LAKE CREEK
DEMONSTRATION PROJECT

OCC Tasks 18 and 19
FY 1990 319(h) Sub-Task 200(B)
EPA Grant # C9-006704-90-0

Submitted by:

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Table of Contents

Background

The primary objective of this sub-task [FY 1990 §319(h) Sub-Task 200(B)] was to carry out a demonstration project to control agricultural nonpoint source (NPS) pollution on the small Lake Creek watershed within the North Fork of the Red River (North Fork) basin.

The North Fork watershed above Lake Altus is located in parts of Greer and Beckham Counties within Oklahoma Water Quality Management Plan Segment 311510. The portion of the segment involved lies in stream cluster 311510-01, North Fork from Lake Altus upstream to Deep Creek. Lake Creek is a tributary to the North Fork lying within Greer County, with its confluence with the North Fork not far upstream from the headwaters of Lake Altus. The headwaters of Lake Creek lie near the small town of Willow (Figure 1). In the §319 Assessment Report (OCC 1988), several concerns were documented on the North Fork, which focused primarily on the upper end of Lake Altus. Concerns in Lake Altus included excessive siltation, high suspended solids, and excessive nutrients.

Most of the soils in the Lake Creek system were formed from old alluvium (including wind blown materials) that is often quite sandy in texture. This creates considerable potential for erosion and sediment yield from cropped land and pasture areas, especially on sloping land. The nature of the soils makes it difficult to address these erosion problems using structural measures such as terraces. The sandy soils are not well suited to construct terraces, and terraces might pose a threat to groundwater. The sandy soils also accentuate the potential for riparian habitat damage if cattle are allowed to graze and water near the watercourses. Controlling sediment yields (and associated nutrients) must involve best management practices such as filter strips, stream-bank protection, and livestock exclusion coupled with practices to address critical erosion areas.

The major project activities under this sub-task included:

1) determining the BMP needs of landowners in the Lake Creek watershed,
2) submitting a Quality Assurance Project Plan (QAPP) and monitoring plan to EPA,
3) soliciting landowner sign-up (target of 70% participation),
4) conducting water quality monitoring, and
5) implementing BMPs.

The agencies involved included the Oklahoma Conservation Commission, the Greer County Conservation District, and the Natural Resources Conservation Service (NRCS).

The Oklahoma Conservation Commission was responsible for the overall coordination of the Lake Creek project in cooperation with the Greer County Conservation District. The district and NRCS undertook primary operational responsibilities for:

1) soliciting landowner participation (with a goal of at least 70% participation),
2) implementing detailed landowner specific management plans using appropriate combinations of water quality BMPs,
3) providing technical assistance in installing the BMPs, and
4) exercising oversight to assure that BMPs have been correctly installed and maintained.

The Oklahoma Conservation Commission coordinated with the district to administer the distribution of project funds to landowners participating in the demonstration project and carried out monitoring work to document improvements in water quality associated with reductions in the levels of sediment and nutrients and improvements in riparian habitat conditions.

Lake Creek Pre-Implementation Monitoring

Prior to initiating monitoring, the Oklahoma Conservation Commission prepared a monitoring plan for the project following an EPA approved QAPP.

Prior to implementation (November, 1990 to December, 1992), several sites in the Lake Creek watershed and two sites on the North Fork of the Red River (Table 1) were monitored to determine water quality. Pre-implementation water quality data is included in Appendix A. Lake Creek's beneficial uses are *Agriculture, Industrial and Municipal Process and Cooling Water, Aesthetics, Warm Water Aquatic Community,* and *Primary Body Contact Recreation*. The beneficial uses of the North Fork are *Public and Private Water Supply, Warm Water Aquatic Community, Class III Irrigation, Municipal and Industrial Process and Cooling Water, Primary Body Contact Recreation,* and *Aesthetics* (OWRB 1995).

Table 1. Site numbers, names, and waterbody I.D. numbers for Lake Creek Project.

Site #	Site Name	WBID#
1	Lake Creek near the town of Lake Creek	OK311510010040G
2	Lake Creek near the town of Granite	OK311510010040N
3	Lake Creek near the town of Willow	OK311510010040Q
4	North Fork of Red River above Lake Creek	OK311510010010K
5	North Fork of Red River below Lake Creek	OK311510010010J
6	Lake Creek tributary near the town of Lake Creek	OK311510010040I
7	Lake Creek at the town of Lake Creek	OK311510010040L
8	Lake Creek at the town of Willow	OK311510010040U

An ISCO automatic sampler was located at Site 1 (Lake Creek near the town of Lake Creek) to collect high flow samples. Site 6 (Lake Creek tributary near the town of Lake Creek), which receives much of its discharge from a seep, was monitored to determine if ground water was a source of the NPS pollution. Sites 7 and 8 (Lake Creek at the town of Lake Creek and Lake Creek at the town of Willow, respectively) were added halfway through the project. Site 7 was only sampled a couple of times to determine if discharge from a septic system was a significant source. Site 8 was routinely sampled to determine if the town of Willow's sewage lagoons were impacting Lake Creek. Figure 1 shows the locations of all sites monitored during the Lake Creek project.

Figure 1. Locations of Lake Creek Project and sampling sites.

Base Flow Monitoring Results

Dissolved oxygen (D.O.) levels at all Lake Creek and North Fork of the Red River sites complied with the Oklahoma Water Quality Standards (OWRB 1995). However, the D.O. levels at Site 6 (Lake Creek tributary near Lake Creek) violated the Oklahoma Water Quality Standards (OWQS) dissolved oxygen criterion on two occasions (May 29, 1991 and June 26, 1991). On May 29, 1991, D.O. was severally depleted (1.1 mg/L) to a level which can not be tolerated by fish and most benthic macroinvertebrates. According to 305(b) criteria (EPA 1995), this tributary would be considered partially supporting the warm water aquatic community beneficial use. Dissolved oxygen supersaturation (percent saturation > 125%) was observed on numerous occasions at all Lake Creek sites. This may indicate high levels of primary productivity resulting from elevated nutrient levels. Dissolved oxygen supersaturation is often associated with pre-dawn D.O. depletion. Dissolved oxygen supersaturation was generally not observed in the North Fork of the Red River.

The pH indicated that the water in the project area was somewhat basic. The pH in Lake Creek generally increased as the water moved downstream (Table 2). The pH values in the North Fork were essentially the same above and below the Lake Creek confluence. The observed pH values were generally compliant with the OWQS. However on two occasions (9.2 on August 27, 1991 and 9.1 November 26, 1991), the OWQS pH criterion (9.0) was exceeded at Site 1. The OWQS pH criterion was also approached on numerous occasions at other Lake Creek and North Fork of the Red River sites. This indicates that the warm water aquatic community may be threatened by elevated pH. The observed excessive pH levels likely resulted from intense primary productivity. Intense primary productivity is often associated with pre-dawn D.O. depletion.

Conductivity was primarily used to indicate the levels of total dissolved solids (TDS) in the water. The TDS levels (mg/L) were determined by multiplying the conductivity (uS/cm) by 0.66. Conductivity, and therefore TDS levels, in Lake Creek decreased substantially as the water flowed downstream. The TDS levels in Lake Creek's upper reaches (Sites 8, 3, and 2) indicated that the water was unsuitable under most conditions for irrigation (TDS > 2,100 mg/L). The TDS in the lower reaches of the Lake Creek watershed (Sites 1) and the North Fork suggested the water's suitability for irrigation was dependent on the crop grown, soil, climate, and other factors (TDS between 700-2,100 mg/L). Conductivity and TDS levels at Site 6, which receives discharge from a seep, were substantially lower than those in Lake Creek indicating that the groundwater may be suitable under almost all conditions for irrigation (TDS < 700). The conductivity in the North Fork was slightly diluted by the inflow from Lake Creek. The TDS levels in the upper Lake Creek sites (8, 3, and 2) exceeded both the TDS yearly mean standard (2334 mg/L) and sample standard (2815 mg/L) listed in the OWQS for stream segment 311510. The lower Lake Creek site (1) complied with the TDS yearly mean standard; however, it exceeded the sample mean standard several times. The Lake Creek tributary near the town of Lake Creek and both North Fork sites contained TDS levels compliant with both the TDS yearly mean standard and sample standard.

Table 2. Mean concentrations during the Lake Creek Project pre-implementation monitoring

Excluding Site 6, the water was brackish. However, the water at all sites could be used with reasonable safety for watering cattle, sheep, swine, and horses, but these waters were not recommended for poultry. The water may require an acclimation period for livestock to adjust and may cause livestock to have mild, temporary cases of diarrhea. In the upper reaches of Lake Creek where the TDS levels were highest, it may be beneficial to exclude pregnant or lactating animals. Except for samples collected from Site 6, the TDS levels in all other samples exceeded the Safe Drinking Water Act TDS standard of 500 mg/L. Even at Site 6, almost 40% of the samples contained TDS levels exceeding 500 mg/L.

Turbidity usually varied substantially from site to site indicating that local conditions were primarily responsible for the observed levels. For example, on June 26, 1991, turbidity ranged from 33 NTU at Site 8 to 14 NTU at Site 3 to 99 NTU at Site 2 to 25 NTU at Site 1. Although this was an extreme case, it showed local conditions play a significant role in determining the turbidity levels at a specific site. The OWQS turbidity criterion (50 NTU) was exceeded six times at both North Fork sites (4 & 5). The OWQS turbidity criterion was exceeded four times at Site 6. The OWQS turbidity criterion was exceeded once at Sites 8, 2, and 1. The OWQS turbidity criterion was never exceeded at Site 3. This indicated that the *Warm Water Aquatic Community* and *Aesthetic* value were impacted by turbidity.

Total suspended solids (TSS) varied substantially from site to site, as well. This was likely due to the same factors that caused the turbidity to vary. TSS levels were generally present at moderate to high levels.

Alkalinity also varied from site to site indicating that local conditions might have influenced the observed levels. For example, on April 2, 1992, alkalinity ranged from 239 mg/L at Site 8, to 222 mg/L at Site 3, to 280 mg/L at Site 2, to 270 mg/L at Site 1. The variations, however, were not biologically significant, although they may indicate varying levels of primary productivity at each site. Alkalinity levels at all sites indicated the water had a substantial buffering capacity (alkalinity > 100 mg/L). The water was very hard (hardness > 180 mg/L) at all sites. Hardness generally decreased as the water moved downstream in Lake Creek.

Sulfate and chloride generally decreased in Lake Creek as the water moved downstream. Chloride levels at all sites complied with both the OWQS yearly mean standard (4541 mg/L) and sample standard (7133 mg/L) for chloride. Except for the upper Lake Creek Site 8, sulfate levels at all sites complied with the OWQS yearly mean standard for sulfate (1422 mg/L). However, the OWQS sample standard for sulfate (1860 mg/L) was exceeded five times at Site 8, four times at Site 3, and one time at both North Fork Sites 4 and 5. This shows that excessive sulfate levels were primarily a problem in only the upper reaches of Lake Creek. Except for the samples collected from Site 6, most samples contained sulfate and chloride levels exceeding the Safe Drinking Water Act standards (250 mg/L). This provided further indication that the groundwater, which provided a majority of the discharge at Site 6, was of higher quality than the surface water.

Mean phosphorous levels generally decreased from Lake Creek at Willow (Site 8) through Lake Creek near Granite (Site 2) and then increased between Lake Creek near Granite (Site 2) and Lake Creek near Lake Creek (Site 1). The data indicated a large amount of phosphorous originated at Willow (most likely sewage lagoon seepage and overflow). At Site 3, the data indicated the phosphorous levels were diluted due to the inflow from a relatively large tributary, which contained low phosphorous levels. Both the mean and median phosphorous concentrations at Site 3 were half the mean and median phosphorous concentrations at Site 8.

Between Site 3 (Lake Creek near Willow) and Site 2 (Lake Creek near Granite), no definite trend in phosphorous concentrations was observed.

Between Site 2 (Lake Creek near Granite) and Site 1 (Lake Creek near Lake Creek), phosphorous concentrations increased substantially. The mean phosphorous concentration increased 133% from 0.066 mg/L to 0.154 mg/L. However, the median phosphorous concentration increased only slightly (12%) indicating that extreme values resulted in the observed increased mean value. The data indicated additional phosphorous entered the stream between the two sites. Septic systems in the Lake Creek community were considered potential sources of the additional phosphorous. These sources were monitored on several occasions (Site 7); however, the findings were inconclusive. Another source considered was groundwater inflow. This was sampled at Site 6. The levels at Site 6 were elevated compared to those at Site 2 indicating groundwater inflow might be a significant source.

Mean and median phosphorous concentrations increased between the North Fork Sites 4 and 5; however, the increase was not statistically significant. This may indicate that the Lake Creek inflow impacted the phosphorous levels in the North Fork.

EPA (1986) suggests total phosphorous concentrations should not exceed 0.100 mg/L to prevent the development of plant nuisances in streams. In Lake Creek, observed total phosphorous levels exceeded this criterion in 22% of the samples from Site 8, 19% from Site 3, 13% from Site 2, and 38% from Site 1. The trend in exceedances followed the same trend that the mean total phosphorous concentrations followed. This indicated a decrease in total phosphorous levels from Site 8 to Site 2 and an increase in phosphorous levels between Site 2 and Site 1.

EPA also suggests phosphorous levels not exceed 0.050 mg/L in streams discharging into lakes or reservoirs. In the North Fork (which discharges into Lake Altus), this criterion was exceeded in 33% of the samples collected at Site 4 and in 27% of the samples collected from Site 5.

The data indicated the *Aesthetics* and *Warm Water Aquatic Community* in both Lake Creek and the North Fork were being impacted by elevated levels of phosphorous. The data also indicated phosphorous loading from the North Fork threatens Lake Altus.

Phosphate phosphorous was measured in only the last six base flow samples. Phosphate exhibited a similar trend as total phosphorous which indicated Willow's lagoon (Site 8), groundwater (Site 6), and other nonpoint pollution sources (NPS) between Sites 2 and 1 impacted Lake Creek.

Phosphate typically comprised 44% to 67% of the total phosphorous. The lowest percentage was observed at Site 8 indicating organic phosphorous comprised more than half the total phosphorous. This might have been due to the discharge of inadequately treated sewage from Willow's lagoon, which contained higher levels of organic material. The highest percentage was found at Site 6 which received groundwater inflow and would be expected to have lower levels of organic matter and organic phosphorous.

Observed nitrite levels complied with the MCL (1 mg/L) listed in the Safe Drinking Water Act (1986). Observed nitrite/nitrate concentrations indicated nitrate levels complied with the OWQS Public and Private Water Supply raw water criterion (10 mg/L). Observed ammonia levels generally complied with the EPA standards listed in the *Gold Book*; however, on February 27, 1992, the ammonia level at Site 6 (Lake Creek tributary near Lake Creek) exceeded the chronic criterion level (1.73 mg/L) listed in the *Gold Book* for the observed pH and temperature. Ammonia levels exceeding 0.1 mg/L usually indicate polluted waters (Jacobson 1991). Based on this, Site 8 (Lake Creek at Willow) and Site 6 (Lake Creek tributary), which exceeded this criterion in 50% and 60% of the samples, respectively, were the most polluted sites.

Total nitrogen concentrations were relatively high in Lake Creek when compared to the levels found in the North Fork. Total nitrogen concentrations in Lake Creek typically increased as the water flowed downstream. The inflow from Lake Creek into the North Fork also resulted in a slight increase in the average total nitrogen level in the North Fork.

On average, nitrite comprised 1-3% of the total nitrogen, nitrate comprised 34-62%, and total Kjeldahl nitrogen (organic plus ammonia nitrogen) comprised 36-65%. Of the total nitrogen, ammonia typically made up 1-4%, which indicated organic nitrogen made up most of the observed TKN levels. However, at Site 6 ammonia comprised 17% of the total nitrogen, on average.

High Flow Monitoring Results

High flow water quality was routinely monitored at Site 1 only. High flow samples were inadvertently collected on December 19, 1991 at the other sites. Therefore, much of the following discussion will focus primarily on the findings at Site 1. Due to insufficient data, comparisons of high flow and low flow levels of D.O., pH, temperature, turbidity, and alkalinity could not be made. High flow conductivity, chloride, sulfate, hardness, and TDS levels were substantially lower than base flow levels. High flow conductivity, chloride, sulfate, hardness, and TDS levels were 73%, 67%, 64%, 59%, and 73% lower, respectively. These measurements provided a good indication of dilution from rainfall, which typically contains low levels of dissolved substances.

Conversely, high flow total suspended solids levels were 2615% higher than base flow levels which indicated sediment loading from nonpoint source runoff, stream bank erosion, and/or bed load movement were considerable. High flow total phosphorous and phosphate levels were also substantially higher than base flow levels (230% and 542%, respectively) which indicated phosphorous runoff from nonpoint sources was also considerable.

Levels of the inorganic forms of nitrogen (nitrate and nitrite) in high flow samples were typically lower than those levels found in base flow samples. In contrast, organic and ammonia nitrogen levels were typically higher in high flow samples than in base flow samples. The lower levels of nitrate and nitrite combined with higher levels of organic and ammonia nitrogen resulted in an overall lower total nitrogen level during high flow events compared to base flow events. Because base flow TKN and total nitrogen levels were so high, little difference was observed between base and high flow samples.

Analysis of the high flow data collected at all sites on December 19, 1991 indicated suspended sediment and nutrient concentrations decreased between Lake Creek Sites 8 and 3, most likely due to dilution from the inflow of water from a less impacted tributary. However after Site 3, the concentrations of suspended sediment and nutrients steadily increased in Lake Creek (at Sites 2 and 1) due to the inflow of NPS pollution runoff.

Conclusions from Pre-Implementation Monitoring

Pre-implementation base flow monitoring of Lake Creek indicated TDS levels severely impaired its *Agricultural* use, and turbidity and nutrient levels severely impaired its *Warm Water Aquatic Community* and its *Aesthetic* value. Pre-implementation monitoring of the North Fork indicated TDS, sulfate, and chloride levels severely impaired its *Public and Private Water Supply* use, turbidity severely impaired its *Aesthetic* value and *Warm Water Aquatic Community*, and TDS impaired its *Agricultural* use. Pre-implementation high flow monitoring indicated large amounts of sediment and nutrients entered the streams due to runoff, stream bank erosion, or bed load movement.

The TDS, sulfate, and chloride originated primarily from natural sources; however, irrigation certainly contributed. Nutrient sources appeared to be overflow and/or seepage from the sewage treatment lagoon for the town of Willow, nonpoint source pollution, and groundwater (which most likely had been contaminated by nonpoint source pollution). The source of the sediment was attributed to NPS runoff from surrounding agricultural land, bed load movement and stream bank erosion. Implementation activities should be aimed at addressing these issues.

Implementation Activities

The demonstration project on Lake Creek promoted the installation of water quality oriented BMPs to reduce NPS pollutants associated with cropland, pasture, and livestock grazing. The water quality oriented BMPs promoted by this project are listed below and contained in the agricultural component of Oklahoma's EPA approved Section 319 NPS Management Plan.

BMP Description	BMP # from 319 Management Plan
Conservation Tillage	5
Filter Strips	8
Diversions	18
Livestock Exclusion	19
Grade Stabilization Structures	20
Stream Bank Protection	22
On site Sewage Disposal System	25
Critical Area Erosion Control	27

Of the funds originally budgeted (listed below), the federal share was $101,738 and the non-federal share was $67,826.

BMP Implementation:	$100,000
Education/Technical Assistance/Technical Transfer:	$ 32,004
Monitoring:	$ 32,003
Administration:	$ 5,557
Total Funds for Project:	$169,564

Implementation began in the fall of 1993. The following BMPs (Table 3) were implemented.

Table 3. BMPs implemented in the Lake Creek watershed.

Best Management Practice	# of Jobs	Area
Grassed Waterways	6	10.8 acres
Diversions	2	2119 ft^3
Filter Strip	5	33.2 acres
Pasture & Hay Land Planting	5	364 acres
Concrete Lined Outlets	6	96 ft^3
Rural Waste System	1	N/A
Pasture & Hay Land Management	6	807.7 acres
Conservation Cropping Sequence	7	1185.6 acres
Nutrient Management	10	2091.6 acres
Pest Management	10	2091.6 acres
Proper Grazing Use	3	145.5 acres
Crop Residue Management	7	969.7 acres
Soil Testing	17	N/A
Waterway Maintenance	1	15.7 acres
Shelter Belt	2	8.7 acres

Because of a lack of local interest, the local sponsor withdrew its support of the project. Due to the withdrawal, the demonstration project ended December 31, 1994. Commitments to existing demonstration projects were completed. Because the project ended prematurely, only the following funds were used:

BMP Implementation:	$50,715.83
Education/Technical Assistance/Technical Transfer:	$21,311.81
Monitoring:	$21,310.81
Total Funds for Project:	$98,895.45

Of the funds used, the federal share was $59,336.87 and the non-federal share was $28,267.42. The remaining $70,669 was transferred to the Whisky Creek Project [FY 1990, sub-task 200(A)]. Because the project was not fully implemented, post-implementation monitoring was not conducted.

Conclusion

As the pre-implementation monitoring showed, there was a definite need for BMP implementation in this area. Hopefully through education, local interest can be aroused and BMPs be implemented in the future to address the water quality problems identified.

The success of the Lake Creek project was to be determined from comparisons of pre- and post-implementation data. The goal was to observe at least a fifty-percent reduction in average high flow levels of turbidity, suspended solids, total phosphorus, and total nitrogen. Another goal of the project was to have a 70% landowner participation rate. Unfortunately, none of these goals was achieved; therefore, this project was not a success.

Literature Cited

EPA (U.S. Environmental Protection Agency). 1986. Quality Criteria for Water 1986. EPA Publication 440/5-86-001. Washington, DC.

EPA (U.S. Environmental Protection Agency). 1995. Guidelines for Preparation of 1996 State Water Quality Assessment Reports. EPA 841/B-95-001. Washington, DC.

Jacobson, C. 1991. Water, Water Everywhere, Second Edition. Hach Company, Loveland, CO.

OCC (Oklahoma Conservation Commission). 1988. Oklahoma's Nonpoint Source Pollution Assessment Report. OCC – Water Quality Division, Oklahoma City, OK.

OWRB (Oklahoma Water Resources Board). 1995. Oklahoma's Water Quality Standards 1995.
Oklahoma Administrative Code 785:45. Oklahoma City, OK.

APPENDIX A

WATER QUALITY DATA:
LAKE CREEK PROJECT

Site	Date	D.O. mg/L	pH S.U.	Cond. uS/cm	Temp. *C	Turb NTU	Alk mg/L	Cl mg/L	SO4 mg/L	Hard. mg/L	TDS mg/L	TSS mg/L	TP mg/L	PO4 mg/L	NO2 mg/L	NO2/NO3 mg/L	TKN mg/L	TN mg/L	NH3-N mg/L
Lake Cr Site 1	11/14/90	13.6	8.4	2,170	14.3	6.5	293	318	407	492	1,432	14.0	0.327			1.30	1.21	2.51	
Lake Cr Site 1	12/13/90	12.2	8.3	2,090	6.1	16.0	326	200	315	525	1,379	15.0	0.033			4.40	2.03	6.43	
Lake Cr Site 1	01/24/91	15.0	8.1	1,900	5.0	14.0	324	172	259	529	1,254	22.0	0.114			3.00	0.82	3.82	
Lake Cr Site 1	02/27/91	12.2	8.5	1,915	11.5	10.0	308	210	114	455	1,264	2.0	0.154			2.60	1.34	3.94	
Lake Cr Site 1	03/26/91	11.6	8.7	1,942	19.3	16.0	302	226	305	422	1,282	13.0	0.011			0.20	1.13	1.33	
Lake Cr Site 1	04/23/91	11.8	8.7	1,924	16.7	8.0	272	359	74	406	1,270	**0.5**	0.042			0.20	1.53	1.73	
Lake Cr Site 1	05/29/91	6.9	7.9	5,500	25.8	45.0	418	389	623	701	3,630	62.0	0.268			2.60	1.08	3.68	
Lake Cr Site 1	06/26/91	13.6	8.6	2,680	28.0	25.0	190	409	915	511	1,769	60.0	**0.003**			**0.05**	2.52	2.57	
Lake Cr Site 1	07/23/91	10.5	8.9	1,650	31.9	33.0	202	309	331	323	1,089	60.0	0.041			0.90	1.94	2.84	
Lake Cr Site 1	08/27/91	13.5	9.2	901	20.8	60.0	229	102	106	191	595	51.0	1.100			**0.05**	2.91	2.96	
Lake Cr Site 1	09/24/91		8.6	2,040	16.8	30.0	263	295	339		1,346	35.0	0.120	0.090	0.08	2.60	1.00	3.60	0.08
Lake Cr Site 1	10/24/91		8.2	2,050	17.0	16.0	269	255	358	420	1,353	15.0	0.060	0.010	0.07	0.74	0.80	1.54	0.15
Lake Cr Site 1	11/26/91	11.5	9.1	2,750	10.3	12.0	304	400	546	700	1,815	1.0	0.070	0.050	0.05	3.50	0.60	4.10	0.05
Lake Cr Site 1	01/23/92	14.0	8.4	3,980	6.9	7.0	296	650	895	1,110	2,627	9.0	0.030	**0.005**	0.08	5.20	0.60	5.80	0.03
Lake Cr Site 1	02/27/92	16.8	8.4	4,900	12.9	5.0	273	640	873	1,150	3,234	1.0	0.080	0.020	0.05	2.70	1.00	3.70	0.03
Lake Cr Site 1	04/02/92	12.6	8.2	3,440	12.7	11.0	270	1,120	804	920	2,270	10.0	0.010	0.020	0.08	3.10	0.60	3.70	**0.01**
	Min	6.9	7.9	901	5.0	5.0	190	102	74	191	595	0.5	0.003	0.005	0.05	0.05	0.60	1.33	0.01
	Max	16.8	9.2	5,500	31.9	60.0	418	1,120	915	1,150	3,630	62.0	1.100	0.090	0.08	5.20	2.91	6.43	0.15
	Mean	12.6	8.5	2,615	16.0	19.7	284	378	454	590	1,726	23.2	0.154	0.033	0.07	2.07	1.32	3.39	0.06
	Median	12.4	8.5	2,070	15.5	15.0	283	314	349	511	1,366	14.5	0.065	0.020	0.08	2.60	1.10	3.64	0.04

Site	Date	D.O. mg/L	pH S.U.	Cond. uS/cm	Temp. *C	Turb NTU	Alk mg/L	Cl mg/L	SO4 mg/L	Hard. mg/L	TDS mg/L	TSS mg/L	TP mg/L	PO4 mg/L	NO2 mg/L	NO2/NO3 mg/L	TKN mg/L	TN mg/L	NH3-N mg/L
Lake Cr Site 1 - Hi Flow	05/23/91					200.0	100	39	**10**	129		790.0	0.630			0.50	1.37	1.87	
Lake Cr Site 1 - Hi Flow	09/19/91			480				44	60	89	317	620.0	0.012			**0.05**	0.85	0.90	
Lake Cr Site 1 - Hi Flow	12/12/91			914				145	138	244	603	1,260.0	0.740	0.270	0.05	0.90	2.30	3.20	0.18
Lake Cr Site 1 - Hi Flow	12/19/91	12.4	7.4	602	4.5			92	88	159	397	968.0	1.100	0.220	0.03	0.40	3.10	3.50	0.12
Lake Cr Site 1 - Hi Flow	04/19/92											300.0	0.220	0.190	0.05	1.30	0.90	2.20	0.14
Lake Cr Site 1 - Hi Flow	06/05/92			868				102	155	230	573	676.0	0.310	0.220	0.03	0.46	0.90	1.36	0.06
Lake Cr Site 1 - Hi Flow	06/28/92											932.0	0.690	0.230	0.04	0.74	1.90	2.64	0.02
Lake Cr Site 1 - Hi Flow	11/12/92							320	542	620		160.0	0.210	0.070	0.08	2.20	1.20	3.40	0.09
Lake Cr Site 1 - Hi Flow	11/21/92							57	91	146		198.0	0.500	0.260	0.05	1.10	1.10	2.20	0.06
Lake Cr Site 1 - Hi Flow	12/15/92							188	232	340		384.0	0.660	0.210	0.06	2.20	1.70	3.90	0.10
	Min	12.4	7.4	480	4.5	200.0	100	39	10	89	317	160.0	0.012	0.070	0.03	0.05	0.85	0.90	0.02
	Max	12.4	7.4	914	4.5	200.0	100	320	542	620	603	1,260.0	1.100	0.270	0.08	2.20	3.10	3.90	0.18
	Mean	12.4	7.4	716	4.5	200.0	100	123	164	245	473	628.8	0.507	0.209	0.05	0.99	1.53	2.52	0.10
	Median	12.4	7.4	735	4.5	200.0	100	97	114	195	485	648.0	0.565	0.220	0.05	0.82	1.29	2.42	0.10
% Difference Btwn Hi & Lo Flow		N/A	N/A	-73%	N/A	N/A	N/A	-67%	-64%	-59%	-73%	2615%	230%	542%	-29%	-52%	16%	-26%	67%

Site	Date	D.O. mg/L	pH S.U.	Cond. uS/cm	Temp. *C	Turb NTU	Alk mg/L	Cl mg/L	SO4 mg/L	Hard. mg/L	TDS mg/L	TSS mg/L	TP mg/L	PO4 mg/L	NO2 mg/L	NO2/NO3 mg/L	TKN mg/L	TN mg/L	NH3-N mg/L
Lake Cr Site 2	11/14/90	11.9	8.3	3,250	12.1	15.0	358	431	676	802	2,145	22.0	0.303			1.20	1.49	2.69	
Lake Cr Site 2	12/13/90	15.0	8.3	2,790	6.4	7.0	347	285	461	723	1,841	4.0	0.015			4.20	2.39	6.59	
Lake Cr Site 2	01/24/91	17.2	8.0	2,880	6.0	7.0	309	300	458	905	1,901	20.0	0.084			3.70	0.52	4.22	
Lake Cr Site 2	02/27/91	14.9	8.6	2,690	11.8	11.0	332	314	964	703	1,775	9.0	0.005			2.90	1.15	4.05	
Lake Cr Site 2	03/26/91	12.6	8.6	2,690	20.5	24.0	292	333	528	614	1,775	31.0	0.013			0.20	1.03	1.23	
Lake Cr Site 2	04/23/91	15.0	8.8	2,810	21.7	21.0	264	341	486	622	1,855	30.0	**0.003**			0.20	1.65	1.85	
Lake Cr Site 2	05/29/91	8.1	7.9	3,640	25.9	39.0	342	534	870	970	2,402	52.0	0.138			2.30	1.09	3.39	
Lake Cr Site 2	06/26/91	13.8	8.5	3,720	27.2	99.0	242	556	938	835	2,455	204.0	**0.003**			**0.05**	1.68	1.73	
Lake Cr Site 2	07/23/91	12.4	8.4	3,280	29.0		62	593	701	717	2,165	108.0	0.058			**0.05**	3.02	3.07	
Lake Cr Site 2	09/24/91		8.5	2,930	16.9	26.0	233	470	1,169		1,934	30.0	0.100	0.060	0.08	1.70	0.80	2.50	0.07
Lake Cr Site 2	10/24/91		8.2	3,080	18.2	17.0	264	450	395	690	2,033	20.0	0.070	0.010	0.02	**0.03**	0.70	0.73	0.03
Lake Cr Site 2	11/26/91	11.2	9.0	3,850	8.6	25.0	315	578	784	1,060	2,541	18.0	0.070	0.060	0.04	3.00	0.70	3.70	0.05
Lake Cr Site 2	01/23/92	15.2	8.1	5,070	8.7	5.0	367	930	1,068	1,560	3,346	9.0	0.020	**0.005**	0.07	5.30	0.50	5.80	0.02
Lake Cr Site 2	02/27/92	18.2	8.2	6,450	14.4	6.2	260	955	1,287	1,635	4,257	5.0	0.080	0.010	0.04	2.70	1.00	3.70	0.02
Lake Cr Site 2	04/02/92	14.7	8.1	4,770	13.7	11.5	280	1,540	1,171	1,400	3,148	13.0	0.030	0.020	0.08	3.30	0.90	4.20	0.02
	Min	8.1	7.9	2,690	6.0	5.0	62	285	395	614	1,775	4.0	0.003	0.005	0.02	0.03	0.50	0.73	0.02
	Max	18.2	9.0	6,450	29.0	99.0	367	1,540	1,287	1,635	4,257	204.0	0.303	0.060	0.08	5.30	3.02	6.59	0.07
	Mean	13.9	8.4	3,593	16.1	22.4	284	574	797	945	2,372	38.3	0.066	0.028	0.06	2.06	1.24	3.30	0.04
	Median	14.7	8.3	3,250	14.4	16.0	292	470	784	819	2,145	20.0	0.058	0.015	0.06	2.30	1.03	3.39	0.03
Lake Cr Site 2 - Hi Flow	12/19/91	11.8	7.6	697	4.5			12	96	183	460	560.0	0.810	0.290	0.04	0.64	1.90	2.54	0.08

Site	Date	D.O. mg/L	pH S.U.	Cond. uS/cm	Temp. *C	Turb NTU	Alk mg/L	Cl mg/L	SO4 mg/L	Hard. mg/L	TDS mg/L	TSS mg/L	TP mg/L	PO4 mg/L	NO2 mg/L	NO2/NO3 mg/L	TKN mg/L	TN mg/L	NH3-N mg/L
Lake Cr Site 3	11/14/90	14.4	8.1	3,160	12.2	15.0	142	429	625	1,002	2,086	27.0	0.304			0.80	1.41	2.21	
Lake Cr Site 3	12/13/90	12.4	8.0	6,060	5.4	11.0	236	402	795	2,099	4,000	5.0	0.014			5.10	1.98	7.08	
Lake Cr Site 3	01/24/91	18.0	7.7	5,920	6.0	3.0	222	1,267	714	2,079	3,907	8.0	0.083			4.20	0.60	4.80	
Lake Cr Site 3	02/27/91	12.3	7.9	5,970	9.8	3.0	235	2,650	1,442	2,475	3,940	9.0	0.010			4.80	1.05	5.85	
Lake Cr Site 3	03/26/91	11.2	7.9	6,090	19.9	13.0	215	1,187	1,110	1,861	4,019	21.0	0.007			0.20	0.93	1.13	
Lake Cr Site 3	04/23/91	12.1	8.1	6,170	19.2	23.0	195	609	897	2,158	4,072	43.0	0.022			0.20	1.57	1.77	
Lake Cr Site 3	05/29/91	8.3	7.5	5,840	26.3	25.0	291	1,063	1,421	1,782	3,854	21.0	0.093			1.40	1.00	2.40	
Lake Cr Site 3	06/26/91		8.0	6,490	27.7	14.0	200	1,286	780	1,762	4,283	27.0	0.016			**0.05**	1.63	1.68	
Lake Cr Site 3	07/23/91	8.3	8.0	7,810	29.0	25.0	90	2,134	1,162	2,534	5,155	46.0	0.021			**0.05**	1.48	1.53	
Lake Cr Site 3	08/27/91		7.9	7,690	28.9	32.0	103	1,994	3,130	2,689	5,075	36.0	0.278			**0.05**	0.81	0.86	
Lake Cr Site 3	09/24/91		7.9	5,960	16.8	30.0	203	250	987		3,934	45.0	0.110	0.060	0.04	1.50	0.90	2.40	0.10
Lake Cr Site 3	10/24/91		7.8	6,840	17.8	13.0	208	1,420	1,165	2,236	4,514	29.0	0.030	0.010	0.14	3.50	0.60	4.10	0.07
Lake Cr Site 3	11/26/91	10.5	8.6	6,670	8.1	5.0	262	1,400	1,372	1,880	4,402	1.0	0.050	0.030	**0.01**	1.80	0.60	2.40	0.05
Lake Cr Site 3	01/23/92	15.3	7.9	7,620	7.7	5.0	235	1,600	1,997	2,600	5,029	10.0	0.040	0.020	0.05	3.10	0.70	3.80	0.03
Lake Cr Site 3	02/27/92	16.1	7.9	8,980	11.7	3.0	270	1,525	1,863	2,370	5,927	1.0	0.040	0.020	0.04	2.50	0.90	3.40	0.10
Lake Cr Site 3	04/02/92	12.4	8.0	7,490	11.7	6.0	222	2,820	1,971	2,250	4,943	12.0	0.040	0.030	0.02	1.50	0.90	2.40	0.09
	Min	8.3	7.5	3,160	5.4	3.0	90	250	625	1,002	2,086	1.0	0.007	0.010	0.01	0.05	0.60	0.86	0.03
	Max	18.0	8.6	8,980	29.0	32.0	291	2,820	3,130	2,689	5,927	46.0	0.304	0.060	0.14	5.10	1.98	7.08	0.10
	Mean	12.6	7.9	6,548	16.1	14.1	208	1,377	1,339	2,118	4,321	21.3	0.072	0.028	0.05	1.92	1.07	2.99	0.07
	Median	12.4	7.9	6,330	14.5	13.0	219	1,343	1,164	2,158	4,178	21.0	0.040	0.025	0.04	1.50	0.91	2.40	0.08
Lake Cr Site 3 - Hi Flow	12/19/91	12.0	7.9	582	4.6			98	79	153	384	112.0	0.520	0.220	0.03	0.77	1.20	1.97	0.05

Site	Date	D.O. mg/L	pH S.U.	Cond. uS/cm	Temp. *C	Turb NTU	Alk mg/L	Cl mg/L	SO4 mg/L	Hard. mg/L	TDS mg/L	TSS mg/L	TP mg/L	PO4 mg/L	NO2 mg/L	NO2/NO3 mg/L	TKN mg/L	TN mg/L	NH3-N mg/L
Lake Cr Site 4	12/13/90	12.4	8.4	2,870	6.0	21.0	209	329	665	994	1,894	36.0	0.007			1.30	1.81	3.11	
Lake Cr Site 4	01/24/91	13.6	8.0	2,680	4.0	49.0	224	286	420	1,109	1,769	78.0	0.074			0.10	0.40	0.50	
Lake Cr Site 4	02/27/91	13.0	8.3	2,850	10.1	15.0	194	359	1,290	990	1,881	27.0	0.013			1.00	0.83	1.83	
Lake Cr Site 4	03/26/91	9.9	8.5	2,970	20.0	19.0	164	409	700	945	1,960	25.0	0.015			0.30	1.20	1.50	
Lake Cr Site 4	04/23/91	10.0	8.5	2,980	17.1	11.0	223	2,075	698	921	1,967	16.0	0.027			0.20	0.89	1.09	
Lake Cr Site 4	05/29/91	8.9	8.1	2,470	26.2	79.0	150	368	683	693	1,630	114.0	0.047			**0.05**	0.59	0.64	
Lake Cr Site 4	06/26/91	8.2	8.5	2,180	26.1	55.5	100	286	804	671	1,439	74.0	**0.003**			**0.05**	1.02	1.07	
Lake Cr Site 4	07/23/91	7.0	8.1	2,740	27.5	18.5	96	559	602	754	1,808	28.0	0.013			**0.05**	0.83	0.88	
Lake Cr Site 4	08/27/91	7.9	8.3	3,480	28.2	8.0	109	694	2,440	996	2,297	11.0	0.498			**0.05**	0.81	0.86	
Lake Cr Site 4	09/24/91		8.0	3,070	17.5	69.0	159	460	357		2,026	95.0	0.080	0.020	0.02	0.51	0.70	1.21	0.01
Lake Cr Site 4	10/24/91		8.2	3,660	16.2	6.0	120	430	959	1,110	2,416	11.0	0.010	**0.005**	0.02	0.47	0.40	0.87	0.03
Lake Cr Site 4	11/26/91	9.0	9.0	3,000	6.0	61.0	222	450	771	980	1,980		0.080	0.040	**0.01**	0.91	0.50	1.41	0.11
Lake Cr Site 4	01/23/92	12.0	8.4	2,990	4.3	59.0	241	450	844	1,060	1,973	70.0	0.070	0.030	0.03	1.20	0.50	1.70	0.09
Lake Cr Site 4	02/27/92	11.0	8.2	3,750	11.4	43.0	205	450	761	1,035	2,475	26.0	0.030	**0.005**	**0.01**	0.79	0.40	1.19	0.02
Lake Cr Site 4	04/02/92	9.9	8.2	2,910	11.5	60.0	194	960	804	1,000	1,921	95.0	**0.005**	0.030	0.02	0.56	0.20	0.76	**0.01**
	Min	7.0	8.0	2,180	4.0	6.0	96	286	357	671	1,439	11.0	0.003	0.005	0.01	0.05	0.20	0.50	0.01
	Max	13.6	9.0	3,750	28.2	79.0	241	2,075	2,440	1,110	2,475	114.0	0.498	0.040	0.03	1.30	1.81	3.11	0.11
	Mean	10.2	8.3	2,973	15.5	38.3	174	571	853	947	1,962	50.4	0.065	0.022	0.02	0.50	0.74	1.24	0.04
	Median	9.9	8.3	2,970	16.2	43.0	194	450	761	992	1,960	32.0	0.027	0.025	0.02	0.47	0.70	1.09	0.03
Lake Cr Site 4 - Hi Flow	12/19/91	11.9	7.3	817	4.5			116	110	210	539	896.0	1.200	0.210	0.03	0.73	3.60	4.33	0.24

Site	Date	D.O. mg/L	pH S.U.	Cond. uS/cm	Temp. *C	Turb NTU	Alk mg/L	Cl mg/L	SO4 mg/L	Hard. mg/L	TDS mg/L	TSS mg/L	TP mg/L	PO4 mg/L	NO2 mg/L	NO2/NO3 mg/L	TKN mg/L	TN mg/L	NH3-N mg/L
Lake Cr Site 5	12/13/90	12.2	8.3	2,830	5.9	21.0	200	320	633	974	1,868	45.0	0.006			1.30	1.92	3.22	
Lake Cr Site 5	01/24/91	13.2	8.1	2,680	4.0	50.0	224	284	387	1,109	1,769	77.0	0.062			**0.05**	0.40	0.45	
Lake Cr Site 5	02/27/91	12.0	8.2	2,840	10.0	16.0	198	345	1,298	1,010	1,874	22.0	0.014			0.70	0.89	1.59	
Lake Cr Site 5	03/26/91	9.7	8.4	2,970	19.4	19.0	153	404	672	952	1,960	29.0	0.016			0.20	2.91	3.11	
Lake Cr Site 5	04/23/91	10.1	8.5	3,000	17.0	13.0	188	590	678	923	1,980	16.0	0.032			0.20	1.15	1.35	
Lake Cr Site 5	05/29/91	8.6	8.2	2,400	25.7	62.0	202	351	630	685	1,584	84.0	0.041			0.30	0.71	1.01	
Lake Cr Site 5	06/26/91	7.9	8.4	2,220	26.2	56.0	103	284	807	669	1,465	84.0	**0.003**			**0.05**	0.96	1.01	
Lake Cr Site 5	07/23/91	7.0	8.1	2,790	27.0	16.0	115	538	543	776	1,841	34.0	0.013			**0.05**	0.93	0.98	
Lake Cr Site 5	08/27/91	8.9	8.3	3,430	28.7	7.0	110	555	2,250	996	2,264	10.0	0.623			**0.05**	0.79	0.84	
Lake Cr Site 5	09/24/91		8.4	3,120	17.7	83.0	162	455	853		2,059	92.0	0.080	0.030	0.02	0.52	0.60	1.12	0.03
Lake Cr Site 5	10/24/91		8.2	3,610	16.5	5.0	121	575	877	1,070	2,383	7.0	0.010	**0.005**	0.02	0.47	0.30	0.77	0.03
Lake Cr Site 5	11/26/91	9.2	9.0	2,780	6.2	62.0	212	430	746	900	1,835	60.0	0.050	0.030	**0.01**	0.93	0.50	1.43	0.11
Lake Cr Site 5	01/23/92	12.2	8.3	2,980	4.1	57.0	214	450	883	1,060	1,967	72.0	0.060	0.030	0.02	1.20	0.40	1.60	0.07
Lake Cr Site 5	02/27/92	10.9	8.1	3,950	11.4	46.0	198	380	826	1,038	2,607	35.0	0.040	**0.005**	**0.01**	0.78	0.60	1.38	0.03
Lake Cr Site 5	04/02/92	9.9	8.3	2,820	11.1	59.0	194	860	827	970	1,861	84.0	0.050	0.050	0.02	0.55	0.40	0.95	**0.01**
	Min	7.0	8.1	2,220	4.0	5.0	103	284	387	669	1,465	7.0	0.003	0.005	0.01	0.05	0.30	0.45	0.01
	Max	13.2	9.0	3,950	28.7	83.0	224	860	2,250	1,109	2,607	92.0	0.623	0.050	0.02	1.30	2.91	3.22	0.11
	Mean	10.1	8.3	2,961	15.4	38.1	173	455	861	938	1,954	50.1	0.073	0.025	0.02	0.49	0.90	1.39	0.05
	Median	9.9	8.3	2,840	16.5	46.0	194	430	807	972	1,874	45.0	0.040	0.030	0.02	0.47	0.71	1.12	0.03
Lake Cr Site 5 - Hi Flow	12/19/91			2,210				640	454	212	1,459	240.0	0.310	0.060	0.02	0.72	1.10	1.82	0.05

Site	Date	D.O. mg/L	pH S.U.	Cond. uS/cm	Temp. *C	Turb NTU	Alk mg/L	Cl mg/L	SO4 mg/L	Hard. mg/L	TDS mg/L	TSS mg/L	TP mg/L	PO4 mg/L	NO2 mg/L	NO2/NO3 mg/L	TKN mg/L	TN mg/L	NH3-N mg/L
Lake Cr Site 6	12/13/90	12.2	8.0	850	5.6	5.0	393	14	**10**	396	561	3.0	0.027			1.10	1.87	2.97	
Lake Cr Site 6	01/24/91	16.2	7.7	853	5.0	4.0	382	20	**10**	374	563	7.0	0.052			0.80	1.00	1.80	
Lake Cr Site 6	02/27/91	12.6	8.2	753	9.0	7.0	358	**5**	189	455	497	3.0	0.015			1.50	1.67	3.17	
Lake Cr Site 6	03/26/91	8.6	8.1	744	18.2	15.0	326	21	126	297	491	34.0	**0.003**			0.30	0.58	0.88	
Lake Cr Site 6	04/23/91	9.8	8.7	747	16.6	23.0	284	31	**10**	303	493	49.0	**0.003**			0.10	3.16	3.26	
Lake Cr Site 6	05/29/91	1.1	7.2	436	24.4	170.0	221	15	**10**	416	288	116.0	0.292			0.20	1.22	1.42	
Lake Cr Site 6	06/26/91	4.3	7.8	613	26.7	21.0	300	17	37	241	405	20.0	**0.003**			**0.05**	1.29	1.34	
Lake Cr Site 6	07/23/91	5.9	7.7	596	28.3	62.0	255	64	43	206	393	80.0	0.082			0.10	4.34	4.44	
Lake Cr Site 6	09/24/91		7.4	104	15.4	388.0	73	25	**3**		69	46.0	0.550	0.310	0.04	0.18	1.50	1.68	0.39
Lake Cr Site 6	11/26/91	9.6	7.8	501	9.6	98.0	194	13	80	190	331	8.0	0.590	0.490	0.06	**0.03**	0.90	0.93	0.05
Lake Cr Site 6	01/23/92	12.3	8.0	1,139	7.2	7.0	419	59	144	450	752	1.0	0.030	0.010	0.05	5.60	0.60	6.20	0.01
Lake Cr Site 6	02/27/92	11.4	7.8	1,225	10.0	8.5	408	53	81	410	809	1.0	0.060	0.010	0.19	4.00	3.60	7.60	1.90
Lake Cr Site 6	04/02/92	7.6	7.8	954	11.1	13.5	350	49	63	338	630	11.0	0.090	0.060	0.12	2.70	1.00	3.70	0.15
	Min	1.1	7.2	104	5.0	4.0	73	5	3	190	69	1.0	0.003	0.010	0.04	0.03	0.58	0.88	0.01
	Max	16.2	8.7	1,225	28.3	388.0	419	64	189	455	809	116.0	0.590	0.490	0.19	5.60	4.34	7.60	1.90
	Mean	9.3	7.9	732	14.4	63.2	305	30	62	340	483	29.2	0.138	0.176	0.09	1.28	1.75	3.03	0.50
	Median	9.7	7.8	747	11.1	15.0	326	21	43	356	493	11.0	0.052	0.060	0.06	0.30	1.29	2.97	0.15
Lake Cr Site 6 - Hi Flow	12/19/91	12.4	6.6	37	4.5			12	8	17	24	360.0	0.750	0.310	0.03	0.31	1.60	1.91	0.16

Site	Date	D.O. mg/L	pH S.U.	Cond. uS/cm	Temp. *C	Turb NTU	Alk mg/L	Cl mg/L	SO4 mg/L	Hard. mg/L	TDS mg/L	TSS mg/L	TP mg/L	PO4 mg/L	NO2 mg/L	NO2/NO3 mg/L	TKN mg/L	TN mg/L	NH3-N mg/L
Lake Cr Site 7	06/26/91	17.1	8.3	3,150	26.2	58.0	222	459	1,540	669	2,079	96.0	**0.003**			**0.05**	2.93	2.98	

Site	Date	D.O. mg/L	pH S.U.	Cond. uS/cm	Temp. *C	Turb NTU	Alk mg/L	Cl mg/L	SO4 mg/L	Hard. mg/L	TDS mg/L	TSS mg/L	TP mg/L	PO4 mg/L	NO2 mg/L	NO2/NO3 mg/L	TKN mg/L	TN mg/L	NH3-N mg/L
Lake Cr Site 8	06/26/91		7.8	7,280	29.5	33.0	185	1,521	298	2,455	4,805	73.0	**0.003**			**0.05**	1.46	1.51	
Lake Cr Site 8	07/23/91	5.2	7.5	8,430	28.2	41.5	189	2,077	1,673	3,188	5,564	74.0	0.043			**0.05**	1.71	1.76	
Lake Cr Site 8	08/27/91		7.8	6,350	28.5	26.0	158	4,129	2,640	2,012	4,191	65.0	0.826			**0.05**	1.49	1.54	
Lake Cr Site 8	09/24/91		7.4	5,110	17.0	23.0	183	985	1,035		3,373	21.0	0.090	0.060	0.06	1.30	1.00	2.30	0.07
Lake Cr Site 8	10/24/91		7.5	7,490	17.5	46.0	317	1,290	2,035	2,500	4,943	19.0	0.080	0.020	0.02	0.05	1.00	1.05	0.16
Lake Cr Site 8	11/26/91	15.0	8.7	8,570	9.6	56.0	227	1,900	2,186	2,740	5,656	60.0	0.130	0.040	0.03	3.70	1.20	4.90	0.12
Lake Cr Site 8	01/23/92	13.3	7.4	7,640	9.7	15.0	359	1,550	223	2,990	5,042	55.0	0.090	0.040	0.02	2.10	1.20	3.30	0.08
Lake Cr Site 8	02/27/92	20.8	7.7	12,500	15.0	6.6	270	2,200	1,886	3,260	8,250	15.0	0.050	0.020	0.05	3.20	1.00	4.20	0.09
Lake Cr Site 8	04/02/92	12.7	7.4	9,730	14.2	5.0	239	2,275	1,962	3,363	6,422	17.0	0.010	0.020	0.05	4.10	0.70	4.80	0.16
	Min	5.2	7.4	5,110	9.6	5.0	158	985	223	2,012	3,373	15.0	0.003	0.020	0.02	0.05	0.70	1.05	0.07
	Max	20.8	8.7	12,500	29.5	56.0	359	4,129	2,640	3,363	8,250	74.0	0.826	0.060	0.06	4.10	1.71	4.90	0.16
	Mean	13.4	7.7	8,122	18.8	28.0	236	1,992	1,549	2,814	5,361	44.3	0.147	0.033	0.04	1.62	1.19	2.82	0.11
	Median	13.3	7.5	7,640	17.0	26.0	227	1,900	1,886	2,865	5,042	55.0	0.080	0.030	0.04	1.30	1.20	2.30	0.11
Lake Cr Site 8 - Hi Flow	12/19/91	11.8	7.4	1,204	4.8			480	112	162	795	196.0	0.540	0.250	0.03	1.00	1.20	2.20	0.04