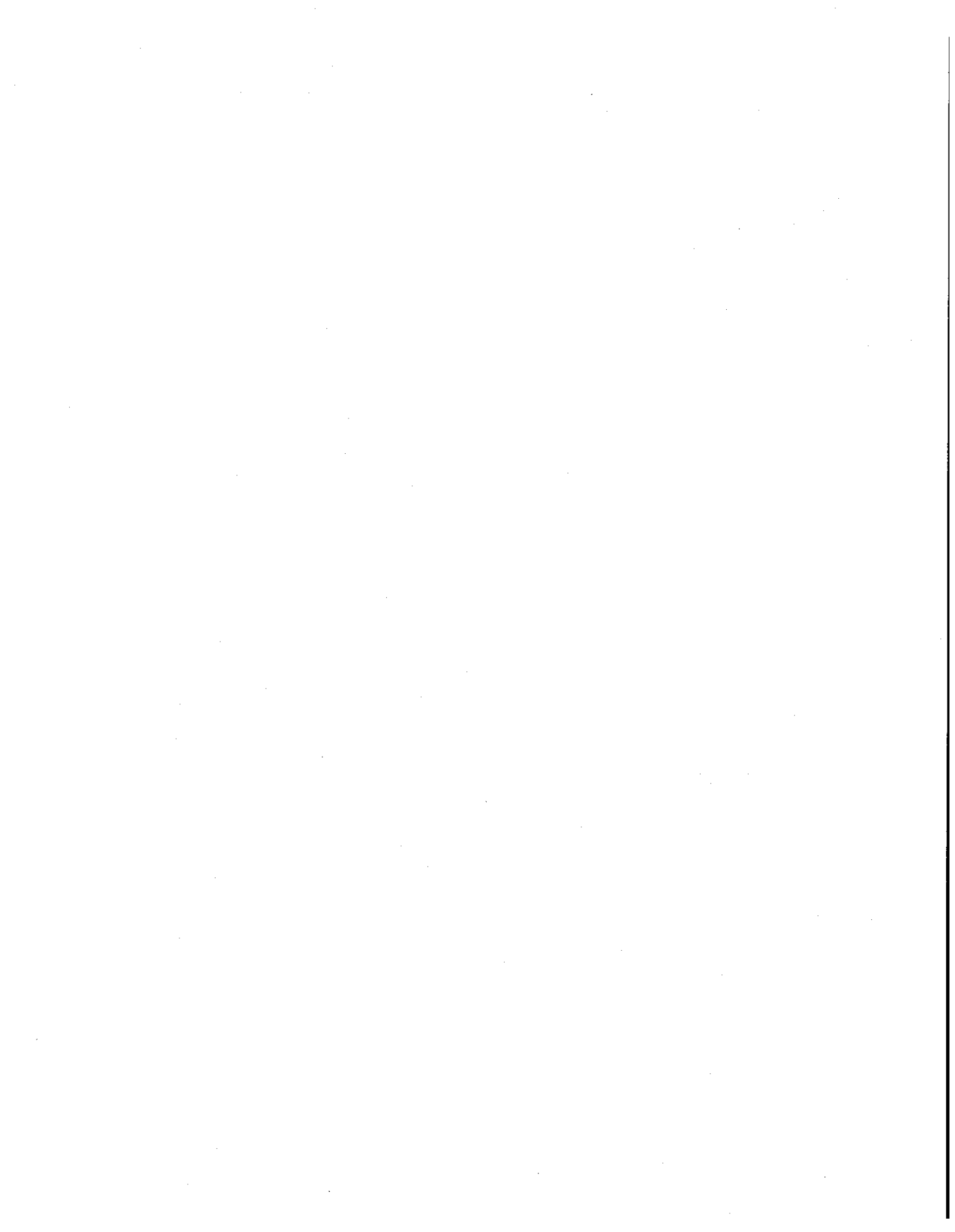


DATA SUMMARY
OF
SPECIAL WATER QUALITY SAMPLING
ON
LAKE CONWAY, ARKANSAS



April 2001
WQ-01-04-12



LAKE CONWAY, FAULKNER COUNTY, ARKANSAS

INTRODUCTION

Lake Conway is located in Faulkner County, Arkansas near the City of Conway. The lake was constructed and is owned by the Arkansas Game and Fish Commission (AGFC). In July 1998, concerned citizens residing in the area around Lake Conway requested that the Arkansas Department of Pollution Control and Ecology (Department) conduct a study to determine the extent of possible contamination in Lake Conway. The citizens were concerned that the effluent discharge from waste water treatment facilities (WWTF) and poorly maintained and operated septic systems may be causing unacceptable levels of nutrients, metals and fecal coliform bacteria in the lake. Recently, additional concerns have been expressed to the Arkansas Commission on Pollution Control and Ecology which prompted additional data collection.

DATA COLLECTION

The data included in this report has been compiled from four sampling events:

October 12, 1998 - Water quality, dissolved metals and fecal coliform bacteria collected was collected from five stations on Lake Conway (Figure 1). Data from this sampling event is shown in Table 1. It should be noted that the water level in Lake Conway was very low during this sampling event due to a designed drawdown of the lake by AGFC, and the water temperature was below 70° F.

Location of Sample Stations

Hwy 89 - Hwy 89 at the first bridge after exiting I-40.

Narrows - Hwy 89 at the narrows bridge.

Gold Creek - At the first bridge on I-40 (Gold Creek) between the cities of Mayflower and Conway.

Stone Dam Cr - At the second bridge on I-40 (Stone Dam Creek) between the cities of Mayflower and Conway.

Caney Creek - At the Arkansas Game and Fish Caney Creek access to Lake Conway on Amity Road in Conway.

July 1999 - Water quality, dissolved metals and fecal coliform bacteria collected from transects across the upper and lower ends of Lake Conway during the project titled "Water Quality Assessment of Arkansas' Significant Publicly-Owned Lakes".

March 27, 2001(Table 2) - Water quality and dissolved metals collected from the same five stations identified during the October 12, 1998 event.

April 10, 2001 - Fecal Coliform bacteria samples were collected by boat at 50 locations in Lake Conway. Samples were evenly distributed around the lake and were collected near the shoreline.

DATA RESULTS

The most elevated concentrations of **total phosphorus** in Lake Conway was 0.86 mg/L and 1.14 mg/L at the Stone Dam Creek station in 1998 and 2001, respectively (Figure 2). All other stations indicated concentrations of total phosphorus at or below 0.17 mg/L. Generally lower values were found in March 2001 than in October 1998.

Nitrate-nitrogen concentrations were most elevated at the Stone Dam Creek site. In 1998, water samples indicated a concentration of 4.17 mg/L nitrates. In March 2001, a concentration of 7.43 mg/L was collected at the same location. All other stations indicated nitrate concentrations at or below 0.50 mg/L (Figure 3).

Chloride concentrations were relatively low at all stations with the exception of Stone Dam Creek. This station indicated chloride concentrations of 45.5 mg/L and 44.0 mg/L for 1999 and 2001, respectively. All other stations produced chloride concentrations at or below 10.9 mg/L (Figure 4).

Fecal Coliform bacteria samples collected during the 1998 event at the five tributary stations produced concentrations of 590 col/100ml and 560 col/100ml at Gold Creek and Stone Dam Creek, respectively. At the same stations in 2001, the concentrations were much reduced, with concentrations of ~10 and ~20 col/100ml (Figure 5).

Concentrations of Fecal Coliform bacteria were very low at all 50 shoreline stations collected during the April 2001 event (Figure 6). Eighty-five percent of water samples collected around the shore of Lake Conway produced concentrations of 10 col/100 ml or less. The western shore of the Lake produced the majority of bacterial counts above 10 col/100ml, however, no concentrations were found to exceed 30 col/100ml in the April 2001 collections.

Dissolved copper was detected at higher concentrations on March 27, 2001 than on previous sampling events (Figure 7). The most elevated concentration of 3.65 $\mu\text{g/L}$ was indicated at the Stone Dam Creek station. In 1998, only the sample collected at the Stone Dam Creek station produced a concentration of copper above the ADEQ laboratory detection limit, this value was below toxic levels.

Dissolved lead was also found in the highest concentration of 0.58 $\mu\text{g/L}$ at the Stone Dam Creek station in 2001, and the Caney Creek sample revealed a lead concentration of 0.46 $\mu\text{g/L}$ (Figure 8). In 1998, no samples indicated lead levels above the ADEQ laboratory detection limit.

Using the ecoregion hardness value for calculating toxic levels as prescribed in the implementation procedure, none of the dissolved metals were found to be acutely toxic. However, the concentrations of copper (3.65 $\mu\text{g/L}$) and lead (0.58 $\mu\text{g/L}$) collected on March 27, 2001 slightly exceed the chronic toxicity values for copper and lead of 3.5 $\mu\text{g/L}$ and 0.5 $\mu\text{g/L}$, respectively.

CONCLUSIONS

The results of these data collection activities demonstrate the influence of a municipal WWTF on a tributary entering Lake Conway. Several parameters, including nutrients, chlorides and some heavy metals were noticeably elevated below the city of Conway WWTF although the values are typical of most municipal WWTF discharges.

Little can be concluded from the fecal coliform bacteria data , except, under the conditions which existed at the time of the collection, none of the values were considered to be excessive.

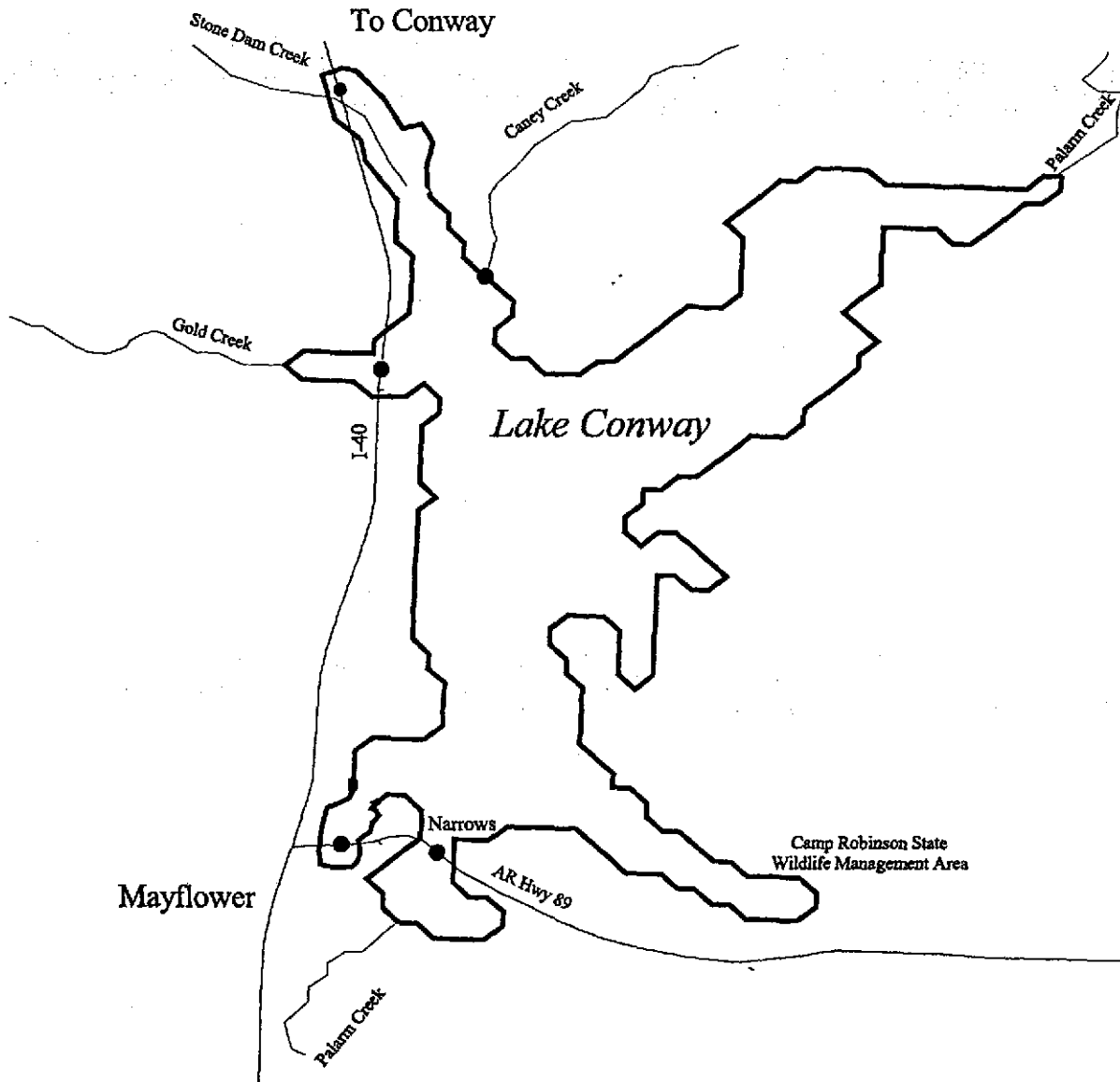
Table 1

STATION ID	units	Hwy 89	Narrows	Gold Cr.	Stone Dam	Caney Cr	Upper Lake	Lower Lake
Water Quality								
October 12, 1998							July 1999	July 1999
Collect Time	hrs	0900	0920	1000	1020	1140		
DO	mg/L	4.11	6.43	4.50	4.11	3.78	7.50	8.71
pH	s.u.	7.50	7.75	7.40	7.43	7.21	7.55	8.08
Water Temp	C	17.20	19.70	19.70	19.50	21.30	30.20	31.30
Bromide(Br)	mg/L	0.06	0.05	<0.03	<0.03	<0.03	0.07	0.06
Chloride(Cl)	mg/L	10.90	10.20	5.09	45.50	4.78	6.31	6.35
Fluoride(F)	mg/L	0.16	0.23	0.12	1.54	0.15	0.13	0.12
Sulfate(SO4)	mg/L	9.62	6.53	16.90	195.00	13.92	3.91	3.50
NH3-N	mg/L	0.08	<0.005	0.26	0.52	0.29	<0.01	<0.01
NO3-N	mg/L	0.04	0.03	0.52	4.17	0.33	0.02	0.02
O-PHOS	mg/L	1.28	0.01	0.02	0.52	0.02	0.01	0.01
T-PHOS	mg/L	0.17	0.12	0.17	0.86	0.17	0.06	0.06
TKN	mg/L	1.73	1.35	1.87	1.52	1.51	0.92	0.79
TOC	mg/L	6.60	7.90	7.50	7.60	7.10	5.90	5.50
BOD5	mg/L	4.50	3.70	3.50	2.05	3.29	2.98	2.93
Turbidity	NTU	*	*	*	*	*	6.10	6.20
TSS	mg/L	32.00	15.00	55.00	42.00	50.00	4.50	6.50
TDS	mg/L	77.00	83.00	85.00	450.00	82.00	64.00	63.50
Fecal Coliform	col/100ml	66	188	590	560	216	3.8**	4.6**
Dissolved Metals								
Aluminum (Al)	ug/L	<127	<127	342.50	<127	467.30	<127.00	<127.00
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	1.64	<1.0	1.51	1.80
Barium (Ba)	ug/L	24.00	13.20	24.10	23.90	25.60	<8.80	<8.80
Beryllium (Be)	ug/L	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11
Boron (B)	ug/L	35.70	57.60	33.50	418.60	23.50	31.10	24.30
Cadmium (Cd)	ug/L	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
Calcium (Ca)	mg/L	5.50	5.60	4.10	23.40	4.60	5.30	5.40
Chromium (Cr)	ug/L	0.41	<0.4	0.44	0.76	0.56	<0.40	<0.40
Cobalt (Co)	ug/L	<0.50	<0.50	1.21	1.50	1.34	<0.50	<0.50
Copper (Cu)	ug/L	<0.5	<0.5	<0.5	2.15	<0.5	<0.50	<0.50
Iron (Fe)	ug/L	198.90	41.70	443.50	164.90	560.70	43.60	33.00
Lead (Pb)	ug/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.30	<0.30
Magnesium (Mg)	mg/L	2.40	2.40	2.60	3.80	1.90	2.30	2.40
Manganese (Mn)	ug/L	430.40	113.60	462.80	653.50	485.00	1.60	31.30
Nickel (Ni)	ug/L	<2.0	<2.0	2.62	17.65	<2.0	<2.00	<2.00
Potassium (K)	mg/L	4.90	5.90	4.70	11.10	3.30	4.50	4.40
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.00	<3.00
Sodium (Na)	mg/L	10.50	14.00	6.30	107.40	4.70	7.80	6.60
Vanadium (V)	ug/L	<1.0	<1.0	<1.0	2.43	<1.0	<1.00	<1.00
Zinc (Z)	ug/L	5.60	3.50	5.00	17.40	4.80	5.90	1.30
Hardness	mg/L	24.00	24.00	21.00	74.00	20.00	23.00	23.00
* Turbidity was not run due to laboratory technician error.								
** Calculated as the average of five 100 ml grab samples across the lake.								

Table 2

STATION ID	units	Hwy 89	Narrows	Gold Cr.	Stone Dam	Caney Cr
Water Quality						
March 27 2001						
Collect Time	hrs	1230	1250	1300	1305	1320
D.O.	mg/L	9.6	9.8	11	12.5	10.6
PH	s.u.	7.25	7.50	8.23	8.00	7.78
Water Temp	C	14.90	13.50	14.40	15.30	15.20
Bromide(Br)	mg/L	<0.010	<0.010	0.03	0.23	0.03
Chloride(Cl)	mg/L	4.04	3.90	5.64	44.01	9.91
Fluoride(F)	mg/L	0.07	0.10	0.12	1.10	0.12
Sulfate(SO4)	mg/L	4.86	6.40	9.66	129.00	9.16
NH3-N	mg/L	<0.005	<0.005	<0.005	0.86	<0.005
NO3-N	mg/L	0.06	0.04	0.05	7.43	0.02
O-PHOS	mg/L	<0.005	<0.005	<0.005	0.96	<0.005
T-PHOS	mg/L	0.07	0.08	0.14	1.14	0.09
TKN	mg/L	0.96	0.83	1.02	4.31	0.84
TOC	mg/L	6.70	4.81	4.72	9.48	6.72
BOD	mg/L	2.15	2.17	4.20	3.22	2.72
Turbidity	NTU	5.0	5.2	9.3	16.5	7.7
TSS	mg/L	7.0	8.5	13.5	10.3	5.8
TDS	mg/L	47	41	52	362	76
Fecal Coliform	col/100ml	<5	<5	~10	~20	<5
Dissolved Metals						
Aluminum (Al)	ug/L	<127	<127	<127	<127	<127
Arsenic (As)	ug/L	<1	<1	<1	1.76	<1
Barium (Ba)	ug/L	12.6	11.3	<8.8	11.1	11.9
Beryllium (Be)	ug/L	<0.11	<0.11	<0.11	<0.11	<0.11
Boron (B)	ug/L	11.1	13.6	18.6	384	10.9
Cadmium (Cd)	ug/L	<0.14	<0.14	<0.14	<0.14	<0.14
Calcium (Ca)	mg/L	3	2.8	3.2	22	5.9
Chromium (Cr)	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4
Cobalt (Co)	ug/L	<0.50	<0.50	<0.50	1.72	<0.50
Copper (Cu)	ug/L	1.28	1.20	1.02	3.65	1.39
Iron (Fe)	ug/L	587	106	168	153	525
Lead (Pb)	ug/L	0.33	<0.3	<0.3	0.58	0.46
Magnesium (Mg)	mg/L	1.4	1.5	1.7	3.8	2.8
Manganese (Mn)	ug/L	50.9	13.3	15.1	382	66.8
Nickel (Ni)	ug/L	<2	<2	<2	11.98	<2
Potassium (K)	mg/L	2.2	3.1	2.3	9.1	3.1
Selenium (Se)	ug/L	<3	<3	<3	<3	<3
Sodium (Na)	mg/L	5.1	5.6	7.8	69.1	10.7
Vanadium (V)	ug/L	<1.0	<1.0	<1.0	1.04	<1.0
Zinc (Z)	ug/L	4.3	2.2	1.1	20.1	2.1
Hardness	mg/L	14	13	15	70	26

Figure 1



● Sample Sites



LAKE CONWAY

Sampling Stations

October 12, 1998

March 27, 2001

Arkansas Department of
Environmental Quality

Water Division

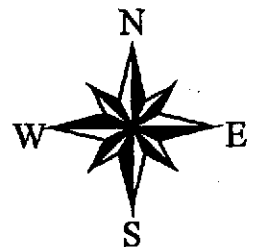


Figure 2

Total Phosphorus

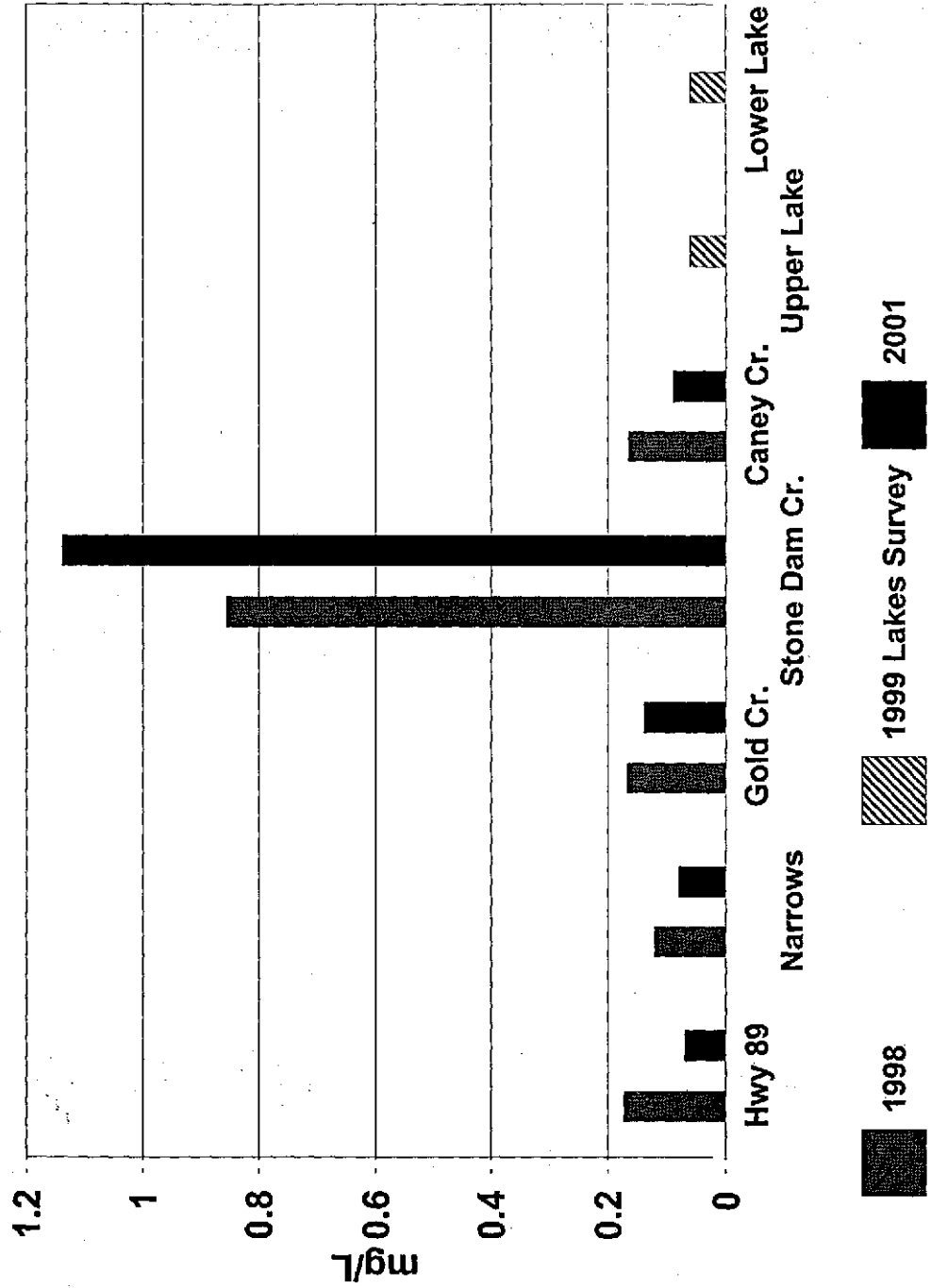


Figure 3

Nitrates

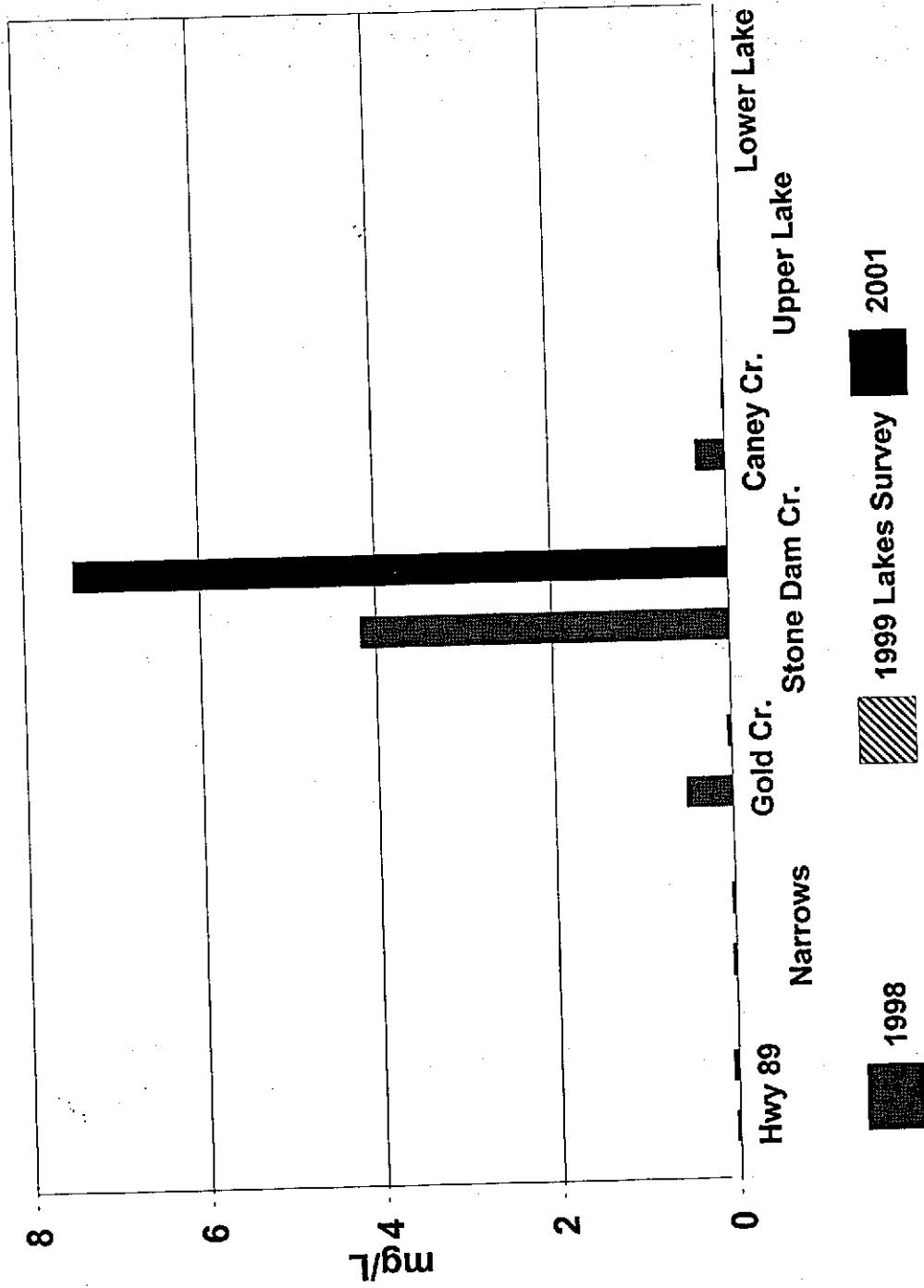


Figure 4

Chloride

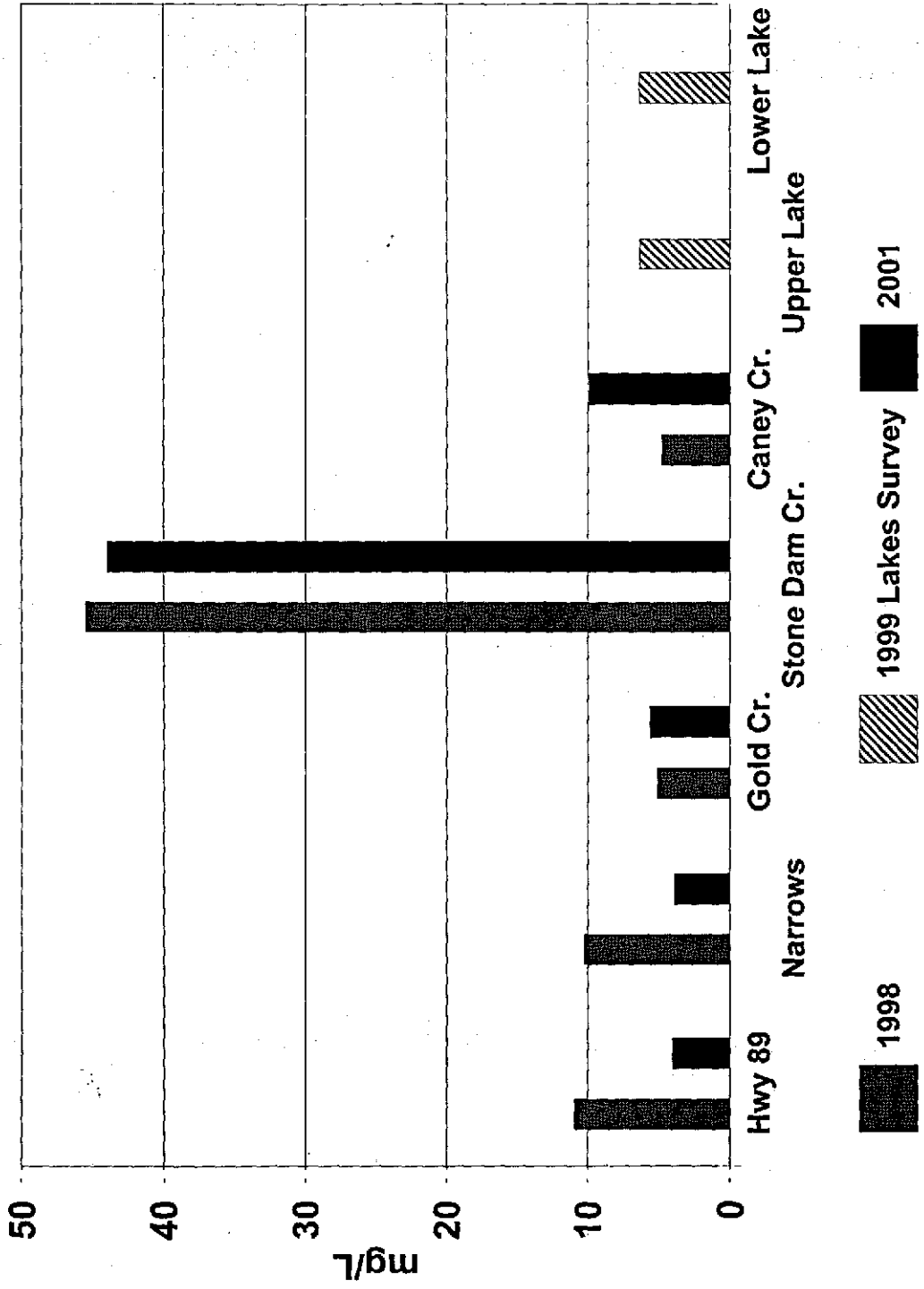


Figure 5

Fecal Coliform Bacteria

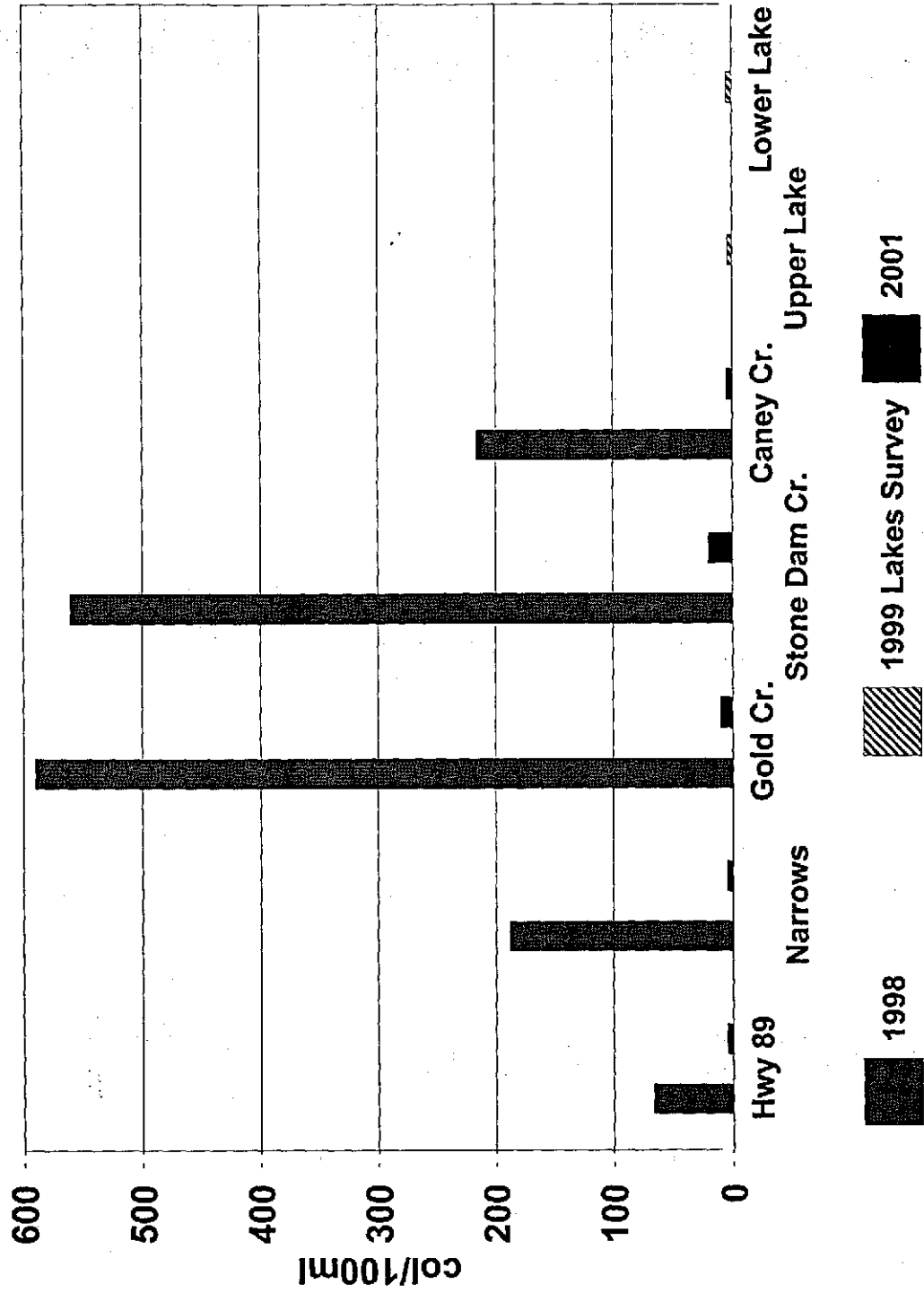


Figure 7

Dissolved Copper

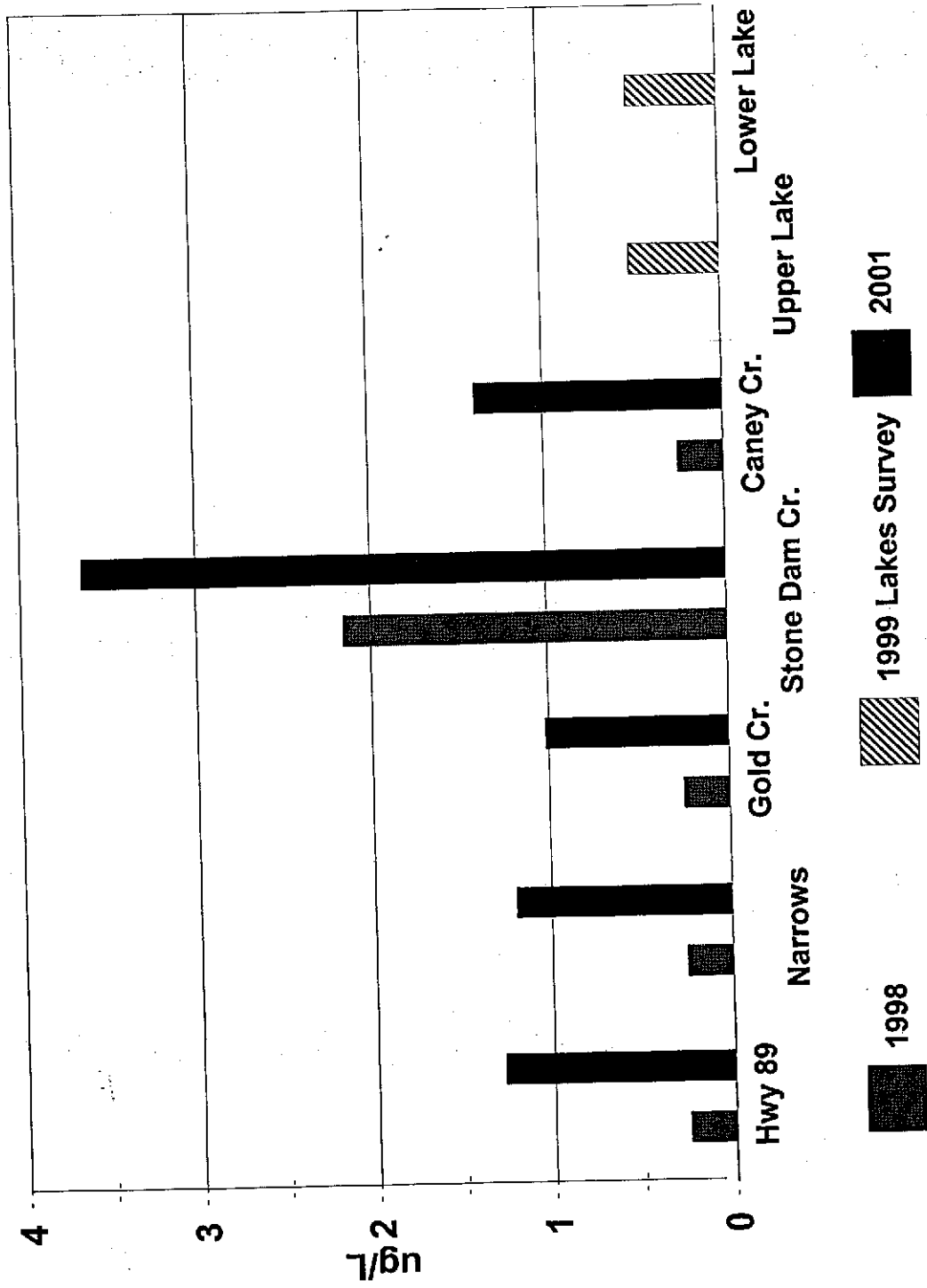


Figure 8

Dissolved Lead

