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WATER QUALITY ASSESSMENT OF ARKANSAS' SIGNIFICANT PUBLICLY-OWNED LAKES

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WATER QUALITY ASSESSMENT
OF
ARKANSAS' SIGNIFICANT PUBLICLY-OWNED LAKES
SUMMER 1999

In 1989, the original assessment of Arkansas' significant publicly-owned lakes was conducted. Seventy-five (75) lakes were sampled for water quality, including nutrients, chlorophyll ^a and fecal coliform bacteria. The lakes were divided into groups according to their morphological characteristics (Type A, B, C, D and E, to be discussed later). Trophic state indices were calculated for each of the lakes and the lakes were ranked based on highest trophic state to the lowest.

In 1994, the Department reassessed Arkansas' significant publicly-owned lakes. Eighty lakes were sampled for water quality, including nutrients, chlorophyll ^a and fecal coliform bacteria. Sediment samples were also collected from most of the lakes. The same lake classification scheme was used as in 1989. Trophic state indices were calculated for each of the lakes and were compared to the 1989 indices. The 1989 and 1994 trophic rankings were very similar. Type A and B lakes ranked in the lower one-third (lowest trophic level) both years. Sixty percent of the ten highest-ranking lakes (highest trophic levels) remained in that ranking for both surveys.

During July and August 1999, Arkansas' significant publicly-owned lakes were reassessed. Hurricane Lake was dropped from the list, bringing the total of significant publicly-owned lakes to seventy-nine, Table 1. Three lakes (Overcup, Greenlee and Nimrod) were not sampled due to draw downs during the summer for lake-maintenance work. Lake Dardanelle, which was not sampled during the previous two assessments, was sampled during this assessment. Ozark Lake, a large Arkansas River impoundment, was not considered in this study. Ninety-three transects from 75 lakes were sampled. For the first time, plankton samples were collected from the lakes. Figure 1 depicts the locations of Arkansas' significant publicly-owned lakes.

The Water Quality Act of 1987, Section (314) mandates the development of a public lakes assessment program. The primary objectives of the lakes assessment were: (1) identify lakes which were not currently meeting water quality standards; (2) identify degraded, impaired, or threatened lakes, and (3) identify the relative trophic status of each lake.

METHODOLOGY

All water quality sampling was completed between July 12, 1999 and August 26, 1999. Two, 2-day sampling trips were made each week and two to four sites were sampled each day. Each trip was restricted to no more than two days so the samples could be analyzed within the 48-hour maximum holding time for certain parameters. The Technical Services Division of the Department of Environmental Quality analyzed water quality parameters. Dissolved oxygen profiles, pH and secchi transparency was measured in-situ. Personnel from the Water Quality Planning Branch, Water Division, of ADEQ identified and enumerated plankton samples.

A shore to shore transect in the lower portion of each man-made lake (near the dam) was established, depths along transects were determined and a sample point at the deepest portion along the transect was established. Lakes of approximately 2000 surface acres or larger had more than one sample transect, including one in the lower one-third and one in the upper one-third of the lake. Naturally occurring lakes and oxbow lakes were sampled at their deepest points, normally the middle of the lake. An additional transect in the upper third of Lake DeQueen was established to assess the effects of a point source discharge.

Field Observations

The following observations were noted at each transect site:

- 1) Climatic conditions
- 2) Air temperature
- 3) Lake surface condition
- 4) Unusual occurrences
- 5) Quality Assurance/Quality Control issues

In-Situ Measurements

The following measurements were taken at each sample site:

- 1) Secchi disc transparency
- 2) Vertical water temperature profile (Hydrolab)
- 3) Vertical dissolved oxygen profile (Hydrolab)
- 4) Vertical pH profile (Hydrolab)
- 5) GPS readings at each shore point of the transect and at the sample site

Water temperature and dissolved oxygen concentrations were measured at 1 meter intervals within the epilimnion, at 0.3 meter intervals in the thermocline and 1 to 5 meter intervals in the hypolimnion.

TABLE 1. Arkansas' Significant Publicly-Owned Lakes

NO	NAME	COUNTY	ACRES	AVERAGE DEPTH	WATER-SHED ¹	W/A ²	ECO-REGION ³	PURPOSE ⁴	TYPE	NO	NAME	COUNTY	ACRES	AVERAGE DEPTH	WATER-SHED ¹	W/A ²	ECO-REGION ³	PURPOSE ⁴	TYPE
1	WINONA	SALINE	1240	30.0	44.4	22.9	OM	W	A	41	FRIERSON	GREENE	335	7.5	7.3	13.9	DL	A	C
2	DIERKS	HOWARD	1360	22.0	114.0	53.6	OM	F	A	42	STORM CREEK	PHILLIPS	420	7.0	8.0	12.2	DL	D	C
3	GILLHAM	HOWARD	1370	21.0	271.0	126.6	OM	F	A	43	CALION	UNION	510	6.0	6.7	8.4	GC	A	C
4	DEQUEEN	SEVIER	1680	21.0	169.0	64.4	OM	F	A	44	POINSETT	POINSETT	550	7.0	4.5	5.2	DL	A	C
5	CATHERINE	HOT SPRING	1940	18.0	1516.0	500.1	OM	H	A	45	BEAR CREEK	LEE	625	10.0	6.0	6.1	DL	R	C
6	GREESON	PIKE	7200	38.7	237.0	21.1	OM	H	A	46	UP. WHITE OAK	OUACHITA	630	8.0	20.7	21.0	GC	A	C
7	HAMILTON	GARLAND	7300	26.0	1441.0	126.3	OM	H	A	47	ATKINS	POPE	750	5.5	10.2	8.7	AV	A	C
8	MAUMELLE	PULASKI	8900	23.0	137.0	9.9	OM	W	A	48	OVERCUP	CONWAY	1025	4.0	17.2	10.7	AV	A	C
9	DEGRAY	CLARK	13200	48.8	453.0	22.0	OM	H	A	49	LO. WHITE OAK	OUACHITA	1080	8.0	42.5	25.2	GC	A	C
10	NORFORK	BAXTER	22200	57.0	1806.0	52.5	OH	H	A	50	HARRIS BRAKE	PERRY	1300	6.0	11.2	5.5	AV	A	C
11	BEAVER	BENTON	28200	58.0	1186.0	26.9	OH	H	A	51	CANE CREEK	LINCOLN	1620	6.0	24.0	9.5	GC	A	C
12	GREERS FERRY	CLEBURNE	31500	60.0	1153.0	23.4	BM	H	A	52	WILSON	ASHLEY	150	5.0	1.0	4.3	DL	A	D
13	OUACHITA	GARLAND	40100	51.0	1105.0	17.6	OM	H	A	53	ENTERPRISE	ASHLEY	200	5.0	2.0	6.4	DL	A	D
14	BULL SHOALS	MARION	45440	67.0	6036.0	85.0	OH	H	A	54	1 ST OLD RIVER	MILLER	200	4.0	2.0	6.4	GC	A	D
15	CRYSTAL	BENTON	60	12.0	4.5	48.0	OH	A	B	55	PICKTHORNE	LONOKE	207	5.0	0.5	1.5	DL	A	D
16	SHORES	FRANKLIN	82	10.0	26.0	202.9	BM	R	B	56	HOGUE	POINSETT	280	4.4	2.0	4.6	DL	A	D
17	SPRING	YELL	82	23.0	10.5	82.0	AV	R	B	57	GREENLEE	MONROE	300	6.0	0.5	1.1	DL	A	D
18	HORSEHEAD	JOHNSON	100	16.0	17.3	110.7	BM	R	B	58	MALLARD	MISSISSIPPI	300	6.0	0.5	1.1	DL	A	D
19	WEDDINGTON	WASHINGTON	102	16.0	3.0	18.8	OH	R	B	59	GRAMPUS	ASHLEY	334	6.0	2.0	3.8	DL	A	D
20	COVE	LOGAN	160	10.0	8.5	34.0	AV	R	B	60	DESARC	PRAIRIE	350	6.0	1.0	1.8	DL	A	D
21	ELMDALE	WASHINGTON	180	8.0	6.0	21.3	OH	A	B	61	WALLACE	DREW	362	5.2	1.0	1.8	DL	A	D
22	FAYETTEVILLE	WASHINGTON	196	15.0	6.0	19.6	OH	R	B	62	PINE BLUFF	JEFFERSON	500	6.0	4.0	5.1	DL	A	D
23	BOBB KIDD	WASHINGTON	200	13.3	4.0	12.8	OH	A	B	63	ASHBAUGH	GREENE	500	5.0	1.0	1.3	DL	A	D
24	WILHELMINA	POLK	200	10.0	13.5	43.2	OM	A	B	64	BOIS D'ARC	HEMPSTEAD	750	4.0	4.0	3.4	GC	A	D
25	BARNETT	WHITE	245	27.0	37.5	98.0	AV	A	B	65	OLD TOWN	PHILLIPS	900	3.5	23.0	16.4	DL	R	D
26	SUGARLOAF	SEBASTIAN	250	12.0	5.0	12.8	AV	A	B	66	HORSESHOE	CRITTENDEN	1200	10.0	13.5	7.2	DL	R	E
27	NOLAN	SEBASTIAN	350	9.0	3.1	5.7	AV	A	B	67	UPPER CHICOT	CHICOT	1270	15.0	14.0	7.1	DL	R	E
28	FORT SMITH	CRAWFORD	416	28.0	73.0	112.3	BM	W	B	68	GRAND	CHICOT	1400	7.0	5.5	2.5	DL	A	E
29	SEQUOYAH	WASHINGTON	500	8.0	275.0	352.0	OH	R	B	69	GA. PACIFIC	ASHLEY	1700	4.0	4.0	1.5	GC	W	E
30	SWEPKO	BENTON	531	17.0	14.0	16.9	OH	W	B	70	BLUE MT.	LOGAN	2900	8.6	488.0	107.7	AV	F	E
31	SHEPHERD SPGS.	CRAWFORD	552	31.0	68.0	78.8	BM	W	B	71	COLUMBIA	COLUMBIA	2950	11.0	48.0	10.4	GC	W	E
32	CHARLES	LAWRENCE	562	8.0	18.0	20.5	OH	A	B	72	NIMROD	YELL	3600	8.2	680.0	120.9	AV	F	E
33	LEE CREEK	CRAWFORD	634	11.0	465.0	469.4	BM	W	B	73	LOWER CHICOT	CHICOT	4030	15.4	350.0	55.6	DL	R	E
34	BEAVER FORK	FAULKNER	900	10.0	11.5	8.2	AV	R	B	74	CONWAY	FAULKNER	6700	5.0	136.0	13.0	AV	A	E
35	HINKLE	SCOTT	965	15.0	27.5	18.2	AV	A	B	75	ERLING	LAFAYETTE	7000	7.0	400.0	36.6	GC	W	E
36	BREWER	CONWAY	1165	20.0	36.4	20.0	AV	W	B	76	OZARK	FRANKLIN	10600	14.0	151801.0	9165.3	AV	N	E
37	JUNE	LAFAYETTE	60	5.0	4.0	42.7	GC	A	C	77	FELSENTHAL	BRADLEY	14000	7.0	10852.0	496.1	GC	R	E
38	BAILEY	CONWAY	124	8.0	7.5	38.7	AV	R	C	78	MILLWOOD	LITTLE RIVER	29500	5.2	41444.0	89.9	GC	F	E
39	TRICOUNTY	CALHOUN	280	7.0	11.5	26.3	GC	A	C	79	DARDANELLE	POPE	34300	14.2	153666.0	2867.2	AV	N	E
40	COX CREEK	GRANT	300	6.0	17.0	36.3	GC	A	C										

TOTAL ACREAGE 355954

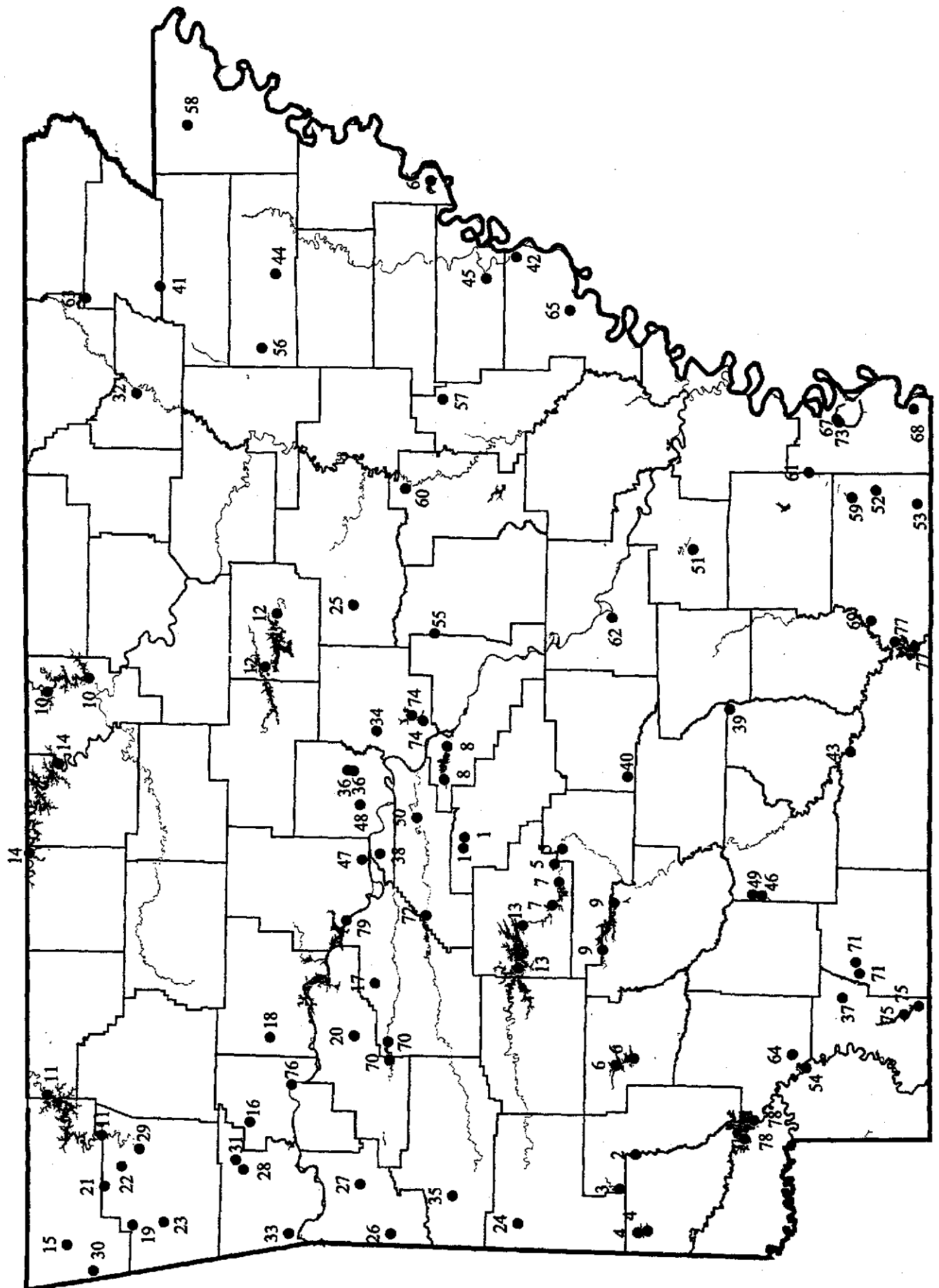
1 -- Watershed: square miles

2 -- W/A: Watershed (acres)/Area of Lake

3 -- Ecoregion: OM-Ouachita Mountains; BM-Boston Mountains; OH-Ozark Highlands; AV-Arkansas River Valley; GC-Gulf Coastal; DL-Delta

4 -- Purpose: W-Water Supply; F-Flood Control; H-Hydropower; A-Angling (public fishing); N-Navigation; R-Recreation

FIGURE 1. Location of Arkansas' Significant Publicly-Owned Lakes



Water Quality Sampling

Water quality grab samples were collected with an Alpha Water sampler at one meter (epilimnion) and at 0.8 (80%) maximum depth (hypolimnion) at the main sample point on each transect. The samples were labeled by using: 1) the given STORET station identifier at each station; 2) either an "A", "B", or "C" to identify the transect location; and by 3) an "E" or an "H" to identify the epilimnion and hypolimnion samples.

Example: LARK001A-H = Lake Conway near the dam, hypolimnion water quality grab sample.
The water quality samples were analyzed for the following parameters:

In-Situ Readings	Laboratory Analysis		
Dissolved Oxygen	NH ₃ -N	Total phosphorus	Chlorides
Temperature	NO ₂ +NO ₃ -N	Ortho-phosphorus	Sulfates
pH	Total dissolved solids	Conductivity	Alkalinity
	Total suspended solids	Turbidity	
	Total organic carbon	Total Hardness	

Bacteria Sampling

Bacteria samples were collected one-half meter below the water surface at five locations along the transect. One sample was collected approximately 50 feet from each shore, at each quarter point and at the mid-point of the transect. One duplicate sample per every two sample transects was collected. Geometric means of the samples were calculated for each lake. The samples were labeled using the given STORET station identifier at each station and adding an identifier to depict the sample location along the transect - left, right or center facing dam (L, R or C) and shore or quarter point (S or 1/4).

Example: LARK001A-L1/4 = Lake Conway near the dam, left quarter point

Metals Sampling

A sample for dissolved metals analysis was collected from the hypolimnion and the epilimnion at the grab sample site along each transect. The samples were collected and preserved in accordance with *Standard Methods for the Examination of Water and Wastewater, 17th Edition, 1989, Parts 300, 301, and 301A*. The grab samples were labeled using the given STORET station identifier at each station and by using either an "E" or an "H" to depict between the epilimnion and hypolimnion samples.

Example: LARK001A-H = Lake Conway near the dam, hypolimnion

The following metals were analyzed:

Aluminum	Beryllium	Cobalt	Iron	Manganese	Sodium
Boron	Calcium	Chromium	Lead	Potassium	Vanadium
Barium	Cadmium	Copper	Nickel	Magnesium	Zinc

Toxic effect ratios were calculated where metals concentrations were abnormally elevated and were compared to acute and chronic metals toxicity criteria.

Chlorophyll ^a

Grab samples were collected from the same sample sites where bacteria samples were collected, and composited. A sub-sample was then mixed with a sample collected just above the thermocline at the water quality grab-sampling site. The analysis was performed on a sub-sample of this mix.

All chlorophyll ^a samples were be preserved and analyzed according to the methods described in *Standard Methods For the Examination of Water and Wastewater, 17th Edition, 1989, Spectrophotometric Determination of Chlorophyll*. The sample was labeled using the given STORET station identifier at each station.

Example: LARK001A = Lake Conway near the dam chlorophyll ^a sample

Plankton

One plankton sample was collected at the deepest point along each transect. A Wisconsin Net was lowered to the thermocline, left there for approximately one minute and retrieved vertically to the surface at a steady rate of approximately one foot/second. In lakes without a thermocline, the net was lowered to half the lake depth. The net was pulled through a minimum of nine feet vertical to obtain a sample volume of 28 liters, the minimum recommended. When the thermocline or half the lake depth was less than nine feet, multiple pulls were taken until a minimum of nine feet of water column was sampled.

The net was rinsed with water to wash all organisms into the bottle. Samples were emptied into plastic bottles, preserved with Lugol's solution (1:100 or tea color) and labeled. Samples were stored in the dark until lab identification and enumeration.

In the lab, an aliquot (~ 1 ml) was withdrawn from the sample bottle by means of a 1 ml dropper. A Sedgewick-Rafter Counting Cell and Whipple Micrometer Disk were used for identification and enumeration of aliquots. Three aliquots were withdrawn from each sample. Ten random fields from each aliquot were analyzed at a magnification of 400X (total of 30 fields).

The samples were labeled using the given STORET station identifier at each station.

Pesticides

Pesticide samples were collected from a select group of lakes, mainly the Delta lakes, by taking a surface water grab sample from the main sample point. The grab samples were labeled using the given STORET station identifier at each station.

Example: LARK001A = Lake Conway near the dam pesticide sample.

All other parameter analyses were completed under the Departments existing "Quality Assurance Project Plan For Arkansas' Water Quality and Compliance Sampling", 1999.

RESULTS

The spring and early summer of 1999 were unusually cool. Rainfall amounts were normal for the first part of 1999 but air temperatures were four to six degrees Fahrenheit below monthly averages. A drought and above average temperatures began about the third week of June and continued throughout the survey. This weather pattern was quite different than in the previous two surveys. Those surveys were conducted during periods of lower than average temperatures and above average rainfall amounts.

Lake Classification

The 1989 survey classified Arkansas' significant publicly-owned lakes into five general types based on size, average depth and ecoregion. This classification was also used for the 1994 and 1999 surveys.

Type A Lakes

These lakes are located in the montane areas of the state, Ozark, Ouachita and Boston Mountains, and are usually several thousand acres in size with average depths of 30 to 60 feet. Most are operated by the U.S. Army Corps of Engineers and were constructed mainly as flood control and/or hydropower lakes. The watersheds of most of these lakes are forest dominated, but some of this land is being cleared for agricultural uses such as pasture and confined animal operations. The watersheds to lake surface area ratios (W/A) were generally 20 to 100 with a median of 39.7. The smallest ratio is 9.9 and the largest is 500. The hydraulic residence time in many of these reservoirs is about one year, except for Lakes Catherine and Hamilton, which have hydraulic residence times of two and four weeks, respectively.

Water quality data for Type A lakes can be found in Appendix A, Table A-1 through Table A-14. These lakes are usually weakly buffered due to in low alkalinities and dissolved solids, except Ozark Highlands' lakes. Alkalinities in Bull Shoals and Norfork lakes, which have limestone-dominated watersheds, generally range between 100 mg/L and 150 mg/L. Beaver Lake, which receives drainage from both the Ozark Highlands and Boston Mountains, has an alkalinity around 50 mg/L. The remainder of Type A lakes had alkalinities near 20 mg/L or less, reflecting their Ouachita Mountain watersheds. Total dissolved solids and conductivities produce a wide range of values which is reflective of the drainage basin of a particular lake. Values for pH (Table C-1) in lakes Beaver, Norfork, and Bull Shoals are higher than other Type A lakes, once again reflecting the watershed geology differences of the lakes in different ecoregions. Lakes Winona, Hamilton and Maumelle had hypolimnetic pH values less than the 6.0 standard. Each of these lakes drainages is from the mid-soils of the Ouachita Mountains.

Surface water temperatures ranged from 28.7°C in Greers Ferry Lake to 33.6°C at upper Lake DeQueen (Table C-2). Only three lakes had surface water temperatures above the 32°C maximum temperature standard; these include upper Lake DeQueen, 33.6°C; lower Lake Maumelle, 32.3°C; and upper Lake DeGray, 33°C. None of these temperatures are of concern and probably are a result of the above average temperatures and below average rainfall amounts that occurred during the survey.

Secchi disk transparency ranged from four feet in upper Lake DeQueen to 21 feet in lower Beaver, Bull Shoals, and Norfork lakes. Most lakes had transparencies exceeding ten feet. Epilimnion turbidity values were all less than 3.1 NTU. Hypolimnetic values were higher than the epilimnion values, but most were below 10 NTU (Table C-3). The upper Beaver Lake sample point had a turbidity value of 30.0 NTU in the hypolimnion. This is consistent with the 1989 value. Many chlorophyll *a* concentrations were less than 1.0 µg/L. The highest collected was 20.40 µg/L at the lower Lake DeQueen site.

The hypolimnetic $\text{NO}_2 + \text{NO}_3$ nitrogen value was elevated in upper Beaver Lake as compared to the other Type A lake values. Hypolimnetic $\text{NO}_2 + \text{NO}_3$ nitrogen values were elevated in lower Greeson, DeGray, Norfolk, Beaver, Greers Ferry, and Bull Shoals, and in upper Norfolk, Greers Ferry, and Bull Shoals, Figure 1. These values are similar to those of the previous surveys. Hypolimnetic ammonia-nitrogen concentrations were elevated in upper Beaver, DeQueen and DeGray, and lower Dierks, DeGray and DeQueen. Ortho-phosphorus was generally below the detection limit and total phosphorus concentrations were only slightly higher, perhaps partly due to suspended silt particles carrying attached phosphorus.

The Type A lakes located in the Ouachita Mountains had high levels of iron in their hypolimnion samples. This is a result of the geology in the Ouachita Mountains and the anoxic hypolimnion conditions that exist in these lakes. However, Lakes Ouachita, Hamilton and Catherine did not have elevated concentrations of iron or other metals in their hypolimnions. These lakes have well oxygenated hypolimnions throughout the year. None of the metals concentrations were toxic concentrations in any of the Type A Lakes.

Fecal coliform concentrations were not a problem in this group of lakes (Figure C-5). The highest concentration of fecal coliform bacteria recorded from any one sample was 29 colonies per 100 ml of sample (29 col/100ml). The geometric means of the five samples collected from each of the lakes in this group were all less than 3 col/100 ml.

Type B Lakes

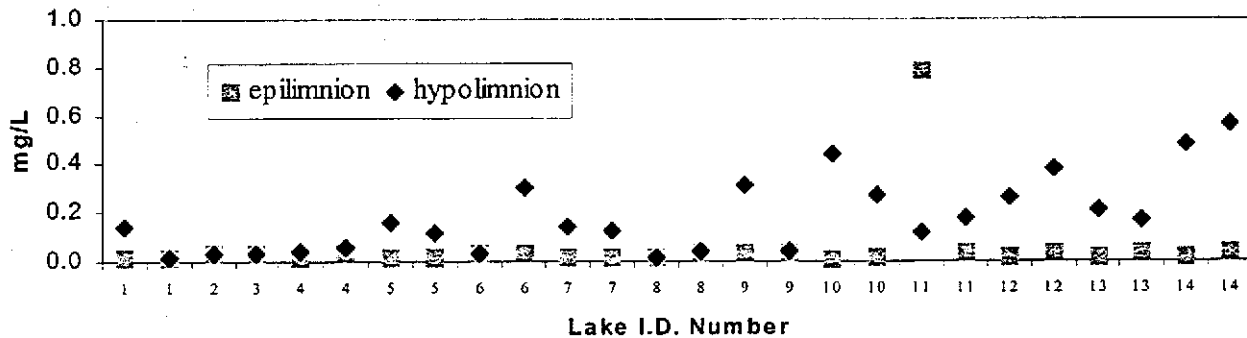
The Type B lakes include the smaller lakes, about 500 acres in size, located in the uplands or steeper terrain of the Ozark, Ouachita and Boston Mountains, and the Arkansas River Valley. The primary purpose of these Lakes is multi-purpose recreation. Three lakes are used as a public water supply and one lake is used as a cooling water supply for an electric power plant. Average depths range 10 to 25 feet and the watershed to lake-surface area ratios range from 5.7 to 352 with a median of approximately 28. Hydraulic residence time is very short in most of these lakes. Watersheds are predominately forested.

Water quality data for Type B lakes is listed in Appendix A in Table A-15 through Table A-36. Type B lakes located in the Ozark Highlands ecoregion have noticeably higher conductivity, pH, total dissolved solids and alkalinity than the Type B lakes located in the Ouachita Mountains or Arkansas River Valley ecoregions (Table C-1). The surface pH value in Crystal Lake was 9.26 which exceeded the standard. Chloride and sulfate values were low in all these lakes, except Lake Swepeco which had a sulfate concentration exceeding the water quality standard.

Surface water temperatures ranged from 27°C in Lake Crystal to 36.2°C in Lake Swepeco (Table C-2). The surface water temperature in Lake Hinkle exceeded the 32°C temperature standard. This was probably due to the above average air temperatures and lower than average rain fall totals experienced during the survey. Lake Swepeco is a cooling water lake for a coal-fired power plant which has a site-specific temperature standard of 54.0°C.

Turbidity values in the epilimnion of these lakes were generally less than 6 NTU, but the hypolimnion values were generally slightly elevated (Table C-3). The hypolimnetic turbidity values in lakes Swepeco, 32 NTU, and Lee Creek, 28 NTU, were above the 25 NTU standard. Chlorophyll *a* concentrations were <0.1 µg/L in many lakes, to over 44 µg/L in Lake Charles. Secchi disk transparencies ranged from two feet in Lake Fayetteville to greater than eleven feet in Lake Weddington. Most of these lakes have low productivity. Lake Fayetteville tends to illustrate above average productivity for this group of lakes.

Figure 2
NITRATE-NITROGEN
Type A Lakes



The epilimnetic $\text{NO}_2 + \text{NO}_3$ nitrogen concentrations were generally less than 0.06 mg/L except for Crystal Lake; which was 0.23 mg/L. The hypolimnetic $\text{NO}_2 + \text{NO}_3$ nitrogen concentrations of lakes Crystal, Sugarloaf, Ft. Smith, and Shepherd Springs were four to twenty times higher than the other lake values. The hypolimnetic ammonia nitrogen ($\text{NH}_3\text{-N}$) concentration of many Type B lakes was greater than 2.0 mg/L. Lake Fayetteville had the highest concentration of 5.1 mg/L, but this value is similar to the values recorded in earlier surveys. Lake Fayetteville had a total phosphorus concentration of 0.82 mg/L in the hypolimnion. Other Type B Lakes concentrations were generally less than 0.03 mg/L. Type B lakes tend to be strongly stratified with a deep anoxic zone, which may be contributing to these high nutrient concentrations. Watershed uses range from confined animal operations to urban development.

Iron and manganese concentrations ranged from 100 $\mu\text{g/L}$ to >8000 $\mu\text{g/L}$. The elevated concentrations occurred in those lakes that strongly stratify for extended periods of time during the summer and fall months. Almost all Type B lakes had detectable levels of arsenic in their hypolimnions; the greatest concentration was 11.94 $\mu\text{g/L}$ in Lee Creek Lake. None of these lakes had any metals in toxic concentrations.

The fecal coliform concentrations in these lakes were generally below 15 col/100 ml at all sample locations along the transects (Table C-5). Some lakes had elevated concentrations at one of the shore sampling sites, probably a result of either primary-contact recreation activities or the location of camp/home sites adjacent to the lake. Most of these counts were below 50 col/100ml. Lake Beaverfork had elevated concentrations at every sample point across its transect; none of which were greater than 40 col/100 ml. This lake receives heavy primary contact recreation, probably the cause of the elevated bacteria concentrations. Lake Wilhelmina had a fecal coliform geometric mean concentration of >1040 col/100 ml. Part of this lake is used as a concentrated fish production facility which was the area of the elevated counts. However, since fecal coliform bacteria contamination is associated with warm blooded animals, another bacteria that produces similar colonies may be the cause of the high numbers.

Type C Lakes

These lakes are mainly located in the flatter, lowland areas of the Delta, Crowley's Ridge region, Gulf Coastal Plains, and the Arkansas River Valley. They generally range in size from 300 to 1000 acres. Watershed to lake-surface area ratios range between 5 and 50 with a median of 13. Those lakes with high W/A ratios and shallow average depths generally have high flushing rates. The average depth of Type C

lakes is less than 10 feet. Watersheds of these lakes are mostly comprised of lowland hardwoods with some pines. There are small farms scattered throughout most of these watersheds. These lakes were mainly constructed for public fishing and other types of secondary contact recreation uses. A few have expanded to multiple recreation use designations. Water quality data for these lakes can be found in Appendix A, Tables A-37 through A-51.

Chloride concentrations in lakes June and Poinsett, and the sulfate concentration in Bear Creek Lake were elevated compared to other Type C lakes. The alkalinities in Bear Creek and Storm Creek lakes were noticeably higher than that of other Type C lakes. These two lakes had pH values near 9.0. This consistent with the values recorded during earlier surveys (Table C-1). The other lakes in this group generally had pH values less than 7.3.

Surface water temperatures ranged between 28°C and 33°C. Lakes Frierson, Storm Creek and Calion had a temperature of 33.2°C. The above average air temperature and lower than average rainfall totals probably contributed to these elevated readings.

Chlorophyll ^a concentrations ranged from <1.0 µg/L to >38 µg/L; most were 10 µg/L or less. Storm Creek, Bear Creek, and Upper White Oak lakes had chlorophyll ^a concentrations >30 µg/L. Many of the Type C lakes are routinely fertilized for fisheries enhancement, thus increasing their productivity. This increase in productivity can lead to higher turbidity from plankton production and lower secchi disk transparencies. Most of the lakes in this group had turbidity values below the 25 NTU standard, except for Cox Creek which had a value of 35 NTU in the hypolimnion. Lake Frierson had a value of 75 NTU in the epilimnion and 91 NTU in the hypolimnion. These were the highest values recorded during the survey. These values are very similar to the values recorded during the 1994 survey. Secchi disk transparencies ranged from 11 inches in Lake Frierson to 44 inches in Lake Poinsett during the survey.

Nutrient concentrations in these lakes were generally at or below the detection level for the given parameter, except for total phosphorus. Storm Creek Lake had the highest hypolimnetic total phosphorus concentration of 0.56 mg/L and Lake Frierson had the highest epilimnetic total phosphorus concentration of 0.14 mg/L. Many of these lakes had elevated total phosphorus concentrations occurring mostly in the hypolimnions. This is probably a result of the elevated total suspended solids and turbidity in the lakes.

All lakes in this group had detectable levels of metals which would be expected in lakes with anoxic hypolimnions. No metals were found to be at toxic levels however. Almost all lakes in this group had detectable levels of arsenic. Lakes Cox Creek and Frierson had levels of aluminum of 296.9 µg/L and 443.6 µg/L, respectively. These are the only lakes in this group where aluminum was above detection level.

Calion lake exceeded the primary contact recreation standard for fecal coliform bacteria. It had a geometric mean of >485 col/100ml (Figure C-5). This lake is heavily used for primary contact recreation and is surrounded by summer/permanent resident homes on septic tank systems. Lakes June and Cox Creek had elevated counts at all sample points on the transect, but the geometric means were below 40 col/100ml. A few other lakes had slightly elevated counts at one or more of the shore sampling points on the transect, probably due to fishing camps and/or near shore swimming activities.

Type D Lakes

These lakes are the smaller Delta ecoregion impoundments, generally between 200 to 500 acres; however, two similar lakes of 750 and 900 acres in the Gulf Coastal Ecoregion are also included. Some of these lakes are naturally occurring oxbows or cut-off lakes from main stems of larger rivers. Some of the oxbow lakes have been altered through the construction of water control structures and have been cut off from their parent stream and/or watershed by levees. Average depth of these lakes is generally less than 5 feet. Watershed to lake surface area ratios is 0.5 to 23 with a median of 3.6. Watershed uses consist primarily of row crop agriculture; however very little discharge from these activities enters directly to any of these lakes. The primary use of Type D lakes is public fishing. Water quality data for these lakes can be found in Appendix A, Tables A-52 through A-65.

The Type D lakes pH values ranged from 5.34 in the hypolimnion of lake Grampus to 9.42 in the epilimnion of Old Town Lake (Table C-1). The epilimnion pH values in lakes Wilson, Wallace and Old Town and the hypolimnion pH values in lakes Enterprise and Grampus exceeded the pH standard. This was probably due to the hotter than usual temperatures and the lower than average rainfall during the survey and the natural productivity of the lake area and run-off from row-crop agriculture activities.

Lakes Wilson, DesArc, Wallace, Ashbaugh, and Old Town had surface water temperatures above the 32°C standard (Table C-2). The surface water temperatures ranged from 27°C in Lake Pickthorne to 34.2°C in Lake Wallace. The time of day the sample was collected influenced this temperature variation. The higher surface water temperatures were probably due to the above average ambient temperatures and the lower than normal rainfall that occurred during the survey.

Turbidity values for this group were generally less than 15 NTU. The epilimnion samples from lakes Pickthorne and Old Town were 26 NTU, and the hypolimnion sample from Old Town Lake was 24 NTU (Table C-4). These epilimnion values exceeded the 25 NTU lake turbidity standard. Secchi disk transparencies ranged from 12 inches in Old Town Lake to 31 inches in Lake Grampus. Chlorophyll *a* concentrations ranged from 9.9 µg/L in Lake Grampus to 123.4 µg/L in Old Town Lake.

Nutrient concentrations in the water column from these lakes were generally low, except in Lakes DesArc and Old Town. The NH₃-N concentration from DesArc Lake was 0.99 mg/L and the total phosphorus concentrations from DesArc and Old Town lakes was 0.20 and 0.38 mg/L, respectively. The low nutrient values in this type lake generally reflects high nutrient utilization resulting in increased plankton (Chlorophyll *a*) production, high turbidity, and low secchi disk transparencies. Where nutrients remain high, it is likely that nutrient input exceeds nutrient utilization or that another nutrient is limiting production.

All Type D lakes had detectable levels of arsenic. Only Lake DesArc had elevated levels of iron and manganese. Lake Pickthorne had an aluminum concentration of 1000 µg/L in the epilimnion and 360 µg/L in the hypolimnion. Lake Wallace's copper concentration was 5.72 µg/L in the hypolimnion sample, which was above the chronic toxicity criteria of 4.29 µg/L calculated using a hardness value of 32 mg/L. In general, metals concentrations in these lakes were quite low.

The fecal coliform bacteria geometric means were below 25 col/100ml (Figure C-5). A few lakes had individual sample points with elevated bacteria concentrations. These points were near the shore, indicating that an on shore or near shore activity was the source of the bacteria. Lake Hogue had the highest geometric mean of 24.6 and the highest single concentration of 110 col/100 ml. Neither the geometric mean nor the individual concentrations exceed any bacteria standards for contact recreation activities.

Type E Lakes

These are the large lowland lakes, generally 1000 to 30,000 acres located in the Delta, Gulf Coastal Plains, and Arkansas River Valley ecoregions. Average depth in these lakes is usually less than 10 feet. Watershed to lake surface area ratios range from 1.5 to >9000. Flushing rates are also quite variable within this group because of the large variations in watershed to lake surface area ratio. The watersheds of these lakes contain a mixture of row crop agriculture, confined animal operations, pastureland and some forestland. Primary uses of these lakes include three main stem reservoirs for flood control and navigation, one of which has substantial recreation and fish and wildlife enhancement features; several for water supply; two for industrial water supply; one for municipal uses; and one primarily for public fishing. The water quality data for these lakes can be found in Appendix A, Tables A-66 through Table A79.

Typical total dissolved solids (TDS) concentrations of Type E lakes are approximately 50 mg/L with conductivities around 75 μ mhos, except for the Mississippi River oxbows and Lake Dardanelle. Lake Dardanelle had a TDS value of 400 mg/L, which was the highest recorded during the survey. Chloride and sulfate concentrations were generally below 10 mg/L and total hardness was typically less than 25 mg/L for all of these type lakes except Lake Dardanelle. Grand Lake had an epilimnetic pH value of 9.41 and the upper transect of lakes Blue Mountain and Columbia had hypolimnetic pH values of 5.94 and 5.56, respectively. These were the extremes recorded for Type E Lakes (Table C-1).

Surface water temperature ranged from 29.0°C in lower Lake Columbia to 32.8°C in lower Lake Chicot (Table C-2). These lakes were sampled early in the survey after a cooler and wetter than normal spring and before the hot dry summer. The surface water of these lakes probably had not yet reached peak summer temperatures.

Historically, turbidity values have been below 10 NTU for these lakes. Samples from the upper and lower Blue Mountain Lake transects exceeded the 25 NTU standard (Table C-3). Secchi disk transparencies in this group were usually greater than 20 inches but ranged from 10 inches in upper Blue Mountain Lake to 71 inches in Lake Georgia Pacific. Chlorophyll *a* concentrations ranged from 1.7 μ g/L in lower Lake Felsenthal to 50.50 μ g/L in Horseshoe Lake. Most of the lakes in this group had Chlorophyll *a* concentrations of less than 10.0 μ g/L. This was consistent with the earlier surveys.

Ammonia nitrogen concentrations for these lakes were usually less than 0.03 mg/L. The lower Lake Erling hypolimnion sample had a concentration of 1.43 mg/L, consistent with the values from the previous surveys, and the NO₂+NO₃ nitrogen concentration was below the detection level. Upper Blue Mountain lake had the highest NO₂+NO₃ nitrogen concentration of 0.23 mg/L. Most of the other Type E lakes had concentrations near the detection level of 0.02 mg/L. The lower Lake Erling site had the highest total phosphorus concentration of 0.36 mg/L. Most total phosphorus concentrations were less than 0.03 mg/L. Grand Lake had an elevated ortho-phosphorus concentration of 0.12 mg/L. All other Type E lake ortho-phosphorus concentrations were less than 0.04 mg/L.

Three Type E lakes had detectable quantities of aluminum. Lake Dardanelle had the highest overall epilimnion concentration of 224.9 μ g/L. Nine lakes had detectable levels of arsenic; Grand Lake had 21.23 μ g/L in the epilimnion, and upper Lake Chicot had 22.49 μ g/L in the hypolimnion. The lower Lake Felsenthal site had a hypolimnetic copper concentration of 11.42 μ g/L. This was above the acute and chronic toxicity criteria of 4.60 μ g/L and 3.47 μ g/L, respectively, based on an ecoregion hardness value of 25 mg/L. The 1994 survey reported elevated copper concentrations for upper Lake Felsenthal.

Upper Lake Millwood was the only Type E lake that exceeded the primary contact recreation standard for fecal coliform concentrations based on the geometric mean of the transect samples (Figure C-5). Several lakes had elevated counts near shorelines, but none were above 50 col/100 ml, except for the left shore sample in Horseshoe Lake, which had a concentration of >600 col/100 ml. The majority of the bacteria counts were <5 col/100 ml.

Trophic Status

A ranking of all lakes sampled relative to their trophic status was accomplished by this survey. The three principal parameters normally considered in trophic state determination are total phosphorus ($\mu\text{g/L}$), chlorophyll a ($\mu\text{g/L}$), and secchi disk transparency (inches). A trophic Index (TI) was calculated using the following formula:

$$\frac{\text{T-Phos } (\mu\text{g/L}) + \text{Chlorophyll } a (\mu\text{g/L})}{\text{Secchi Disk Transparency (in)}}$$

One-half of the detection limit of a parameter was used for calculation when analysis was determined to be less than the detection limit. Example: T-Phos <0.020 $\mu\text{g/L}$, then 0.010 $\mu\text{g/L}$ was used to calculate the trophic index. Table 2 lists calculated trophic indices for each lake in descending trophic index ranking order. Higher index values indicate a richer trophic status.

Trophic indices ranged from 42.45 in Old Town Lake to 0.03 in Lake Norfolk. Elevated concentrations of total phosphorus, $\text{NO}_3\text{-N}$ and $\text{NH}_3\text{-N}$ (Table A-65) were contributing to greater algae production in Old Town Lake, thus increasing its chlorophyll a concentrations to 123.4 $\mu\text{g/L}$. This was two times greater than the next highest chlorophyll a concentration which occurred in Lake Mallard. High turbidity from plankton production in Old Town Lake limited the secchi disk transparency to 12 inches. The combination of these conditions produced the high trophic index in Old Town Lake.

Grand Lake, with an index of 24.86, had the second highest trophic ranking during this assessment. The third highest trophic index was 12.85 for Lake Frierson. Secchi disk transparency was similar in Grand and Frierson lakes, but light penetration was limited by different factors in each lake. The chlorophyll a concentration of Lake Grand was 37.3 $\mu\text{g/L}$, resulting in a low secchi transparency reading. The chlorophyll a concentration in Lake Frierson was only 6.4 $\mu\text{g/L}$, but the turbidity value was over 75 NTU. Light penetration was limited in Lake Frierson by suspended silt particles. The next three highest trophic rankings were upper Blue Mountain, Mallard and Wallace. Each had similar trophic indices ranging from 10.71 to 12.85. The excessive turbidity and low secchi disk transparencies in Blue Mountain Lake was caused primarily by suspended silt particles.

The lower one-third of all ranked lakes was consisted only of Type A and Type B lakes. Dierks Lake had the highest Type A-lake trophic index. Eighty-one percent of the Type A lakes ranked in the lower one-third of the list. They comprised 13 of the 14 lowest trophic rankings. The mean Type A lake trophic index of 0.39 was approximately three times lower than the mean index of the Type B Lakes. Lake Charles had the highest Type B trophic index of 3.46, and Spring Lake had the lowest at 0.11. Thirty-five percent of the Type B lakes ranked in the lower one-third of the index list and sixty-one percent of Type B lakes were in the lower one-half of the trophic ranking index.

TABLE 2. Trophic Rankings of Arkansas' Significant Publicly-Owned Lakes

NO	NAME	TYPE	T-Phos (mg/L)	Chlor a (µg/L)	Secchi (in)	Index	NO	NAME	TYPE	T-Phos (mg/L)	Chlor a (µg/L)	Secchi (in)	Index
66	OLD TOWN	D	0.386	123.40	12.0	42.45	40	COX CREEK	C	0.026	18.60	40.0	1.12
69	GRAND	E	0.261	37.30	12.0	24.86	4	DEQUEEN (B)	A	0.041	8.40	45.0	1.10
42	FRIERSON	C	0.135	6.40	11.0	12.85	36	BREWER (B)	B	0.047		46.0	1.02
71	BLUE MT. (B)	E	0.109	11.10	10.0	12.01	14	BULL SHOALS (A)	A	0.280	0.06	275.5	1.02
59	MALLARD	D	0.150	62.10	19.0	11.16	16	SHORES	B	0.034	5.40	42.0	0.94
62	WALLACE	D	0.117	54.40	16.0	10.71	78	FELSENTHAL (A)	E	0.031	1.70	35.0	0.93
74	LOWER CHICOT	E	0.155	22.00	19.0	9.32	50	LO. WHITE OAK	C	0.022	11.20	38.0	0.87
57	HOGUE	D	0.104	51.70	17.0	9.16	27	NOLAN (Wright)	B	0.040	<1.00	48.0	0.85
67	HORSESHOE	E	0.142	50.50	21.5	8.95	51	HARRIS BRAKE	C	0.030	2.20	46.0	0.70
65	BOIS D'ARC	D	0.115	40.70	18.0	8.65	36	BREWER (A)	B	0.037	2.30	58.0	0.68
71	BLUE MT. (A)	E	0.089	2.90	11.5	7.99	4	DEQUEEN (A)	A	<0.020	20.40	47.0	0.65
68	UPPER CHICOT	E	0.120	17.80	20.5	6.72	45	POINSETT	C	0.024	<1.00	44.0	0.57
64	ASHBAUGH	D	0.076	57.90	20.0	6.70	25	BARNETT	B	0.037	2.10	70.0	0.56
37	JUNE	C	0.116	5.00	20.0	6.05	26	SUGARLOAF	B	0.035	2.80	72.0	0.53
63	PINE BLUFF	D	0.135	10.90	26.0	5.61	72	COLUMBIA (B)	E	0.021	3.90	54.0	0.46
53	WILSON	D	0.096	19.50	21.5	5.37	70	GA. PACIFIC	E	0.030	2.60	71.0	0.46
55	1ST OLD RIVER	D	0.084	43.70	25.0	5.11	5	CATHERINE (A)	A	<0.020	13.80	54.5	0.44
76	ERLING (B)	E	0.092	6.00	20.0	4.90	72	COLUMBIA (A)	E	0.020	2.60	61.0	0.37
39	TRICOUNTY	C	0.099	10.10	23.0	4.74	2	DIERKS	A	<0.020	15.20	73.0	0.35
58	PICKTHORNE	D	0.053	12.10	15.5	4.20	5	CATHERINE (B)	A	<0.020	11.20	65.0	0.32
54	ENTERPRISE	D	0.080	44.80	30.5	4.09	3	GILLHAM	A	<0.020	10.60	66.5	0.31
46	BEAR CREEK	C	0.046	37.60	24.0	3.48	19	WEDDINGTON	B	0.035	4.20	135.5	0.29
32	CHARLES	B	0.056	44.30	29.0	3.46	34	BEAVER FORK	B	<0.020	5.60	58.5	0.27
22	FAYETTEVILLE	B	0.063	17.90	24.5	3.30	31	SHEPHERD SPGS	B	0.020	1.80	82.0	0.27
61	DESARC	D	0.061	19.80	25.0	3.23	20	COVE	B	0.020	1.50	83.0	0.26
75	CONWAY (B)	E	0.057	8.70	21.5	3.06	35	HINKLE	B	0.026	<1.00	108.0	0.25
80	DARDANELLE	E	0.089	5.70	31.0	3.05	28	FT. SMITH	B	0.023	1.60	102.0	0.24
48	ATKINS	C	0.069	7.70	25.5	3.01	9	DEGRAY (B)	A	<0.020	4.20	59.0	0.24
79	MILLWOOD (A)	E	0.053	18.20	25.5	2.79	6	GREESON (B)	A	<0.020	7.10	73.0	0.23
43	STORM CREEK	C	0.042	38.50	29.0	2.78	14	BULL SHOALS (B)	A	0.010	0.05	43.0	0.23
75	CONWAY (A)	E	0.060	1.40	23.3	2.64	12	GREERS FERRY (B)	A	0.027	<1.00	139.5	0.39
47	UP. WHITE OAK	C	0.043	31.00	33.0	2.24	7	HAMILTON (B)	A	<0.020	11.20	108.5	0.20
52	CANE CREEK	C	0.042	9.50	24.5	2.10	18	HORSEHEAD	B	<0.020	2.40	73.0	0.17
29	SEQUOYAH	B	0.040	9.00	25.0	1.96	1	WINONA (B)	A	<0.020	<1.00	72.0	0.15
23	BOBB KIDD	B	0.057	15.80	39.0	1.87	7	HAMILTON (A)	A	<0.020	7.20	113.0	0.15
21	ELMDALE	B	0.051	17.90	38.0	1.81	8	MAUMELLE (B)	A	<0.020	<1.00	84.0	0.13
30	SWEPCO	B	0.146	3.60	84.0	1.78	8	GREESON (A)	A	<0.020	3.60	108.0	0.13
60	GRAMPUS	D	0.043	9.90	31.0	1.71	8	MAUMELLE (A)	A	0.021	<1.00	180.0	0.12
11	BEAVER (B)	A	0.050	0.04	33.5	1.49	17	SPRING	B	<0.020	<1.00	97.0	0.11
76	ERLING (A)	E	0.043	10.80	38.0	1.42	9	DEGRAY (A)	A	<0.020	4.30	135.0	0.11
15	CRYSTAL	B	0.055	15.20	50.0	1.40	12	GREERS FERRY (A)	A	<0.020	10.40	182.5	0.11
44	CALION	C	0.036	10.00	34.0	1.35	1	WINONA (A)	A	<0.020	<1.00	132.0	0.08
38	BAILEY	C	0.038	<1.00	29.0	1.34	13	OUACHITA (C)	A	<0.020	2.00	148.0	0.08
24	WILHELMINA	B	0.035	5.00	30.0	1.33	13	OUACHITA (A)	A	<0.020	<1.00	161.0	0.07
79	MILLWOOD (B)	E	0.026	6.90	27.5	1.20	11	BEAVER (A)	A	0.010	0.04	185.0	0.05
33	LEE CREEK	B	0.042	5.80	42.0	1.14	10	NORFORK (A)	A	0.010	0.00	382.0	0.03
76	FELSENTHAL (B)	E	0.036	4.20	35.5	1.13	10	NORFORK (B)	A	0.010	0.00	358.0	0.03

(A) - Lower lake station (B) - Upper lake station

The mean trophic index of Type C lakes was 3.09. Lake Frierson had the highest-ranking of 12.85. It was followed by Lakes June at 6.05 and Tricounty at 4.74. Lake Poinsett had a trophic index of 0.57, which was the lowest of the Type C lakes. Forty-four percent of the Type C lakes ranked in the upper one-third of the list. In contrast, ninety-three percent of Type D lakes that ranked in the upper one-third of the list. Old Town Lake had the highest Type D trophic value of 42.45. The next highest was Lake Mallard at 11.16, and Lake Grampus had the lowest Type D lake trophic index of 1.71. The mean Type D lake trophic ranking was 9.09.

Sixty-one percent of the Type E lakes ranked in the highest one-third of the list with a mean trophic index of 5.13. The Grand Lake index of 24.86 was the highest Type E trophic index, and lower Lake Columbia had the lowest index of 0.37. There were no Type E lakes in the lowest one-third of the list.

The mean trophic index of Type C, D, and E lakes was eight times greater than that of Type A and B lakes. This demonstrates that Type C, D, and E lakes continue to be more productive than the Type A and B lakes.

Eight of the ten lakes with the highest trophic index rankings are located in the Delta ecoregion, while upper Blue Mountain is located in the Arkansas River Valley and Bois D' Arc in the Gulf Coastal Plains. Some of these ten lakes receive runoff from rich agricultural lands and a few are routinely fertilized to enhance fisheries production.

Lakes Stratification

Figures D-1 through D-24 illustrate vertical dissolved oxygen and temperature profiles measured for each lake station. Arkansas' lakes can be best categorized as warm monomictic lakes; however, several lakes diverge from this categorization. Most lakes in Arkansas do form a distinctive summertime stratification with a definable anoxic zone and eventually "turn-over" in late fall through early spring. Other lakes within the State may experience several turnovers and stratify repeatedly while others may not ever stratify and are continually mixed.

A few of the larger lakes demonstrated a unique stratification pattern. The thermocline of most of these lakes was located at approximately 10 meters depth. Just above the thermocline, and normally at the lower station, the dissolved oxygen concentration increased noticeably (sometimes to supersaturation), probably from increased phytoplankton activity; and then it decreased sharply, often to near zero milligrams per liter just below or within the thermocline. A recovery of the dissolved oxygen concentration to approximately 5 mg/L would then occur through much of the mid-section of the hypolimnion. In the smaller Ozark Highlands lakes and at the upper lake stations of the larger reservoirs, the dissolved oxygen and temperature profiles mirror each another throughout the water column (Figures D-1 through D-13), and unlike the lower lake stations of the larger reservoirs, the dissolved oxygen concentration below the thermocline does not recover, but rather it demonstrates a very distinctive anoxic hypolimnion. There were a few upper lake stations and a few stations in the smaller montane lakes that had hypolimnetic dissolved oxygen concentrations above 1 mg/L, but most of these lakes had large anoxic zones.

Dissolved oxygen and temperature profiles in the small lakes of the State displayed several differences (Figures D-13 through D-16). Several lakes had a very sharp decline in dissolved oxygen and a well-delineated thermocline at approximately two meters depth. Others in the group displayed a more gradual decline in dissolved oxygen and temperature concentrations. Most of these lakes had an anoxic hypolimnion. There were two lakes in this group, Lake Elmdale and Lake June, that had either no or very little decline in dissolved oxygen or temperature throughout the water column. There was also some lakes that displayed

only a remnant of a thermocline near the bottom of the lake. This perhaps was indicating that mixing frequently occurs throughout all or most of the lake. The small, more open waterbodies in this group tended to be less stratified, perhaps due to the continual mixing of the lake waters because of wind action. These characteristics listed above and the dissolved oxygen and temperature profiles measured during this survey are very similar to the characteristics and profiles measured during the 1989 and 1994 surveys. This was unexpected because of the climate differences between the surveys. The only difference in some lakes was that the surface water temperature was one to two degrees higher during the 1999 survey.

Type D lakes are primarily located in the flat terrain of the delta and can be divided into two groups, oxbows and man-made lakes with levees on three to four sides. The man-made lakes are usually very shallow and tend to remain well mixed. This is evident when examining the dissolved oxygen and temperature profiles of these lakes (Figures D-16 through D-20). These profiles change very little from lake surface to lake bottom with usually only a small decrease in dissolved oxygen and temperature. There may be a slight anoxic zone located just above the bottom of these lakes. The oxbow lakes generally have a dissolved oxygen decline around 1.5 meters, and about three meters depth, the water is anoxic. There is only about a 5°C temperature loss from lake surface to lake bottom in most of these lakes.

The Type E lakes displayed a variety of dissolved oxygen and temperature profiles (Figures D-20 through D-24). This is to be expected because of the different lake morphologies within this group. The lakes located in the flatter areas of the State and two of the larger Corps lakes had straight-line profiles with a very small or no anoxic zone. Two of the smaller lakes displayed a distinctive thermocline and anoxic zone. These profiles are very similar to the profiles seen during the 1994 survey. The lake's depth, the prevailing wind action, and the fetch (the distance over the water surface the wind can travel uninterrupted by a physical barrier) all affect the dissolved oxygen and temperature profiles of these lakes.

Plankton

Plankton is an important component in lakes acting as primary and secondary links in the trophic relationship. Water quality is important in determining the taxonomic nature of the plankton. Community composition is used to classify the degree of water pollution and suggests the quantities of various naturally occurring substances (i.e. nitrogen and phosphorus).

One plankton sample was collected from each lake sampled during the 1999 survey. Photosynthetic populations (phytoplankton) and the non-photosynthetic populations dependent upon them (zooplankton) are dynamic. This results in substantial spatial and temporal variations in distribution. One sample is insufficient to characterize seasonal and diel trends, but it does allow analyses of phyto- and zooplankton relative abundance and variations resulting from productivity differences between lake types.

Prior to the 1989 assessment of Arkansas' Significant Publicly-Owned Lakes, a lake classification scheme established five general categories for separating lakes. Expected levels of productivity are established by trophic status ranking of Arkansas' lakes. Trophic state indices established a separation of lake types based on expected productivity. For example, Type A and B lakes comprise > 90% of the lower one-third (least productive) of all lakes. Greater than 93% of Type D lakes occur in the upper one-third (most productive) of all lakes. Type C and E lakes comprise the majority of the middle-third of all lakes.

Figures E-1 and E-2 illustrate relative abundance of phytoplankton cells/Liter for each lake. Type A and B lakes were the least productive lakes based on phytoplankton abundance. Type D, E, and C lakes were the most productive lakes, respectively.

Phytoplankton abundance corresponded positively with nutrient concentrations, Table 3. Soluble phosphorus, a component of total phosphorus, is usually the major limiting factor for algal growth in freshwater ecosystems. Dissolved organic nitrogen (DON), a component of TKN, serves as an excellent source for phytoplankton growth. However, most algae are not heterotrophic, thus DON plays only a minor role in the phytoplankton production. Phytoplankton abundance increased with mean total phosphorus and TKN concentrations. Undoubtedly, dissolved phosphorus and nitrogen are contributing to phytoplankton growth. This suggests that total phosphorus is limiting phytoplankton abundance more than TKN.

Phytoplankton production is proportional to total phosphorus. Living and dead biomass compose most of the organic form of phosphorus in lake water. Aquatic organisms excrete both soluble and organic phosphorus and decomposing organisms release dissolved organic phosphorus (DOP) and phosphate. Sorption of phosphate onto organic and inorganic particles (i.e. sediments and detritus) is a major loss of phosphorus from a lake. Desorption from particles releases phosphate which is available for phytoplankton growth. Major influxes of phosphorus to the cycle are from erosion, stream inflows and discharges of human wastes. This internal loading or cycling is the reason many shallow lakes remain eutrophic, even if the phosphorus supply is removed.

Lake Fayetteville was the most productive lake sampled and historically has been very productive. The lake has a small watershed which has undergone extensive development during the past few years, and a low flushing rate. These factors have likely contributed to increased productivity in the lake.

Cell numbers often do not represent true biomass because of considerable variation in sizes of cells among algal species and divisions. Blue-green algae dominated cell counts in Type C, D and E lakes, except Mallard, Pine Bluff, lower Conway, and Georgia Pacific lakes where green algae were dominant. Type A and B lakes were less predictable, but blue-green and green algae comprised a majority of the community.

It is apparent that slight differences occurred in taxon presence/absence and abundance between lake types. It is difficult to quantify these differences with division level identification. For example, the widely distributed *Dinobryon* (Chrysophyta) was more prevalent in Type A and B lakes. *Dinobryon* is generally indicative of hard waters, but in the soft water of Lake Ft. Smith it was the dominant taxa. Four *Dinobryon* species are known to occur in Arkansas. These species may tolerate different environmental conditions. These tolerances may account for differences in abundance between lake types.

Figures F-3 and F-4 illustrate zooplankton organisms/Liter for each lake. Calculation of the ratio of calanoid copepods to cyclopoid copepods plus Cladocera was not a useful indication of trophic conditions in Type C, D and E lakes, Table 3. These values were the lowest in Type A and B lakes, but were higher in the more eutrophic Type C, D and E lakes.

Rotifers were the dominant zooplankton group in all lake types except Type D. The greatest rotifer abundance occurred in Type C and D lakes. The lowest mean rotifer abundance occurred in Type A lakes. In some instances, rotifer abundance has been a valuable indicator of trophic state. Rotifer abundance in Type E lakes was lower than expected based upon trophic ratios. This variation may be partly explained by the high flushing rates of the Type C. No other apparent explanations exist.

Cyclopoid copepods are typically found in littoral (around shores) habitats, very few are planktonic (open water). Lake size and depth may explain a large increase in cyclopoid copepods in Type D lakes, Table 3. Calanoid copepods are planktonic, rarely littoral, but occur in lake, pond and ditch habitats. Calanoid copepod abundance increased with trophic state. No apparent patterns were observed in the cladocerans.

TABLE 3.

Mean Plankton Abundance, Selected Ratios and Mean Surface Values
for Selected Physicochemical Variables in each Lake Type.

	TYPE A	TYPE B	TYPE C	TYPE D	TYPE E
Phytoplankton					
Cells/Liter	108,095	382,125	422,633	1,068,827	547,423
Zooplankton					
# Rotifers/Liter	30	122	194	191	88
# Nauplii/Liter	9	48	72	575	46
# Calanoida/Liter	1	9	31	85	37
# Cyclopoida/Liter	1	9	9	53	6
# Cladocera/Liter	3	25	19	74	10
All organisms/Liter	44	211	325	978	186
Ratio (Calanoida/Cyclopoida + Cladocera)	0.08	0.38	1.20	1.08	1.31
Physicochemical					
Secchi (in)	131.00	62.50	30.10	21.30	29.90
Temperature (*C)	30.70	29.70	30.90	31.40	30.70
Chlorophyll a (μ g/L)	5.22	7.60	13.56	42.38	11.91
Chlorides (mg/L)	2.50	3.50	7.50	4.30	11.50
Turbidity (NTU)	1.50	4.30	12.50	9.90	12.00
NH ₃ -N (mg/L)	0.02	0.01	0.03	0.02	0.05
NO ₂ +NO ₃ -N (mg/L)	0.06	0.04	0.03	0.03	0.04
TKN (mg/L)	0.48	0.66	0.93	1.58	1.06
O-Phos (mg/L)	0.01	0.01	0.01	0.02	0.02
T-Phos (mg/L)	0.03	0.04	0.05	0.12	0.08
Alkalinity (mg/L)	28.38	36.04	21.96	39.08	37.31
Average Trophic Ratio	0.39	1.09	3.09	9.09	5.13

Pesticides

Pesticide samples were collected from 19 lakes during the survey. These lakes were located in the Delta region of the state. A list of the 61 pesticides analyzed, the lakes sampled, and the results of the analyses can be found in Appendix B.

All of the pesticides detected during this survey were herbicides, except for the derivatives of DDT. Most are used for the control of broadleaf weeds and grasses. The majority of the herbicides detected were post-emergent herbicides. However, there were some pre-emergent herbicides detected. The general characteristics of all of these herbicides are: 1) readily to moderately water soluble; 2) extremely short half-life to moderately persistent; and 3) almost non-toxic to slightly toxic; however molinate is toxic to macroinvertebrates at 0.3 to 0.6 mg/L.

At least one pesticide was detected from 18 of the 20 lake sites sampled. Atrazine was the most commonly detected pesticide, found in 15 lakes with a maximum concentration of 0.48 $\mu\text{g/L}$ in Old Town Lake. Metolachlor was detected in nine lakes with a maximum concentration of 0.04 $\mu\text{g/L}$ in lower Lake Chicot. Seven lakes had a detectable level of bentazon, with Grand Lake having the highest concentration, 0.41 $\mu\text{g/L}$. Six of the lakes where bentazon was detected were collected on July 19th and 20th, perhaps indicating that a recent application had been made in the general area of these lakes. Cyanazine was detected in six lakes with a maximum concentration of 1.01 $\mu\text{g/L}$ occurring in Old Town Lake. This was the only pesticide detected with a concentration greater than 1.0 $\mu\text{g/L}$. Ametryn, p-p'-DDE, atraton, and prometon were detected only once, and the latter two were detected in Lake Hogue. This is perhaps indicating that these pesticides were being used for a specific problem in the area surrounding the lake. The pesticide p-p'-DDE is a breakdown product of DDT which has a half-life between 2 to 15 years. It is also very persistent in soils.

Even though there were a number of pesticides detected during this survey, it is unlikely that they are having any significant environmental effect. All of the concentrations detected were well below any known toxic concentrations. In addition, most of the detected pesticides were non-toxic to low-toxic herbicides used for the control of broad-leaf weeds and grasses, and they have a very short half-life.

Water Quality Standards

Arkansas' water quality standards for lakes have been adapted from the surface water quality standards for streams. The designated use support or non-support assessment is based on a certain percentage of the data points exceeding the criteria set to protect the use. Because the current assessment method and water quality criteria was established using data from Arkansas' Ambient Water Quality Monitoring Network that monitors Arkansas' rivers and streams on a monthly basis, it is not well adapted to assess lake-water quality where only a few data points exist. Although the designated uses that are assigned to Arkansas' lakes may be appropriate, the criteria set forth to protect them individually may require some additional considerations. Arkansas' lakes are highly variable in water quality, morphology, watershed characteristics, purposes, operation and management activities and naturally occurring influences.

Setting specific lake standards for Arkansas' lakes present many problems. Adopting criteria to protect a specific designated use may interfere with other designated uses for the same waterbody. For example, Chlorophyll ^a, phosphorus or water clarity criteria may be designed to protect the drinking water use or certain recreational uses of a lake, but they may be counter-productive for lakes created for the primary purpose of public fishing. Arkansas' current water quality criteria for lakes is limited in parameters and designed with great flexibility to allow a common sense resolution to some of the problems mentioned above.

Appendix C compares the existing lake water quality criteria and standards to the recent data collected. The pH standard for lakes states that no discharge shall cause a pH to go above 9.0 or fall below 6.0. Epilimnion and hypolimnion pH values for all lakes and lake stations are plotted in Figure C-1 and are grouped into Type A and B lakes and Type C, D, and E lakes. Most pH values for the lakes were slightly above 7.0. However, Lake Winona's hypolimnion pH was 5.83 at the upper lake site and 5.54 at the lower lake site. Lake Maumelle's hypolimnion pH was 5.82 at the upper lake site and 5.21 at the lower lake site. The lower Lake Hamilton hypolimnion sample had a pH of 5.21. Crystal Lake had an epilimnion pH value of 9.26. Type D lake samples that had a pH value above the standard were epilimnion samples from Lakes Wilson and Wallace. Hypolimnion samples below the standard were from Lakes Enterprise and Grampus. There were four Type E lakes with values exceeding the standard. These were the epilimnion samples from Lakes Old Town and Grand, and hypolimnion samples from upper Blue Mountain Lake and upper Lake Columbia. These pH values were the result of natural in-lake processes and not the result of a discharge.

Figure C-2 displays the temperature data relative to the maximum temperature criteria. The data is from one meter below the lake surface and is grouped by lake types. The maximum allowable water temperature from man-induced causes in lakes is 32 degrees Celsius (32.0°C). Several lakes had water temperatures at one meter depth above this criteria. However, none of these temperatures were from man-induced causes, except for Lake Swepeco.

Hypolimnion and epilimnion turbidity values are plotted in Figure C-3 and are grouped into Type A and B and Type C, D and E lakes. The epilimnion values for Type A and B lakes were generally below 5 NTU. Most hypolimnion values for the Type A lakes were below 10 NTU, except for upper Beaver Lake which had a value of 30 NTU. Type B lakes turbidity values were generally below 15 NTU. Only the hypolimnion samples from lakes Swepeco and Lee Creek exceeded the 25 NTU maximum criteria. Type C, D, and E lakes had similar turbidity values as Type B lakes. Only five of these lakes had turbidity values exceeding 25 NTU. They include: 35 NTU in the hypolimnion of Cox Creek Lake; 75 NTU in the epilimnion and 91 NTU in the hypolimnion of Lake Frierson; 26 NTU in the epilimnion of Old Town Lake; 42 NTU in the epilimnion and 49 NTU in the hypolimnion of upper Blue Mountain Lake; and 34 NTU in the epilimnion and 49 NTU in the hypolimnion of lower Blue Mountain Lake.

The minimum dissolved oxygen standard for lakes is 5.0 mg/L, but depth is not specified. Figure C-4 is a plot of the dissolved oxygen concentrations measured one foot below the surface and grouped into Type A and B lakes and Type C, D, and E lakes. Type A and B lakes dissolved oxygen concentrations ranged from 5.5 mg/L to 9.26 mg/L. Type C, D and E lakes dissolved oxygen concentrations ranged from 4.0 mg/L in lower Blue Mountain Lake to 13.61 mg/L in Old Town Lake. The lower Blue Mountain Lake sample and the Lake Hogue Sample were the only lakes with a surface water dissolved oxygen concentration below the 5.0 mg/L standard. It is possible that other lakes, such as Old Town Lake and Lake Wallace which had elevated day time dissolved oxygen concentrations could have depressed night time concentrations below the 5.0 mg/L standard.

The geometric means of the five fecal coliform samples collected along a shore-to-shore transect of each lake sampled is plotted in Figure C-5 and are grouped into Type A and B lakes and Type C, D and E lakes. Fecal coliform standards applicable for lakes are:

- The determination of fecal coliform levels for the following waters shall be based on a minimum of not less than five samples taken over not more than a 30-day period.
- "Primary Contact Waters – Between April 1 and September 30, the fecal coliform content shall not exceed a geometric mean of 200/100 ml, nor shall more than 10 percent of the total samples taken during any 30-day period exceed 400/100 ml."
- "Secondary Contact Waters – The fecal coliform content shall not exceed a geometric mean of 1000/100 ml, nor equal or exceed 2000/100 ml in more than 10 percent of the samples taken in any 30-day period."

Overall, the fecal coliform concentrations measured during this survey were quite low as compared to the data from the previous two surveys. All lakes, except Lakes Wilhelmina, Calion, and upper Lake Millwood, had fecal coliform concentrations well below the primary and secondary contact recreation standards. Typically, the highest concentrations were located near the shores where domestic development has occurred or where routine, primary-contact recreation activities occur. Lake Wilhelmina had a geometric mean value of 1040 col/100 ml. Three sites along the transect had concentrations greater than 1000 col/100 ml. This exceeded both the primary and secondary-contact recreation standards. This transect was located near a caged fish production facility. There was a noticeable reduction in the bacteria concentration from this right-

shore facility where >2700 col/100 ml were counted, to the left shore sample that had 233 col/100 ml. This same trend occurred during the 1994 survey. Lake Calion had a fecal coliform geometric mean of 485 col/100 ml and had four samples along the transect with concentrations greater than 400 col/100ml. These elevated concentrations did not exist during the 1994 survey where the highest count was only 10 col/100 ml. Lake Millwood had a geometric mean of 310 col/100 ml and had four points along the transect with concentrations above 400 col/100 ml. The right shore sample had a concentration of 216 col/100 ml. This transect was not sampled in 1994.

The State's water quality standards for chlorides, sulfates and total dissolved solids were developed from naturally occurring background levels from each ecoregion. Figures C-6 through C-11 compare the mineral levels found in this survey with the mineral standards. In these figures, the lakes were grouped into the ecoregion containing their watersheds. The data plotted in these figures is the average of the epilimnion values and hypolimnion values for each lake station. The mineral values for most of the lakes in this survey were usually well below the established standards. Lake Swepeco had an average sulfate concentration of 56.4 mg/L which exceeded the Ozark Highlands sulfate standard of 23.0 mg/L. Figure C-8 indicates that Lake Dardanelle is exceeding the Arkansas River Valley mineral standards. However, Lake Dardanelle is a main-stem impoundment of the Arkansas River and has site-specific mineral standards of 250 mg/L for Chlorides, 120 mg/L for Sulfates, and 500 mg/L for total dissolved solids. The chloride concentration of 44.60 mg/L in Lake June and 22.25 mg/L in Lake Calion exceeded the Gulf Coastal Plains chloride standard of 19 mg/L. Both of these lakes are located in watersheds where land use activities are dominated by forestry and oil field activities.

LAKES DATA COMPARISON BETWEEN THE 1989, 1994 AND 1999 SURVEYS

Water Quality

The 1989 survey identified eight Ouachita Mountains lakes with hypolimnetic pH values below the minimum pH standard of 6.0; the 1994 survey identified only one such lake; and the 1999 survey identified three lakes with hypolimnetic pH values below the standard. The 1989 survey identified eight Type C, D and E lakes with epilimnetic values above the maximum pH standard of 9.0. Three of these lakes also had hypolimnetic values exceeding this standard. None of the Type C, D or E lake pH values were below 6.0 during 1989. The 1994 survey identified two lakes with hypolimnion pH values below 6.0 and three lakes with epilimnion values exceeding the 9.0 standard. In 1999, three lakes had hypolimnetic pH values below 6.0 and four lakes had epilimnetic pH values above 9.0. This database will not allow for a use assessment based on pH standard exceedance because the data is collected only one time during a five year period. It is perhaps safe to conclude that these exceedances are short lived and are not adversely affecting the lakes' designated uses.

The dissolved oxygen standard of 5.0 mg/L was not maintained in nine of the Type C, D and E lakes during the 1989 survey and in seven Type C, D and E lakes in 1994. Only Lake Hogue and lower Blue Mountain Lake had a dissolved oxygen concentration below 5.0 mg/L during the 1999 survey. Most of these occurrences were only slightly below the standard and were probably short-term effects from climatic events. None of the surveys identified any dissolved oxygen standard violations in Type A and B lakes.

The fecal coliform standard is based on different criteria for primary and secondary contact recreation activities. The 1989 survey indicated that almost all of the fecal coliform values for all lakes were substantially below the criteria established for swimmable waters except for the samples collected from Lakes Hinkle and Wilhelmina which were all too numerous to count. Lake Wilhelmina exceeded both the

primary and secondary contact recreation standards during the 1994 survey. There were eleven additional lakes that had geometric means that exceeded either the primary contact recreation or secondary contact recreation standard during the 1994 survey. Three lakes during the 1999 survey had bacteria concentrations exceeding one of the standards. They were Lake Wilhelmina, which exceeded both standards, and Lakes Calion and upper Millwood, which exceeded only the primary contact standard. Lake Wilhelmina is the only lake that continuously exceeds the bacteria standards. Other lakes from time to time indicate some elevated concentrations, but they are probably short-term, event specific occurrences.

Trophic Status Comparison

Trophic state indices allowed a direct comparison between lakes and surveys. Table 4 compares the trophic rankings from each of the surveys. Old Town, Grand, Mallard and Horseshoe Lakes occurred in the ten highest trophic rankings of all lakes ranked during each of the three assessments. Lakes Frierson, Wallace, Lower Chicot, Upper Chicot, Bear Creek and Greenlee have ranked in the top ten during two of the surveys. Lake Greenlee was not sampled in 1999 because of lake maintenance activities. Upper Blue Mountain, Hogue, Bois D' Arc, June, and First Old River have each been in the top ten during one survey. Lakes Old Town, Greenlee, Grand, Frierson, and Mallard consistently rank in the top five of the list.

The lower one-third (lowest trophic status) of all lakes ranked in each of these assessments was comprised of Type A and B lakes. Three lake stations ranked among the ten lowest rankings during each assessment. These stations are located on Ouachita and Norfork lakes. Upper lake stations of the larger Type A lakes generally ranked higher than lower lake stations. This demonstrates that the stream-influenced zones of the larger lakes are more productive than their more lentic zones.

Sixty-five percent of Type C lakes ranked in the upper one-third of the 1999 trophic ranking as compared to seventy-five percent in 1989 and 1994. Lake Frierson had the highest Type C ranking in 1999 and 1994. Lake June ranked among the top three Type C lakes during each assessment.

Ninety-two percent of Type D lakes ranked in the upper one-third of the trophic rankings during each assessment. Old Town Lake had the highest trophic index in 1999 and 1989, ranking fourth in 1994. Lake Greenlee had the highest index in 1994 and it ranked fourth in 1989. It was not sampled during the 1999 survey due to maintenance activities. Lake Greenlee's 1994 trophic index was the result of excessive suspended silt turbidity in the lake which reduced the secchi disk transparency to four inches.

Sixty-one percent of the Type E lake stations ranked in the upper one-third of the trophic indices in 1999, as compared to sixty-six percent in 1994 and fifty percent in 1989. Lake Grand had the highest Type E lake trophic index in 1999 and 1989 and ranked second in 1994. Horseshoe Lake ranked ninth in 1999, first in 1994, and second in 1989.

It is apparent from the data collected from the three surveys that certain conclusions in trophic rankings can be made. They are:

- Type A and B lakes have the lowest trophic indices;
- The large montane reservoirs in the state have the lowest trophic indices;
- Lakes Norfork and Ouachita consistently have the lowest trophic rankings of all lakes;
- Type D and E lakes have the highest trophic indices;
- Delta lakes have high trophic indices;
- Lakes Old Town and Grand consistently have the highest trophic indices of all lakes.

TABLE 4. Comparison of Trophic Rankings Between 1989, 1994 and 1999 of Arkansas' Significant Publicly-Owned Lakes

NO	NAME	TYPE	1999		1994		1989		NO	NAME	TYPE	1999		1994		1989	
			Index	Rank	Index	Rank	Index	Rank				Index	Rank	Index	Rank	Index	Rank
66	OLD TOWN	D	42.45	1	16.81	4	41.19	1	4	DEQUEEN (B)	A	1.10	49	0.42	71	0.39	69
69	GRAND	E	24.86	2	11.35	6	26.32	2	14	BULL SHOALS (A)	A	1.02	50	0.11	94	0.08	93
42	FRIERSON	C	12.85	3	24.34	2	4.09	21	16	SHORES	B	0.94	51	0.23	80	0.41	67
71	BLUE MT. (B)	E	12.01	4					78	FELSENTAL (A)	E	0.93	52	3.96	23	1.96	39
59	MALLARD	D	11.16	5	11.64	5	22.56	3	50	LO. WHITE OAK	C	0.87	53	1.56	45	1.41	44
62	WALLACE	D	10.71	6	5.92	15	11.08	8	27	NOLAN (Wright)	B	0.85	54	1.68	42		
74	LOWER CHICOT	E	9.32	7	10.70	7	4.38	20	51	HARRIS BRAKE	C	0.70	55	1.02	52	2.89	30
57	HOGUE	D	9.16	8	7.29	11	2.02	38	36	BREWER (A)	B	0.68	56	0.86	56	0.76	53
67	HORSESHOE	E	8.95	9	17.72	3	14.44	5	4	DEQUEEN (A)	A	0.65	57	0.39	72	0.32	72
65	BOIS D'ARC	D	8.65	10					45	POINSETT	C	0.57	58	1.60	44	0.47	62
71	BLUE MT. (A)	E	7.99	11	4.57	21	1.11	49	25	BARNETT	B	0.56	59	0.26	77	2.29	35
68	UPPER CHICOT	E	6.72	12	10.04	8	13.70	6	26	SUGARLOAF	B	0.53	60	0.63	65	0.49	58
64	ASHBAUGH	D	6.70	13	2.63	29	3.15	24	72	COLUMBIA (B)	E	0.46	61	1.80	38	2.62	31
37	JUNE	C	6.05	14	6.20	14	12.81	7	70	GA. PACIFIC	E	0.46	62	1.66	43	2.25	36
63	PINE BLUFF	D	5.61	15	6.43	13			5	CATHERINE (A)	A	0.44	63	0.70	60	1.33	45
53	WILSON	D	5.37	16	3.92	24	3.14	25	72	COLUMBIA (A)	E	0.37	64	1.00	53	2.59	32
55	1ST OLD RIVER	D	5.11	17	8.96	10	7.24	15	2	DIERKS	A	0.35	65	0.51	68	0.43	66
76	ERLING (B)	E	4.90	18	3.40	27	7.45	14	5	CATHERINE (B)	A	0.32	66	1.40	48	1.48	43
39	TRICOUNTY	C	4.74	19	4.78	20	6.39	16	3	GILLHAM	A	0.31	67	0.74	58	0.41	68
56	PICKTHORNE	D	4.20	20	1.73	41			19	WEDDINGTON	B	0.29	68	0.16	86	0.22	77
54	ENTERPRISE	D	4.09	21	2.57	25	3.06	26	34	BEAVER FORK	B	0.27	69	1.27	50	0.45	64
46	BEAR CREEK	C	3.48	22	9.28	9	10.81	9	31	SHEPHERD SPGS	B	0.27	70	0.15	89	0.44	65
32	CHARLES	B	3.46	23	4.99	19	2.90	29	20	COVE	B	0.26	71	0.26	75	0.27	74
22	FAYETTEVILLE	B	3.30	24	1.80	39	0.65	54	35	HINKLE	B	0.25	72	0.60	66	0.45	63
61	DESARC	D	3.23	25	5.63	17	2.94	28	28	FT. SMITH	B	0.24	73	0.15	88	0.23	76
75	CONWAY (B)	E	3.06	26	4.27	22	7.86	12	9	DEGRAY (B)	A	0.24	74	2.18	35	0.49	59
80	DARDANELLE	E	3.05	27					6	GREESON (B)	A	0.23	75	0.65	63	0.50	57
48	ATKINS	C	3.01	28	2.57	30	1.78	41	14	BULL SHOALS (B)	A	0.23	76	0.11	96	0.11	87
79	MILLWOOD (A)	E	2.79	29	2.19	34	1.54	42	12	GREERS FERRY (B)	A	0.20	77	0.10	97	0.11	88
43	STORM CREEK	C	2.78	30	5.64	16	7.84	13	7	HAMILTON (B)	A	0.20	78	0.97	55	0.60	55
75	CONWAY (A)	E	2.64	31	6.52	12	8.89	11	18	HORSEHEAD	B	0.17	79	0.20	84	0.48	60
47	UP. WHITE OAK	C	2.24	32	3.40	26	3.00	27	1	WINONA (B)	A	0.15	80				
52	CANE CREEK	C	2.10	33	0.98	54	3.66	22	7	HAMILTON (A)	A	0.15	81	0.18	85	0.57	56
29	SEQUOYAH	B	1.96	34	1.79	40			8	MAUMELLE (B)	A	0.13	82	1.06	51	0.38	71
23	BOBB KIDD	B	1.87	35	1.34	49	1.19	47	6	GREESON (A)	A	0.13	83	0.59	67	0.13	83
21	ELMDALE	B	1.81	36	0.70	59	2.03	37	8	MAUMELLE (A)	A	0.12	84	0.15	87	0.29	73
30	SWEPKO	B	1.78	37	0.31	73	0.22	78	17	SPRING	B	0.11	85	0.24	79	0.38	70
60	GRAMPUS	D	1.71	38	2.35	33	3.53	23	9	DEGRAY (A)	A	0.11	86	0.27	74	0.11	86
11	BEAVER (B)	A	1.49	39	0.46	69	0.80	51	12	GREERS FERRY (A)	A	0.11	87	0.25	78	0.13	84
76	ERLING (A)	E	1.42	40	2.09	36	4.64	18	1	WINONA (A)	A	0.08	88	0.11	92	0.2	80
15	CRYSTAL	B	1.40	41	0.68	61	0.25	75	13	OUACHITA (C)	A	0.08	89	0.26	76	0.22	79
44	CALION	C	1.35	42	1.48	47	2.57	33	13	OUACHITA (A)	A	0.07	90	0.15	90	0.08	92
38	BAILEY	C	1.34	43	2.52	31	4.90	17	11	BEAVER (A)	A	0.05	91	0.22	82	0.09	90
24	WILHELMINA	B	1.33	44	2.06	37	1.30	46	10	NORFORK (A)	A	0.03	92	0.12	91	0.09	89
79	MILLWOOD (B)	E	1.20	45	2.19	34	1.54	42	10	NORFORK (B)	A	0.03	93	0.10	98	0.11	85
33	LEE CREEK	B	1.14	46	0.22	81			58	GREENLEE	D			288.74	1	15.64	4
78	FELSENTAL (B)	E	1.13	47	5.54	18	2.32	34	49	OVERCUP	C			3.27	28	4.63	19
40	COX CREEK	C	1.12	48	2.50	32			73	NIMROD	E			1.52	46	0.88	50

(A) - Lower Lake Station (B) - Upper Lake Station
U.S. Army Corps of Engineers data used to calculate trophic index

Lakes Stratification

Several of the larger lakes in the montane regions of the State display a unique stratification of dissolved oxygen (DO). The DO decreases to near anoxic conditions in the metalimnion but recovers somewhat in the middle section of the hypolimnion. During the 1994 survey this pattern was observed in only a few of the larger lakes. There was a slight DO stratification pattern difference in the smaller Ozark Highlands lakes between the two surveys. In the 1989 survey, the DO concentrations in several of these lakes displayed a slight to substantial increase just above the thermocline and then declined to almost zero in the hypolimnion. This DO concentration increase just above the thermocline was not as apparent in the 1994 survey. The presence of a deep anoxic zone was still prevalent in most of the Ozark Highlands lakes. The 1999 survey revealed stratification patterns much like the 1994 survey. There were a few lakes that displayed a slightly different pattern, but these were most likely due to the difference in weather patterns between the surveys.

The larger, shallower lakes of the Delta ecoregion displayed similar stratification characteristics in all three surveys. These lakes tend to remain well mixed from unabated wind action causing straight-line DO and temperature profiles, with perhaps only the bottom one to two meters being anoxic. Two of these lakes during the 1999 survey displayed a slightly deeper anoxic zone, perhaps the result of hotter, drier weather trends.

The smaller lakes in the States' flatter terrain areas displayed similar stratification trends. Many had only a remnant thermocline and others displayed very little stratification. This indicates that periodic mixing occurs even during hot, dry summer periods. All three surveys indicated that some of these lakes had a gradual decline in DO and temperature throughout the water column with no apparent thermocline.

As discussed in the earlier surveys, Lake Felsenthal exhibited very unique DO and temperature profiles. Profiles were taken in the upper and lower ends of the lake. In the 1989 survey, the DO profiles were virtually straight-line throughout the water column and the maximum DO concentration at any depth was 2.1 mg/L. The low DO throughout the water column was probably due to the fact that the reservoir was only about five years old at this time and much of the flooded terrestrial vegetation was still decomposing. The 1994 survey indicated similar conditions, but the maximum DO concentration was 5.0 mg/L at the lower station and about 6.4 mg/L at the upper station. The profiles from the 1999 survey produced a straight-line profile at the upper lake station with a maximum concentration near 6.4 mg/L, but a definite anoxic zone existed at the lower lake station with a maximum DO concentration of about 6.3 mg/L occurring. Perhaps the reduction in stream flow in the Ouachita River caused by the lack of rainfall allowed stratification to develop at the lower lake station.

DEGRADED, THREATENED, or IMPAIRED LAKE USES

This is the third sampling of the lakes over a ten year period. These "single point in time" surveys are insufficient to positively identify those lakes which may be degraded, threatened or impaired due to point or nonpoint sources of pollution. However, some generalities can be concluded and some trends in water quality can be identified.

All designated uses for Arkansas' significant publicly-owned lakes are currently being maintained. Although some individual water quality violations did occur, most were either short term or naturally occurring events. This survey did not indicate any impairment of designated uses caused by any point source discharges.

Nonpoint sources of pollution are much more difficult to separate from naturally occurring events in a, most often, artificially created environment. Excessive turbidity and/or nutrients in some of the lakes are most likely due to watershed land use activities. Elevated chlorophyll ^a and total phosphorus concentrations may also be indicating effects from nonpoint source pollutants, although, reservoirs by design are constructed "traps" for such constituents. Old Town Lake is an example of an impacted lake from nutrient-enriched and silt-laden agricultural run-off. This lake has a long history of excessive siltation and eutrophication and numerous plans have been developed to remedy the situation. Most solutions recommend diverting watershed flows around the lake, but have been cost prohibitive. Lake Frierson has displayed elevated turbidity values during the last two surveys and is perhaps impacted by silt laden agricultural run-off. Lake Wilhelmina continues to have elevated fecal coliform bacteria concentrations, which are related to the in-lake aquaculture activities and not associated with human fecal contamination.

SUMMARY

In 1989, seventy-eight (78) impoundments were identified as significant publicly owned lakes and were selected for evaluation because of size, public significance and accessibility. In 1994, two additional lakes were added to the survey. In 1999, one lake was dropped from the list for the survey. Currently, a total of 79 lakes are listed as Arkansas significant publicly-owned lakes. Water quality parameter evaluation included: nutrients, minerals, chlorophyll ^a, dissolved oxygen and temperature profiles, fecal coliform bacteria, dissolved metals and pesticides. Usually more than one sample site was located on the larger lakes.

The classification system used in 1989 was utilized in succeeding surveys. The lakes were categorized into five basic lake types based on watershed characteristics and morphologies. Watershed characteristics undoubtedly influence the water quality of each lake within the individual lake types. There was some influence by weather patterns during the surveys. Dissolved oxygen, temperature profiles and chlorophyll ^a concentrations were all greatly influenced by the physical properties of these lakes. The chemical parameters were more influenced by the lake watershed properties.

A ranking of the lakes was based on trophic status. In 1999, Old Town Lake had the highest trophic index of all lakes, as it did in 1989. It also had the highest chlorophyll ^a concentration which was twice that of the next highest concentration in Mallard Lake. Grand Lake trophic index ranked second highest in 1999, as it did in 1989. Lake Frierson's third highest trophic ranking in 1999 and second highest ranking in 1994 was probably influenced by the excessive turbidity in the lake during both surveys and was not a valid reflection of its trophic status. The upper Blue Mountain Lake transect ranked fourth in 1999 as a result of its low secchi disk transparency. This lake also has a history of high suspended and colloidal silt particles. Lake Mallard ranked fifth in 1999 and 1994, and third in 1989. It had the second highest chlorophyll ^a concentration in 1999 and the fourth highest concentration in 1994. This lake was routinely fertilized for fisheries enhancement. The lowest one-third (least productive) of all of the trophic indices consisted of Type A and B lakes. Ninety-three percent (93%) of the Type D lakes and two-thirds of the Type E lakes were in the upper one-third (most productive) of all trophic indices. Eight of the ten lakes with the highest trophic rankings are located in the Delta ecoregion, one in the Gulf Coastal Plains and one in the Arkansas River Valley. The same lakes dominate the upper one-third of the trophic index list from all three surveys. Also, Lakes Old Town, Grand, Frierson, and Mallard are consistently in the top five of the index list.

A comparison of the in-lake water quality data to water quality standards must be made with some qualifications. The State's in-lake water quality standards have been adopted from the State's stream standards. The standards must remain flexible to address the inherent variability of the many lake water quality parameters. Even though every lake is a unique system, the vast majority of the water quality data collected indicated a maintenance of the water quality standards.

There were only slight violations of the pH standard, most were low values in an anoxic hypolimnion; some were high values in phytoplankton rich surface waters in the more productive lakes of the Delta. Several lakes exceeded the temperature standard, but these violations were most likely due to the extremely hot ambient temperatures and dry conditions that existed during the survey. Several lakes had hypolimnetic turbidity values above the 25 NTU standard. Most of the elevated values were probably caused by either phytoplankton fall-out or the re-suspension of clay particles from undercurrents.

Lake Wilhelmina's fecal coliform geometric mean exceeded both the primary and secondary contact recreation criteria. This lake has a history of elevated bacteria counts associated with the fish production facility located in the lake. This facility is the cause of the elevated counts, although it is not associated with warm blooded animals, except for the scavenger and predacious birds that frequent the area. The upper Lake Millwood transect and Lake Calion values exceeded the primary contact recreation standard for bacteria. These exceedances are probably short-term, localized, or event specific occurrences.

The only mineral standards exceeded during the survey were slightly elevated chloride levels in Lakes June and Calion. These values were well below levels that would impair any designated use of these lakes. In addition, Lake Swepco had an elevated sulfate concentration. The mineral standards for Lake Dardanelle are Arkansas River specific standards instead of ecoregion based standards, and those standards were not exceeded.

Acute and chronic copper toxicity criteria were exceeded in lower Lake Felsenthal, and the chronic copper criteria was exceeded in Lake Wallace. Both of these occurred in the hypolimnion samples where higher concentrations of metals usually occur because of lower pH values and anoxic conditions.

Phytoplankton abundance responded positively to increased concentrations of total phosphorus and TKN. Type A and B lakes were the least productive lakes based on phytoplankton abundance. Type D, E and C lakes were the most productive lakes, respectively. Lake Fayetteville was the most productive lake sampled and has historically been very productive. Zooplankton ratio did not prove to be an useful indication of trophic conditions in Type C, D and E lakes.

APPENDIX A

WATER QUALITY DATA BY LAKE

Appendix A lists the water quality data by lake collected during 1989, 1994 and 1999. Personnel from the Water Quality Management Planning Section, Water Division, of the Department collected data during 1999. Water quality samples collected were analyzed in the Department's Water Quality Laboratory under the existing Quality Assurance/Quality Control project plan. The Little Rock District Corps of Engineers provided supplemental data from the Corps of Engineers Lakes Norfolk, Beaver and Bull Shoals.

The unit of measure for the parameters listed are as follows: fecal coliform in numbers of colonies per 100 ml (col/100 ml); chlorophyll ^a in $\mu\text{g/L}$; secchi disk transparency in inches; turbidity in NTU; conductivity in micro-mhos per centimeter; alkalinity, chlorides, sulfates, ammonia-nitrogen, nitrite-nitrate nitrogen, total phosphorus, ortho-phosphorus, total organic carbon, total dissolved solids, total suspended solids and total hardness in mg/L ; metals in $\mu\text{g/L}$. The laboratory detection limits were: $\text{NH}_3\text{-N} = 0.05 \text{ mg/L}$; $\text{NO}_2\text{-NO}_3\text{-N} = 0.02 \text{ mg/L}$; total phosphorus and ortho-phosphorus = 0.03 mg/L ; total dissolved solids, total suspended solids, turbidity, and sulfates = 1.0 mg/L ; chlorides = 1.2 mg/L ; total hardness and total organic carbon = 2.0 mg/L ; Cadmium = $0.5 \mu\text{g/L}$; Chromium = $1.0 \mu\text{g/L}$; Copper = $4.0 \mu\text{g/L}$, Lead = $2.0 \mu\text{g/L}$ and Zinc = $8.0 \mu\text{g/L}$. Fecal coliform columns are ls= left shore, l 1/4= left quarter point, c= center, r 1/4= right quarter point, rs= right shore and mean is the geometric mean of the five samples.

TABLE A-1A. Water Quality Data from Lake Winona - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	0.00	<0.10	<1.00			
Secchi (in)	149.00	134.00	132.00			
Trophic Index	0.20	0.11	0.08			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	<8.80	NA	NA	10.50
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	<4.50	NA	NA	<4.50
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	1.40	NA	NA	1.40
Chromium (ug/L)	NA	NA	<0.40	NA	NA	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Iron (ug/L)	NA	NA	29.70	NA	NA	260.30
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	1.00	NA	NA	0.80
Manganese (ug/L)	NA	NA	0.50	NA	NA	407.90
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	0.90	NA	NA	1.20
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.10	NA	NA	1.30
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	<1.00	NA	NA	3.10
Hardness (mg/L)	NA	6.00	7.00	NA	2.50	7.00
DO (mg/L)	NA	NA	6.50	NA	NA	3.21
pH	7.10	NA	6.96	5.90	NA	5.54
Water Temp (°C)	NA	NA	30.14	NA	NA	9.27
Alkalinity (mg/L)	7.20	8.00	7.00	6.80	8.00	6.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	<0.01
Chloride (mg/L)	2.50	1.54	1.29	2.20	1.50	1.34
Fluoride (mg/L)	NA	NA	0.03	NA	NA	0.02
Sulfate (mg/L)	3.00	2.80	2.77	3.00	4.00	3.08
NH3-N (mg/L)	0.05	0.03	<0.01	0.05	0.03	0.01
NO3-N (mg/L)	0.02	0.01	0.02	0.13	0.04	0.14
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.02	0.01
T-PHOS (mg/L)	0.03	0.02	<0.02	0.03	0.02	<0.02
TKN (mg/L)	NA	NA	0.17	NA	NA	0.27
TOC (mg/L)	NA	5.90	3.70	NA	4.90	3.70
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	1.00	1.00	3.00	3.00	3.60
TSS (mg/L)	NA	1.00	<1.00	NA	0.50	1.50
TDS (mg/L)	23.00	21.00	22.50	27.00	25.00	27.00
Conductivity (micro-mhos/cm)	22.10	NA	NA	22.40	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	<3			
	l 1/4	NA	<3			
	c	NA	<1			
	r 1/4	NA	<3			
	rs	NA	<3			
	Gm Mean	NA	<3			

TABLE A-1B. Water Quality Data from Lake Winona - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	NA	NA	<1.00			
Secchi (in)	NA	NA	72.00			
Trophic Index	NA	NA	0.15			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	<8.80	NA	NA	19.10
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	<4.50	NA	NA	<4.50
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	1.40	NA	NA	1.90
Chromium (ug/L)	NA	NA	<0.40	NA	NA	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	1.62
Copper (ug/L)	NA	NA	<0.50	NA	NA	0.51
Iron (ug/L)	NA	NA	62.30	NA	NA	2888.00
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	1.00	NA	NA	1.00
Manganese (ug/L)	NA	NA	1.40	NA	NA	732.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.30	NA	NA	1.50
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.30	NA	NA	1.30
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	1.20	NA	NA	9.40
Hardness (mg/L)	NA	NA	8.00	NA	NA	9.00
DO (mg/L)	NA	NA	6.19	NA	NA	0.20
pH	NA	NA	6.58	NA	NA	5.83
Water Temp (°C)	NA	NA	30.61	NA	NA	16.34
Alkalinity (mg/L)	NA	NA	8.00	NA	NA	9.00
Bromide (mg/L)	NA	NA	<0.01	NA	NA	0.04
Chloride (mg/L)	NA	NA	1.31	NA	NA	1.35
Fluoride (mg/L)	NA	NA	0.03	NA	NA	0.03
Sulfate (mg/L)	NA	NA	2.69	NA	NA	2.48
NH3-N (mg/L)	NA	NA	<0.01	NA	NA	0.11
NO3-N (mg/L)	NA	NA	0.02	NA	NA	0.02
O-PHOS (mg/L)	NA	NA	<0.01	NA	NA	<0.01
T-PHOS (mg/L)	NA	NA	<0.02	NA	NA	<0.02
TKN (mg/L)	NA	NA	0.39	NA	NA	0.79
TOC (mg/L)	NA	NA	3.40	NA	NA	4.20
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	NA	NA	1.80	NA	NA	11.00
TSS (mg/L)	NA	NA	1.50	NA	NA	14.50
TDS (mg/L)	NA	NA	23.50	NA	NA	27.00
Conductivity (micro-mhos/cm)	NA	NA	NA	NA	NA	NA
Fecal Coliform (col/100 ml)	NA	NA	<3			
Is	NA	NA	<3			
1 1/4	NA	NA	<3			
c	NA	NA	<3			
r 1/4	NA	NA	<3			
rs	NA	NA	<3			
Gm Mean	NA	NA	<3			

Station added in 1999

TABLE A-2A. Water Quality Data from Lake Dierks - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	9.1	NA	15.20			
Secchi (in)	67.00	47.00	73.00			
Trophic Index	0.43	0.51	0.35			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	3.04
Barium (ug/L)	NA	NA	<8.80	NA	NA	31.60
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	7.40	NA	NA	7.30
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	2.20	NA	NA	2.90
Chromium (ug/L)	NA	NA	<0.40	NA	NA	0.49
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	1.05
Copper (ug/L)	NA	NA	0.62	NA	NA	0.99
Iron (ug/L)	NA	NA	<15.00	NA	NA	5459.00
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	1.50	NA	NA	1.60
Manganese (ug/L)	NA	NA	0.70	NA	NA	732.40
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.50	NA	NA	1.70
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	3.00	NA	NA	2.80
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	7.80	NA	NA	3.40
Hardness (mg/L)	NA	NA	12.00	NA	NA	14.00
DO (mg/L)	NA	NA	6.92	NA	NA	0.10
pH	8.00	NA	8.02	5.90	NA	6.47
Water Temp (°C)	NA	NA	30.10	NA	NA	14.40
Alkalinity (mg/L)	11.00	NA	15.00	17.00	NA	22.00
Bromide (mg/L)	NA	NA	<0.01	NA	NA	0.03
Chloride (mg/L)	2.90	NA	2.32	NA	NA	2.29
Fluoride (mg/L)	NA	NA	0.03	NA	NA	0.03
Sulfate (mg/L)	5.00	NA	3.18	NA	NA	2.52
NH3-N (mg/L)	NA	NA	0.01	NA	NA	1.05
NO3-N (mg/L)	0.02	0.01	0.03	0.02	0.02	0.03
O-PHOS (mg/L)	0.01	0.02	<0.01	0.09	0.02	0.07
T-PHOS (mg/L)	0.02	0.02	<0.02	0.11	0.04	0.24
TKN (mg/L)	NA	NA	0.59	NA	NA	1.84
TOC (mg/L)	NA	NA	4.70	NA	NA	5.93
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	1.00	2.00	2.10	9.80	6.10	1.90
TSS (mg/L)	NA	NA	<1.00	NA	NA	1.50
TDS (mg/L)	NA	NA	36.00	NA	NA	55.00
Conductivity (micro-mhos/cm)	37.00	NA	NA	54.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	l 1/4	NA	NA			
	c	NA	NA			
	r 1/4	NA	NA			
	rs	NA	NA			
Gm Mean	NA	NA	<1			

TABLE A-2B. Water Quality Data from Lake Dierks - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	12.00	15.00	NA			
Secchi (in)	67.00	47.00	NA			
Trophic Index	0.78	0.64	NA			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	NA	NA	NA	NA	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	NA	NA	NA	NA	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	NA	NA	NA	NA	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	NA	NA	NA	NA	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	NA	NA	NA	NA	NA
Hardness (mg/L)	NA	NA	NA	NA	NA	NA
DO (mg/L)	NA	NA	NA	NA	NA	NA
pH	6.10	NA	NA	6.00	NA	NA
Water Temp (°C)	NA	NA	NA	NA	NA	NA
Alkalinity (mg/L)	12.00	NA	NA	22.00	NA	NA
Bromide (mg/L)	NA	NA	NA	NA	NA	NA
Chloride (mg/L)	NA	NA	NA	NA	NA	NA
Fluoride (mg/L)	NA	NA	NA	NA	NA	NA
Sulfate (mg/L)	NA	NA	NA	NA	NA	NA
NH3-N (mg/L)	NA	NA	NA	NA	NA	NA
NO3-N (mg/L)	0.02	0.01	NA	0.02	0.01	NA
O-PHOS (mg/L)	0.01	0.02	NA	0.17	0.02	NA
T-PHOS (mg/L)	0.04	0.05	NA	0.20	0.03	NA
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	NA	NA	NA	NA	NA
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	1.00	2.00	NA	7.20	4.10	NA
TSS (mg/L)	NA	NA	NA	NA	NA	NA
TDS (mg/L)	NA	NA	NA	NA	NA	NA
Conductivity (micro-mhos/cm)	39.00	NA	NA	78.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	1 1/4	NA	NA			
	c	NA	NA			
	r 1/4	NA	NA			
	rs	NA	NA			
	Gm Mean	NA	NA			

Station not collected in 1999

TABLE A-3A. Water Quality Data from Lake Gillham - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	4.30	14.00	10.60			
Secchi (in)	59.00	39.00	66.50			
Trophic Index	0.41	0.74	0.31			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	5.80	NA	NA	14.20
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	6.90	NA	NA	6.60
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	2.30	NA	NA	2.50
Chromium (ug/L)	NA	NA	<0.40	NA	NA	0.46
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	NA	0.54	NA	NA	0.60
Iron (ug/L)	NA	NA	<15.00	NA	NA	598.30
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.3
Magnesium (ug/L)	NA	NA	1.10	NA	NA	1.00
Manganese (ug/L)	NA	NA	0.70	NA	NA	148.10
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.00	NA	NA	1.00
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.30	NA	NA	1.90
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	1.70	NA	NA	3.80
Hardness (mg/L)	NA	NA	10.00	NA	NA	10.00
DO (mg/L)	NA	NA	7.07	NA	NA	0.15
pH	6.80	NA	8.07	5.90	NA	6.46
Water Temp (°C)	NA	NA	31.90	NA	NA	18.00
Alkalinity (mg/L)	11.00	NA	11.00	14.00	NA	12.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	<0.01
Chloride (mg/L)	2.60	NA	1.75	NA	NA	1.61
Fluoride (mg/L)	NA	NA	0.03	NA	NA	0.03
Sulfate (mg/L)	4.40	NA	3.43	NA	NA	2.74
NH3-N (mg/L)	NA	NA	0.01	NA	NA	0.14
NO3-N (mg/L)	0.02	0.01	0.03	0.02	0.01	0.03
O-PHOS (mg/L)	0.01	0.02	<0.01	0.05	0.05	0.01
T-PHOS (mg/L)	0.02	0.02	<0.02	0.08	0.07	<0.02
TKN (mg/L)	NA	NA	0.38	NA	NA	0.49
TOC (mg/L)	NA	NA	3.25	NA	NA	3.40
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	1.00	5.00	2.50	9.00	6.30	3.60
TSS (mg/L)	NA	NA	2.50	NA	NA	1.50
TDS (mg/L)	NA	NA	31.00	NA	NA	33.00
Conductivity (micro-mhos/cm)	35.00	NA	NA	47.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	l 1/4	NA	NA			
	c	NA	NA			
	r 1/4	NA	NA			
	rs	NA	NA			
	Gm Mean	NA	NA			

TABLE A-3B. Water Quality Data from Lake Gillham - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	4.10	14.00	NA			
Secchi (in)	51.00	43.00	NA			
Trophic Index	0.47	0.67	NA			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	NA	NA	NA	NA	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	NA	NA	NA	NA	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	NA	NA	NA	NA	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	NA	NA	NA	NA	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	NA	NA	NA	NA	NA
Hardness (mg/L)	NA	NA	NA	NA	NA	NA
DO (mg/L)	NA	NA	NA	NA	NA	NA
pH	6.10	NA	NA	5.90	NA	NA
Water Temp (°C)	NA	NA	NA	NA	NA	NA
Alkalinity (mg/L)	10.00	NA	NA	16.00	NA	NA
Bromide (mg/L)	NA	NA	NA	NA	NA	NA
Chloride (mg/L)	NA	NA	NA	NA	NA	NA
Fluoride (mg/L)	NA	NA	NA	NA	NA	NA
Sulfate (mg/L)	NA	NA	NA	NA	NA	NA
NH3-N (mg/L)	NA	NA	NA	NA	NA	NA
NO3-N (mg/L)	0.02	<0.02	NA	0.02	<0.02	NA
O-PHOS (mg/L)	0.01	<0.03	NA	0.05	<0.03	NA
T-PHOS (mg/L)	0.02	<0.03	NA	0.08	<0.03	NA
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	NA	NA	NA	NA	NA
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	1.40	4.40	NA	8.40	4.30	NA
TSS (mg/L)	NA	NA	NA	NA	NA	NA
TDS (mg/L)	NA	NA	NA	NA	NA	NA
Conductivity (micro-mhos/cm)	37.00	NA	NA	60.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	1 1/4	NA	NA			
	c	NA	NA			
	r 1/4	NA	NA			
	rs	NA	NA			
Gm Mean	NA	NA	NA			

Station not collected in 1999

TABLE A-4A. Water Quality Data from Lake DeQueen - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	2.50	7.80	20.40			
Secchi (in)	71.00	59.00	47.00			
Trophic Index	0.32	0.39	0.65			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	1.64
Barium (ug/L)	NA	NA	<8.80	NA	NA	19.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	8.10	NA	NA	10.20
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	1.80	NA	NA	2.70
Chromium (ug/L)	NA	NA	<0.40	NA	NA	0.43
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	0.63
Copper (ug/L)	NA	NA	1.01	NA	NA	1.49
Iron (ug/L)	NA	NA	<15.00	NA	NA	2043.00
Lead (ug/L)	NA	NA	<0.30	NA	NA	0.39
Magnesium (ug/L)	NA	NA	1.10	NA	NA	1.00
Manganese (ug/L)	NA	NA	1.10	NA	NA	445.90
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.50	NA	NA	1.60
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	3.10	NA	NA	2.20
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	6.20	NA	NA	12.00
Hardness (mg/L)	NA	NA	9.00	NA	NA	11.00
DO (mg/L)	NA	NA	6.51	NA	NA	0.14
pH	7.90	NA	7.78	5.80	NA	6.02
Water Temp (°C)	NA	NA	31.40	NA	NA	20.20
Alkalinity (mg/L)	11.00	NA	11.00	13.00	NA	16.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	<0.01
Chloride (mg/L)	3.10	NA	2.19	NA	NA	1.74
Fluoride (mg/L)	NA	NA	0.03	NA	NA	0.03
Sulfate (mg/L)	4.80	NA	3.36	NA	NA	2.10
NH3-N (mg/L)	NA	NA	0.01	NA	NA	0.52
NO3-N (mg/L)	0.02	0.01	0.02	0.02	0.01	0.04
O-PHOS (mg/L)	0.01	0.02	<0.01	0.04	0.02	0.07
T-PHOS (mg/L)	0.02	0.02	<0.02	0.05	0.02	0.17
TKN (mg/L)	NA	NA	0.65	NA	NA	1.19
TOC (mg/L)	NA	NA	4.19	NA	NA	5.70
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	1.00	<1.00	3.10	5.40	2.50	4.80
TSS (mg/L)	NA	NA	2.50	NA	NA	2.00
TDS (mg/L)	NA	NA	33.00	NA	NA	44.00
Conductivity (micro-mhos/cm)	37.00	NA	NA	46.00	NA	NA
Fecal Coliform (col/100 ml)	is	NA	3			
	1 1/4	NA	<1			
	c	NA	<1			
	r 1/4	NA	12			
	rs	NA	3			
Gm Mean	NA	NA	2.6			

TABLE A-4B. Water Quality Data from Lake DeQueen - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	9.40	9.50	8.40			
Secchi (in)	75.00	59.00	45.00			
Trophic Index	0.39	0.42	1.10			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	1.77
Barium (ug/L)	NA	NA	5.50	NA	NA	33.00
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	7.90	NA	NA	10.60
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	2.10	NA	NA	4.70
Chromium (ug/L)	NA	NA	<0.40	NA	NA	0.46
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	1.57
Copper (ug/L)	NA	NA	0.69	NA	NA	0.81
Iron (ug/L)	NA	NA	24.10	NA	NA	3889.00
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	1.20	NA	NA	1.60
Manganese (ug/L)	NA	NA	2.10	NA	NA	845.60
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.90	NA	NA	1.90
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	4.00	NA	NA	3.50
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	7.10	NA	NA	9.10
Hardness (mg/L)	NA	NA	10.00	NA	NA	18.00
DO (mg/L)	NA	NA	6.98	NA	NA	0.16
pH	7.90	NA	8.22	6.10	NA	6.10
Water Temp (°C)	NA	NA	33.60	NA	NA	22.70
Alkalinity (mg/L)	10.00	NA	14.00	13.00	NA	28.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	0.03
Chloride (mg/L)	NA	NA	2.41	NA	NA	2.23
Fluoride (mg/L)	NA	NA	0.03	NA	NA	0.03
Sulfate (mg/L)	NA	NA	3.33	NA	NA	1.06
NH3-N (mg/L)	NA	NA	0.03	NA	NA	0.67
NO3-N (mg/L)	0.02	0.01	0.03	0.02	0.01	0.06
O-PHOS (mg/L)	0.01	0.02	0.01	0.03	0.03	0.08
T-PHOS (mg/L)	0.02	0.02	0.04	0.05	0.05	0.24
TKN (mg/L)	NA	NA	0.81	NA	NA	1.62
TOC (mg/L)	NA	NA	4.60	NA	NA	5.64
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	2.00	3.10	4.30	6.90	7.20
TSS (mg/L)	NA	NA	2.00	NA	NA	3.50
TDS (mg/L)	NA	NA	38.00	NA	NA	58.00
Conductivity (micro-mhos/cm)	37.00	NA	NA	48.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	1 1/4	NA	NA			
	c	NA	NA			
	r 1/4	NA	NA			
	rs	NA	NA			
Gm Mean	NA	NA	1.3			

TABLE A-5A. Water Quality Data from Lake Catherine - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	21.40	<0.10	13.80			
Secchi (in)	46.00	64.00	54.50			
Trophic Index	1.33	0.70	0.44			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	11.60	NA	NA	12.20
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	4.90	NA	NA	5.10
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	6.50	NA	NA	6.40
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	0.43
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	0.94
Iron (ug/L)	NA	NA	<15.00	NA	NA	30.40
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.70	NA	NA	1.70
Manganese (ug/L)	NA	NA	1.20	NA	NA	69.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.90	NA	NA	2.00
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	3.40	NA	NA	5.40
Vanadium (ug/L)	NA	NA	16.75	NA	NA	33.31
Zinc (ug/L)	NA	<8.00	1.00	NA	<8.00	5.30
Hardness (mg/L)	NA	15.60	23.00	NA	15.60	23.00
DO (mg/L)	NA	NA	8.49	NA	NA	4.12
pH	7.00	NA	7.84	6.50	NA	6.39
Water Temp (°C)	NA	NA	29.90	NA	NA	18.60
Alkalinity (mg/L)	17.60	16.00	21.00	20.50	20.00	20.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	0.03
Chloride (mg/L)	5.10	2.76	2.16	7.00	2.27	2.52
Fluoride (mg/L)	NA	NA	0.05	NA	NA	0.05
Sulfate (mg/L)	3.00	7.00	6.39	7.00	2.10	10.10
NH3-N (mg/L)	0.05	0.03	0.01	0.55	0.03	0.17
NO3-N (mg/L)	0.02	0.09	0.02	0.09	0.30	0.16
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.02	0.01
T-PHOS (mg/L)	0.04	0.06	<0.02	0.04	0.05	<0.02
TKN (mg/L)	NA	NA	0.41	NA	NA	1.07
TOC (mg/L)	NA	4.70	3.70	NA	4.60	4.40
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	4.00	6.00	1.90	4.00	7.40	2.80
TSS (mg/L)	NA	5.50	1.50	NA	10.00	2.50
TDS (mg/L)	42.00	48.00	48.00	53.00	43.00	54.00
Conductivity (micro-mhos/cm)	63.80	63.20	NA	87.50	58.10	NA
Fecal Coliform (col/100 ml)	Is	3	<2			
	l 1/4	-	9			
	c	6	<2			
	r 1/4	-	2			
	rs	6	29			
Gm Mean	NA	4.8	4.6			

TABLE A-5B. Water Quality Data from Lake Catherine - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	5.90	3.00	11.20			
Secchi (in)	31.00	42.00	65.00			
Trophic Index	1.48	1.40	0.32			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	13.50	NA	NA	12.00
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	4.80	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	6.70	NA	NA	6.40
Chromium (ug/L)	NA	<1.00	0.51	NA	<1.00	0.46
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	1.75
Iron (ug/L)	NA	NA	<15.00	NA	NA	30.90
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.70	NA	NA	1.60
Manganese (ug/L)	NA	NA	1.50	NA	NA	50.70
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.70	NA	NA	2.10
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	3.40	NA	NA	2.20
Vanadium (ug/L)	NA	NA	16.82	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	2.00	NA	<8.00	12.50
Hardness (mg/L)	NA	17.40	24.00	NA	17.40	23.00
DO (mg/L)	NA	NA	7.92	NA	NA	3.84
pH	6.50	NA	7.94	6.00	NA	6.41
Water Temp (°C)	NA	NA	30.10	NA	NA	17.70
Alkalinity (mg/L)	18.10	20.00	21.00	20.50	21.00	20.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	0.02
Chloride (mg/L)	3.60	2.67	2.20	2.90	2.99	2.10
Fluoride (mg/L)	NA	NA	0.05	NA	NA	0.04
Sulfate (mg/L)	4.00	7.00	6.25	2.00	9.00	3.76
NH3-N (mg/L)	0.06	0.03	0.01	0.10	0.19	0.07
NO3-N (mg/L)	0.02	0.09	0.02	0.05	0.20	0.12
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.02	0.01
T-PHOS (mg/L)	0.04	0.05	<0.02	0.03	0.04	<0.02
TKN (mg/L)	NA	NA	0.52	NA	NA	0.69
TOC (mg/L)	NA	5.10	3.60	NA	4.30	3.90
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	7.00	3.00	2.20	4.00	4.00	2.30
TSS (mg/L)	NA	3.50	2.00	NA	4.00	3.00
TDS (mg/L)	42.00	47.00	47.00	37.00	43.00	42.00
Conductivity (micro-mhos/cm)	59.90	66.30	NA	54.90	76.00	NA
Fecal Coliform (col/100 ml)	Is	NA	689			
	l 1/4	NA	-			
	c	NA	17			
	r 1/4	NA	-			
	rs	NA	7			
Gm Mean	NA	43.4	3.5			

TABLE A-6B. Water Quality Data from Lake Greeson - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	2.4	2.4	3.60			
Secchi (in)	95.00	68.00	108.00			
Trophic Index	0.13	0.59	0.13			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	<8.80	NA	NA	13.50
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	6.40	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	1.50	NA	NA	1.70
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	1.26	NA	<4.00	1.27
Iron (ug/L)	NA	NA	<15.00	NA	NA	118.00
Lead (ug/L)	NA	<2.00	<0.30	NA	4.80	<0.30
Magnesium (ug/L)	NA	NA	1.00	NA	NA	1.00
Manganese (ug/L)	NA	NA	0.60	NA	NA	185.50
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	0.80	NA	NA	0.80
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.80	NA	NA	1.70
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	15.10	NA	<8.00	5.60
Hardness (mg/L)	NA	2.50	8.00	NA	2.50	8.00
DO (mg/L)	NA	NA	6.73	NA	NA	2.08
pH	6.20	NA	7.27	6.00	NA	6.02
Water Temp (°C)	NA	NA	31.00	NA	NA	8.87
Alkalinity (mg/L)	NA	NA	9.00	NA	NA	8.00
Bromide (mg/L)	NA	NA	<0.01	NA	NA	0.02
Chloride (mg/L)	NA	1.98	1.75	NA	1.68	1.67
Fluoride (mg/L)	NA	NA	0.03	NA	NA	0.03
Sulfate (mg/L)	3.00	1.80	3.24	3.00	3.00	3.21
NH3-N (mg/L)	0.01	0.03	0.01	0.01	0.03	0.02
NO3-N (mg/L)	0.02	0.01	0.03	0.27	0.25	0.30
O-PHOS (mg/L)	0.01	0.02	<0.01	0.01	0.02	<0.01
T-PHOS (mg/L)	0.01	0.04	<0.02	0.01	0.04	<0.02
TKN (mg/L)	NA	NA	0.26	NA	NA	0.18
TOC (mg/L)	2.90	NA	3.18	3.00	NA	3.02
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	2.30	1.20	3.20	4.60	2.10
TSS (mg/L)	NA	2.00	1.50	NA	0.50	<1.00
TDS (mg/L)	NA	22.00	25.00	NA	31.00	29.00
Conductivity (micro-mhos/cm)	32.00	23.70	NA	35.00	28.80	NA
Fecal Coliform (col/100 ml)	Is	NA	4			
	1 1/4	NA	2			
	c	NA	<1			
	r 1/4	NA	<1			
	rs	NA	<1			
Gm Mean	NA	NA	1.5			

TABLE A-6A. Water Quality Data from Lake Greeson - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	8.1	<0.01	7.10			
Secchi (in)	76.00	74.00	73.00			
Trophic Index	0.50	0.65	0.23			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	1.57
Barium (ug/L)	NA	NA	<8.80	NA	NA	23.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	6.00	NA	NA	4.70
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	1.40	NA	NA	2.20
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	0.44
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	0.91
Copper (ug/L)	NA	<4.00	0.50	NA	<4.00	2.06
Iron (ug/L)	NA	NA	<15.00	NA	NA	2646.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	1.03
Magnesium (ug/L)	NA	NA	1.00	NA	NA	1.00
Manganese (ug/L)	NA	NA	0.50	NA	NA	842.40
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	2.04
Potassium (ug/L)	NA	NA	1.00	NA	NA	1.00
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.00	NA	NA	1.80
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	4.60	NA	<8.00	3.20
Hardness (mg/L)	NA	16.50	8.00	NA	6.30	10.00
DO (mg/L)	NA	NA	6.64	NA	NA	0.11
pH	7.30	NA	7.05	6.50	NA	6.11
Water Temp (°C)	NA	NA	31.80	NA	NA	12.00
Alkalinity (mg/L)	10.80	NA	9.00	22.10	NA	15.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	0.02
Chloride (mg/L)	1.70	2.16	1.71	1.80	2.11	1.73
Fluoride (mg/L)	NA	NA	0.03	NA	NA	0.03
Sulfate (mg/L)	2.00	1.80	3.00	7.00	3.00	2.79
NH3-N (mg/L)	0.05	0.09	0.01	0.23	0.07	0.24
NO3-N (mg/L)	0.03	0.01	0.03	0.02	0.01	0.03
O-PHOS (mg/L)	0.03	0.04	<0.01	0.03	0.03	0.01
T-PHOS (mg/L)	0.03	0.05	<0.02	0.06	0.06	0.06
TKN (mg/L)	NA	NA	0.27	NA	NA	0.63
TOC (mg/L)	3.7	NA	2.74	5.70	NA	3.25
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	2.60	1.80	7.00	7.80	10.00
TSS (mg/L)	NA	2.50	1.00	NA	3.50	2.00
TDS (mg/L)	32.00	23.00	24.00	52.00	31.00	37.00
Conductivity (micro-mhos/cm)	29.00	27.40	NA	46.50	35.20	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	1 1/4	NA	NA			
	c	NA	NA			
	r 1/4	NA	NA			
	rs	NA	NA			
	Gm Mean	NA	NA			

TABLE A-7A. Water Quality Data from Lake Hamilton - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	10.20	4.54	7.20			
Secchi (in)	71.00	108.00	113.00			
Trophic Index	0.57	0.18	0.15			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	16.50	NA	NA	11.00
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	9.30	NA	NA	5.60
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	6.60	NA	NA	6.30
Chromium (ug/L)	NA	<1.00	0.41	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	0.55	NA	<4.00	0.76
Iron (ug/L)	NA	NA	<15.00	NA	NA	19.50
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.60	NA	NA	1.70
Manganese (ug/L)	NA	NA	0.50	NA	NA	19.40
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.90	NA	NA	2.00
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.20	NA	NA	2.00
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	2.60	NA	23.00	5.00
Hardness (mg/L)	NA	10.50	23.00	NA	15.60	22.00
DO (mg/L)	NA	NA	6.94	NA	NA	5.22
pH	NA	NA	7.58	NA	NA	5.21
Water Temp (°C)	NA	NA	30.80	NA	NA	16.10
Alkalinity (mg/L)	17.10	16.00	23.00	20.00	16.00	20.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	0.03
Chloride (mg/L)	2.80	2.11	2.01	2.60	2.76	1.92
Fluoride (mg/L)	NA	NA	0.05	NA	NA	0.04
Sulfate (mg/L)	1.00	2.10	3.66	1.00	7.00	3.82
NH3-N (mg/L)	0.06	0.03	<0.01	0.08	0.03	0.02
NO3-N (mg/L)	0.02	0.01	0.02	0.06	0.09	0.14
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.02	<0.01
T-PHOS (mg/L)	0.03	0.02	<0.02	0.03	0.06	<0.02
TKN (mg/L)	NA	NA	0.34	NA	NA	0.36
TOC (mg/L)	NA	3.60	3.40	NA	4.70	3.60
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	2.00	1.20	6.00	2.00	2.20
TSS (mg/L)	NA	2.00	<1.00	NA	1.50	2.50
TDS (mg/L)	30.00	37.00	40.00	32.00	37.00	39.00
Conductivity (micro-mhos/cm)	46.50	43.80	NA	54.20	63.30	NA
Fecal Coliform (col/100 ml)	Is	NA	0			11
	l 1/4	NA	-			11
	c	NA	3			2
	r 1/4	NA	-			22
	rs	NA	3			4
Gm Mean	NA	3.0	7.3			

TABLE A-7B. Water Quality Data from Lake Hamilton - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	7.50	2.13	11.20			
Secchi (in)	63.00	54.00	108.50			
Trophic Index	0.60	0.97	0.20			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	17.30	NA	NA	12.40
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	5.90	NA	NA	5.10
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	6.70	NA	NA	6.20
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	0.70
Iron (ug/L)	NA	NA	<15.00	NA	NA	46.80
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.60	NA	NA	1.70
Manganese (ug/L)	NA	NA	<0.50	NA	NA	107.20
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.70	NA	NA	1.70
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.20	NA	NA	1.90
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	4.20	NA	<8.00	4.00
Hardness (mg/L)	NA	12.30	23.00	NA	12.30	22.00
DO (mg/L)	NA	NA	7.47	NA	NA	4.07
pH	NA	NA	7.89	NA	NA	6.29
Water Temp (°C)	NA	NA	30.20	NA	NA	16.10
Alkalinity (mg/L)	17.10	18.00	21.00	18.60	20.00	20.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	0.02
Chloride (mg/L)	2.60	2.31	2.03	2.50	2.95	1.88
Fluoride (mg/L)	NA	NA	0.05	NA	NA	0.04
Sulfate (mg/L)	1.00	2.10	3.79	1.00	2.10	3.72
NH3-N (mg/L)	0.05	0.05	0.01	0.05	0.16	0.05
NO3-N (mg/L)	0.02	0.01	0.02	0.04	0.11	0.13
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.02	<0.01
T-PHOS (mg/L)	0.03	0.02	<0.02	0.03	0.02	<0.02
TKN (mg/L)	NA	NA	0.41	NA	NA	0.32
TOC (mg/L)	NA	4.30	3.60	NA	4.00	3.50
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	4.40	1.40	6.50	3.40	1.80
TSS (mg/L)	NA	3.50	<1.00	NA	3.50	<1.00
TDS (mg/L)	29.00	33.00	40.00	34.00	37.00	40.00
Conductivity (micro-mhos/cm)	46.70	42.70	NA	49.50	51.80	NA
Fecal Coliform (col/100 ml)	NA	58	7			
ls	NA	58	7			
l 1/4	NA	-	7			
c	NA	28	9			
r 1/4	NA	-	16			
rs	NA	69	9			
Gm Mean	NA	48.2	9.1			

TABLE A-8A. Water Quality Data from Lake Maumelle - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	3.4	NA	<1.00			
Secchi (in)	115.00	122.00	180.00			
Trophic Index	0.29	0.15	0.12			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	<8.80	NA	NA	<8.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	<4.50	NA	NA	<4.50
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	1.20	NA	NA	1.20
Chromium (ug/L)	NA	NA	<0.40	NA	NA	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	NA	<0.50	NA	NA	0.66
Iron (ug/L)	NA	NA	<15.00	NA	NA	<15.00
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	1.30	NA	NA	1.30
Manganese (ug/L)	NA	NA	0.70	NA	NA	1.70
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.30	NA	NA	1.70
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.60	NA	NA	1.90
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	<1.00	NA	NA	5.50
Hardness (mg/L)	NA	NA	8.00	NA	7.00	8.00
DO (mg/L)	NA	NA	6.76	NA	NA	0.27
pH	NA	NA	7.10	NA	NA	5.82
Water Temp (°C)	NA	NA	32.27	NA	NA	22.96
Alkalinity (mg/L)	15.20	NA	6.00	25.90	7.00	6.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.04
Chloride (mg/L)	2.00	NA	1.92	3.00	1.50	2.04
Fluoride (mg/L)	NA	NA	0.03	NA	NA	0.03
Sulfate (mg/L)	4.00	NA	3.52	9.00	2.80	3.17
NH3-N (mg/L)	0.15	NA	0.01	0.59	0.03	0.02
NO3-N (mg/L)	0.02	NA	0.02	0.02	0.01	0.02
O-PHOS (mg/L)	0.03	NA	<0.01	0.06	0.02	0.01
T-PHOS (mg/L)	0.03	NA	0.02	0.06	0.02	0.04
TKN (mg/L)	NA	NA	0.21	NA	NA	1.06
TOC (mg/L)	3.70	NA	3.20	5.00	4.30	4.20
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	NA	0.90	5.50	1.00	2.50
TSS (mg/L)	NA	NA	<1.00	NA	NA	4.50
TDS (mg/L)	24.00	NA	21.00	47.00	22.00	22.50
Conductivity (micro-mhos/cm)	25.50	NA	NA	54.90	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	<3			
	l 1/4	NA	<3			
	c	NA	<1			
	r 1/4	NA	<3			
	rs	NA	<3			
	Gm Mean	NA	<3			

TABLE A-8B. Water Quality Data from Lake Maumelle - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	4.50	2.10	<1.00			
Secchi (in)	92.00	35.00	84.00			
Trophic Index	0.38	1.06	0.13			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	<8.80	NA	NA	<8.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	<4.50	NA	NA	<4.50
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	1.10	NA	NA	1.10
Chromium (ug/L)	NA	NA	<0.40	NA	NA	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	NA	<0.50	NA	NA	0.54
Iron (ug/L)	NA	NA	16.10	NA	NA	<15.00
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	1.20	NA	NA	1.20
Manganese (ug/L)	NA	NA	1.40	NA	NA	1.40
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.30	NA	NA	1.50
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.50	NA	NA	1.60
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	1.40	NA	NA	4.10
Hardness (mg/L)	NA	6.00	8.00	NA	10.80	8.00
DO (mg/L)	NA	NA	6.51	NA	NA	1.82
pH	NA	NA	6.75	NA	NA	5.21
Water Temp (°C)	NA	NA	31.64	NA	NA	29.39
Alkalinity (mg/L)	7.80	10.00	8.00	25.50	12.00	6.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.03
Chloride (mg/L)	1.90	1.84	1.89	2.20	1.80	1.93
Fluoride (mg/L)	NA	NA	0.03	NA	NA	0.03
Sulfate (mg/L)	4.00	4.00	3.37	11.00	4.00	3.41
NH3-N (mg/L)	0.13	0.09	<0.01	0.63	0.08	0.02
NO3-N (mg/L)	0.02	0.04	0.03	0.02	0.01	0.04
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.02	<0.01
T-PHOS (mg/L)	0.03	0.04	<0.02	0.03	0.02	0.03
TKN (mg/L)	NA	NA	0.39	NA	NA	0.46
TOC (mg/L)	3.30	5.60	3.50	6.10	5.30	3.80
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	3.00	1.90	7.00	6.90	2.20
TSS (mg/L)	NA	3.00	2.00	NA	5.50	2.00
TDS (mg/L)	23.00	22.00	27.50	51.00	28.00	22.50
Conductivity (micro-mhos/cm)	25.70	NA	NA	51.80	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	<3			
	1 1/4	NA	<3			
	c	NA	<3			
	r 1/4	NA	<3			
	rs	NA	<3			
	Gm Mean	NA	<3			

TABLE A-9A. Water Quality Data from Lake DeGray - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	2.3	1.07	4.30			
Secchi (in)	110.00	146.00	135.00			
Trophic Index	0.11	0.27	0.11			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	10.20	NA	NA	<8.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	5.70	NA	NA	6.30
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	5.00	NA	NA	5.50
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	0.63	NA	<4.00	1.16
Iron (ug/L)	NA	NA	<15.00	NA	NA	16.80
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	0.35
Magnesium (ug/L)	NA	NA	1.40	NA	NA	1.40
Manganese (ug/L)	NA	NA	1.40	NA	NA	3.40
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	0.70	NA	NA	1.10
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.00	NA	NA	2.00
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	2.50	NA	9.00	4.30
Hardness (mg/L)	NA	11.40	18.00	NA	9.60	19.00
DO (mg/L)	NA	NA	7.06	NA	NA	3.30
pH	NA	NA	7.78	NA	NA	6.70
Water Temp (°C)	NA	NA	31.80	NA	NA	7.70
Alkalinity (mg/L)	NA	NA	18.00	NA	NA	18.00
Bromide (mg/L)	NA	NA	0.02	NA	NA	0.03
Chloride (mg/L)	NA	2.00	1.89	NA	1.90	1.99
Fluoride (mg/L)	NA	NA	0.04	NA	NA	0.04
Sulfate (mg/L)	4.00	4.10	3.73	4.00	4.10	4.09
NH3-N (mg/L)	0.01	0.11	0.01	0.04	0.03	0.01
NO3-N (mg/L)	0.01	0.01	0.03	0.21	0.25	0.31
O-PHOS (mg/L)	0.01	0.02	<0.01	0.01	0.02	0.01
T-PHOS (mg/L)	0.01	0.04	<0.02	0.01	0.04	<0.02
TKN (mg/L)	NA	NA	0.32	NA	NA	0.18
TOC (mg/L)	4.30	NA	3.46	4.70	NA	2.91
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	1.00	1.00	1.00	1.80	2.60	1.10
TSS (mg/L)	NA	0.50	1	NA	0.50	1.5
TDS (mg/L)	NA	32.00	37	NA	38.00	43
Conductivity (micro-mhos/cm)	51.00	47.20	NA	50.00	48.30	NA
Fecal Coliform (col/100 ml)	Is	NA	7			
	l 1/4	NA	2			
	c	NA	0			
	r 1/4	NA	13			
	rs	NA	5			
	Gm Mean	NA	5.5			

TABLE A-9B. Water Quality Data from Lake DeGray - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	5.6	3.2	4.20			
Secchi (in)	73.00	74.00	59.00			
Trophic Index	0.49	2.18	0.24			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	5.41
Barium (ug/L)	NA	NA	12.70	NA	NA	36.60
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	6.20	NA	NA	5.10
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	6.20	NA	NA	8.60
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	1.28
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	1.41
Iron (ug/L)	NA	NA	<15.00	NA	NA	6536.00
Lead (ug/L)	NA	<2.00	<0.30	NA	2.60	<0.30
Magnesium (ug/L)	NA	NA	1.60	NA	NA	1.70
Manganese (ug/L)	NA	NA	1.50	NA	NA	1690.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	0.90	NA	NA	1.10
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.10	NA	NA	2.00
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	1.05
Zinc (ug/L)	NA	<8.00	6.30	NA	<8.00	5.10
Hardness (mg/L)	NA	16.50	22.00	NA	18.00	28.00
DO (mg/L)	NA	NA	7.02	NA	NA	0.13
pH	NA	NA	8.07	NA	NA	6.80
Water Temp (°C)	NA	NA	33.00	NA	NA	15.00
Alkalinity (mg/L)	19.60	NA	21.00	33.30	NA	35.00
Bromide (mg/L)	NA	NA	<0.01	NA	NA	0.03
Chloride (mg/L)	1.60	2.20	1.95	1.70	2.03	1.89
Fluoride (mg/L)	NA	NA	0.04	NA	NA	0.04
Sulfate (mg/L)	3.00	7.20	3.93	8.00	3.00	0.91
NH3-N (mg/L)	0.05	0.29	<0.01	0.49	0.03	0.77
NO3-N (mg/L)	0.02	0.01	0.03	0.02	0.01	0.04
O-PHOS (mg/L)	0.03	0.14	<0.01	0.15	0.02	0.10
T-PHOS (mg/L)	0.03	0.16	<0.02	0.20	0.06	0.40
TKN (mg/L)	NA	NA	0.40	NA	NA	1.41
TOC (mg/L)	4.00	NA	3.19	5.60	NA	4.85
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	11.00	1.60	12.00	2.80	6.60
TSS (mg/L)	NA	4.50	1.00	NA	2.00	2.00
TDS (mg/L)	40.00	56.00	40.00	65.00	44.00	69.00
Conductivity (micro-mhos/cm)	50.60	71.40	NA	71.70	65.90	NA
Fecal Coliform (col/100 ml)	Is	NA	7			
	1 1/4	NA	10			
	c	NA	8			
	r 1/4	NA	5			
	rs	NA	7			
Gm Mean	NA	7.2	1.3			

TABLE A-10A. Water Quality Data from Lake Norfolk - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	0.3	1.87	*0.001			
Secchi (in)	214.00	142.00	*382.00			
Trophic Index	0.09	0.12	0.03			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	33.60	NA	NA	26.90
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	5.70	NA	NA	4.70
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	40.10	NA	NA	29.00
Chromium (ug/L)	NA	NA	0.58	NA	NA	0.64
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Iron (ug/L)	NA	NA	<15.00	NA	NA	<15.00
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	22.30	NA	NA	21.90
Manganese (ug/L)	NA	NA	103.40	NA	NA	<0.50
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.60	NA	NA	2.70
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.90	NA	NA	1.80
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	1.19
Zinc (ug/L)	NA	NA	2.00	NA	NA	6.00
Hardness (mg/L)	NA	174.00	192.00	NA	193.00	162.00
DO (mg/L)	NA	NA	8.30	NA	NA	4.00
pH	NA	NA	8.70	NA	NA	8.00
Water Temp (°C)	NA	NA	29.90	NA	NA	12.80
Alkalinity (mg/L)	144.00	NA	76.00	144.00	NA	89.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.03
Chloride (mg/L)	2.80	3.18	3.24	NA	3.01	3.22
Fluoride (mg/L)	NA	NA	0.04	NA	NA	0.06
Sulfate (mg/L)	NA	5.60	4.45	NA	5.60	4.70
NH3-N (mg/L)	NA	0.07	0.05	NA	0.06	0.07
NO3-N (mg/L)	0.03	0.01	0.01	0.36	0.47	0.44
O-PHOS (mg/L)	0.01	0.02	0.01	0.01	0.02	0.01
T-PHOS (mg/L)	0.02	0.15	*0.01	0.02	0.02	NA
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	3.60	2.09	NA	3.20	2.16
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	0.00	1.00	0.35	0.30	0.90	1.00
TSS (mg/L)	NA	1.50	<1.00	NA	<1.00	<1.00
TDS (mg/L)	NA	155.00	161.00	NA	174.00	192.00
Conductivity (micro-mhos/cm)	272.00	NA	NA	288.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	1 1/4	NA	NA			
	c	NA	<4			
	r 1/4	NA	NA			
	rs	NA	NA			
	Gm Mean	NA	NA			

* Data collected by USACE

TABLE A-10C. Water Quality Data from Lake Norfolk - Middle.

		Epilimnion			Hypolimnion		
		1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)		NA	0.56	NA			
Secchi (in)		NA	144.00	NA			
Trophic Index		NA	0.11	NA			
Aluminum (ug/L)		NA	NA	NA	NA	NA	NA
Arsenic (ug/L)		NA	NA	NA	NA	NA	NA
Barium (ug/L)		NA	NA	NA	NA	NA	NA
Beryllium (ug/L)		NA	NA	NA	NA	NA	NA
Boron (ug/L)		NA	NA	NA	NA	NA	NA
Cadmium (ug/L)		NA	NA	NA	NA	NA	NA
Calcium (ug/L)		NA	NA	NA	NA	NA	NA
Chromium (ug/L)		NA	NA	NA	NA	NA	NA
Cobalt (ug/L)		NA	NA	NA	NA	NA	NA
Copper (ug/L)		NA	NA	NA	NA	NA	NA
Iron (ug/L)		NA	NA	NA	NA	NA	NA
Lead (ug/L)		NA	NA	NA	NA	NA	NA
Magnesium (ug/L)		NA	NA	NA	NA	NA	NA
Manganese (ug/L)		NA	NA	NA	NA	NA	NA
Mercury (ug/L)		NA	NA	NA	NA	NA	NA
Nickel (ug/L)		NA	NA	NA	NA	NA	NA
Potassium (ug/L)		NA	NA	NA	NA	NA	NA
Selenium (ug/L)		NA	NA	NA	NA	NA	NA
Sodium (ug/L)		NA	NA	NA	NA	NA	NA
Vanadium (ug/L)		NA	NA	NA	NA	NA	NA
Zinc (ug/L)		NA	NA	NA	NA	NA	NA
Hardness (mg/L)		NA	NA	NA	NA	NA	NA
DO (mg/L)		NA	NA	NA	NA	NA	NA
pH		NA	NA	NA	NA	NA	NA
Water Temp (°C)		NA	NA	NA	NA	NA	NA
Alkalinity (mg/L)		NA	NA	NA	NA	NA	NA
Bromide (mg/L)		NA	NA	NA	NA	NA	NA
Chloride (mg/L)		NA	3.01	NA	NA	2.87	NA
Fluoride (mg/L)		NA	NA	NA	NA	NA	NA
Sulfate (mg/L)		NA	5.60	NA	NA	4.50	NA
NH3-N (mg/L)		NA	0.03	NA	NA	0.17	NA
NO3-N (mg/L)		NA	0.01	NA	NA	0.01	NA
O-PHOS (mg/L)		NA	0.02	NA	NA	0.02	NA
T-PHOS (mg/L)		NA	0.02	NA	NA	0.02	NA
TKN (mg/L)		NA	NA	NA	NA	NA	NA
TOC (mg/L)		NA	2.90	NA	NA	3.00	NA
BOD (mg/L)		NA	NA	NA	NA	NA	NA
Turbidity (NTU)		NA	1.00	NA	NA	4.20	NA
TSS (mg/L)		NA	0.50	NA	NA	3.50	NA
TDS (mg/L)		NA	162.00	NA	NA	178.00	NA
Conductivity (micro-mhos/cm)		NA	NA	NA	NA	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA	NA			
	I 1/4	NA	NA	NA			
	c	NA	NA	NA			
	r 1/4	NA	NA	NA			
	rs	NA	NA	NA			
	Gm Mean	NA	NA	NA			

Station not collected in 1989 and 1999

TABLE A-10B. Water Quality Data from Lake Norfolk - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	1.2	<0.10	*0.001			
Secchi (in)	186.00	151.00	*358.00			
Trophic Index	0.11	0.10	0.03			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	1.31
Barium (ug/L)	NA	NA	28.70	NA	NA	39.90
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	5.10	NA	NA	<4.50
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	29.30	NA	NA	44.10
Chromium (ug/L)	NA	NA	0.61	NA	NA	0.69
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Iron (ug/L)	NA	NA	<15.00	NA	NA	611.00
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	22.70	NA	NA	22.90
Manganese (ug/L)	NA	NA	<0.50	NA	NA	680.90
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	3.00	NA	NA	3.00
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.10	NA	NA	2.00
Vanadium (ug/L)	NA	NA	1.24	NA	NA	<1.00
Zinc (ug/L)	NA	NA	11.60	NA	NA	2.00
Hardness (mg/L)	NA	NA	167.00	NA	NA	204.00
DO (mg/L)	NA	NA	7.90	NA	NA	0.70
pH	NA	NA	8.60	NA	NA	7.70
Water Temp (°C)	NA	NA	30.20	NA	NA	27.77
Alkalinity (mg/L)	48.00	NA	78.00	166.00	NA	96.50
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.04
Chloride (mg/L)	NA	2.86	3.21	NA	2.82	3.15
Fluoride (mg/L)	NA	NA	0.04	NA	NA	0.06
Sulfate (mg/L)	NA	4.50	4.22	NA	4.50	2.98
NH3-N (mg/L)	NA	0.03	0.05	NA	0.03	0.33
NO3-N (mg/L)	0.03	0.01	0.02	0.21	0.02	0.27
O-PHOS (mg/L)	0.01	0.02	0.01	0.01	0.02	0.02
T-PHOS (mg/L)	0.02	0.02	*0.01	0.02	0.02	NA
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	2.80	1.99	NA	2.20	1.88
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	0.00	1.00	0.85	3.70	2.60	6.30
TSS (mg/L)	NA	0.50	<1.00	NA	0.50	6.00
TDS (mg/L)	NA	160.00	161.00	NA	155.00	200.00
Conductivity (micro-mhos/cm)	315.00	NA	NA	318.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	l 1/4	NA	NA			
	c	NA	<4			
	r 1/4	NA	NA			
	rs	NA	NA			
	Gm Mean	NA	NA			

* Data collected by USACE

TABLE A-11A Water Quality Data from Beaver Lake - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	0.5	0.53	*0.044			
Secchi (in)	218.00	219.00	*185.00			
Trophic Index	0.09	0.22	0.05			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	21.10	NA	NA	19.90
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	13.70	NA	NA	12.30
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	24.20	NA	NA	24.90
Chromium (ug/L)	NA	NA	0.54	NA	NA	0.52
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Iron (ug/L)	NA	NA	<15.00	NA	NA	<15.00
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	2.10	NA	NA	2.30
Manganese (ug/L)	NA	NA	2.20	NA	NA	1.70
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.70	NA	NA	2.60
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	3.70	NA	NA	3.20
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	2.50	NA	NA	1.30
Hardness (mg/L)	NA	63.00	69.00	NA	65.40	72.00
DO (mg/L)	NA	NA	8.00	NA	NA	2.67
pH	NA	NA	8.79	NA	NA	7.34
Water Temp (°C)	NA	NA	30.60	NA	NA	8.66
Alkalinity (mg/L)	56.00	NA	62.00	52.00	NA	57.50
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.04
Chloride (mg/L)	3.30	2.61	3.51	NA	2.67	3.92
Fluoride (mg/L)	NA	NA	0.03	NA	NA	0.03
Sulfate (mg/L)	6.90	6.20	6.99	NA	6.20	8.03
NH3-N (mg/L)	NA	0.03	0.06	NA	0.03	0.07
NO3-N (mg/L)	0.02	0.11	0.78	0.45	0.23	0.12
O-PHOS (mg/L)	0.01	0.02	0.01	0.01	0.02	0.01
T-PHOS (mg/L)	0.02	0.05	*0.01	0.02	0.05	NA
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	NA	2.27	NA	NA	2.62
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	0.00	1.00	0.90	1.10	1.00	1.80
TSS (mg/L)	NA	<1.00	1.00	NA	<1.00	6.00
TDS (mg/L)	NA	83.00	87.00	NA	86.00	93.00
Conductivity (micro-mhos/cm)	141.00	NA	NA	141.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	1 1/4	NA	NA			
	c	NA	8			
	r 1/4	NA	NA			
	rs	NA	NA			
Gm Mean	NA	NA	<3			

*Data collected by USACE

TABLE A-11C. Water Quality Data from Beaver Lake - Middle.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	2.00	<0.10	NA			
Secchi (in)	131.00	111.00	NA			
Trophic Index	0.17	0.46	NA			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	NA	NA	NA	NA	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	NA	NA	NA	NA	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	NA	NA	NA	NA	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	NA	NA	NA	NA	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	NA	NA	NA	NA	NA
Hardness (mg/L)	NA	60.60	NA	NA	61.80	NA
DO (mg/L)	NA	NA	NA	NA	NA	NA
pH	NA	NA	NA	NA	NA	NA
Water Temp (°C)	NA	NA	NA	NA	NA	NA
Alkalinity (mg/L)	50.00	NA	NA	40.00	NA	NA
Bromide (mg/L)	NA	NA	NA	NA	NA	NA
Chloride (mg/L)	NA	2.84	NA	NA	2.80	NA
Fluoride (mg/L)	NA	NA	NA	NA	NA	NA
Sulfate (mg/L)	NA	6.20	NA	NA	6.20	NA
NH3-N (mg/L)	NA	0.03	NA	NA	0.11	NA
NO3-N (mg/L)	0.02	0.13	NA	0.68	0.50	NA
O-PHOS (mg/L)	0.01	0.02	NA	0.01	0.02	NA
T-PHOS (mg/L)	0.02	0.05	NA	0.03	0.07	NA
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	NA	NA	NA	NA	NA
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	1.00	2.00	NA	14.00	3.40	NA
TSS (mg/L)	NA	<1.00	NA	NA	2.50	NA
TDS (mg/L)	NA	81.00	NA	NA	85.00	NA
Conductivity (micro-mhos/cm)	131.00	NA	NA	123.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	1 1/4	NA	NA			
	c	NA	<4			
	r 1/4	NA	NA			
	rs	NA	NA			
Gm Mean	NA	NA	NA			

Station not collected in 1999

TABLE A-11B. Water Quality Data from Beaver Lake - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	2.70	0.80	*0.040			
Secchi (in)	103.00	107.00	*33.50			
Trophic Index	0.80	0.46	1.49			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	3.94
Barium (ug/L)	NA	NA	24.40	NA	NA	44.20
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	21.00	NA	NA	23.20
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	23.00	NA	NA	32.50
Chromium (ug/L)	NA	NA	<0.40	NA	NA	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	0.98
Copper (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Iron (ug/L)	NA	NA	<15.00	NA	NA	330.00
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	2.20	NA	NA	2.60
Manganese (ug/L)	NA	NA	1.00	NA	NA	2364.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	3.50	NA	NA	3.70
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	3.60	NA	NA	4.50
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	3.40	NA	NA	7.70
Hardness (mg/L)	NA	59.40	66.00	NA	63.00	92.00
DO (mg/L)	NA	NA	7.12	NA	NA	0.24
pH	NA	NA	8.74	NA	NA	7.09
Water Temp (°C)	NA	NA	30.60	NA	NA	26.70
Alkalinity (mg/L)	46.00	NA	57.00	54.00	NA	84.00
Bromide (mg/L)	NA	NA	0.05	NA	NA	0.04
Chloride (mg/L)	NA	2.78	3.65	NA	2.68	3.88
Fluoride (mg/L)	NA	NA	0.05	NA	NA	0.05
Sulfate (mg/L)	NA	6.20	7.39	NA	5.10	7.34
NH3-N (mg/L)	NA	0.03	0.06	NA	0.07	0.68
NO3-N (mg/L)	0.02	0.10	0.03	0.28	0.22	0.18
O-PHOS (mg/L)	0.01	0.02	0.01	0.03	0.02	0.03
T-PHOS (mg/L)	0.08	0.05	*0.05	0.07	0.05	NA
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	NA	3.10	NA	NA	3.30
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	1.00	3.00	3.10	30.00	3.50	30.00
TSS (mg/L)	NA	<1.00	4.00	NA	1.50	26.00
TDS (mg/L)	NA	80.00	85.00	NA	85.00	121.00
Conductivity (micro-mhos/cm)	134.00	NA	NA	147.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	l 1/4	NA	NA			
	c	NA	<4			
	r 1/4	NA	NA			
	rs	NA	NA			
	Gm Mean	NA	NA			

*Data collected by USACE

TABLE A-12A. Water Quality Data from Greers Ferry Lake - Lower (FY1).

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	0.30	1.07	10.40			
Secchi (in)	158.00	245.00	182.50			
Trophic Index	0.13	0.25	0.11			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	9.40	NA	NA	8.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	7.00	NA	NA	6.10
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	4.60	NA	NA	5.30
Chromium (ug/L)	NA	NA	<0.40	NA	NA	0.49
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	NA	<0.50	NA	NA	0.70
Iron (ug/L)	NA	NA	<15.00	NA	NA	18.90
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	1.10	NA	NA	1.10
Manganese (ug/L)	NA	NA	0.80	NA	NA	13.80
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.90	NA	NA	1.70
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.50	NA	NA	1.40
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Hardness (mg/L)	2.50	<5.00	16.00	9.90	9.90	18.00
DO (mg/L)	NA	NA	7.40	NA	NA	4.68
pH	NA	NA	7.60	NA	NA	6.42
Water Temp (°C)	NA	NA	28.70	NA	NA	8.70
Alkalinity (mg/L)	11.00	16.00	15.00	11.00	16.00	15.50
Bromide (mg/L)	NA	NA	<0.01	NA	NA	<0.01
Chloride (mg/L)	1.70	2.00	1.85	NA	2.10	1.83
Fluoride (mg/L)	NA	NA	0.08	NA	NA	0.08
Sulfate (mg/L)	4.00	4.10	3.80	NA	4.10	4.01
NH3-N (mg/L)	NA	0.09	0.01	NA	0.12	0.01
NO3-N (mg/L)	0.02	0.02	0.02	0.17	0.04	0.26
O-PHOS (mg/L)	0.01	0.02	<0.01	0.01	0.02	<0.01
T-PHOS (mg/L)	0.02	0.06	<0.02	0.04	0.02	0.03
TKN (mg/L)	NA	NA	0.18	NA	NA	0.19
TOC (mg/L)	NA	4.00	2.30	NA	3.60	3.70
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	0.00	1.00	0.80	3.00	0.90	2.00
TSS (mg/L)	NA	0.50	<1.00	NA	0.50	<1.00
TDS (mg/L)	NA	27.00	26.00	NA	27.00	30.00
Conductivity (micro-mhos/cm)	38.00	41.00	NA	41.00	42.00	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	1 1/4	NA	NA			
	c	NA	NA			
	r 1/4	NA	NA			
	rs	NA	NA			
	Gm Mean	NA	NA			

TABLE A-12C. Water Quality Data from Greers Ferry Lake - Middle (FY2).

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	NA	0.53	NA			
Secchi (in)	NA	185.00	NA			
Trophic Index	NA	0.08	NA			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	NA	NA	NA	NA	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	NA	NA	NA	NA	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	NA	NA	NA	NA	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	NA	NA	NA	NA	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	NA	NA	NA	NA	NA
Hardness (mg/L)	NA	12.00	NA	NA	15.90	NA
DO (mg/L)	NA	NA	NA	NA	NA	NA
pH	NA	NA	NA	NA	NA	NA
Water Temp (°C)	NA	NA	NA	NA	NA	NA
Alkalinity (mg/L)	NA	18.00	NA	NA	18.00	NA
Bromide (mg/L)	NA	NA	NA	NA	NA	NA
Chloride (mg/L)	NA	2.04	NA	NA	1.90	NA
Fluoride (mg/L)	NA	NA	NA	NA	NA	NA
Sulfate (mg/L)	NA	3.20	NA	NA	4.10	NA
NH3-N (mg/L)	NA	0.09	NA	NA	0.09	NA
NO3-N (mg/L)	NA	0.03	NA	NA	0.18	NA
O-PHOS (mg/L)	NA	0.02	NA	NA	0.02	NA
T-PHOS (mg/L)	NA	0.02	NA	NA	0.04	NA
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	4.20	NA	NA	3.40	NA
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	NA	1.00	NA	NA	2.00	NA
TSS (mg/L)	NA	0.50	NA	NA	0.50	NA
TDS (mg/L)	NA	31.00	NA	NA	38.00	NA
Conductivity (micro-mhos/cm)	NA	46.00	NA	NA	52.00	NA
Fecal Coliform (col/100 ml)	NA	NA	NA			
Is	NA	NA	NA			
1 1/4	NA	NA	NA			
c	NA	NA	NA			
r 1/4	NA	NA	NA			
rs	NA	NA	NA			
Gm Mean	NA	NA	NA			

Station not collected in 1989 and 1999

TABLE A-12B. Water Quality Data from Greers Ferry Lake - Upper (FY3).

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	0.20	<0.10	<1.00			
Secchi (in)	186.00	157.00	139.50			
Trophic Index	0.11	0.10	0.20			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	10.80	NA	NA	20.50
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	7.90	NA	NA	6.00
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	5.00	NA	NA	5.50
Chromium (ug/L)	NA	NA	0.61	NA	NA	0.49
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	NA	0.65	NA	NA	<0.50
Iron (ug/L)	NA	NA	<15.00	NA	NA	87.70
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	1.10	NA	NA	1.00
Manganese (ug/L)	NA	NA	0.80	NA	NA	1032.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.30	NA	NA	1.00
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.50	NA	NA	1.30
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	19.20	NA	NA	5.50
Hardness (mg/L)	NA	12.00	17.00	NA	9.90	18.00
DO (mg/L)	NA	NA	7.40	NA	NA	0.69
pH	NA	NA	7.65	NA	NA	6.26
Water Temp (°C)	NA	NA	28.70	NA	NA	9.50
Alkalinity (mg/L)	13.00	15.00	16.00	11.00	12.00	17.50
Bromide (mg/L)	NA	NA	<0.01	NA	NA	0.04
Chloride (mg/L)	NA	1.95	1.86	NA	1.72	1.90
Fluoride (mg/L)	NA	NA	0.07	NA	NA	0.07
Sulfate (mg/L)	NA	3.20	3.71	NA	3.20	3.96
NH3-N (mg/L)	NA	0.08	0.01	NA	0.08	0.02
NO3-N (mg/L)	0.02	0.02	0.03	0.18	0.16	0.38
O-PHOS (mg/L)	0.01	0.02	<0.01	0.01	0.02	0.01
T-PHOS (mg/L)	0.02	0.02	0.03	0.02	0.04	0.04
TKN (mg/L)	NA	NA	0.21	NA	NA	0.18
TOC (mg/L)	NA	3.60	3.30	NA	3.00	2.00
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	0.00	1.00	0.10	5.50	1.90	6.80
TSS (mg/L)	NA	0.50	<1.00	NA	0.50	1.00
TDS (mg/L)	NA	30.00	28.00	NA	31.00	37.00
Conductivity (micro-mhos/cm)	43.00	43.00	NA	37.00	37.00	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	1 1/4	NA	NA			
	c	NA	NA			
	r 1/4	NA	NA			
	rs	NA	NA			
	Gm Mean	NA	NA			

TABLE A-13A. Water Quality Data from Lake Ouachita - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	2	1.07	<1.00			
Secchi (in)	150.00	176.00	161.00			
Trophic Index	0.08	0.23	0.07			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	<8.80	NA	NA	<8.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	<4.50	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	6.40	NA	NA	6.20
Chromium (ug/L)	NA	<1.00	0.43	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	0.78
Iron (ug/L)	NA	NA	<15.00	NA	NA	<15.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.60	NA	NA	1.70
Manganese (ug/L)	NA	NA	0.50	NA	NA	1.80
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.60	NA	NA	2.10
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.20	NA	NA	2.30
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	16.00	7.50	NA	<8.00	6.20
Hardness (mg/L)	NA	18.60	23.00	NA	20.10	22.00
DO (mg/L)	NA	NA	6.81	NA	NA	4.02
pH	NA	NA	7.61	NA	NA	6.56
Water Temp (°C)	NA	NA	30.80	NA	NA	8.40
Alkalinity (mg/L)	NA	21.00	20.00	NA	20.00	19.50
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.04
Chloride (mg/L)	NA	1.84	2.09	NA	1.77	2.20
Fluoride (mg/L)	NA	NA	0.08	NA	NA	0.07
Sulfate (mg/L)	4.00	3.80	4.05	4.00	3.80	4.14
NH3-N (mg/L)	0.01	0.03	<0.01	0.01	0.03	0.01
NO3-N (mg/L)	0.01	0.01	0.02	0.18	0.16	0.21
O-PHOS (mg/L)	0.01	0.02	<0.01	0.01	0.02	<0.01
T-PHOS (mg/L)	0.01	0.04	<0.02	0.01	0.04	<0.02
TKN (mg/L)	NA	NA	0.28	NA	NA	0.57
TOC (mg/L)	5.60	5.20	3.40	4.70	5.00	3.70
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	1.00	0.70	1.10	0.60	0.80	1.80
TSS (mg/L)	NA	<1.00	<1.00	NA	<1.00	<1.00
TDS (mg/L)	NA	35.00	25.00	NA	38.00	33.30
Conductivity (micro-mhos/cm)	55.00	52.80	NA	56.00	54.90	NA
Fecal Coliform (col/100 ml)	Is	NA	0			4
	l 1/4	NA	0			3
	c	NA	1			<2
	r 1/4	NA	1			3
	rs	NA	0			<2
	Gm Mean	NA	1			2.7

TABLE A-13B. Water Quality Data from Lake Ouachita - Middle.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	1.1	<0.10	NA			
Secchi (in)	212.00	261.00	NA			
Trophic Index	0.15	0.15	NA			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	<0.50	NA	NA	<0.50	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	<1.00	NA	NA	<1.00	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	<4.00	NA	NA	<4.00	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	<2.00	NA	NA	3.00	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	<8.00	NA	NA	<8.00	NA
Hardness (mg/L)	NA	17.10	NA	NA	17.10	NA
DO (mg/L)	NA	NA	NA	NA	NA	NA
pH	NA	NA	NA	NA	NA	NA
Water Temp (°C)	NA	NA	NA	NA	NA	NA
Alkalinity (mg/L)	19.50	22.00	NA	18.10	18.00	NA
Bromide (mg/L)	NA	NA	NA	NA	NA	NA
Chloride (mg/L)	2.30	1.88	NA	2.50	1.94	NA
Fluoride (mg/L)	NA	NA	NA	NA	NA	NA
Sulfate (mg/L)	1.00	3.80	NA	2.00	3.80	NA
NH3-N (mg/L)	0.05	0.03	NA	0.05	0.03	NA
NO3-N (mg/L)	0.02	0.01	NA	0.19	0.21	NA
O-PHOS (mg/L)	0.03	0.02	NA	0.03	0.02	NA
T-PHOS (mg/L)	0.03	0.04	NA	0.03	0.04	NA
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	4.80	NA	NA	5.40	NA
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	1.00	0.50	NA	2.00	0.70	NA
TSS (mg/L)	NA	<1.00	NA	NA	<1.00	NA
TDS (mg/L)	32.00	33.00	NA	37.00	27.00	NA
Conductivity (micro-mhos/cm)	50.10	52.80	NA	50.60	50.80	NA
Fecal Coliform (col/100 ml)	Is	2	NA			
	1 1/4	0	NA			
	c	0	NA			
	r 1/4	0	NA			
	rs	0	NA			
Gm Mean	NA	2	NA			

Station not collected in 1999

TABLE A-13C. Water Quality Data from Lake Ouachita - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	1.9	0.27	2.00			
Secchi (in)	148.00	183.00	148.00			
Trophic Index	0.22	0.26	0.08			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	<8.80	NA	NA	9.60
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	<4.50	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	6.10	NA	NA	6.10
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	0.77
Iron (ug/L)	NA	NA	<15.00	NA	NA	<15.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.60	NA	NA	1.60
Manganese (ug/L)	NA	NA	0.70	NA	NA	60.90
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.80	NA	NA	1.90
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.20	NA	NA	2.20
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	1.80	NA	<8.00	4.30
Hardness (mg/L)	NA	14.10	22.00	NA	17.10	22.00
DO (mg/L)	NA	NA	1.39	NA	NA	7.17
pH	NA	NA	6.24	NA	NA	7.80
Water Temp (°C)	NA	NA	15.32	NA	NA	29.00
Alkalinity (mg/L)	19.50	21.00	20.50	16.10	20.00	19.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.04
Chloride (mg/L)	2.20	2.19	2.03	2.30	2.13	2.09
Fluoride (mg/L)	NA	NA	0.08	NA	NA	0.07
Sulfate (mg/L)	1.00	3.80	4.14	2.00	4.80	4.22
NH3-N (mg/L)	0.05	0.03	<0.01	0.05	0.03	<0.01
NO3-N (mg/L)	0.02	0.01	0.03	0.27	0.30	0.17
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.02	<0.01
T-PHOS (mg/L)	0.03	0.05	<0.02	0.03	0.05	<0.02
TKN (mg/L)	NA	NA	0.23	NA	NA	0.30
TOC (mg/L)	NA	5.00	3.50	NA	5.60	3.50
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	1.0	0.8	0.86	5.50	5.20	0.74
TSS (mg/L)	NA	<1.00	<1.00	NA	<1.00	<1.00
TDS (mg/L)	32.0	35.0	29.70	36.0	38.0	31.00
Conductivity (micro-mhos/cm)	50.4	52.6	NA	47.3	49.9	NA
Fecal Coliform (col/100 ml)	Is	NA	0	<2		
	l 1/4	NA	0	<2		
	c	NA	0	<2		
	r 1/4	NA	0	<2		
	rs	NA	0	<2		
	Gm Mean	NA	0	<2		

TABLE A-14A. Water Quality Data from Bull Shoals Lake - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	0.30	1.18	*0.057			
Secchi (in)	257.00	146.00	*275.50			
Trophic Index	0.08	0.11	1.02			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	26.00	NA	NA	30.00
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	9.70	NA	NA	10.70
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	29.90	NA	NA	38.90
Chromium (ug/L)	NA	NA	0.61	NA	NA	0.54
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Iron (ug/L)	NA	NA	<15.00	NA	NA	<15.00
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	12.10	NA	NA	10.90
Manganese (ug/L)	NA	NA	<0.50	NA	NA	18.20
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.30	NA	NA	2.60
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	3.70	NA	NA	4.20
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	1.70	NA	NA	4.00
Hardness (mg/L)	NA	130.00	125.00	NA	155.00	142.00
DO (mg/L)	NA	NA	7.90	NA	NA	0.30
pH	NA	NA	8.50	NA	NA	7.66
Water Temp (°C)	NA	NA	29.60	NA	NA	9.60
Alkalinity (mg/L)	122.00	NA	125.00	122.00	NA	134.00
Bromide (mg/L)	NA	NA	0.22	NA	NA	0.21
Chloride (mg/L)	4.40	5.18	5.18	NA	4.61	5.67
Fluoride (mg/L)	NA	NA	0.04	NA	NA	0.05
Sulfate (mg/L)	7.10	7.50	6.55	NA	7.50	6.62
NH3-N (mg/L)	NA	0.10	0.05	NA	0.07	0.05
NO3-N (mg/L)	0.02	0.01	0.02	0.32	0.56	0.48
O-PHOS (mg/L)	0.01	0.04	0.01	0.01	0.02	0.01
T-PHOS (mg/L)	0.02	0.02	*0.28	0.02	0.02	NA
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	4.40	2.30	NA	2.80	2.23
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	1.00	1.00	0.45	0.20	0.80	1.1
TSS (mg/L)	NA	1.00	<1.00	NA	<1.00	1
TDS (mg/L)	NA	142.00	145	NA	153.00	169
Conductivity (micro-mhos/cm)	245.00	NA	NA	259.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	l 1/4	NA	NA			
	c	NA	<4			
	r 1/4	NA	NA			
	rs	NA	NA			
Gm Mean	NA	NA	<2			

*Data collected by USACE

TABLE A-14C. Water Quality Data from Bull Shoals Lake - Middle.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	0.6	1.34	NA			
Secchi (in)	246.00	146.00	NA			
Trophic Index	0.08	0.11	NA			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	NA	NA	NA	NA	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	NA	NA	NA	NA	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	NA	NA	NA	NA	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	NA	NA	NA	NA	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	NA	NA	NA	NA	NA
Hardness (mg/L)	NA	NA	NA	NA	NA	NA
DO (mg/L)	NA	NA	NA	NA	NA	NA
pH	NA	NA	NA	NA	NA	NA
Water Temp (°C)	NA	NA	NA	NA	NA	NA
Alkalinity (mg/L)	136.00	NA	NA	136.00	NA	NA
Bromide (mg/L)	NA	NA	NA	NA	NA	NA
Chloride (mg/L)	NA	4.44	NA	NA	3.81	NA
Fluoride (mg/L)	NA	NA	NA	NA	NA	NA
Sulfate (mg/L)	NA	6.60	NA	NA	5.60	NA
NH3-N (mg/L)	NA	0.03	NA	NA	0.03	NA
NO3-N (mg/L)	0.02	0.01	NA	0.32	0.23	NA
O-PHOS (mg/L)	0.01	0.02	NA	0.01	0.02	NA
T-PHOS (mg/L)	0.02	0.02	NA	0.02	0.02	NA
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	3.30	NA	NA	2.80	NA
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	0.00	1.00	NA	1.80	2.20	NA
TSS (mg/L)	NA	1.00	NA	NA	<1.00	NA
TDS (mg/L)	NA	141.00	NA	NA	178.00	NA
Conductivity (micro-mhos/cm)	277.00	NA	NA	295.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	I 1/4	NA	NA			
	c	NA	<4			
	r 1/4	NA	NA			
	rs	NA	NA			
Gm Mean	NA	NA	NA			

Station not collected in 1999

TABLE A-14B. Water Quality Data from Bull Shoals Lake - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	0.6	1.34	*0.046			
Secchi (in)	186.00	152.00	*43.00			
Trophic Index	0.11	0.11	0.23			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.19	NA	NA	<1.00
Barium (ug/L)	NA	NA	25.40	NA	NA	32.30
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	11.00	NA	NA	12.20
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	25.80	NA	NA	36.80
Chromium (ug/L)	NA	NA	0.61	NA	NA	0.59
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Iron (ug/L)	NA	NA	<15.00	NA	NA	<15.00
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	11.40	NA	NA	7.50
Manganese (ug/L)	NA	NA	<0.50	NA	NA	1.30
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.70	NA	NA	1.90
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	4.00	NA	NA	4.00
Vanadium (ug/L)	NA	NA	1.02	NA	NA	<1.00
Zinc (ug/L)	NA	NA	15.00	NA	NA	2.80
Hardness (mg/L)	NA	131.00	111.00	NA	147.00	123.00
DO (mg/L)	NA	NA	8.62	NA	NA	0.53
pH	NA	NA	8.65	NA	NA	7.60
Water Temp (°C)	NA	NA	29.36	NA	NA	15.54
Alkalinity (mg/L)	126.00	NA	103.00	116.00	NA	118.00
Bromide (mg/L)	NA	NA	0.21	NA	NA	0.17
Chloride (mg/L)	NA	4.97	5.54	NA	5.10	5.74
Fluoride (mg/L)	NA	NA	0.04	NA	NA	0.04
Sulfate (mg/L)	NA	7.50	6.38	NA	7.50	6.72
NH3-N (mg/L)	NA	0.08	0.05	NA	0.12	0.05
NO3-N (mg/L)	0.02	0.01	0.03	0.37	0.56	0.56
O-PHOS (mg/L)	0.01	0.04	0.01	0.02	0.02	0.02
T-PHOS (mg/L)	0.02	0.02	*0.01	0.06	0.02	NA
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	3.80	2.48	NA	3.10	2.13
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	0.00	1.00	1.10	22.00	3.40	2.40
TSS (mg/L)	NA	1.00	2.50	NA	3.50	3.50
TDS (mg/L)	NA	133.00	127.00	NA	144.00	155.00
Conductivity (micro-mhos/cm)	263.00	NA	NA	263.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	1 1/4	NA	NA			
	c	NA	<4			
	r 1/4	NA	NA			
	rs	NA	NA			
Gm Mean	NA	NA	2.3			

* Data collected by USACE

TABLE A-15. Water Quality Data from Lake Crystal.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	3.5	6.07	15.20			
Secchi (in)	136.00	74.00	50.00			
Trophic Index	0.25	0.68	1.40			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	2.02
Barium (ug/L)	NA	NA	26.90	NA	NA	66.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	10.30	NA	NA	5.20
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	18.70	NA	NA	41.40
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	0.93
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	<15.00	NA	NA	1080.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.50	NA	NA	1.60
Manganese (ug/L)	NA	NA	1.90	NA	NA	1969.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.30	NA	NA	2.80
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	3.50	NA	NA	3.30
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	10.60	NA	<8.00	6.00
Hardness (mg/L)	NA	71.10	53.00	NA	111.00	110.00
DO (mg/L)	NA	NA	10.00	NA	NA	0.82
pH	NA	NA	9.26	NA	NA	7.19
Water Temp (°C)	NA	NA	27.00	NA	NA	13.60
Alkalinity (mg/L)	91.00	69.00	56.00	114.00	96.00	125.00
Bromide (mg/L)	NA	NA	0.05	NA	NA	0.05
Chloride (mg/L)	3.40	4.24	3.38	3.30	3.59	3.54
Fluoride (mg/L)	NA	NA	0.07	NA	NA	0.10
Sulfate (mg/L)	2.00	3.40	3.80	2.00	4.40	1.27
NH3-N (mg/L)	0.05	0.03	<0.01	0.05	1.50	1.99
NO3-N (mg/L)	0.02	0.01	0.23	0.02	0.01	0.13
O-PHOS (mg/L)	0.03	0.02	0.01	0.03	0.04	0.01
T-PHOS (mg/L)	0.03	0.05	0.06	0.18	0.22	0.05
TKN (mg/L)	NA	NA	0.98	NA	NA	3.01
TOC (mg/L)	5.60	5.80	3.97	9.80	10.20	3.92
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	1.00	2.00	4.80	12.00	10.00	6.10
TSS (mg/L)	NA	2.00	4.50	NA	8.50	3.00
TDS (mg/L)	117.00	91.00	87.00	144.00	139.00	151.00
Conductivity (micro-mhos/cm)	194.00	150.00	NA	237.00	223.00	NA
Fecal Coliform (col/100 ml)						
Is	NA	10	7			
l 1/4	NA	18	11			
c	NA	3	7			
r 1/4	NA	3	13			
rs	NA	5	7			
Gm Mean	NA	6	8.7			

TABLE A-16. Water Quality Data from Lake Shores.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	2.7	2.4	5.40			
Secchi (in)	79.00	77.00	42.00			
Trophic Index	0.41	0.23	0.94			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.13	NA	NA	1.84
Barium (ug/L)	NA	NA	<8.80	NA	NA	21.10
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	10.10	NA	NA	8.90
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	3.50	NA	NA	3.50
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	0.48
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	1.43
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	0.89
Iron (ug/L)	NA	NA	54.90	NA	NA	1468.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.50	NA	NA	1.40
Manganese (ug/L)	NA	NA	3.10	NA	NA	1149.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	0.80	NA	NA	0.70
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.50	NA	NA	1.30
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	<1.00	NA	<8.00	7.40
Hardness (mg/L)	NA	9.30	15.00	NA	19.80	15.00
DO (mg/L)	NA	NA	5.57	NA	NA	0.20
pH	NA	NA	6.71	NA	NA	6.57
Water Temp (°C)	NA	NA	29.26	NA	NA	18.47
Alkalinity (mg/L)	19.10	NA	15.00	27.40	NA	17.50
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.04
Chloride (mg/L)	1.50	1.58	1.85	1.50	1.70	1.49
Fluoride (mg/L)	NA	NA	0.13	NA	NA	0.07
Sulfate (mg/L)	1.00	2.70	3.35	1.00	5.00	2.90
NH3-N (mg/L)	0.05	0.05	0.02	0.18	0.76	0.04
NO3-N (mg/L)	0.02	NA	0.04	0.02	NA	0.03
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.02	<0.01
T-PHOS (mg/L)	0.03	0.02	0.03	0.03	0.02	0.04
TKN (mg/L)	NA	NA	0.38	NA	NA	0.59
TOC (mg/L)	1.50	3.10	3.18	2.40	4.00	3.15
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	2.00	3.30	17.00	14.00	10.00
TSS (mg/L)	NA	0.05	2.50	NA	6.50	7.00
TDS (mg/L)	31.00	29.00	33.00	38.00	59.00	36.00
Conductivity (micro-mhos/cm)	44.80	35.00	NA	59.60	58.00	NA
Fecal Coliform (col/100 ml)	Is	2	<2			
	1 1/4	0	<2			
	c	0	4			
	r 1/4	0	<2			
	rs	0	<2			
Gm Mean	NA	2	2.3			

TABLE A-17. Water Quality Data from Spring Lake.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	0.3	2.14	<1.00			
Secchi (in)	79.00	72.00	97.00			
Trophic Index	0.38	0.24	0.11			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	20.40	NA	NA	38.60
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	5.00	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	1.30	NA	NA	2.50
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	5.44
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	100.10	NA	NA	3849.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.00	NA	NA	1.30
Manganese (ug/L)	NA	NA	4.90	NA	NA	1829.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	<0.46	NA	NA	<0.46
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.70	NA	NA	1.30
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	15.80	NA	<8.00	3.70
Hardness (mg/L)	NA	6.90	7.00	NA	14.10	11.00
DO (mg/L)	NA	NA	6.46	NA	NA	0.24
pH	NA	NA	6.58	NA	NA	6.73
Water Temp (°C)	NA	NA	29.13	NA	NA	11.47
Alkalinity (mg/L)	9.80	NA	90.00	27.90	NA	16.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.04
Chloride (mg/L)	2.30	2.26	1.76	2.00	1.90	1.60
Fluoride (mg/L)	NA	NA	0.09	NA	NA	0.09
Sulfate (mg/L)	4.00	3.90	3.07	10.00	9.90	3.04
NH3-N (mg/L)	0.11	0.06	<0.01	0.28	0.03	0.08
NO3-N (mg/L)	0.02	0.01	0.02	0.06	0.01	0.03
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.02	<0.01
T-PHOS (mg/L)	0.03	0.02	<0.02	0.03	0.02	0.03
TKN (mg/L)	NA	NA	0.21	NA	NA	0.42
TOC (mg/L)	1.30	3.40	2.17	2.40	6.30	2.43
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	3.00	3.00	1.60	5.40	13.00	6.10
TSS (mg/L)	NA	2.50	<1.00	NA	4.00	4.50
TDS (mg/L)	33.00	24.00	26.50	54.00	52.00	39.50
Conductivity (micro-mhos/cm)	29.60	28.00	NA	38.50	46.00	NA
Fecal Coliform (col/100 ml)	Is	NA	0			14
	1 1/4	NA	0			6
	c	NA	2			6
	r 1/4	NA	0			<3
	rs	NA	0			3
Gm Mean	NA	2	5.4			

TABLE A-18. Water Quality Data from Horsehead Lake.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	1.3	2.80	2.40			
Secchi (in)	65.00	89.00	73.00			
Trophic Index	0.48	0.20	0.17			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	1.71
Barium (ug/L)	NA	NA	<8.80	NA	NA	29.60
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	7.10	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	2.10	NA	NA	2.40
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	3.26
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	33.40	NA	NA	3112.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.30	NA	NA	1.30
Manganese (ug/L)	NA	NA	0.50	NA	NA	2335.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	0.90	NA	NA	<0.46
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.50	NA	NA	1.50
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	<1.00	NA	8.00	12.80
Hardness (mg/L)	NA	2.50	11.00	NA	11.70	11.00
DO (mg/L)	NA	NA	6.50	NA	NA	0.24
pH	NA	NA	7.12	NA	NA	7.09
Water Temp (°C)	NA	NA	28.26	NA	NA	8.18
Alkalinity (mg/L)	10.80	NA	16.00	15.20	NA	17.50
Bromide (mg/L)	NA	NA	<0.01	NA	NA	0.04
Chloride (mg/L)	1.50	1.86	1.58	1.50	1.89	1.71
Fluoride (mg/L)	NA	NA	0.09	NA	NA	0.09
Sulfate (mg/L)	2.00	3.90	2.90	2.00	6.00	3.03
NH3-N (mg/L)	0.05	0.05	<0.01	0.19	0.21	0.35
NO3-N (mg/L)	0.02	0.01	0.02	0.02	0.01	0.03
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.02	<0.01
T-PHOS (mg/L)	0.03	0.02	<0.02	0.03	0.02	0.03
TKN (mg/L)	NA	NA	0.34	NA	NA	0.66
TOC (mg/L)	1.50	3.20	2.64	1.30	3.10	2.13
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	2.00	1.80	14.00	6.80	4.80
TSS (mg/L)	NA	1.50	1.50	NA	2.50	3.50
TDS (mg/L)	24.00	24.00	31.50	29.00	34.00	40.00
Conductivity (micro-mhos/cm)	29.10	31.00	NA	39.40	41.00	NA
Fecal Coliform (col/100 ml)	Is	5	<3			
	1 1/4	2	<3			
	c	2	6			
	r 1/4	0	3			
	rs	2	<3			
Gm Mean	NA	2.5	3.4			

TABLE A-19. Water Quality Data from Lake Weddington.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	0.00	2.67	4.20			
Secchi (in)	137.00	102.00	135.50			
Trophic Index	0.22	0.16	0.29			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	1.45
Barium (ug/L)	NA	NA	21.90	NA	NA	61.40
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	8.40	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	21.30	NA	NA	26.60
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	0.51
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	22.90	NA	NA	4120.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	0.70	NA	NA	0.90
Manganese (ug/L)	NA	NA	3.90	NA	NA	2483.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.10	NA	NA	1.00
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.90	NA	NA	1.70
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	1.10	NA	<8.00	1.20
Hardness (mg/L)	NA	57.60	56.00	NA	71.10	70.00
DO (mg/L)	NA	NA	7.88	NA	NA	0.13
pH	NA	NA	8.40	NA	NA	6.81
Water Temp (°C)	NA	NA	28.50	NA	NA	11.10
Alkalinity (mg/L)	57.80	60.00	59.00	74.40	80.00	82.50
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.04
Chloride (mg/L)	2.30	3.25	2.08	2.70	2.79	2.59
Fluoride (mg/L)	NA	NA	0.06	NA	NA	0.09
Sulfate (mg/L)	2.00	4.40	4.00	2.00	3.40	0.99
NH3-N (mg/L)	0.06	0.03	0.01	0.16	0.34	0.90
NO3-N (mg/L)	0.02	0.01	0.03	0.02	0.01	0.04
O-PHOS (mg/L)	0.03	0.02	0.01	0.03	0.02	0.01
T-PHOS (mg/L)	0.03	0.02	0.04	0.06	0.30	0.07
TKN (mg/L)	NA	NA	0.45	NA	NA	1.78
TOC (mg/L)	3.80	4.40	4.50	5.30	3.50	5.15
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	1.00	1.00	1.20	10.00	8.10	8.40
TSS (mg/L)	NA	0.05	<1.00	NA	3.00	3.00
TDS (mg/L)	77.00	74.00	84.00	97.00	131.00	106.00
Conductivity (micro-mhos/cm)	129.00	121.00	NA	156.00	160.00	NA
Fecal Coliform (col/100 ml)						
Is	NA	0	<3			
l 1/4	NA	0	<3			
c	NA	0	6			
r 1/4	NA	3	<3			
rs	NA	0	<3			
Gm Mean	NA	3	3.4			

TABLE A-20. Water Quality Data from Cove Lake.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	1.6	2.94	1.50			
Secchi (in)	115.00	68.00	83.00			
Trophic Index	0.27	0.26	0.26			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	3.46
Barium (ug/L)	NA	NA	10.40	NA	NA	42.00
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	5.30	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	1.30	NA	NA	2.30
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	1.98
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	37.80	NA	NA	8345.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.10	NA	NA	1.50
Manganese (ug/L)	NA	NA	1.40	NA	NA	1502.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	0.50	NA	NA	<0.46
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.70	NA	NA	1.70
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	1.70	NA	<8.00	<1.00
Hardness (mg/L)	NA	6.90	8.00	NA	9.30	12.00
DO (mg/L)	NA	NA	7.08	NA	NA	1.54
pH	NA	NA	6.95	NA	NA	6.95
Water Temp (°C)	NA	NA	28.63	NA	NA	13.36
Alkalinity (mg/L)	9.80	10.00	9.00	25.00	18.00	19.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.05
Chloride (mg/L)	1.50	1.79	1.84	1.70	1.77	1.91
Fluoride (mg/L)	NA	NA	0.09	NA	NA	0.09
Sulfate (mg/L)	3.00	3.90	3.14	9.00	9.00	1.34
NH3-N (mg/L)	0.05	0.06	<0.01	0.38	0.33	0.42
NO3-N (mg/L)	0.02	0.01	0.02	0.02	0.01	0.02
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.02	0.01
T-PHOS (mg/L)	0.03	0.02	0.02	0.03	0.02	0.04
TKN (mg/L)	NA	NA	0.33	NA	NA	0.91
TOC (mg/L)	1.00	3.80	2.89	3.30	5.00	3.56
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	4.00	2.50	17.00	17.00	18.00
TSS (mg/L)	NA	3.00	1.50	NA	5.00	8.50
TDS (mg/L)	26.00	25.00	29.00	51.00	48.00	55.50
Conductivity (micro-mhos/cm)	27.00	27.00	NA	39.20	40.00	NA
Fecal Coliform (col/100 ml)	Is	NA	2			<3
	1 1/4	NA	3			3
	c	NA	0			<3
	r 1/4	NA	0			3
	rs	NA	3			<3
Gm Mean	NA	2.6	3			

TABLE A-21. Water Quality Data from Lake Elmdale.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	11.00	1.46	17.90			
Secchi (in)	30.00	66.00	38.00			
Trophic Index	2.03	0.70	1.81			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.28	NA	NA	3.40
Barium (ug/L)	NA	NA	46.30	NA	NA	105.70
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	11.30	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	22.40	NA	NA	32.40
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	0.43
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	1.20
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	23.70	NA	NA	3540.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.30	NA	NA	1.30
Manganese (ug/L)	NA	NA	4.10	NA	NA	2487.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	3.60	NA	NA	2.90
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	3.50	NA	NA	4.00
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	16.00	2.90	NA	9.00	3.80
Hardness (mg/L)	NA	80.70	61.00	NA	88.50	86.00
DO (mg/L)	NA	NA	8.08	NA	NA	3.49
pH	NA	NA	8.76	NA	NA	7.04
Water Temp (°C)	NA	NA	27.70	NA	NA	13.30
Alkalinity (mg/L)	52.90	85.00	69.00	82.20	96.00	107.50
Bromide (mg/L)	NA	NA	0.05	NA	NA	0.06
Chloride (mg/L)	6.10	5.58	3.96	5.80	5.48	4.50
Fluoride (mg/L)	NA	NA	0.03	NA	NA	0.09
Sulfate (mg/L)	2.00	2.30	2.94	1.00	4.40	1.35
NH3-N (mg/L)	0.08	0.03	<0.01	0.48	1.03	2.74
NO3-N (mg/L)	0.02	0.01	0.03	0.02	0.01	0.04
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.17	0.02
T-PHOS (mg/L)	0.05	0.05	0.05	0.09	0.33	0.47
TKN (mg/L)	NA	NA	1.15	NA	NA	4.17
TOC (mg/L)	7.50	8.40	5.09	5.50	11.40	4.93
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	6.00	2.00	6.80	8.50	9.60	18.00
TSS (mg/L)	NA	3.50	5.00	NA	3.50	10.50
TDS (mg/L)	73.00	103.00	99.00	100.00	119.00	125.00
Conductivity (micro-mhos/cm)	125.00	178.00	NA	182.00	205.00	NA
Fecal Coliform (col/100 ml)						
ls	NA	2	13			
l 1/4	NA	0	9			
c	NA	0	9			
r 1/4	NA	0	15			
rs	NA	0	9			
Gm Mean	NA	2	10.7			

TABLE A-22. Water Quality Data from Lake Fayetteville.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	5.9	8.81	17.90			
Secchi (in)	55.00	53.00	24.50			
Trophic Index	0.65	1.8	3.30			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.47	NA	NA	6.29
Barium (ug/L)	NA	NA	41.40	NA	NA	116.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	12.80	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	20.70	NA	NA	51.30
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	0.47
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	1.37
Copper (ug/L)	NA	<4.00	0.59	NA	<4.00	0.92
Iron (ug/L)	NA	NA	<15.00	NA	NA	4290.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	1.00
Magnesium (ug/L)	NA	NA	1.70	NA	NA	2.20
Manganese (ug/L)	NA	NA	2.20	NA	NA	3484.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	4.30	NA	NA	4.10
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	4.50	NA	NA	5.50
Vanadium (ug/L)	NA	NA	1.30	NA	NA	1.77
Zinc (ug/L)	NA	<8.00	2.40	NA	<8.00	5.80
Hardness (mg/L)	NA	62.10	59.00	NA	108.00	137.00
DO (mg/L)	NA	NA	6.82	NA	NA	0.11
pH	NA	NA	8.36	NA	NA	6.95
Water Temp (°C)	NA	NA	26.90	NA	NA	15.50
Alkalinity (mg/L)	73.40	75.00	65.00	132.00	141.00	149.00
Bromide (mg/L)	NA	NA	<0.01	NA	NA	0.06
Chloride (mg/L)	4.80	6.65	5.56	5.40	6.31	6.76
Fluoride (mg/L)	NA	NA	0.10	NA	NA	0.12
Sulfate (mg/L)	4.00	3.40	4.18	4.00	4.40	0.97
NH3-N (mg/L)	0.05	0.03	<0.01	3.16	4.28	5.10
NO3-N (mg/L)	0.02	0.01	0.02	0.02	0.01	0.04
O-PHOS (mg/L)	0.03	0.02	0.01	0.05	0.10	0.02
T-PHOS (mg/L)	0.03	0.09	0.06	0.65	1.06	0.82
TKN (mg/L)	NA	NA	1.28	NA	NA	6.48
TOC (mg/L)	7.30	7.20	4.99	8.30	12.80	6.82
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	4.00	3.00	14.00	15.00	21.00	22.00
TSS (mg/L)	NA	5.00	11.50	NA	13.00	12.50
TDS (mg/L)	105.00	93.00	100.00	158.00	150.00	169.00
Conductivity (micro-mhos/cm)	172.00	147.00	NA	281.00	280.00	NA
Fecal Coliform (col/100 ml)	Is	NA	3			
	I 1/4	NA	0			
	c	NA	2			
	r 1/4	NA	0			
	rs	NA	0			
Gm Mean	NA	2.4	4			

TABLE A-23. Water Quality Data from Lake Bobb Kidd.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	11.3	6.45	15.80			
Secchi (in)	43.00	46.00	39.00			
Trophic Index	1.19	1.34	1.87			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.48	NA	NA	7.87
Barium (ug/L)	NA	NA	15.20	NA	NA	87.10
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	16.60	NA	NA	11.80
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	4.80	NA	NA	10.70
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	2.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	24.30	NA	NA	572.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	0.30
Magnesium (ug/L)	NA	NA	3.10	NA	NA	3.40
Manganese (ug/L)	NA	NA	2.40	NA	NA	5404.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	2.39
Potassium (ug/L)	NA	NA	4.60	NA	NA	4.30
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	4.30	NA	NA	4.10
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	7.70	NA	<8.00	5.20
Hardness (mg/L)	NA	56.40	25.00	NA	64.50	41.00
DO (mg/L)	NA	NA	6.79	NA	NA	0.57
pH	NA	NA	6.92	NA	NA	6.75
Water Temp (°C)	NA	NA	27.60	NA	NA	17.50
Alkalinity (mg/L)	53.80	51.00	16.00	92.00	89.00	50.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.05
Chloride (mg/L)	5.30	6.10	5.37	5.50	5.94	5.11
Fluoride (mg/L)	NA	NA	0.16	NA	NA	0.12
Sulfate (mg/L)	8.00	11.70	13.60	4.00	9.90	8.48
NH3-N (mg/L)	0.10	0.03	<0.01	1.40	2.22	0.64
NO3-N (mg/L)	0.02	0.01	0.03	0.02	0.01	0.06
O-PHOS (mg/L)	0.03	0.02	0.01	0.14	0.24	0.03
T-PHOS (mg/L)	0.04	0.06	0.06	0.55	0.45	0.09
TKN (mg/L)	NA	NA	0.82	NA	NA	1.48
TOC (mg/L)	7.00	5.90	4.88	8.40	6.80	5.47
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	3.00	4.00	5.50	9.00	19.00	2.60
TSS (mg/L)	NA	4.00	4.50	NA	7.00	2.50
TDS (mg/L)	86.00	91.00	61.00	107.00	111.00	88.00
Conductivity (micro-mhos/cm)	150.00	143.00	NA	197.00	192.00	NA
Fecal Coliform (col/100 ml)	Is	NA	0			2
	l 1/4	NA	0			<2
	c	NA	0			<2
	r 1/4	NA	0			<2
	rs	NA	3			<2
	Gm Mean	NA	3			2

TABLE A-24. Water Quality Data from Lake Wilhelmina.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	9.7	<0.10	5.00			
Secchi (in)	46.00	37.00	30.00			
Trophic Index	1.30	2.06	1.33			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	168.2
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	2.08
Barium (ug/L)	NA	NA	9.10	NA	NA	16.20
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	<4.50	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	1.50	NA	NA	1.90
Chromium (ug/L)	NA	1.00	<0.40	NA	<1.00	0.42
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	2.13
Copper (ug/L)	NA	4.00	1.37	NA	<4.00	0.67
Iron (ug/L)	NA	NA	35.70	NA	NA	6066.00
Lead (ug/L)	NA	2.30	<0.30	NA	<2.00	0.42
Magnesium (ug/L)	NA	NA	0.90	NA	NA	1.00
Manganese (ug/L)	NA	NA	2.10	NA	NA	760.80
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.90	NA	NA	1.80
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.80	NA	NA	2.10
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	9.00	5.70	NA	<8.00	6.90
Hardness (mg/L)	NA	11.10	8.00	NA	11.10	9.00
DO (mg/L)	NA	NA	5.46	NA	NA	0.46
pH	NA	NA	6.66	NA	NA	6.34
Water Temp (°C)	NA	NA	29.80	NA	NA	12.80
Alkalinity (mg/L)	9.30	9.00	7.50	30.30	20.00	15.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	0.04
Chloride (mg/L)	2.40	1.80	1.58	2.70	2.20	1.88
Fluoride (mg/L)	NA	NA	0.06	NA	NA	0.06
Sulfate (mg/L)	4.00	2.60	2.57	13.00	10.60	1.69
NH3-N (mg/L)	0.05	0.09	0.01	2.17	1.11	0.74
NO3-N (mg/L)	0.02	0.01	0.03	0.02	0.01	0.05
O-PHOS (mg/L)	0.03	0.02	<0.01	0.46	0.19	0.04
T-PHOS (mg/L)	0.05	0.08	0.04	0.55	0.32	0.12
TKN (mg/L)	NA	NA	1.02	NA	NA	1.63
TOC (mg/L)	4.70	6.40	6.10	7.30	7.70	5.60
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	4.00	5.00	6.80	8.60	18.00	11.00
TSS (mg/L)	NA	5.00	4.00	NA	22.00	3.50
TDS (mg/L)	27.00	24.00	22.30	49.00	43.00	31.70
Conductivity (micro-mhos/cm)	26.10	26.00	NA	46.80	42.00	NA
Fecal Coliform (col/100 ml)	Is	NA	>1000			233
	l 1/4	NA	>2400			300
	c	NA	>2300			1167
	r 1/4	NA	>2900			1400
	rs	NA	>4200			>2700
Gm Mean	NA	>2320.2	>1040.2			

TABLE A-25. Water Quality Data from Lake Barnett.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	5.40	0.33	2.10			
Secchi (in)	68.00	62.00	70.00			
Trophic Index	2.29	0.26	0.56			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	20.90	NA	NA	48.50
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	13.20	NA	NA	5.70
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	2.40	NA	NA	2.70
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	0.41
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	2.01
Copper (ug/L)	NA	4.60	<0.50	NA	<4.00	0.63
Iron (ug/L)	NA	NA	<15.00	NA	NA	1115.00
Lead (ug/L)	NA	2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.50	NA	NA	1.50
Manganese (ug/L)	NA	NA	0.80	NA	NA	1600.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.40	NA	NA	3.10
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.10	NA	NA	2.10
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	6.70	NA	<8.00	26.00
Hardness (mg/L)	NA	12.90	12.00	NA	12.90	13.00
DO (mg/L)	NA	NA	6.38	NA	NA	0.09
pH	NA	NA	7.10	NA	NA	6.24
Water Temp (°C)	NA	NA	27.50	NA	NA	7.42
Alkalinity (mg/L)	11.70	12.00	13.00	49.80	12.00	17.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	<0.01
Chloride (mg/L)	3.20	2.86	3.58	3.40	3.40	3.67
Fluoride (mg/L)	NA	NA	0.07	NA	NA	0.08
Sulfate (mg/L)	3.00	1.50	2.54	13.00	2.80	2.95
NH3-N (mg/L)	0.14	0.03	0.02	1.60	0.15	0.52
NO3-N (mg/L)	0.02	0.02	0.02	0.02	0.45	0.09
O-PHOS (mg/L)	0.03	0.02	0.01	0.33	0.02	0.01
T-PHOS (mg/L)	0.15	0.02	0.04	0.45	0.02	0.08
TKN (mg/L)	NA	NA	0.52	NA	NA	1.00
TOC (mg/L)	NA	5.50	4.70	NA	3.50	2.60
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	NA	2.00	1.80	NA	2.10	14.00
TSS (mg/L)	NA	2.50	<1.00	NA	1.50	2.50
TDS (mg/L)	27.00	30.00	34.00	73.00	36.00	34.00
Conductivity (micro-mhos/cm)	36.50	37.50	NA	97.10	44.80	NA
Fecal Coliform (col/100 ml)	Is	NA	3			5
	l 1/4	NA	3			7
	c	NA	5			7
	r 1/4	NA	7			3
	rs	NA	3			36
	Gm Mean	NA	3.9			7.7

TABLE A-26. Water Quality Data from Lake Sugarloaf.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	4.00	1.34	2.80			
Secchi (in)	89.00	77.00	72.00			
Trophic Index	0.49	0.63	0.53			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	1.88
Barium (ug/L)	NA	NA	<8.80	NA	NA	32.90
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	5.80	NA	NA	4.80
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	1.10	NA	NA	1.80
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	0.85
Copper (ug/L)	NA	<4.00	0.74	NA	<4.00	1.04
Iron (ug/L)	NA	NA	31.00	NA	NA	1038.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	2.40	NA	NA	2.50
Manganese (ug/L)	NA	NA	6.70	NA	NA	2642.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.70	NA	NA	2.00
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	4.60	NA	NA	5.00
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	15.00	11.00	NA	13.00	17.10
Hardness (mg/L)	NA	17.10	13.00	NA	20.10	14.00
DO (mg/L)	NA	NA	6.48	NA	NA	0.39
pH	NA	NA	7.07	NA	NA	6.57
Water Temp (°C)	NA	NA	31.80	NA	NA	14.80
Alkalinity (mg/L)	14.70	15.00	13.00	24.50	28.00	16.50
Bromide (mg/L)	NA	NA	0.05	NA	NA	0.05
Chloride (mg/L)	2.70	2.74	2.49	3.00	2.62	2.81
Fluoride (mg/L)	NA	NA	0.11	NA	NA	0.10
Sulfate (mg/L)	9.00	6.90	7.59	9.00	7.90	6.86
NH3-N (mg/L)	0.05	0.07	<0.01	0.58	0.42	0.15
NO3-N (mg/L)	0.02	0.01	0.02	0.02	0.01	1.12
O-PHOS (mg/L)	0.03	0.02	<0.01	0.11	0.04	<0.01
T-PHOS (mg/L)	0.04	0.05	0.04	0.12	0.08	0.03
TKN (mg/L)	NA	NA	0.49	NA	NA	0.85
TOC (mg/L)	3.30	6.00	4.70	3.40	5.60	4.50
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	3.00	3.00	2.40	3.60	2.80	4.20
TSS (mg/L)	NA	1.50	1.00	NA	1.50	2.00
TDS (mg/L)	41.00	36.00	43.50	56.00	50.00	56.50
Conductivity (micro-mhos/cm)	55.70	53.60	NA	78.80	72.90	NA
Fecal Coliform (col/100 ml)	Is	NA	260			
	I 1/4	NA	5			
	c	NA	10			
	r 1/4	NA	8			
	rs	NA	10			
Gm Mean	NA	16	4.9			

TABLE A-27. Water Quality Data from Lake Wright (Nolan).

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	11.9	6.87	<1.00			
Secchi (in)	31.00	44.00	48.00			
Trophic Index	4.90	2.52	0.85			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.00	NA	NA	2.87
Barium (ug/L)	NA	NA	13.30	NA	NA	200.20
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	4.50	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	3.40	NA	NA	9.00
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	1.30
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	0.64
Iron (ug/L)	NA	NA	22.00	NA	NA	1176.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	2.60	NA	NA	2.70
Manganese (ug/L)	NA	NA	4.40	NA	NA	8471.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	3.00	NA	NA	3.30
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	5.00	NA	NA	5.00
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	18.00	3.10	NA	10.00	8.10
Hardness (mg/L)	NA	14.10	19.00	NA	66.60	33.00
DO (mg/L)	NA	NA	6.35	NA	NA	0.29
pH	NA	NA	7.42	NA	NA	6.96
Water Temp (°C)	NA	NA	31.90	NA	NA	18.80
Alkalinity (mg/L)	NA	37.00	19.00	NA	83.00	53.00
Bromide (mg/L)	NA	NA	0.05	NA	NA	0.06
Chloride (mg/L)	NA	3.97	3.13	NA	4.26	3.47
Fluoride (mg/L)	NA	NA	0.13	NA	NA	0.10
Sulfate (mg/L)	NA	4.80	5.01	NA	8.80	1.73
NH3-N (mg/L)	NA	0.17	<0.01	NA	3.06	0.52
NO3-N (mg/L)	NA	0.04	0.02	NA	0.03	0.03
O-PHOS (mg/L)	NA	0.02	0.01	NA	0.05	<0.01
T-PHOS (mg/L)	NA	0.07	0.04	NA	0.11	0.05
TKN (mg/L)	NA	NA	0.76	NA	NA	1.80
TOC (mg/L)	NA	8.60	6.40	NA	13.30	7.90
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	NA	3.00	4.40	NA	7.40	13.00
TSS (mg/L)	NA	3.00	2.50	NA	7.50	13.00
TDS (mg/L)	NA	48.00	50.00	NA	111.00	80.00
Conductivity (micro-mhos/cm)	NA	71.5	NA	NA	190.00	NA
Fecal Coliform (col/100 ml)	Is	NA	3			
	1 1/4	NA	5			
	c	NA	8			
	r 1/4	NA	3			
	rs	NA	5			
Gm Mean	NA	4.5	3.2			

TABLE A-28. Water Quality Data from Lake Ft. Smith.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	2.1	1.34	1.60			
Secchi (in)	141.00	112.00	102.00			
Trophic Index	0.23	0.15	0.24			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	<8.80	NA	NA	<8.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	8.30	NA	NA	5.30
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	2.80	NA	NA	3.90
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	<15.00	NA	NA	35.90
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.50	NA	NA	1.50
Manganese (ug/L)	NA	NA	2.10	NA	NA	106.70
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	0.90	NA	NA	0.60
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.50	NA	NA	1.60
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	1.10	NA	<8.00	8.40
Hardness (mg/L)	NA	15.90	13.00	NA	15.90	16.00
DO (mg/L)	NA	NA	7.26	NA	NA	0.21
pH	NA	NA	7.58	NA	NA	6.60
Water Temp (°C)	NA	NA	30.94	NA	NA	10.58
Alkalinity (mg/L)	14.20	NA	13.00	17.60	NA	14.00
Bromide (mg/L)	NA	NA	<0.01	NA	NA	0.04
Chloride (mg/L)	1.50	1.82	1.69	1.50	1.90	1.85
Fluoride (mg/L)	NA	NA	0.10	NA	NA	0.09
Sulfate (mg/L)	2.00	3.90	3.65	3.00	3.90	4.02
NH3-N (mg/L)	0.05	0.06	0.01	0.05	0.06	0.02
NO3-N (mg/L)	0.02	NA	0.06	0.19	NA	0.48
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.02	0.01
T-PHOS (mg/L)	0.03	0.02	0.02	0.03	0.02	0.03
TKN (mg/L)	NA	NA	0.30	NA	NA	0.18
TOC (mg/L)	1.00	2.50	3.62	1.10	1.80	1.61
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	2.00	1.80	5.40	6.80	8.50
TSS (mg/L)	NA	1.00	<1.00	NA	1.50	2.00
TDS (mg/L)	26.00	31.00	31.50	34.00	38.00	40.50
Conductivity (micro-mhos/cm)	39.10	37.00	NA	47.20	41.00	NA
Fecal Coliform (col/100 ml)	Is	NA	0			
	l 1/4	NA	0			
	c	NA	7			
	r 1/4	NA	0			
	rs	NA	3			
	Gm Mean	NA	4.6			

TABLE A-29. Water Quality Data from Lake Sequoyah.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	NA	7.38	9.00			
Secchi (in)	NA	35.00	25.00			
Trophic Index	NA	1.79	1.96			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	2.51	NA	NA	4.75
Barium (ug/L)	NA	NA	<8.80	NA	NA	22.50
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	15.20	NA	NA	17.10
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	16.40	NA	NA	17.80
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	0.60
Iron (ug/L)	NA	NA	<15.00	NA	NA	146.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	2.50	NA	NA	2.70
Manganese (ug/L)	NA	NA	2.80	NA	NA	3216.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.40	NA	NA	2.30
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.70	NA	NA	2.70
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	6.30	NA	14.00	7.40
Hardness (mg/L)	NA	52.80	51.00	NA	58.80	56.00
DO (mg/L)	NA	NA	5.70	NA	NA	0.10
pH	NA	NA	7.61	NA	NA	7.02
Water Temp (°C)	NA	NA	27.50	NA	NA	25.90
Alkalinity (mg/L)	63.60	57.00	56.00	NA	68.00	64.00
Bromide (mg/L)	NA	NA	0.05	NA	NA	0.04
Chloride (mg/L)	1.60	2.72	2.33	NA	2.70	2.38
Fluoride (mg/L)	NA	NA	0.08	NA	NA	0.13
Sulfate (mg/L)	5.00	4.40	3.04	NA	3.40	2.63
NH3-N (mg/L)	0.28	0.03	0.01	NA	0.40	0.42
NO3-N (mg/L)	0.02	0.01	0.02	NA	0.01	0.06
O-PHOS (mg/L)	0.03	0.02	0.01	0.03	0.02	0.01
T-PHOS (mg/L)	0.11	0.05	0.15	NA	0.07	0.08
TKN (mg/L)	NA	NA	0.95	NA	NA	1.46
TOC (mg/L)	3.40	5.70	3.47	NA	7.50	3.64
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	36.00	6.00	7.00	NA	9.10	7.10
TSS (mg/L)	NA	4.00	6.00	NA	7.50	8.00
TDS (mg/L)	85.00	74.00	79.00	NA	85.00	86.00
Conductivity (micro-mhos/cm)	154.00	120.00	NA	NA	141.00	NA
Fecal Coliform (col/100 ml)	Is	NA	0			<3
	l 1/4	NA	0			<3
	c	NA	0			3
	r 1/4	NA	0			<3
	rs	NA	3			84
Gm Mean	NA	3	5.8			

TABLE A-30. Water Quality Data from Lake SWEPCO.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	3.80	4.20	3.60			
Secchi (in)	156.00	61.00	84.00			
Trophic Index	0.22	0.31	1.78			
Aluminum (ug/L)	NA	NA	451.20	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.31	NA	NA	<1.00
Barium (ug/L)	NA	NA	125.70	NA	NA	179.40
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	236.60	NA	NA	247.10
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	32.40	NA	NA	43.70
Chromium (ug/L)	NA	<1.00	0.77	NA	<1.00	0.54
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	10.15	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	<15.00	NA	NA	28.40
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	0.32
Magnesium (ug/L)	NA	NA	3.20	NA	NA	3.30
Manganese (ug/L)	NA	NA	3.90	NA	NA	1626.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	3.09	NA	NA	3.05
Potassium (ug/L)	NA	NA	6.40	NA	NA	5.50
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	27.70	NA	NA	30.20
Vanadium (ug/L)	NA	NA	3.25	NA	NA	1.58
Zinc (ug/L)	NA	<8.00	9.70	NA	<8.00	6.00
Hardness (mg/L)	NA	99.30	94.00	NA	136.00	123.00
DO (mg/L)	NA	NA	6.61	NA	NA	0.09
pH	NA	NA	8.53	NA	NA	7.34
Water Temp (°C)	NA	NA	36.30	NA	NA	18.40
Alkalinity (mg/L)	85.20	77.00	82.50	129.00	138.00	132.50
Bromide (mg/L)	NA	NA	0.09	NA	NA	0.10
Chloride (mg/L)	10.20	11.40	14.00	11.30	12.80	15.40
Fluoride (mg/L)	NA	NA	0.20	NA	NA	0.18
Sulfate (mg/L)	58.00	62.30	60.00	48.00	45.80	52.80
NH3-N (mg/L)	0.09	0.03	<0.01	0.68	1.37	1.78
NO3-N (mg/L)	0.02	0.01	0.06	0.02	0.01	0.07
O-PHOS (mg/L)	0.03	0.02	0.01	0.03	0.02	0.11
T-PHOS (mg/L)	0.03	0.02	0.04	0.04	0.03	0.14
TKN (mg/L)	NA	NA	0.59	NA	NA	2.68
TOC (mg/L)	2.70	6.30	3.23	4.60	7.20	2.78
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	1.00	2.00	1.60	32.00	33.00	32.00
TSS (mg/L)	NA	1.00	1.50	NA	0.50	<1.00
TDS (mg/L)	180.00	190.00	206.00	211.00	211.00	248.00
Conductivity (micro-mhos/cm)	317.00	313.00	NA	386.00	368.00	NA
Fecal Coliform (col/100 ml)	Is	NA	0			
	I 1/4	NA	0			
	c	NA	0			
	r 1/4	NA	0			
	rs	NA	0			
	Gm Mean	NA	0			

TABLE A-31. Water Quality Data from Shepherd Springs Lake.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	2.8	1.34	1.80			
Secchi (in)	74.00	112.00	82.00			
Trophic Index	0.44	0.15	0.27			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	<8.80	NA	NA	<8.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	10.50	NA	NA	4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	4.60	NA	NA	3.80
Chromium (ug/L)	NA	<1.00	0.43	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	71.70	NA	NA	36.50
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.70	NA	NA	1.50
Manganese (ug/L)	NA	NA	2.80	NA	NA	148.40
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.80	NA	NA	0.80
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.70	NA	NA	1.50
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	<1.00	NA	<8.00	5.20
Hardness (mg/L)	NA	1.40	18.00	NA	4.50	16.00
DO (mg/L)	NA	NA	7.43	NA	NA	0.23
pH	NA	NA	7.31	NA	NA	6.31
Water Temp (°C)	NA	NA	29.44	NA	NA	10.30
Alkalinity (mg/L)	18.10	NA	19.00	14.20	NA	14.00
Bromide (mg/L)	NA	NA	<0.01	NA	NA	<0.01
Chloride (mg/L)	1.50	1.75	1.74	1.50	1.77	1.81
Fluoride (mg/L)	NA	NA	0.10	NA	NA	0.10
Sulfate (mg/L)	2.00	3.90	4.35	4.00	3.90	3.95
NH3-N (mg/L)	0.05	0.05	0.06	0.05	0.07	0.03
NO3-N (mg/L)	0.02	NA	0.02	0.28	NA	0.62
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.02	<0.01
T-PHOS (mg/L)	0.03	0.02	0.02	0.03	0.02	0.02
TKN (mg/L)	NA	NA	0.34	NA	NA	0.23
TOC (mg/L)	1.80	3.10	10.01	0.50	1.80	1.91
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	1.00	2.20	4.60	4.50	6.30
TSS (mg/L)	NA	0.50	1.50	NA	0.50	2.50
TDS (mg/L)	31.00	34.00	38.00	34.00	34.00	38.50
Conductivity (micro-mhos/cm)	45.70	42.00	NA	42.60	44.00	NA
Fecal Coliform (col/100 ml)	Is	NA	0			
	1 1/4	NA	0			
	c	NA	0			
	r 1/4	NA	0			
	rs	NA	0			
	Gm Mean	NA	0			

TABLE A-32. Water Quality Data from Lake Charles.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	18.3	25.63	44.30			
Secchi (in)	27.00	19.00	29.00			
Trophic Index	2.90	4.99	3.46			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	2.58	NA	NA	6.23
Barium (ug/L)	NA	NA	17.40	NA	NA	59.90
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	6.90	NA	NA	8.30
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	20.10	NA	NA	25.70
Chromium (ug/L)	NA	<1.00	0.54	NA	<1.00	0.59
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	<15.00	NA	NA	345.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	15.30	NA	NA	15.00
Manganese (ug/L)	NA	NA	0.90	NA	NA	1482.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.00	NA	NA	1.80
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.80	NA	NA	1.90
Vanadium (ug/L)	NA	NA	1.48	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	1.30	NA	10.00	4.30
Hardness (mg/L)	NA	133.00	113.00	NA	142.00	126.00
DO (mg/L)	NA	NA	7.34	NA	NA	0.18
pH	NA	NA	8.71	NA	NA	7.29
Water Temp (°C)	NA	NA	31.72	NA	NA	28.43
Alkalinity (mg/L)	126.00	132.00	118.00	126.00	132.00	141.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	0.03
Chloride (mg/L)	3.40	5.19	3.81	3.20	4.35	3.82
Fluoride (mg/L)	NA	NA	0.09	NA	NA	0.09
Sulfate (mg/L)	4.00	3.80	3.13	2.00	2.60	1.57
NH3-N (mg/L)	0.11	0.23	<0.01	0.05	0.38	0.38
NO3-N (mg/L)	0.02	0.01	0.01	0.02	0.03	0.01
O-PHOS (mg/L)	0.03	0.05	0.02	0.03	0.05	0.02
T-PHOS (mg/L)	0.06	0.07	0.06	0.04	0.09	0.08
TKN (mg/L)	NA	NA	1.35	NA	NA	1.52
TOC (mg/L)	9.90	NA	6.28	7.80	NA	5.50
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	5.00	7.00	5.60	5.50	8.00	12.00
TSS (mg/L)	NA	11.50	12.00	NA	10.50	9.00
TDS (mg/L)	150.00	149.00	159.00	143.00	147.00	144.00
Conductivity (micro-mhos/cm)	244.00	245.00	NA	252.00	259.00	NA
Fecal Coliform (col/100 ml)	Is	NA	48			
	l 1/4	NA	40			
	c	NA	0			
	r 1/4	NA	710			
	rs	NA	>6400			
Gm Mean	NA	>97.3	3.4			

TABLE A-33. Water Quality Data from Lee Creek Lake.

		Epilimnion			Hypolimnion		
		1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)		NA	1.07	5.80			
Secchi (in)		NA	72.00	42.00			
Trophic Index		NA	0.22	1.14			
Aluminum (ug/L)		NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)		NA	NA	2.10	NA	NA	11.94
Barium (ug/L)		NA	NA	<8.80	NA	NA	59.20
Beryllium (ug/L)		NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)		NA	NA	10.20	NA	NA	9.30
Cadmium (ug/L)		NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)		NA	NA	12.80	NA	NA	12.60
Chromium (ug/L)		NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)		NA	NA	<0.50	NA	NA	1.25
Copper (ug/L)		NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)		NA	NA	15.20	NA	NA	4218.00
Lead (ug/L)		NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)		NA	NA	1.90	NA	NA	1.70
Manganese (ug/L)		NA	NA	1.10	NA	NA	3889.00
Mercury (ug/L)		NA	NA	NA	NA	NA	NA
Nickel (ug/L)		NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)		NA	NA	1.10	NA	NA	0.90
Selenium (ug/L)		NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)		NA	NA	2.40	NA	NA	1.70
Vanadium (ug/L)		NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)		NA	<8.00	<1.00	NA	<8.00	1.30
Hardness (mg/L)		NA	19.80	40.00	NA	49.50	39.00
DO (mg/L)		NA	NA	7.95	NA	NA	0.25
pH		NA	NA	8.38	NA	NA	7.08
Water Temp (°C)		NA	NA	31.89	NA	NA	21.84
Alkalinity (mg/L)		NA	NA	41.00	NA	NA	50.00
Bromide (mg/L)		NA	NA	0.04	NA	NA	0.05
Chloride (mg/L)		NA	2.85	2.52	NA	2.70	1.93
Fluoride (mg/L)		NA	NA	0.11	NA	NA	0.13
Sulfate (mg/L)		NA	5.00	3.84	NA	9.00	1.65
NH3-N (mg/L)		NA	0.03	0.01	NA	0.06	0.23
NO3-N (mg/L)		NA	NA	0.03	NA	NA	0.02
O-PHOS (mg/L)		NA	0.02	0.01	NA	0.02	0.01
T-PHOS (mg/L)		NA	0.02	0.04	NA	0.02	0.06
TKN (mg/L)		NA	NA	0.52	NA	NA	0.74
TOC (mg/L)		NA	5.30	2.68	NA	8.00	3.67
BOD (mg/L)		NA	NA	NA	NA	NA	NA
Turbidity (NTU)		NA	3.00	5.10	NA	15.00	28.00
TSS (mg/L)		NA	1.00	4.50	NA	6.50	16.00
TDS (mg/L)		NA	47.00	66.00	NA	84.00	78.00
Conductivity (micro-mhos/cm)		NA	67.00	NA	NA	120.00	NA
Fecal Coliform (col/100 ml)	Is	NA	13	<2			
	1 1/4	NA	10	<2			
	c	NA	2	<2			
	r 1/4	NA	7	<2			
	rs	NA	2	<2			
	Gm Mean	NA	5.2	<2			

TABLE A-34. Water Quality Data from Lake Beaverfork.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	4.8	3.20	5.60			
Secchi (in)	78.00	81.00	58.50			
Trophic Index	0.45	1.27	0.27			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	1.35
Barium (ug/L)	NA	NA	<8.80	NA	NA	47.40
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	14.00	NA	NA	25.40
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	2.30	NA	NA	4.00
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	0.62	NA	<4.00	0.88
Iron (ug/L)	NA	NA	<15.00	NA	NA	31.20
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.50	NA	NA	3.30
Manganese (ug/L)	NA	NA	2.00	NA	NA	3496.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.20	NA	NA	2.20
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	5.40	NA	NA	11.10
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	5.20	NA	<8.00	28.10
Hardness (mg/L)	NA	6.90	12.00	NA	18.00	24.00
DO (mg/L)	NA	NA	6.53	NA	NA	0.16
pH	NA	NA	6.91	NA	NA	6.17
Water Temp (°C)	NA	NA	28.90	NA	NA	22.20
Alkalinity (mg/L)	10.30	12.00	12.00	23.00	15.00	13.00
Bromide (mg/L)	NA	NA	0.06	NA	NA	0.06
Chloride (mg/L)	5.00	6.29	6.62	5.00	6.09	6.66
Fluoride (mg/L)	NA	NA	0.06	NA	NA	0.06
Sulfate (mg/L)	5.00	5.00	6.02	5.00	6.00	5.38
NH3-N (mg/L)	0.05	0.07	<0.01	0.12	0.1	0.02
NO3-N (mg/L)	0.02	0.03	0.02	0.02	0.02	0.04
O-PHOS (mg/L)	0.03	0.015	0.01	0.03	0.015	0.01
T-PHOS (mg/L)	0.03	0.07	<0.02	0.03	0.08	0.03
TKN (mg/L)	NA	NA	0.45	NA	NA	0.71
TOC (mg/L)	4.10	5.60	4.10	4.40	5.80	4.30
BOD (mg/L)	NA	NA	0.84	NA	NA	1.49
Turbidity (NTU)	2.00	2.00	2.40	6.00	3.40	4.30
TSS (mg/L)	NA	1.50	1.00	NA	2.00	3.50
TDS (mg/L)	35.00	37.00	45.00	46.00	39.00	51.00
Conductivity (micro-mhos/cm)	46.90	67.00	NA	69.60	73.00	NA
Fecal Coliform (col/100 ml)	Is	NA	0			
	1 1/4	NA	0			
	c	NA	0			
	r 1/4	NA	3			
	rs	NA	8			
	Gm Mean	NA	4.9			

TABLE A-35. Water Quality Data from Lake Hinkle.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	5.4	1.34	<1.00			
Secchi (in)	78.00	81.00	108.00			
Trophic Index	0.45	0.6	0.25			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	<8.80	NA	NA	30.10
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	<4.50	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	0.90	NA	NA	1.20
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	15.50	NA	NA	153.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.50	NA	NA	1.40
Manganese (ug/L)	NA	NA	2.70	NA	NA	1726.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.10	NA	NA	1.60
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.90	NA	NA	2.90
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	10	2.50	NA	<8.00	3.60
Hardness (mg/L)	NA	12.60	8.00	NA	14.10	9.00
DO (mg/L)	NA	NA	7.80	NA	NA	0.97
pH	NA	NA	7.00	NA	NA	6.81
Water Temp (°C)	NA	NA	32.30	NA	NA	11.60
Alkalinity (mg/L)	11.30	13.00	8.00	23.50	18.00	12.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.05
Chloride (mg/L)	2.10	2.51	2.19	2.20	2.24	2.45
Fluoride (mg/L)	NA	NA	0.06	NA	NA	0.06
Sulfate (mg/L)	4.00	4.80	4.75	5.00	4.80	5.31
NH3-N (mg/L)	0.08	0.03	<0.01	0.50	0.14	<0.01
NO3-N (mg/L)	0.02	0.01	0.02	0.02	0.06	0.06
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.02	<0.01
T-PHOS (mg/L)	0.03	0.05	0.02	0.05	0.05	0.03
TKN (mg/L)	NA	NA	0.31	NA	NA	0.49
TOC (mg/L)	3.70	5.10	4.00	4.10	5.90	3.50
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	2.00	1.40	3.00	15.00	6.40
TSS (mg/L)	NA	1.50	1.00	NA	1.50	3.50
TDS (mg/L)	33.00	27.00	20.70	43.00	35.00	24.00
Conductivity (micro-mhos/cm)	36.70	36.80	NA	53.10	47.50	NA
Fecal Coliform (col/100 ml)	is	NA	2			
	l 1/4	NA	0			
	c	NA	2			
	r 1/4	NA	5			
	rs	NA	3			
Gm Mean	NA	2.8	<2			

TABLE A-36A. Water Quality Data from Lake Brewer - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	8.00	0.53	2.30			
Secchi (in)	50.00	90.00	46.00			
Trophic Index	0.76	0.86	0.68			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	6.24
Barium (ug/L)	NA	NA	11.80	NA	NA	109.10
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	7.40	NA	NA	5.20
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	2.60	NA	NA	4.10
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	0.53
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	2.34
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	21.10	NA	NA	5566.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.80	NA	NA	2.20
Manganese (ug/L)	NA	NA	4.60	NA	NA	5340.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.70	NA	NA	3.30
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	3.10	NA	NA	2.90
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	3.00	NA	<8.00	3.20
Hardness (mg/L)	NA	11.70	14.00	NA	19.80	19.00
DO (mg/L)	NA	NA	7.57	NA	NA	0.10
pH	NA	NA	8.14	NA	NA	6.85
Water Temp (°C)	NA	NA	30.50	NA	NA	16.00
Alkalinity (mg/L)	11.30	14.00	16.00	33.30	38.00	38.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.05
Chloride (mg/L)	2.30	3.05	4.07	2.60	3.49	4.04
Fluoride (mg/L)	NA	NA	0.07	NA	NA	0.08
Sulfate (mg/L)	3.00	5.00	3.10	11.00	9.90	1.13
NH3-N (mg/L)	0.05	0.07	0.03	0.82	1.20	1.49
NO3-N (mg/L)	0.02	0.02	0.05	0.02	0.03	0.05
O-PHOS (mg/L)	0.03	0.02	<0.01	0.07	0.13	<0.01
T-PHOS (mg/L)	0.03	0.08	0.04	0.04	0.19	0.11
TKN (mg/L)	NA	NA	0.57	NA	NA	2.61
TOC (mg/L)	3.10	4.80	3.90	4.70	5.80	4.60
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	3.00	2.00	3.30	8.50	19.00	11.00
TSS (mg/L)	NA	0.50	1.50	NA	1.00	6.00
TDS (mg/L)	28.00	28.00	34.00	56.00	56.00	57.00
Conductivity (micro-mhos/cm)	36.10	49.00	NA	72.70	92.00	NA
Fecal Coliform (col/100 ml)	Is	NA	0			
	l 1/4	NA	0			
	c	NA	0			
	r 1/4	NA	0			
	rs	NA	0			
	Gm Mean	NA	0			

TABLE A-36B. Water Quality Data from Lake Brewer - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	NA	NA	NA			
Secchi (in)	NA	NA	58.00			
Trophic Index	NA	NA	NA			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	14.00	NA	NA	13.50
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	6.90	NA	NA	7.70
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	2.60	NA	NA	2.70
Chromium (ug/L)	NA	NA	<0.40	NA	NA	0.49
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	NA	<0.50	NA	NA	0.50
Iron (ug/L)	NA	NA	17.80	NA	NA	23.00
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	1.80	NA	NA	1.90
Manganese (ug/L)	NA	NA	2.10	NA	NA	131.90
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.80	NA	NA	1.80
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.90	NA	NA	2.80
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	<1.00	NA	NA	8.30
Hardness (mg/L)	NA	NA	14.00	NA	NA	14.00
DO (mg/L)	NA	NA	7.85	NA	NA	0.13
pH	NA	NA	7.69	NA	NA	6.45
Water Temp (°C)	NA	NA	28.90	NA	NA	24.40
Alkalinity (mg/L)	NA	NA	16.00	NA	NA	16.50
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.04
Chloride (mg/L)	NA	NA	4.06	NA	NA	4.02
Fluoride (mg/L)	NA	NA	0.08	NA	NA	0.09
Sulfate (mg/L)	NA	NA	3.09	NA	NA	3.12
NH3-N (mg/L)	NA	NA	0.03	NA	NA	0.09
NO3-N (mg/L)	NA	NA	0.04	NA	NA	0.09
O-PHOS (mg/L)	NA	NA	0.01	NA	NA	0.01
T-PHOS (mg/L)	NA	NA	0.05	NA	NA	0.05
TKN (mg/L)	NA	NA	0.69	NA	NA	0.60
TOC (mg/L)	NA	NA	4.00	NA	NA	3.40
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	NA	NA	4.80	NA	NA	5.00
TSS (mg/L)	NA	NA	4.00	NA	NA	3.50
TDS (mg/L)	NA	NA	33.00	NA	NA	34.00
Conductivity (micro-mhos/cm)	NA	NA	NA	NA	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	11			
	1 1/4	NA	13			
	c	NA	7			
	r 1/4	NA	3			
	rs	NA	24			
	Gm Mean	NA	9.4			

Station added in 1999

TABLE A-37. Water Quality Data from Lake June.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	31.80	<0.10	5.00			
Secchi (in)	22.00	26.00	20.00			
Trophic Index	12.81	6.2	6.05			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	<0.50	NA	NA	<0.50	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	<1.00	NA	NA	<1.00	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	<4.00	NA	NA	<4.00	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	<2.00	NA	NA	<2.00	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	<8.00	NA	NA	<8.00	NA
Hardness (mg/L)	NA	22.80	NA	NA	27.30	NA
DO (mg/L)	NA	NA	8.51	NA	NA	4.69
pH	NA	NA	8.04	NA	NA	6.39
Water Temp (°C)	NA	NA	30.60	NA	NA	28.80
Alkalinity (mg/L)	9.30	NA	25.00	7.80	NA	25.00
Bromide (mg/L)	NA	NA	0.35	NA	NA	0.36
Chloride (mg/L)	11.60	30.40	44.20	8.90	30.70	45.00
Fluoride (mg/L)	NA	NA	0.06	NA	NA	0.07
Sulfate (mg/L)	7.00	5.10	3.29	7.00	6.20	3.55
NH3-N (mg/L)	0.05	0.03	0.02	0.05	0.03	0.01
NO3-N (mg/L)	0.02	0.01	0.02	0.02	0.01	0.02
O-PHOS (mg/L)	0.08	0.02	0.02	0.08	0.02	0.02
T-PHOS (mg/L)	0.25	0.16	0.12	0.25	0.17	0.15
TKN (mg/L)	NA	NA	1.45	NA	NA	1.32
TOC (mg/L)	NA	12.00	9.83	NA	11.60	9.25
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	8.00	5.00	NA	8.50	8.00	NA
TSS (mg/L)	NA	7.00	NA	NA	10.00	NA
TDS (mg/L)	80.00	113.00	NA	72.00	119.00	NA
Conductivity (micro-mhos/cm)	66.20	170.90	NA	54.30	180.10	NA
Fecal Coliform (col/100 ml)	Is	163	17			
	l 1/4	850	104			
	c	46	23			
	r 1/4	33	<3			
	rs	104	210			
Gm Mean	NA	72.9	30.3			

TABLE A-38. Water Quality Data from Lake Bailey.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	11.9	13.62	<1.00			
Secchi (in)	31.00	40.00	29.00			
Trophic Index	4.90	2.52	1.34			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.02	NA	NA	1.51
Barium (ug/L)	NA	NA	<8.80	NA	NA	62.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	9.20	NA	NA	8.00
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	0.25
Calcium (ug/L)	NA	NA	2.70	NA	NA	3.10
Chromium (ug/L)	NA	<1.00	5.14	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	0.86
Copper (ug/L)	NA	<4.00	0.82	NA	<4.00	0.97
Iron (ug/L)	NA	NA	150.30	NA	NA	257.50
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.80	NA	NA	1.70
Manganese (ug/L)	NA	NA	3.20	NA	NA	1742.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	2.20
Potassium (ug/L)	NA	NA	1.10	NA	NA	1.40
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.00	NA	NA	2.20
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	4.40	NA	<8.00	6.60
Hardness (mg/L)	NA	14.10	14.00	NA	17.10	15.00
DO (mg/L)	NA	NA	6.13	NA	NA	0.23
pH	NA	NA	6.99	NA	NA	6.23
Water Temp (°C)	NA	NA	30.60	NA	NA	27.90
Alkalinity (mg/L)	17.60	11.00	16.00	11.20	14.00	20.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.04
Chloride (mg/L)	3.30	2.02	2.24	3.60	2.22	2.52
Fluoride (mg/L)	NA	NA	0.09	NA	NA	0.08
Sulfate (mg/L)	5.00	1.50	2.25	5.00	1.50	2.21
NH3-N (mg/L)	0.15	0.07	0.01	0.21	0.11	0.04
NO3-N (mg/L)	0.02	0.03	<0.01	0.02	0.03	0.03
O-PHOS (mg/L)	0.05	0.02	<0.01	0.05	0.02	0.01
T-PHOS (mg/L)	0.14	0.09	0.04	0.13	0.09	0.07
TKN (mg/L)	NA	NA	0.71	NA	NA	1.12
TOC (mg/L)	NA	7.90	4.71	NA	8.20	5.37
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	8.00	4.00	4.60	9.30	NA	8.10
TSS (mg/L)	NA	3.50	NA	NA	6.00	9.50
TDS (mg/L)	32.00	32.00	NA	38.00	36.00	46.00
Conductivity (micro-mhos/cm)	31.20	32.90	NA	32.90	36.80	NA
Fecal Coliform (col/100 ml)	Is	5	66			
	1 1/4	7	100			
	c	2	100			
	r 1/4	10	90			
	rs	0	330			
Gm Mean	NA	5.1	114.4			

TABLE A-39. Water Quality Data from Lake Tricounty.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	30.50	3.85	10.10			
Secchi (in)	22.00	23.00	23.00			
Trophic Index	6.39	4.78	4.74			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	2.37	NA	NA	3.75
Barium (ug/L)	NA	NA	10.60	NA	NA	35.00
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	<4.50	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	1.90	NA	NA	2.20
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	1.06	NA	<4.00	0.50
Iron (ug/L)	NA	NA	616.80	NA	NA	720.70
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.30	NA	NA	1.30
Manganese (ug/L)	NA	NA	30.90	NA	NA	1586.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.00	NA	NA	1.90
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	3.70	NA	NA	3.60
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	1.40	NA	<8.00	2.10
Hardness (mg/L)	NA	11.40	10.00	NA	9.60	11.00
DO (mg/L)	NA	NA	6.96	NA	NA	0.48
pH	NA	NA	6.55	NA	NA	6.40
Water Temp (°C)	NA	NA	31.90	NA	NA	27.00
Alkalinity (mg/L)	13.70	15.00	9.00	17.60	16.00	14.00
Bromide (mg/L)	NA	NA	0.07	NA	NA	0.07
Chloride (mg/L)	3.30	5.72	4.22	3.10	5.74	4.16
Fluoride (mg/L)	NA	NA	0.09	NA	NA	0.08
Sulfate (mg/L)	6.00	3.00	3.83	6.00	3.00	3.49
NH3-N (mg/L)	0.05	0.03	0.02	0.08	0.03	0.04
NO3-N (mg/L)	0.02	0.01	0.04	0.02	0.01	0.04
O-PHOS (mg/L)	0.03	0.02	0.02	0.03	0.02	0.03
T-PHOS (mg/L)	0.11	0.11	0.10	0.15	0.10	0.12
TKN (mg/L)	NA	NA	1.04	NA	NA	1.08
TOC (mg/L)	13.40	12.40	9.18	14.00	10.40	9.00
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	8.00	7.00	10.00	9.40	7.00	10.00
TSS (mg/L)	NA	7.00	4.50	NA	7.50	5.50
TDS (mg/L)	NA	64.00	66.00	NA	60.00	70.00
Conductivity (micro-mhos/cm)	42.10	57.30	NA	48.80	57.40	NA
Fecal Coliform (col/100 ml)	Is	NA	8			
	1 1/4	NA	5			
	c	NA	0			
	r 1/4	NA	7			
	rs	NA	10			
	Gm Mean	NA	7.3			

TABLE A-40. Water Quality Data from Lake Cox Creek.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	NA	1.42	18.60			
Secchi (in)	NA	31.00	40.00			
Trophic Index	NA	2.50	1.12			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	296.90
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	2.14
Barium (ug/L)	NA	NA	24.20	NA	NA	92.90
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	<4.50	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	1.90	NA	NA	4.10
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	4.31
Copper (ug/L)	NA	<4.00	0.61	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	74.40	NA	NA	6490.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.00	NA	NA	1.30
Manganese (ug/L)	NA	NA	1.70	NA	NA	1470.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.40	NA	NA	1.60
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.70	NA	NA	1.50
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	2.00
Zinc (ug/L)	NA	<8.00	12.50	NA	<8.00	10.80
Hardness (mg/L)	NA	2.50	9.00	NA	13.20	15.00
DO (mg/L)	NA	NA	7.29	NA	NA	0.90
pH	NA	NA	7.18	NA	NA	6.61
Water Temp (°C)	NA	NA	31.10	NA	NA	15.60
Alkalinity (mg/L)	NA	11.00	6.00	NA	24.00	19.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.05
Chloride (mg/L)	NA	2.44	1.94	NA	3.37	2.13
Fluoride (mg/L)	NA	NA	0.05	NA	NA	0.05
Sulfate (mg/L)	NA	5.10	4.29	NA	9.10	2.56
NH3-N (mg/L)	NA	0.06	0.01	NA	0.24	0.28
NO3-N (mg/L)	NA	0.01	0.02	NA	0.01	0.03
O-PHOS (mg/L)	NA	0.015	0.01	NA	0.04	0.01
T-PHOS (mg/L)	NA	0.08	0.03	NA	0.07	0.04
TKN (mg/L)	NA	NA	0.62	NA	NA	1.24
TOC (mg/L)	NA	8.50	5.14	NA	12.80	8.46
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	NA	6.00	5.40	NA	18.00	35.00
TSS (mg/L)	NA	3.00	3.50	NA	16.00	11.50
TDS (mg/L)	NA	36.00	37.00	NA	59.00	60.00
Conductivity (micro-mhos/cm)	NA	19.90	NA	NA	57.70	NA
Fecal Coliform (col/100 ml)	Is	NA	8			68
	l 1/4	NA	15			88
	c	NA	10			11
	r 1/4	NA	8			25
	rs	NA	8			40
	Gm Mean	NA	9.5			36.6

TABLE A-41. Water Quality Data from Lake Frierson.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	30.00	25.71	6.40			
Secchi (in)	22.00	8.00	11.00			
Trophic Index	4.09	24.34	12.85			
Aluminum (ug/L)	NA	NA	1063.00	NA	NA	443.60
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	1.43
Barium (ug/L)	NA	NA	35.70	NA	NA	45.20
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	14.30	NA	NA	12.70
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	3.60	NA	NA	4.00
Chromium (ug/L)	NA	<1.00	0.88	NA	<1.00	0.59
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	0.87
Copper (ug/L)	NA	<4.00	1.71	NA	<4.00	1.39
Iron (ug/L)	NA	NA	1016.00	NA	NA	533.00
Lead (ug/L)	NA	<2.00	0.79	NA	<2.00	0.58
Magnesium (ug/L)	NA	NA	1.50	NA	NA	1.50
Manganese (ug/L)	NA	NA	23.00	NA	NA	1065.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	3.40	NA	NA	3.50
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.70	NA	NA	1.70
Vanadium (ug/L)	NA	NA	2.34	NA	NA	1.60
Zinc (ug/L)	NA	<8.00	13.90	NA	<8.00	6.90
Hardness (mg/L)	NA	24.60	15.00	NA	17.10	16.00
DO (mg/L)	NA	NA	5.44	NA	NA	0.22
pH	NA	NA	6.87	NA	NA	6.33
Water Temp (°C)	NA	NA	32.20	NA	NA	26.27
Alkalinity (mg/L)	14.20	18.00	14.00	15.20	17.00	18.00
Bromide (mg/L)	NA	NA	0.02	NA	NA	<0.01
Chloride (mg/L)	2.00	2.97	2.22	2.10	3.73	2.14
Fluoride (mg/L)	NA	NA	0.08	NA	NA	0.09
Sulfate (mg/L)	4.00	6.90	5.63	5.00	6.90	5.15
NH3-N (mg/L)	0.05	0.22	0.09	0.16	0.46	0.45
NO3-N (mg/L)	0.02	0.03	0.05	0.02	0.04	0.04
O-PHOS (mg/L)	0.03	0.21	0.05	0.03	0.21	0.07
T-PHOS (mg/L)	0.06	0.17	0.14	0.06	0.20	0.17
TKN (mg/L)	NA	NA	1.10	NA	NA	1.39
TOC (mg/L)	5.90	NA	7.98	5.50	NA	8.33
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	16.00	76.00	75.00	26.00	93.00	91.00
TSS (mg/L)	NA	47.00	15.00	NA	76.00	25.00
TDS (mg/L)	47.00	111.00	136.00	53.00	109.00	138.00
Conductivity (micro-mhos/cm)	42.80	46.00	NA	44.10	50.00	NA
Fecal Coliform (col/100 ml)	Is	68	3			
	I 1/4	11	43			
	c	400	<3			
	r 1/4	34	20			
	rs	20	9			
Gm Mean	NA	45.9	9.3			

TABLE A-42. Water Quality Data from Lake Storm Creek.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	74.6	60.74	38.50			
Secchi (in)	21.00	23.00	29.00			
Trophic Index	7.84	5.64	2.78			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	26.81	NA	NA	1.36
Barium (ug/L)	NA	NA	23.00	NA	NA	99.70
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	<4.50	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	18.20	NA	NA	21.30
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	0.59	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	<15.00	NA	NA	3766.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	8.30	NA	NA	8.70
Manganese (ug/L)	NA	NA	2.10	NA	NA	4132.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.30	NA	NA	2.50
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.40	NA	NA	1.50
Vanadium (ug/L)	NA	NA	1.38	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	<1.00	NA	<8.00	1.70
Hardness (mg/L)	NA	76.50	80.00	NA	106.00	89.00
DO (mg/L)	NA	NA	9.33	NA	NA	0.16
pH	NA	NA	9.03	NA	NA	7.13
Water Temp (°C)	NA	NA	32.40	NA	NA	12.90
Alkalinity (mg/L)	69.10	84.00	90.00	86.20	118.00	114.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	0.03
Chloride (mg/L)	1.40	1.72	1.47	1.60	1.76	1.58
Fluoride (mg/L)	NA	NA	0.09	NA	NA	0.12
Sulfate (mg/L)	7.00	4.10	3.74	14.00	9.20	1.27
NH3-N (mg/L)	0.05	0.10	<0.01	1.55	1.79	1.72
NO3-N (mg/L)	0.02	0.03	<0.01	0.02	0.03	0.01
O-PHOS (mg/L)	0.03	0.02	0.01	0.29	0.20	0.11
T-PHOS (mg/L)	0.09	0.07	0.04	0.40	0.46	0.56
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	8.50	10.50	8.10	8.40	10.50	7.35
BOD (mg/L)	NA	NA	5.42	NA	NA	5.91
Turbidity (NTU)	9.00	10.00	8.00	16.00	14.00	10.00
TSS (mg/L)	NA	4.00	4.50	NA	6.00	7.00
TDS (mg/L)	91.00	100.00	116.00	110.00	126.00	134.00
Conductivity (micro-mhos/cm)	140.00	159.00	NA	174.00	223.00	NA
Fecal Coliform (col/100 ml)	Is	850	9			
	1 1/4	0	3			
	c	0	<3			
	r 1/4	2	<3			
	rs	0	3			
Gm Mean	NA	41.2	3.7			

TABLE A-43. Water Quality Data from Lake Calion.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	9.40	4.75	10.00			
Secchi (in)	27.00	41.00	34.00			
Trophic Index	2.57	1.48	1.35			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	39.20	NA	NA	40.90
Beryllium (ug/L)	NA	NA	<0.14	NA	NA	<0.11
Boron (ug/L)	NA	NA	7.50	NA	NA	8.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	0.25
Calcium (ug/L)	NA	NA	4.90	NA	NA	4.90
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	0.52	NA	<4.00	4.27
Iron (ug/L)	NA	NA	102.30	NA	NA	117.80
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	0.43
Magnesium (ug/L)	NA	NA	1.60	NA	NA	1.60
Manganese (ug/L)	NA	NA	4.10	NA	NA	29.40
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.30	NA	NA	1.90
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	10.90	NA	NA	11.30
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	8.40	NA	21.00	24.70
Hardness (mg/L)	NA	18.00	19.00	NA	18.00	19.00
DO (mg/L)	NA	NA	7.70	NA	NA	6.16
pH	NA	NA	6.88	NA	NA	6.45
Water Temp (°C)	NA	NA	33.20	NA	NA	31.40
Alkalinity (mg/L)	8.80	15.00	12.00	9.80	16.00	12.00
Bromide (mg/L)	NA	NA	0.30	NA	NA	0.30
Chloride (mg/L)	9.40	23.10	22.50	9.00	23.30	22.00
Fluoride (mg/L)	NA	NA	0.08	NA	NA	0.08
Sulfate (mg/L)	6.00	1.80	3.12	7.00	3.00	2.51
NH3-N (mg/L)	0.05	0.12	0.03	0.05	0.03	0.02
NO3-N (mg/L)	0.02	0.01	0.03	0.02	0.01	0.03
O-PHOS (mg/L)	0.03	0.02	0.01	0.03	0.02	0.01
T-PHOS (mg/L)	0.06	0.06	0.04	0.06	0.08	0.04
TKN (mg/L)	NA	NA	1.05	NA	NA	1.28
TOC (mg/L)	12.00	9.10	8.11	12.40	10.10	7.32
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	7.00	3.00	5.10	15.00	6.60	8.50
TSS (mg/L)	NA	3.00	3.50	NA	13.00	6.50
TDS (mg/L)	NA	80.00	84.00	NA	80.00	82.00
Conductivity (micro-mhos/cm)	60.00	115.30	NA	61.40	116.80	NA
Fecal Coliform (col/100 ml)	Is	NA	7			640
	1 1/4	NA	8			600
	c	NA	7			280
	r 1/4	NA	7			480
	rs	NA	10			520
Gm Mean	NA	7.7	485.0			

TABLE A-44. Water Quality Data from Lake Poinsett.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	4	1.57	<1.00			
Secchi (in)	73.00	38.00	44.00			
Trophic Index	0.47	1.6	0.57			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.08	NA	NA	8.98
Barium (ug/L)	NA	NA	17.70	NA	NA	60.40
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	17.50	NA	NA	17.20
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	2.70	NA	NA	3.70
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	1.16
Copper (ug/L)	NA	<4.00	1.18	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	18.60	NA	NA	3096.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	2.80	NA	NA	3.40
Manganese (ug/L)	NA	NA	1.00	NA	NA	4214.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	3.10	NA	NA	2.10
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	4.30	NA	NA	4.10
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	1.10
Zinc (ug/L)	NA	<8.00	<1.00	NA	10.00	1.30
Hardness (mg/L)	NA	17.10	18.00	NA	24.60	23.00
DO (mg/L)	NA	NA	10.04	NA	NA	0.15
pH	NA	NA	7.31	NA	NA	6.66
Water Temp (°C)	NA	NA	29.36	NA	NA	16.77
Alkalinity (mg/L)	8.80	9.00	7.00	29.40	23.00	36.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	0.04
Chloride (mg/L)	3.20	2.41	3.31	3.20	3.43	3.20
Fluoride (mg/L)	NA	NA	0.10	NA	NA	0.12
Sulfate (mg/L)	15.00	15.80	18.00	13.00	18.20	5.94
NH3-N (mg/L)	0.11	0.13	<0.01	0.78	0.84	1.47
NO3-N (mg/L)	0.02	0.01	0.01	0.02	0.01	0.01
O-PHOS (mg/L)	0.03	0.02	0.01	0.15	0.45	0.03
T-PHOS (mg/L)	0.03	0.06	0.02	0.29	0.44	0.18
TKN (mg/L)	NA	NA	0.52	NA	NA	2.06
TOC (mg/L)	4.10	NA	4.17	5.30	NA	5.48
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	5.00	4.30	25.00	30.00	23.00
TSS (mg/L)	NA	4.50	3.0	NA	24.00	9.50
TDS (mg/L)	48.00	51.00	59.0	77.00	82.00	71.00
Conductivity (micro-mhos/cm)	62.10	64.00	NA	90.50	94.00	NA
Fecal Coliform (col/100 ml)	Is	NA	240			
	l 1/4	NA	52			
	c	NA	230			
	r 1/4	NA	44			
	rs	NA	58			
	Gm Mean	NA	94			

TABLE A-45. Water Quality Data from Lake Bear Creek.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	72.2	38.81	37.60			
Secchi (in)	15.00	17.00	24.00			
Trophic Index	10.81	9.28	3.48			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.77	NA	NA	23.42
Barium (ug/L)	NA	NA	17.20	NA	NA	74.10
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	<4.50	NA	NA	<4.50
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	11.80	NA	NA	15.40
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	0.59
Copper (ug/L)	NA	<4.00	0.60	NA	<4.00	1.00
Iron (ug/L)	NA	NA	<15.00	NA	NA	3540.00
Lead (ug/L)	NA	5.90	<0.30	NA	3.00	<0.30
Magnesium (ug/L)	NA	NA	5.80	NA	NA	6.50
Manganese (ug/L)	NA	NA	2.50	NA	NA	2685.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.30	NA	NA	2.40
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.30	NA	NA	1.50
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	<1.00	NA	<8.00	5.40
Hardness (mg/L)	NA	70.20	53.00	NA	85.80	65.00
DO (mg/L)	NA	NA	9.20	NA	NA	0.16
pH	NA	NA	8.91	NA	NA	6.44
Water Temp (°C)	NA	NA	31.50	NA	NA	12.30
Alkalinity (mg/L)	55.90	76.00	63.00	79.40	96.00	86.00
Bromide (mg/L)	NA	NA	<0.01	NA	NA	0.03
Chloride (mg/L)	1.70	1.90	1.73	1.90	2.06	2.11
Fluoride (mg/L)	NA	NA	0.09	NA	NA	0.08
Sulfate (mg/L)	6.00	3.20	2.40	17.00	9.90	1.22
NH3-N (mg/L)	0.05	0.10	<0.01	1.73	1.60	1.59
NO3-N (mg/L)	0.02	0.03	0.01	0.02	0.02	0.01
O-PHOS (mg/L)	0.03	0.02	0.01	0.44	0.37	0.06
T-PHOS (mg/L)	0.09	0.12	0.05	0.51	0.46	0.20
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	8.60	13.00	9.12	8.50	11.50	7.71
BOD (mg/L)	NA	NA	5.94	NA	NA	4.43
Turbidity (NTU)	15	14	12.00	5.4	10	4.50
TSS (mg/L)	NA	5.50	4.50	NA	2.50	3.50
TDS (mg/L)	80	93	93.00	104	108	112.00
Conductivity (micro-mhos/cm)	116	139	NA	162	182	NA
Fecal Coliform (col/100 ml)	Is	NA	0			
	l 1/4	NA	0			
	c	NA	0			
	r 1/4	NA	0			
	rs	NA	0			
Gm Mean	NA	0	3.4			

TABLE A-46. Water Quality Data from Upper White Oak Lake.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	21.00	27.70	31.00			
Secchi (in)	37.00	34.00	33.00			
Trophic Index	3.00	3.40	2.24			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	<0.50	NA	NA	<0.50	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	<1.00	NA	NA	<1.00	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	<4.00	NA	NA	<4.00	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	<2.00	NA	NA	<2.00	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	<8.00	NA	NA	<8.00	NA
Hardness (mg/L)	NA	6.30	NA	NA	16.50	NA
DO (mg/L)	NA	NA	8.68	NA	NA	0.30
pH	NA	NA	7.64	NA	NA	6.26
Water Temp (°C)	NA	NA	31.26	NA	NA	24.30
Alkalinity (mg/L)	7.80	9.00	7.00	21.50	27.00	31.00
Bromide (mg/L)	NA	NA	0.18	NA	NA	0.18
Chloride (mg/L)	3.00	2.31	7.48	3.30	2.89	7.55
Fluoride (mg/L)	NA	NA	0.04	NA	NA	0.04
Sulfate (mg/L)	3.00	NA	2.80	14.00	14.40	2.93
NH3-N (mg/L)	0.06	0.03	0.07	0.05	0.83	2.82
NO3-N (mg/L)	0.02	NA	0.07	0.02	0.01	0.02
O-PHOS (mg/L)	0.05	0.02	0.02	0.03	0.02	0.02
T-PHOS (mg/L)	0.09	0.09	0.04	0.08	0.09	0.04
TKN (mg/L)	NA	NA	1.16	NA	NA	4.81
TOC (mg/L)	NA	8.80	6.83	NA	12.80	13.05
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	3.00	4.00	NA	7.00	8.60	NA
TSS (mg/L)	NA	2.50	NA	NA	6.50	NA
TDS (mg/L)	44.00	27.00	NA	75.00	67.00	NA
Conductivity (micro-mhos/cm)	23.50	25.10	NA	45.90	60.20	NA
Fecal Coliform (col/100 ml)	Is	NA	90			
	l 1/4	NA	60			
	c	NA	32			
	r 1/4	NA	100			
	rs	NA	25			
Gm Mean	NA	53.3	13.8			

TABLE A-47. Water Quality Data from Lake Atkins.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	13.4	12.82	7.70			
Secchi (in)	30.00	39.00	25.50			
Trophic Index	1.78	2.57	3.01			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.92	NA	NA	3.66
Barium (ug/L)	NA	NA	12.20	NA	NA	82.30
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	12.10	NA	NA	11.10
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	3.10	NA	NA	7.00
Chromium (ug/L)	NA	NA	<0.40	NA	NA	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Iron (ug/L)	NA	NA	<15.00	NA	NA	93.50
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	2.50	NA	NA	2.60
Manganese (ug/L)	NA	NA	1.50	NA	NA	5313.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	3.20	NA	NA	3.00
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	4.50	NA	NA	4.30
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	1.80	NA	NA	1.00
Hardness (mg/L)	NA	20.10	18.00	NA	20.10	28.00
DO (mg/L)	NA	NA	6.85	NA	NA	0.09
pH	NA	NA	7.27	NA	NA	6.97
Water Temp (°C)	NA	NA	28.40	NA	NA	22.10
Alkalinity (mg/L)	20.50	22.00	20.50	20.50	20.00	47.50
Bromide (mg/L)	NA	NA	0.05	NA	NA	0.05
Chloride (mg/L)	3.60	4.40	4.30	3.40	4.08	4.21
Fluoride (mg/L)	NA	NA	0.14	NA	NA	0.13
Sulfate (mg/L)	3.00	3.80	4.22	4.00	3.80	2.05
NH3-N (mg/L)	0.20	0.22	0.02	0.19	0.08	1.16
NO3-N (mg/L)	0.02	0.03	0.03	0.02	0.03	0.03
O-PHOS (mg/L)	0.03	0.03	0.02	0.03	0.02	0.02
T-PHOS (mg/L)	0.04	0.09	0.07	0.05	0.09	0.08
TKN (mg/L)	NA	NA	1.11	NA	NA	2.42
TOC (mg/L)	NA	9.50	5.99	NA	8.40	5.72
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	4.00	3.00	5.60	4.50	3.40	6.70
TSS (mg/L)	NA	2.00	6.00	NA	3.00	7.00
TDS (mg/L)	47.00	44.00	53.00	50.00	49.00	70.00
Conductivity (micro-mhos/cm)	61.50	67.20	NA	61.10	35.50	NA
Fecal Coliform (col/100 ml)	Is	NA	2			
	l 1/4	NA	0			
	c	NA	0			
	r 1/4	NA	5			
	rs	NA	0			
Gm Mean	NA	3.2	3.1			

TABLE A-48. Water Quality Data from Lake Overcup.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	19.60	14.14	NA			
Secchi (in)	28.00	31.00	NA			
Trophic Index	4.63	3.27	NA			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	<0.50	NA	NA	<0.50	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	<1.00	NA	NA	<1.00	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	<4.00	NA	NA	<4.00	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	<2.00	NA	NA	<2.00	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	9.00	NA	NA	9.00	NA
Hardness (mg/L)	NA	29.10	NA	NA	24.60	NA
DO (mg/L)	NA	NA	NA	NA	NA	NA
pH	NA	NA	NA	NA	NA	NA
Water Temp (°C)	NA	NA	NA	NA	NA	NA
Alkalinity (mg/L)	23.40	36.00	NA	42.00	28.00	NA
Bromide (mg/L)	NA	NA	NA	NA	NA	NA
Chloride (mg/L)	4.60	4.89	NA	4.50	4.87	NA
Fluoride (mg/L)	NA	NA	NA	NA	NA	NA
Sulfate (mg/L)	3.00	2.60	NA	4.00	1.50	NA
NH3-N (mg/L)	0.26	0.49	NA	1.13	0.08	NA
NO3-N (mg/L)	0.02	0.03	NA	0.02	0.03	NA
O-PHOS (mg/L)	0.03	0.02	NA	0.03	0.01	NA
T-PHOS (mg/L)	0.11	0.09	NA	0.13	0.09	NA
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	11.90	NA	NA	12.00	NA
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	4.00	5.00	NA	5.50	5.20	NA
TSS (mg/L)	NA	5.50	NA	NA	6.50	NA
TDS (mg/L)	42.00	60.00	NA	62.00	60.00	NA
Conductivity (micro-mhos/cm)	67.00	89.50	NA	99.70	81.20	NA
Fecal Coliform (col/100 ml)	NA	18	NA			
Is	NA	0	NA			
l 1/4	NA	0	NA			
c	NA	2	NA			
r 1/4	NA	2	NA			
rs	NA	17	NA			
Gm Mean	NA	5.9	NA			

Station not collected in 1999

TABLE A-49. Water Quality Data from Lower White Oak Lake.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	13.40	6.94	11.20			
Secchi (in)	59.00	48.00	38.00			
Trophic Index	1.41	1.56	0.87			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	<0.50	NA	NA	<0.50	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	<1.00	NA	NA	<1.00	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	<4.00	NA	NA	<4.00	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	<2.00	NA	NA	<2.00	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	9.00	NA	NA	9.00	NA
Hardness (mg/L)	NA	2.50	NA	NA	8.10	NA
DO (mg/L)	NA	NA	8.43	NA	NA	0.30
pH	NA	NA	7.34	NA	NA	6.08
Water Temp (°C)	NA	NA	30.48	NA	NA	24.60
Alkalinity (mg/L)	6.80	11.00	6.00	13.70	16.00	13.00
Bromide (mg/L)	NA	NA	0.07	NA	NA	0.06
Chloride (mg/L)	2.40	2.47	2.10	2.30	2.38	2.08
Fluoride (mg/L)	NA	NA	0.03	NA	NA	0.03
Sulfate (mg/L)	2.00	1.80	2.24	3.00	1.80	2.02
NH3-N (mg/L)	0.05	0.07	0.13	0.19	0.41	0.70
NO3-N (mg/L)	0.02	0.02	0.15	0.02	0.02	0.05
O-PHOS (mg/L)	0.03	0.02	0.02	0.03	0.02	0.02
T-PHOS (mg/L)	0.07	0.07	0.02	0.07	0.08	0.02
TKN (mg/L)	NA	NA	1.05	NA	NA	1.68
TOC (mg/L)	NA	7.50	7.60	NA	7.30	6.95
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	3.00	NA	3.00	14.00	NA
TSS (mg/L)	NA	1.00	NA	NA	2.50	NA
TDS (mg/L)	33.00	25.00	NA	42.00	33.00	NA
Conductivity (micro-mhos/cm)	22.80	24.00	NA	33.30	42.00	NA
Fecal Coliform (col/100 ml)	Is	NA	2			9
	l 1/4	NA	5			6
	c	NA	8			6
	r 1/4	NA	5			6
	rs	NA	8			40
Gm Mean	NA	5	9.5			

TABLE A-50. Water Quality Data from Harris Brake Lake.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	21.4	2.7	2.20			
Secchi (in)	42.00	37.00	29.00			
Trophic Index	2.89	1.02	1.34			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.82	NA	NA	2.17
Barium (ug/L)	NA	NA	<8.80	NA	NA	<8.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	10.60	NA	NA	9.60
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	2.20	NA	NA	2.60
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	0.61
Iron (ug/L)	NA	NA	<15.00	NA	NA	<15.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.80	NA	NA	1.70
Manganese (ug/L)	NA	NA	1.30	NA	NA	886.10
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	0.50	NA	NA	1.30
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.50	NA	NA	2.70
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	3.30	NA	<8.00	4.60
Hardness (mg/L)	NA	17.10	13.00	NA	12.90	13.00
DO (mg/L)	NA	NA	6.01	NA	NA	0.22
pH	NA	NA	6.94	NA	NA	6.70
Water Temp (°C)	NA	NA	31.10	NA	NA	30.10
Alkalinity (mg/L)	12.70	12.00	14.00	13.70	12.00	16.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.06
Chloride (mg/L)	3.20	3.14	3.29	3.20	3.14	3.38
Fluoride (mg/L)	NA	NA	0.09	NA	NA	0.09
Sulfate (mg/L)	2.00	2.80	2.78	3.00	2.80	2.64
NH3-N (mg/L)	0.17	0.03	<0.01	0.18	0.03	0.16
NO3-N (mg/L)	0.02	0.01	<0.01	0.02	0.03	0.02
O-PHOS (mg/L)	0.03	0.02	<0.01	0.03	0.02	<0.01
T-PHOS (mg/L)	0.10	0.04	0.03	0.10	0.02	0.05
TKN (mg/L)	NA	NA	0.67	NA	NA	1.06
TOC (mg/L)	NA	5.50	3.97	NA	5.30	4.56
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	4.00	3.00	2.50	3.00	3.00	4.10
TSS (mg/L)	NA	2.50	2.00	NA	3.00	5.00
TDS (mg/L)	27.00	31.00	37.50	29.00	35.00	41.00
Conductivity (micro-mhos/cm)	37.10	37.20	NA	38.80	36.90	NA
Fecal Coliform (col/100 ml)	Is	NA	5			4
	l 1/4	NA	5			<2
	c	NA	3			<2
	r 1/4	NA	2			<2
	rs	NA	16			24
	Gm Mean	NA	4.7			3.8

TABLE A-51. Water Quality Data from Lake Cane Creek.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	32.6	0.005	9.50			
Secchi (in)	28.00	46.00	24.50			
Trophic Index	3.66	0.98	2.10			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.27	NA	NA	3.29
Barium (ug/L)	NA	NA	11.00	NA	NA	76.00
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	22.00	NA	NA	20.00
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	7.30	NA	NA	510.00
Chromium (ug/L)	NA	<1.00	0.46	NA	<1.00	0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	0.58
Copper (ug/L)	NA	<4.00	1.50	NA	<4.00	0.57
Iron (ug/L)	NA	NA	79.00	NA	NA	862.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	2.20	NA	NA	2.200
Manganese (ug/L)	NA	NA	100.00	NA	NA	3870.000
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	<0.46	NA	NA	<0.46
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	5.00	NA	NA	5.00
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	<1.00	NA	9.00	3.20
Hardness (mg/L)	NA	26.10	27.00	NA	43.80	1283.00
DO (mg/L)	NA	NA	5.00	NA	NA	0.26
pH	NA	NA	6.56	NA	NA	6.41
Water Temp (°C)	NA	NA	28.90	NA	NA	24.20
Alkalinity (mg/L)	16.70	19.00	18.00	69.60	59.00	6.00
Bromide (mg/L)	NA	NA	0.06	NA	NA	0.06
Chloride (mg/L)	2.60	3.34	3.50	2.60	3.87	3.53
Fluoride (mg/L)	NA	NA	0.09	NA	NA	0.08
Sulfate (mg/L)	7.00	9.40	10.00	7.00	14.20	7.91
NH3-N (mg/L)	0.05	0.08	<0.005	1.68	1.34	0.26
NO3-N (mg/L)	0.02	0.01	0.02	0.02	0.01	0.02
O-PHOS (mg/L)	0.03	0.015	0.01	0.30	0.14	0.01
T-PHOS (mg/L)	0.07	0.05	0.04	0.60	0.22	0.05
TKN (mg/L)	NA	NA	0.69	NA	NA	0.96
TOC (mg/L)	NA	8.20	7.10	NA	12.20	6.60
BOD (mg/L)	NA	NA	1.18	NA	NA	1.89
Turbidity (NTU)	6.00	4.00	NA	22.00	12.00	7.50
TSS (mg/L)	NA	2.50	7.00	NA	11.50	7.00
TDS (mg/L)	45.00	54.00	56.00	100.00	94.00	72.50
Conductivity (micro-mhos/cm)	55.20	NA	NA	136.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	260			
	l 1/4	NA	920			
	c	NA	31			
	r 1/4	NA	>6400			
	rs	NA	168			
Gm Mean	NA	187.9	4			

TABLE A-52. Water Quality Data from Lake Wilson.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a ($\mu\text{g/L}$)	39.50	3.20	19.50			
Secchi (in)	38.00	30.00	21.50			
Trophic Index	3.14	3.92	5.37			
Aluminum ($\mu\text{g/L}$)	NA	NA	<127.00	NA	NA	<127.00
Arsenic ($\mu\text{g/L}$)	NA	NA	6.44	NA	NA	7.62
Barium ($\mu\text{g/L}$)	NA	NA	11.20	NA	NA	32.10
Beryllium ($\mu\text{g/L}$)	NA	NA	<0.11	NA	NA	<0.11
Boron ($\mu\text{g/L}$)	NA	NA	31.50	NA	NA	30.80
Cadmium ($\mu\text{g/L}$)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium ($\mu\text{g/L}$)	NA	NA	5.90	NA	NA	5.80
Chromium ($\mu\text{g/L}$)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt ($\mu\text{g/L}$)	NA	NA	<0.50	NA	NA	<0.50
Copper ($\mu\text{g/L}$)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron ($\mu\text{g/L}$)	NA	NA	<15.00	NA	NA	48.00
Lead ($\mu\text{g/L}$)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium ($\mu\text{g/L}$)	NA	NA	2.60	NA	NA	2.50
Manganese ($\mu\text{g/L}$)	NA	NA	2.50	NA	NA	181.90
Mercury ($\mu\text{g/L}$)	NA	NA	NA	NA	NA	NA
Nickel ($\mu\text{g/L}$)	NA	NA	<2.00	NA	NA	<2.00
Potassium ($\mu\text{g/L}$)	NA	NA	4.90	NA	NA	4.10
Selenium ($\mu\text{g/L}$)	NA	NA	<3.00	NA	NA	<3.00
Sodium ($\mu\text{g/L}$)	NA	NA	4.80	NA	NA	4.20
Vanadium ($\mu\text{g/L}$)	NA	NA	<1.00	NA	NA	<1.00
Zinc ($\mu\text{g/L}$)	NA	<8.00	2.40	NA	<8.00	<1.00
Hardness (mg/L)	NA	18.90	25.00	NA	22.20	25.00
DO (mg/L)	NA	NA	11.76	NA	NA	0.35
pH	NA	NA	9.18	NA	NA	6.75
Water Temp ($^{\circ}\text{C}$)	NA	NA	33.00	NA	NA	29.00
Alkalinity (mg/L)	16.70	29.00	29.00	17.60	30.00	29.00
Bromide (mg/L)	NA	NA	0.05	NA	NA	0.05
Chloride (mg/L)	3.50	5.22	7.29	3.50	5.35	6.40
Fluoride (mg/L)	NA	NA	0.10	NA	NA	0.10
Sulfate (mg/L)	1.00	0.50	2.07	1.00	0.50	1.74
NH ₃ -N (mg/L)	0.05	0.09	0.02	0.11	0.30	0.14
NO ₃ -N (mg/L)	0.02	0.02	0.02	0.02	0.01	0.02
O-PHOS (mg/L)	0.03	0.02	0.01	0.03	0.02	0.02
T-PHOS (mg/L)	0.08	0.13	0.10	0.09	0.14	0.17
TKN (mg/L)	NA	NA	1.73	NA	NA	2.18
TOC (mg/L)	NA	10.20	8.84	NA	9.40	7.65
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	4.00	4.00	NA	4.50	4.60	NA
TSS (mg/L)	NA	9.00	NA	NA	8.50	NA
TDS (mg/L)	NA	61.00	NA	20.00	58.00	NA
Conductivity (micro-mhos/cm)	42.50	77.70	NA	44.20	82.80	NA
Fecal Coliform (col/100 ml)	Is	315	17			
	1 1/4	62	9			
	c	240	6			
	r 1/4	44	29			
	rs	56	23			
Gm Mean	NA	102.9	14.4			

TABLE A-53. Water Quality Data from Lake Enterprise.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	55.40	43.80	44.80			
Secchi (in)	41.00	42.00	30.50			
Trophic Index	3.06	3.57	4.09			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	2.26	NA	NA	2.50
Barium (ug/L)	NA	NA	12.40	NA	NA	39.20
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	32.00	NA	NA	30.90
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	1.80	NA	NA	2.40
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	21.00	NA	NA	125.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	0.90	NA	NA	1.00
Manganese (ug/L)	NA	NA	1.20	NA	NA	98.80
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.90	NA	NA	3.80
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.30	NA	NA	2.40
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	12.00	2.20	NA	10.00	6.50
Hardness (mg/L)	NA	17.40	8.00	NA	10.50	10.00
DO (mg/L)	NA	NA	8.55	NA	NA	0.37
pH	NA	NA	7.36	NA	NA	5.79
Water Temp (°C)	NA	NA	30.60	NA	NA	27.20
Alkalinity (mg/L)	11.80	16.00	12.00	17.60	16.00	13.00
Bromide (mg/L)	NA	NA	<0.01	NA	NA	<0.01
Chloride (mg/L)	3.50	4.26	3.38	3.20	4.27	3.41
Fluoride (mg/L)	NA	NA	0.06	NA	NA	0.06
Sulfate (mg/L)	2.00	0.50	1.64	3.00	0.50	1.86
NH3-N (mg/L)	0.05	0.03	0.01	0.05	0.03	0.01
NO3-N (mg/L)	0.02	0.01	0.01	0.02	0.01	0.01
O-PHOS (mg/L)	0.03	0.02	0.01	0.08	0.02	0.01
T-PHOS (mg/L)	0.07	0.11	0.08	0.19	0.10	0.10
TKN (mg/L)	NA	NA	1.60	NA	NA	1.59
TOC (mg/L)	NA	10.20	8.92	NA	9.90	8.13
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	4.00	2.00	NA	12.00	2.60	NA
TSS (mg/L)	NA	2.00	NA	NA	4.00	NA
TDS (mg/L)	29.00	41.00	NA	35.00	38.00	NA
Conductivity (micro-mhos/cm)	36.60	47.50	NA	48.40	48.60	NA
Fecal Coliform (col/100 ml)	Is	NA	13			51
	l 1/4	NA	18			11
	c	NA	13			9
	r 1/4	NA	15			23
	rs	NA	33			<3
	Gm Mean	NA	17.2			12.8

TABLE A-54. Water Quality Data from Lake 1st Old River.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	52.1	13.35	43.70			
Secchi (in)	21.00	18.00	25.00			
Trophic Index	7.24	8.96	5.11			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	<0.50	NA	NA	<0.50	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	<1.00	NA	NA	1.00	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	<4.00	NA	NA	<4.00	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	<2.00	NA	NA	<2.00	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	<8.00	NA	NA	<8.00	NA
Hardness (mg/L)	NA	78.60	NA	NA	72.30	NA
DO (mg/L)	73.50	NA	8.30	86.20	NA	0.40
pH	NA	NA	8.61	NA	NA	6.97
Water Temp (°C)	NA	NA	29.90	NA	NA	28.60
Alkalinity (mg/L)	NA	NA	82.00	NA	NA	83.00
Bromide (mg/L)	NA	NA	0.05	NA	NA	0.05
Chloride (mg/L)	3.00	3.66	2.90	3.00	3.37	2.86
Fluoride (mg/L)	1.00	0.50	0.07	4.00	0.50	0.08
Sulfate (mg/L)	NA	NA	1.67	NA	NA	1.63
NH3-N (mg/L)	0.05	0.03	0.04	2.22	0.03	0.34
NO3-N (mg/L)	0.02	0.01	0.03	0.02	0.01	0.03
O-PHOS (mg/L)	0.03	0.02	0.02	0.24	0.02	0.02
T-PHOS (mg/L)	0.10	0.15	0.08	0.07	0.16	0.12
TKN (mg/L)	NA	NA	1.71	NA	NA	1.93
TOC (mg/L)	10.90	NA	7.69	10.40	NA	7.72
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	9.00	12.00	NA	16.00	12.00	NA
TSS (mg/L)	NA	17.50	NA	NA	16.00	NA
TDS (mg/L)	108.00	113.00	NA	114.00	118.00	NA
Conductivity (micro-mhos/cm)	147.00	176.60	NA	181.00	179.70	NA
Fecal Coliform (col/100 ml)	Is	NA	12			3
	l 1/4	NA	3			31
	c	NA	3			20
	r 1/4	NA	13			6
	rs	NA	7			11
	Gm Mean	NA	6.3			10.4

TABLE A-55. Water Quality Data from Lake Pickthorne.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	NA	2.20	12.10			
Secchi (in)	NA	21.00	15.50			
Trophic Index	NA	1.73	4.20			
Aluminum (ug/L)	NA	NA	1000.00	NA	NA	360.00
Arsenic (ug/L)	NA	NA	1.33	NA	NA	1.32
Barium (ug/L)	NA	NA	25.0	NA	NA	25.00
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	260.00	NA	NA	20.00
Cadmium (ug/L)	NA	<0.50	<0.14	NA	0.25	<0.14
Calcium (ug/L)	NA	NA	2.30	NA	NA	2.30
Chromium (ug/L)	NA	<1.00	0.45	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	0.78	NA	<4.00	0.76
Iron (ug/L)	NA	NA	724.00	NA	NA	411.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.20	NA	NA	1.20
Manganese (ug/L)	NA	NA	6.50	NA	NA	4.20
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.30	NA	NA	0.80
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	5.90	NA	NA	6.00
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	9.00	2.40	NA	12.00	2.10
Hardness (mg/L)	NA	17.10	11.00	NA	17.10	11.00
DO (mg/L)	NA	NA	5.54	NA	NA	5.40
pH	NA	NA	7.09	NA	NA	6.81
Water Temp (°C)	NA	NA	27.00	NA	NA	27.10
Alkalinity (mg/L)	NA	23.00	11.00	NA	24.00	21.00
Bromide (mg/L)	NA	NA	0.09	NA	NA	0.09
Chloride (mg/L)	NA	4.70	4.32	NA	4.57	4.32
Fluoride (mg/L)	NA	NA	0.19	NA	NA	0.18
Sulfate (mg/L)	NA	1.50	3.20	NA	1.50	3.21
NH3-N (mg/L)	NA	0.03	0.01	NA	0.07	0.01
NO3-N (mg/L)	NA	0.03	0.02	NA	0.03	0.03
O-PHOS (mg/L)	NA	0.02	0.01	NA	0.02	0.01
T-PHOS (mg/L)	NA	0.04	0.05	NA	0.04	0.06
TKN (mg/L)	NA	NA	0.86	NA	NA	0.93
TOC (mg/L)	NA	10.30	10.20	NA	10.20	8.80
BOD (mg/L)	NA	NA	1.30	NA	NA	0.92
Turbidity (NTU)	NA	10.00	26.00	NA	15.00	18.00
TSS (mg/L)	NA	9.50	15.00	NA	16.50	20.50
TDS (mg/L)	NA	61.00	72.50	NA	59.00	74.50
Conductivity (micro-mhos/cm)	NA	65.40	NA	NA	67.60	NA
Fecal Coliform (col/100 ml)	NA	4	4			
Is	NA	4	6			
1 1/4	NA	2	3			
c	NA	0	3			
r 1/4	NA	4	12			
rs	NA	3.4	4.8			
Gm Mean	NA					

TABLE A-56. Water Quality Data from Lake Hogue.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	22.7	14.68	51.70			
Secchi (in)	36.00	18.00	17.00			
Trophic Index	2.02	7.29	9.16			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.77	NA	NA	1.79
Barium (ug/L)	NA	NA	18.70	NA	NA	18.90
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	26.90	NA	NA	24.70
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	5.60	NA	NA	5.60
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	0.60	NA	4.30	0.81
Iron (ug/L)	NA	NA	27.90	NA	NA	26.30
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	2.60	NA	NA	2.60
Manganese (ug/L)	NA	NA	4.20	NA	NA	61.50
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.50	NA	NA	2.20
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	6.00	NA	NA	6.00
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	6.50	NA	<8.00	<1.00
Hardness (mg/L)	NA	20.10	25.00	NA	17.10	24.00
DO (mg/L)	NA	NA	4.20	NA	NA	2.50
pH	NA	NA	7.05	NA	NA	6.82
Water Temp (°C)	NA	NA	30.98	NA	NA	30.98
Alkalinity (mg/L)	43.10	30.00	31.00	66.60	28.00	31.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.03
Chloride (mg/L)	2.70	3.18	4.69	3.60	3.29	4.65
Fluoride (mg/L)	NA	NA	0.19	NA	NA	0.24
Sulfate (mg/L)	1.00	2.60	2.69	1.00	2.60	2.69
NH3-N (mg/L)	0.07	0.14	0.03	1.06	0.13	0.07
NO3-N (mg/L)	0.02	0.01	0.02	0.02	0.01	0.02
O-PHOS (mg/L)	0.03	0.08	0.02	0.03	0.02	0.02
T-PHOS (mg/L)	0.05	0.12	0.10	0.33	0.06	0.11
TKN (mg/L)	NA	NA	1.28	NA	NA	1.24
TOC (mg/L)	11.40	NA	5.68	11.40	NA	5.53
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	6.00	10.00	11.00	40.00	9.70	13
TSS (mg/L)	NA	16.50	13.00	NA	15.50	17.50
TDS (mg/L)	61.00	63.00	67.00	84.00	63.00	70.00
Conductivity (micro-mhos/cm)	87.10	74.00	NA	139.00	74.00	NA
Fecal Coliform (col/100 ml)	Is	NA	10			
	l 1/4	NA	10			
	c	NA	2			
	r 1/4	NA	3			
	rs	NA	6			
Gm Mean	NA	5.1	24.6			

TABLE A-57. Water Quality Data from Lake Greenlee.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	22.7	15.16	NA			
Secchi (in)	20.00	4.00	NA			
Trophic Index	15.64	288.79	NA			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	<0.50	NA	NA	<0.50	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	<1.00	NA	NA	<1.00	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	<4.00	NA	NA	<4.00	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	<2.00	NA	NA	3.00	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	<8.00	NA	NA	<8.00	NA
Hardness (mg/L)	NA	36.30	NA	NA	33.30	NA
DO (mg/L)	NA	NA	NA	NA	NA	NA
pH	NA	NA	NA	NA	NA	NA
Water Temp (°C)	NA	NA	NA	NA	NA	NA
Alkalinity (mg/L)	23.00	23.00	NA	63.00	63.00	NA
Bromide (mg/L)	NA	NA	NA	NA	NA	NA
Chloride (mg/L)	4.90	4.70	NA	4.97	5.12	NA
Fluoride (mg/L)	NA	NA	NA	NA	NA	NA
Sulfate (mg/L)	9.00	7.00	NA	13.60	14.30	NA
NH3-N (mg/L)	0.05	0.05	NA	0.41	0.46	NA
NO3-N (mg/L)	0.02	0.02	NA	0.31	0.31	NA
O-PHOS (mg/L)	0.17	0.16	NA	0.62	0.67	NA
T-PHOS (mg/L)	0.29	0.28	NA	1.14	1.09	NA
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	9.4	NA	NA	10.7	NA
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	9.00	9.70	NA	180.00	180.00	NA
TSS (mg/L)	NA	4.00	NA	NA	4.50	NA
TDS (mg/L)	64.00	60.00	NA	612.00	615.00	NA
Conductivity (micro-mhos/cm)	68.30	67.30	NA	63.00	63.00	NA
Fecal Coliform (col/100 ml)	Is	NA	0	NA		
	l 1/4	NA	9	NA		
	c	NA	0	NA		
	r 1/4	NA	0	NA		
	rs	NA	9	NA		
Gm Mean	NA	9	NA			

Station not collected in 1999

TABLE A-58. Water Quality Data from Lake Mallard.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	115.8	45.42	62.10			
Secchi (in)	14.00	21.00	19.00			
Trophic Index	22.56	11.64	11.16			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	2.71	NA	NA	2.75
Barium (ug/L)	NA	NA	25.90	NA	NA	27.50
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	36.60	NA	NA	37.30
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	16.50	NA	NA	17.30
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	23.50	NA	NA	24.60
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	6.60	NA	NA	6.60
Manganese (ug/L)	NA	NA	2.60	NA	NA	2.40
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.80	NA	NA	3.30
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	5.00	NA	NA	5.50
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	<1.00	NA	10.00	27.20
Hardness (mg/L)	NA	70.20	68.00	NA	76.50	70.00
DO (mg/L)	NA	NA	10.60	NA	NA	4.96
pH	NA	NA	9.02	NA	NA	8.25
Water Temp (°C)	NA	NA	31.20	NA	NA	30.14
Alkalinity (mg/L)	78.30	75.00	74.00	77.30	76.00	74.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	0.04
Chloride (mg/L)	6.60	5.81	5.31	6.50	5.66	5.36
Fluoride (mg/L)	NA	NA	0.19	NA	NA	0.21
Sulfate (mg/L)	1.00	4.80	3.16	2.00	3.80	3.35
NH3-N (mg/L)	0.07	0.39	0.01	0.16	0.43	0.02
NO3-N (mg/L)	0.02	0.01	0.01	0.02	0.01	0.01
O-PHOS (mg/L)	0.03	0.06	0.03	0.03	0.04	0.02
T-PHOS (mg/L)	0.20	0.20	0.15	0.20	0.20	0.11
TKN (mg/L)	NA	NA	2.59	NA	NA	2.19
TOC (mg/L)	16.60	NA	10.49	17.20	NA	9.64
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	16.00	18.00	13.00	18.00	18.00	11.00
TSS (mg/L)	NA	19.50	15.00	NA	20.00	12.50
TDS (mg/L)	134.00	126.00	121.00	135.00	127.00	118.00
Conductivity (micro-mhos/cm)	171.00	177.00	NA	177.00	178.00	NA
Fecal Coliform (col/100 ml)	Is	NA	1800			
	l 1/4	NA	270			
	c	NA	96			
	r 1/4	NA	470			
	rs	NA	90			
Gm Mean	NA	287.8	<3			

TABLE A-59. Water Quality Data from Lake Grampus.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	53.50	0.53	9.90			
Secchi (in)	35.00	41.00	31.00			
Trophic Index	3.53	2.35	1.71			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.80	NA	NA	2.03
Barium (ug/L)	NA	NA	<8.80	NA	NA	<8.8
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	15.80	NA	NA	16.80
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	1.80	NA	NA	1.90
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	0.52
Iron (ug/L)	NA	NA	<15.00	NA	NA	54.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.00	NA	NA	1.00
Manganese (ug/L)	NA	NA	1.00	NA	NA	77.40
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.80	NA	NA	2.00
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	0.40	NA	NA	0.60
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	9.00	<1.00	NA	<8.00	2.30
Hardness (mg/L)	NA	8.70	9.00	NA	10.50	9.00
DO (mg/L)	NA	NA	9.50	NA	NA	0.60
pH	NA	NA	8.34	NA	NA	5.34
Water Temp (°C)	NA	NA	31.30	NA	NA	23.60
Alkalinity (mg/L)	10.80	38.00	11.00	30.40	19.00	23.00
Bromide (mg/L)	NA	NA	<0.01	NA	NA	<0.01
Chloride (mg/L)	2.20	1.70	1.70	2.40	1.88	1.54
Fluoride (mg/L)	NA	NA	0.06	NA	NA	0.06
Sulfate (mg/L)	2.00	0.50	0.92	3.00	0.50	0.91
NH3-N (mg/L)	0.05	0.03	<0.01	0.05	0.03	0.01
NO3-N (mg/L)	0.02	0.01	0.01	0.02	0.01	0.01
O-PHOS (mg/L)	0.03	0.02	<0.01	0.09	0.04	<0.01
T-PHOS (mg/L)	0.07	0.10	0.04	0.37	0.17	0.09
TKN (mg/L)	NA	NA	1.18	NA	NA	1.80
TOC (mg/L)	NA	9.90	7.52	NA	9.90	7.71
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	4.00	2.00	NA	48.00	8.30	NA
TSS (mg/L)	NA	6.00	NA	NA	9.00	NA
TDS (mg/L)	14.00	34.00	NA	42.00	36.00	NA
Conductivity (micro-mhos/cm)	25.60	31.00	NA	66.90	39.90	NA
Fecal Coliform (col/100 ml)	Is	NA	50			<3
	I 1/4	NA	27			6
	c	NA	32			<3
	r 1/4	NA	23			3
	rs	NA	25			3
Gm Mean	NA	30.1	3.4			

TABLE A-60. Water Quality Data from Lake DesArc.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	8.1	36.12	19.80			
Secchi (in)	30.00	24.00	25.00			
Trophic Index	2.94	5.63	3.23			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	3.80	NA	NA	15.54
Barium (ug/L)	NA	NA	<8.80	NA	NA	49.60
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	8.70	NA	NA	8.80
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	2.50	NA	NA	3.60
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	0.52
Copper (ug/L)	NA	<4.00	0.73	NA	<4.00	1.19
Iron (ug/L)	NA	NA	50.30	NA	NA	874.80
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.30	NA	NA	1.50
Manganese (ug/L)	NA	NA	3.40	NA	NA	5242.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	0.90	NA	NA	1.00
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	5.80	NA	NA	6.00
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	4.20	NA	<8.00	7.50
Hardness (mg/L)	NA	15.90	12.00	NA	12.00	15.00
DO (mg/L)	NA	NA	7.57	NA	NA	0.28
pH	NA	NA	8.88	NA	NA	6.82
Water Temp (°C)	NA	NA	32.50	NA	NA	25.90
Alkalinity (mg/L)	26.00	56.00	18.00	64.70	55.00	38.00
Bromide (mg/L)	NA	NA	0.06	NA	NA	0.06
Chloride (mg/L)	3.00	2.38	3.10	2.80	2.58	3.03
Fluoride (mg/L)	NA	NA	0.29	NA	NA	0.28
Sulfate (mg/L)	6.00	3.20	3.72	6.00	3.20	1.67
NH3-N (mg/L)	0.05	0.21	0.08	1.84	0.11	0.99
NO3-N (mg/L)	0.02	0.03	0.02	0.02	0.02	0.02
O-PHOS (mg/L)	0.03	0.04	0.02	0.10	0.04	0.07
T-PHOS (mg/L)	0.08	0.13	0.06	0.24	0.10	0.20
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	7.80	5.70	NA	8.80	5.61
BOD (mg/L)	NA	NA	3.96	NA	NA	2.28
Turbidity (NTU)	6.00	7.00	1.20	7.30	7.50	10.00
TSS (mg/L)	NA	6.50	8.00	NA	8.50	7.50
TDS (mg/L)	48.00	40.00	54.00	82.00	41.00	62.00
Conductivity (micro-mhos/cm)	64.50	56.00	NA	136.00	55.00	NA
Fecal Coliform (col/100 ml)	Is	NA	0			9
	l 1/4	NA	0			<3
	c	NA	2			<3
	r 1/4	NA	3			<3
	rs	NA	5			3
Gm Mean	NA	3.1	3.7			

TABLE A-61. Water Quality Data from Lake Wallace.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	98.00	4.81	54.40			
Secchi (in)	26.00	29.00	16.00			
Trophic Index	11.08	5.92	10.71			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	3.73	NA	NA	3.34
Barium (ug/L)	NA	NA	16.50	NA	NA	20.20
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	25.60	NA	NA	26.60
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	5.80	NA	NA	7.90
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	5.72
Iron (ug/L)	NA	NA	<15.00	NA	NA	16.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	0.81
Magnesium (ug/L)	NA	NA	2.30	NA	NA	2.90
Manganese (ug/L)	NA	NA	1.80	NA	NA	5.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	3.80	NA	NA	3.60
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.90	NA	NA	4.10
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	9.00	<1.00	NA	9.00	<1.00
Hardness (mg/L)	NA	26.70	24.00	NA	18.90	32.00
DO (mg/L)	NA	NA	12.53	NA	NA	0.89
pH	NA	NA	9.41	NA	NA	6.94
Water Temp (°C)	NA	NA	34.20	NA	NA	30.00
Alkalinity (mg/L)	19.60	27.00	28.00	29.40	29.00	36.00
Bromide (mg/L)	NA	NA	0.05	NA	NA	0.05
Chloride (mg/L)	2.00	3.20	3.99	2.00	3.03	4.80
Fluoride (mg/L)	NA	NA	0.07	NA	NA	0.09
Sulfate (mg/L)	1.00	0.50	1.92	4.00	NA	1.98
NH3-N (mg/L)	0.05	0.07	0.01	0.23	0.03	0.02
NO3-N (mg/L)	0.02	0.01	0.01	0.02	0.01	0.02
O-PHOS (mg/L)	0.03	0.04	0.02	0.16	0.04	0.02
T-PHOS (mg/L)	0.19	0.17	0.12	0.56	0.16	0.14
TKN (mg/L)	NA	NA	2.11	NA	NA	2.22
TOC (mg/L)	NA	9.80	9.50	NA	9.80	8.07
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	7.00	6.00	NA	20.00	5.40	NA
TSS (mg/L)	NA	9.50	NA	NA	9.00	NA
TDS (mg/L)	20.00	79.00	NA	37.00	63.00	NA
Conductivity (micro-mhos/cm)	43.70	63.90	NA	61.60	62.80	NA
Fecal Coliform (col/100 ml)	Is	NA	7			9
	1 1/4	NA	22			<3
	c	NA	22			<3
	r 1/4	NA	15			6
	rs	NA	387			3
Gm Mean	NA	28.8	4.3			

TABLE A-62. Water Quality Data from Lake Pine Bluff.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	NA	26.00	10.90			
Secchi (in)	NA	25.50	26.00			
Trophic Index	NA	6.43	5.61			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	4.51	NA	NA	4.47
Barium (ug/L)	NA	NA	32.00	NA	NA	32.00
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	50.00	NA	NA	46.00
Cadmium (ug/L)	NA	<0.50	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	10.00	NA	NA	11.00
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	21.00	NA	NA	22.00
Lead (ug/L)	NA	<2.00	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	1.70	NA	NA	1.70
Manganese (ug/L)	NA	NA	2.80	NA	NA	1.60
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	3.20	NA	NA	3.80
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	7.00	NA	NA	7.00
Vanadium (ug/L)	NA	NA	1.34	NA	NA	1.31
Zinc (ug/L)	NA	<8.00	1.20	NA	<8.00	<1.00
Hardness (mg/L)	NA	39.60	32.00	NA	39.60	34.00
DO (mg/L)	NA	NA	8.00	NA	NA	6.21
pH	NA	NA	8.50	NA	NA	8.26
Water Temp (°C)	NA	NA	28.90	NA	NA	28.50
Alkalinity (mg/L)	NA	48.00	45.00	NA	48.00	49.00
Bromide (mg/L)	NA	NA	0.05	NA	NA	0.06
Chloride (mg/L)	NA	3.68	3.55	NA	4.12	3.55
Fluoride (mg/L)	NA	NA	0.21	NA	NA	0.20
Sulfate (mg/L)	NA	6.20	5.63	NA	6.20	5.56
NH3-N (mg/L)	NA	0.1	0.02	NA	0.18	0.06
NO3-N (mg/L)	NA	0.01	0.03	NA	0.01	0.03
O-PHOS (mg/L)	NA	0.05	0.02	NA	0.05	0.03
T-PHOS (mg/L)	NA	0.14	0.14	NA	0.14	0.14
TKN (mg/L)	NA	NA	1.52	NA	NA	1.50
TOC (mg/L)	NA	8.4	7.40	NA	7.9	7.00
BOD (mg/L)	NA	NA	5.50	NA	NA	2.63
Turbidity (NTU)	NA	8.00	9.90	NA	8.6	11.00
TSS (mg/L)	NA	11.50	13.00	NA	11.5	12.00
TDS (mg/L)	NA	84.00	88.00	NA	83.00	90.00
Conductivity (micro-mhos/cm)	NA	NA	NA	NA	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	567			<4
	l 1/4	NA	1560			<4
	c	NA	180			8
	r 1/4	NA	1760			8
	rs	NA	>6400			8
Gm Mean	NA	727.6	6.1			

TABLE A-63. Water Quality Data from Lake Ashbaugh.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	28.2	10.32	57.90			
Secchi (in)	28.00	34.00	20.00			
Trophic Index	3.15	2.63	6.70			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	2.22	NA	NA	2.34
Barium (ug/L)	NA	NA	21.40	NA	NA	19.20
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	12.80	NA	NA	12.30
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	14.50	NA	NA	14.50
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	18.40	NA	NA	22.60
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	9.30	NA	NA	9.40
Manganese (ug/L)	NA	NA	2.10	NA	NA	3.30
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.10	NA	NA	1.60
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.10	NA	NA	2.20
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	13.00	<1.00	NA	8.00	11.90
Hardness (mg/L)	NA	57.30	74.00	NA	69.00	75.00
DO (mg/L)	NA	NA	5.75	NA	NA	2.06
pH	NA	NA	8.34	NA	NA	7.70
Water Temp (°C)	NA	NA	32.56	NA	NA	31.66
Alkalinity (mg/L)	66.60	72.00	73.00	65.60	74.00	73.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	<0.01
Chloride (mg/L)	2.60	3.32	2.95	2.60	3.25	2.98
Fluoride (mg/L)	NA	NA	0.07	NA	NA	0.08
Sulfate (mg/L)	3.00	5.90	4.00	4.00	4.80	4.01
NH3-N (mg/L)	0.05	0.19	<0.01	0.05	0.16	0.02
NO3-N (mg/L)	0.02	0.01	0.01	0.02	0.01	0.02
O-PHOS (mg/L)	0.03	0.04	0.02	0.03	0.02	0.02
T-PHOS (mg/L)	0.06	0.08	0.08	0.06	0.05	0.08
TKN (mg/L)	NA	NA	1.40	NA	NA	1.56
TOC (mg/L)	9.90	NA	5.83	7.70	NA	5.37
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	6.00	5.00	8.50	5.50	4.60	8.40
TSS (mg/L)	NA	8.00	7.50	NA	8.00	10.00
TDS (mg/L)	94.00	97.00	100	82.00	94.00	99.00
Conductivity (micro-mhos/cm)	147.00	151.00	NA	147.00	278.00	NA
Fecal Coliform (col/100 ml)	Is	33	20			
	1 1/4	64	26			
	c	32	<3			
	r 1/4	7	11			
	rs	380	14			
Gm Mean	NA	44.8	11.9			

TABLE A-64. Water Quality Data from Lake Bois D' Arc.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	110.8	NA	40.70			
Secchi (in)	21.00	NA	18.00			
Trophic Index	10.51	NA	8.65			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	0.25	NA	NA	0.25	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	0.50	NA	NA	0.50	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	2.00	NA	NA	5.00	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	1.00	NA	NA	1.00	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	11.00	NA	NA	9.00	NA
Hardness (mg/L)	NA	21.30	NA	NA	25.80	NA
DO (mg/L)	NA	NA	5.67	NA	NA	2.93
pH	NA	NA	7.18	NA	NA	6.83
Water Temp (°C)	NA	NA	28.80	NA	NA	28.20
Alkalinity (mg/L)	30.40	NA	39.00	33.30	NA	39.00
Bromide (mg/L)	NA	NA	0.09	NA	NA	0.10
Chloride (mg/L)	4.80	8.78	9.08	4.80	8.50	9.08
Fluoride (mg/L)	NA	NA	0.09	NA	NA	0.09
Sulfate (mg/L)	3.00	1.80	3.73	3.00	1.80	3.72
NH3-N (mg/L)	0.05	0.05	0.02	0.21	0.03	0.02
NO3-N (mg/L)	0.02	0.01	0.02	0.02	0.01	0.02
O-PHOS (mg/L)	0.03	0.02	0.02	0.03	0.02	0.02
T-PHOS (mg/L)	0.11	0.16	0.12	0.16	0.17	0.11
TKN (mg/L)	NA	NA	1.41	NA	NA	1.45
TOC (mg/L)	11.10	9.90	7.27	9.30	8.80	7.23
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	16.00	10.00	NA	7.50	9.70	NA
TSS (mg/L)	NA	12.50	NA	NA	8.50	NA
TDS (mg/L)	77.00	87.00	NA	78.00	86.00	NA
Conductivity (micro-mhos/cm)	88.30	NA	NA	88.90	NA	NA
Fecal Coliform (col/100 ml)	Is	210	30			
	l 1/4	7	25			
	c	7	24			
	r 1/4	3	3			
	rs	0	12			
Gm Mean	NA	13.3	14.5			

TABLE A-65. Water Quality Data from Lake Old Town.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	174.3	110.36	123.40			
Secchi (in)	12.00	19.00	12.00			
Trophic Index	41.19	16.81	42.45			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	25.60	NA	NA	23.17
Barium (ug/L)	NA	NA	24.60	NA	NA	32.50
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	30.40	NA	NA	30.60
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	12.20	NA	NA	12.20
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	29.40	NA	NA	33.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	3.20	NA	NA	3.30
Manganese (ug/L)	NA	NA	5.30	NA	NA	21.30
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	4.40	NA	NA	4.30
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.60	NA	NA	2.60
Vanadium (ug/L)	NA	NA	1.17	NA	NA	1.04
Zinc (ug/L)	NA	14.00	<1.00	NA	<8.00	<1.00
Hardness (mg/L)	NA	42.00	44.00	NA	49.80	44.00
DO (mg/L)	NA	NA	13.61	NA	NA	0.88
pH	NA	NA	9.42	NA	NA	7.37
Water Temp (°C)	NA	NA	34.50	NA	NA	31.90
Alkalinity (mg/L)	44.10	68.00	55.00	44.10	64.00	55.00
Bromide (mg/L)	NA	NA	0.03	NA	NA	<0.01
Chloride (mg/L)	2.00	3.17	2.68	1.90	3.18	3.33
Fluoride (mg/L)	NA	NA	0.16	NA	NA	0.14
Sulfate (mg/L)	5.00	3.20	1.97	6.00	3.20	2.37
NH3-N (mg/L)	0.05	0.16	<0.01	0.05	0.15	0.04
NO3-N (mg/L)	0.02	0.04	0.05	0.02	0.03	0.14
O-PHOS (mg/L)	0.07	0.06	0.14	0.06	0.06	0.11
T-PHOS (mg/L)	0.32	0.21	0.38	0.32	0.25	0.39
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	6.70	9.90	8.64	7.10	9.80	7.43
BOD (mg/L)	NA	NA	9.30	NA	NA	8.28
Turbidity (NTU)	24.00	14.00	24.00	24.00	15.00	26.00
TSS (mg/L)	NA	17.00	29.00	NA	17.50	28.50
TDS (mg/L)	72.00	89.00	95.00	69.00	88.00	93.00
Conductivity (micro-mhos/cm)	99.10	130.00	NA	93.30	132.00	NA
Fecal Coliform (col/100 ml)	Is	NA	3			6
	I 1/4	NA	7			<3
	c	NA	10			<3
	r 1/4	NA	12			3
	rs	NA	7			34
Gm Mean	NA	7.1	5.6			

TABLE A-66. Water Quality Data from Lake Horseshoe.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	87.70	170.00	50.50			
Secchi (in)	13.00	18.00	21.50			
Trophic Index	14.44	17.72	8.95			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	4.61	NA	NA	9.89
Barium (ug/L)	NA	NA	44.20	NA	NA	40.10
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	33.60	NA	NA	13.60
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	16.90	NA	NA	15.80
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	0.78
Iron (ug/L)	NA	NA	<15.00	NA	NA	<15.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	5.50	NA	NA	4.70
Manganese (ug/L)	NA	NA	2.00	NA	NA	85.20
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	3.90	NA	NA	3.60
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	1.70	NA	NA	1.00
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	<1.00	NA	<8.00	1.10
Hardness (mg/L)	NA	65.70	65.00	NA	65.70	59.00
DO (mg/L)	NA	NA	9.10	NA	NA	0.33
pH	NA	NA	8.82	NA	NA	7.38
Water Temp (°C)	NA	NA	32.70	NA	NA	31.10
Alkalinity (mg/L)	61.30	67.00	68.00	61.30	70.00	72.00
Bromide (mg/L)	NA	NA	<0.01	NA	NA	<0.01
Chloride (mg/L)	1.30	1.31	1.82	1.30	1.53	1.78
Fluoride (mg/L)	NA	NA	0.13	NA	NA	0.13
Sulfate (mg/L)	8.00	4.10	2.81	9.00	4.10	2.88
NH3-N (mg/L)	0.05	0.10	0.01	0.05	0.10	0.16
NO3-N (mg/L)	0.02	0.02	0.01	NA	0.02	0.01
O-PHOS (mg/L)	0.03	0.05	0.01	0.03	0.02	0.02
T-PHOS (mg/L)	0.10	0.15	0.09	0.10	0.13	0.14
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	14.00	11.60	6.80	NA	9.50	6.11
BOD (mg/L)	NA	NA	6.31	NA	NA	3.85
Turbidity (NTU)	17.00	20.00	10.00	16.00	15.00	10.00
TSS (mg/L)	NA	8.50	9.50	NA	14.50	11.00
TDS (mg/L)	100.00	96.00	96.00	82.00	87.00	99.00
Conductivity (micro-mhos/cm)	131.00	134.00	NA	131.00	136.00	NA
Fecal Coliform (col/100 ml)	Is	NA	2			
	l 1/4	NA	0			
	c	NA	0			
	r 1/4	NA	10			
	rs	NA	10			
Gm Mean	NA	5.8	17.3			

TABLE A-67. Water Quality Data from Lake Chicot - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	36.10	13.70	17.80			
Secchi (in)	20.00	20.00	20.50			
Trophic Index	14.31	10.04	6.72			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	20.90	NA	NA	22.49
Barium (ug/L)	NA	NA	32.50	NA	NA	44.90
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	44.60	NA	NA	45.00
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	20.70	NA	NA	22.20
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	5.00	0.58
Iron (ug/L)	NA	NA	<15.00	NA	NA	33.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	10.80	NA	NA	10.70
Manganese (ug/L)	NA	NA	1.20	NA	NA	172.40
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	3.60	NA	NA	3.50
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	11.90	NA	NA	11.80
Vanadium (ug/L)	NA	NA	1.37	NA	NA	1.28
Zinc (ug/L)	NA	11.00	<1.00	NA	9.00	<1.00
Hardness (mg/L)	NA	93.90	96.00	NA	96.00	99.00
DO (mg/L)	NA	NA	8.47	NA	NA	0.29
pH	NA	NA	8.83	NA	NA	7.22
Water Temp (°C)	NA	NA	31.40	NA	NA	29.50
Alkalinity (mg/L)	110.00	96.00	97.00	NA	128.00	102.00
Bromide (mg/L)	NA	NA	0.07	NA	NA	0.08
Chloride (mg/L)	NA	13.40	14.20	NA	13.90	14.20
Fluoride (mg/L)	NA	NA	0.17	NA	NA	0.18
Sulfate (mg/L)	1.00	5.90	5.55	NA	5.90	5.42
NH3-N (mg/L)	0.01	0.07	0.01	NA	0.06	0.02
NO3-N (mg/L)	0.18	0.01	0.01	0.02	0.01	0.02
O-PHOS (mg/L)	0.15	0.05	0.01	NA	0.05	0.06
T-PHOS (mg/L)	0.25	0.20	0.12	NA	0.19	0.17
TKN (mg/L)	NA	NA	1.98	NA	NA	2.15
TOC (mg/L)	NA	9.40	7.89	NA	8.90	7.50
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	11.00	10.00	NA	NA	9.20	NA
TSS (mg/L)	NA	23.50	NA	NA	22.50	NA
TDS (mg/L)	NA	183.00	NA	NA	135.00	NA
Conductivity (micro-mhos/cm)	221.00	238.00	NA	NA	238.00	NA
Fecal Coliform (col/100 ml)	Is	NA	148			23
	1 1/4	NA	15			<3
	c	NA	18			<3
	r 1/4	NA	82			6
	rs	NA	100			<3
	Gm Mean	NA	50.5			5.2

TABLE A-68. Water Quality Data from Lake Grand.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	147.50	40.00	37.30			
Secchi (in)	17.00	20.00	12.00			
Trophic Index	26.32	11.35	24.86			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	21.23	NA	NA	20.77
Barium (ug/L)	NA	NA	26.80	NA	NA	29.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	35.20	NA	NA	33.70
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	17.20	NA	NA	17.10
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	0.84
Iron (ug/L)	NA	NA	<15.00	NA	NA	42.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	5.90	NA	NA	6.00
Manganese (ug/L)	NA	NA	4.00	NA	NA	216.00
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	4.00	NA	NA	3.80
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.30	NA	NA	2.30
Vanadium (ug/L)	NA	NA	1.85	NA	NA	1.33
Zinc (ug/L)	NA	<8.00	2.30	NA	17.00	2.80
Hardness (mg/L)	NA	88.80	67.00	NA	93.90	68.00
DO (mg/L)	NA	NA	8.27	NA	NA	0.35
pH	NA	NA	9.41	NA	NA	7.48
Water Temp (°C)	NA	NA	31.40	NA	NA	28.90
Alkalinity (mg/L)	75.50	98.00	72.00	75.50	100.00	73.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.04
Chloride (mg/L)	2.90	3.03	2.24	2.80	2.64	2.19
Fluoride (mg/L)	NA	NA	0.15	NA	NA	0.14
Sulfate (mg/L)	1.00	0.50	1.46	1.00	NA	1.50
NH3-N (mg/L)	0.05	0.03	0.01	0.05	0.03	0.01
NO3-N (mg/L)	0.02	0.01	0.01	0.02	0.01	0.01
O-PHOS (mg/L)	0.10	0.05	0.10	0.09	0.07	0.12
T-PHOS (mg/L)	0.30	0.19	0.26	0.28	0.19	0.30
TKN (mg/L)	NA	NA	3.00	NA	NA	3.23
TOC (mg/L)	NA	9.50	8.72	NA	9.20	7.60
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	15.00	8.00	NA	15.00	7.70	NA
TSS (mg/L)	NA	19.00	NA	NA	20.50	NA
TDS (mg/L)	74.00	131.00	NA	97.00	124.00	NA
Conductivity (micro-mhos/cm)	15.50	198.80	NA	15.60	198.80	NA
Fecal Coliform (col/100 ml)	Is	NA	5600			23
	l 1/4	NA	13			<3
	c	NA	18			<3
	r 1/4	NA	80			<3
	rs	NA	3800			<3
Gm Mean	NA	209.0	4.5			

TABLE A-69. Water Quality Data from Lake Georgia Pacific.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	9.90	0.53	2.60			
Secchi (in)	31.00	40.00	71.00			
Trophic Index	2.25	1.66	0.46			
Aluminum (ug/L)	NA	NA	206.30	NA	NA	155.90
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	21.70	NA	NA	22.00
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	11.70	NA	NA	12.20
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	0.14
Calcium (ug/L)	NA	NA	3.20	NA	NA	4.10
Chromium (ug/L)	NA	<1.00	0.44	NA	<1.00	0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	0.99	NA	<4.00	2.32
Iron (ug/L)	NA	NA	240.20	NA	NA	229.20
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	0.39
Magnesium (ug/L)	NA	NA	2.40	NA	NA	2.40
Manganese (ug/L)	NA	NA	6.40	NA	NA	4.30
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.20	NA	NA	1.30
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	10.10	NA	NA	9.90
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	2.90	NA	<8.00	7.60
Hardness (mg/L)	NA	14.70	18.00	NA	11.40	20.00
DO (mg/L)	NA	NA	6.86	NA	NA	8.48
pH	NA	NA	6.67	NA	NA	7.18
Water Temp (°C)	NA	NA	30.80	NA	NA	31.40
Alkalinity (mg/L)	11.80	14.00	16.00	13.70	14.00	16.00
Bromide (mg/L)	NA	NA	0.08	NA	NA	0.07
Chloride (mg/L)	2.90	3.82	3.88	2.70	3.98	4.12
Fluoride (mg/L)	NA	NA	0.12	NA	NA	0.10
Sulfate (mg/L)	8.00	16.90	20.20	8.00	16.90	20.50
NH3-N (mg/L)	0.05	0.03	0.02	0.05	0.03	0.07
NO3-N (mg/L)	0.02	0.01	0.02	0.02	0.01	0.11
O-PHOS (mg/L)	0.03	0.02	0.01	0.03	0.02	0.01
T-PHOS (mg/L)	0.06	0.07	0.03	0.06	0.07	0.03
TKN (mg/L)	NA	NA	0.74	NA	NA	1.43
TOC (mg/L)	8.50	8.80	5.26	9.70	11.60	6.28
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	7.00	4.00	4.40	8.20	5.20	4.60
TSS (mg/L)	NA	0.50	<1.00	NA	1.50	1.50
TDS (mg/L)	NA	69.00	76.00	NA	69.00	80.00
Conductivity (micro-mhos/cm)	56.80	84.90	NA	63.30	85.00	NA
Fecal Coliform (col/100 ml)	Is	NA	8			
	1 1/4	NA	3			
	c	NA	0			
	r 1/4	NA	0			
	rs	NA	5			
	Gm Mean	NA	4.1			1

TABLE A-70A. Water Quality Data from Blue Mountain Lake - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	8.9	3.20	2.90			
Secchi (in)	35.00	17.00	11.50			
Trophic Index	1.11	4.57	7.99			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.38	NA	NA	1.47
Barium (ug/L)	NA	NA	25.10	NA	NA	27.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	16.70	NA	NA	16.60
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	3.90	NA	NA	4.00
Chromium (ug/L)	NA	NA	<0.40	NA	NA	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	NA	1.00	NA	NA	0.78
Iron (ug/L)	NA	NA	159.70	NA	NA	149.80
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	2.70	NA	NA	2.70
Manganese (ug/L)	NA	NA	647.90	NA	NA	804.50
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	2.10	NA	NA	2.90
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	4.60	NA	NA	4.70
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	3.30	NA	NA	3.80
Hardness (mg/L)	NA	NA	21.00	NA	NA	21.00
DO (mg/L)	NA	NA	4.00	NA	NA	2.41
pH	NA	NA	6.97	NA	NA	6.79
Water Temp (°C)	NA	NA	28.20	NA	NA	26.50
Alkalinity (mg/L)	17.00	NA	27.00	17.00	NA	27.50
Bromide (mg/L)	NA	NA	0.05	NA	NA	0.05
Chloride (mg/L)	4.00	3.31	3.68	NA	3.07	3.53
Fluoride (mg/L)	NA	NA	0.15	NA	NA	0.20
Sulfate (mg/L)	8.60	8.20	5.25	NA	7.30	5.26
NH3-N (mg/L)	NA	0.03	0.22	NA	0.03	0.28
NO3-N (mg/L)	0.02	0.01	0.12	0.04	0.03	0.14
O-PHOS (mg/L)	0.01	0.02	0.01	0.03	0.02	0.02
T-PHOS (mg/L)	0.03	0.08	0.09	0.04	0.08	0.09
TKN (mg/L)	NA	NA	0.99	NA	NA	0.99
TOC (mg/L)	NA	5.00	5.04	NA	4.80	4.87
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	6.00	1.00	34.00	20.00	18.00	35.00
TSS (mg/L)	NA	11.50	22.00	NA	12.50	16.50
TDS (mg/L)	NA	47.00	63.00	NA	47.00	64.00
Conductivity (micro-mhos/cm)	60.00	NA	NA	75.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	1 1/4	NA	NA			
	c	NA	NA			
	r 1/4	NA	NA			
	rs	NA	NA			
Gm Mean	NA	NA	3.4			

TABLE A-70B. Water Quality Data from Blue Mountain Lake - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	NA	NA	11.10			
Secchi (in)	NA	NA	10.00			
Trophic Index	NA	NA	12.01			
Aluminum (ug/L)	NA	NA	130.80	NA	NA	208.20
Arsenic (ug/L)	NA	NA	1.08	NA	NA	1.07
Barium (ug/L)	NA	NA	17.90	NA	NA	19.30
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	17.70	NA	NA	17.70
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	3.90	NA	NA	5.60
Chromium (ug/L)	NA	NA	<0.40	NA	NA	1.11
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	1.75
Copper (ug/L)	NA	NA	1.07	NA	NA	3.00
Iron (ug/L)	NA	NA	186.50	NA	NA	229.70
Lead (ug/L)	NA	NA	<0.30	NA	NA	0.68
Magnesium (ug/L)	NA	NA	2.70	NA	NA	2.60
Manganese (ug/L)	NA	NA	35.00	NA	NA	54.90
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	3.10	NA	NA	2.40
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	4.90	NA	NA	4.80
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	NA	1.50	NA	NA	45.00
Hardness (mg/L)	NA	NA	21.00	NA	NA	25.00
DO (mg/L)	NA	NA	6.91	NA	NA	7.09
pH	NA	NA	7.32	NA	NA	5.94
Water Temp (°C)	NA	NA	27.01	NA	NA	26.50
Alkalinity (mg/L)	NA	NA	23.50	NA	NA	22.00
Bromide (mg/L)	NA	NA	0.05	NA	NA	0.06
Chloride (mg/L)	NA	NA	3.88	NA	NA	4.05
Fluoride (mg/L)	NA	NA	0.14	NA	NA	0.14
Sulfate (mg/L)	NA	NA	5.44	NA	NA	5.54
NH3-N (mg/L)	NA	NA	0.03	NA	NA	0.03
NO3-N (mg/L)	NA	NA	0.06	NA	NA	0.23
O-PHOS (mg/L)	NA	NA	0.01	NA	NA	0.01
T-PHOS (mg/L)	NA	NA	0.11	NA	NA	0.12
TKN (mg/L)	NA	NA	1.03	NA	NA	1.13
TOC (mg/L)	NA	NA	5.02	NA	NA	5.00
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	NA	NA	42.00	NA	NA	49.00
TSS (mg/L)	NA	NA	33.50	NA	NA	40.50
TDS (mg/L)	NA	NA	63.00	NA	NA	64.00
Conductivity (micro-mhos/cm)	NA	NA	NA	NA	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	l 1/4	NA	NA			
	c	NA	NA			
	r 1/4	NA	NA			
	rs	NA	NA			
	Gm Mean	NA	NA			

Not collected in 1989 and 1994

TABLE A-70A. Water Quality Data from Lake Columbia - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	20.90	14.38	2.60			
Secchi (in)	39.00	72.00	61.00			
Trophic Index	2.69	1.00	0.37			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	<0.50	NA	NA	<0.50	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	<1.00	NA	NA	<1.00	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	<4.00	NA	NA	<4.00	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	<2.00	NA	NA	<2.00	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	<8.00	NA	NA	<8.00	NA
Hardness (mg/L)	NA	13.20	NA	NA	30.30	NA
DO (mg/L)	NA	NA	6.85	NA	NA	0.12
pH	NA	NA	6.52	NA	NA	6.20
Water Temp (°C)	NA	NA	29.00	NA	NA	24.79
Alkalinity (mg/L)	10.70	13.00	7.00	32.70	38.00	31.00
Bromide (mg/L)	NA	NA	0.19	NA	NA	0.17
Chloride (mg/L)	11.00	11.80	7.35	11.70	14.30	7.52
Fluoride (mg/L)	NA	NA	0.04	NA	NA	0.04
Sulfate (mg/L)	4.00	1.80	1.24	20.00	1.80	3.14
NH3-N (mg/L)	0.05	NA	0.02	1.08	0.35	0.33
NO3-N (mg/L)	0.02	0.02	0.02	0.02	0.02	0.02
O-PHOS (mg/L)	0.03	0.02	0.02	0.08	0.02	0.02
T-PHOS (mg/L)	0.08	0.06	<0.02	0.15	0.07	<0.02
TKN (mg/L)	NA	NA	0.65	NA	NA	1.11
TOC (mg/L)	NA	10.20	8.25	NA	13.50	10.64
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	4.00	2.00	NA	7.50	5.30	NA
TSS (mg/L)	NA	<1.00	NA	NA	2.50	NA
TDS (mg/L)	72.00	59.00	NA	117.00	99.00	NA
Conductivity (micro-mhos/cm)	72.00	77.90	NA	105.00	116.10	NA
Fecal Coliform (col/100 ml)	Is	3	<3			
	l 1/4	2	<3			
	c	3	<3			
	r 1/4	7	<3			
	rs	7	<3			
Gm Mean	NA	3.9	3			

TABLE A-71B. Water Quality Data from Lake Columbia - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	14.40	1.34	3.90			
Secchi (in)	36.00	44.00	54.00			
Trophic Index	2.62	1.80	0.46			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	<0.50	NA	NA	<0.50	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	<1.00	NA	NA	<1.00	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	<4.00	NA	NA	<4.00	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	<2.00	NA	NA	<2.00	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	<8.00	NA	NA	<8.00	NA
Hardness (mg/L)	NA	14.70	NA	NA	13.20	NA
DO (mg/L)	NA	NA	6.87	NA	NA	1.53
pH	NA	NA	6.47	NA	NA	5.56
Water Temp (°C)	NA	NA	29.76	NA	NA	28.63
Alkalinity (mg/L)	7.80	12.00	4.00	10.70	12.00	10.00
Bromide (mg/L)	NA	NA	0.06	NA	NA	0.10
Chloride (mg/L)	8.20	11.80	2.07	7.50	11.90	2.07
Fluoride (mg/L)	NA	NA	0.03	NA	NA	0.03
Sulfate (mg/L)	6.00	3.00	1.03	8.00	1.80	1.35
NH3-N (mg/L)	0.05	0.03	0.02	0.05	0.03	0.01
NO3-N (mg/L)	0.02	0.01	0.02	0.02	0.02	0.02
O-PHOS (mg/L)	0.03	0.02	0.02	0.03	0.02	0.01
T-PHOS (mg/L)	0.08	0.08	0.02	0.09	0.07	0.03
TKN (mg/L)	NA	NA	0.68	NA	NA	0.79
TOC (mg/L)	NA	10.20	8.80	NA	9.70	8.88
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.00	3.00	NA	5.50	2.90	NA
TSS (mg/L)	NA	2.00	NA	NA	2.50	NA
TDS (mg/L)	68.00	57.00	NA	76.00	56.00	NA
Conductivity (micro-mhos/cm)	56.20	76.80	NA	56.70	77.10	NA
Fecal Coliform (col/100 ml)						
Is	NA	2	<3			
l 1/4	NA	0	<3			
c	NA	2	<3			
r 1/4	NA	10	3			
rs	NA	2	6			
Gm Mean	NA	3	3.4			

TABLE A-72. Water Quality Data from Lake Nimrod.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	8.60	7.20	NA			
Secchi (in)	44.00	37.00	NA			
Trophic Index	0.88	1.52	NA			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	<0.50	NA	NA	<0.50	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	<1.00	NA	NA	<1.00	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	<4.00	NA	NA	<4.00	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	<2.00	NA	NA	<2.00	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	NA	NA	NA	14.00	NA
Hardness (mg/L)	NA	9.90	NA	NA	9.90	NA
DO (mg/L)	NA	NA	NA	NA	NA	NA
pH	NA	NA	NA	NA	NA	NA
Water Temp (°C)	NA	NA	NA	NA	NA	NA
Alkalinity (mg/L)	10.00	18.00	NA	NA	9.00	NA
Bromide (mg/L)	NA	NA	NA	NA	NA	NA
Chloride (mg/L)	2.70	2.74	NA	NA	2.38	NA
Fluoride (mg/L)	NA	NA	NA	NA	NA	NA
Sulfate (mg/L)	4.00	3.20	NA	NA	4.10	NA
NH3-N (mg/L)	NA	0.12	NA	NA	0.28	NA
NO3-N (mg/L)	0.02	0.05	NA	0.02	0.02	NA
O-PHOS (mg/L)	0.01	0.02	NA	0.04	0.02	NA
T-PHOS (mg/L)	0.03	0.05	NA	0.07	0.08	NA
TKN (mg/L)	NA	NA	NA	NA	NA	NA
TOC (mg/L)	NA	6.80	NA	NA	6.80	NA
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	6.00	5.00	NA	32.00	12.00	NA
TSS (mg/L)	NA	4.50	NA	NA	11.00	NA
TDS (mg/L)	NA	34.00	NA	NA	38.00	NA
Conductivity (micro-mhos/cm)	35.00	43.00	NA	48.00	47.00	NA
Fecal Coliform (col/100 ml)	Is	NA	NA			
	1 1/4	NA	NA			
	c	NA	<4			
	r 1/4	NA	NA			
	rs	NA	NA			
	Gm Mean	NA	NA			

Not collected in 1999

TABLE A-73. Water Quality Data from Lake Chicot - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	45.10	0.89	22.00			
Secchi (in)	24.00	18.00	19.00			
Trophic Index	4.38	10.70	9.32			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	16.22	NA	NA	15.70
Barium (ug/L)	NA	NA	38.10	NA	NA	42.50
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	42.10	NA	NA	43.90
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	20.00	NA	NA	19.50
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	0.55
Iron (ug/L)	NA	NA	<15.00	NA	NA	<15.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	10.40	NA	NA	10.30
Manganese (ug/L)	NA	NA	1.60	NA	NA	1.80
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	3.30	NA	NA	2.90
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	12.80	NA	NA	12.90
Vanadium (ug/L)	NA	NA	1.82	NA	NA	1.94
Zinc (ug/L)	NA	20.00	<1.00	NA	14.00	<1.00
Hardness (mg/L)	NA	89.70	93.00	NA	102.00	91.00
DO (mg/L)	NA	NA	7.73	NA	NA	6.04
pH	NA	NA	8.91	NA	NA	8.69
Water Temp (°C)	NA	NA	32.80	NA	NA	31.80
Alkalinity (mg/L)	93.00	109.00	92.00	NA	109.00	91.00
Bromide (mg/L)	NA	NA	0.08	NA	NA	0.07
Chloride (mg/L)	NA	10.90	16.70	NA	13.20	16.50
Fluoride (mg/L)	NA	NA	0.17	NA	NA	0.16
Sulfate (mg/L)	7.00	10.90	7.47	NA	4.70	7.48
NH3-N (mg/L)	0.01	0.11	0.01	NA	0.19	0.02
NO3-N (mg/L)	0.01	0.04	0.02	NA	0.05	0.02
O-PHOS (mg/L)	0.03	0.03	0.04	NA	0.04	0.04
T-PHOS (mg/L)	0.06	0.19	0.16	NA	0.17	0.15
TKN (mg/L)	NA	NA	2.14	NA	NA	2.03
TOC (mg/L)	11.50	9.00	7.58	NA	9.10	7.42
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	11.00	8.00	NA	NA	7.60	NA
TSS (mg/L)	NA	18.50	NA	NA	19.00	NA
TDS (mg/L)	NA	148.00	NA	NA	146.00	NA
Conductivity (micro-mhos/cm)	134.00	252.00	NA	NA	253.00	NA
Fecal Coliform (col/100 ml)	Is	NA	198			
	I 1/4	NA	157			
	c	NA	220			
	r 1/4	NA	76			
	rs	NA	120			
	Gm Mean	NA	144.2			

TABLE A-74A. Water Quality Data from Lake Conway - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	110.8	26.70	1.40			
Secchi (in)	21.00	15.80	23.25			
Trophic Index	10.51	6.52	2.64			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.80	NA	NA	1.09
Barium (ug/L)	NA	NA	<8.80	NA	NA	<8.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	24.30	NA	NA	22.60
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	5.40	NA	NA	5.40
Chromium (ug/L)	NA	1.50	<0.40	NA	1.50	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	<0.50
Iron (ug/L)	NA	NA	33.00	NA	NA	36.00
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	2.40	NA	NA	2.40
Manganese (ug/L)	NA	NA	31.30	NA	NA	91.10
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	4.40	NA	NA	3.90
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	6.60	NA	NA	6.40
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	13.00	1.30	NA	13.00	3.20
Hardness (mg/L)	NA	21.00	23.00	NA	22.80	24.00
DO (mg/L)	NA	NA	8.71	NA	NA	3.94
pH	NA	NA	8.08	NA	NA	6.74
Water Temp (°C)	NA	NA	31.30	NA	NA	27.50
Alkalinity (mg/L)	26.40	29.00	26.00	33.20	29.00	26.00
Bromide (mg/L)	NA	NA	0.06	NA	NA	0.07
Chloride (mg/L)	4.80	5.21	6.35	4.70	4.84	6.35
Fluoride (mg/L)	NA	NA	0.12	NA	NA	0.11
Sulfate (mg/L)	5.00	2.80	3.50	4.00	1.50	3.49
NH3-N (mg/L)	0.17	0.05	<0.01	0.53	0.06	0.01
NO3-N (mg/L)	0.02	0.03	0.02	0.02	0.05	0.03
O-PHOS (mg/L)	0.03	0.02	0.01	0.03	0.02	0.01
T-PHOS (mg/L)	0.14	0.08	0.06	0.16	0.09	0.05
TKN (mg/L)	NA	NA	0.79	NA	NA	0.94
TOC (mg/L)	NA	8.20	5.50	NA	7.70	5.50
BOD (mg/L)	NA	NA	2.93	NA	NA	1.03
Turbidity (NTU)	NA	7.00	6.20	NA	6.80	6.20
TSS (mg/L)	NA	7.00	6.50	NA	7.00	5.50
TDS (mg/L)	52.00	59.00	63.50	58.00	58.00	61.00
Conductivity (micro-mhos/cm)	73.00	75.40	NA	90.10	75.30	NA
Fecal Coliform (col/100 ml)	Is	NA	21			3
	1 1/4	NA	31			3
	c	NA	24			3
	r 1/4	NA	32			6
	rs	NA	27			8
Gm Mean	NA	27	4.2			

TABLE A-74B. Water Quality Data from Lake Conway - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	34.40	0.89	8.70			
Secchi (in)	26.00	18.00	21.5			
Trophic Index	7.86	4.27	3.06			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	1.51	NA	NA	1.50
Barium (ug/L)	NA	NA	<8.80	NA	NA	9.10
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	31.10	NA	NA	31.20
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	5.30	NA	NA	5.40
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	<0.50	NA	<4.00	2.57
Iron (ug/L)	NA	NA	43.60	NA	NA	52.70
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	2.30	NA	NA	2.30
Manganese (ug/L)	NA	NA	1.60	NA	NA	24.10
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	4.50	NA	NA	4.40
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	7.80	NA	NA	7.90
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	9.00	5.90	NA	14.00	12.60
Hardness (mg/L)	NA	24.30	23.00	NA	26.10	23.00
DO (mg/L)	NA	NA	7.50	NA	NA	4.20
pH	NA	NA	7.55	NA	NA	6.45
Water Temp (°C)	NA	NA	30.20	NA	NA	28.00
Alkalinity (mg/L)	22.5	31.00	27.00	22.00	32.00	27.00
Bromide (mg/L)	NA	NA	0.07	NA	NA	0.07
Chloride (mg/L)	4.3	5.09	6.31	4.00	4.94	6.38
Fluoride (mg/L)	NA	NA	0.13	NA	NA	0.13
Sulfate (mg/L)	4	2.80	3.91	4.00	2.80	4.02
NH3-N (mg/L)	0.17	NA	<0.01	0.16	0.08	0.02
NO3-N (mg/L)	0.02	0.03	0.02	0.02	0.03	0.06
O-PHOS (mg/L)	0.03	0.02	0.01	0.03	0.02	0.01
T-PHOS (mg/L)	0.17	0.08	0.06	0.16	0.08	0.06
TKN (mg/L)	NA	NA	0.92	NA	NA	0.96
TOC (mg/L)	NA	7.40	5.90	NA	8.00	6.20
BOD (mg/L)	NA	NA	2.98	NA	NA	2.17
Turbidity (NTU)	NA	9.00	6.10	NA	9.60	6.60
TSS (mg/L)	NA	10.00	4.50	NA	9.50	5.50
TDS (mg/L)	47.00	61.00	64.00	48.00	62.00	66.00
Conductivity (micro-mhos/cm)	66.20	81.20	NA	64.00	84.40	NA
Fecal Coliform (col/100 ml)	Is	NA	0			3
	1 1/4	NA	4			<1
	c	NA	3			11
	r 1/4	NA	12			2
	rs	NA	7			3
Gm Mean	NA	5.6	2.9			

TABLE A-75A. Water Quality Data from Lake Erling - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	19.2	9.61	10.80			
Secchi (in)	30.00	42.00	38.00			
Trophic Index	4.64	2.09	1.42			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	<0.50	NA	NA	<0.50	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	<1.00	NA	NA	<1.00	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	<4.00	NA	NA	<4.00	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	<2.00	NA	NA	<2.00	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	<8.00	NA	NA	<8.00	NA
Hardness (mg/L)	NA	16.50	NA	NA	33.30	NA
DO (mg/L)	NA	NA	7.12	NA	NA	0.12
pH	NA	NA	7.08	NA	NA	6.69
Water Temp (°C)	NA	NA	31.20	NA	NA	20.00
Alkalinity (mg/L)	9.80	NA	13.00	33.20	NA	38.00
Bromide (mg/L)	NA	NA	0.14	NA	NA	0.15
Chloride (mg/L)	7.20	10.30	10.30	8.10	11.80	9.09
Fluoride (mg/L)	NA	NA	0.04	NA	NA	0.05
Sulfate (mg/L)	5.00	1.80	2.96	13.00	15.20	1.01
NH3-N (mg/L)	0.05	NA	0.02	1.13	1.31	1.43
NO3-N (mg/L)	0.02	0.01	0.02	0.02	0.01	0.02
O-PHOS (mg/L)	0.03	0.02	0.02	0.14	0.21	0.03
T-PHOS (mg/L)	0.12	0.08	0.04	0.26	0.30	0.36
TKN (mg/L)	NA	NA	0.87	NA	NA	2.81
TOC (mg/L)	NA	12.20	9.94	NA	17.30	15.30
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	5.00	2.00	NA	11.00	8.70	NA
TSS (mg/L)	NA	<1.00	NA	NA	6.50	NA
TDS (mg/L)	70.00	63.00	NA	108.00	114.00	NA
Conductivity (micro-mhos/cm)	51.40	77.20	NA	97.60	124.90	NA
Fecal Coliform (col/100 ml)	Is	NA	15			<3
	l 1/4	NA	360			3
	c	NA	110			3
	r 1/4	NA	0			11
	rs	NA	2			11
Gm Mean	NA	33	5			

TABLE A-75B. Water Quality Data from Lake Erling - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	16.50	7.48	6.00			
Secchi (in)	21.00	34.00	20.00			
Trophic Index	7.45	3.40	4.90			
Aluminum (ug/L)	NA	NA	NA	NA	NA	NA
Arsenic (ug/L)	NA	NA	NA	NA	NA	NA
Barium (ug/L)	NA	NA	NA	NA	NA	NA
Beryllium (ug/L)	NA	NA	NA	NA	NA	NA
Boron (ug/L)	NA	NA	NA	NA	NA	NA
Cadmium (ug/L)	NA	<0.50	NA	NA	<0.50	NA
Calcium (ug/L)	NA	NA	NA	NA	NA	NA
Chromium (ug/L)	NA	<1.00	NA	NA	<1.00	NA
Cobalt (ug/L)	NA	NA	NA	NA	NA	NA
Copper (ug/L)	NA	<4.00	NA	NA	<4.00	NA
Iron (ug/L)	NA	NA	NA	NA	NA	NA
Lead (ug/L)	NA	<2.00	NA	NA	<2.00	NA
Magnesium (ug/L)	NA	NA	NA	NA	NA	NA
Manganese (ug/L)	NA	NA	NA	NA	NA	NA
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	NA	NA	NA	NA
Potassium (ug/L)	NA	NA	NA	NA	NA	NA
Selenium (ug/L)	NA	NA	NA	NA	NA	NA
Sodium (ug/L)	NA	NA	NA	NA	NA	NA
Vanadium (ug/L)	NA	NA	NA	NA	NA	NA
Zinc (ug/L)	NA	<8.00	NA	NA	<8.00	NA
Hardness (mg/L)	NA	18.00	NA	NA	14.70	NA
DO (mg/L)	NA	NA	7.36	NA	NA	2.92
pH	NA	NA	6.97	NA	NA	6.03
Water Temp (°C)	NA	NA	30.70	NA	NA	28.80
Alkalinity (mg/L)	8.80	NA	12.00	9.80	NA	12.00
Bromide (mg/L)	NA	NA	0.15	NA	NA	0.15
Chloride (mg/L)	6.30	10.20	11.00	6.30	10.20	10.80
Fluoride (mg/L)	NA	NA	0.05	NA	NA	0.05
Sulfate (mg/L)	6.00	1.80	3.05	7.00	1.80	3.10
NH3-N (mg/L)	0.05	NA	0.02	0.08	0.05	0.12
NO3-N (mg/L)	0.02	0.02	0.02	0.03	0.01	0.07
O-PHOS (mg/L)	0.03	0.02	0.02	0.05	0.02	0.02
T-PHOS (mg/L)	0.14	0.11	0.09	0.17	0.10	0.10
TKN (mg/L)	NA	NA	1.16	NA	NA	1.05
TOC (mg/L)	NA	12.10	10.06	NA	12.10	9.84
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	8.00	4.00	NA	13.00	4.00	NA
TSS (mg/L)	NA	2.00	NA	NA	2.00	NA
TDS (mg/L)	71.00	66.00	NA	74.00	67.00	NA
Conductivity (micro-mhos/cm)	46.90	76.20	NA	49.50	77.40	NA
Fecal Coliform (col/100 ml)	Is	NA	225			<3
	I 1/4	NA	530			<3
	c	NA	240			3
	r 1/4	NA	980			3
	rs	NA	2380			43
Gm Mean	NA	582	5.1			

TABLE A-77A. Water Quality Data from Felsenthal - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	2.70	3.10	1.70			
Secchi (in)	37.00	22.00	35.00			
Trophic Index	1.96	3.96	0.93			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	32.80	NA	NA	34.50
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	8.20	NA	NA	7.20
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	0.31
Calcium (ug/L)	NA	NA	6.60	NA	NA	6.50
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	0.42
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	1.02	NA	<4.00	11.42
Iron (ug/L)	NA	NA	177.70	NA	NA	194.30
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	2.96
Magnesium (ug/L)	NA	NA	2.00	NA	NA	1.90
Manganese (ug/L)	NA	NA	15.00	NA	NA	123.90
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	12.55
Potassium (ug/L)	NA	NA	0.90	NA	NA	0.50
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	12.60	NA	NA	12.40
Vanadium (ug/L)	NA	NA	7.55	NA	NA	5.46
Zinc (ug/L)	NA	9.00	5.70	NA	8.00	6.60
Hardness (mg/L)	NA	18.00	25.00	NA	18.00	24.00
DO (mg/L)	NA	NA	6.48	NA	NA	0.90
pH	NA	NA	6.62	NA	NA	6.07
Water Temp (°C)	NA	NA	31.00	NA	NA	29.60
Alkalinity (mg/L)	16.70	18.00	18.00	17.20	15.00	18.00
Bromide (mg/L)	NA	NA	0.19	NA	NA	0.22
Chloride (mg/L)	10.30	7.49	14.60	8.00	7.72	16.80
Fluoride (mg/L)	NA	NA	0.08	NA	NA	0.07
Sulfate (mg/L)	7.00	8.10	14.90	8.00	7.20	12.50
NH3-N (mg/L)	0.05	0.07	0.05	0.05	0.07	0.07
NO3-N (mg/L)	0.10	0.15	0.10	0.08	0.16	0.09
O-PHOS (mg/L)	0.03	0.05	0.01	0.03	0.05	0.01
T-PHOS (mg/L)	0.07	0.09	0.03	0.09	0.09	0.04
TKN (mg/L)	NA	NA	0.55	NA	NA	0.61
TOC (mg/L)	9.90	10.00	4.18	11.20	10.00	4.44
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	6.00	22.00	6.50	6.20	26.00	6.80
TSS (mg/L)	NA	25.50	4.50	NA	36.00	6.50
TDS (mg/L)	NA	77.00	83.00	NA	77.00	82.00
Conductivity (micro-mhos/cm)	88.70	80.10	NA	82.90	80.20	NA
Fecal Coliform (col/100 ml)	Is	NA	175			4
	l 1/4	NA	816			<1
	c	NA	270			4
	r 1/4	NA	1700			<1
	rs	NA	17			5
	Gm Mean	NA	256.7			2.4

TABLE A-77B. Water Quality Data from Felsenthal - Upper.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	3.50	2.67	4.20			
Secchi (in)	36.00	16.00	35.50			
Trophic Index	2.32	5.54	1.13			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	30.70	NA	NA	29.90
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	<4.50	NA	NA	<4.50
Cadmium (ug/L)	NA	0.90	<0.14	NA	<0.50	0.00
Calcium (ug/L)	NA	NA	6.00	NA	NA	6.00
Chromium (ug/L)	NA	<1.00	0.48	NA	<1.00	0.53
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	19.00	1.18	NA	<4.00	3.05
Iron (ug/L)	NA	NA	225.30	NA	NA	220.00
Lead (ug/L)	NA	7.50	<0.30	NA	<2.00	0.40
Magnesium (ug/L)	NA	NA	1.70	NA	NA	1.70
Manganese (ug/L)	NA	NA	15.10	NA	NA	17.20
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	2.68
Potassium (ug/L)	NA	NA	1.20	NA	NA	1.00
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	11.10	NA	NA	11.50
Vanadium (ug/L)	NA	NA	9.98	NA	NA	9.99
Zinc (ug/L)	NA	13.00	2.60	NA	<8.00	2.90
Hardness (mg/L)	NA	16.50	22.00	NA	18.00	22.00
DO (mg/L)	NA	NA	6.86	NA	NA	6.18
pH	NA	NA	6.67	NA	NA	6.54
Water Temp (°C)	NA	NA	30.80	NA	NA	30.60
Alkalinity (mg/L)	18.10	14.00	19.00	17.60	15.00	19.00
Bromide (mg/L)	NA	NA	0.17	NA	NA	0.17
Chloride (mg/L)	4.40	7.02	12.50	3.90	6.77	130.00
Fluoride (mg/L)	NA	NA	0.07	NA	NA	0.06
Sulfate (mg/L)	14.00	7.20	12.30	13.00	7.20	12.50
NH3-N (mg/L)	0.05	0.10	0.04	0.05	0.07	0.07
NO3-N (mg/L)	0.06	0.15	0.13	0.06	0.14	0.14
O-PHOS (mg/L)	0.03	0.04	0.01	0.03	0.06	0.01
T-PHOS (mg/L)	0.08	0.09	0.04	0.09	0.07	0.04
TKN (mg/L)	NA	NA	0.53	NA	NA	1.08
TOC (mg/L)	13.30	10.60	3.71	13.40	11.20	4.55
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	5.00	20.00	8.10	4.90	23.00	8.20
TSS (mg/L)	NA	20.50	3.50	NA	31.00	6.00
TDS (mg/L)	NA	74.00	77.00	NA	73.00	78.00
Conductivity (micro-mhos/cm)	73.90	75.80	NA	71.80	75.50	NA
Fecal Coliform (col/100 ml)	Is	NA	2000			<3
	I 1/4	NA	600			6
	c	NA	680			3
	r 1/4	NA	210			<3
	rs	NA	1380			<3
Gm Mean	NA	749.5	3.4			

TABLE A-78A. Water Quality Data from Lake Millwood - Lower.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	14.00	NA	18.20			
Secchi (in)	35.00	NA	25.50			
Trophic Index	1.54	NA	2.79			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	3.95	NA	NA	1.48
Barium (ug/L)	NA	NA	23.00	NA	NA	9.20
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	11.60	NA	NA	11.30
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	4.20	NA	NA	5.20
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	0.79	NA	<4.00	1.51
Iron (ug/L)	NA	NA	91.10	NA	NA	22.60
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.10	NA	NA	1.20
Manganese (ug/L)	NA	NA	832.90	NA	NA	1.60
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.50	NA	NA	1.30
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	2.80	NA	NA	3.20
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	4.00	NA	<8.00	2.50
Hardness (mg/L)	NA	NA	15.00	NA	NA	18.00
DO (mg/L)	NA	NA	6.53	NA	NA	0.16
pH	NA	NA	7.47	NA	NA	6.07
Water Temp (°C)	NA	NA	30.80	NA	NA	27.50
Alkalinity (mg/L)	20.00	NA	19.00	19.00	NA	18.00
Bromide (mg/L)	NA	NA	0.04	NA	NA	0.04
Chloride (mg/L)	6.00	NA	2.92	NA	NA	3.09
Fluoride (mg/L)	NA	NA	0.04	NA	NA	0.04
Sulfate (mg/L)	5.90	NA	3.21	NA	NA	3.39
NH3-N (mg/L)	NA	NA	0.17	NA	NA	0.01
NO3-N (mg/L)	0.02	NA	0.03	0.02	NA	0.03
O-PHOS (mg/L)	0.02	NA	0.02	0.02	NA	0.01
T-PHOS (mg/L)	0.04	NA	0.05	0.05	NA	0.05
TKN (mg/L)	NA	NA	0.75	NA	NA	0.76
TOC (mg/L)	NA	NA	3.73	NA	NA	4.22
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	4.00	NA	7.80	5.90	NA	7.30
TSS (mg/L)	NA	NA	NA	NA	NA	NA
TDS (mg/L)	NA	NA	NA	NA	NA	NA
Conductivity (micro-mhos/cm)	63.00	NA	NA	60.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	28			
	l 1/4	NA	25			
	c	NA	4			
	r 1/4	NA	19			
	rs	NA	38			
Gm Mean	NA	NA	18.2			

TABLE A-78B. Water Quality Data from Lake Millwood - Upper

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	7.2	NA	6.90			
Secchi (in)	40.00	NA	27.50			
Trophic Index	1.18	NA	1.20			
Aluminum (ug/L)	NA	NA	<127.00	NA	NA	<127.00
Arsenic (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Barium (ug/L)	NA	NA	10.90	NA	NA	10.80
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	10.60	NA	NA	9.80
Cadmium (ug/L)	NA	<0.50	<0.14	NA	<0.50	<0.14
Calcium (ug/L)	NA	NA	3.00	NA	NA	2.50
Chromium (ug/L)	NA	<1.00	<0.40	NA	<1.00	<0.40
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	<4.00	0.89	NA	<4.00	0.90
Iron (ug/L)	NA	NA	98.10	NA	NA	92.20
Lead (ug/L)	NA	<2.00	<0.30	NA	<2.00	<0.30
Magnesium (ug/L)	NA	NA	1.20	NA	NA	1.10
Manganese (ug/L)	NA	NA	4.60	NA	NA	3.90
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	1.40	NA	NA	1.40
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	3.90	NA	NA	3.20
Vanadium (ug/L)	NA	NA	<1.00	NA	NA	<1.00
Zinc (ug/L)	NA	<8.00	4.40	NA	<8.00	3.90
Hardness (mg/L)	NA	NA	12.00	NA	NA	11.00
DO (mg/L)	NA	NA	6.41	NA	NA	4.01
pH	NA	NA	6.98	NA	NA	6.01
Water Temp (°C)	NA	NA	31.70	NA	NA	28.20
Alkalinity (mg/L)	24.00	NA	13.00	19.00	NA	11.00
Bromide (mg/L)	NA	NA	0.05	NA	NA	0.04
Chloride (mg/L)	2.60	NA	4.39	3.80	NA	3.42
Fluoride (mg/L)	NA	NA	0.03	NA	NA	0.03
Sulfate (mg/L)	3.80	NA	3.40	3.30	NA	3.34
NH3-N (mg/L)	NA	NA	0.01	NA	NA	0.03
NO3-N (mg/L)	0.02	NA	0.03	0.02	NA	0.07
O-PHOS (mg/L)	0.02	NA	0.01	0.02	NA	0.01
T-PHOS (mg/L)	0.04	NA	0.03	0.05	NA	0.03
TKN (mg/L)	NA	NA	0.34	NA	NA	0.30
TOC (mg/L)	NA	NA	3.38	NA	NA	3.21
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	2.30	NA	6.20	5.60	NA	6.90
TSS (mg/L)	NA	NA	NA	NA	NA	NA
TDS (mg/L)	NA	NA	NA	NA	NA	NA
Conductivity (micro-mhos/cm)	69.00	NA	NA	61.00	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	>320			
	l 1/4	NA	>320			
	c	NA	>320			
	r 1/4	NA	408			
	rs	NA	216			
Gm Mean	NA	NA	310.5			

TABLE A-79A. Water Quality Data from Lake Dardanelle.

	Epilimnion			Hypolimnion		
	1989	1994	1999	1989	1994	1999
Chlorophyll a (ug/L)	NA	NA	5.70			
Secchi (in)	NA	NA	31.00			
Trophic Index	NA	NA	3.05			
Aluminum (ug/L)	NA	NA	224.90	NA	NA	208.30
Arsenic (ug/L)	NA	NA	2.89	NA	NA	2.73
Barium (ug/L)	NA	NA	96.70	NA	NA	94.50
Beryllium (ug/L)	NA	NA	<0.11	NA	NA	<0.11
Boron (ug/L)	NA	NA	70.10	NA	NA	68.60
Cadmium (ug/L)	NA	NA	<0.14	NA	NA	<0.14
Calcium (ug/L)	NA	NA	49.20	NA	NA	48.50
Chromium (ug/L)	NA	NA	0.66	NA	NA	0.58
Cobalt (ug/L)	NA	NA	<0.50	NA	NA	<0.50
Copper (ug/L)	NA	NA	3.45	NA	NA	3.52
Iron (ug/L)	NA	NA	35.10	NA	NA	30.30
Lead (ug/L)	NA	NA	<0.30	NA	NA	<0.30
Magnesium (ug/L)	NA	NA	13.60	NA	NA	13.20
Manganese (ug/L)	NA	NA	2.70	NA	NA	3.90
Mercury (ug/L)	NA	NA	NA	NA	NA	NA
Nickel (ug/L)	NA	NA	<2.00	NA	NA	<2.00
Potassium (ug/L)	NA	NA	5.90	NA	NA	5.30
Selenium (ug/L)	NA	NA	<3.00	NA	NA	<3.00
Sodium (ug/L)	NA	NA	68.00	NA	NA	67.00
Vanadium (ug/L)	NA	NA	4.09	NA	NA	3.88
Zinc (ug/L)	NA	NA	15.20	NA	NA	1.60
Hardness (mg/L)	NA	NA	179.00	NA	NA	175.00
DO (mg/L)	NA	NA	9.36	NA	NA	4.24
pH	NA	NA	8.70	NA	NA	8.20
Water Temp (°C)	NA	NA	30.70	NA	NA	28.80
Alkalinity (mg/L)	NA	NA	118.00	NA	NA	118.00
Bromide (mg/L)	NA	NA	0.16	NA	NA	0.12
Chloride (mg/L)	NA	NA	83.60	NA	NA	83.40
Fluoride (mg/L)	NA	NA	0.26	NA	NA	0.27
Sulfate (mg/L)	NA	NA	88.10	NA	NA	87.80
NH3-N (mg/L)	NA	NA	0.02	NA	NA	0.10
NO3-N (mg/L)	NA	NA	0.02	NA	NA	0.06
O-PHOS (mg/L)	NA	NA	0.03	NA	NA	0.04
T-PHOS (mg/L)	NA	NA	0.09	NA	NA	0.08
TKN (mg/L)	NA	NA	0.85	NA	NA	0.67
TOC (mg/L)	NA	NA	4.90	NA	NA	4.31
BOD (mg/L)	NA	NA	NA	NA	NA	NA
Turbidity (NTU)	NA	NA	11.00	NA	NA	12.00
TSS (mg/L)	NA	NA	8.00	NA	NA	7.50
TDS (mg/L)	NA	NA	400.00	NA	NA	399.00
Conductivity (micro-mhos/cm)	NA	NA	NA	NA	NA	NA
Fecal Coliform (col/100 ml)	Is	NA	<2			
	l 1/4	NA	<2			
	c	NA	<2			
	r 1/4	NA	<2			
	rs	NA	<2			
	Gm Mean	NA	<2			

Not collected in 1989 and 1994

APPENDIX B

PESTICIDE DATA BY LAKE

Appendix B lists the pesticide data by lake collected during the summer of 1999. Water samples were analyzed in the Department's Water Quality Laboratory under the existing Quality Assurance/Quality Control project plan. The unit of measure for the parameters listed is $\mu\text{g/L}$. All values less than "given number" are below the lab detection limits. All values which were detectable are in bold type.

TABLE B-1. Pesticide Data from Type B and C Lakes.

	Charles	Storm Creek	Bear Creek	Frierson	Poinsett
3-5-Dichlorobenzoic_Acid	<.03352	<.03416	<.02139	<.02688	Void
Dicamba	<.02119	<.03262	<.03015	<.01341	Void
Dichlorprop	<.10303	<.07593	<.04556	<.06642	Void
2-4-D	<.21960	<.02557	<.03271	0.04533	Void
Pentachlorophenol	<.07785	<.05082	<.06359	<.03077	Void
Silvex	<.04413	<.03178	<.04136	<.02329	Void
2-4-5-T	<.02555	<.01586	<.03454	<.01419	Void
Dinoseb	<.05690	<.04182	<.01954	<.01551	Void
2-4-DB	<.29765	<.01239	<.01964	<.03789	Void
Bentazon	<.03305	<.01866	<.01642	<.00785	Void
Picloram	<.03201	<.02243	<.02918	<.01689	Void
Acifluorfen	<.03363	<.04480	<.04606	<.03280	Void
Molinate	<.01087	<.01139	<.00806	<.01450	<.01276
Propachlor	<.01495	<.01539	<.01350	<.00769	<.01218
Trifluralin	<.01160	<.01061	<.00639	<.00524	<.00528
Alpha-BHC	<.01523	<.01025	<.00510	<.00731	<.01578
Atraton	<.01810	<.02586	<.01768	<.01125	<.01286
Prometon	<.01081	<.00626	<.00548	<.01198	<.00801
Simazine	<.00767	<.03290	<.03781	<.01687	<.05097
Atrazine	0.73246	0.01772	0.01872	0.02325	0.01441
Propazine	<.00204	<.01767	<.01633	<.00722	<.00658
Beta-BHC	<.01525	<.01061	<.00528	<.00732	<.01580
Gamma-BHC	<.01379	<.00975	<.00486	<.00662	<.01429
Terbutylazine	<.04596	<.05837	<.03784	<.04303	<.05212
Diazinon	<.00858	<.01454	<.01054	<.01359	<.01654
Fluchloralin	<.01575	<.01321	<.00877	<.00666	<.00729
Fonofos	<.01918	<.01695	<.02623	<.01328	<.01219
Delta-BHC	<.01860	<.01228	<.00612	<.00893	<.01927
Cyprazine	<.00957	<.01898	<.01305	<.00965	<.00929
Metribuzin	<.01300	<.01379	<.01965	<.00894	<.01282
Methyl-Parathion	<.01220	<.02176	<.01341	<.00843	<.00477
Alachlor	<.00875	<.01051	<.00954	<.00479	<.00666
Ametryn	<.00922	<.02153	<.01451	<.00358	<.01038
Prometryn	<.01068	<.01271	<.02491	<.00496	<.00549
Heptachlor	<.01060	<.01277	<.01500	<.01439	<.01522
Terbutryn	<.00696	<.00616	<.01247	<.00537	<.00725
Metolachlor	<.00669	<.00832	<.00603	0.01222	0.00687
Malathion	<.04484	<.04631	<.02999	<.02107	<.04180
Dipropetryn	<.00950	<.00805	<.01194	<.00605	<.01342
Chlorpyrifos	<.01910	<.02536	<.03023	<.00879	<.03826
Cyanazine	<.01017	<.01963	<.01080	<.01777	<.01313
Aldrin	<.02979	<.04806	<.02962	<.02059	<.01164
Pendimethalin	<.00613	<.01767	<.01360	<.00445	<.00524
Heptachlor-Epoxyde	<.02309	<.03459	<.04195	<.00703	<.01313
Endosulfan-I	<.24681	<.14055	<.26695	<.16661	<.26488
p-p'-DDE	<.00872	<.00607	<.00678	<.00481	0.00943
Dieldrin	<.04257	<.11452	<.07776	<.02591	<.03168
Endrin	<.05194	<.09836	<.05941	<.03477	<.01737
Endosulfan-II	<.09345	<.12716	<.11561	<.07328	<.04207
p-p'-DDD	<.00335	<.00799	<.00615	<.00523	<.00346
Endosulfan-Sulfate	<.00816	<.04847	<.02310	<.01626	<.00943
p-p'-DDT	<.00370	<.00761	<.00586	<.00576	<.00382
Hexazinone	<.00485	<.01252	<.00822	<.00635	<.00786
Methoxychlor	<.00318	<.00589	<.00389	<.00119	<.00306
PCB-as-AR1221	<.02484	<.02715	<.02465	<.01361	<.01892
PCB-as-AR1232	<.05142	<.05619	<.05103	<.02816	<.03916
PCB-as-AR1242	<.19698	<.20566	<.18315	<.12516	<.06725
PCB-as-AR1248	<.54303	<.56700	<.50491	<.34505	<.18538
PCB-as-AR1254	<.53109	<.32221	<.48418	<.32007	<.22948
PCB-as-AR1260	<.22299	<.13529	<.20329	<.13439	<.09635
Technical-Chlordane	<.06261	<.09650	<.08436	<.04370	<.06525

TABLE B-2. Pesticide Data from Type D Lakes.

	Enterprise	Wilson	Wallace	Grampus	DesArc	Old Town	Hogue	Mallard	Ashbaugh
3-5-Dichlorobenzoic_Acid	<.05716	<.05414	<.04522	<.04590	<.02988	<.02491	<.01848	<.02504	<.02912
Dicamba	<.03271	<.06831	<.03487	<.02855	<.03581	<.02565	<.01631	<.02634	<.01214
Dichlorprop	<.06694	<.11050	<.02784	<.07630	<.05431	<.03752	<.03688	<.02397	<.02835
2-4-D	<.03385	<.05166	0.18106	<.02667	<.03048	<.01630	<.33972	<.05235	<.07877
Pentachlorophenol	<.05055	<.04129	<.05193	<.04047	<.04131	<.04177	<.02970	<.02991	<.04188
Silvex	<.07825	<.05323	<.03055	<.03874	<.03146	<.02044	<.03369	<.02908	<.03530
2-4-5-T	<.03788	<.03810	<.01445	<.03136	<.02503	<.02499	<.01781	<.03396	<.05403
Dinoseb	<.05181	<.06159	<.01693	<.03132	<.03038	<.03689	<.04638	<.03335	<.01941
2-4-DB	<.01625	<.01474	<.01911	<.01220	<.00954	<.01463	<.02935	<.07601	<.02280
Bentazon	<.02641	0.14126	0.0415	0.02453	<.01894	0.06154	<.01611	<.02268	<.01794
Picloram	<.05846	<.03977	<.02282	<.02895	<.02220	<.01443	<.02443	<.02109	<.02560
Acifluorfen	<.06806	<.05386	<.05205	<.03655	<.02559	<.03434	<.05235	<.04989	<.02741
Molinate	<.01317	0.04689	0.13076	<.00775	<.00789	<.01473	<.00710	<.01484	<.00714
Propachlor	<.01123	<.00829	<.01030	<.00496	<.01396	<.01351	<.01578	<.00923	<.01726
Trifluralin	<.00048	<.00605	<.00249	<.00334	<.00491	<.00743	<.00286	<.00392	<.01139
Alpha-BHC	<.00978	<.00836	<.00982	<.00760	<.01001	<.01288	<.01326	<.01123	<.00789
Atraton	<.00479	<.01086	<.00693	<.00655	<.01478	<.02037	0.0188	<.01688	<.00913
Prometon	<.00532	<.00876	<.01157	<.01119	<.01214	<.01040	0.01408	<.01245	<.01021
Simazine	<.01148	<.02127	<.01519	<.01727	<.03289	<.02877	<.00774	<.01709	<.01843
Atrazine	0.01744	0.03249	0.04798	0.01909	<.01334	0.4784	<.00501	0.01325	<.01041
Propazine	<.00358	<.00794	<.00515	<.00624	<.00714	<.00946	<.00819	<.00698	<.00572
Beta-BHC	<.01094	<.00935	<.01099	<.00850	<.01036	<.01333	<.01328	<.01124	<.00790
Gamma-BHC	<.00990	<.00847	<.00995	<.00770	<.00952	<.01225	<.01201	<.01017	<.00714
Terbutylazine	<.02759	<.02622	<.02141	<.02998	<.06376	<.05175	<.04147	<.04710	<.07389
Diazinon	<.00526	<.01588	<.01743	<.01320	<.01153	<.01231	<.00996	<.01557	<.01099
Fluchloralin	<.00070	<.00999	<.00401	<.00586	<.00709	<.01113	<.00370	<.00566	<.01585
Fonofos	<.01550	<.01542	<.01222	<.01021	<.00330	<.01279	<.00905	<.02204	<.01499
Delta-BHC	<.01208	<.01033	<.01214	<.00939	<.01199	<.01543	<.01619	<.01371	<.00964
Cyprazine	<.00450	<.00813	<.00596	<.00610	<.00762	<.01190	<.00351	<.00388	<.01244
Metribuzin	<.00482	<.00915	<.00756	<.00483	<.01176	<.01830	<.00468	<.01467	<.00595
Methyl-Parathion	<.00638	<.01095	<.01072	<.01037	<.00986	<.01671	<.00831	<.00760	<.00547
Alachlor	<.00280	<.01020	<.00773	<.00440	<.00635	<.00348	<.00489	<.00995	<.00704
Ametryn	<.00290	<.00810	<.00710	<.00684	<.01018	<.01087	<.00525	<.00807	<.01216
Prometryn	0.06954	0.14165	<.00783	0.01345	<.01317	<.01308	<.00602	<.00871	<.00843
Heptachlor	<.00993	<.01714	<.01286	<.00963	<.00619	<.01326	<.00572	<.00940	<.01284
Terbutryn	<.00672	<.00337	<.00402	<.00393	<.01030	<.01038	<.00296	<.00356	<.00844
Metolachlor	0.03107	0.01169	0.09719	0.00562	<.00468	0.03153	<.00322	<.00438	<.00599
Malathion	<.01469	<.01688	<.03763	<.01661	<.01402	<.03863	<.02095	<.03808	<.03562
Dipropetryn	<.00512	<.00988	<.00706	<.00481	<.01112	<.01280	<.00347	<.00854	<.00650
Chlorpyrifos	<.00732	<.00910	<.01110	<.00742	<.01836	<.02786	<.00945	<.01700	<.02068
Cyanazine	<.00943	0.19834	<.01540	0.04285	<.01204	1.0118	<.01044	<.02686	<.01982
Aldrin	<.01303	<.02236	<.02188	<.02118	<.02178	<.03690	<.02029	<.01856	<.01336
Pendimethalin	<.00571	<.00416	<.00573	<.00488	<.00618	<.00591	<.00603	<.00570	<.00809
Heptachlor-Epoxide	<.01518	<.01014	<.01163	<.01368	<.03258	<.02506	<.01356	<.01148	<.02644
Endosulfan-I	<.25028	<.16490	<.19475	<.21987	<.23822	<.14875	<.13085	<.13581	<.11483
p-p'-DDE	<.00295	<.00409	<.00321	<.00349	<.00510	<.01099	<.00304	<.00642	<.00609
Dieldrin	<.04175	<.04345	<.04732	<.03460	<.05185	<.06310	<.03032	<.03417	<.04773
Endrin	<.03021	<.04886	<.04649	<.04268	<.05978	<.10373	<.03265	<.03096	<.02325
Endosulfan-II	<.09266	<.08238	<.07803	<.06385	<.11426	<.15542	<.02410	<.05958	<.08964
p-p'-DDD	<.00224	<.00394	<.00422	<.00296	<.00470	<.00620	<.00283	<.00322	<.00436
Endosulfan-Sulfate	<.01084	<.01434	<.01659	<.00912	<.06286	<.06213	<.01244	<.01295	<.02040
p-p'-DDT	<.00243	<.00428	<.00458	<.00322	<.00447	<.00590	<.00312	<.00355	<.00481
Hexazinone	<.00523	<.00356	<.00243	<.00409	<.00809	<.00805	<.00254	<.00683	<.00498
Methoxychlor	<.00114	<.00299	<.00255	<.00233	<.00374	<.00409	<.00167	<.00266	<.00419
PCB-as-AR1221	<.01363	<.04957	<.03757	<.02136	<.01641	<.00900	<.01389	<.02826	<.01999
PCB-as-AR1232	<.02824	<.10271	<.07785	<.04425	<.03396	<.01862	<.02874	<.05849	<.04138
PCB-as-AR1242	<.57616	<.44277	<.99668	<.76481	<.15487	<.20155	<.02742	<.10457	<.15083
PCB-as-AR1248	<.1.5837	<.1.2170	<.2.7396	<.2.1022	<.42697	<.55564	<.07558	<.28827	<.41581
PCB-as-AR1254	<.3.3915	<.2.0587	<.2.0317	<.1.9842	<.28186	<.32111	<.07320	<.11545	<.24339
PCB-as-AR1260	<.1.4259	<.86561	<.85424	<.83428	<.11835	<.13483	<.03074	<.04848	<.10219
Technical-Chlordane	<.38507	<.1.3989	<.86041	<.82353	<.08470	<.15246	<.03370	<.06257	<.10695

TABLE B-3. Pesticide Data from Type E Lakes.

	Grand	Upper Chicot	Lower Chicot	Felsenthal - L	Felsenthal - U	Horseshoe
3-5-Dichlorobenzoic_Acid	<.16596	<.02037	<.13041	<.03476	<.02310	<.02091
Dicamba	<.07160	<.02131	<.06447	<.03184	<.04227	<.02081
Dichlorprop	<.09299	<.04540	<.07719	<.06304	<.06864	<.05713
2-4-D	<.06564	<.01772	<.08373	<.02617	<.02482	<.01835
Pentachlorophenol	<.06934	<.05052	<.02109	<.04100	<.02621	<.02979
Silvex	<.04436	<.03355	<.07007	<.02979	<.03321	<.03454
2-4-5-T	<.02286	<.00577	<.04358	<.03729	<.03535	<.02159
Dinoseb	<.04554	<.03278	<.08076	<.03971	<.04277	<.02250
2-4-DB	<.03043	<.03883	<.05158	<.02372	<.01482	<.01497
Bentazon	0.41337	0.11905	0.17304	<.01961	<.01708	<.01547
Picloram	<.03314	<.02507	<.05235	<.02226	<.02481	<.02438
Acifluorfen	0.11786	<.03599	0.09476	<.04106	<.03179	<.02805
Molinate	<.01275	<.00957	0.09204	<.00665	<.00738	<.01021
Propachlor	<.00608	<.00925	<.00657	<.00523	<.00583	<.01221
Trifluralin	<.00443	<.00274	<.00669	<.00146	<.00263	<.00710
Alpha-BHC	<.00831	<.00562	<.01232	<.01500	<.00933	<.01374
Atraton	<.00727	<.01207	<.00419	<.01080	<.00979	<.00851
Prometon	<.00495	<.01163	<.00570	<.01291	<.00678	<.00395
Simazine	<.02369	<.01603	<.01928	<.01727	<.02566	<.02709
Atrazine	0.33899	0.09498	0.12638	<.00752	<.00681	0.01579
Propazine	<.00684	<.00415	<.00708	<.00094	<.00318	<.01074
Beta-BHC	<.00929	<.00629	<.01378	<.01678	<.01043	<.01423
Gamma-BHC	<.00841	<.00569	<.01247	<.01519	<.00945	<.01307
Terbutylazine	<.01256	<.01133	<.04667	<.02075	<.02131	<.05967
Diazinon	<.00928	<.01402	<.01394	<.00556	<.00485	<.01739
Fluchloralin	<.00674	<.00480	<.01104	<.00211	<.00446	<.00946
Fonofos	<.01828	<.01267	<.02142	<.00862	<.00713	<.01015
Delta-BHC	<.01027	<.00695	<.01522	<.01854	<.01153	<.01646
Cyprazine	<.00601	<.00555	<.00693	<.00515	<.00614	<.00964
Metribuzin	<.00731	<.00752	<.00775	<.00609	<.00499	<.01193
Methyl-Parathion	<.00897	<.00971	<.00662	<.00462	<.00677	<.00814
Alachlor	<.00692	<.00936	<.00460	<.00343	<.00478	<.00939
Ametryn	0.00773	<.00910	<.01312	<.00308	<.00627	<.01026
Prometryn	<.00943	<.00584	0.02281	<.00908	<.00363	0.06652
Heptachlor	<.01279	<.01501	<.01410	<.01268	<.01354	<.00968
Terbutryn	<.00974	<.00521	<.00496	<.00292	<.00386	<.01502
Metolachlor	<.00232	0.04074	0.04423	<.00306	<.00224	0.01038
Malathion	<.01919	<.01879	<.02929	<.01576	<.01756	<.02268
Dipropetryn	<.00583	<.01446	<.00840	<.00890	<.00654	<.00941
Chlorpyrifos	<.01269	<.01932	<.00914	<.00838	<.01092	<.02858
Cyanazine	<.01764	0.14488	0.12234	<.01276	<.00985	0.03628
Aldrin	<.01831	<.01982	<.01351	<.00944	<.01382	<.01798
Pendimethalin	<.00434	<.00853	<.00818	<.00625	<.00832	<.00612
Heptachlor-Epoxide	<.01080	<.01656	<.02490	<.00642	<.01552	<.03729
Endosulfan-I	<.21622	<.30012	<.35798	<.37372	<.22410	<.18529
p-p'-DDE	<.00224	<.00303	<.00172	<.00099	<.00112	<.00750
Dieldrin	<.06452	<.06015	<.03439	<.02846	<.03549	<.06961
Endrin	<.03935	<.03902	<.02856	<.02071	<.02727	<.04367
Endosulfan-II	<.05750	<.10216	<.08041	<.06982	<.05694	<.08027
p-p'-DDD	<.00292	<.00362	<.00485	<.00171	<.00408	<.00577
Endosulfan-Sulfate	<.01247	<.01803	<.02200	<.00701	<.00972	<.04474
p-p'-DDT	<.00318	<.00394	<.00526	<.00185	<.00444	<.00549
Hexazinone	<.00464	<.00595	<.00635	0.01512	0.01745	<.00501
Methoxychlor	<.00188	<.00303	<.00469	<.00114	<.00209	<.00333
PCB-as-AR1221	<.03360	<.04548	<.02235	<.01665	<.02322	<.02426
PCB-as-AR1232	<.06962	<.09423	<.04632	<.03451	<.04811	<.05022
PCB-as-AR1242	<.30855	<.13919	<.94874	<.66272	<.69289	<.18938
PCB-as-AR1248	<.84812	<.3260	<.26078	<.18216	<.19045	<.52211
PCB-as-AR1254	<.16010	<.12381	<.47470	<.17004	<.10272	<.28237
PCB-as-AR1260	<.67315	<.52059	<.19959	<.71498	<.43190	<.11856
Technical-Chlordane	<.54991	<.83727	<.47556	<.47700	<.43222	<.06074

APPENDIX C

LAKES DATA COMPARED TO WATER QUALITY CRITERIA AND GUIDELINES

Figure C-1 Temperature data by lake types

Maximum standard is 32 degrees Celsius
Samples taken one meter below the surface

Figure C-2 Turbidity data by lake types

Maximum standard is 25 NTU
Samples taken one meter below the surface (epilimnion) and at eighty percent (80%) of the maximum depth (hypolimnion)

Figure C-3 pH data by Lake Types

Maximum standard is 9.0 standard units
Minimum standard is 6.0 standard units
Samples taken one meter below the surface (epilimnion) and at eighty percent (80%) of the maximum depth (hypolimnion)

Figure C-4 DO data by lake types

Minimum standard is 5 mg/l
Samples taken one meter below the surface

Figure C-5 Bacteria data by lake types

Primary contact recreation: geometric mean of five samples collected with in a 30-day period shall not exceed 200 col/100 ml; 10% of samples shall not exceed 400 col/100 ml.

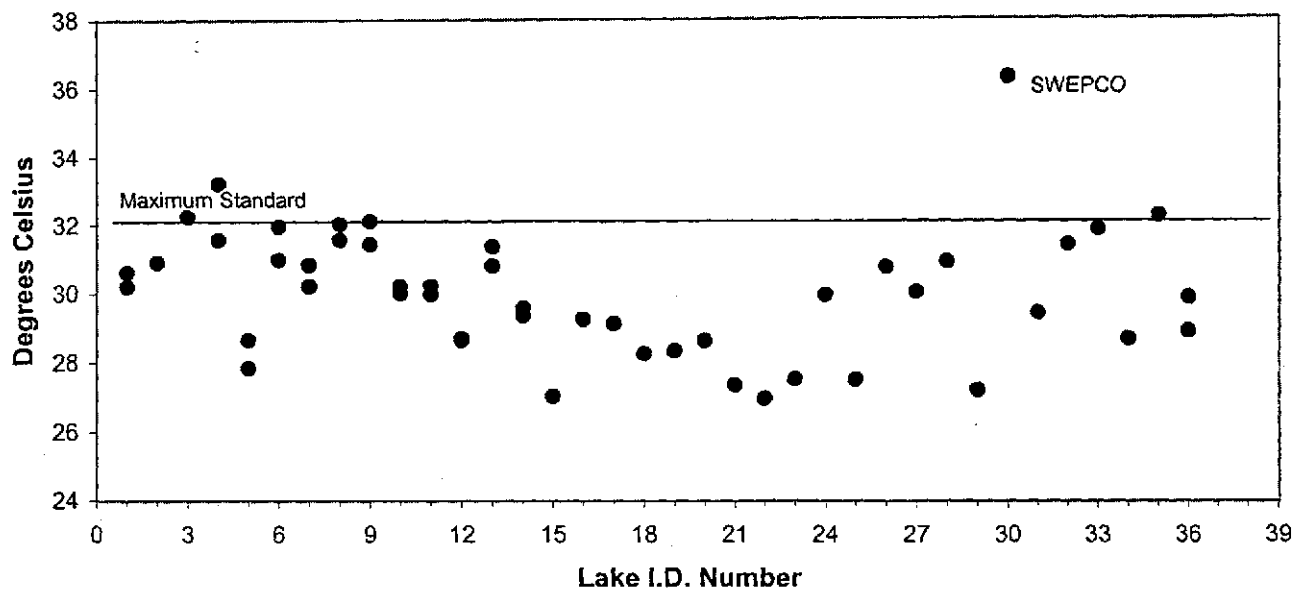
Secondary contact recreation: geometric mean of five samples collected with in a 30-day period shall not exceed 1000 col/100 ml; 10% of samples shall not exceed 2000 col/100 ml.

Figures C-6, C-7, C-8, C-9, C-10, C-11 - - Minerals Data By Ecoregion

Note: Upper lake station data appear first, identified by lake number only, followed by lower lake station transect data with no X axis identifiers.

**Figure C-1. Temperature Data
(1 Meter Depth)**

Type A and B Lakes



Type C, D and E Lakes

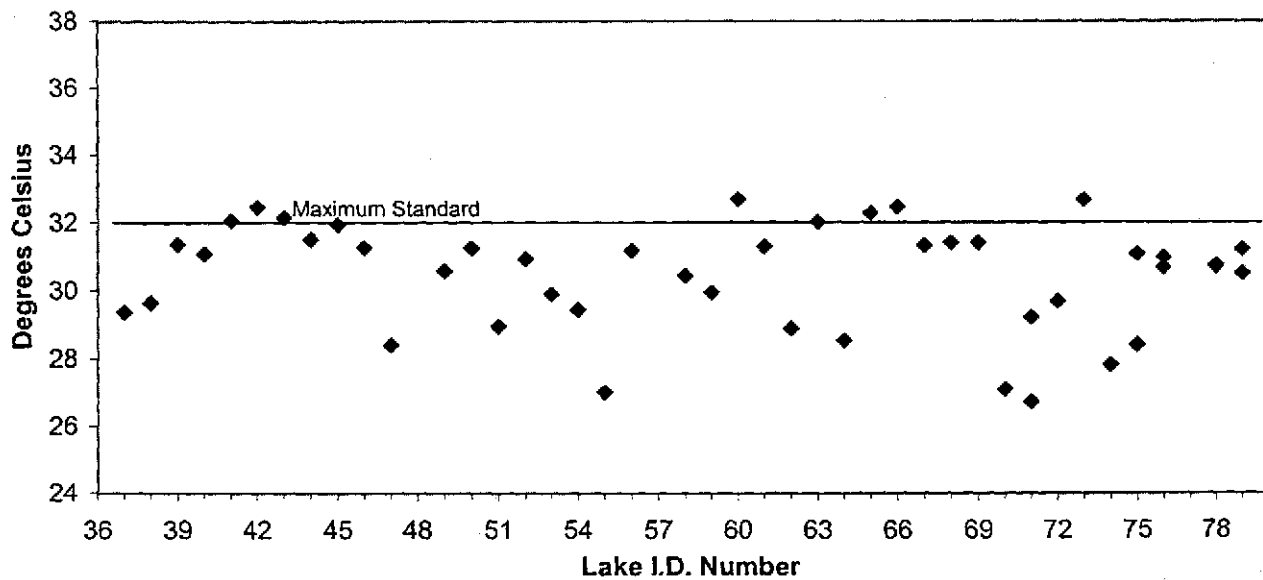
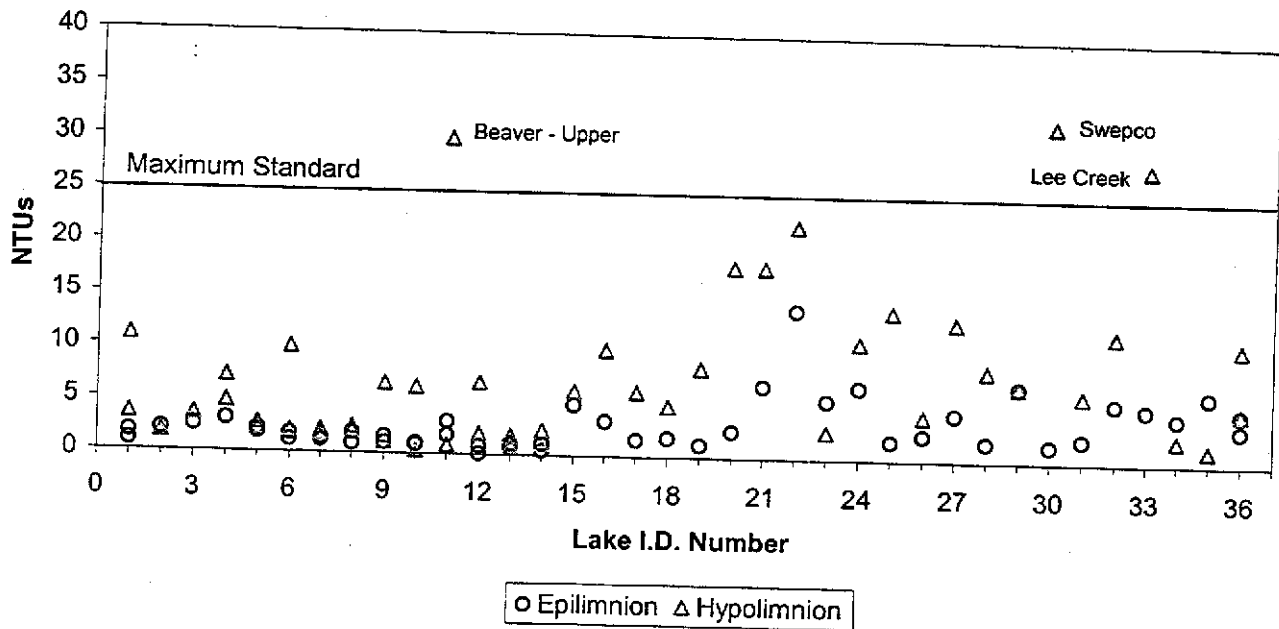


Figure C-2. Turbidity Data

Type A and B Lakes



Type C, D and E Lakes

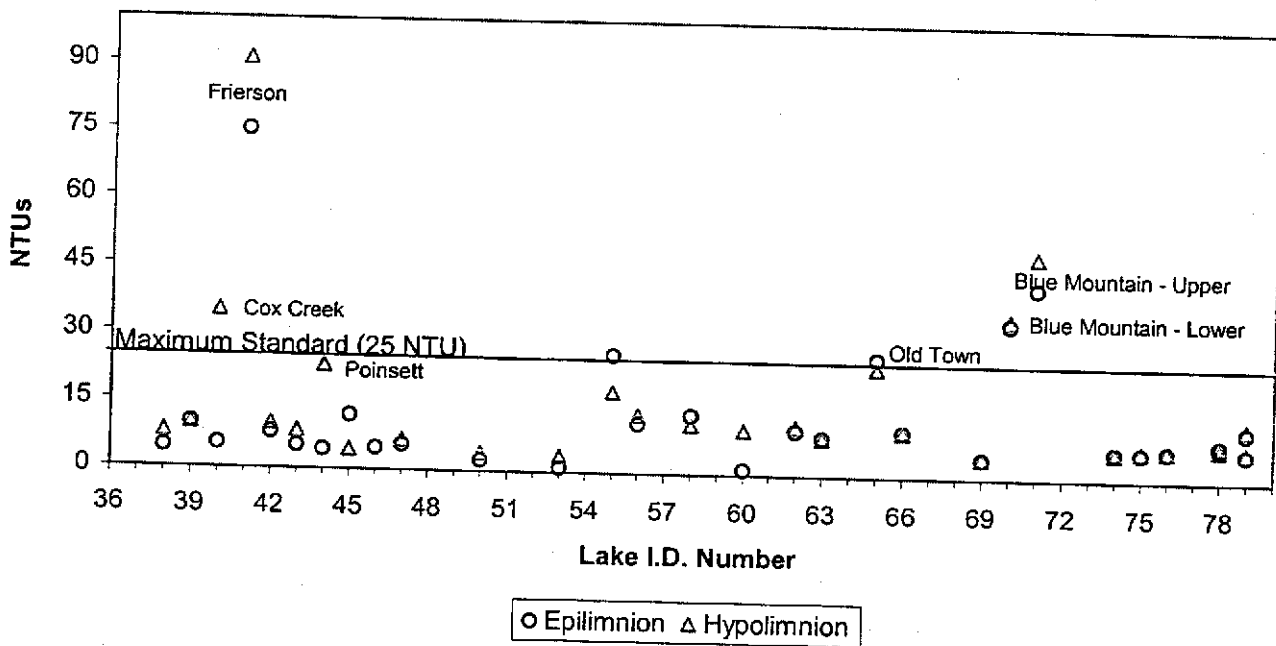
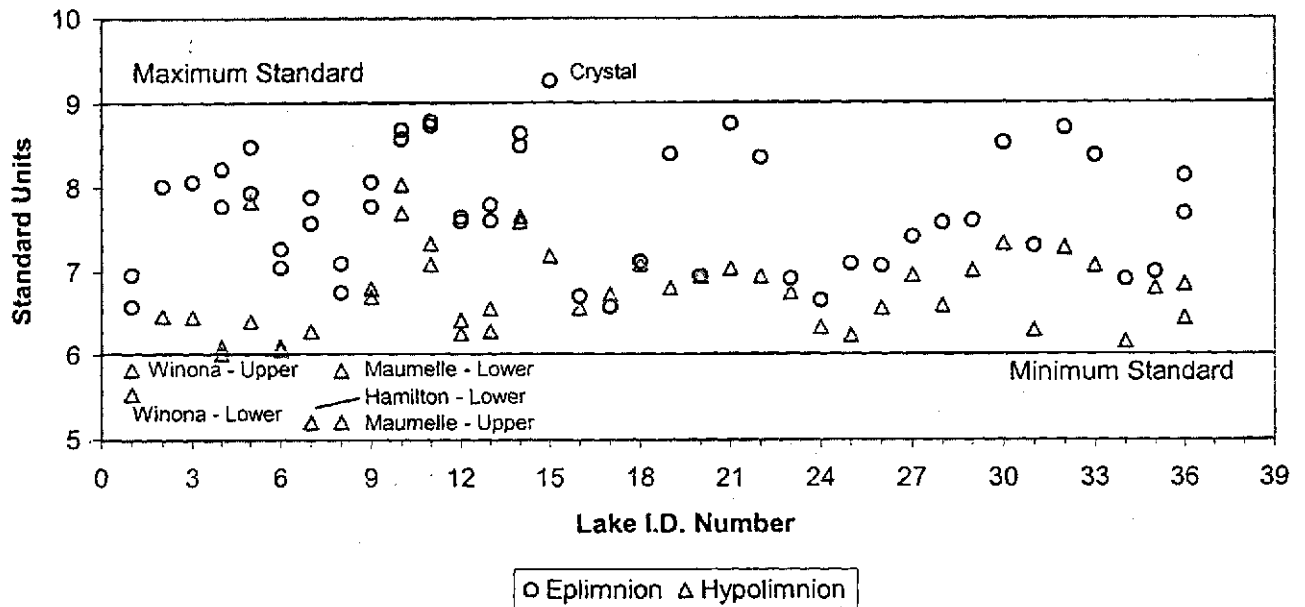


Figure C-3. pH Data

Type A and B Lakes



Type C, D and E Lakes

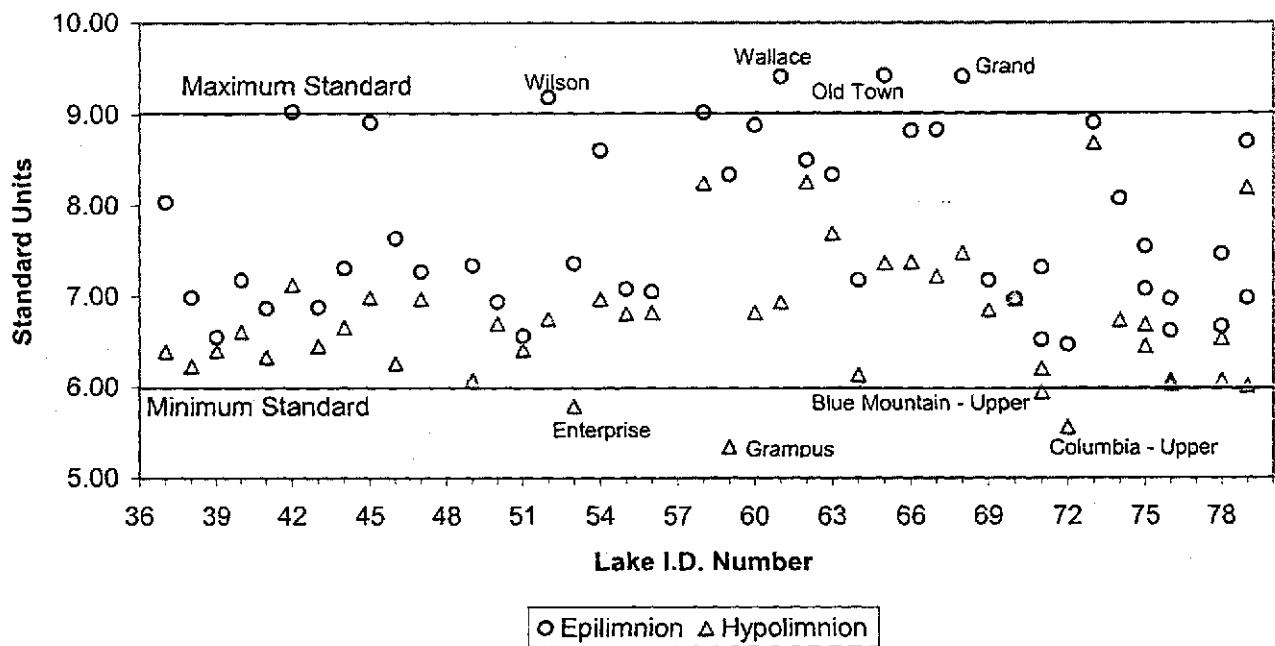
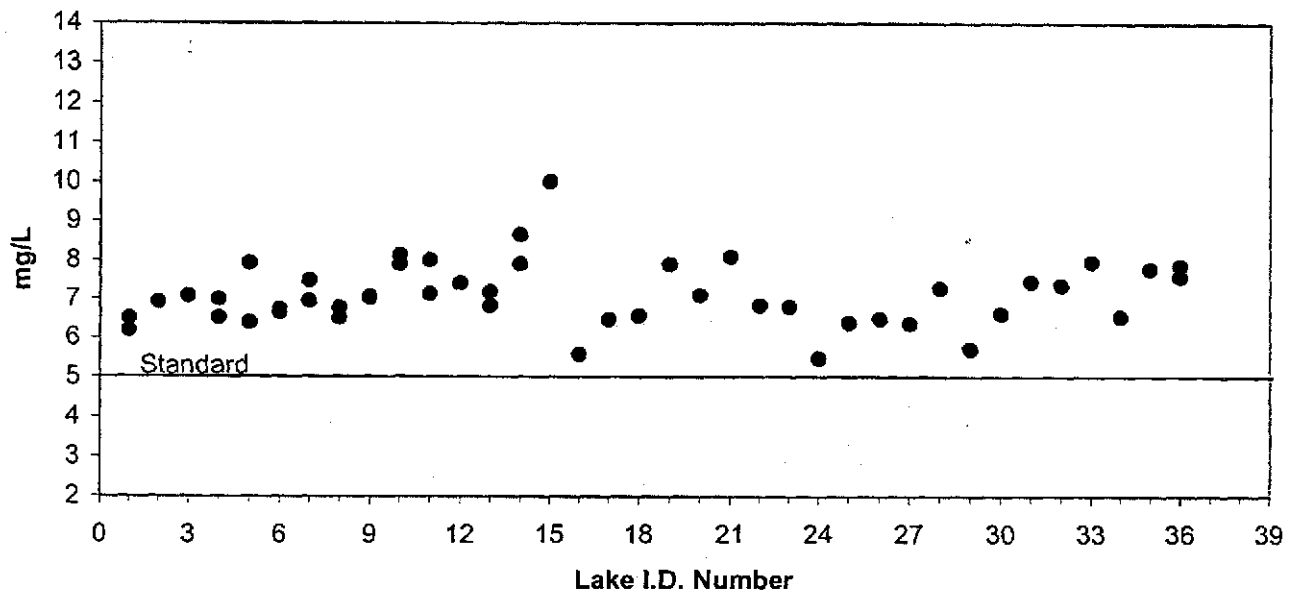


Figure C-4. Dissolved Oxygen Data

Type A and B Lakes



Blue Mountain - Lower

Type C, D and E Lakes

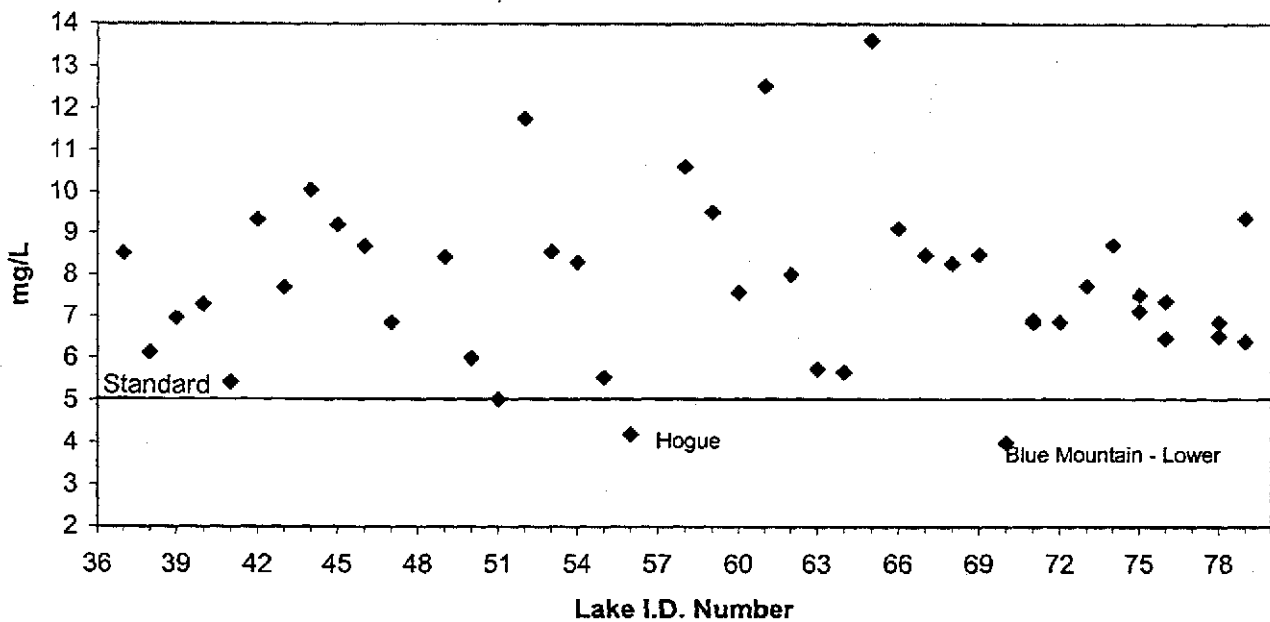
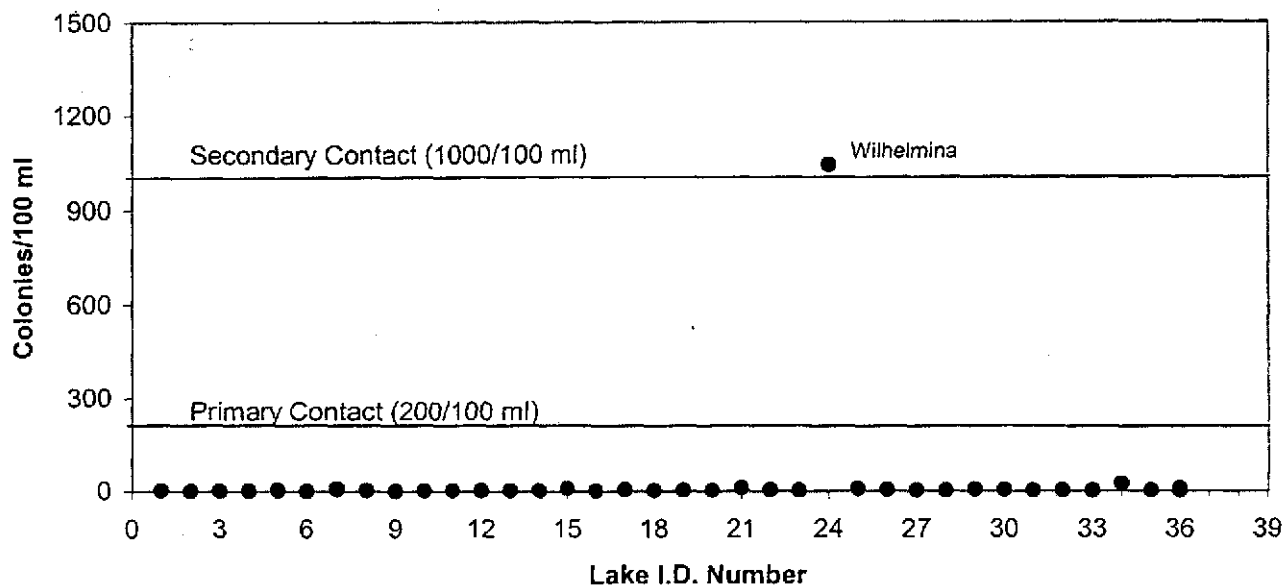


Figure C-5. Fecal Coliform Data

Type A and B Lakes



Type C, D and E Lakes

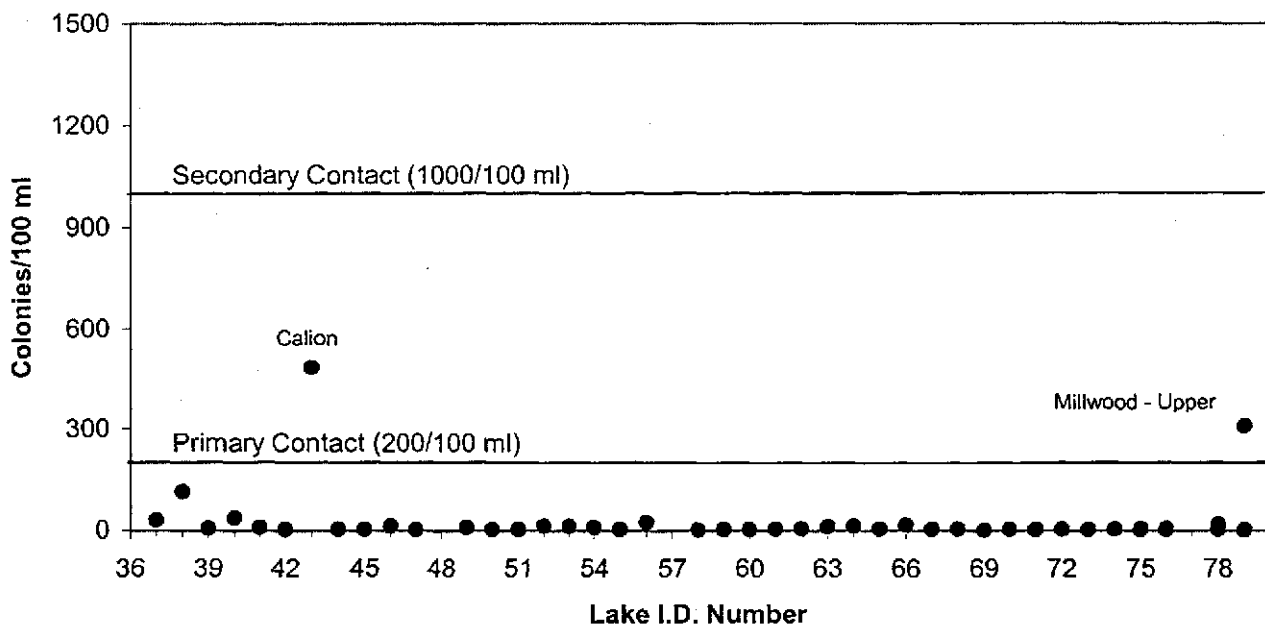
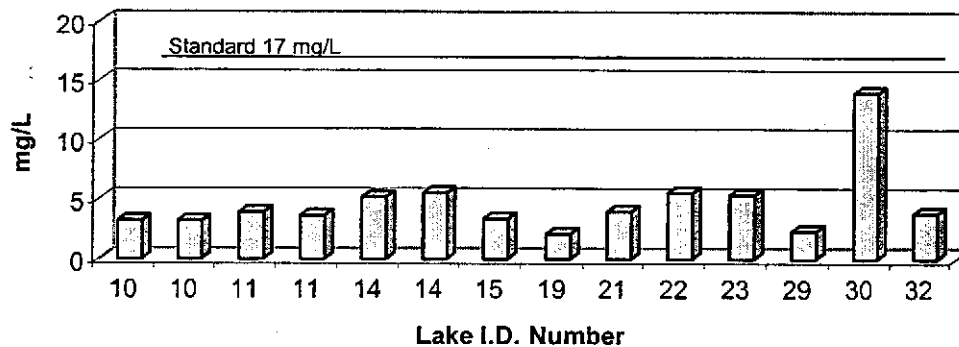
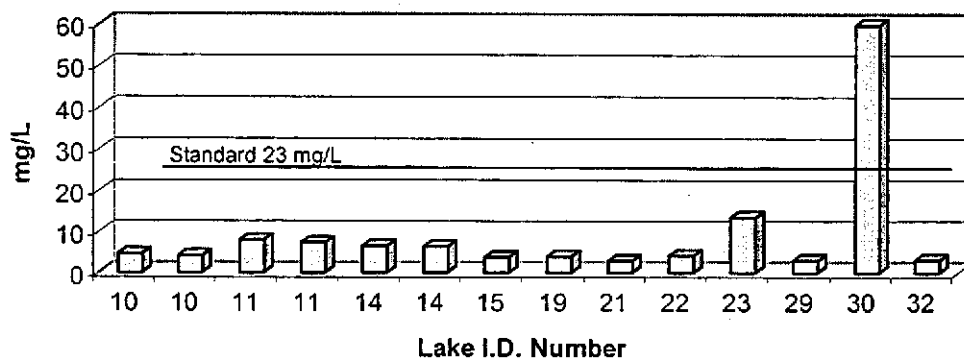


Figure C-6. Ozark Highlands Lakes - Minerals

CHLORIDES



SULFATES



TOTAL DISSOLVED SOLIDS

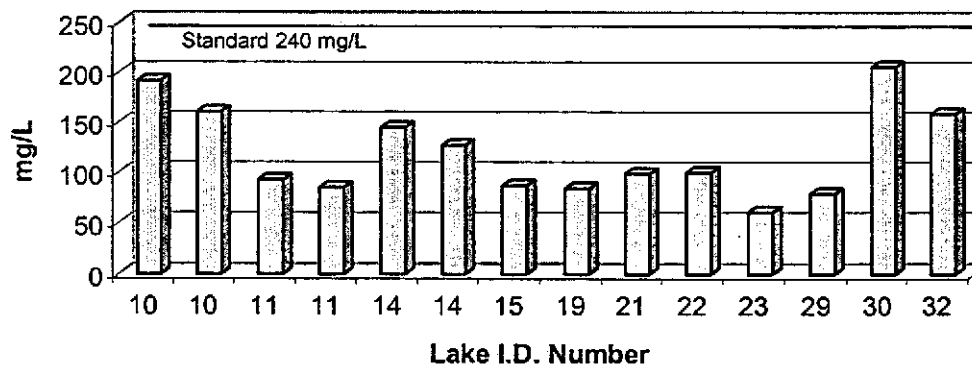


Figure C-7. Boston Mountains Lakes - Minerals

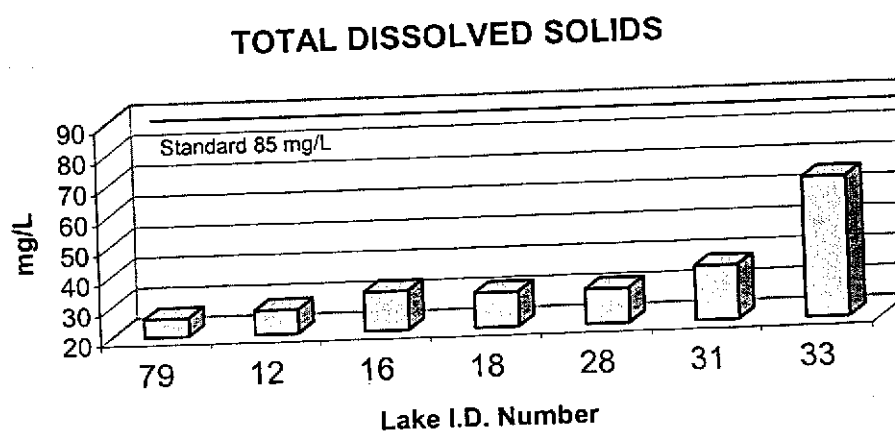
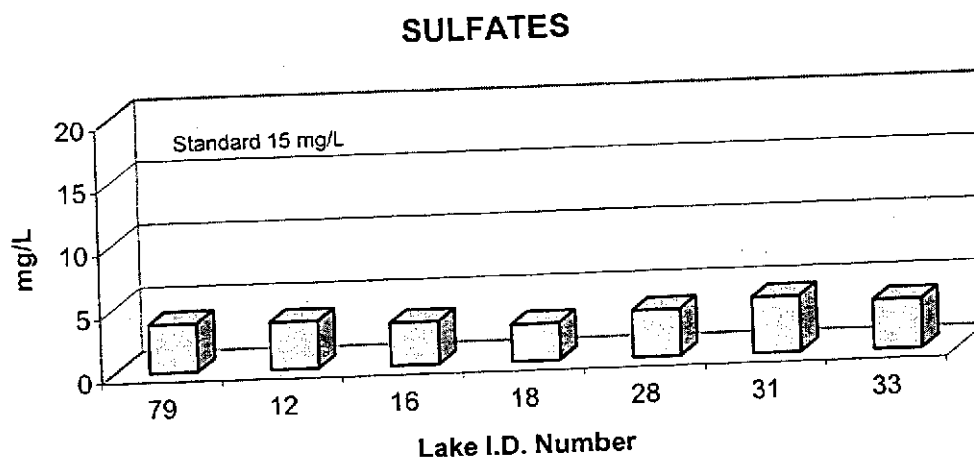
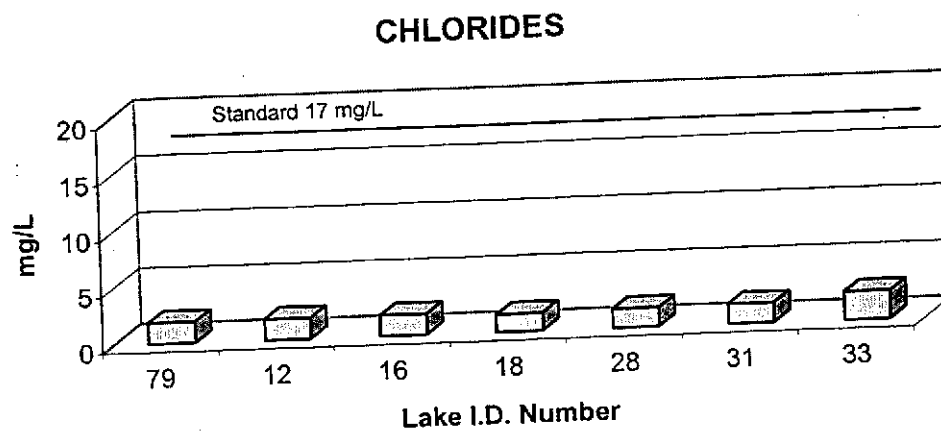
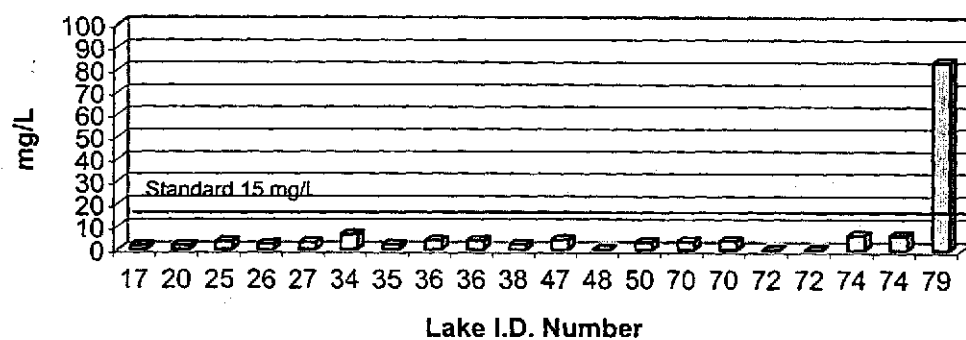
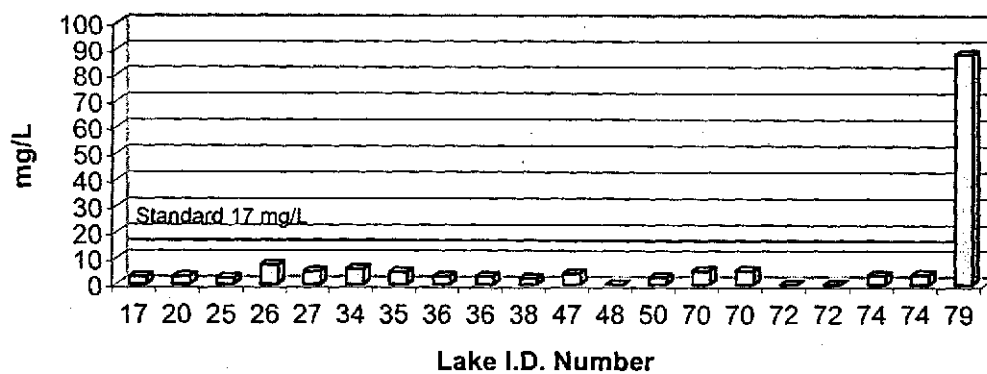


Figure C-8. Arkansas River Valley Lakes - Minerals*

CHLORIDES



SULFATES



TOTAL DISSOLVED SOLIDS

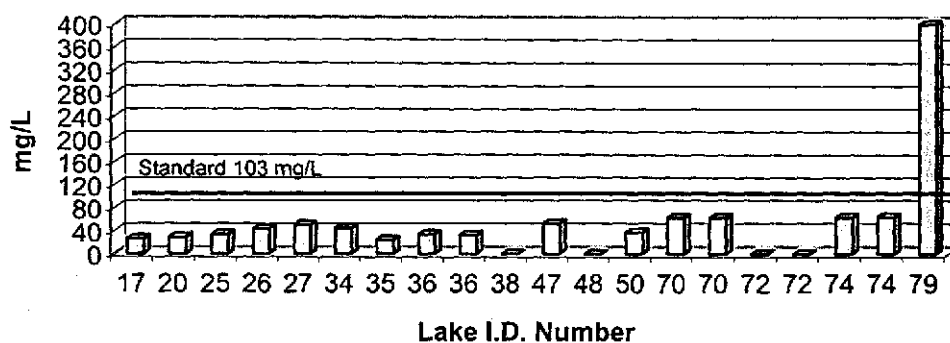
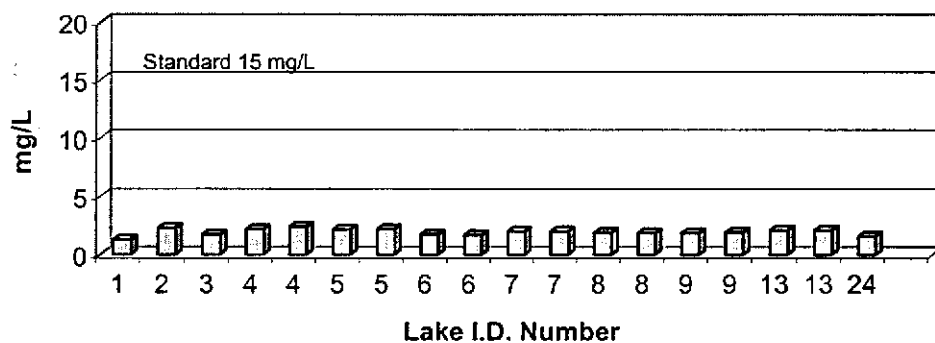
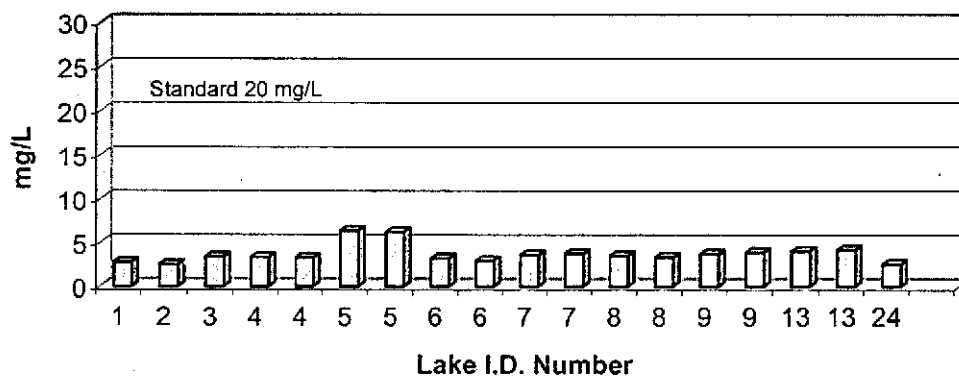


Figure C-9. Ouachita Mountains Lakes - Minerals

CHLORIDES



SULFATES



TOTAL DISSOLVED SOLIDS

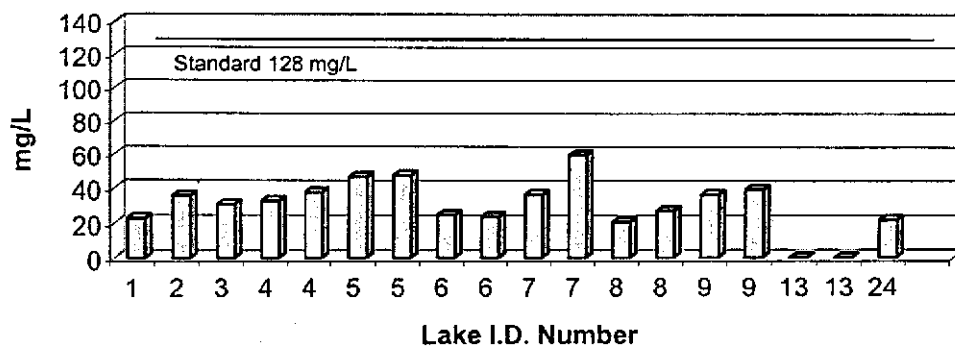
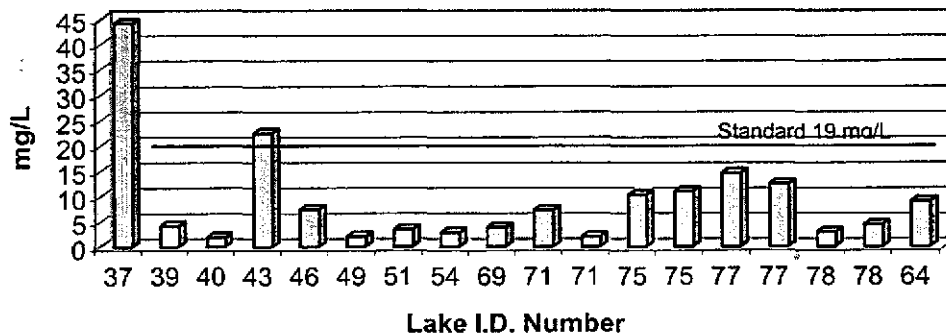
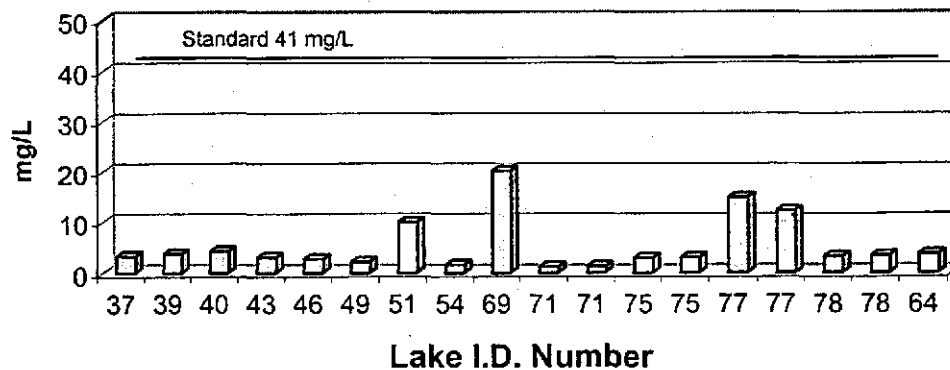


Figure C-10. Gulf Coastal Plains Lakes - Minerals

CHLORIDES



SULFATES



TOTAL DISSOLVED SOLIDS

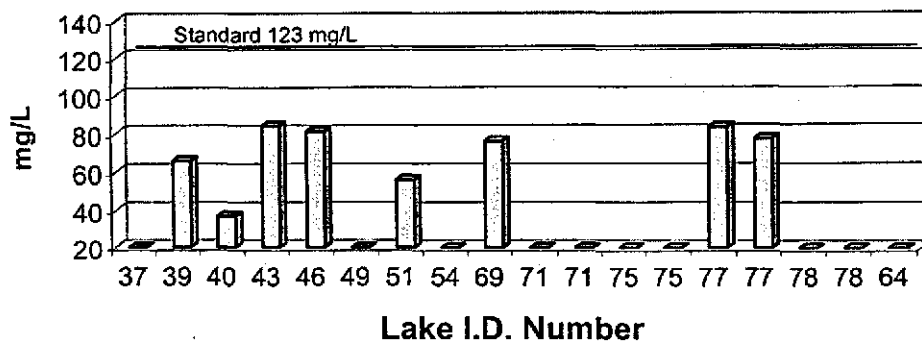
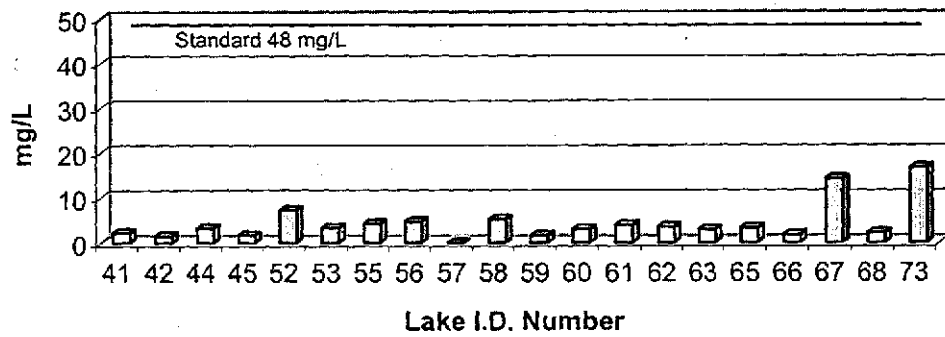
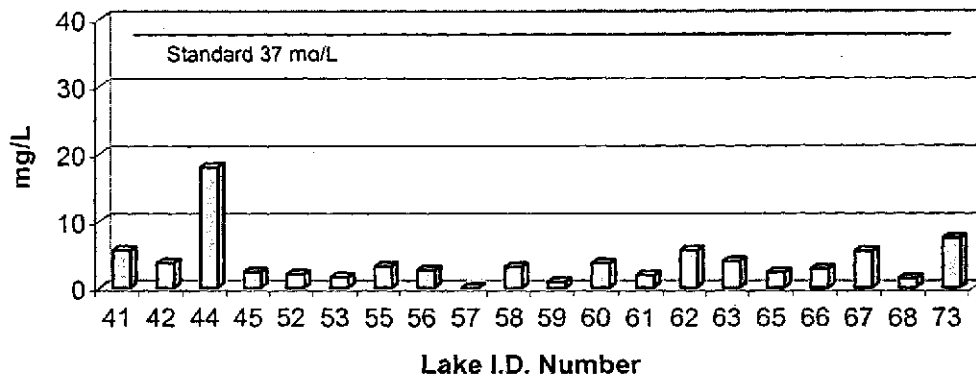


Figure C-11. Delta Lakes - Minerals

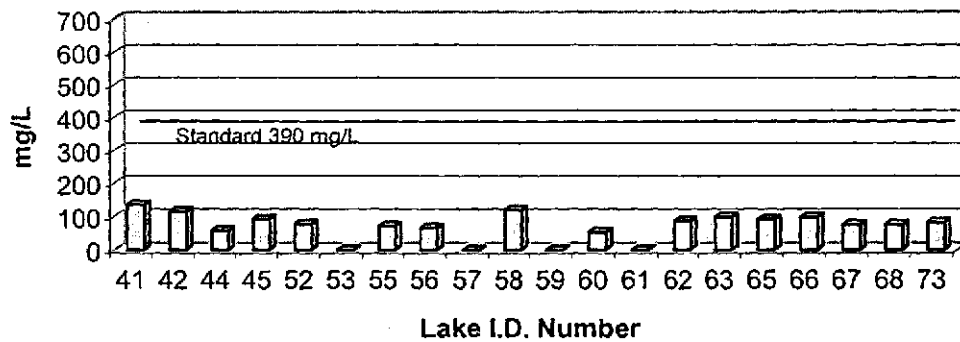
CHLORIDES



SULFATES



TOTAL DISSOLVED SOLIDS



APPENDIX D

LAKES DISSOLVED OXYGEN and TEMPERATURE PROFILES

This appendix contains a graphic representation of the dissolved oxygen and temperature profile data collected from all lake stations sampled during this survey. The open circles represent the dissolved oxygen data in mg/L and the asterisk represents the temperature in degrees Celsius. Depths are designated in meters. Figures are printed in numeric order by lake identification number and/or station. Due to differences in the maximum depth of the lakes, the depth scale was frequently changed.

O = Dissolved Oxygen in mg/L

Δ = Temperature in degrees Celsius

FIGURE D-1. Dissolved Oxygen and Temperature Profiles

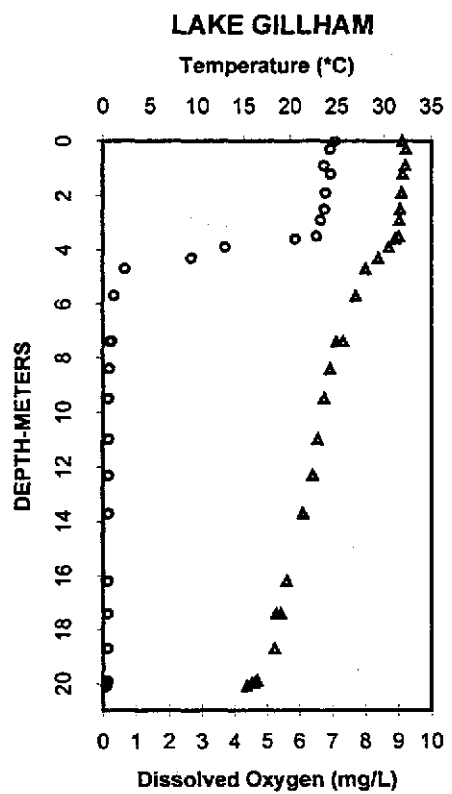
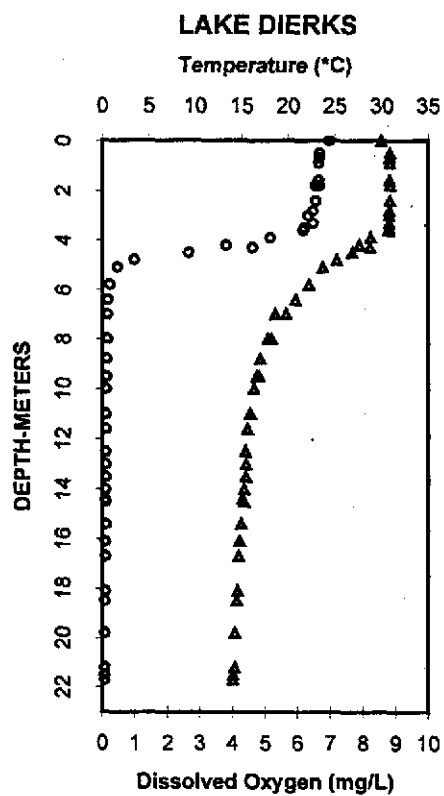
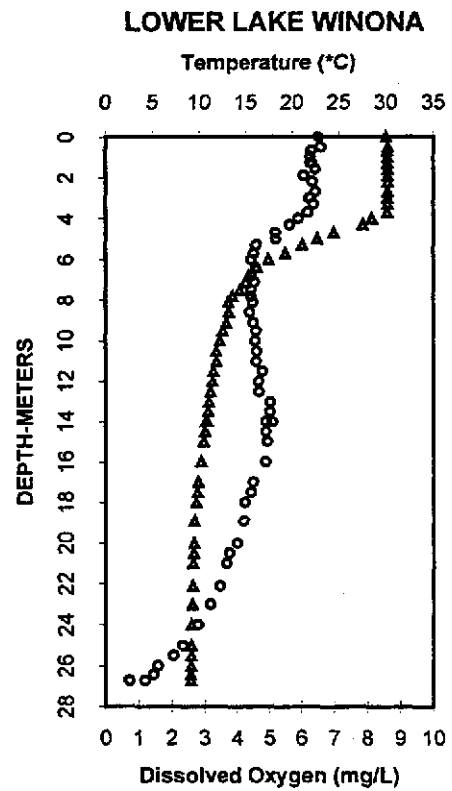
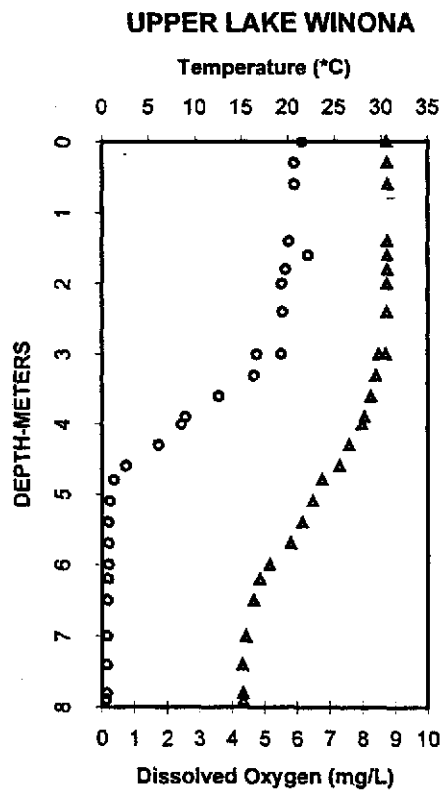


FIGURE D-2. Dissolved Oxygen and Temperature Profiles

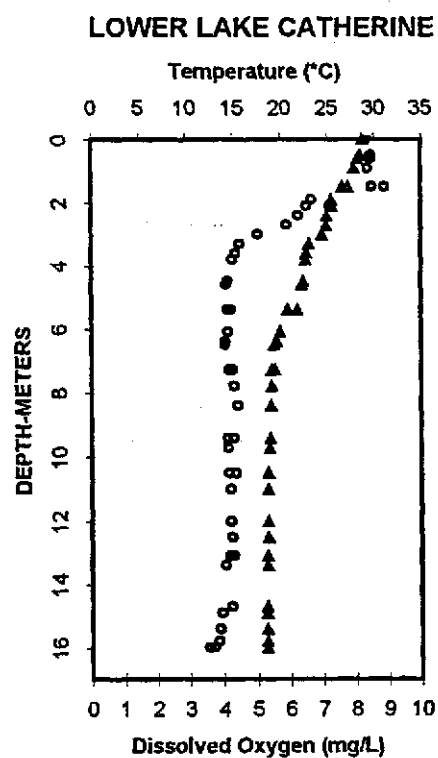
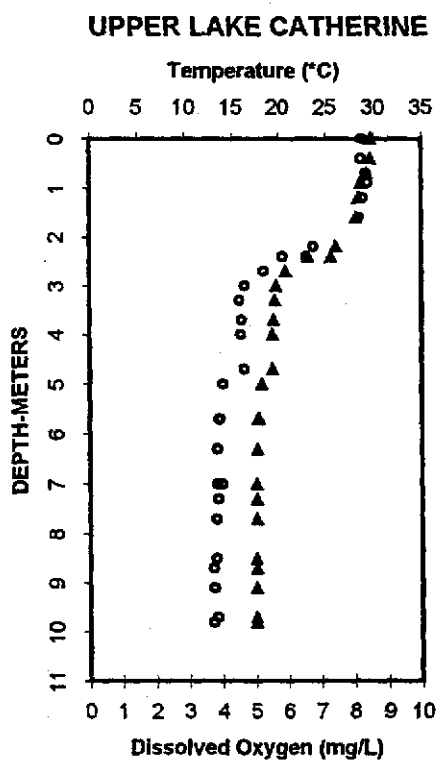
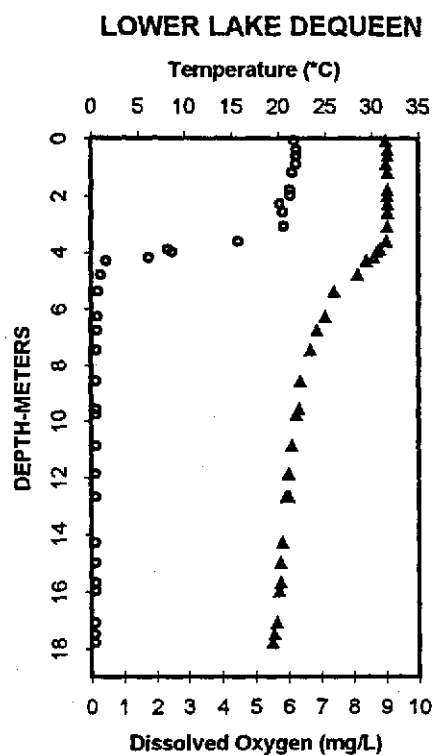
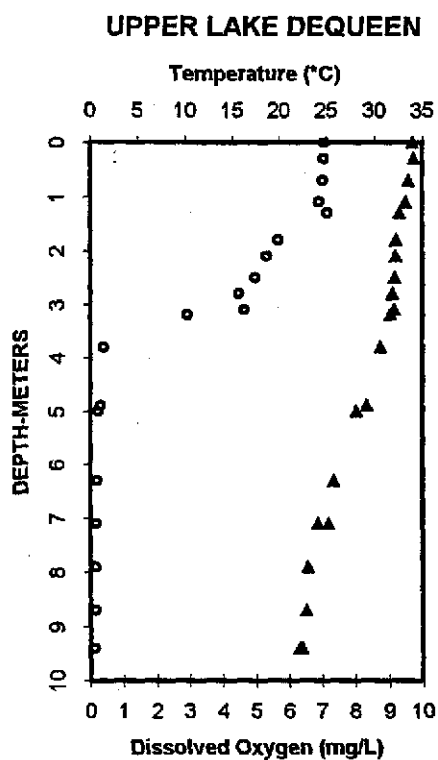


FIGURE D-3. Dissolved Oxygen and Temperature Profiles

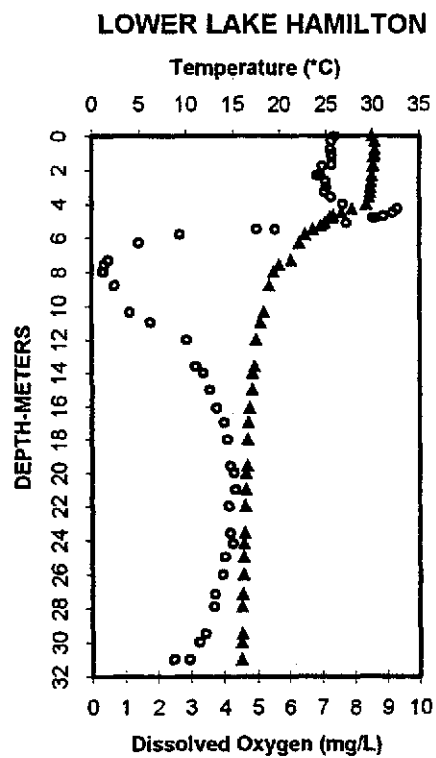
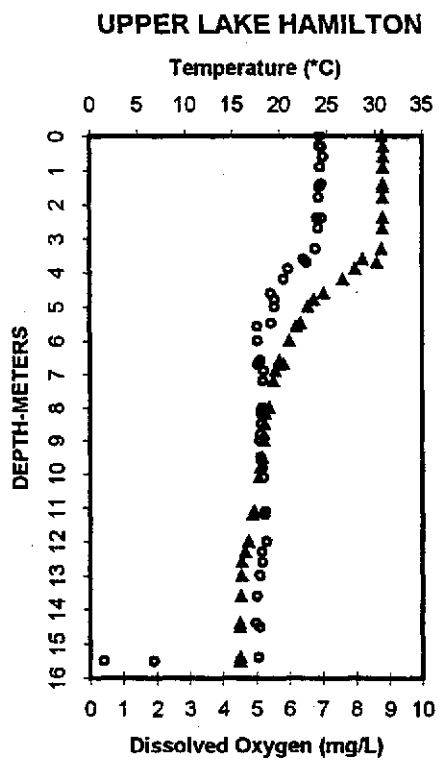
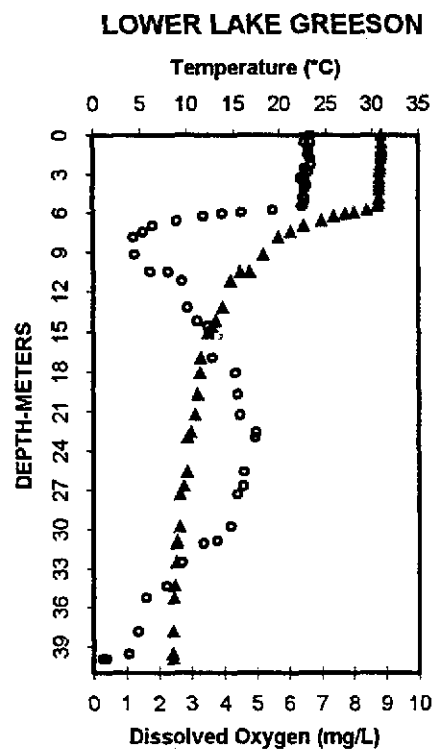
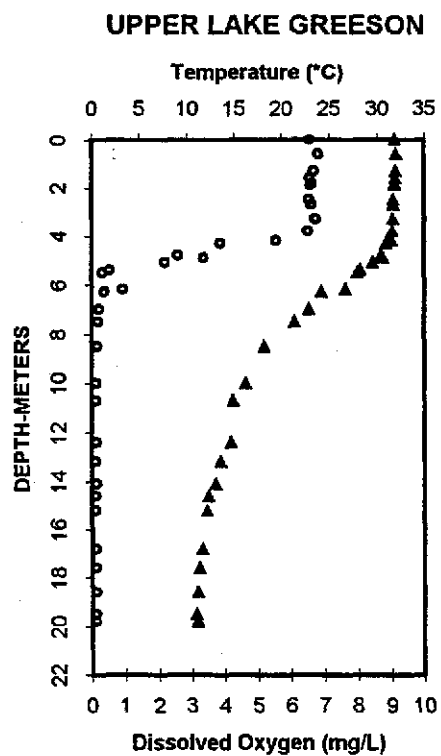


FIGURE D-4. Dissolved Oxygen and Temperature Profiles

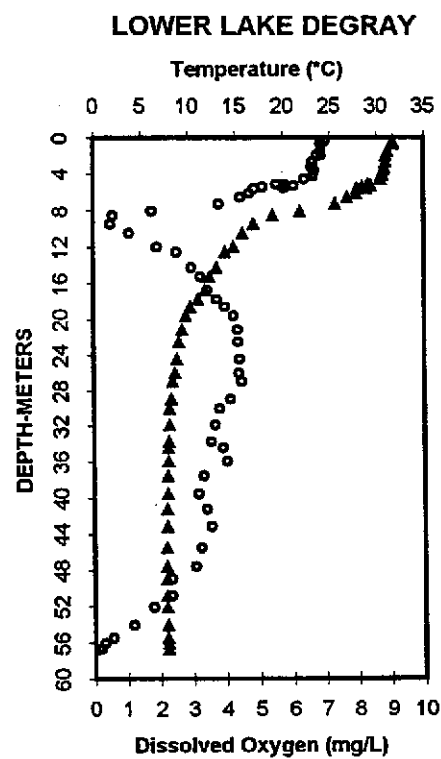
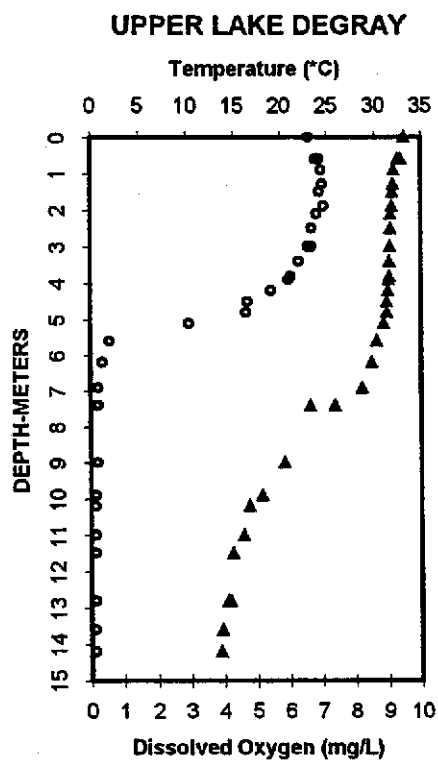
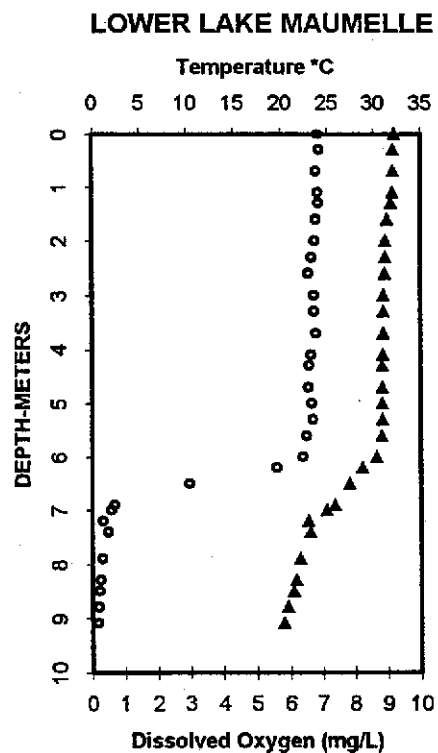
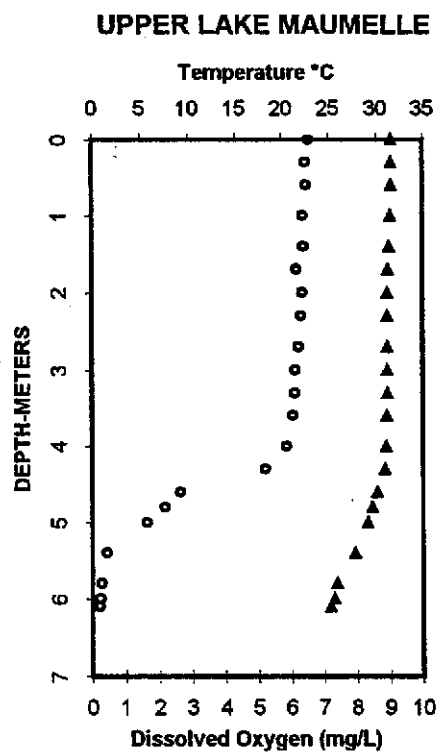


FIGURE D-5. Dissolved Oxygen and Temperature Profiles

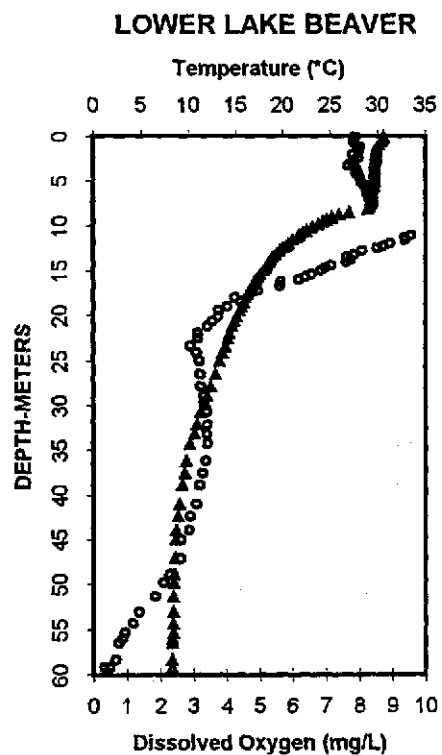
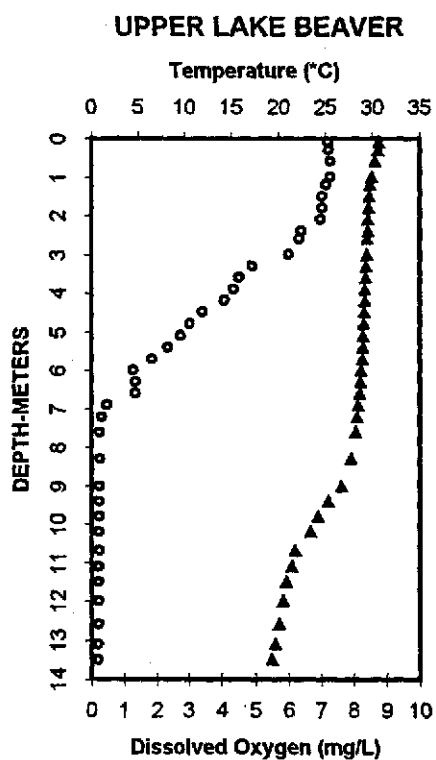
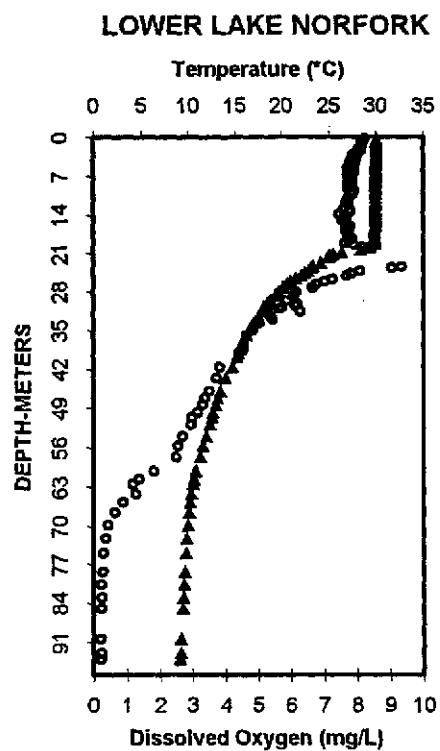
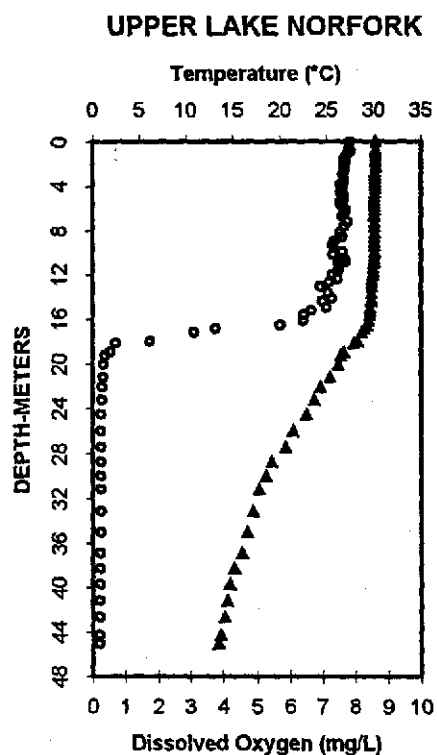


FIGURE D-6. Dissolved Oxygen and Temperature Profiles

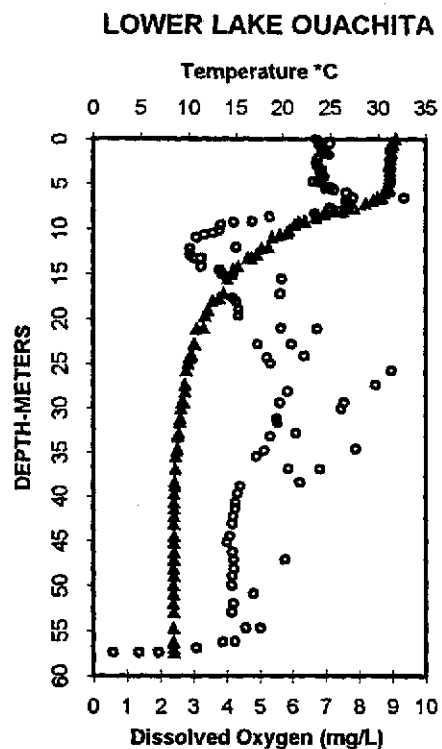
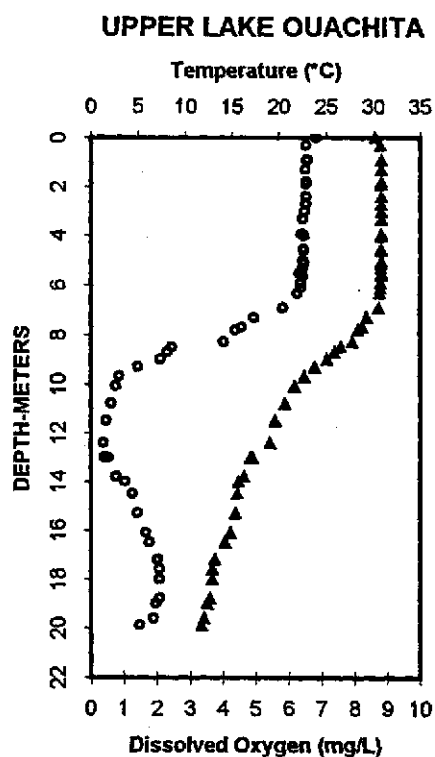
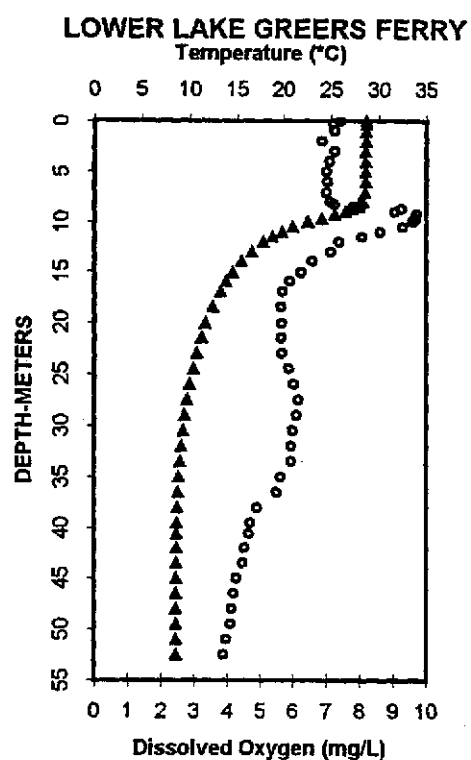
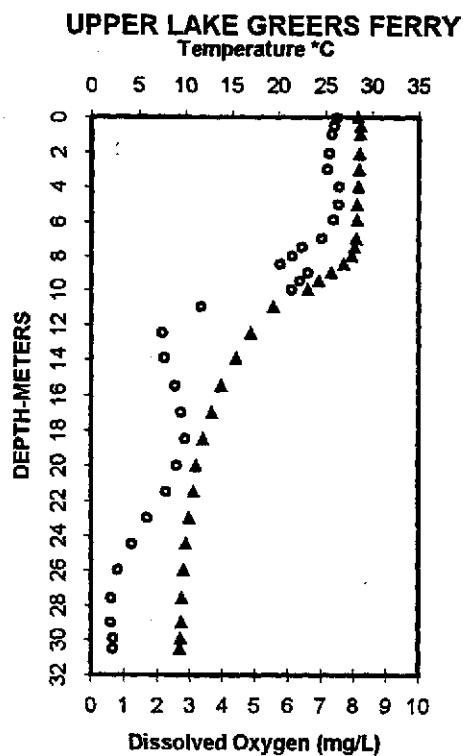


FIGURE D-7. Dissolved Oxygen and Temperature Profiles

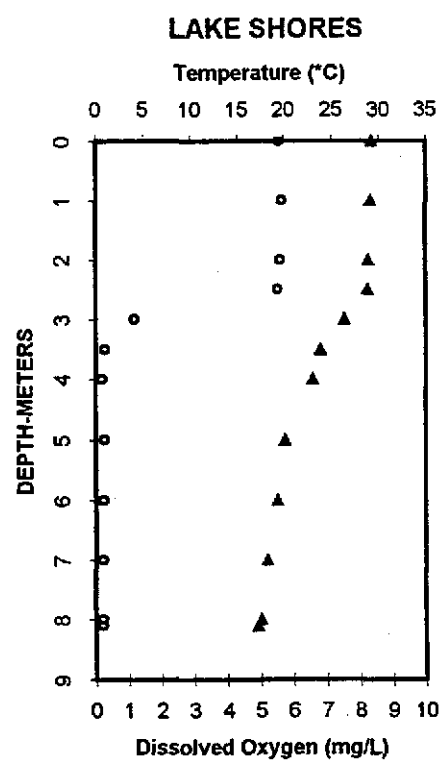
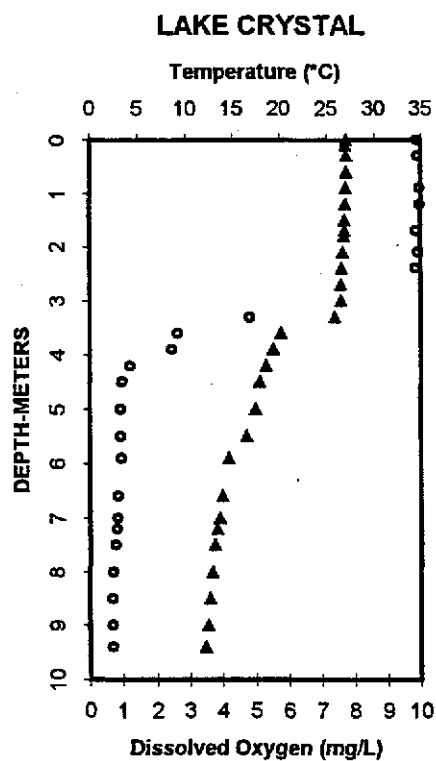
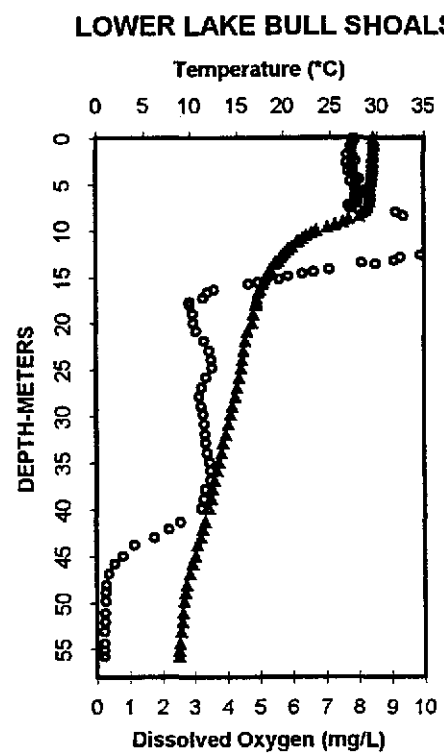
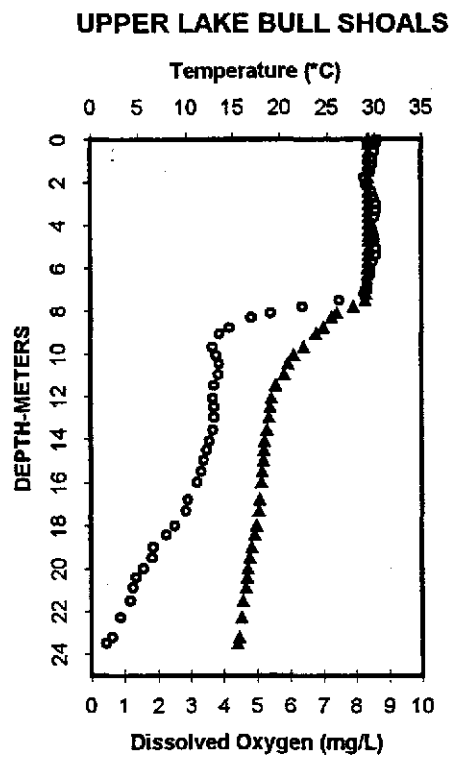


FIGURE D-8. Dissolved Oxygen and Temperature Profiles

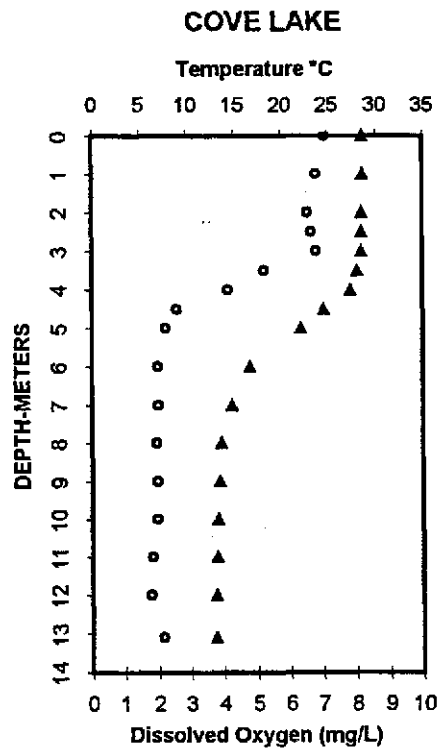
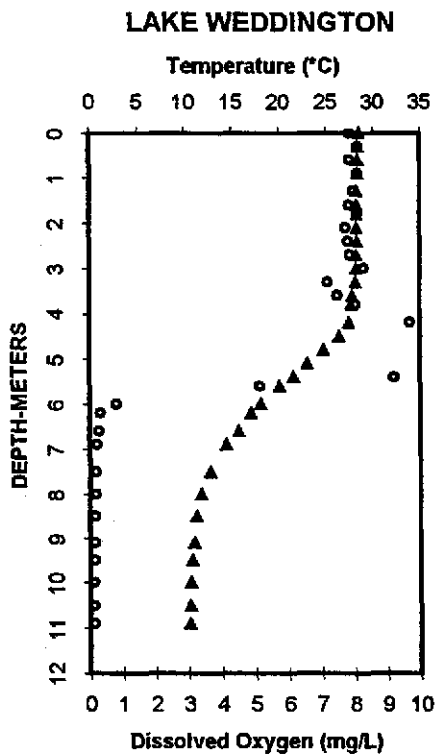
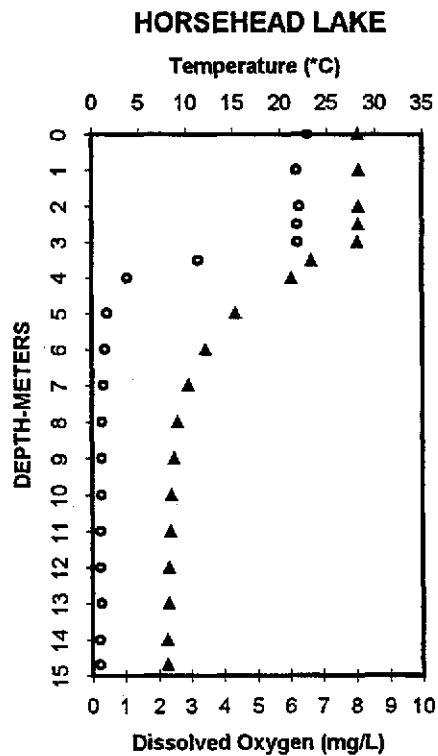
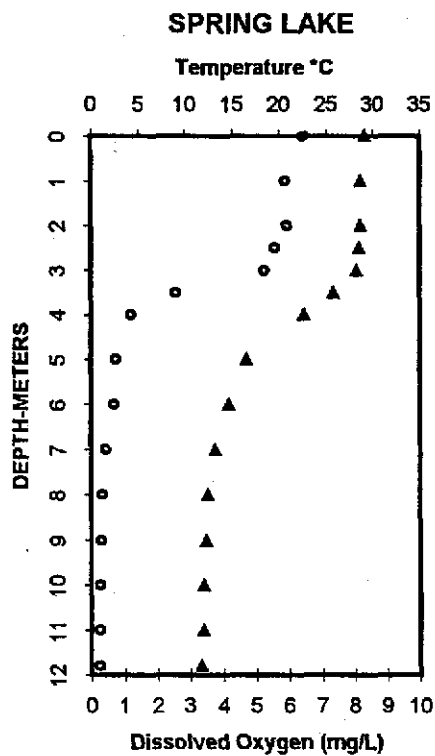


FIGURE D-9. Dissolved Oxygen and Temperature Profiles

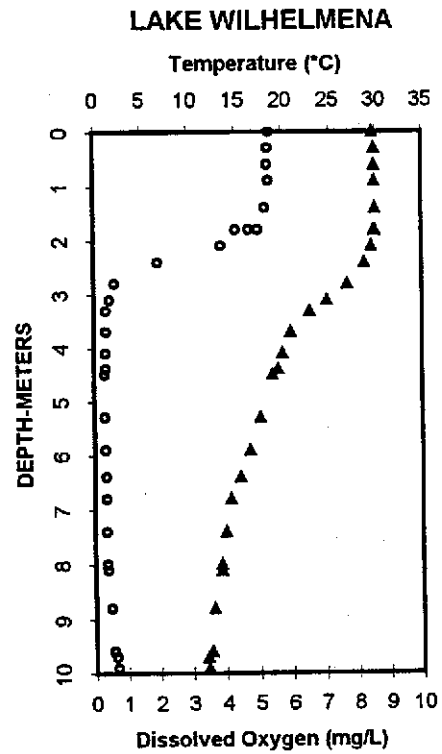
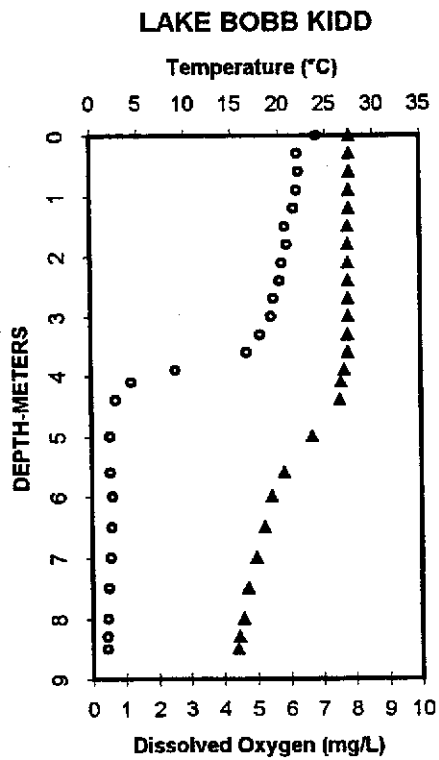
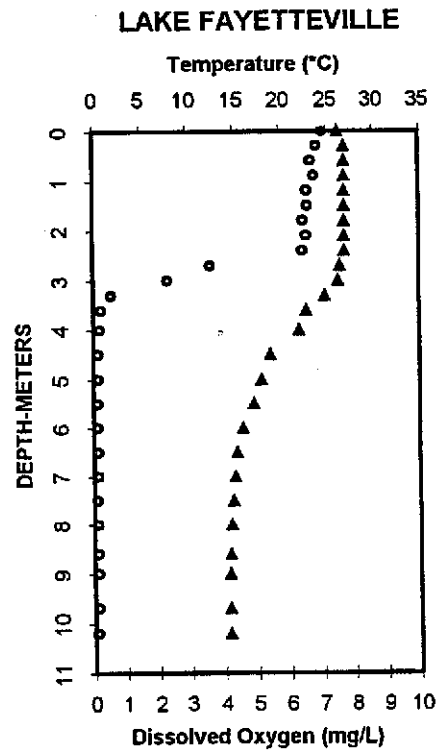
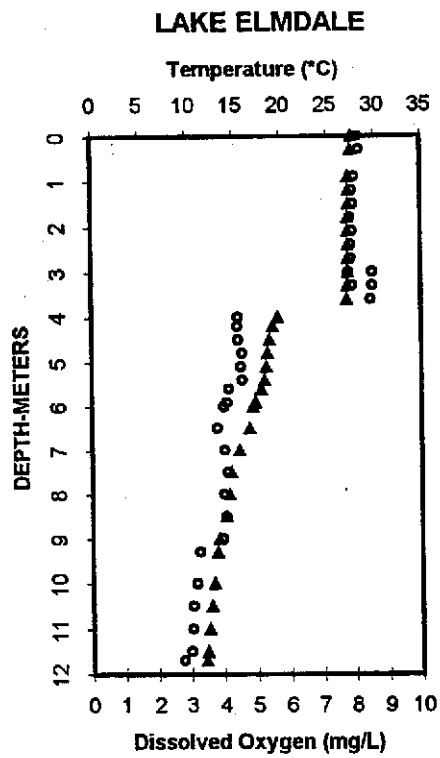


FIGURE D-10. Dissolved Oxygen and Temperature Profiles

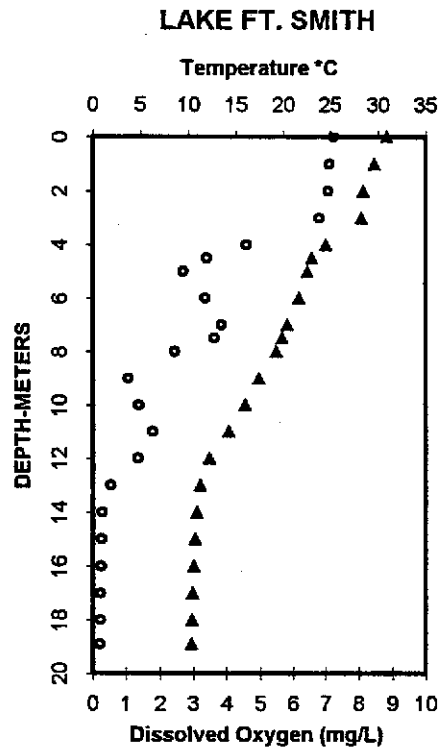
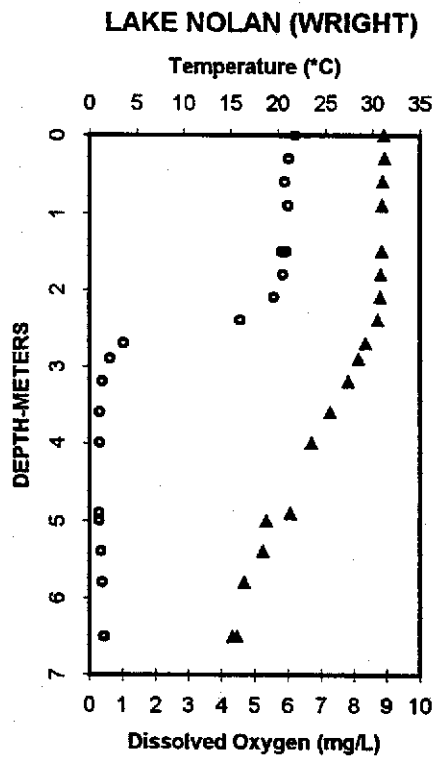
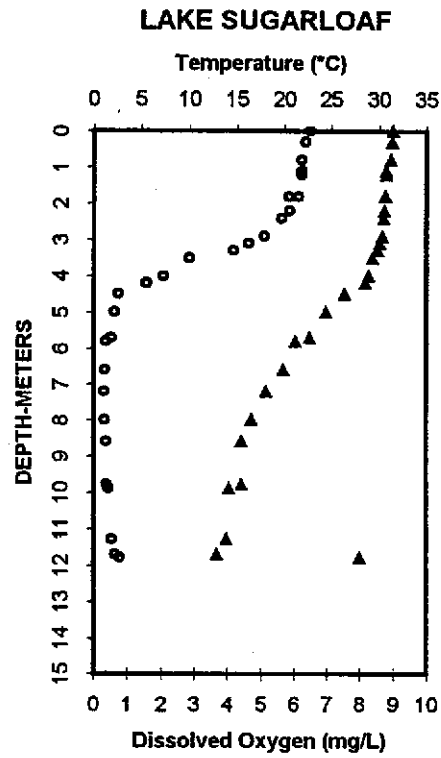
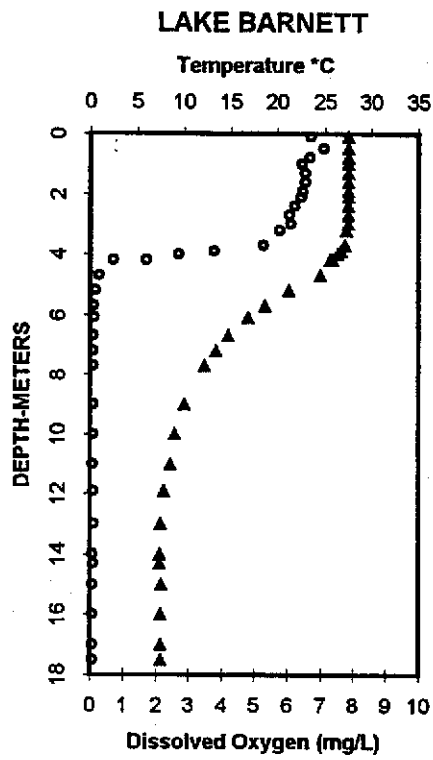


FIGURE D-11. Dissolved Oxygen and Temperature Profiles

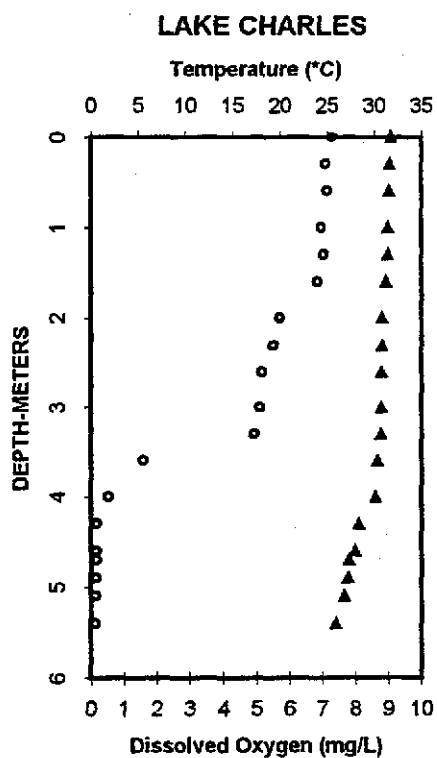
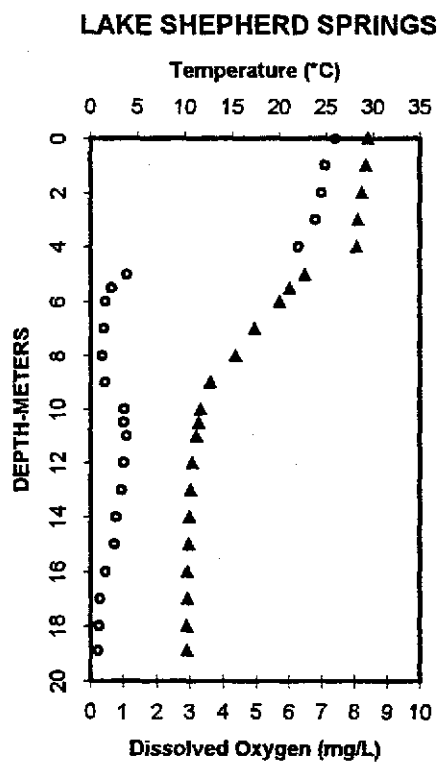
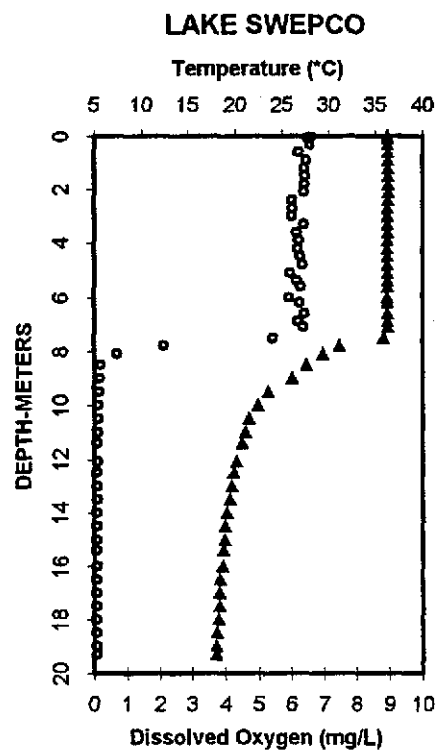
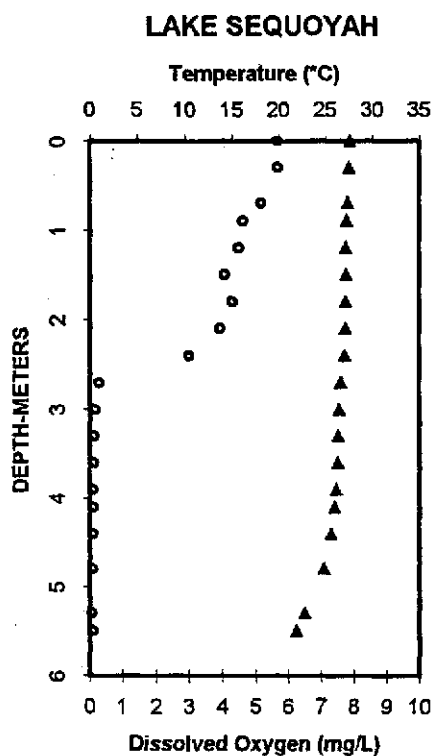


FIGURE D-12. Dissolved Oxygen and Temperature Profiles

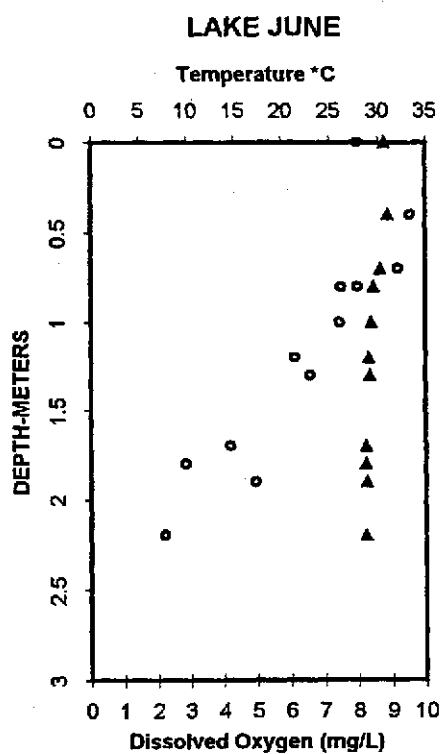
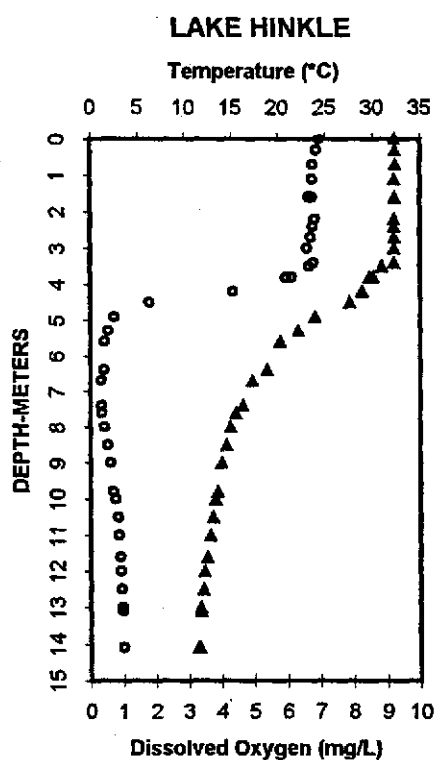
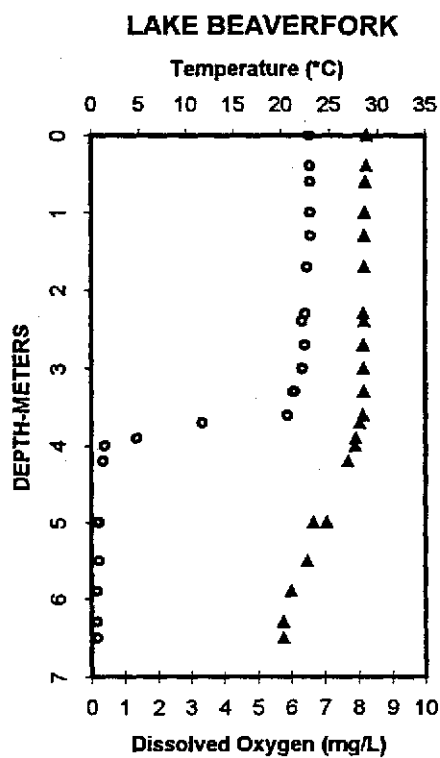
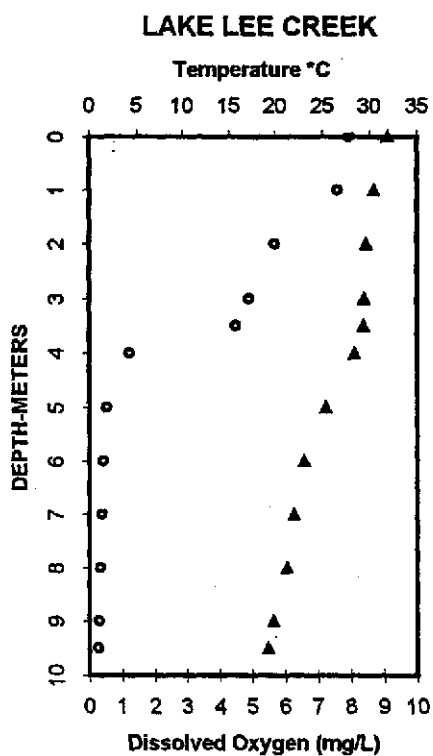


FIGURE D-13. Dissolved Oxygen and Temperature Profiles

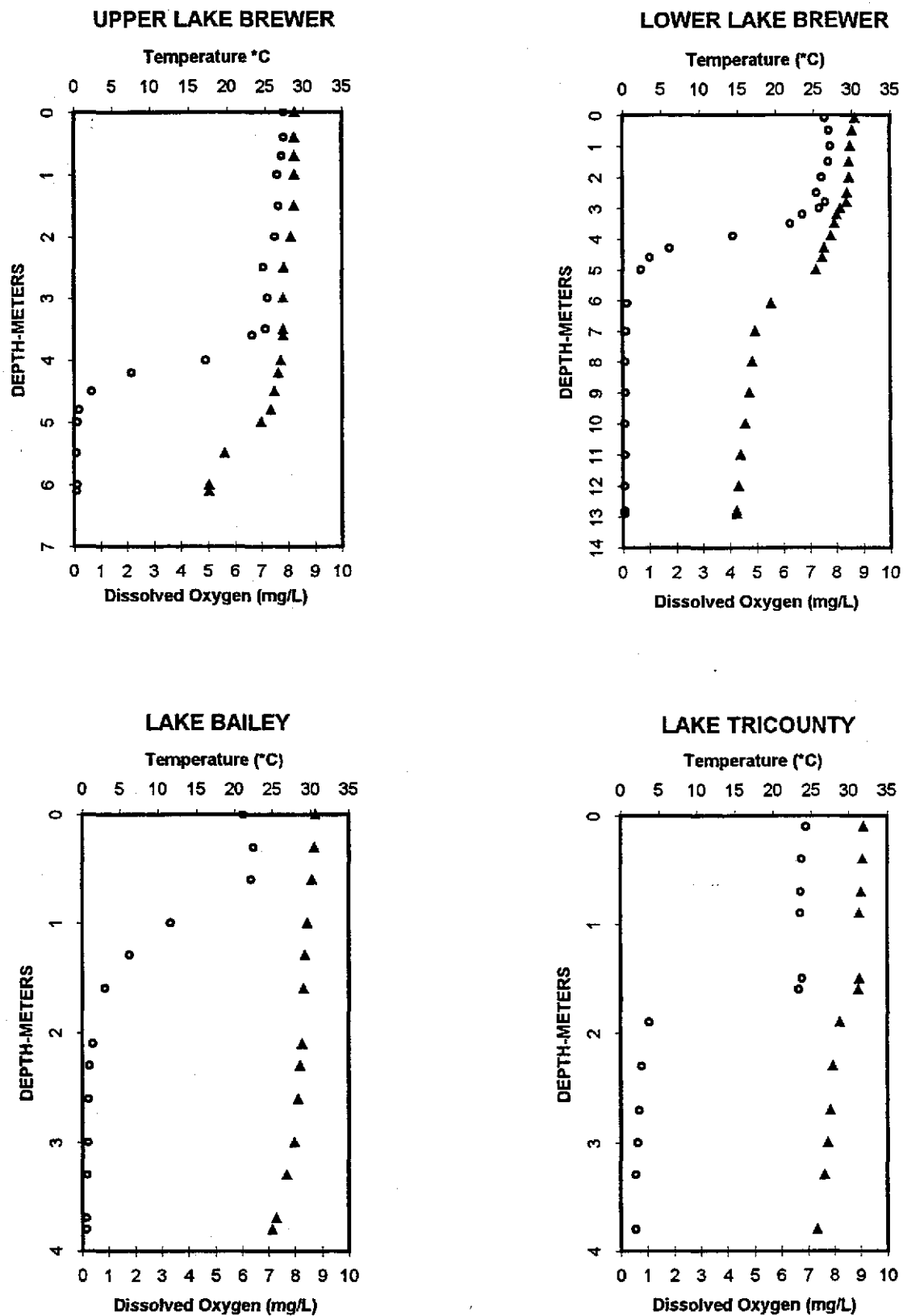


FIGURE D-14. Dissolved Oxygen and Temperature Profiles

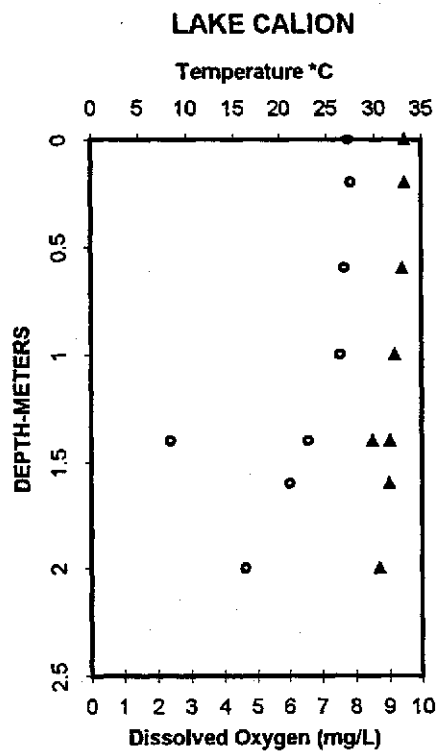
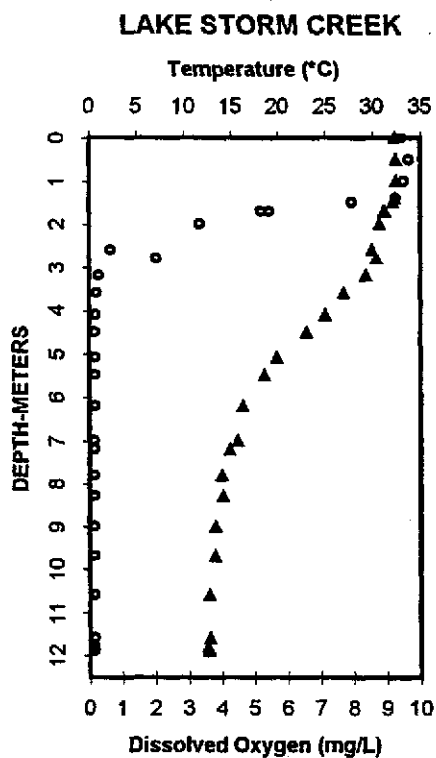
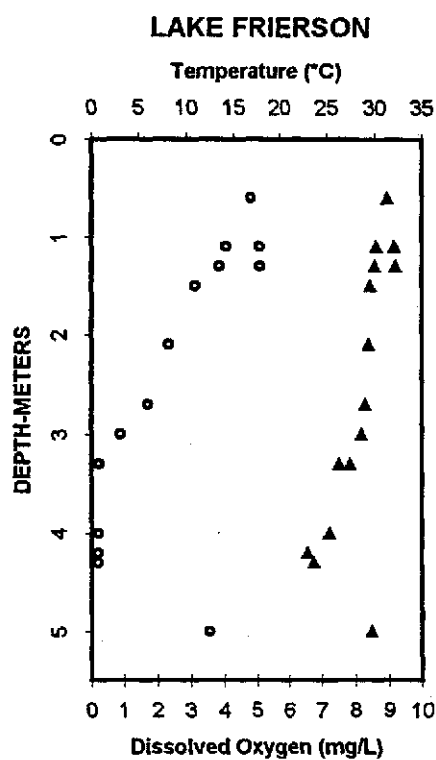
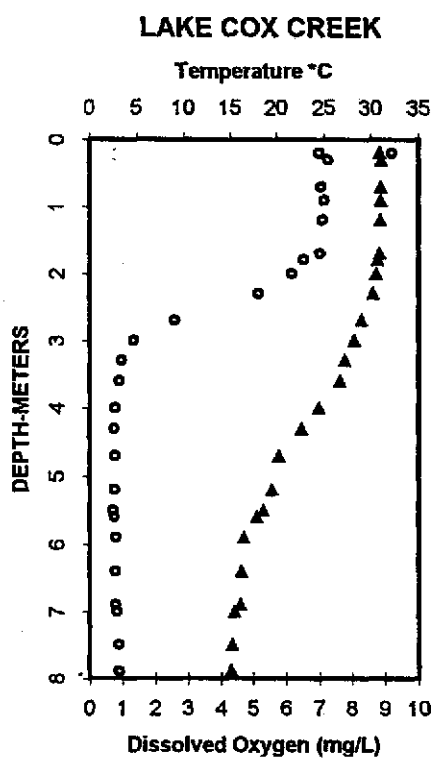


FIGURE D-15. Dissolved Oxygen and Temperature Profiles

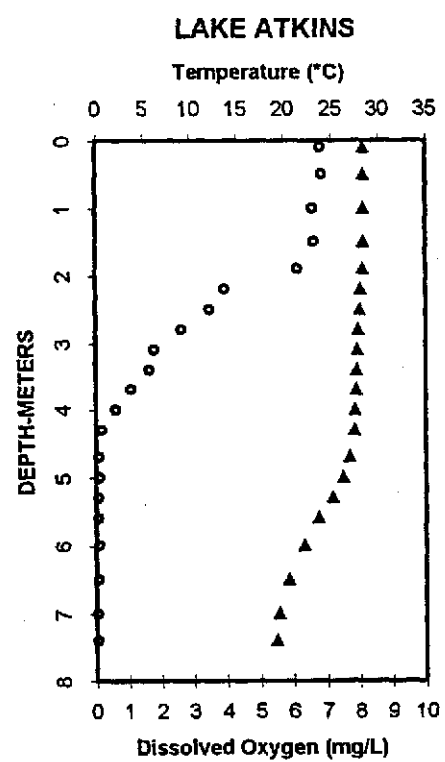
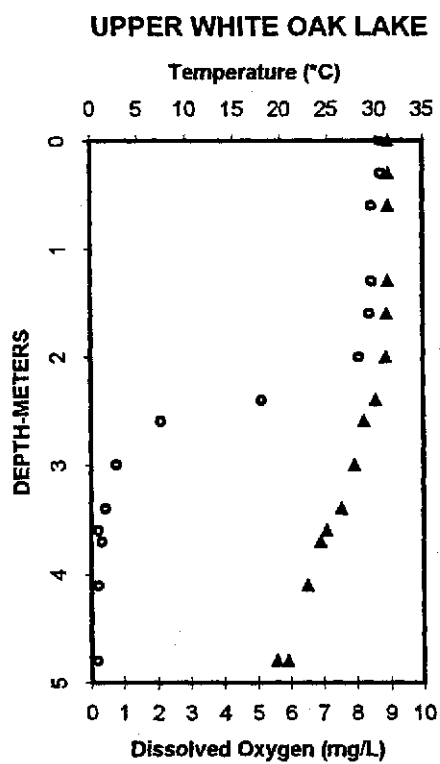
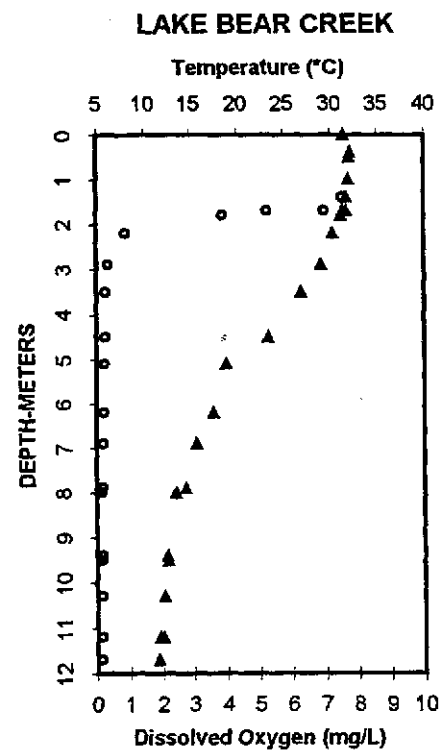
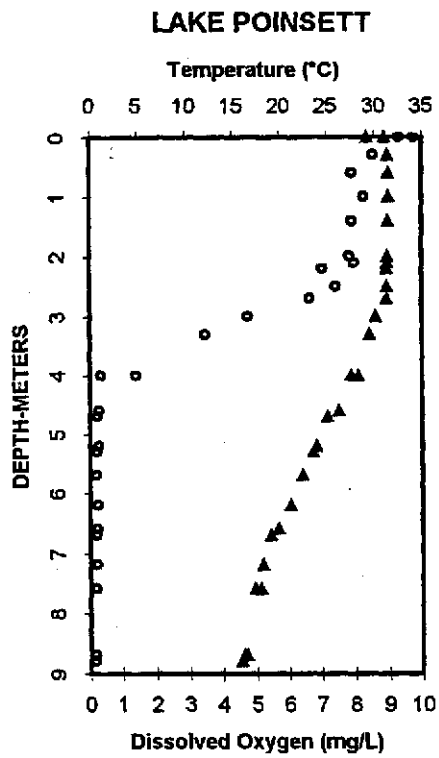


FIGURE D-16. Dissolved Oxygen and Temperature Profiles

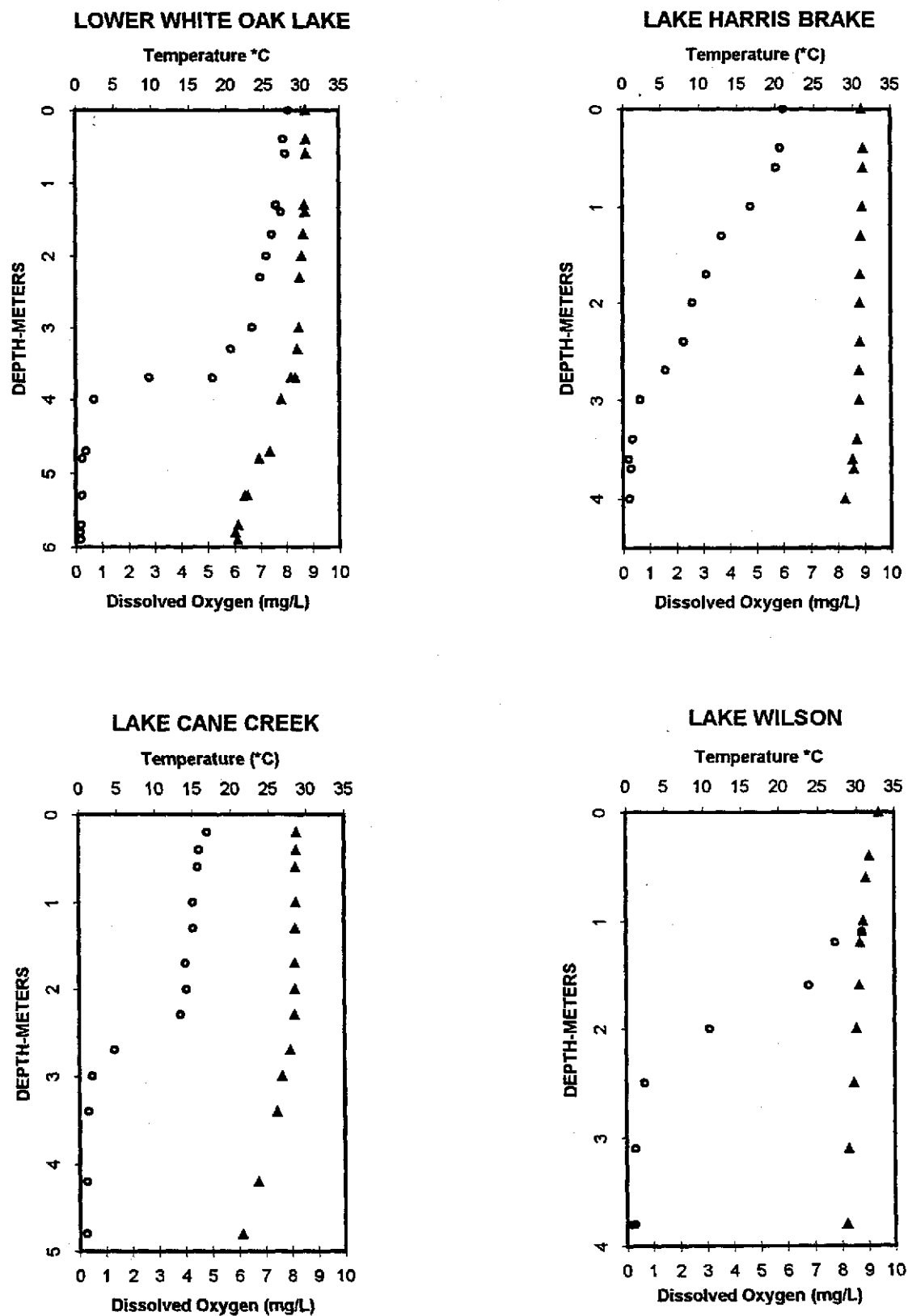


FIGURE D-17. Dissolved Oxygen and Temperature Profiles

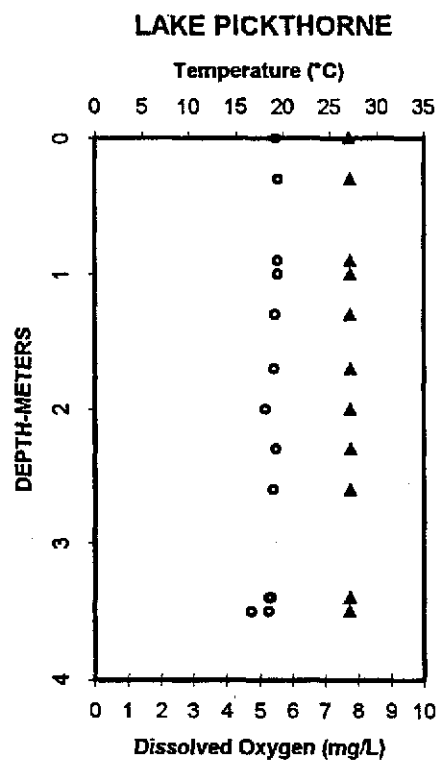
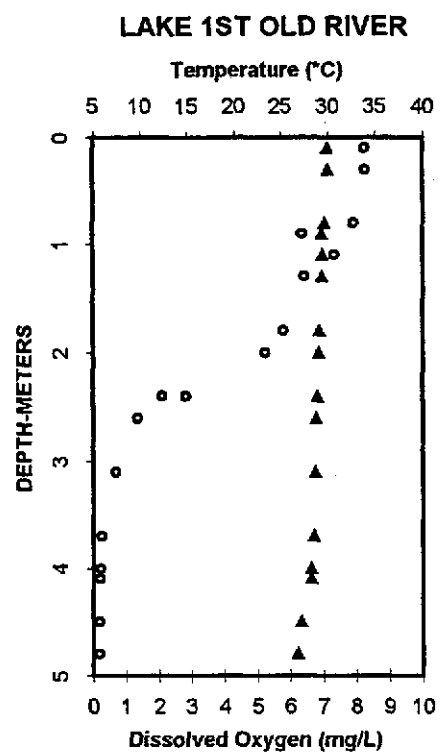
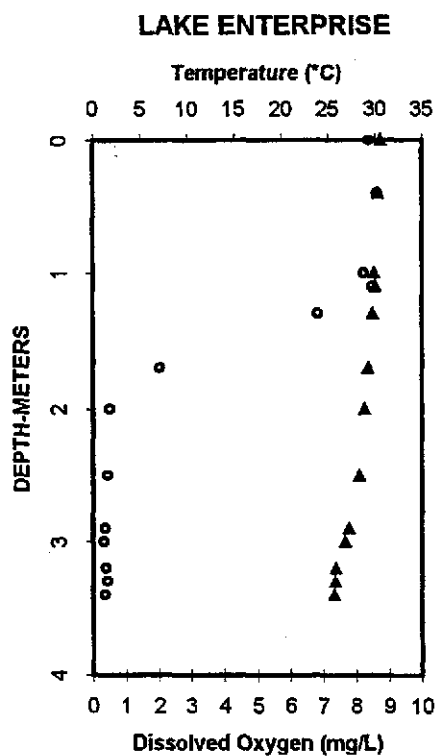


FIGURE D-18. Dissolved Oxygen and Temperature Profiles

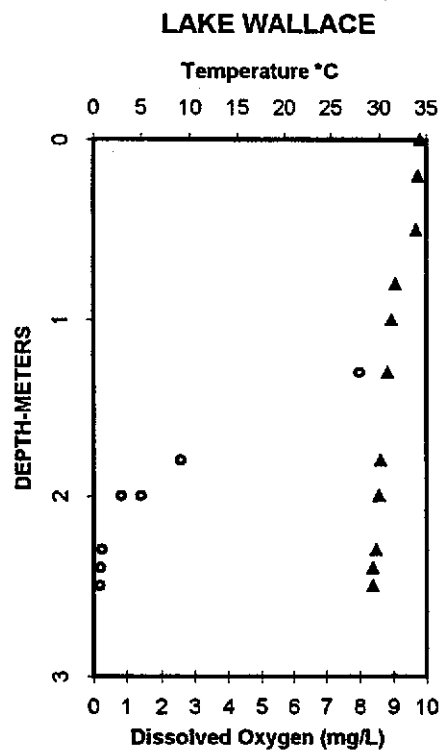
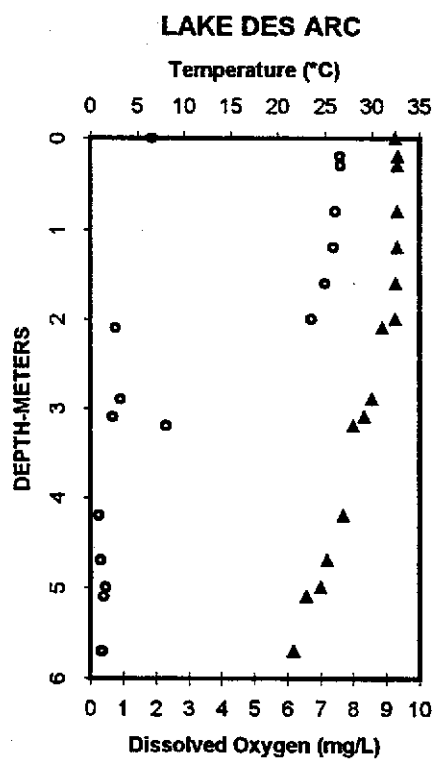
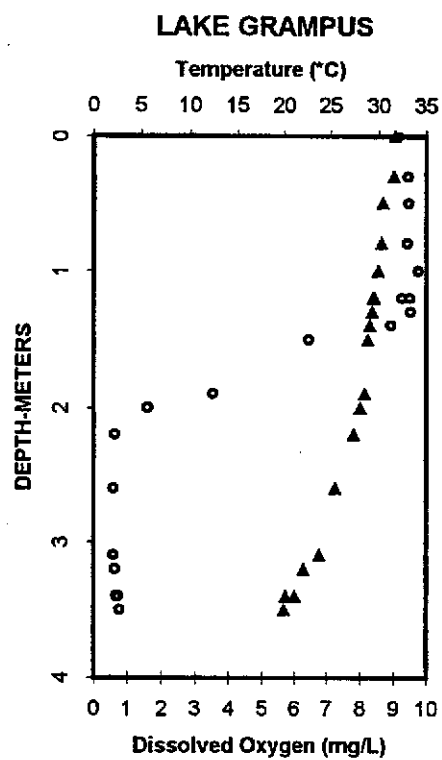
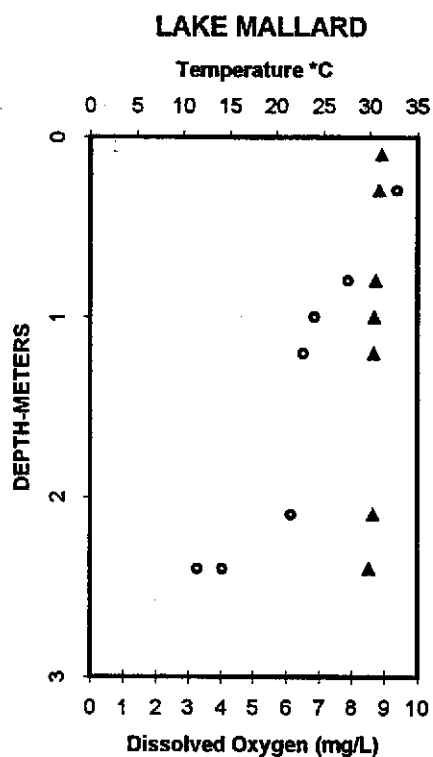


FIGURE D-19. Dissolved Oxygen and Temperature Profiles

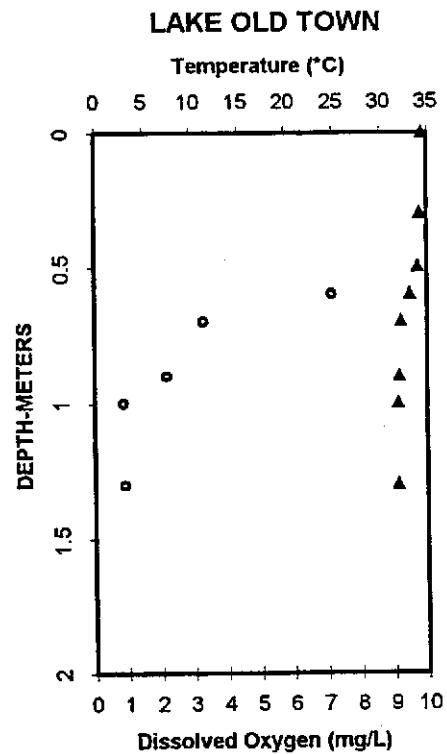
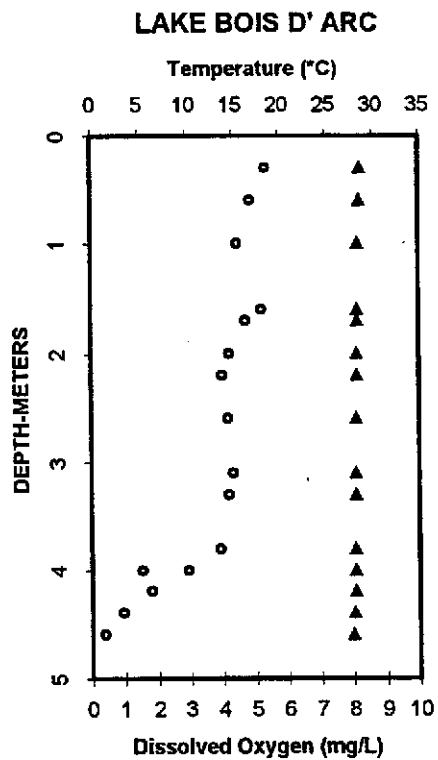
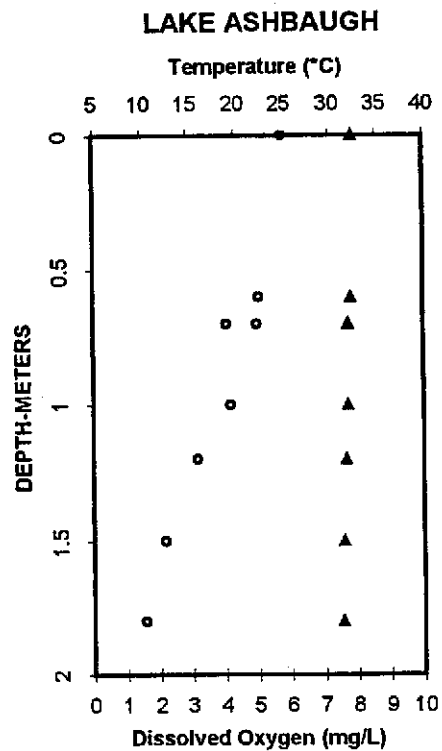
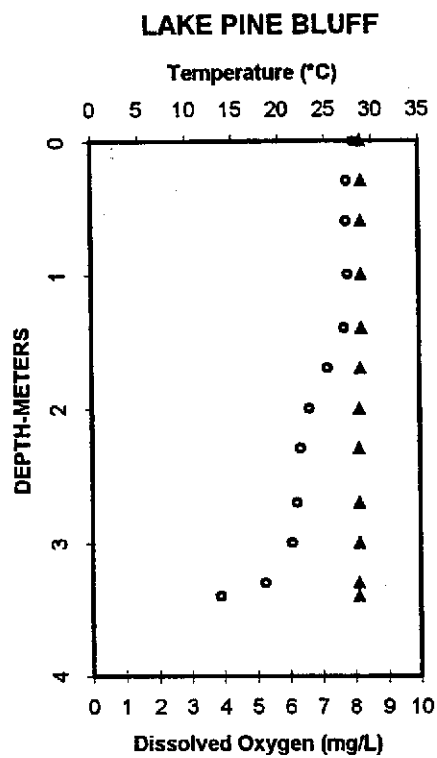


FIGURE D-20. Dissolved Oxygen and Temperature Profiles

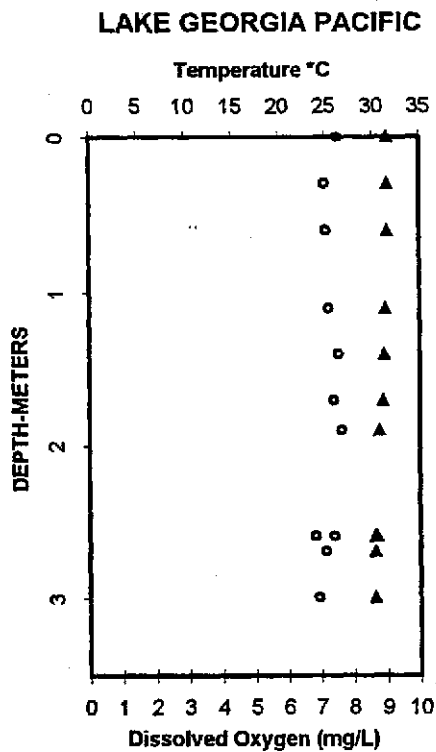
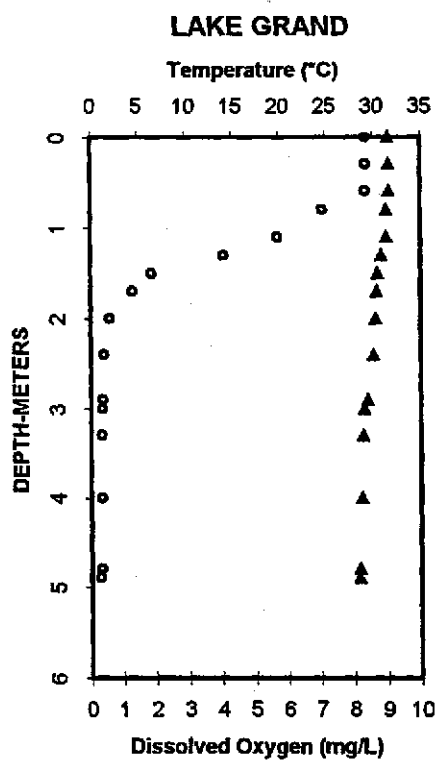
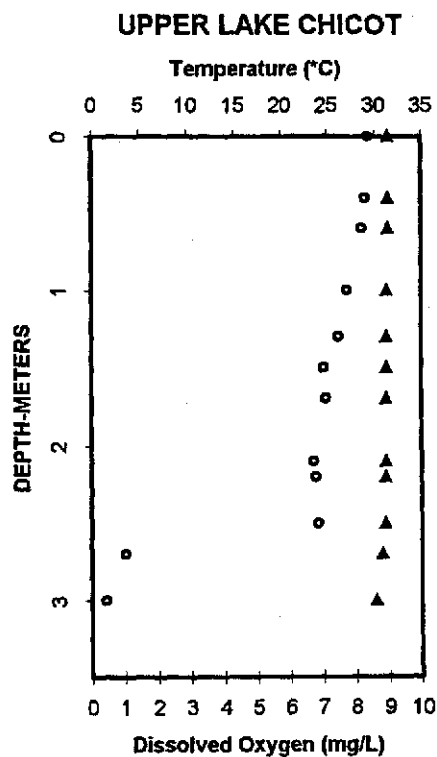
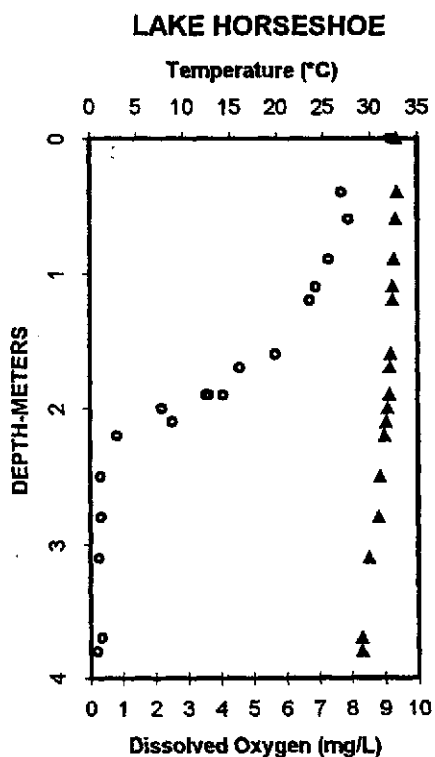


FIGURE D-21. Dissolved Oxygen and Temperature Profiles

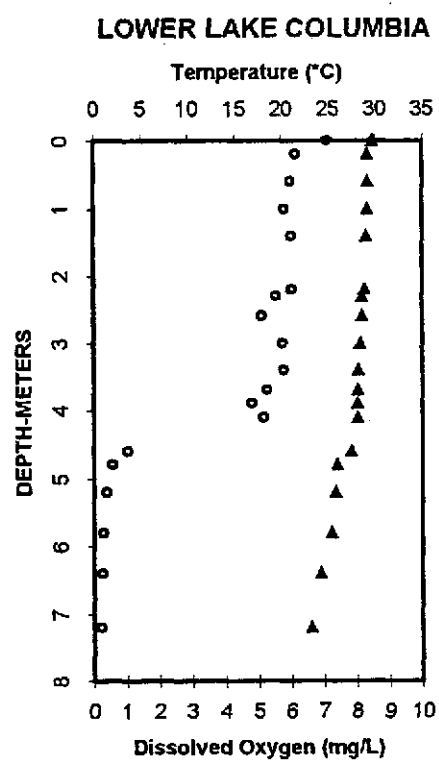
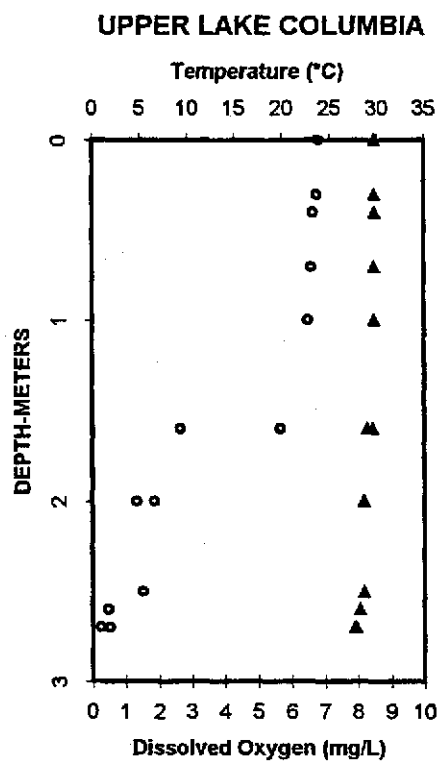
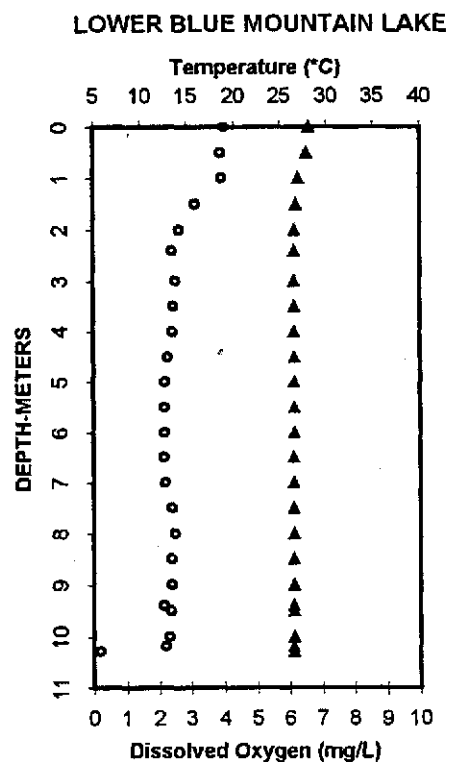
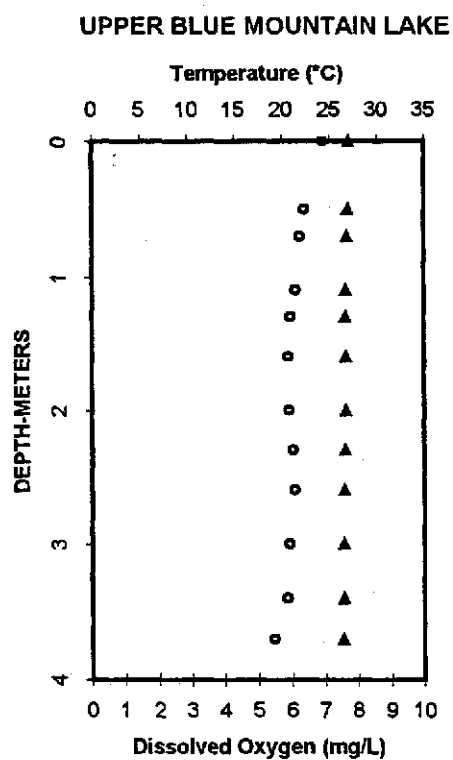


FIGURE D-22. Dissolved Oxygen and Temperature Profiles

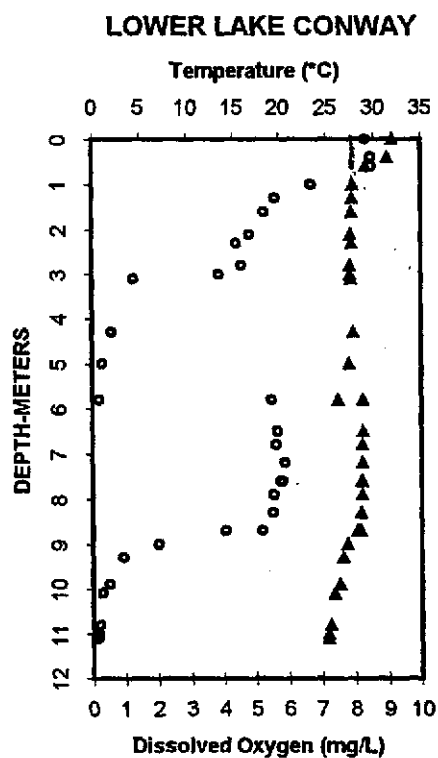
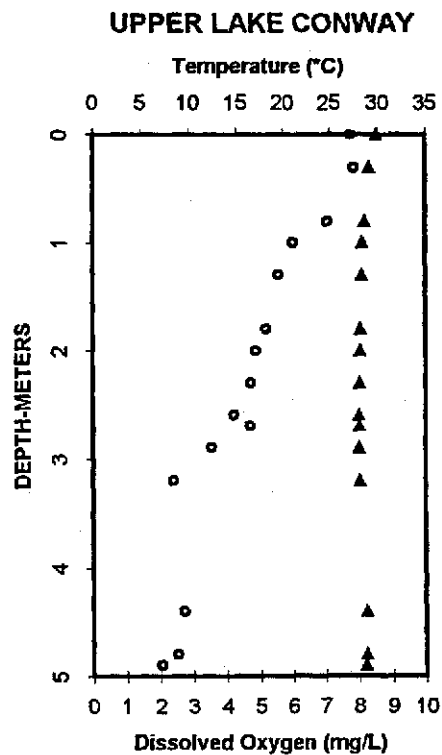
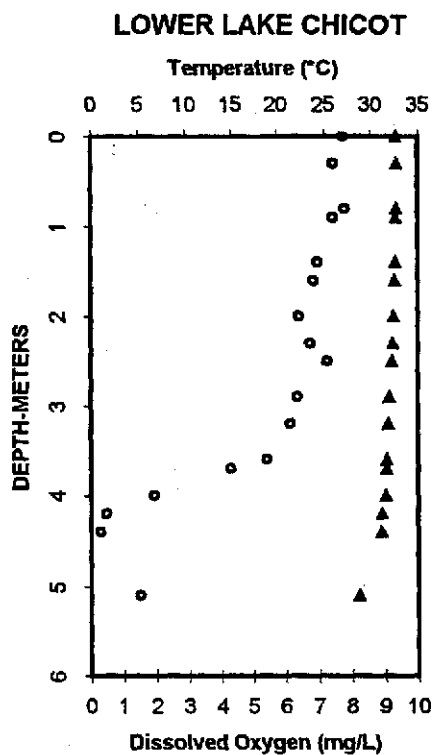


FIGURE D-23. Dissolved Oxygen and Temperature Profiles

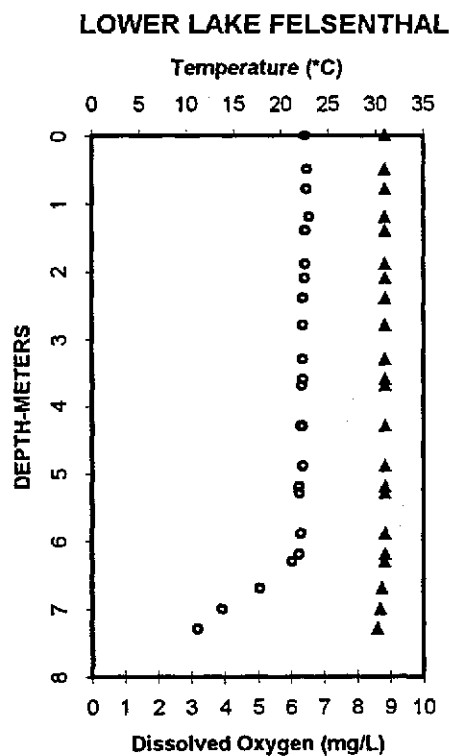
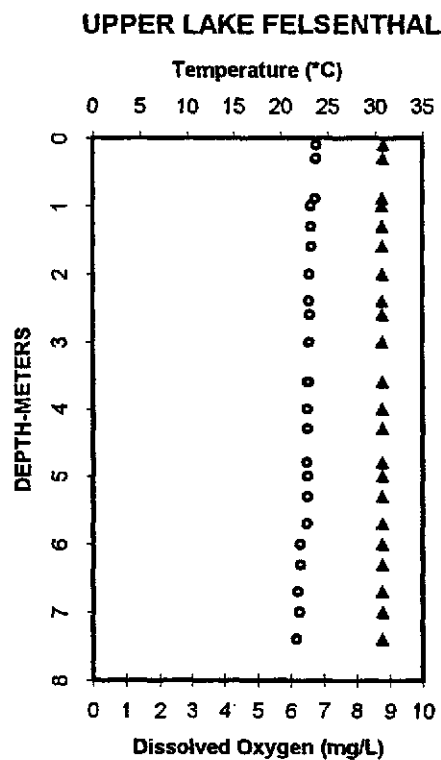
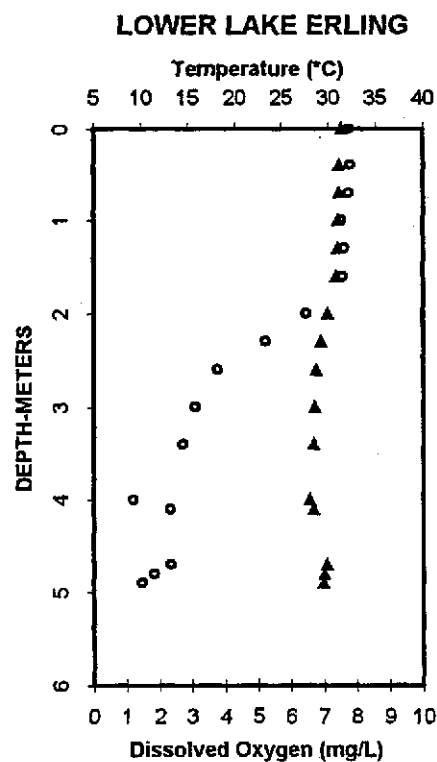
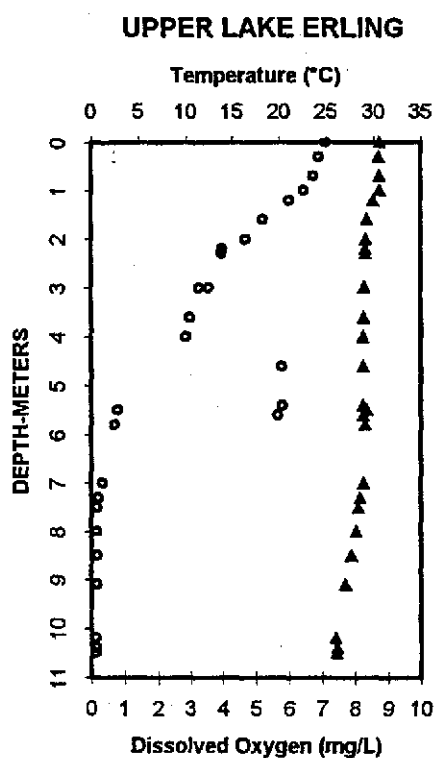
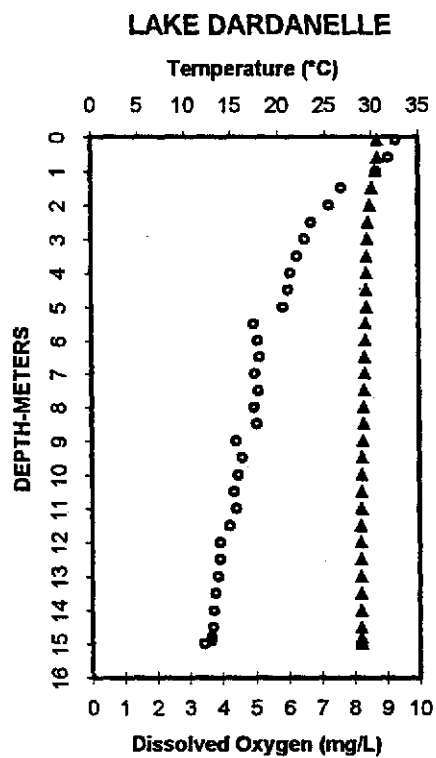
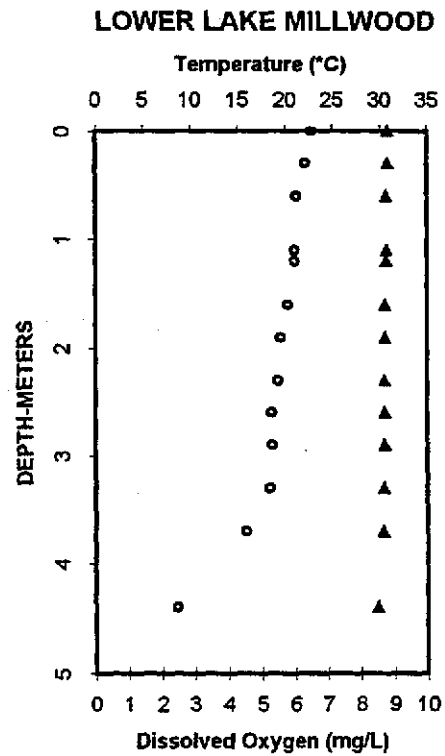
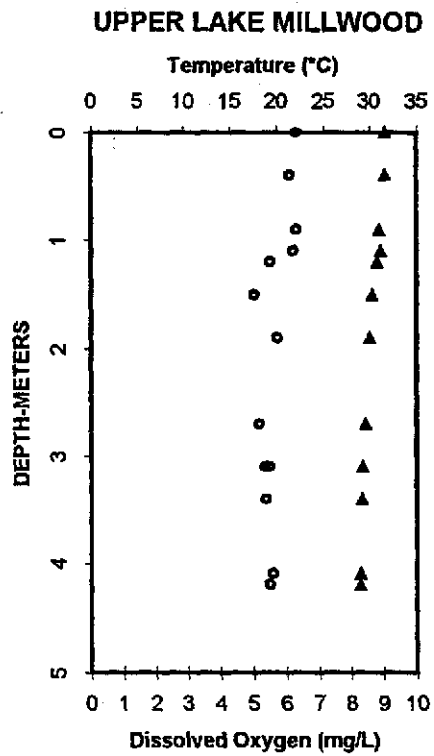


FIGURE D-24. Dissolved Oxygen and Temperature Profiles



APPENDIX E

PLANKTON RELATIVE ABUNDANCE

Relative abundance of phytoplankton and zooplankton are plotted in the following figures. Lakes are identified by name, a "U" or a "L" is used to identify it as either the upper or lower lake station.

Example: Ouachita (A) -- Lower Lake Ouachita.

FIGURE E-1. Phytoplankton - Type A and B Lakes

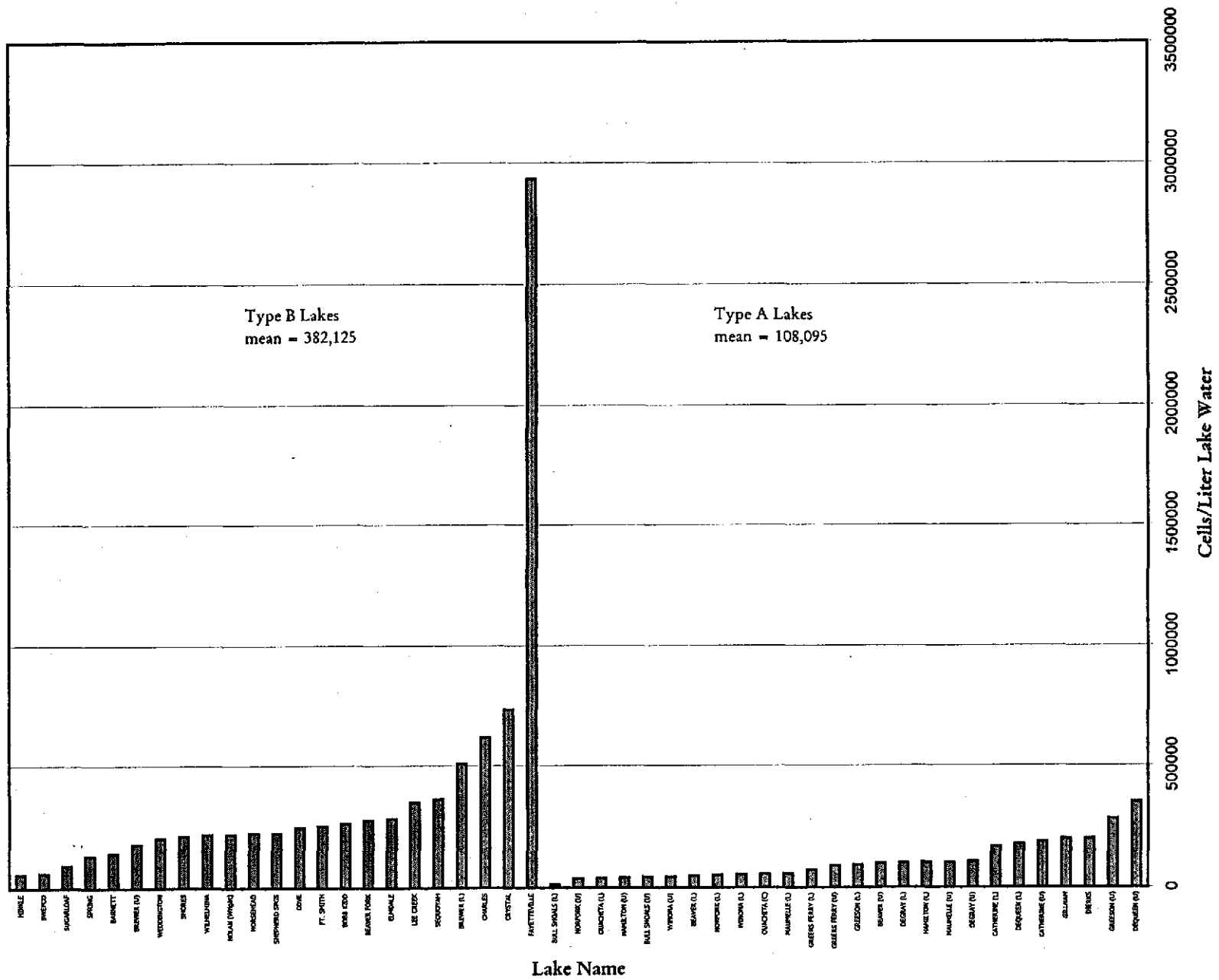


FIGURE E-2. Phytoplankton - Type C, D and E Lakes

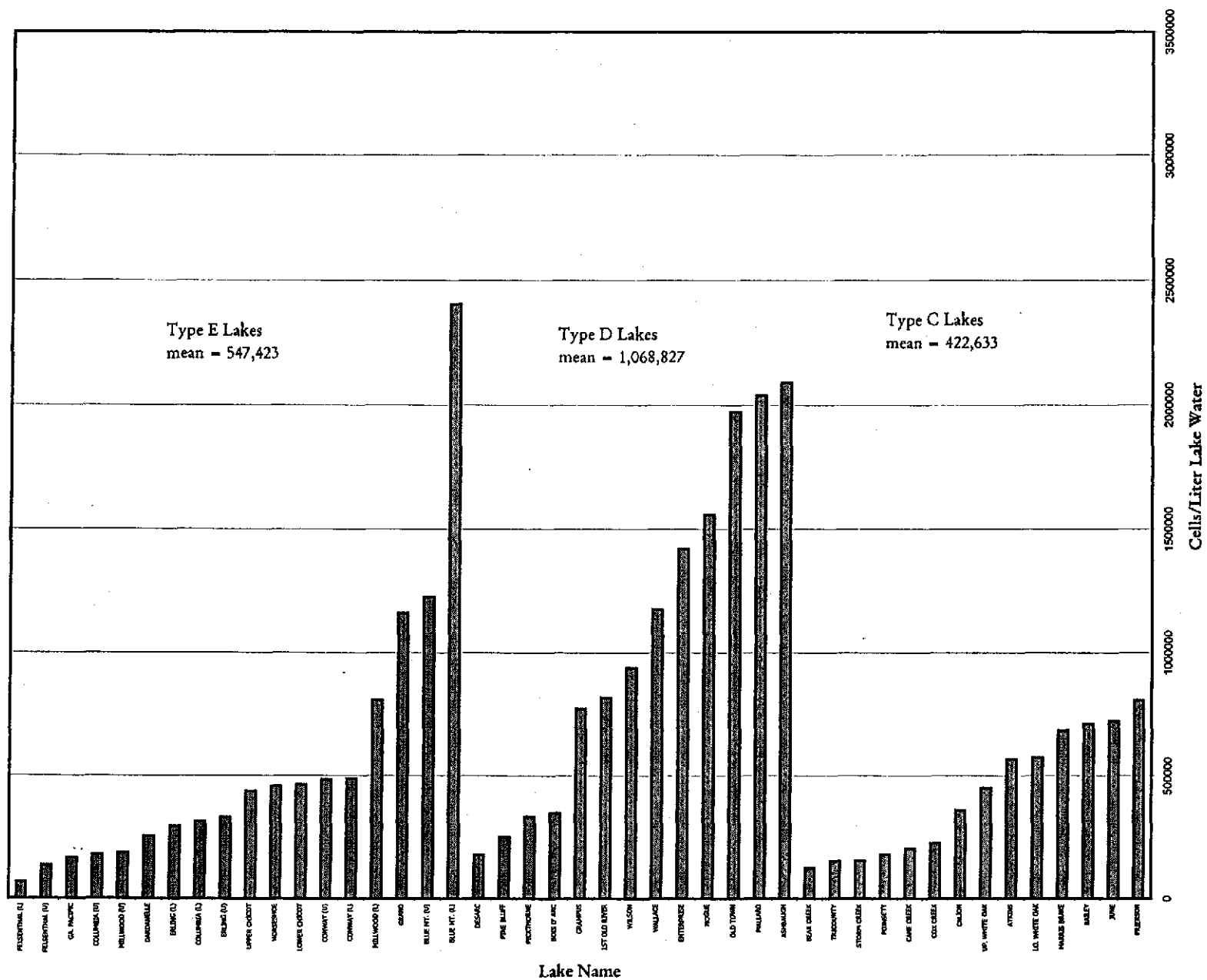
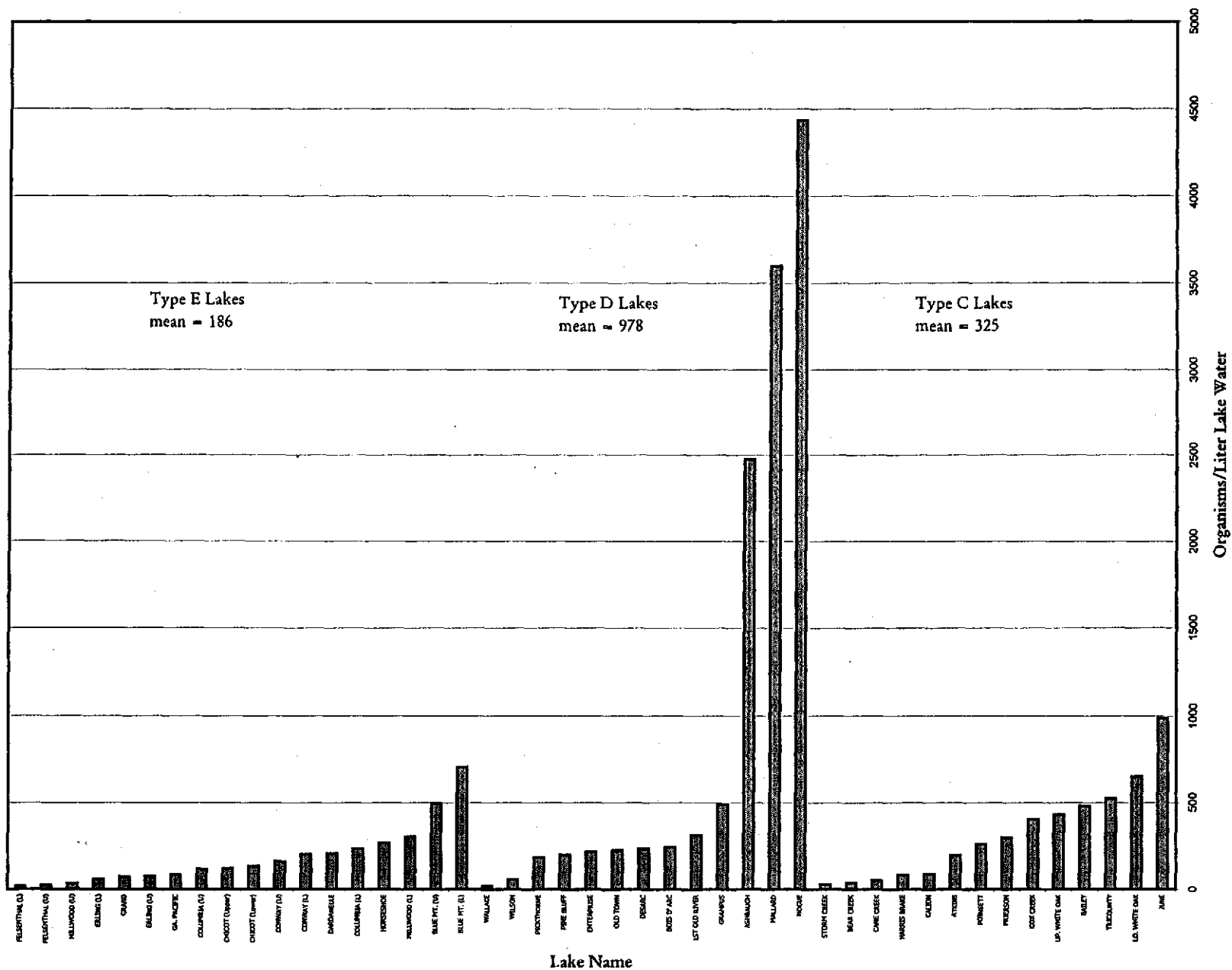


FIGURE E-4. Zooplankton - Type C, D and E Lakes



APPENDIX F

REFERENCES

APPENDIX F

REFERENCES

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