INDICATED

STORED RETRIEVAL DATE 76/03/10

481321 AS481321 P000300  
 32 53 20.0 097 29 20.0 4  
 FORT WORT.. BOAT CLUB  
 48439 7.5 AVONDALE TX  
 D/EAGLE MOUNTAIN LAKE  
 EAGLE MOUNTAIN LAKE  
 11EPALES 2141204  
 0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	N02&N03 N-TOTAL MG/L	00630 TOT KJEL N MG/L	00625 NH3-N TOTAL MG/L	00610 PHOS-DIS ORTHO MG/L	00671 PHOS-TOT P	00665 INST MG/L	50051 FLOW RATE MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/09/30	06 00									
CP(T)-			11.000	2.000	0.140	7.700	9.100	0.010	0.009	
74/09/30	18 00									
74/11/26	06 00									
CP(T)-			6.000	1.000K	0.050K	7.500	9.800	0.005	0.007	
74/11/26	14 00									
74/12/30	06 00									
CP(T)-			14.000	1.000K	0.050K	1.900	9.900	0.012	0.008	
74/12/30	17 30									
75/03/28	06 00									
CP(T)-			0.200	11.000	0.080K	11.200	12.000	0.008	0.005	
75/03/28	18 00									
75/04/30	07 00									
CP(T)-			4.100	0.500K	0.100	5.600	8.810	0.0005	0.001	
75/04/30	16 00									
75/06/09	01 00									
CP(T)-			0.200	14.000	1.900	2.500	8.100	0.007	0.005	
75/06/09	19 00									

K VALUE KNOWN TO BE  
LESS THAN INDICATED