

**WATER-QUALITY MONITORING PROGRAM  
CHATFIELD BASIN AND RESERVOIR  
DENVER METROPOLITAN AREA  
ANNUAL BASIC-DATA REPORT  
JANUARY 1993-DECEMBER 1993**



*ADVANCED  
SCIENCES, INC.*

**WATER-QUALITY MONITORING PROGRAM  
CHATFIELD BASIN AND RESERVOIR  
DENVER METROPOLITAN AREA  
ANNUAL BASIC-DATA REPORT  
JANUARY 1993-DECEMBER 1993**

**Prepared For:**

**Chatfield Basin Authority  
Denver, Colorado**

**Prepared By:**

**Advanced Sciences, Inc.  
Lakewood, Colorado**

**First Quarter: May 25, 1993  
Second Quarter: August 10, 1993  
Third Quarter: October 27, 1993  
Final: February 16, 1994**

February 16, 1994

Mr. Timothy G. Grotheer  
Chair, Chatfield Basin Authority  
Plum Creek Wastewater Authority  
482 Happy Canyon Road  
Castle Rock, Colorado 80104

Subject: Water-Quality Monitoring Program, Chatfield Basin and Reservoir, Denver  
Metropolitan Area: Annual Basic-Data Report, January 1993-December 1993  
ASI Project No. 8969.30

Dear Mr. Grotheer:

The 1993 Annual Basic-Data Report is submitted in fulfillment of the subject program's contract requirements. The attached Tables 1 through 12 incorporate the field measurements and laboratory chemical data collected by Advanced Sciences, Inc. (ASI) and available to date in conjunction with the Chatfield Basin and Reservoir Monitoring Program (see Figures 1 and 2) for the January-through-December 1993 period. Chemical analyses were performed by ACZ Laboratories, Inc., Steamboat Springs, CO, and biological analyses were performed by the University of Colorado Limnological Center, Boulder, CO. A total of 11 duplicate samples were analyzed for chemical constituents in this year's program. Data related to the supplemental tributary surveys (sites 4A and 4B; Figure 3) for the 1993 calendar-year period are provided in Tables 16 and 17. These were provided by the Plum Creek Waste Water Authority (Ms. Becky McMullen, PCWA, written commun., December 14, 1993; pers. commun., January 19, 1994). No data were collected during 1993 for supplemental-tributary sites 2B, 3, and 4 (see ASI 1991 and 1992 Annual Basic-Data Reports, Tables 13, 14, and 15). Also, no data were collected during 1993 for sites 6, 6A, 6B, and 6C (see Figure 3) for the Bear Creek/West Plum Creek system previously monitored by Perry Park Water & Sanitation District (see 1992 Annual Basic-Data Report, Tables 18 through 21).

Regarding in-Reservoir monitoring, two sampling methods were used for chlorophyll-a analyses; the traditional method (mid-euphotic zone) used by your subcontractors, In-Situ and ASI since August 1987 and the recommended CDH method (2 m below water surface). In-Reservoir chlorophyll-a concentrations and phytoplankton-species numbers compatible with the historical sampling methodology are included with the chemical analyses (Tables 4 through 6). The detailed biological (phytoplankton-species) data for the July-through-September 1992 growing-season in-Reservoir surveys are included as Appendix A to this Annual Basic-Data Report. A comparison of chlorophyll-a results for the 2 sampling methods is given in Table A-1. Differences are judged to be random, and average chlorophyll-a concentrations are not significantly different for the 2 methods. Time-series plots for indicator in-Reservoir variables (total phosphorus, chlorophyll-a, and Secchi depth) are given in Figures 4 through 6. Comparison of growing-season average total-phosphorus versus chlorophyll-a concentrations are shown in Figure 7; note that the 1993 data point falls in the lower lefthand end of the historical-period

Mr. Timothy G. Grotheer  
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Page 2

cluster of data points. Time-series plots for 2 biological variables (*asterionella formosa* and *aphanizomenon flos-aquae*) as well as average total cells are provided in Figures 8 through 10, respectively. In addition, beginning in July 1993, in-Reservoir water-column indicator-quality profiles have been obtained; these profiles are given in both graphic and tabular forms (Appendix B).

As was our procedure last year, ASI in addition is providing on behalf of the Authority in this Annual Basic-Data Report relevant Chatfield data from other selected sources. Historical and recent data collected by the U.S. Army Corps of Engineers (COE) in the Chatfield Reservoir area are provided in Appendix C. Selected in-Reservoir data are for the period of record from July 1977 through August 1993 (Table C-1), and the supplemental STORET data retrieval for four COE sites was provided by the Colorado Department of Health (Bill McKee, CDH-WQCD, pers. commun., December 29, 1993). For comparison purposes, historical CDH data for Chatfield Reservoir collected during the mid-1980s are included in Appendix C (Tables C-X, C-Y, and C-Z). In addition, additional water-quality data sources have been provided by the Martin Marietta Astronautics Group (Mark Zitkus, written commun., February 4, 1994; Gary Parham, diskette and written commun., February 9, 1994; Robin Sandell, written commun., February 16, 1994) and Cooley Gravel Company (Rob Laird, written commun., February 14, 1994); these data are provided in Appendices D and E, respectively. No recent data have been collected by the Denver Water Department (DWD) (Steve Lohman, DWD, pers. commun., January 19, 1994).

ASI appreciates having the opportunity to provide the Chatfield Basin Authority with continuing water-quality monitoring and data-compilation services. This Annual Basic-Data Report constitutes the final deliverable under our 1992 calendar-year contract. As of mid-January 1994, we are proceeding under your letter authorization for continuing monitoring and reporting services for 1994. If you have any questions, or need additional information, please give us a call.

Yours truly,

Timothy D. Steele, Ph.D.  
Project Manager and Manager,  
Water-Resources/Physical-Sciences Department

Reviewed by: \_\_\_\_\_  
Tyler D. Smart, P.E.  
Senior Water-Resources Engineer

Distribution - See following page.

Attachments - Monitoring Site Locations Figures 1, 2, and 3  
- Water-Quality Basic Data Tables 1 through 12 and 16 and 17,  
January - December 1993  
- Appendices A and B, Additional ASI 1993 in-Reservoir Data  
- Appendices C through E, Outside Data Sources (COE/CDH, MM, CGC)  
Separate Volume: Supplemental Data (Appendices D and E) - Limited Distribution (2 copies)

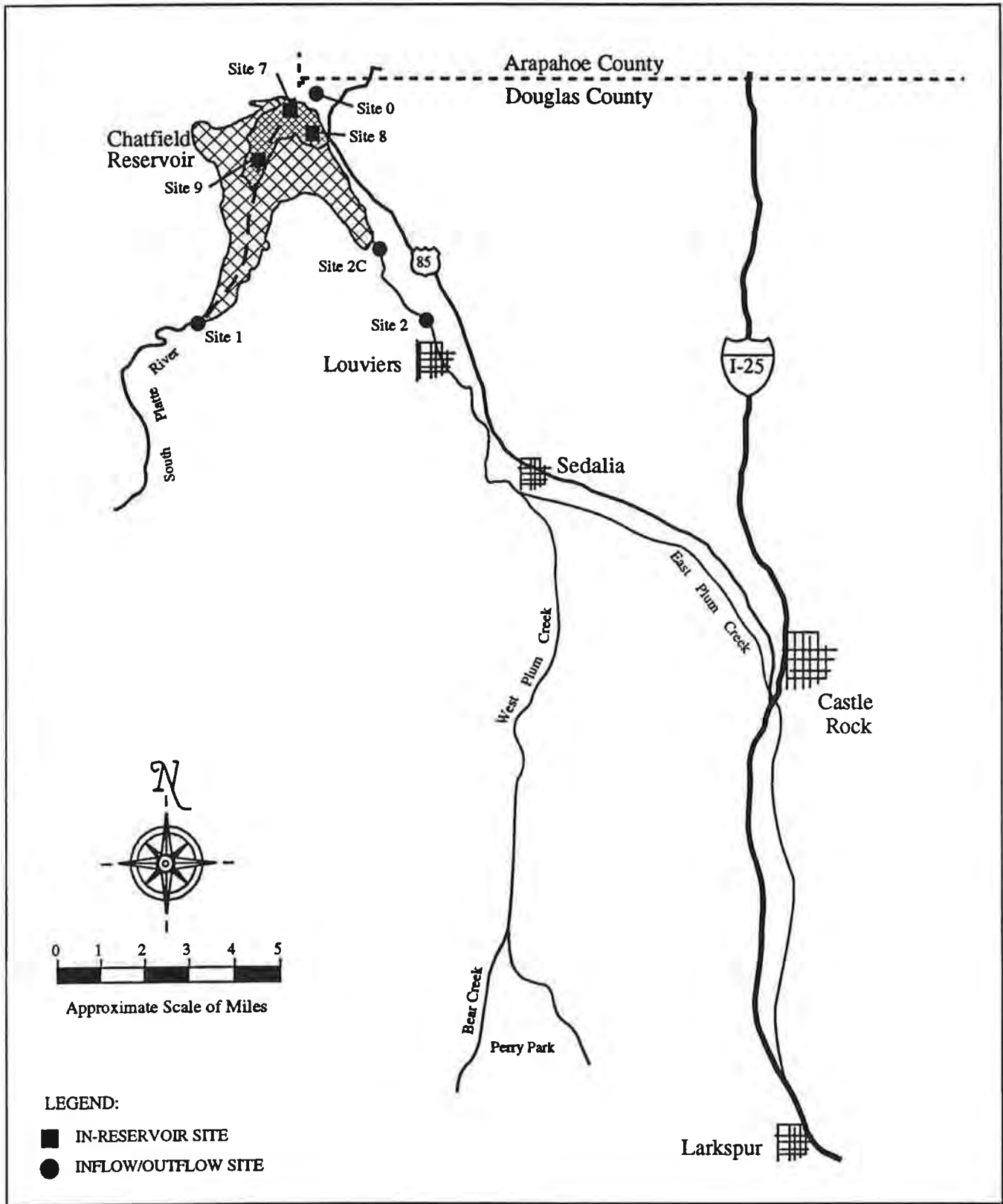
Mr. Timothy G. Grotheer  
February 16, 1994  
Page 3

Distribution:

cc: Denver Regional Council of Governments 2480 West 26th Avenue, Suite 200B Denver, Colorado 80211 Attn: Mr. Larry G. Mugler Mr. Russell N. Clayschulte	Martin Marietta Astronautics Group P.O. Box 179 Denver, Colorado 80201 Attn: Ms. Robin Sandell Mr. Gary Parham
Centennial Water & Sanitation District 62 West Plaza Drive Highlands Ranch, Colorado 80126 Attn: Mrs. Roberta Rivers	Woodward-Clyde Consultants Stanford Place 3, Suite 1000 4582 South Ulster Street Parkway Denver, Colorado 80237 Attn: Dr. Keith Little, P.E.
Holly I. Holder, P.C. 518 Seventeenth Street, Suite 1560 Denver, Colorado 80202 Attn: Ms. Holly I. Holder, Esq.	Douglas County Planning Division 118 Third Street Castle Rock, Colorado 80104 Attn: Mr. Donald Moore AICP
Perry Park Water and Sanitation District 5657 West Red Rock Drive Larkspur, Colorado 80118 Attn: Ms. Bev Carson	Tri-County Health Department 7000 East Belleview Avenue, Suite 301 Englewood, Colorado 80111-1628 Attn: Mr. Warren S. Brown, P.E.
Jefferson County Attorney's Office 100 Jefferson County Parkway Golden, Colorado 80419 Attn: Ms. Jeannie Rossilon	Denver Water Department 1600 West 12th Avenue Denver, CO 80254 Attn: Mr. Steve Lohman
ECC Construction Materials America, Inc. (Cooley Sand and Gravel) Support Services Group - Denver Region 3609 S. Wadsworth Blvd., Suite 300 Lakewood, CO 80235 Attn: Ms. Sherry Ference, Dir., Reg. Affairs Mr. Rob Laird	U.S. Army Corps of Engineers, CEMRO-ED-HF 215 N. 17th Street Omaha, NE 68102-4978 Attn: Dr. John L. Andersen Mr. Tom Curran



## **FIGURES**



**INFLOW/OUTFLOW AND IN-RESERVOIR  
MONITORING LOCATIONS**

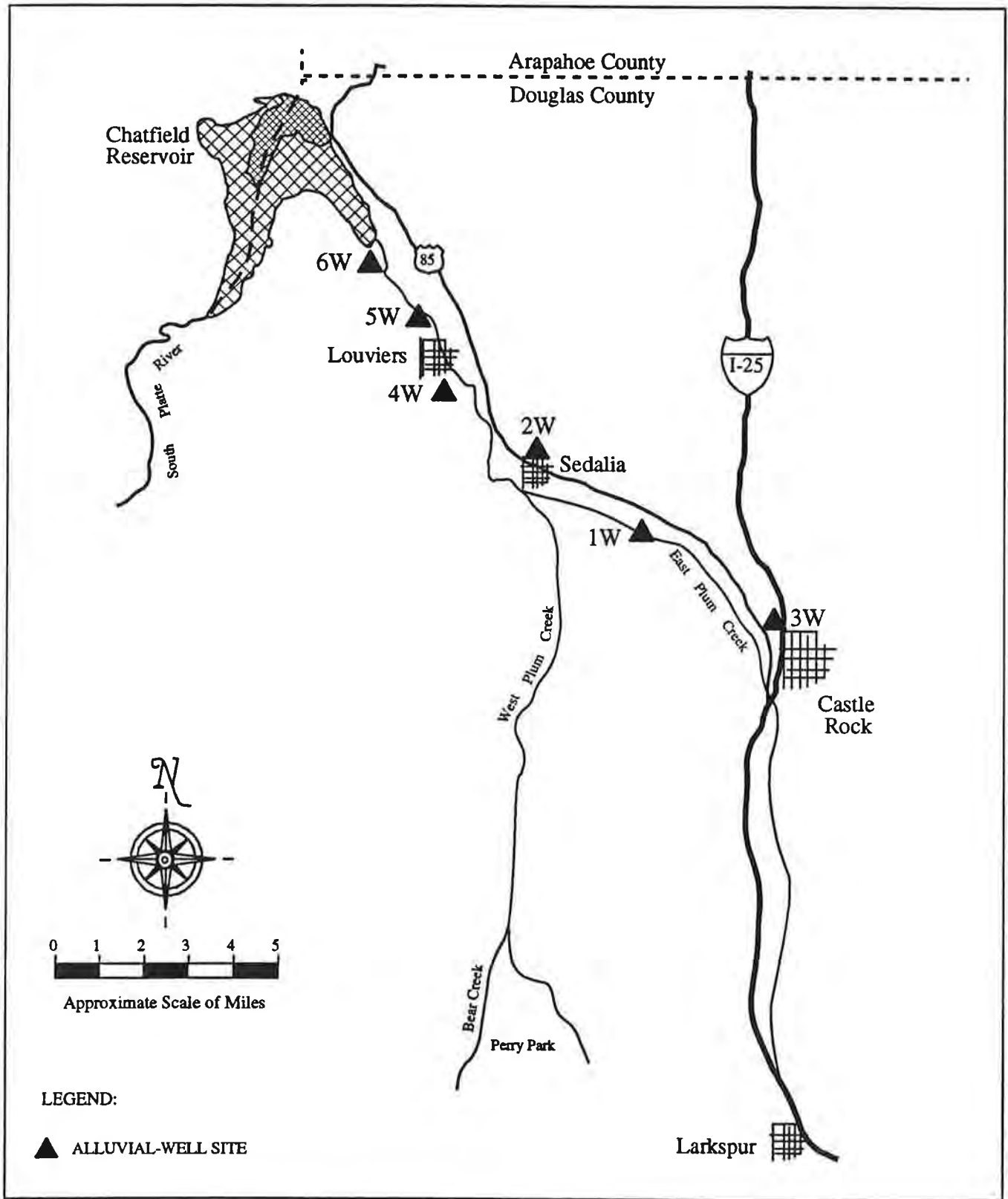
**CHATFIELD BASIN AND RESERVOIR  
WATER-QUALITY MONITORING PROGRAM**

PROJECT NO. 8969.30

**FIGURE 1**







**ALLUVIAL-WELL  
MONITORING LOCATIONS**

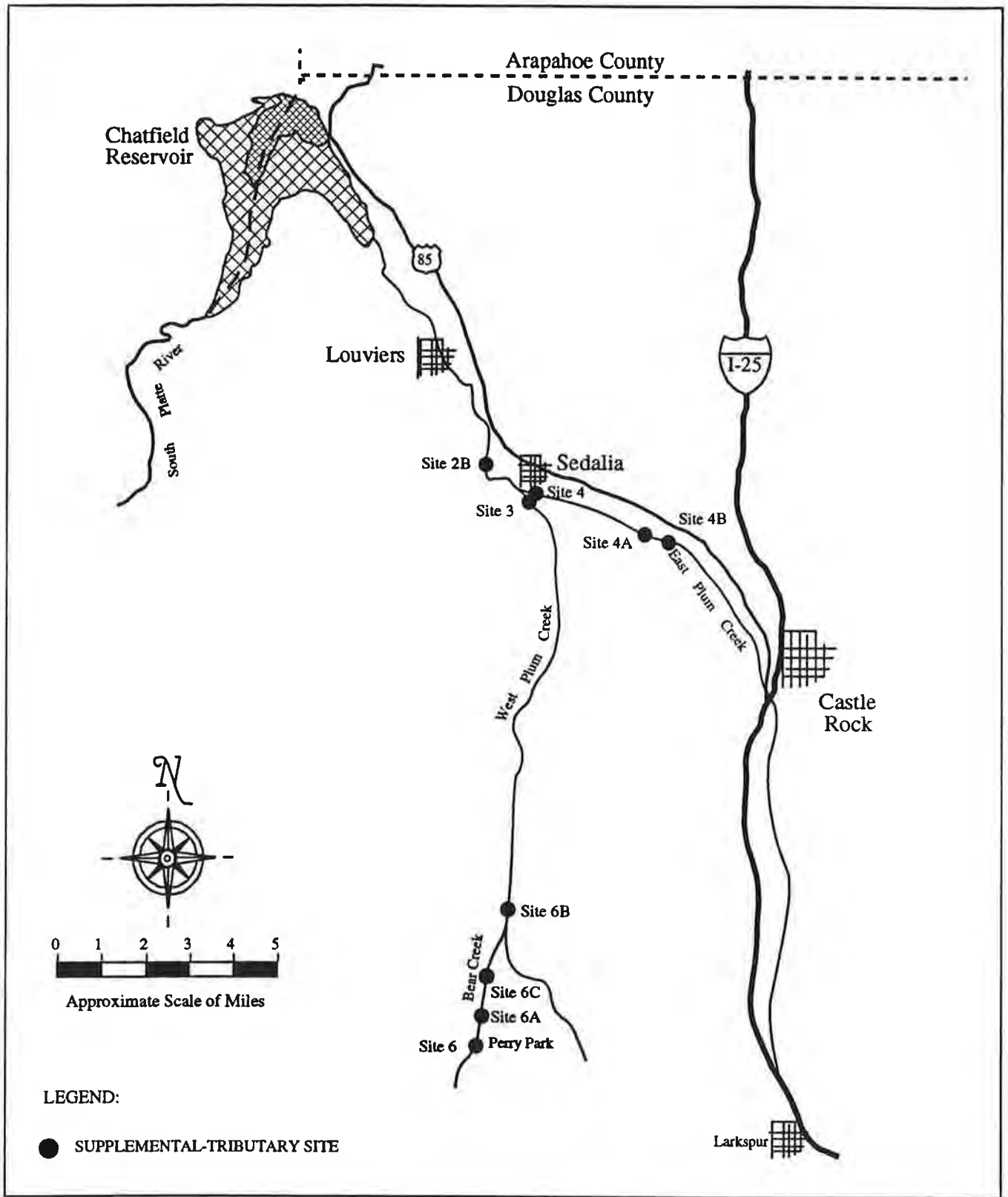
**CHATFIELD BASIN AND RESERVOIR  
WATER-QUALITY MONITORING PROGRAM**

PROJECT NO. 8969.30

**FIGURE 2**

Status: 1/21/94





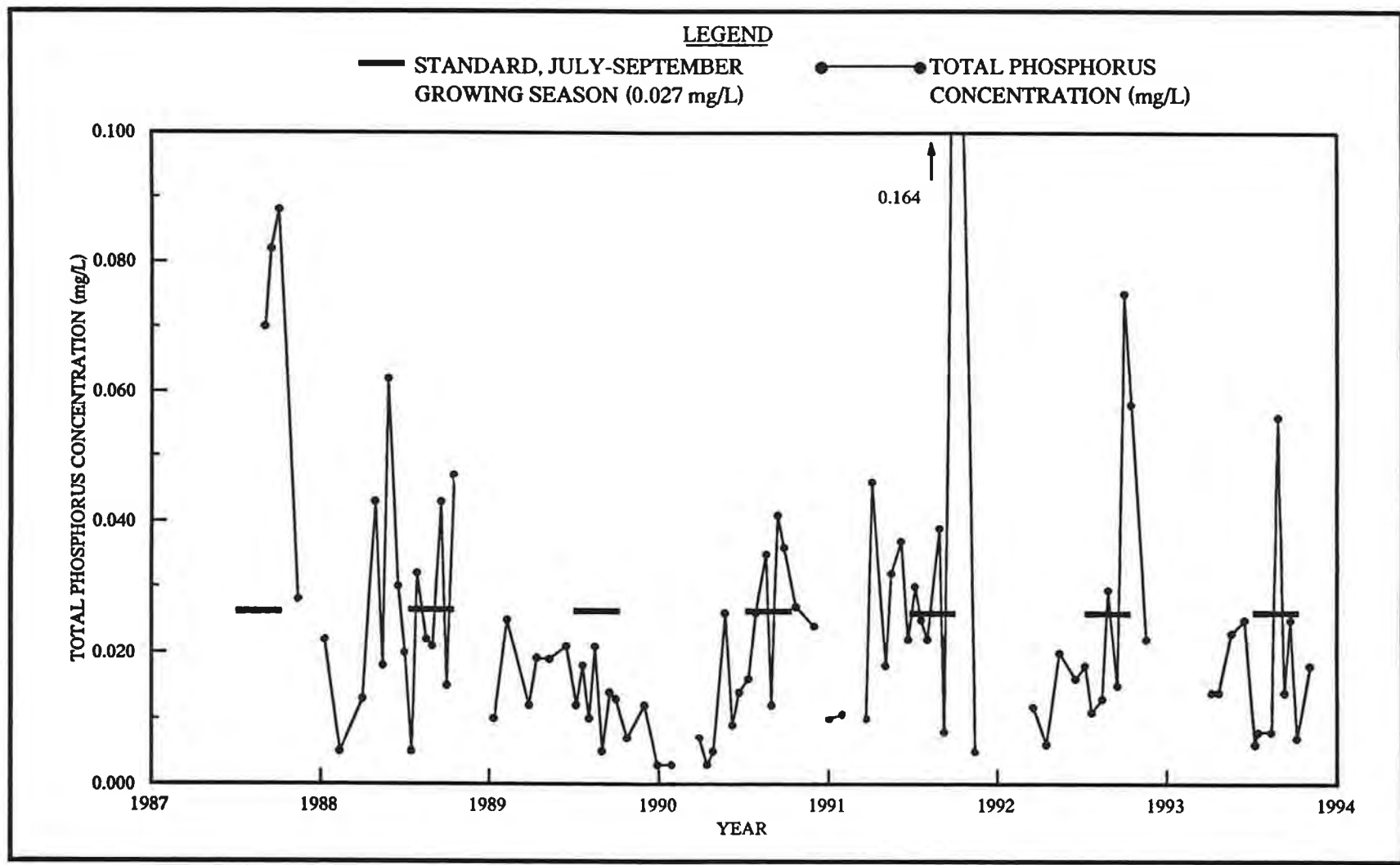
**MONITORING LOCATIONS  
SUPPLEMENTAL-TRIBUTARY**



**CHATFIELD BASIN AND RESERVOIR  
WATER-QUALITY MONITORING PROGRAM**

PROJECT NO. 8969.30

**FIGURE 3**



**TIME SERIES OF AVERAGE TOTAL PHOSPHORUS CONCENTRATION  
CHATFIELD RESERVOIR 1987 - 1993**



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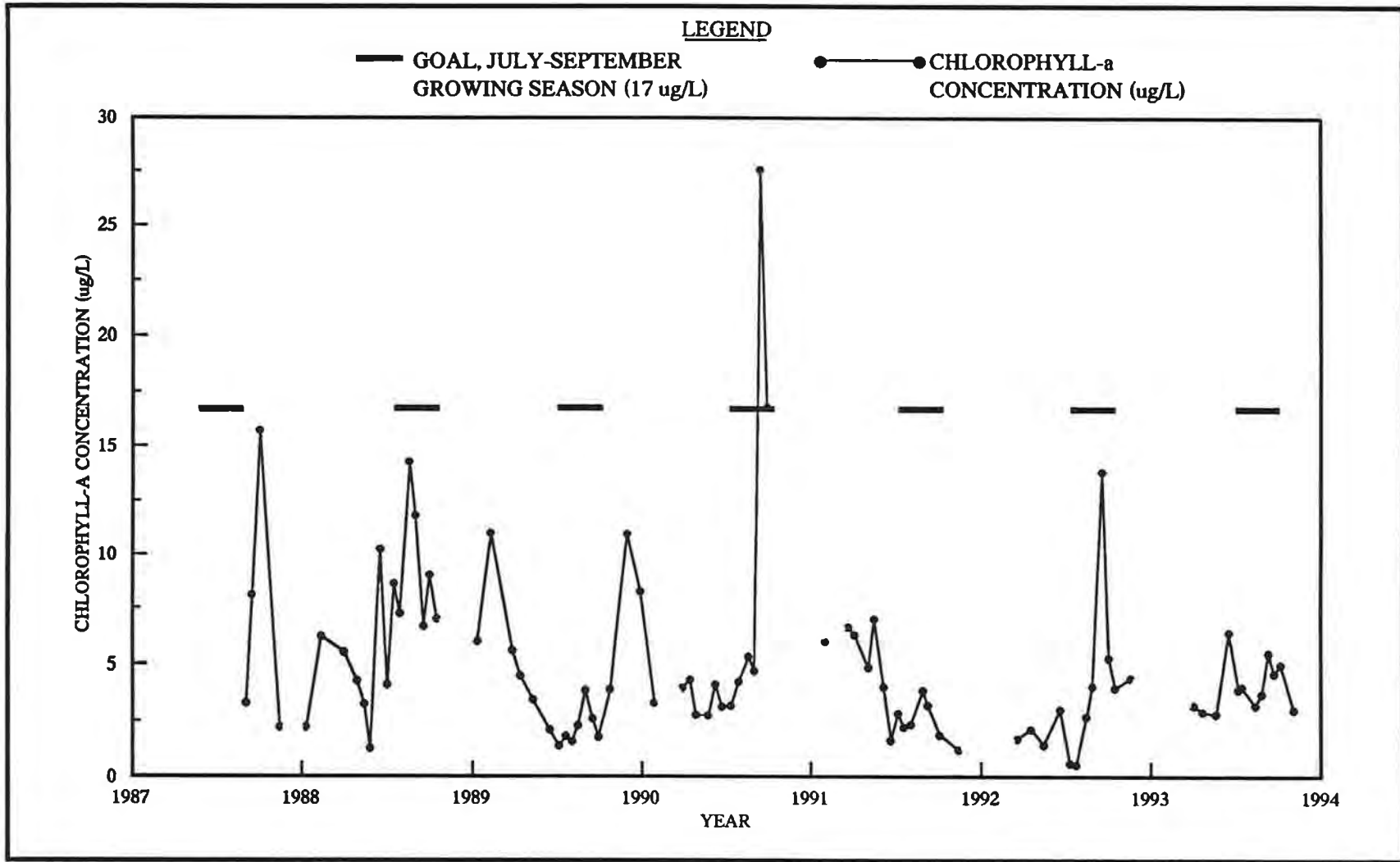
File: CHATFIG4.DRW

**CHATFIELD BASIN AND RESERVOIR  
WATER-QUALITY MONITORING PROGRAM**

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**Figure 4**

Status: 1/21/94



**TIME SERIES OF AVERAGE CHLOROPHYLL-a CONCENTRATION  
CHATFIELD RESERVOIR 1987 - 1993**

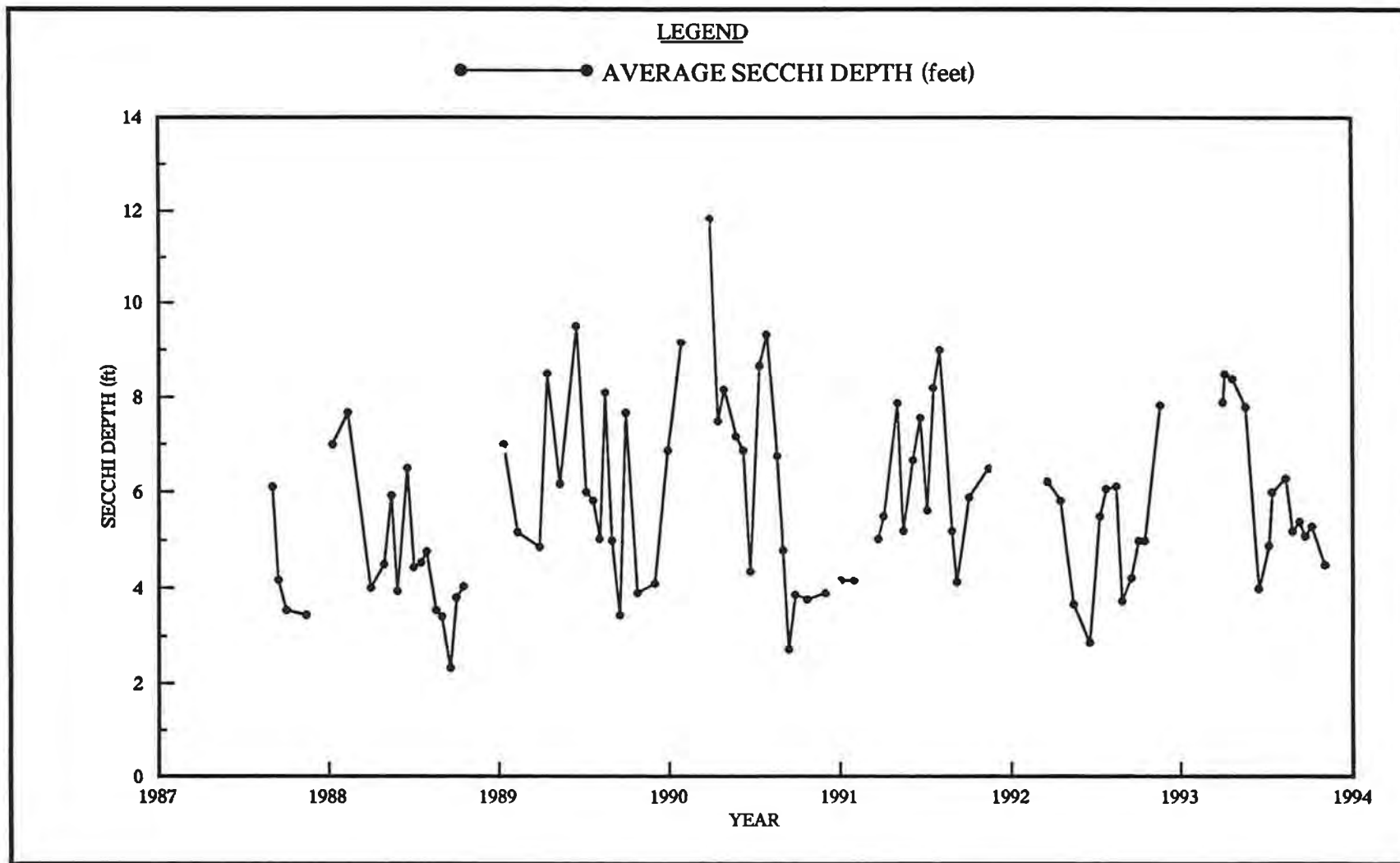


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**CHATFIELD BASIN AND RESERVOIR  
WATER-QUALITY MONITORING PROGRAM**

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**Figure 5**



**TIME SERIES OF AVERAGE SECCHI DEPTH  
CHATFIELD RESERVOIR 1987 - 1993**

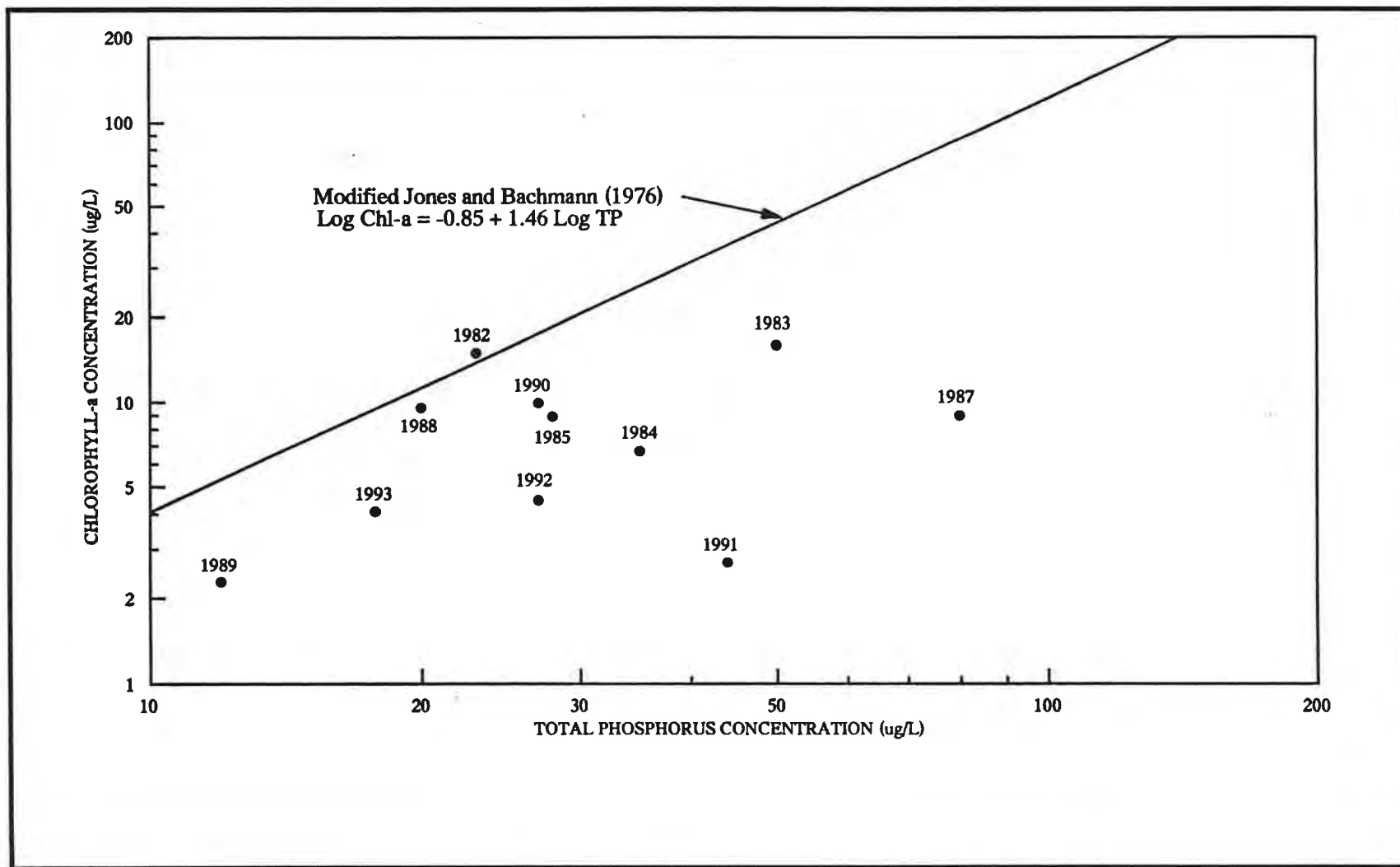


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WATER-QUALITY MONITORING PROGRAM**

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**Figure 6**



JULY THROUGH SEPTEMBER VALUES OF CHLOROPHYLL-a vs. TOTAL PHOSPHORUS  
 CHATFIELD RESERVOIR 1982 - 1993

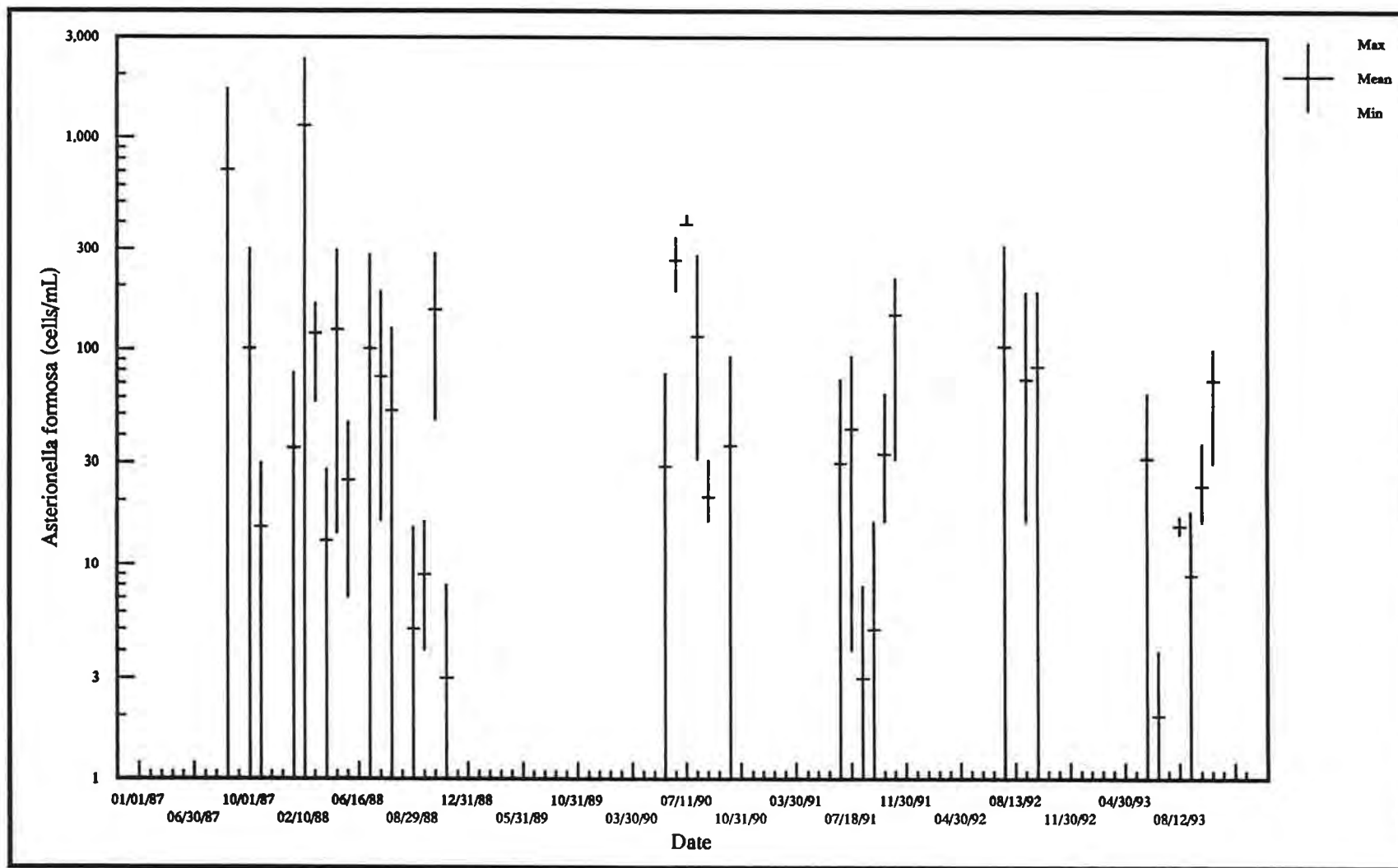


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CHATFIELD BASIN AND RESERVOIR  
 WATER-QUALITY MONITORING PROGRAM

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Figure 7



TIME SERIES OF MAXIMUM, MINIMUM, AND AVERAGE ASTERIONELLA FORMOSA  
CHATFIELD RESERVOIR 1987 - 1993



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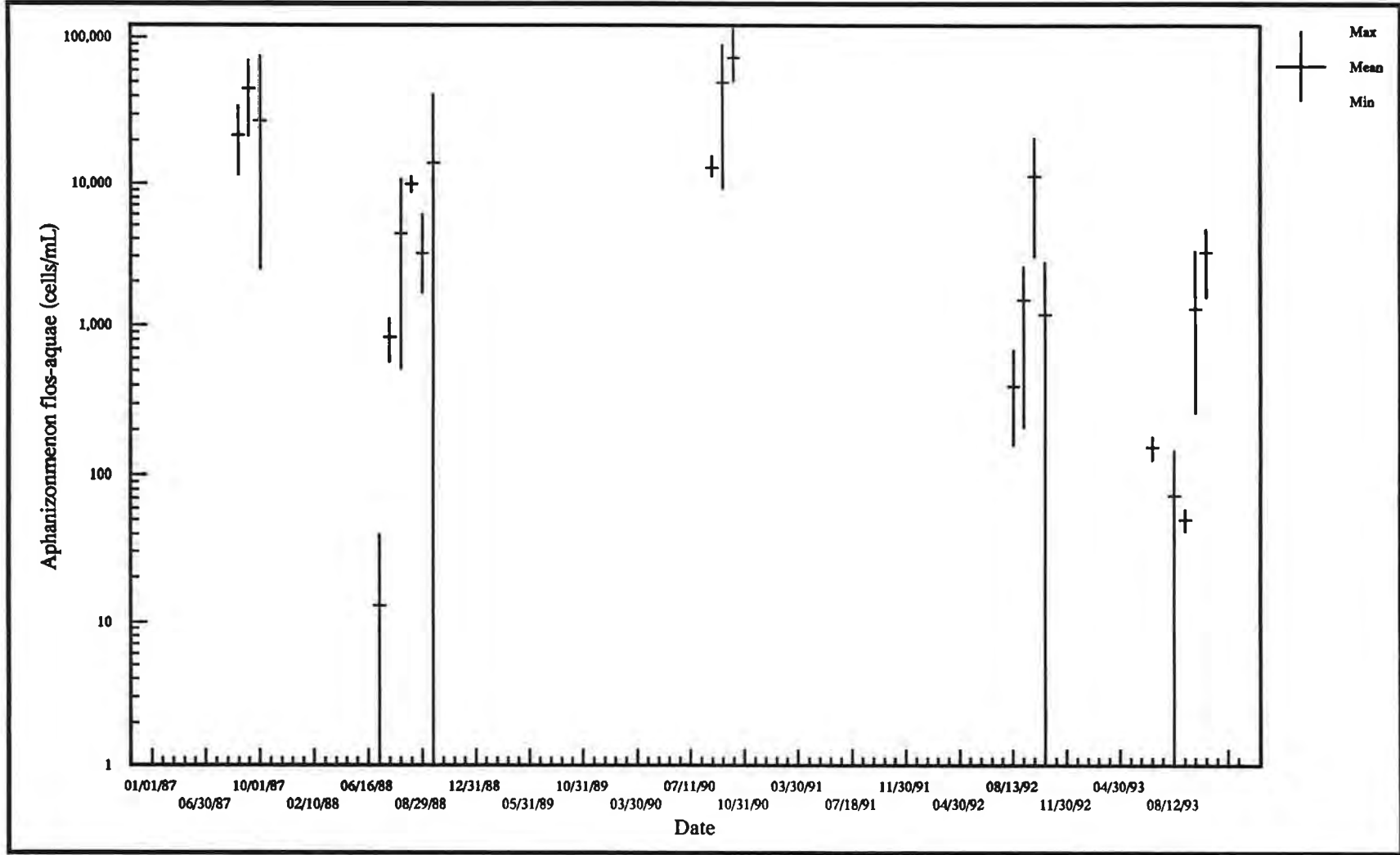
File: CHATFIG8.DRW

CHATFIELD BASIN  
MONITORING PROGRAM

Project No. 8969.30

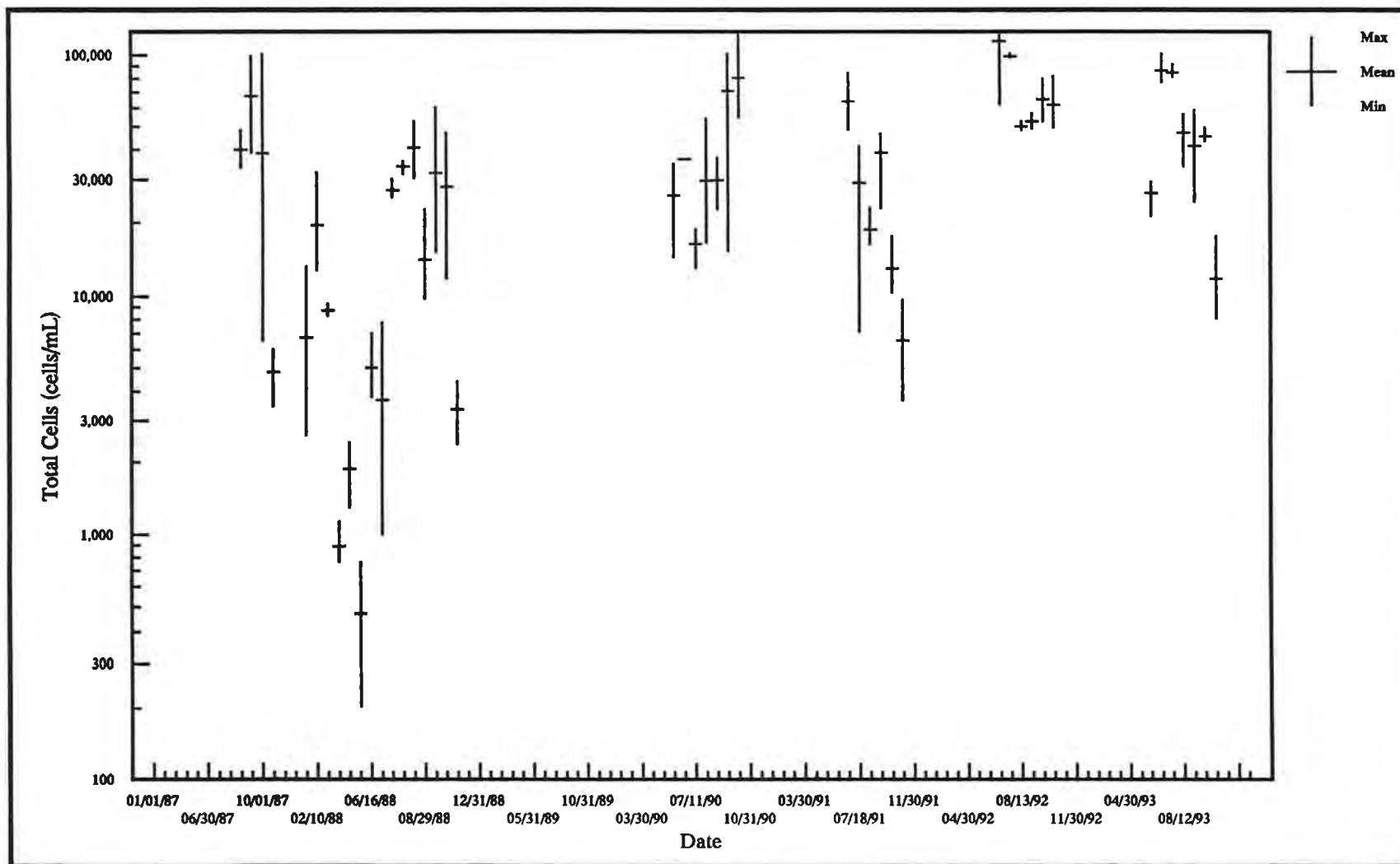
Figure 8

Status: 1/21/94



TIME SERIES OF MAXIMUM, MINIMUM, AND AVERAGE APHANIZOMENON FLOS-AQUAE CHATFIELD RESERVOIR 1987 - 1993





TIME SERIES OF MAXIMUM, MINIMUM, AND AVERAGE TOTAL CELLS  
CHATFIELD RESERVOIR 1987 - 1993



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CHATFIELD BASIN  
MONITORING PROGRAM

Project No. 8969.30

Figure 10

Status: 1/21/94



## **BASIC-DATA TABLES**

TABLE 1  
06709601 CHATFIELD RESERVOIR OUTFLOW NEAR LITTLETON, CO. (SITE 0)  
WATER-QUALITY DATA

DATE	TIME	TEMPER- ATURE (DEG C)	INSTAN- TANEOUS STREAM- FLOW (CFS)	SPE- CIFIC CON- DUC- TANCE FIELD (US/CM)	OXYGEN, DIS- SOLVED (MG/L)	PH FIELD (STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, NITRITE TOTAL (MG/L AS N)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, TOTAL KJELDL (MG/L AS N)	PHOS- PHATE, TOTAL (MG/L AS P)
20-Jan-93	1305	8.0	60 <sup>1)</sup>	240	10.0	7.3		0.13	-0.01	0.16		
20-Jan-93	9999	8.0		240	10.0	7.3		0.07	-0.01	0.16		
17-Feb-93	1350	5.0	52	170	10.6	6.5		-0.05	-0.01	0.24		
01-Apr-93	820	7.0	102	220	9.8	6.5						
05-Apr-93	1540	8.0	59	210	9.6	6.8		0.06	-0.01	0.10		
21-Apr-93	930	11.0	55	290	8.6	7.2		0.05	-0.01	0.08		
19-May-93	1200	15.0	438	270	8.6	8.2		0.05	-0.01	0.05		
16-Jun-93	1430	17.5	100	350	9.6	7.4		0.11	-0.01	0.06		
07-Jul-93	1010	18.5	122	310	9.3	7.8		0.08	-0.01	0.09		
12-Aug-93	1240	20.0	80	310	7.9	7.9		0.08	-0.01	0.02		
26-Aug-93	1245	19.5	55	310	7.8	8.1		0.11	-0.01	-0.02		
10-Sep-93	745	17.5	26	310	7.7	8.2		0.06	-0.01	-0.02		
06-Oct-93	1130	15.5	8.5	305	8.4	8.2	0.2	0.07	-0.01	-0.02		
01-Nov-93	950	9.0	1.5	312	8.6	7.3		0.11	-0.01	0.03		
30-Nov-93	1030	4.0	26	240	14.6	8.0		-0.05	-0.01	0.05		

STREAMFLOW DATA SOURCE: U.S.ARMY COE (TOM CURRAN, WRITTEN COMMUN., JANUARY 21, 1993)

TABLE 1  
06709601 CHATFIELD RESERVOIR OUTFLOW NEAR LITTLETON, CO. (SITE 0)  
WATER-QUALITY DATA

DATE	TIME	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	SOLIDS, RESIDUE AT 105 DEG. C, SUS- PENDED (MG/L)	SUS- PENDED SEDI- MENT (MG/L)	LABOR- ATORY SAMPLE NUMBER
20-Jan-93	1305	0.012			-0.005		-2	457
20-Jan-93	9999	0.012			-0.005		-2	459
17-Feb-93	1350	0.016			-0.005		-2	1249
01-Apr-93	820							#
05-Apr-93	1540	0.012			-0.005		-4	2826
21-Apr-93	930	0.009			0.009		-4	3737
19-May-93	1200	0.014			-0.005		5	4956
16-Jun-93	1430	0.017			-0.005		12	6213
07-Jul-93	1010	0.008			-0.005		11	7110
12-Aug-93	1240	-0.005			-0.005		5	8451
26-Aug-93	1245	0.017			0.013		6	8861
10-Sep-93	745	0.011			-0.005		4	9404
06-Oct-93	1130	-0.005			-0.005		6	10361
01-Nov-93	950	-0.005			-0.005		3	11247
30-Nov-93	1030	0.030			0.013		4	12060

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME=9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.

# = SAMPLE LOST IN SHIPMENT TO COMMERCIAL LABORATORY.

STATE OF COLORADO  
DIVISION OF WATER RESOURCES  
OFFICE OF STATE ENGINEER

STA NO. 06708000

SOUTH PLATTE RIVER AT WATERTON, CO.

PROCESS DATE:

21-JAN-1994 10:39

PLAWMTC008 USED FROM 01-OCT-1992 TO 30-SEP-1993

DISCHARGE, IN CFS, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	31	33	41	---	---	---	40	38	61	297	61	110
2	32	34	39	---	---	---	56	37	62	394	63	74
3	31	36	37	---	---	---	46	36	155	389	63	68
4	31	36	30	---	---	---	42	45	229	363	64	72
5	31	34	41	---	---	---	41	36	99	383	63	72
6	32	34	41	---	---	36	42	36	54	270	65	70
7	32	33	41	---	---	34	42	37	53	148	63	72
8	32	32	39	---	---	34	41	30	100	394	61	70
9	32	32	39	---	---	36	41	42	218	333	59	70
10	32	31	39	---	---	36	41	40	280	302	62	72
11	32	34	38	---	---	36	41	40	251	307	61	71
12	31	36	37	---	---	34	41	39	168	398	66	70
13	34	36	39	---	---	34	36	40	145	313	64	73
14	36	36	46	---	---	32	32	37	190	211	62	72
15	31	34	---	---	---	33	32	58	226	77	60	68
16	31	39	---	---	---	32	34	62	166	166	70	50
17	32	40	---	---	---	32	35	109	209	72	70	34
18	32	37	---	---	---	32	34	165	500	67	68	32
19	32	38	---	---	---	32	35	67	431	75	64	32
20	46	37	---	---	---	32	36	67	291	75	71	36
21	33	39	---	---	---	32	35	75	263	77	69	57
22	31	39	---	---	---	32	42	75	217	162	97	41
23	35	39	---	---	---	32	36	69	141	205	123	41
24	33	37	---	---	---	33	37	65	106	129	101	44
25	34	37	---	---	---	34	37	66	141	70	125	43
26	35	62	---	---	---	32	37	65	88	67	85	43
27	37	59	---	---	---	32	37	63	85	66	80	47
28	40	73	---	---	---	33	37	63	85	63	77	53
29	40	62	---	---	---	33	37	63	85	62	80	52
30	37	48	---	---	---	35	37	61	123	72	114	47
31	36	---	---	---	---	34	---	61	---	67	141	---
TOTAL	1044	1197	---	---	---	---	1160	1051	5304	6080	2312	1756
MEAN	33.7	39.9	---	---	---	---	38.7	59.7	177	196	76.5	58.5
AC-FT	2070	2370	---	---	---	---	2300	3670	10520	12060	4700	3460
MAX	46	73	---	---	---	---	56	169	500	398	141	110
MIN	31	31	---	---	---	---	32	36	53	62	59	32
CAL YR 1992 TOTAL	22630	MEAN	61.8	MAX	402	MIN	23	AC-FT	44890			
WTR YR 1993 TOTAL	20764	MEAN	56.9	MAX	500	MIN	31	AC-FT	41190			

MAX DISCH 11967 CFS AT 1810 02-APR-1993 GH 8.45 FT. SHIFT 0.02 FT. MAX GH 8.45 FT. AT 1810 02-APR-1993 FOR MORE COMPLETE OR DETAILED INFORMATION SEE DAILY OR MONTHLY RECORD.

11-1-94 = 47.90  
11-30-94 = 47.90

Tim,

Permit but should be real close. Any questions  
Call me

Wane

**TABLE 2**  
**06708000 SOUTH PLATTE RIVER AT WATERTON, CO (SITE 1)**  
**WATER-QUALITY DATA**

DATE	TIME	TEMPER- ATURE (DEG C)	INSTAN- TANEOUS STREAM- FLOW (CFS)	SPE- CIFIC CON- DUC- TANCE FIELD (US/CM)	OXYGEN, DIS- SOLVED (MG/L)	PH FIELD (STAND- ARD UNITS)	PH LAB STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, NITRITE TOTAL (MG/L AS N)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, TOTAL KJEDL. (MG/L AS N)
20-Jan-93	1600	1.0	35 <sup>1)</sup>	180	11.2	7.4			-0.05	-0.01	0.14	
17-Feb-93	1330	0.0	35	210	9.4	7.1			0.05	-0.01	0.15	
01-Apr-93	835	7.0	40	200	9.6	8.2			0.07	-0.01	0.13	
05-Apr-93	1600	7.0	41	200	8.2	7.2			-0.05	-0.01	0.10	
09-Apr-93	1100	9.0	41	190	9.2	8.1			0.08	-0.01	0.09	
14-Apr-93	1050	8.0	32	180	11.2	7.1			0.05	-0.01	0.08	
21-Apr-93	1205	13.0	35	230	9.6	7.6			-0.05	-0.01	0.08	
28-Apr-93	940	12.0	37	230	10.4	8.5			-0.05	-0.01	-0.02	
05-May-93	1320	12.0	36	310	11.4	7.9			-0.05	-0.01	0.03	
12-May-93	1400	13.0	39	240	11.2	8.2			-0.05	-0.01	-0.02	
18-May-93	1000	8.5	165	220	10.2	8.4			-0.05	-0.01	-0.02	
26-May-93	1505	15.0	65	190	9.0	8.4			0.05	-0.01	0.05	
02-Jun-93	1050	14.0	62	150	9.2	8.2			-0.05	-0.01	0.05	
02-Jun-93	9999								0.37	-0.01	0.06	
09-Jun-93	830	11.0	218	210	11.9	7.7			0.10	-0.01	0.12	
16-Jun-93	1415	11.5	168	240	11.9	7.8			0.09	-0.01	0.13	
23-Jun-93	1030	14.0	141	140	9.4	8.0			0.05	-0.01	0.10	
07-Jul-93	1320	14.5	148	240	11.8	7.3			0.07	-0.01	0.11	
12-Aug-93	1010	15.5	66	230	11.3	8.1			-0.05	-0.01	0.15	
26-Aug-93	1230	14.5	85	250	9.7	7.7			0.08	-0.01	0.20	
10-Sep-93	1050	13.5	72	240	9.5	8.2			-0.05	-0.01	0.11	
06-Oct-93	1150	12.0		245	9.7	8.3		0.2	0.06	-0.01	0.10	
06-Oct-93	9999								0.07	-0.01	0.11	
01-Nov-93	1010	5.5		332 <sup>2)</sup>	6.6	7.8			0.15	-0.01	-0.02	
30-Nov-93	1100	4.0		250	14.5	8.2			-0.05	-0.01	0.08	

- 1) COLORADO STATE ENGINEERS OFFICE (PROVISIONAL DAILY STREAMFLOW DATA).  
2) 340 UMHOS/CM., SC-METER QA/QC CHECK.



TABLE 2  
06708000 SOUTH PLATTE RIVER AT WATERTON, CO (SITE 1)  
WATER-QUALITY DATA

DATE	TIME	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	SOLIDS, RESIDUE AT 105 DEG. C, SUS- PENDED (MG/L)	SUS- PENDED SEDI- MENT (MG/L)	LABOR- ATORY SAMPLE NUMBER
20-Jan-93	1600	0.012			-0.005		-2	456
17-Feb-93	1330	-0.005			-0.005		-2	1248
01-Apr-93	835	0.009			0.006		2	2757
05-Apr-93	1600	-0.005			-0.005		-4	2827
09-Apr-93	1100	0.020			-0.005		1420	2930
14-Apr-93	1050	0.006			-0.005		-2	3077
21-Apr-93	1205	0.807			0.006		4	3739
28-Apr-93	940	0.014			0.015		-2	4085
05-May-93	1320	0.014			-0.005		-2	4323
12-May-93	1400	0.024			-0.005		4	4591
18-May-93	1000	0.014			-0.005		62	4896
26-May-93	1505	0.022			-0.005		5	5205
02-Jun-93	1050	0.016			-0.005		5	5515
02-Jun-93	9999	0.013			-0.005		4	5517
09-Jun-93	830	0.016			-0.005		5	5969
16-Jun-93	1415	0.008			-0.005		3	6211
23-Jun-93	1030	0.010			-0.005		6	6593
07-Jul-93	1320	-0.005			-0.005		3	7109
12-Aug-93	1010	0.020			-0.005		-2	8450
26-Aug-93	1230	0.009			0.008		-2	8860
10-Sep-93	1050	0.015			0.015		1	9405
06-Oct-93	1150	-0.005			-0.005		-2	10362
06-Oct-93	9999	-0.005			-0.005		-2	10363
01-Nov-93	1010	-0.005			-0.005		-2	11249
30-Nov-93	1100	0.025			0.013		-2	12061

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME=9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.



UNITED STATES DEPARTMENT OF THE INTERIOR - GEOLOGICAL SURVEY - CO DATA

02/02/94

STATION NUMBER 06709530 PLUM CREEK AT TITAN RD NR LOUVIERS, CO STREAM SOURCE AGENCY USGS  
 LATITUDE 393027 LONGITUDE 1050125 DRAINAGE AREA 0.00 DATUM 5535.00 STATE 08 COUNTY 035  
 PROVISIONAL DATA SUBJECT TO REVISION  
 DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993  
 DAILY MEAN VALUES

DRAFT

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.87	22	15	15	16	15	24	40	19	.07	.00	.00
2	.79	21	14	14	10	18	25	42	14	.00	.00	.00
3	.04	26	13	17	7.0	17	43	50	14	.00	.00	.00
4	.00	19	13	16	7.2	14	36	59	13	.00	.00	.00
5	.12	19	12	20	7.4	17	38	61	12	.00	.00	.00
6	1.6	18	11	20	7.6	16	48	40	13	.00	.00	.00
7	4.2	25	11	20	7.8	13	65	34	8.5	.00	.00	.00
8	4.8	19	10	17	6.4	12	61	35	11	.00	.00	.00
9	5.2	18	11	14	19	13	62	30	11	.00	.00	.00
10	5.3	19	12	12	16	13	72	28	10	.00	.00	.00
11	5.7	24	11	20	14	13	67	33	9.5	.00	.00	.00
12	5.6	14	14	23	15	14	69	28	6.7	.00	.00	.00
13	5.9	14	15	25	16	16	69	25	4.9	.00	.00	.00
14	7.7	16	15	23	17	20	56	30	4.8	.00	.00	.00
15	11	17	16	20	18	13	49	27	3.0	.00	.00	.00
16	8.3	15	17	17	17	20	56	38	2.3	.00	.00	.00
17	8.0	12	15	16	19	20	52	46	9.3	.00	.00	.00
18	7.3	13	17	16	20	13	54	46	17	.00	.00	.00
19	8.4	13	12	16	20	8.4	47	36	25	.00	.00	.00
20	6.8	19	10	16	20	6.0	56	38	15	.00	.00	.00
21	6.6	18	11	16	19	13	58	30	19	.00	.00	.00
22	7.3	17	10	16	18	15	44	33	12	.00	.00	.00
23	7.3	16	7.6	16	17	14	41	35	10	.00	.00	.00
24	5.3	16	14	17	16	19	41	26	9.4	.00	.00	.00
25	5.0	16	20	18	16	15	32	29	5.7	.00	.00	.00
26	8.9	16	22	20	16	13	30	23	3.9	.00	.00	.00
27	9.1	17	20	22	16	10	31	18	5.0	.00	.00	.00
28	8.8	17	20	20	16	15	31	25	4.0	.00	.00	.00
29	8.7	17	20	18	---	18	35	25	2.0	.00	.00	.00
30	9.1	16	16	14	---	18	34	23	.26	.00	.00	.00
31	15	---	13	18	---	22	---	22	---	.00	.00	.00
TOTAL	188.72	529	437.6	552	414.4	463.4	1426	1055	294.26	0.07	0.00	0.00
MEAN	6.09	17.6	14.1	17.8	14.8	14.9	47.5	34.0	9.81	.002	.000	.000
MAX	15	26	22	25	20	22	72	61	25	.07	.00	.00
MIN	.00	12	7.6	12	6.4	6.0	24	18	.26	.00	.00	.00
AC-FT	374	1050	868	1090	822	919	2820	2090	584	.1	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1993, BY WATER YEAR (WY)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993		
MEAN	16.3	20.8	16.3	14.7	19.5	32.9	71.5	181	49.1	15.2	15.4	7.20
MAX	71.8	75.9	44.3	29.7	42.7	62.1	126	779	135	45.4	63.4	31.1
(WY)	1985	1985	1985	1985	1988	1988	1987	1984	1984	1984	1984	1984
MIN	.48	5.16	6.30	4.86	5.14	14.9	23.2	10.4	5.89	.002	.000	.000
(WY)	1992	1990	1991	1991	1990	1993	1989	1989	1990	1993	1993	1990

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR	FOR 1993 WATER YEAR	WATER YEARS 1984 - 1993
ANNUAL TOTAL	9209.95	5360.45	31.1
ANNUAL MEAN	25.2	14.7	68.3
HIGHEST ANNUAL MEAN			8.66
LOWEST ANNUAL MEAN			1770
HIGHEST DAILY MEAN	327 Apr 18	72 Apr 10	May 15 1984

P.02  
 99801206  
 TO  
 FROM USGS  
 10:09  
 FEB-02-1994

**TABLE 3**  
**06709530 PLUM CREEK AT TITAN ROAD NEAR LOUVIERS, CO. (SITE 2)**  
**WATER-QUALITY DATA**

DATE	TIME	TEMPER- ATURE (DEG C)	INSTAN- TANEOUS STREAM- FLOW (CFS)	SPE- CIFIC CON- DUC- TANCE FIELD (US/CM)	OXYGEN, DIS- SOLVED (MG/L)	PH FIELD (STAND- ARD UNITS)	PH LAB (STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, NITRITE TOTAL (MG/L AS N)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, TOTAL KJELD. (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)
20-Jan-93	1335	2.0	16 <sup>1)</sup>	240	11.0	7.3		0.22	0.02		1.32		0.062
17-Feb-93	1305	1.0	19	210	10.4	7.1		-0.05	-0.01		0.82		0.034
01-Apr-93	850	12.5	24	240	8.4	7.1							
05-Apr-93	1630	11.0	38	230	8.2	7.2		0.05	0.02		0.17		0.132
09-Apr-93	1120	13.0	62	235	8.0	8.0		0.08	0.02		0.46		0.140
14-Apr-93	1115	13.5	56	260	7.8	6.8		0.05	-0.01		0.15		0.080
21-Apr-93	1145	15.5	58	300	9.2	7.3		0.09	-0.01		0.17		0.057
28-Apr-93	1000	15.0	31	210	9.6	8.3		-0.05	-0.01		0.29		0.105
28-Apr-93	9999							-0.05	-0.01		0.29		0.104
05-May-93	1410	18.5	61	220	9.7	7.6		0.06	-0.01		0.12		0.114
12-May-93	1420	20.0	28	230	8.8	7.9		0.16	-0.01		0.10		0.083
18-May-93	1020	15.0	46	200	9.2	8.0		-0.05	-0.01		0.13		0.129
26-May-93	1520	22.0	23	260	7.0	8.0		0.05					0.090
02-Jun-93	1030	20.0	14	260	7.4	7.8		-0.05	-0.01		0.34		0.046
09-Jun-93	900	13.5	11	345	10.2	7.7		-0.05	-0.01		0.25		0.034
16-Jun-93	1400	21.0	2.3	360	8.2	7.7		0.06	-0.01		0.19		0.033
23-Jun-93	1100	24.0	10	290	8.4	7.7		0.07	-0.01		0.31		0.048
07-Jul-93	?		Dry										
12-Aug-93	?		Dry										
20-Aug-93	?		Dry										
10-Sep-93	?		Dry										
06-Oct-93	1210		Dry										
01-Nov-93	1035	7.0		514 <sup>2)</sup>	8.4	7.2		0.20	-0.01		0.71		0.034
30-Nov-93	1115	1.5		330	14.2	7.7		-0.05	-0.01		0.99		0.044

1) USGS (PROVISIONAL DAILY STREAMFLOW DATA; M. STEVENS, WRITTEN COMMUN., FEBRUARY 2, 1994).  
2) 520 US/CM, SC-METER QA/QC CHECK.

**TABLE 3**  
**06709530 PLUM CREEK AT TITAN ROAD NEAR LOUVIERS, CO. (SITE 2)**  
**WATER-QUALITY DATA**

DATE	TIME	PHOS- PHORUS, DIS- SOLVED (MG/L AS P)	PHORUS, ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	SUS- PENDE SEDI- MENT (MG/L)	LABOR- ATORY SAMPLE NUMBER
20-Jan-93	1335			0.035	31	458
17-Feb-93	1305			0.010	8	1246
01-Apr-93	850					*
05-Apr-93	1630			0.032	160	2828
09-Apr-93	1120			0.020	7040	2931
14-Apr-93	1115			0.012	76	3078
21-Apr-93	1145			0.039	44	3738
28-Apr-93	1000			0.043	51	4086
28-Apr-93	9999			0.039	53	4087
05-May-93	1410			0.009	60	4324
12-May-93	1420			0.013	60	4592
18-May-93	1020			0.034	1110	4897
26-May-93	1520			0.092		5206
02-Jun-93	1030			0.019	-2	5516
09-Jun-93	900			0.015	8	5971
16-Jun-93	1400			0.021	1	6212
23-Jun-93	1100			0.015	15	6594
07-Jul-93	?					
12-Aug-93	?					
20-Aug-93	?					
10-Sep-93	?					
06-Oct-93	1210					
01-Nov-93	1035			-0.005	7	11250
30-Nov-93	1115			0.018	29	12062

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.  
 BLANK RANGES INDICATE NO DATA WERE AVAILABLE.  
 TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.  
 \* = SAMPLE LOST IN SHIPMENT TO LABORATORY.

**TABLE 3A  
393214105024201 PLUM CREEK ABOVE CHATFIELD RESERVOIR (SITE 2C)  
WATER-QUALITY DATA (PAIRED SAMPLE)**

DATE	TIME	TEMPER- ATURE (DEG C)	INSTAN- TANEOUS STREAM- FLOW (CFS)	SPE- CIFIC CON- DUC- TANCE FIELD (US/CM)	OXYGEN, DIS- SOLVED (MG/L)	PH FIELD (STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	NITRO- GEN, NITRITE TOTAL (MG/L AS N)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	SUS- PENDE SEDI- MENT (MG/L)	LABOR- ATORY SAMPLE NUMBER
17-Feb-93	1315	0.0		240	11.8	6.4	0.18	-0.01	0.89	0.053	0.023	10	1247
09-Jun-93	845	13.0		380	9.0	7.2	0.07	-0.01	0.49	0.061	0.036	9	5970
12-Aug-93			DRY										
01-Nov-93	1000	7.5		520 <sup>1)</sup>	8.0	7.4	0.16	-0.01	0.43	0.065	0.006	5	11248

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE SAMPLE IMMEDIATELY ABOVE.

1) 514, SC-METER QA/QC CHECK.

**TABLE 4**  
**393319105033501 CHATFIELD RESERVOIR NEAR DAM (SITE 7)**  
**WATER-QUALITY DATA**

DATE	TIME	TOTAL DEPTH (FEET)	SAMP-LING DEPTH (FEET)	TEMPER-ATURE (DEG C)	TRANS-PARENCY SECCHI DISK (FEET)	SPE-CIFIC CON-DUC-TANCE FIELD (US/CM)	OXYGEN, DIS-SOLVED (MG/L)	PH FIELD (STAND-ARD UNITS)	SOLIDS, RESIDUE AT 105 DEG. C, SUS-PENDED (MG/L)	NITRO-GEN TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)
01-Apr-93	930		5.0	8.0	10.0	220	9.0	6.7				
01-Apr-93	935	40.0	38.0	11.0		200	8.8	6.7				
05-Apr-93	1430		4.5	9.0	9.0	210	9.0	7.2	-2	0.2		
05-Apr-93	1435	41.6	39.6	10.5		200	8.8	7.1	4	0.3		
21-Apr-93	1005		5.9	11.0	11.9	300	7.8	8.1	-2	0.3		
21-Apr-93	9999		5.9						-2	0.3		
21-Apr-93	1010	40.1	38.1	10.0		300	8.0	8.2	-2	0.2		
19-May-93	1105		5.2	16.0	10.3	275	9.0	8.2	-2	0.2		
19-May-93	1115	34.8	32.8	15.0		270	8.0	8.2	-2	0.2		
16-Jun-93	1140		2.4	19.5	4.7	360	9.9	7.4	8	0.1		
16-Jun-93	9999		2.4						4	0.1		
16-Jun-93	1200	36.6	34.6	16.5		350	6.6	7.8	10	0.2		
07-Jul-93	1140		2.5	19.5	4.9	320	9.2	7.9	4	0.2		
07-Jul-93	1145	25.0	23.0	19.0		320	8.0	7.0	10	0.3		
21-Jul-93	1140		3.7	21.5	7.3	306	9.0	8.2	20	0.2		
21-Jul-93	1145	38.0	36.0	18.5		296	4.6	7.2	-2	0.4		
12-Aug-93	1050		4.0	19.0	8.0	310	3.7	7.1	-2	0.1		
12-Aug-93	9999		4.0						-2	0.2		
12-Aug-93	1055	38.5	36.5	21.0		310	9.2	8.0	-2	0.3		
26-Aug-93	1045		4.0	20.5	8.0	310	7.8	8.2	-2	0.3		
26-Aug-93	1050	38.8	36.0	19.5		310	6.0	7.6	30	0.6		
26-Aug-93	9999		36.0						-2	0.6		
10-Sep-93	900		3.8	18.0	7.6	310	8.1	8.2	-2	0.2		
10-Sep-93	910	37.5	35.5	17.5		320	7.6	8.2	38	0.1		
22-Sep-93	1000		3.0	15.5	6.0	310	7.8	8.1	-2	0.2		
22-Sep-93	1005	35.0										
06-Oct-93	1000		3.0	15.0	6.0	306	8.3	8.2		0.3		
06-Oct-93	1010	24.0	22.0	15.0		307	8.3	8.0		0.3		
03-Nov-93	#											
04-Nov-93	#											



**TABLE 4**  
**393319105033501 CHATFIELD RESERVOIR NEAR DAM (SITE 7)**  
**WATER-QUALITY DATA**

DATE	TIME	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, TOTAL KJELD. (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P)	PHORUS, ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	CHLORO- PHYLL A CORR. (UG/L)	PHYTO- PLANK- TON, (SPEC- IES NUMBER)	LABOR- ATORY SAMPLE NUMBER
01-Apr-93	930							2.7		*
01-Apr-93	935									*
05-Apr-93	1430			0.008			-0.005			2820
05-Apr-93	1435			0.014			-0.005			2821
21-Apr-93	1005			0.010			0.006	3.7		3742
21-Apr-93	9999			0.010			0.012			3746
21-Apr-93	1010			0.011			0.009			3743
19-May-93	1105			0.009			-0.005	2.5		4952
19-May-93	1115			0.014			-0.005			4953
16-Jun-93	1140			0.016			-0.005	6.3		6206
16-Jun-93	9999			0.014			-0.005			6210
16-Jun-93	1200			0.016			-0.005			6207
07-Jul-93	1140			-0.005			-0.005	4.2		7104
07-Jul-93	1145			0.009			-0.005			7105
21-Jul-93	1140			-0.005			-0.005	5.0		7531
21-Jul-93	1145			0.007			-0.005			7532
12-Aug-93	1050			-0.005			-0.005	3.1		8444
12-Aug-93	9999			0.005			-0.005	3.4		8446
12-Aug-93	1055			-0.005			-0.005			8448
26-Aug-93	1045			0.032			0.019	4.0		8855
26-Aug-93	1050			0.166 (0.107)&			0.027 (0.020)&			8856
26-Aug-93	9999			0.099 (0.074)&			0.083 (0.022)&			8859
10-Sep-93	900			0.015			-0.005	6.4		9399
10-Sep-93	910			0.034			-0.005			9400
22-Sep-93	1000			0.032			0.023	5.9		9776
22-Sep-93	1005									@
06-Oct-93	1000			-0.005			-0.005	6.0		10355
06-Oct-93	1010			0.005			-0.005			10356
03-Nov-93	#									#
03-Nov-93	#									#

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME=9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.

\* = SAMPLE LOST IN SHIPMENT TO LABORATORY.

@ = SAMPLER BROKEN DURING SURVEY;

NO SAMPLE COLLECTED.

& = LAB RE-RUNS.

# NO SAMPLE TAKEN ON THIS DATE.

**TABLE 5**  
**393248105030201 CHATFIELD RESERVOIR NEAR PLUM CREEK INFLOW (SITE 8)**  
**WATER-QUALITY DATA**

DATE	TIME	TOTAL DEPTH (FEET)	SAMP-LING DEPTH (FEET)	TEMPER-ATURE (DEG C)	TRANS-PARENCY SECCHI DISK (FEET)	SPE-CIFIC CON-DUC-TANCE FIELD (US/CM)	OXYGEN, DIS-SOLVED (MG/L)	PH FIELD (STAND-ARD UNITS)	PH LAB (STAND-ARD UNITS)	SOLIDS, RESIDUE AT 105 DEG. C, SUS-PENDED (MG/L)	NITRO-GEN, TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)
01-Apr-93	915		2.6	7.0	5.2	220	9.6	6.2		4	0.3	
01-Apr-93	920	16.5	14.5	7.0		230	10.0	6.3	*			
05-Apr-93	1450		4.4	10.0	8.8	220	9.2	7.0		2	0.3	
05-Apr-93	1455	17.1	15.1	9.0		220	9.4	6.9		4	0.2	
21-Apr-93	950		3.2	10.5	6.3	290	8.0	8.0		-2	0.2	
21-Apr-93	955	15.7	13.7	10.0		270	8.2	7.6		8	0.2	
19-May-93	1035		3.0	16.0	6.0	270	8.1	8.2		2	0.2	
19-May-93	1030	16.0	14.0	15.0		260	7.2	8.2		44	0.4	
16-Jun-93	1100		2.2	19.0	4.5	360	9.8	9.7		2	0.2	
16-Jun-93	1115	12.9	10.9	19.0		360	9.7	7.8		28	1.3	
07-Jul-93	1110		1.9	20.0	3.7	322	8.9	8.0		-2	0.2	
07-Jul-93	1115	14.5	12.5	19.0		320	8.2	7.6		-2	0.2	
21-Jul-93	1115		2.8	21.5	5.6	308	8.9	8.0		2	0.2	
21-Jul-93	9999		2.8							-2	0.3	
21-Jul-93	1120	14.0	12.5	21.0		309	8.3	7.8		-2	0.3	
12-Aug-93	1030		2.5	20.5	5.0	310	9.1	8.0		-2	0.2	
12-Aug-93	1035	12.8	10.8	20.5		310	9.0	7.9		-2	0.3	
26-Aug-93	1015		2.2	20.5	4.5	310	7.8	8.1		4	0.1	
26-Aug-93	1020	10.0	12.0	20.5		310	7.4	7.9		-2	0.2	
10-Sep-93	1000		2.5	18.0	5.0	310	8.2	8.3		-2	0.2	
10-Sep-93	9999		2.5							4	0.1	
10-Sep-93	1005	12.0	10.0	17.5		310	8.1	8.3		2	0.1	
22-Sep-93	915		1.6	15.5	3.3	310	8.0	8.2		2	0.3	
22-Sep-93	920	12.9		16.0		310	7.9	8.1				
06-Oct-93	940		2.5	15.0	5.0	305	8.2	8.2		2	0.3	
06-Oct-93	945	13.0	11.0	15.0		304	8.3	8.1		10	0.4	
03-Nov-93	1115		2.0	7.5	4.0	220 <sup>1)</sup>	11.4	7.3		6	0.4	
03-Nov-93	1100	8.4	6.4	8.0		220 <sup>1)</sup>	11.5	7.2		18	0.4	

1) 313 & 313 US/CM, RESPECTIVELY; SC-METER QA/QC CHECK.

TABLE 5  
393248105030201 CHATFIELD RESERVOIR NEAR PLUM CREEK INFLOW (SITE 8)  
WATER-QUALITY DATA

DATE	TIME	NITRO- GEN, NITRITE TOTAL (MG/L AS N)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, TOTAL KJLDL (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	CHLORO- PHYLL A CORR. (UG/L)	PHYTO- PLANK- TON, (SPEC- IES NUMBER)	LABOR- ATORY SAMPLE NUMBER
01-Apr-93	915				0.006			-0.005	3.8		2758
01-Apr-93	920										*
05-Apr-93	1450				0.017			-0.005			2822
05-Apr-93	1455				0.012			-0.005			2823
21-Apr-93	950				0.010			0.008	3.1		3740
21-Apr-93	955				0.021			0.021			3741
19-May-93	1035				0.018			-0.005	3.7		4950
19-May-93	1030				0.063			0.015			4951
16-Jun-93	1100				0.056			-0.005	6.6		6204
16-Jun-93	1115				0.028			-0.005			6205
07-Jul-93	1110				0.009			-0.005	4.6		7102
07-Jul-93	1115				0.008			-0.005			7103
21-Jul-93	1115				-0.005			-0.005	3.6		7533
21-Jul-93	9999				-0.005			-0.005			7537
21-Jul-93	1120				-0.005			-0.005			7534
12-Aug-93	1030				-0.005			-0.005	3.3		8443
12-Aug-93	1035				0.032			-0.005			8447
26-Aug-93	1015				0.026			0.018	3.4		8853
26-Aug-93	1020				0.016			0.016			8854
10-Sep-93	1000				0.009			-0.005	6.9		9401
10-Sep-93	9999				0.014			-0.005	6.7		9403
10-Sep-93	1005				0.015			-0.005			9402
22-Sep-93	915				0.035			-0.005	5.1		9775
22-Sep-93	920										⊙
06-Oct-93	940				0.010			-0.005	6.3		10358
06-Oct-93	945				0.013			-0.005			10357
03-Nov-93	1115				0.019			-0.005	2.8		11273
03-Nov-93	1100				0.020			-0.005			11275

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.

\* = SAMPLE LOST IN SHIPMENT TO LABORATORY.

⊙ = SAMPLER BROKEN DURING SURVEY;

NO SAMPLE COLLECTED.



TABLE 6  
 393212105042701 CHATFIELD RESERVOIR NEAR SOUTH PLATTE RIVER INFLOW (SITE 9)  
 WATER-QUALITY DATA

DATE	TIME	TOTAL DEPTH (FEET)	SAMP-LING DEPTH (FEET)	TEMPER-ATURE (DEG C)	TRANS-PARENCY SECCHI DISK (FEET)	SPE-CIFIC CON-DUC-TANCE FIELD (US/CM)	OXYGEN, DIS-SOLVED (MGL)	PH FIELD (STAND-ARD UNITS)	SOLIDS, RESIDUE AT 105 DEG. C, SUS-PENDED (MGL)	NITRO-GEN, TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)
01-Apr-93	950		4.3	8.0	8.6	230	9.5	7.1				*
01-Apr-93	955	12.3	10.3	8.5		210	8.8	6.7				*
05-Apr-93	1515		3.9	10.0	7.8	215	9.2	6.9	2	0.3		
05-Apr-93	1520	12.6	10.6	9.0		210	9.4	6.9	8	0.4		
21-Apr-93	1025		3.5	10.5	6.9	280	8.7	7.6	-2	0.2		
21-Apr-93	1030	13.0	11.0	11.0		280	8.6	7.6	-2	0.3		
19-May-93	1150		3.5	16.0	7.0	290	8.4	8.3	-2	0.2		
19-May-93	1135	11.3	9.3	16.0		280	9.6	8.3	-2	0.5		
16-Jun-93	1310		1.5	18.0	2.9	325	9.8	7.4	10	0.1		
16-Jun-93	1300	9.0	7.0	16.0		280	10.0	7.8	8	-0.1		
07-Jul-93	1220		3.0	20.5	6.1	310	9.6	8.0	4	0.2		
07-Jul-93	9999		3.0						-2	0.4		
07-Jul-93	1230	9.9	7.9	19.5		300	10.0	8.0	-2	0.2		
21-Jul-93	1220		2.5	22.0	5.0	297	9.2	8.2	-2	0.3		
21-Jul-93	1225	9.2	4.6	21.5		299	9.3	8.3	32	0.6		
12-Aug-93	1120		3.0	21.5	6.0	300	7.9	8.3	-2	0.2		
12-Aug-93	1125	8.0	6.0	21.0		300	8.2	8.5	-2	0.2		
26-Aug-93	1115		1.5	20.5	3.0	300	8.0	8.3	-2	0.3		
26-Aug-93	1120	8.0	6.0	20.0		300	8.1	8.4	-2	0.3		
10-Sep-93	835		1.8	15.5	3.6	300	8.0	8.2	6	0.2		
10-Sep-93	840	8.0	6.0	18.0		300	8.3	8.2	8	0.2		
22-Sep-93	1035		3.0	15.5	6.0	300	8.4	8.3	-2	0.2		
22-Sep-93	9999		3.0						-2	0.2		
22-Sep-93	1040	8.3	6.0	15.5		300	8.5	8.4	-2	0.2		
06-Oct-93	1035		2.5	15.5	5.0	296	8.8	8.5	4	0.3		
06-Oct-93	1040	8.3	6.3	15.5		295	9.0	8.4	-2	0.4		
03-Nov-93	1225		2.5	7.0	5.0	230 <sup>1)</sup>	12.6	7.6	6	0.4		
03-Nov-93	1210	10.0	8.0	7.3		230 <sup>1)</sup>	12.6	7.6	2	0.3		

1) 323 AND 322 US/CM, RESPECTIVELY; SC-METER QA/QC CHECK.

TABLE 6  
393212105042701 CHATFIELD RESERVOIR NEAR SOUTH PLATTE RIVER INFLOW (SIT  
WATER-QUALITY DATA

DATE	TIME	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, TOTAL KJELDL (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	CHLORO- PHYLL A CORR. (UG/L)	PHYTO- PLANK- TON, (SPEC- IES NUMBER)	LABOR- ATORY SAMPLE NUMBER
01-Apr-93	950							3.0		*
01-Apr-93	955									*
05-Apr-93	1515			0.050			-0.005			2824
05-Apr-93	1520			0.026			-0.005			2825
21-Apr-93	1025			0.016			0.013	2.0		3744
21-Apr-93	1030			0.014			0.015			3745
19-May-93	1150			0.018			-0.005	2.2		4954
19-May-93	1135			0.014			-0.005			4955
16-Jun-93	1310			0.017			-0.005	#		6208
16-Jun-93	1300			0.018			-0.005			6209
07-Jul-93	1220			-0.005			-0.005	2.8		7106
07-Jul-93	9999			-0.005			-0.005	2.6		7108
07-Jul-93	1230			0.010			-0.005			7107
21-Jul-93	1220			-0.005			-0.005	3.3		7535
21-Jul-93	1225			0.031			-0.005			7536
12-Aug-93	1120			-0.005			-0.005	3.2		8445
12-Aug-93	1125			0.009			-0.005			8449
26-Aug-93	1115			0.011			0.008	3.7		8857
26-Aug-93	1120			0.016			0.012			8858
10-Sep-93	835			0.012			-0.005	3.3		9397
10-Sep-93	840			0.011			-0.005			9398
22-Sep-93	1035			0.022			-0.005	2.7		9777
22-Sep-93	9999			0.012			-0.005			9779
22-Sep-93	1040			0.012			-0.005			9778
06-Oct-93	1035			-0.005			-0.005	2.8		10359
06-Oct-93	1040			0.011			-0.005			10360
03-Nov-93	1225			0.013			-0.005	3.2		11274
03-Nov-93	1210			0.020			-0.005			11276

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.

# = SAMPLE LOST IN LABORATORY.

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME=9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.

\* = SAMPLE LOST IN SHIPMENT TO LABORATORY.

**TABLE 7**  
**392520104542001 ALLUVIAL WELL NEAR PLUM CREEK WASTEWATER AUTHORITY WWTP (SITE 1W)**  
**WATER-QUALITY DATA**

DATE	TIME	TEMPER- ATURE (DEG C)	SPE- CIFIC CON- DUC- TANCE FIELD (US/CM)	OXYGEN, DIS- SOLVED (MG/L)	PH FIELD (STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	LAB- ORATORY SAMPLE NUMBER
17-Feb-93	1200	10.0	240	5.8	6.8	1.4	0.053	0.036	1241
01-Nov-93	1130	11.5	380 <sup>1)</sup>	6.8	7.4	3.3	0.124	0.082	11254

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.

1) 382 US/CM, SC-METER QA/QC CHECK.

**TABLE 8**  
**392620104574001 ALLUVIAL WELL NEAR TOWN OF SEDALIA (SITE 2W)**  
**WATER-QUALITY DATA**

DATE	TIME	TEMPER- ATURE (DEG C)	SPE- CIFIC CON- DUC- TANCE FIELD (US/CM)	OXYGEN, DIS- SOLVED (MG/L)	PH FIELD (STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	LAB- ORATORY SAMPLE NUMBER
17-Feb-93	1220	10.0	240	8.2	7.4	3.2	0.126	0.100	1242
01-Nov-93	1115	13.5	390 1)	7.6	7.7	4.5	0.076	0.056	11253

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.

1) 388 US/CM, SC-METER QA/QC CHECK.

**TABLE 9**  
**392145104513001 ALLUVIAL WELL IN TOWN OF CASTLE ROCK WELL FIELD (SITE 3W)**  
**WATER-QUALITY DATA**

DATE	TIME	TEMPER- ATURE (DEG C)	SPE- CIFIC CON- DUC- TANCE FIELD (US/CM)	OXYGEN, DIS- SOLVED (MG/L)	PH FIELD (STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	LAB- ORATORY SAMPLE NUMBER
17-Feb-93	1230	10.0	230	7.2	8.4	4.3	0.074	0.061	1243

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.

**TABLE 10**  
**392815104595001 ALLUVIAL WELL AT FLYING C RANCH ON DOUGLAS COUNTY ROAD (SITE 4W)**  
**WATER-QUALITY DATA**

DATE	TIME	TEMPER- ATURE (DEG C)	SPE- CIFIC CON- DUC- TANCE FIELD (US/CM)	OXYGEN, DIS- SOLVED (MG/L)	PH FIELD (STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	LAB- ORATORY SAMPLE NUMBER
01-Nov-93	1100	19.0	290 1)	2.4	7.3	0.1	-0.005	-0.005	11252

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.

1) 264 US/CM, SC-METER QA/QC CHECK.

**TABLE 11**  
**392905105000501 ALLUVIAL WELL NEAR PLUM CREEK AT LOUVIERS ROAD (SITE 5W)**  
**WATER-QUALITY DATA**

DATE	TIME	TEMPER- ATURE (DEG C)	SPE- CIFIC CON- DUC- TANCE FIELD (US/CM)	OXYGEN, DIS- SOLVED (MG/L)	PH FIELD (STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	LAB- ORATORY SAMPLE NUMBER
17-Feb-93	1250	8.0	210	6.2	7.2	0.2	0.032	0.014	1244
03-Nov-93	1315	13.0	260	7.0	6.8	1.5	0.025	1)	11277

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.

1) ANALYSIS NOT COMPLETED BY LABORATORY.

**TABLE 12**  
**393020105013001 ALLUVIAL WELL AT PLUM CREEK STABLES ON TITAN ROAD (SITE 6W)**  
**WATER-QUALITY DATA**

DATE	TIME	TEMPER- ATURE (DEG C)	SPE- CIFIC CON- DUC- TANCE FIELD (US/CM)	OXYGEN, DIS- SOLVED (MGL)	PH FIELD (STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	LAB- ORATORY SAMPLE NUMBER
17-Feb-93	1300	4.0	170	6.2	7.6	0.3	-0.005	-0.005	1245
01-Nov-93	1030	11.0	330 1)	3.1	7.4	0.3	-0.005	-0.005	11251

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.

1) 331 US/CM, SC-METER QA/QC CHECK.



**TABLE 13  
 PLUM CREEK BELOW THE CONFLUENCE OF EAST & WEST PLUM CREEK (SITE 2B)  
 SUPPLEMENTAL TRIBUTARY SURVEYS--WATER QUALITY DATA**

DATE	TIME	TEMPER- ATURE (DEG C)	INSTAN- TANEOUS STREAM- FLOW (CFS)	SPE- CIFIC CONDUCTANCE (US/CM)	OXYGEN, DIS- SOLVED (MG/L)	pH FIELD (STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, NITRITE TOTAL (MG/L AS N)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, TOTAL KJELDL. (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	FECAL COLI- FORMS (#/ 100ML)
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NO DATA COLLECTED DURING 1993.

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE SAMPLE IMMEDIATELY ABOVE.

SOURCE: PLUM CREEK WASTEWATER AUTHORITY.

**TABLE 14**  
**WEST PLUM CREEK AT SEDALIA, COLORADO (SITE 3)**  
**SUPPLEMENTAL TRIBUTARY SURVEYS--WATER-QUALITY DATA**

<b>DATE</b>	<b>TIME</b>	<b>STAGE (FEET)</b>	<b>INSTAN- TANEOUS STREAM- FLOW (CFS)</b>	<b>TEMPER- ATURE (DEG C)</b>	<b>SPE- CIFIC CONDUCTANCE FIELD (US/CM)</b>	<b>OXYGEN, DIS- SOLVED (MG/L)</b>	<b>pH FIELD (STAND- ARD UNITS)</b>	<b>BIO- CHEMICAL OXYGEN DEMAND (MG/L)</b>	<b>NITRO- GEN, TOTAL (MG/L AS N)</b>
NO DATA COLLECTED DURING 1993.									

**MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.**

**BLANK RANGES INDICATE NO DATA WERE AVAILABLE.**

**TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE SAMPLE IMMEDIATELY ABOVE.**

**SOURCE: PLUM CREEK WASTEWATER AUTHORITY.**

**TABLE 15  
EAST PLUM CREEK AT SEDALIA, COLORADO (SITE 4)  
SUPPLEMENTAL TRIBUTARY SURVEY--WATER-QUALITY DATA**

DATE	TIME	STAGE	INSTAN- TANEOUS STREAM- FLOW	TEMPER- ATURE	SPE- CIFIC CONduc- TANCE	OXYGEN, DIS- SOLVED	pH FIELD (STD.	BIO- CHEMICAL OXYGEN DEMAND	NITRO- GEN, TOTAL	NITRO- GEN, AMMONIA TOTAL	NITRO- GEN, NITRITE TOTAL	NITRO- GEN, NITRATE TOTAL	NITRO- GEN, TOTAL KJELDL.	PHOS- PHORUS, TOTAL	PHOS- PHORUS, ORTHO, TOTAL	FECAL COLI- FORMS (#/100ML)
		(FEET)	(cfs)	(DEG C)	(US/CM)	(MG/L)	UNITS)	(MG/L)	(MG/L AS N)	(MG/L AS N)	(MG/L AS N)	(MG/L AS N)	(MG/L AS N)	(MG/L AS P)	(MG/L AS P)	
NO DATA COLLECTED DURING 1993.																

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.  
 BLANK RANGES INDICATE NO DATA WERE AVAILABLE.  
 TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE SAMPLE IMMEDIATELY ABOVE.  
 SOURCE: PLUM CREEK WASTEWATER AUTHORITY.

**TABLE 16  
EAST PLUM CREEK DOWNSTREAM FROM THE PCWA WWTP (SITE 4A)  
SUPPLEMENTAL TRIBUTARY SURVEYS--WATER-QUALITY DATA**

DATE	TIME	INSTAN- TANEOUS STREAM- FLOW (CFS)	TEMPER- ATURE (DEG C)	SPE- CIFIC CONDCU- TANCE (US/CM)	OXYGEN, DIS- SOLVED (MG/L)	pH FIELD (STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, NITRITE TOTAL (MG/L AS N)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, TOTAL KJELD. (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO TOTAL (MG/L AS P)	FECAL COLI- FORMS (#/ 100ML)
								1.10	0.04	4.20		0.07	0.06	
05-Jan-93								0.09	0.04	1.18		0.05	0.06	
11-Jan-93								0.05	0.01	0.98		0.05	0.05	
19-Jan-93								0.12	0.11	1.83		0.15	0.06	
26-Jan-93								0.77	0.40	2.90		0.06	0.04	
02-Feb-93								0.08	0.03	1.10		0.04	0.04	
09-Feb-93								0.70	0.11	2.77		0.06	0.08	
17-Feb-93								0.04	0.04	0.98		0.28	0.19	
24-Feb-93								0.06	0.01	0.90		0.06	0.09	
03-Mar-93								0.18	0.08	2.70		0.05	0.05	
09-Mar-93								0.18	0.20	2.47		0.04	0.05	
17-Mar-93								0.04	0.05	1.07		0.13	0.08	
24-Mar-93								5.20	0.63	3.11		0.12		
06-Apr-93								0.23	0.07	1.30		0.08	0.07	
21-Apr-93								0.10	0.02	0.64		0.06	0.08	
27-Apr-93								0.09	0.04	0.54		0.11		
18-May-93								0.07	0.01	0.70		0.09		
24-May-93								0.06	0.02	0.93		0.09		
01-Jun-93								0.81	0.50	13.30		0.17		
10-Jun-93								0.06	0.04	0.70		0.08		
21-Jun-93								0.36	0.20	14.00		0.06		
04-Aug-93								5.00	1.68	18.30		0.07		
18-Aug-93								2.00	1.27	9.73		0.21		
25-Aug-93								3.30	1.95	10.20		0.28		
31-Aug-93								2.80	1.32	8.09		0.32		
07-Sep-93								4.40	0.90	10.60		0.04		
14-Sep-93								3.40	2.00	6.08		2.00		
20-Sep-93								1.90	2.88	9.76		2.88		
27-Sep-93								0.96	1.80	11.80		0.14		
06-Oct-93								0.29	0.54	7.00		0.05		
27-Oct-93								4.70	0.44	1.78		0.14		
03-Nov-93								1.10	0.56	4.31		0.17		
09-Nov-93								1.50	0.74	9.37		0.38		
17-Nov-93								1.70	1.19	7.07		0.44		
22-Nov-93								2.30	1.82	5.67		0.22		
30-Nov-93								0.27	2.23	7.68		0.25		
08-Dec-93								0.05	0.50	9.08		0.34		
14-Dec-93								1.10	2.31	8.65		0.38		
20-Dec-93								0.62	0.54	7.30		0.41		
28-Dec-93														

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.  
 BLANK RANGES INDICATE NO DATA WERE AVAILABLE.  
 TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE SAMPLE IMMEDIATELY ABOVE.  
 SOURCE: PLUM CREEK WASTEWATER AUTHORITY.

TABLE 17  
 EAST PLUM CREEK UPSTREAM FROM THE PCWA WWTP (SITE 4B)  
 SUPPLEMENTAL TRIBUTARY SURVEYS--WATER-QUALITY DATA

DATE	TIME	STAGE (FEET)	INSTAN- TANEOUS STREAM- FLOW (CFS)	TEMPER- ATURE (DEG C)	SPE- CIFIC CONDUC- TANCE (US/CM)	OXYGEN, DIS- SOLVED (MG/L)	pH FIELD (STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, NITRITE TOTAL (MG/L AS N)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, TOTAL KJELD. (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO TOTAL (MG/L AS P)	FECAL COLI- FORMS (#/100ML)
05-Jan-93									0.07	0.01	0.53		0.05	0.05	
11-Jan-93									0.06	0.01	0.84		0.05	0.05	
19-Jan-93									0.09	0.01	1.00		0.07	0.05	
26-Jan-93									0.19	0.01	0.92		0.06	0.06	
02-Feb-93									0.09	-0.01	0.69		0.06	0.05	
09-Feb-93									0.06	0.01	0.85		0.06	0.04	
17-Feb-93									0.11	0.01	1.03		0.04	0.05	
24-Feb-93									0.05	0.04	1.01		0.27	0.19	
03-Mar-93									0.07	0.01	0.94		0.06	0.06	
09-Mar-93									0.07	0.01	0.82		0.05	0.06	
17-Mar-93									0.06	0.02	0.87		0.04	0.05	
24-Mar-93									0.04	0.03	0.75		0.13	0.11	
05-Apr-93									0.14	0.03	0.92		0.12		
21-Apr-93									0.26	0.02	1.11		0.08	0.06	
27-Apr-93									0.11	0.02	0.60		0.06	0.07	
18-May-93									0.08	0.04	0.51		0.09		
24-May-93									0.11	0.01	0.82		0.08		
01-Jun-93									0.05	0.02	0.93		0.07		
10-Jun-93									0.08	0.50	13.30		0.20		
21-Jun-93									0.05	0.04	0.70		0.17		
04-Aug-93									0.39	0.01	0.70		0.08		
18-Aug-93									0.08	0.04	2.69		0.10		
25-Aug-93									0.12	0.06	0.82		0.14		
31-Aug-93									0.11	0.01	0.50		0.19		
07-Sep-93									0.15	0.24	3.65		0.06		
14-Sep-93									0.09	0.01	0.59		0.08		
20-Sep-93									0.08	0.01	0.43		0.05		
27-Sep-93									0.09	0.01	0.50		0.05		
06-Oct-93									0.06	0.01	0.54		0.06		
27-Oct-93									0.08	0.01	0.78		0.05		
03-Nov-93									0.07	0.00	0.48		0.04		
09-Nov-93									0.43	0.20	2.12		0.06		
17-Nov-93									0.14	0.01	0.85		0.03		
22-Nov-93									0.12	0.03	0.70		0.15		
30-Nov-93									0.10	0.01	0.75		0.02		
08-Dec-93									0.07	0.01	0.60		0.02		
14-Dec-93									0.05	0.01	0.54		0.03		
20-Dec-93									0.37	0.01	0.73		0.03		
28-Dec-93									0.05	0.05	0.03		0.04		

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.  
 BLANK RANGES INDICATE NO DATA WERE AVAILABLE.  
 TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE SAMPLE IMMEDIATELY ABOVE.  
 SOURCE: PLUM CREEK WASTEWATER AUTHORITY.

**TABLE 18**  
**BEAR CREEK UPSTREAM FROM PERRY PARK WWTP, COLORADO (SITE 6)**  
**SUPPLEMENTAL TRIBUTARY SURVEYS--WATER-QUALITY DATA**

DATE	TIME	STAGE (FEET)	INSTAN- TANEOUS STREAM FLOW (cfs)	TEMPER- ATURE (DEG C)	SPE- CIFIC CONduc- TANCE FIELD (US/CM)	pH FIELD (STD. UNITS)	OXYGEN, DIS- SOLVED (MG/L)	BIO- CHEMICAL OXYGEN DEMAND (MG/L)	NITRO- GEN- TOTAL (MG/L AS N)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, NITRITE TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, TOTAL KJELDL (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	FECAL COLI- FORMS (#/100ML)	NITRO- GEN, NITRATE + NITRITE TOTAL (mg/L as N)
NO DATA COLLECTED DURING 1993.																	

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.

E = ESTIMATED

SOURCE: PERRY PARK WATER & SANITATION DISTRICT

**TABLE 19  
 BEAR CREEK DOWNSTREAM FROM PERRY PARK WWTP (SITE 6A)  
 SUPPLEMENTAL TRIBUTARY SURVEYS--WATER-QUALITY DATA**

DATE	TIME	TEMPER- ATURE (DEG C)	SPE- CIFIC CONDUCT- TANCE (US/CM)	OXYGEN, DIS- SOLVED (MG/L)	pH FIELD (STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, NITRITE TOTAL (MG/L AS N)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, TOTAL KJELDL. (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO TOTAL (MG/L AS P)	FECAL COLI- FORMS (#/ 100ML)	NITRO- GEN, NITRITE + NITRATE TOTAL (mg/L as N)
NO DATA COLLECTED DURING 1993.														

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.  
 BLANK RANGES INDICATE NO DATA WERE AVAILABLE.  
 TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.  
 E = ESTIMATED  
 SOURCE: PERRY PARK WATER & SANITATION DISTRICT



**TABLE 20**  
**WEST PLUM CREEK DOWNSTREAM FROM THE CONFLUENCE OF BEAR CREEK (SITE 6B)**  
**SUPPLEMENTAL TRIBUTARY SURVEYS--WATER-QUALITY DATA**

DATE	TIME	STAGE (FEET)	INSTAN- TANEOUS STREAM- FLOW (CFS)	TEMPER- ATURE (DEG C)	SPE- CIFIC CONDC- TANCE (US/CM)	OXYGEN, DIS- SOLVED (MG/L)	pH FIELD (STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, NITRITE TOTAL (MG/L AS N)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, TOTAL KJELD. (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO TOTAL (MG/L AS P)	FECAL COLI- FORMS (#/100ML)	NITRO- GEN, NITRITE + NITRATE TOTAL (mg/L as N)
NO DATA COLLECTED DURING 1993.																

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.

E = ESTIMATED

SOURCE: PERRY PARK WATER & SANITATION DISTRICT

**TABLE 21  
BEAR CREEK UPSTREAM FROM THE CONFLUENCE OF WEST PLUM CREEK (SITE 6C)  
SUPPLEMENTAL TRIBUTARY SURVEYS--WATER-QUALITY DATA**

DATE	TIME	STAGE (FEET)	INSTAN- TANEOUS STREAM- FLOW (CFS)	TEMPER- ATURE (DEG C)	SPE- CIFIC CONDUC- TANCE (US/CM)	OXYGEN, DIS- SOLVED (MG/L)	pH FIELD (STAND- ARD UNITS)	NITRO- GEN, TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, NITRITE TOTAL (MG/L AS N)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, TOTAL KJELDL. (MG/L AS N)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO TOTAL (MG/L AS P)	FECAL COLI- FORMS (#/100ML)	NITRO- GEN, NITRITE + NITRATE TOTAL (mg/L as N)
NO DATA COLLECTED DURING 1993.																

MINUS SIGN MEANS "LESS THAN" INDICATED VALUE.

BLANK RANGES INDICATE NO DATA WERE AVAILABLE.

TIME = 9999 MEANS THE SAMPLE IS A DUPLICATE OR A SPLIT OF THE VALUE IMMEDIATELY ABOVE.

E = ESTIMATED

SOURCE: PERRY PARK WATER & SANITATION DISTRICT



## **APPENDIX A**

### **PHYTOPLANKTON SPECIES AND DENSITY - 1993 CY (with comparative chlorophyll-a results)**

**TABLE A-1**  
**CHLOROPHYLL-A DATA COMPARISON**  
**HISTORICAL METHOD VERSUS CDH METHOD**  
**OF SAMPLE COLLECTION (1)**

IN-RESERVOIR MONITORING-SITE IDENTIFICATION (2)							
DATE	RM-1	RM-CDH	RP-1	RP-CDH	RS-1	RS-CDH	
01-Apr-93	2.7	--	3.8	--	3.0	--	
21-Apr-93	3.7	--	3.1	--	2.0	--	
19-May-93	2.5	--	3.7	--	2.2	--	
16-Jun-93	6.3	7.8	6.6	7.0	--(--)*	--*	
07-Jul-93	4.2	3.9	4.6	4.4	2.8(2.6)	1.8	
21-Jul-93	5.0	3.5	3.6	3.3	3.3	3.8	
12-Aug-93	3.1(3.4)	3.9	3.3	3.6	3.2	3.4	
26-Aug-93	4.0	3.9	3.4	3.4	3.7	5.3	
10-Sep-93	6.4	7.1	6.9(6.7)	8.1	3.3	4.3	
22-Sep-93	5.9	5.5	5.1	4.2	2.7	2.8	
06-Oct-93	6.0	7.0	6.3	5.6	2.8	3.0	
03-Nov-93	--#	--#	2.8	2.7	3.2	2.4	

NOTES: \* = SAMPLE(S) LOST IN LABORATORY.

# = NO SAMPLE COLLECTED.

(1) HISTORICAL METHOD (MID-EUPHOTIC ZONE - MID-POINT OF SECCHI DEPTH); CDH METHOD (2 m BELOW WATER SURFACE).

(2) RM - MAIN DAM SITE; RP - PLUM CREEK INFLOW SITE; RS - SOUTH PLATTE RIVER INFLOW SITE.

TABLE A-2

GROWING SEASON (JULY-THROUGH-SEPTEMBER)  
 TOTAL-PHOSPHORUS AND CHLOROPHYLL-a CONCENTRATIONS  
 CHATFIELD RESERVOIR

Year	Total- Phosphorus Concentration (mg/L) <sup>1)2)</sup>	Chlorophyll-a Concentration (ug/L) <sup>1)3)</sup>
1982	0.023	15
1983	0.050	16
1984	0.035	6.7
1985	0.028	8.9
1986	4)	4)
1987	0.080	9.0
1988	0.020	9.6
1989	0.012	2.3
1990	0.027	10
1991	0.044	2.7
1992	0.027	4.5
1993	<u>0.018</u>	<u>4.1</u>
Mean	0.033	8.1
Std. Dev.	0.018	4.4
Maximum	0.080	16.0
Minimum	0.012	2.3
N	11	11

- 1) Average Reservoir values.  
 2) Growing-season standard = 0.027 mg/L.  
 3) Growing-season goal = 17 ug/L.  
 4) No data.

TABLE A-3

PHYTOPLANKTON, DATA 1993 SURVEY RESULTS  
CHATFIELD RESERVOIR

GENUS/SPECIES	16-Jun		07-Jul				DUP
	RM-1 Cells/mL	RS-1 Cells/mL	RM-1-CDH Cells/mL	RP-1 Cells/mL	RP-1-CDH Cells/mL	RS-1-CDH Cells/mL	
<b>BACILLARIOPHYTA</b>							
<i>Asterionella formosa</i>		63	10	4	16	56	6
<i>Caloneis schumanniana</i>							
<i>Cyclotella bodanica</i>	344	156	94	12	20	10	2
<i>Cyclotella meneghiniana</i>							
<i>Cyclotella stelligera</i>	31		125	1375	1125	125	500
<i>Entomoneis paludosa</i>							
<i>Fragilaria capucina</i>	8	8	70	153	46	70	54
<i>Fragilaria crotonensis</i>							
<i>Gyrodinium spencerii</i>	8			2	23		8
<i>Melosira granulata</i>		16	16		70	51	22
<i>Melosira granulata</i> var. <i>angustissima</i>			14	14	18	35	
<i>Melosira italica</i>			47		10	16	
<i>Melosira italica</i> var. <i>tenuissima</i>							
<i>Melosira varians</i>							
<i>Navicula capitata</i>							
<i>Navicula cryptocephala</i>							
<i>Navicula minuscula</i>							
<i>Navicula tripartita</i>							
<i>Nitzschia acicularis</i>				1	1	5	1
<i>Nitzschia agnewii</i>				1	1	2	
<i>Nitzschia dissipata</i>							
<i>Nitzschia hungarica</i>							
<i>Nitzschia ignorata</i>							
<i>Nitzschia kuetzingiana</i>							
<i>Nitzschia lorenziana</i>							
<i>Nitzschia palca</i>			2		3	11	
<i>Nitzschia</i> sp.							
<i>Stauroneis phoenicenteron</i>			1	2	4	1	1
<i>Stephanodiscus astrea</i>			1		1	2	1
<i>Stephanodiscus niagarae</i>				2		1	2
<i>Synedra cycloporum</i>							
<i>Synedra delicatissima</i>							
<i>Synedra radians</i>	8		1		1	1	
<i>Synedra ulna</i>							



TABLE A-3

PHYTOPLANKTON, DATA 1993 SURVEY RESULTS  
CHATFIELD RESERVOIR

GENUS/SPECIES	16-Jun			07-Jul			RS-1-CDH Cells/mL	RS-1-CDH Cells/mL	RS-1-CDH Cells/mL	DUP
	RM-1 Cells/mL	RP-1 Cells/mL	RS-1 Cells/mL	RM-1 Cells/mL	RP-1 Cells/mL	RS-1 Cells/mL				
<b>CHLOROPHYTA</b>										
Ankyra judayi	31			7	17	1	41	37	31	51
Chlamydomonas sp.						250		250	125	125
Chlamydomonas sp.			63	500	375	625	750	125	1125	1750
Chlorella sp.					1					
Closterium gracile										
Coccomyxa sp.	27563	27500	20063	21750	20875	34625	24625	17875	49500	34125
Coelastrum sphaericum				16						
Cosmarium sp.										
Crucigenia tetrapedia										
Crucigeniella apiculata										
Dictyosphaerium ehrenbergianum										
Dictyosphaerium pulchellum					21	9	14	14	8	15
Eremosphaera gigas					260	5	172	58	66	127
Einetranorus foetii		203		87						
Gloeocystis sp.	31					4				
Kirchneriella lunaris										
Monoraphidium griffithii				1						
Monoraphidium mirabile										
Nephrocystium sp.				3						
Oocystis gloeocystiformis			8	58	68	16	25	20	41	20
Oocystis lacustris				33	15	12		34		22
Oocystis parva	38	94		13	22		8	4	46	6
Oocystis pusilla	31			4	3		1	6	5	1
Oocystis solitaria				8		10	20			
Pandorina morum										
Pediastrum boryanum				36	52		36		16	36
Pediastrum duplex								250		
Scenedesmus exornis			125							
Scenedesmus granulatus				10	33	26	60			12
Scenedesmus linearis										
Scenedesmus quadricauda										
Schroederia setigera			31	2		1			3	
Spirogyra sp.										
Staurastrum paradoxum				2						1
Tetraedron muticum										

TABLE A-3  
 PHYTOPLANKTON, DATA 1993 SURVEY RESULTS  
 CHATFIELD RESERVOIR

GENUS/SPECIES	16-Jun			07-Jul						
	RM-1 Cells/mL	RP-1 Cells/mL	RS-1 Cells/mL	RM-1 Cells/mL	RM-1-CDH Cells/mL	RP-1 Cells/mL	RP-1-CDH Cells/mL	RS-1 Cells/mL	RS-1-CDH Cells/mL	DUP Cells/mL
<b>CHRYSOPHYTA</b>										
Chromulina minutissima										
Chrysococcus sp.										
Dinobryon divergens	275	109	172	82	104	78	65	80	124	67
Epichrysis sp.										
Mallomonas akrokomos				4	4		21	5	3	10
Mallomonas sp.										
<b>CRYPTOPHYTA</b>										
Chroomonas acuta	1127	562	500	750	1500	1063	750	1500	1000	1375
Cryptomonas marsonii			31	54	39	11	30	26	21	22
Cryptomonas ovata				30	4		9	2		2
Cryptomonas reflexa				15	59	37	21	2	14	13
Cryptomonas rostratiformis				2	7	4	1	2	3	3
Cryptomonas sp.	125		31							
<b>CYANOPHYTA</b>										
Anabaena flos-aquae										
Anabaena spiroides										
Aphanizomenon flos-aquae				125		182				
Aphanocapsa delicatissima			47	5500	750	2875	2000	4250	1000	1250
Aphanothece sp.		250		4500	12000	5438	15000	2500	7750	25500
Dactylococcopsis fascicularis								1		
Gloeocapsa punctata										
Gomphosphaeria wichurae (Coelosphaerium naegelianum)						100				
Merismopedia tenuissima				46875	47000	29563	50125	74375	30875	60875
Microcystis aeruginosa						32		200	182	312
Oscillatoria limnetica										
Planktolyngbya subtilis			94							
<b>EUGLENOPHYTA</b>										
Euglena sp.										
Strombomonas sp.										
Trachelomonas sp.										
<b>PYRROPHYTA</b>										
Ceratium hirundinella		8		3	4	8	5	4	11	8
Peridinium pusillum										
Peridinium sp.						1				
TOTAL DENSITY (Cells/mL)	29620	28961	21283	80727	83556	76522	95149	101813	92544	126324
TOTAL NUMBER OF TAXA	13	10	14	36	32	39	39	30	28	32

TABLE A-3

PHYTOPLANKTON, DATA 1993 SURVEY RESULTS  
CHATFIELD RESERVOIR

GENUS/SPECIES	21-Jul						12-Aug						DUP
	RM-1	RM-1-CDH	RP-1	RP-1-CDH	RS-1	RS-1-CDH	RM-1	RM-1-CDH	RP-1	RP-1-CDH	RS-1	RS-1-CDH	
	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	
<b>BACILLARIOPHYTA</b>													
Asterionella formosa					1		14	21	17		15	7	
Caloneis schumanniana										1			
Cyclotella bodanica	3		1	9	1						1		1
Cyclotella meneghiana							16						
Cyclotella stelligera													
Entomoneis paludosa													
Fragilaria capucina											14	19	11
Fragilaria crotonensis	4	45	53	13	17	16	10	17	18	46	29	40	8
Gyrosigma spencerii							5	4	6	9	4	3	5
Melosira granulata													
Melosira granulata var. angustissima	20						10		48	28	10		14
Melosira italica		5		1	12				25	5		11	
Melosira italica var. tenuissima	4								20				
Melosira varians													2
Navicula capitata													
Navicula cryptocephala													
Navicula minuscula													
Navicula tripunctata													1
Nitzschia acicularis													1
Nitzschia agnewii				1							1		1
Nitzschia dissipata													
Nitzschia hungarica													1
Nitzschia ignorata													
Nitzschia kuetzingiana			1										
Nitzschia lorenziana													
Nitzschia palca			1					1		5			
Nitzschia sp.													
Stauroneis phoenicenteron								1					
Stephanodiscus astrea	1				1		2	1	1				1
Stephanodiscus niagarae				1									
Synedra cyclopum				4			1	3	2	1			1
Synedra delicatissima													
Synedra radians				4	1	1							
Synedra ulna											2		



TABLE A-3

PHYTOPLANKTON, DATA 1993 SURVEY RESULTS  
CHATFIELD RESERVOIR

GENUS/SPECIES	21-Jul						12-Aug							
	RM-1	RM-1-CDH	RP-1	RP-1-CDH	RS-1	RS-1-CDH	RM-1	RM-1-CDH	RP-1	RP-1-CDH	RS-1	RS-1-CDH	DUP	
	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	
<b>CHLOROPHYTA</b>														
Ankyra judayi	6		5	14	1	7	10	2	13		5	3	1	5
Chlamydomonas sp.			5		63					63				16
Chlamydomonas sp.										63				
Chlorella sp.	250	750	1500	625	1125	1500	125	2625	1875	1000	1000	750	4375	
Closterium gracile									1					
Coccomyxa sp.	2625	1625	6500	6625	1000	7625	9375	9000	12375	10500	5313	10312	6125	
Coelastrum sphaericum		14		3					6					
Cosmarium sp.														
Crucigenia tetrapedia														
Crucigeniella apiculata														
Dictyosphaerium ehrenbergianum														
Dictyosphaerium pulchellum														
Eremosphaera gigas		3		2		16	2	6	2		6	3	2	
Eutetramorus fottii	36	78	34		14	468		50		36			18	
Gloecystis sp.						2								
Kirchneriella lunaris										125				
Monoraphidium griffithii	3		1	1	1			1						
Monoraphidium mirabile										1				
Nephrocytium sp.	8	12	20	6	10									
Oocystis gloecystiformis										3				
Oocystis lacustris	14	25	14	1	8									
Oocystis parva		5	12											
Oocystis pusilla							63							
Oocystis solitaria		2	4						1		1			
Pandorina morum														
Pediastrum boryanum				1										
Pediastrum duplex	32						17	36		32			3	
Scenedesmus ecornis														
Scenedesmus granulatus														
Scenedesmus linearis	77	15	65	18	14			18	14				10	
Scenedesmus quadricauda											2			
Schroederia setigera	2			2					1		3	2		
Spirogyra sp.											5			
Staurastrum paradoxum	1	1							1	1		1		
Tetraedron muticum														

TABLE A-3

PHYTOPLANKTON, DATA 1993 SURVEY RESULTS  
CHATFIELD RESERVOIR

GENUS/SPECIES	21-Jul						12-Aug						
	RM-1	RM-1-CDH	RP-1	RP-1-CDH	RS-1	RS-1-CDH	RM-1	RM-1-CDH	RP-1	RP-1-CDH	RS-1	RS-1-CDH	DUP
	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL
<b>CHRYSOPHYTA</b>													
<i>Chromulina minutissima</i>	125				250		63	125				2	
<i>Chrysococcus</i> sp.						16							
<i>Dinobryon divergens</i>	123	15	17	64	25	47	19	162	42	6	79	24	16
<i>Epichrysis</i> sp.								36					
<i>Mallomonas akrokomos</i>	4	4	2		1		1	5	1	12	1	1	7
<i>Mallomonas</i> sp.							1	4	1	5			3
<b>CRYPTOPHYTA</b>													
<i>Chroomonas acuta</i>	1250	1000	625	783	750	1810	1563	1125	813	1500	2438	313	1250
<i>Cryptomonas marsonii</i>	92	55	63	63	137	172	33	110	63	43	30	63	62
<i>Cryptomonas ovata</i>	2	6	9		23	109	2						
<i>Cryptomonas reflexa</i>	14	9	33		29	47	2	15	6	11	18	12	43
<i>Cryptomonas rostratiformis</i>	6	1	4	1	1	3	11	11	9	15	2	7	11
<i>Cryptomonas</i> sp.													
<b>CYANOPHYTA</b>													
<i>Anabaena flos-aquae</i>							37	143	46	46	10	103	26
<i>Anabaena spiroides</i>								55	147	2500			
<i>Aphanizomenon flos-aquae</i>							813	1625			2250	813	3750
<i>Aphanocapsa delicatissima</i>	2500	500		1375									
<i>Aphanothece</i> sp.	79625	116875	51625	80625	57125	45750	2063	2033	2875	5750	12688	8500	15750
<i>Dactylococcopsis fascicularis</i>				1									
<i>Gloeocapsa punctata</i>													94875
<i>Gomphosphaeria wichurae</i> ( <i>Coelosphaerium naegelianum</i> )													
<i>Merismopedia tenuissima</i>	5375	11200	20000	35938	21125	51938	19813	13125	38625	22125	27125	10938	35500
<i>Microcystis aeruginosa</i>		38	22	45					7				5
<i>Oscillatoria limnetica</i>													
<i>Planktolyngbya subtilis</i>													
<b>EUGLENOPHYTA</b>													
<i>Euglena</i> sp.							1	1	2				1
<i>Srombomonas</i> sp.													
<i>Trachelomonas</i> sp.													
<b>PYRRROPHYTA</b>													
<i>Ceratium hirundinella</i>	1	1	1	1			1						
<i>Peridinium pusillum</i>	1												
<i>Peridinium</i> sp.				1									
TOTAL DENSITY (Cells/mL)	92204	132297	80637	126263	81667	109545	34051	30370	57113	43815	51049	126820	67002
TOTAL NUMBER OF TAXA	29	30	27	29	22	17	29	28	31	30	25	29	25

TABLE A-3

PHYTOPLANKTON, DATA 1993 SURVEY RESULTS  
CHATFIELD RESERVOIR

GENUS/SPECIES	26-Aug						10-Sep					
	RM-1	RM-1-CDH	RP-1	RP-1-CDH	RS-1	RS-1-CDH	RM-1	RM-1-CDH	RP-1	RP-1-CDH	RS-1	RS-1-CDH
	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL
<b>BACILLARIOPHYTA</b>												
Asterionella formosa	18						16	25	37	66	18	58
Caloneis schumanniana									1		2	
Cyclotella bodanica												
Cyclotella meneghiniana												
Cyclotella stelligera			375			13						
Entomoneis paludosa				1								3
Fragilaria capucina												
Fragilaria crotonensis	97	34	131	26	18	3	50	110	2	158	52	37
Gyrosigma spencerii												
Melosira granulata	12	14	143	155	24	25	11	38	16	52		30
Melosira granulata var. angustissima	114	117	144	302	38	84	1658	1529	2620	2450	353	451
Melosira italica	22	10	144	159	52	12	17	100	76	18		28
Melosira italica var. tenuissima	36	16			7	4	77					
Melosira varians												
Navicula capitata												
Navicula cryptocephala												
Navicula minuscula				1								
Navicula tripunctata												
Nitzschia acicularis		1		7	1	3						
Nitzschia agnewii			3	5			3	1		3		
Nitzschia dissipata				2								
Nitzschia hungarica												
Nitzschia ignorata												
Nitzschia kuetzingiana			2									
Nitzschia lorenziana									4	2		
Nitzschia palea												
Nitzschia sp.							2					
Stauroneis phoenicenteron												
Stephanodiscus astrea	4	2	4	1		2	19	10	18	19	4	6
Stephanodiscus niagarae			1									1
Synedra cyclopum	1	2	1	12	1				3			
Synedra delicatissima												
Synedra radians			2					2		2		1
Synedra ulna			8						3	3		



TABLE A-3

PHYTOPLANKTON, DATA 1993 SURVEY RESULTS  
CHATFIELD RESERVOIR

GENUS/SPECIES	26-Aug						10-Sep					
	RM-1	RM-1-CDH	RP-1	RP-1-CDH	RS-1	RS-1-CDH	RM-1	RM-1-CDH	RP-1	RP-1-CDH	RS-1	RS-1-CDH
	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL
<b>CHLOROPHYTA</b>												
Ankyra judayi	112	166	74	84	25	48	63	52	63	37	16	31
Chlamydomonas sp.					250							13
Chlamydomonas sp.												
Chlorella sp.	1625	500	1875	625	1000	1500	375	1625	750	750	250	250
Closterium gracile			1									
Coccomyxa sp.	14125	21000	16250	21125	11750	16875	19750	21875	30000	35750	11500	18250
Coelastrum sphaericum									22			
Cosmarium sp.				1			1				1	
Crucigenia tetrapedia				16								
Crucigeniella apiculata			16									
Dictyosphaerium ehrenbergianum								10				
Dictyosphaerium pulchellum												
Eremosphaera gigas			11			2	10	4	12	6	4	
Eutetramorus foitii	6	252	36	16	68	15			36		8	
Gloeocystis sp.												
Kirchneriella lunaris												
Monoraphidium griffithii			1									
Monoraphidium mirabile												
Nephrocytium sp.												
Oocystis gloeocystiformis												
Oocystis lacustris	16	26	18		24	18		4				
Oocystis parva	12	30		4								
Oocystis pusilla				13								
Oocystis solitaria		1						1				
Pandorina morum												
Pediastrum boryanum		21										
Pediastrum duplex			36				16					
Scenedesmus ecornis												
Scenedesmus granulatus												
Scenedesmus linearis			12			48						16
Scenedesmus quadricauda						4		4				
Schroederia setigera				1		1						
Spirogyra sp.												
Staurastrum paradoxum	1	1	1			1				1		
Tetraedron muticum							1					



TABLE A-3

PHYTOPLANKTON, DATA 1993 SURVEY RESULTS  
CHATFIELD RESERVOIR

GENUS/SPECIES	26-Aug						10-Sep					
	RM-1	RM-1-CDH	RP-1	RP-1-CDH	RS-1	RS-1-CDH	RM-1	RM-1-CDH	RP-1	RP-1-CDH	RS-1	RS-1-CDH
	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL	Cells/mL
<b>CHRYSOPHYTA</b>												
<i>Chromulina minutissima</i>		125	125		125		125	125			13	
<i>Chrysococcus</i> sp.												
<i>Dinobryon divergens</i>	64	89		80	23	22	182	44	142	65	36	82
<i>Epichrysis</i> sp.										20		
<i>Mallomonas akrokomos</i>	21	34	15	26	4	7	4	4	2	10	7	12
<i>Mallomonas</i> sp.	2			6	2						1	
<b>CRYPTOPHYTA</b>												
<i>Chroomonas acuta</i>	1250	1000	375	2125	625	1250	1375		2500	2500	750	750
<i>Cryptomonas marsonii</i>	58	101	37	46	74	127	60		34	42	51	75
<i>Cryptomonas ovata</i>	1		9						1			5
<i>Cryptomonas reflexa</i>	27	22	8	35	71	71	18	17	27	43	22	43
<i>Cryptomonas rostriformis</i>	5	23	11	22	2	11	13	28	22	16	1	6
<i>Cryptomonas</i> sp.												
<b>CYANOPHYTA</b>												
<i>Anabaena flos-aquae</i>	640	561	701	1270	3098	2071	531	91	37	22	248	384
<i>Anabaena spiroides</i>												
<i>Aphanizomenon flos-aquae</i>	42	67	60	1089			3309	438	261	1619	337	612
<i>Aphanocapsa delicatissima</i>	1750		2625		750		3000	2750	3875	3750		1500
<i>Aphanothece</i> sp.	7000	2625	18750	5500	4000	7500	9125	13750	2125	11375	27625	7625
<i>Dactylococcopsis fascicularis</i>												
<i>Gloeocapsa punctata</i>											800	
<i>Gomphosphaeria wichurae</i> ( <i>Coelosphaerium naegelianum</i> )		126										
<i>Merismopedia tenuissima</i>	14250	13500	17250	15000	2250	14625	10250	7125	750	2250	2875	1500
<i>Microcystis aeruginosa</i>	76		50									300
<i>Oscillatoria limnetica</i>					12							
<i>Planktolyngbya subtilis</i>												
<b>EUGLENOPHYTA</b>												
<i>Euglena</i> sp.			12								1	
<i>Strombomonas</i> sp.												1
<i>Trachelomonas</i> sp.												
<b>PYRROPHYTA</b>												
<i>Ceratium hirundinella</i>				2	1	1	1	1			1	1
<i>Peridinium pusillum</i>												
<i>Peridinium</i> sp.					1							
TOTAL DENSITY (Cells/mL)	41387	40466	59317	47757	24296	44343	50062	49794	43450	61852	44157	32065
TOTAL NUMBER OF TAXA	29	29	38	32	28	28	29	28	28	30	25	27

TABLE A-3

PHYTOPLANKTON, DATA 1993 SURVEY RESULTS  
CHATFIELD RESERVOIR

GENUS/SPECIES	22-Sep					
	RM-1 Cells/mL	RM-1-CDH Cells/mL	RP-1 Cells/mL	RP-1-CDH Cells/mL	RS-1 Cells/mL	RS-1-CDH Cells/mL
<b>BACILLARIOPHYTA</b>						
<i>Asterionella formosa</i>	30	85	101	140	87	73
<i>Caloneis schumanniana</i>						
<i>Cyclotella bodanica</i>				2		
<i>Cyclotella meneghiniana</i>						
<i>Cyclotella stelligera</i>			125			
<i>Entomoneis paludosa</i>						
<i>Fragilaria capucina</i>				8	16	4
<i>Fragilaria crotonensis</i>		30	32	61	27	18
<i>Gyrosigma spencerii</i>			1			
<i>Melosira granulata</i>	34	29	18	12	3	5
<i>Melosira granulata</i> var. <i>angustissima</i>	220	294	130	143	38	21
<i>Melosira italica</i>	170	190	233	238	13	38
<i>Melosira italica</i> var. <i>tenuissima</i>						
<i>Melosira varians</i>						
<i>Navicula capitata</i>				1		
<i>Navicula cryptoccephala</i>				3	1	
<i>Navicula minuscula</i>						
<i>Navicula tripunctata</i>				1		
<i>Nitzschia acicularis</i>				1		
<i>Nitzschia agnewii</i>				2	1	
<i>Nitzschia dissipata</i>						
<i>Nitzschia hungarica</i>					1	
<i>Nitzschia ignorata</i>				1		
<i>Nitzschia kuetzingiana</i>						
<i>Nitzschia lorenziana</i>				1		1
<i>Nitzschia palca</i>		1		3		1
<i>Nitzschia</i> sp.				4		
<i>Stauroneis phoenicenteron</i>						
<i>Stephanodiscus astrea</i>	24	33	42	24	2	2
<i>Stephanodiscus niagarae</i>						
<i>Synedra cyclopum</i>					1	1
<i>Synedra delicatissima</i>					1	2
<i>Synedra radians</i>						1
<i>Synedra ulna</i>				1		1

TABLE A-3

PHYTOPLANKTON, DATA 1993 SURVEY RESULTS  
CHATFIELD RESERVOIR

GENUS/SPECIES	22-Sep					
	RM-1 Cells/mL	RM-1-CDH Cells/mL	RP-1 Cells/mL	RP-1-CDH Cells/mL	RS-1 Cells/mL	RS-1-CDH Cells/mL
<b>CHLOROPHYTA</b>						
Ankyra judayi	13	11	8	18	13	5
Chlamydomonas sp.	250					
Chlamydomonas sp.						
Chlorella sp.	750	1000	125	250	563	688
Closterium gracile					2500	3125
Coccomyxa sp.	750	7125	7375	3125		
Coelastrum sphaericum						
Cosmarium sp.					1	1
Crucigenia tetrapedia						
Crucigeniella apiculata						
Dictyosphaerium ehrenbergianum						
Dictyosphaerium pulchellum						
Eremosphaera gigas		8	2	6	5	1
Eutetramorus fottii		8	1	86	10	
Gloeocystis sp.					1	
Kirchneriella lunaris					1	
Monocraethidium griffithii						
Monocraethidium mirabile			1			
Nephrocytium sp.						
Oocystis gloeocystiformis						
Oocystis lacustris		2		6	4	
Oocystis parva						
Oocystis pusilla				6		
Oocystis solitaria						
Pandorina morum						
Pediastrum boryanum						
Pediastrum duplex						
Scenedesmus ecornis						
Scenedesmus granulatus						
Scenedesmus linearis					7	7
Scenedesmus quadricauda					3	
Schroederia setigera					1	
Spirogyra sp.						
Staurastrum paradoxum		2				1
Tetraedron muticum						

TABLE A-3

PHYTOPLANKTON, DATA 1993 SURVEY RESULTS  
CHATFIELD RESERVOIR

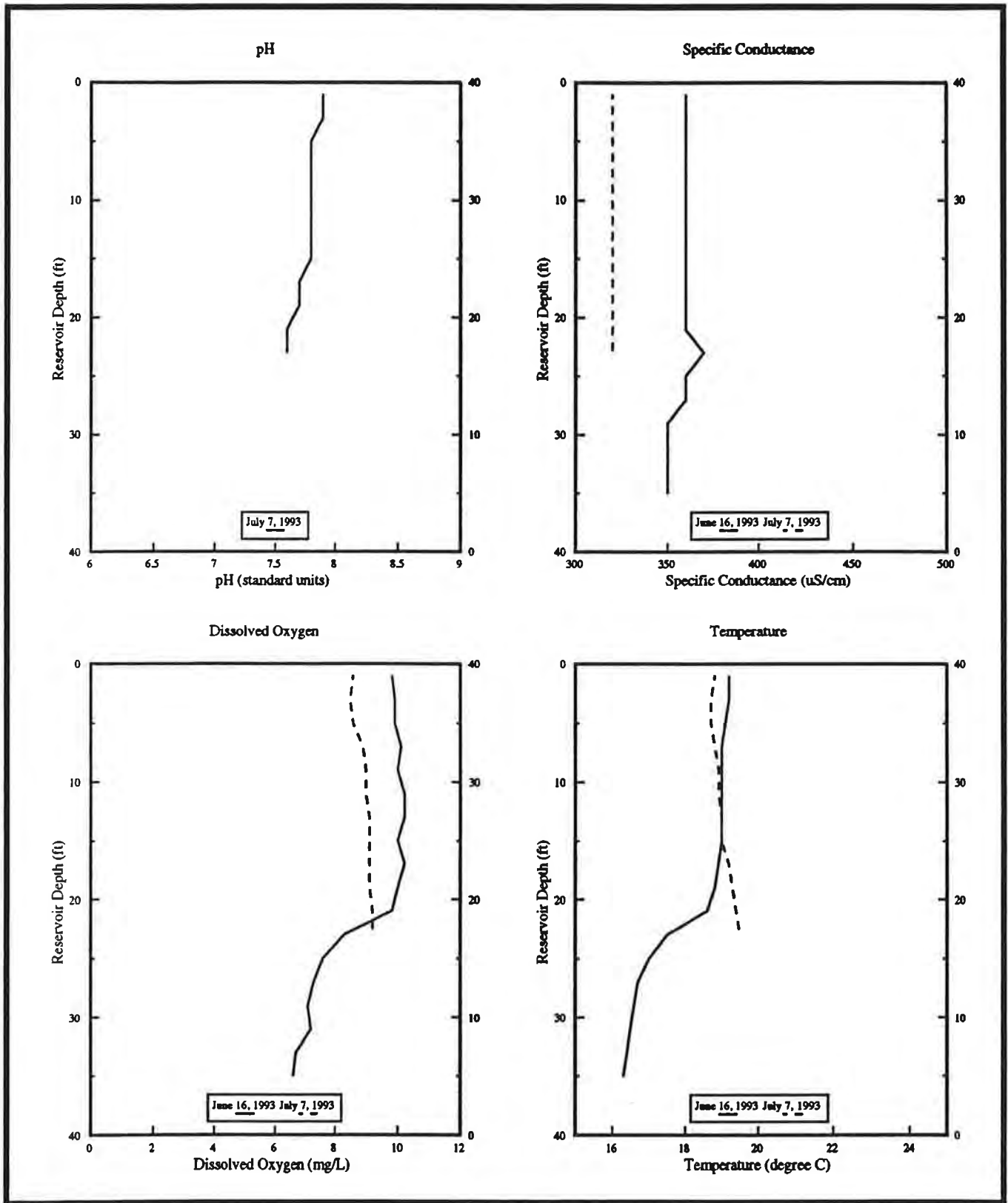
GENUS/SPECIES	22-Sep					
	RM-1 Cells/mL	RM-1-CDH Cells/mL	RP-1 Cells/mL	RP-1-CDH Cells/mL	RS-1 Cells/mL	RS-1-CDH Cells/mL
<b>CHRYSOPHYTA</b>						
Chromulina minutissima			125	125	100	250
Chrysococcus sp.						
Dinobryon divergens	17	45	31	6	75	74
Epichrysis sp.						6
Mallomonas akrokomos	1	2	2	5	6	6
Mallomonas sp.						1
<b>CRYPTOPHYTA</b>						
Chroomonas acuta	1875	1625	1875	1500	625	1063
Cryptomonas marsonii	30	41	24	26	16	16
Cryptomonas ovata						
Cryptomonas reflexa	17	19	18	11	22	21
Cryptomonas rostriformis	10	16	6	3	13	10
Cryptomonas sp.						
<b>CYANOPHYTA</b>						
Anabaena flos-aquae	40	62			216	17
Anabaena spiroides		28			6	
Aphanizomenon flos-aquae	1552	1580	4760	2302	3395	2366
Aphanocapsa delicatissima						
Aphanothece sp.	3250	15000	2750	25000	125	688
Dactylococopsis fascicularis						
Gloeocapsa punctata						
Gomphosphaeria wichurae (Coelosphaerium naegelianum)		26			75	5
Merismopedia tenuissima						
Microcystis aeruginosa	650				100	
Oscillatoria limnetica						
Planktolyngbya subtilis						
<b>EUGLENOPHYTA</b>						
Euglena sp.						1
Strombomonas sp.						
Trachelomonas sp.						
<b>PYRROPHYTA</b>						
Ceratium hirundinella					1	1
Peridinium pusillum					1	1
Peridinium sp.						
TOTAL DENSITY (Cells/mL)	9683	27262	17785	33121	8078	8520
TOTAL NUMBER OF TAXA	19	25	23	34	41	34





**APPENDIX B**

**WATER-COLUMN INDICATOR-VARIABLE PROFILES  
1993 CY MONITORING PROGRAM**



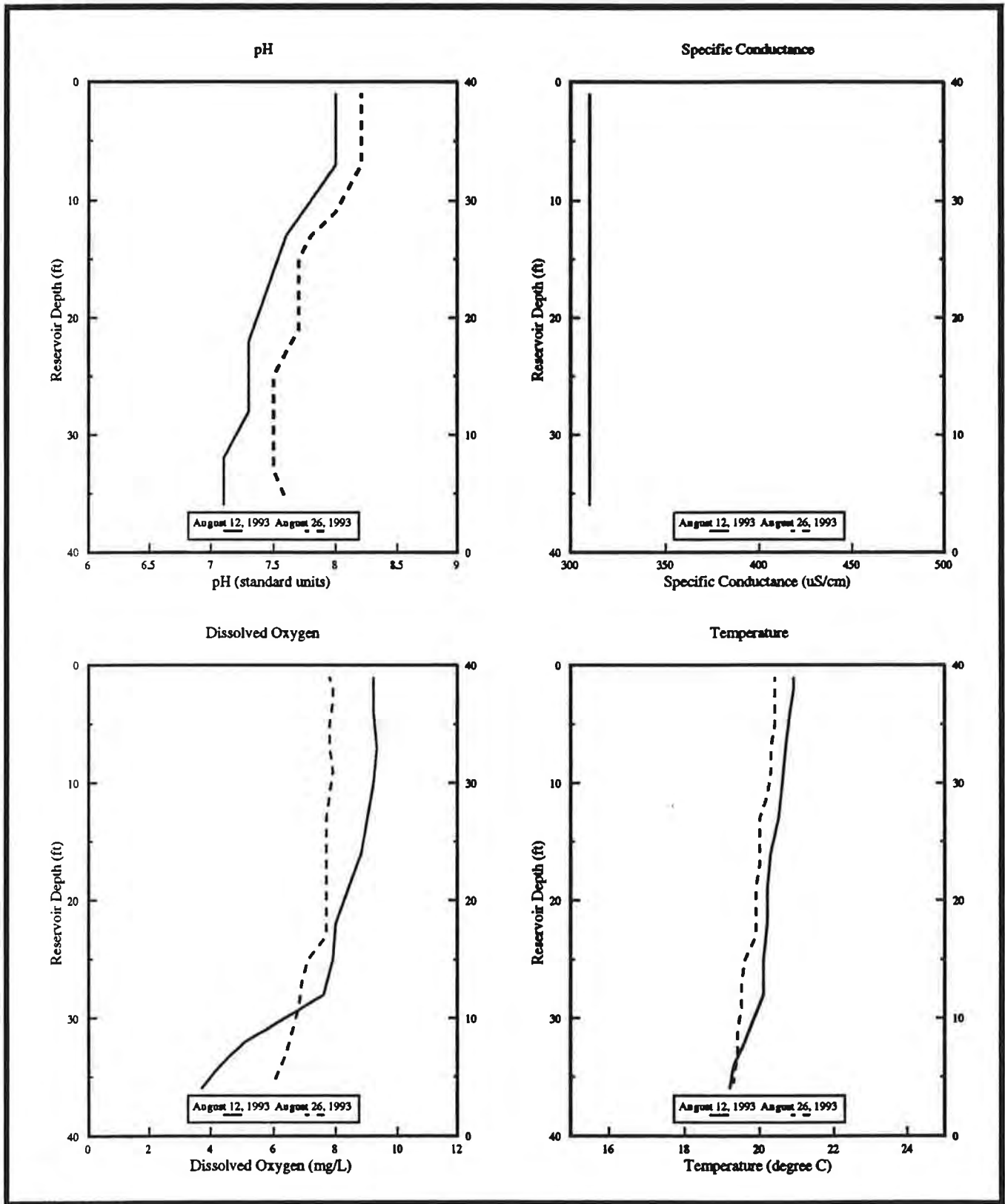
**IN-RESERVOIR DEPTH PROFILE DATA, SITE 7 (RM)  
CHATFIELD RESERVOIR 1993**



**CHATFIELD BASIN AND RESERVOIR  
WATER-QUALITY MONITORING PROGRAM**

Project No. 8969.30

Figure B-1A



**IN-RESERVOIR DEPTH PROFILE DATA, SITE 7 (RM)  
CHATFIELD RESERVOIR 1993**

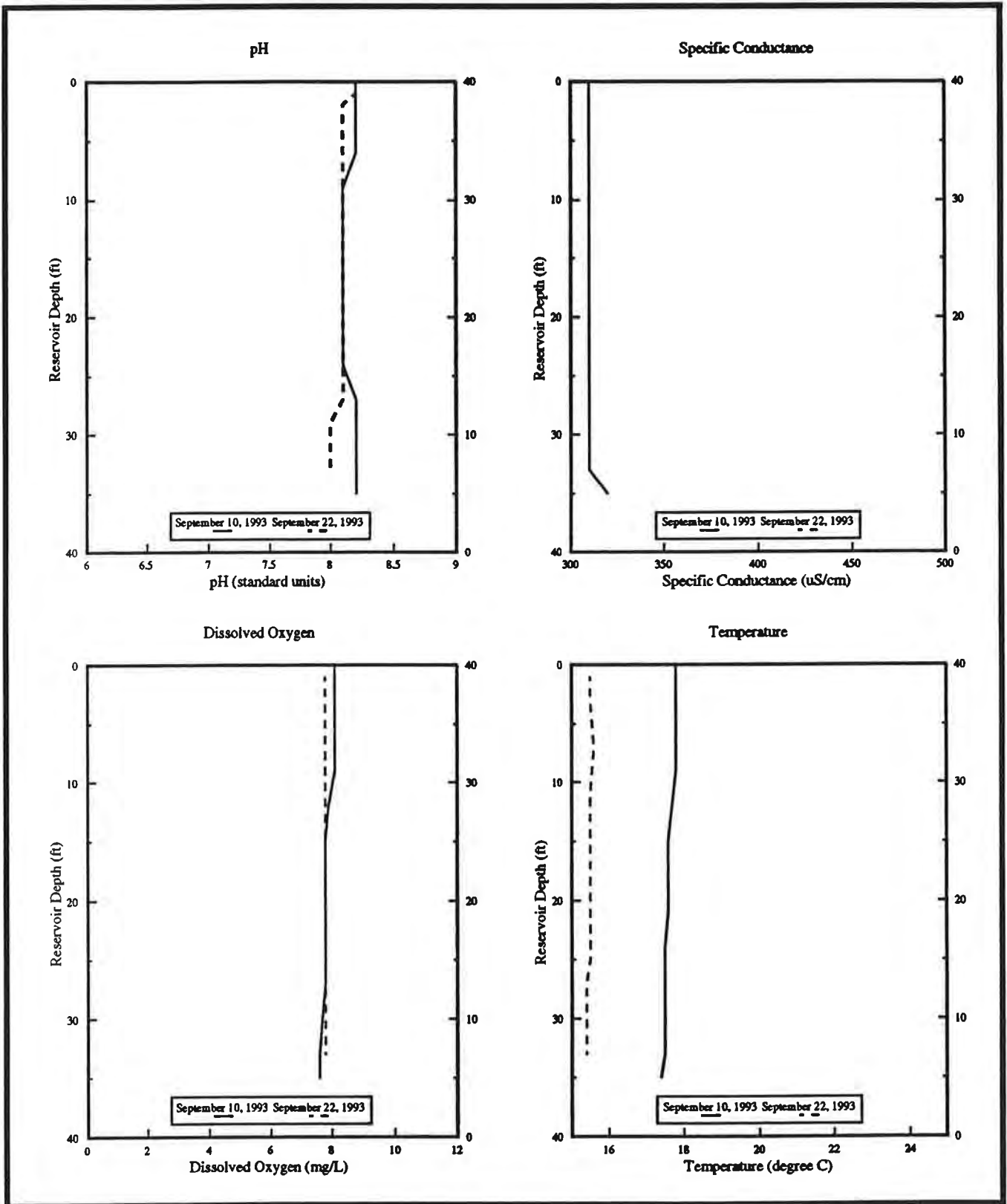


**CHATFIELD BASIN AND RESERVOIR  
WATER-QUALITY MONITORING PROGRAM**

Project No. 8969.30

Figure B-1B





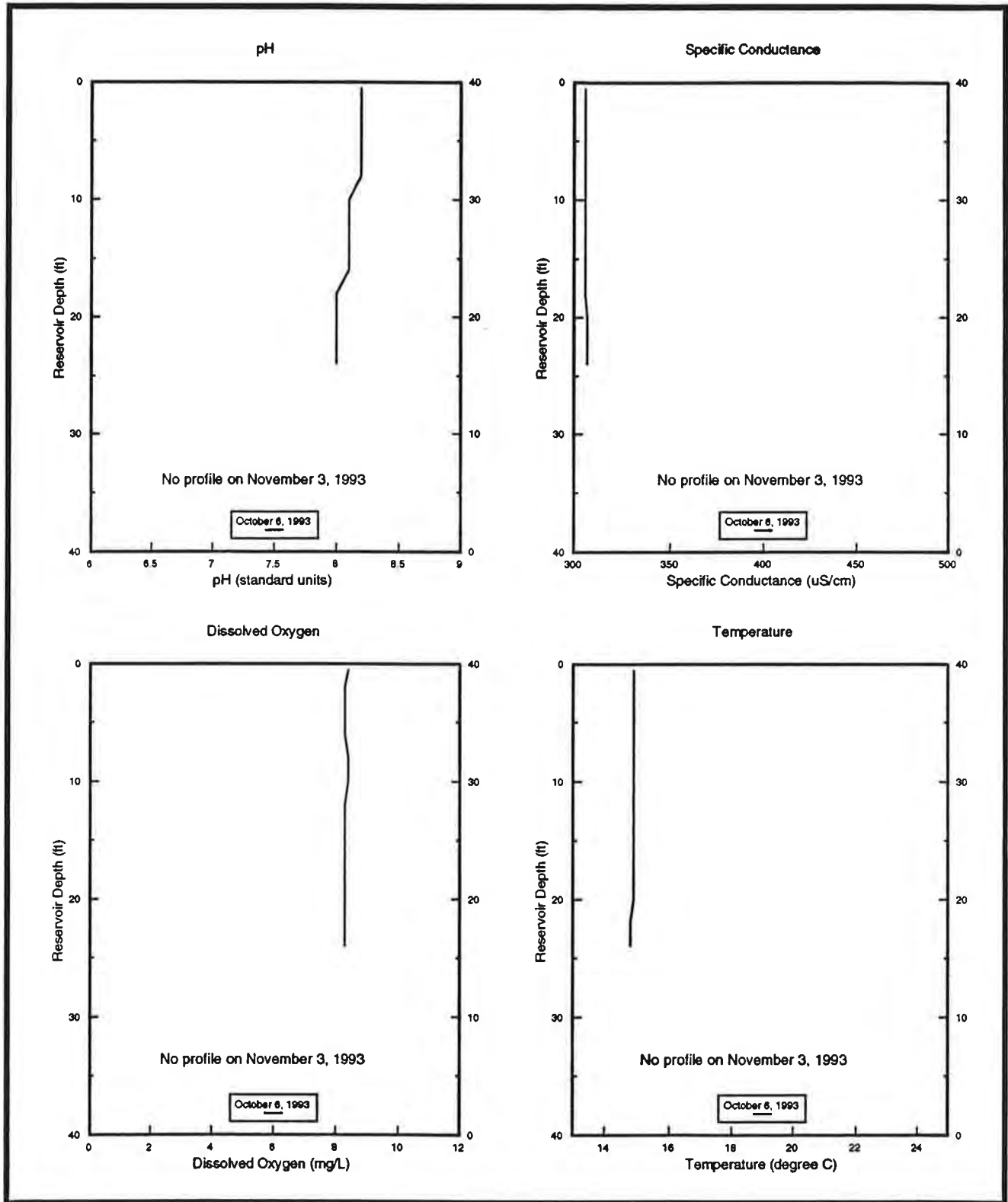
IN-RESERVOIR DEPTH PROFILE DATA, SITE 7 (RM)  
 CHATFIELD RESERVOIR 1993



CHATFIELD BASIN AND RESERVOIR  
 WATER-QUALITY MONITORING PROGRAM

Project No. 8969.30

Figure B-1C



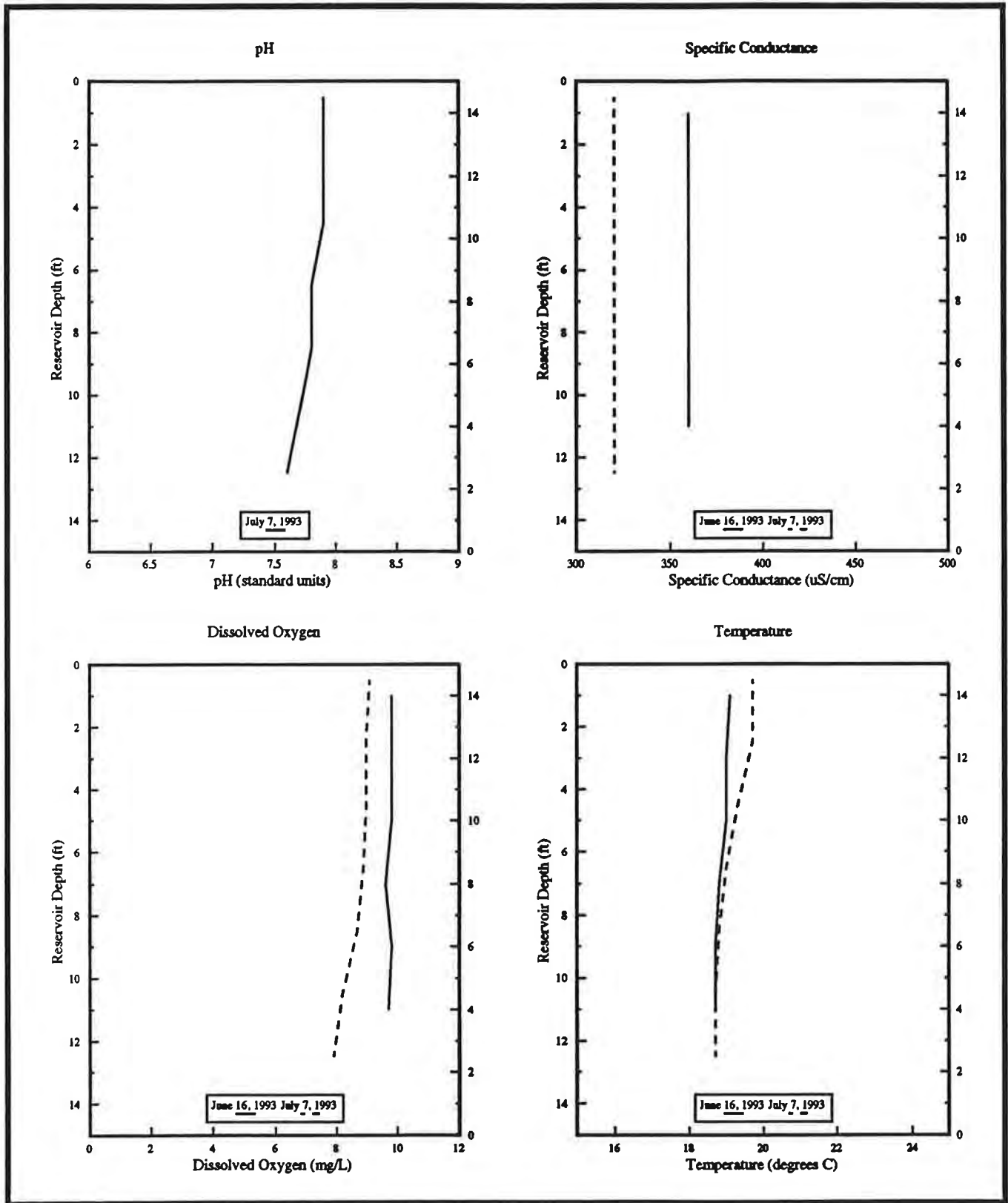
**IN-RESERVOIR DEPTH PROFILE DATA, SITE 7 (RM)  
CHATFIELD RESERVOIR 1993**



**CHATFIELD BASIN AND RESERVOIR  
WATER-QUALITY MONITORING PROGRAM**

Project No. 8969.30

Figure B-1D



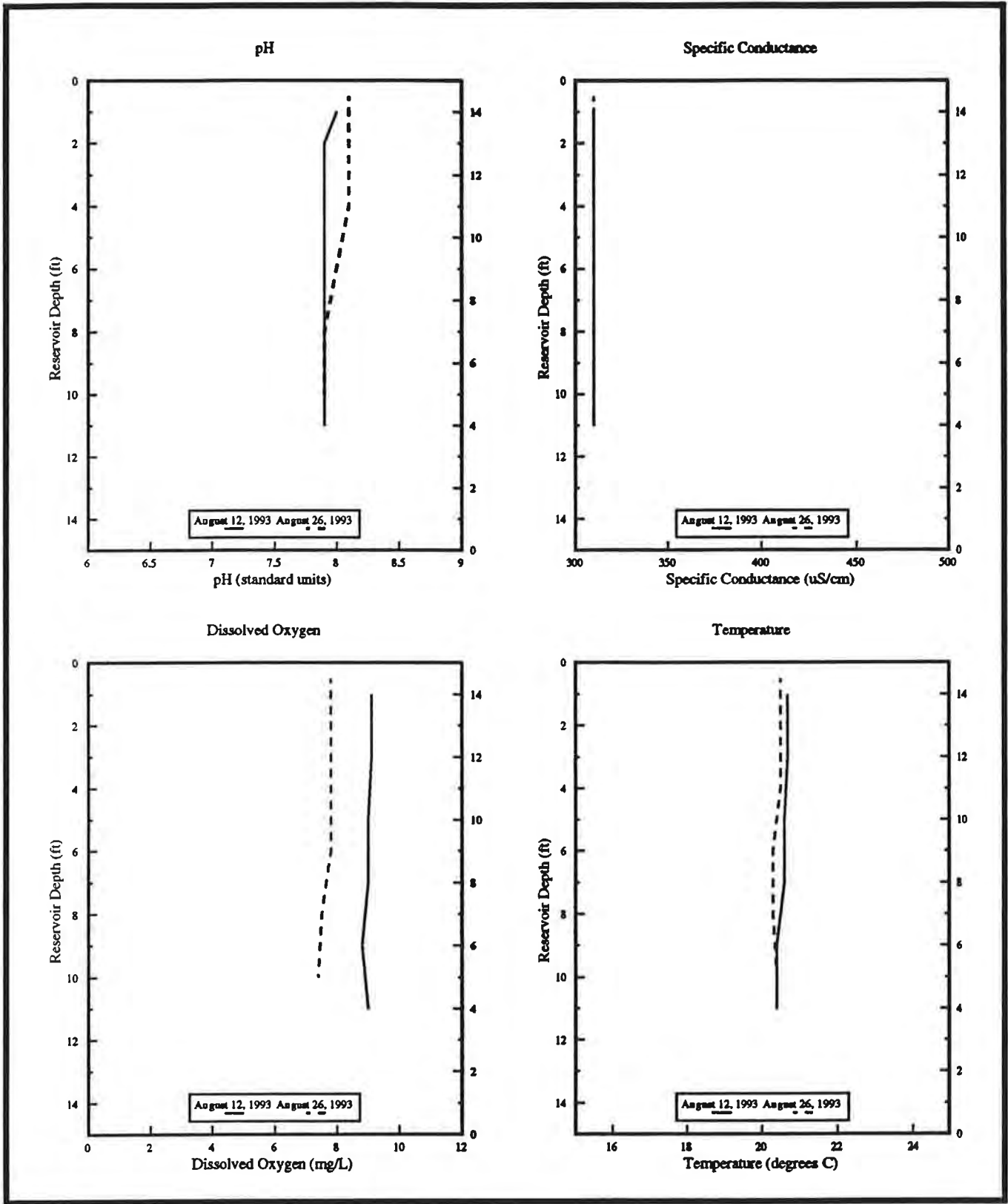
**IN-RESERVOIR DEPTH PROFILE DATA, SITE 8 (RP)  
CHATFIELD RESERVOIR 1993**



**CHATFIELD BASIN AND RESERVOIR  
WATER-QUALITY MONITORING PROGRAM**

Project No. 8969.30

Figure B-2A



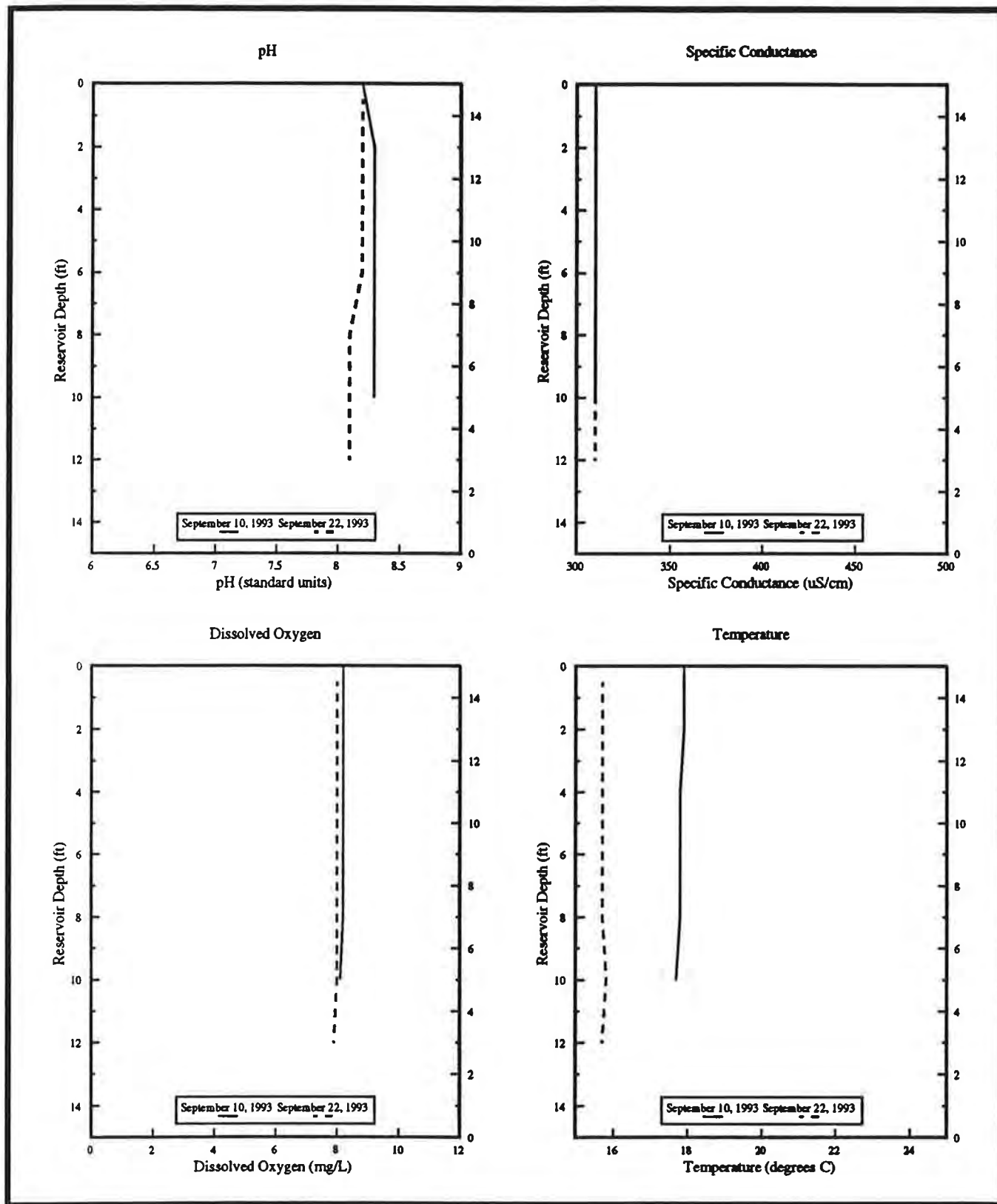
**IN-RESERVOIR DEPTH PROFILE DATA, SITE 8 (RP)  
CHATFIELD RESERVOIR 1993**



**CHATFIELD BASIN AND RESERVOIR  
WATER-QUALITY MONITORING PROGRAM**

Project No. 8969.30

Figure B-2B



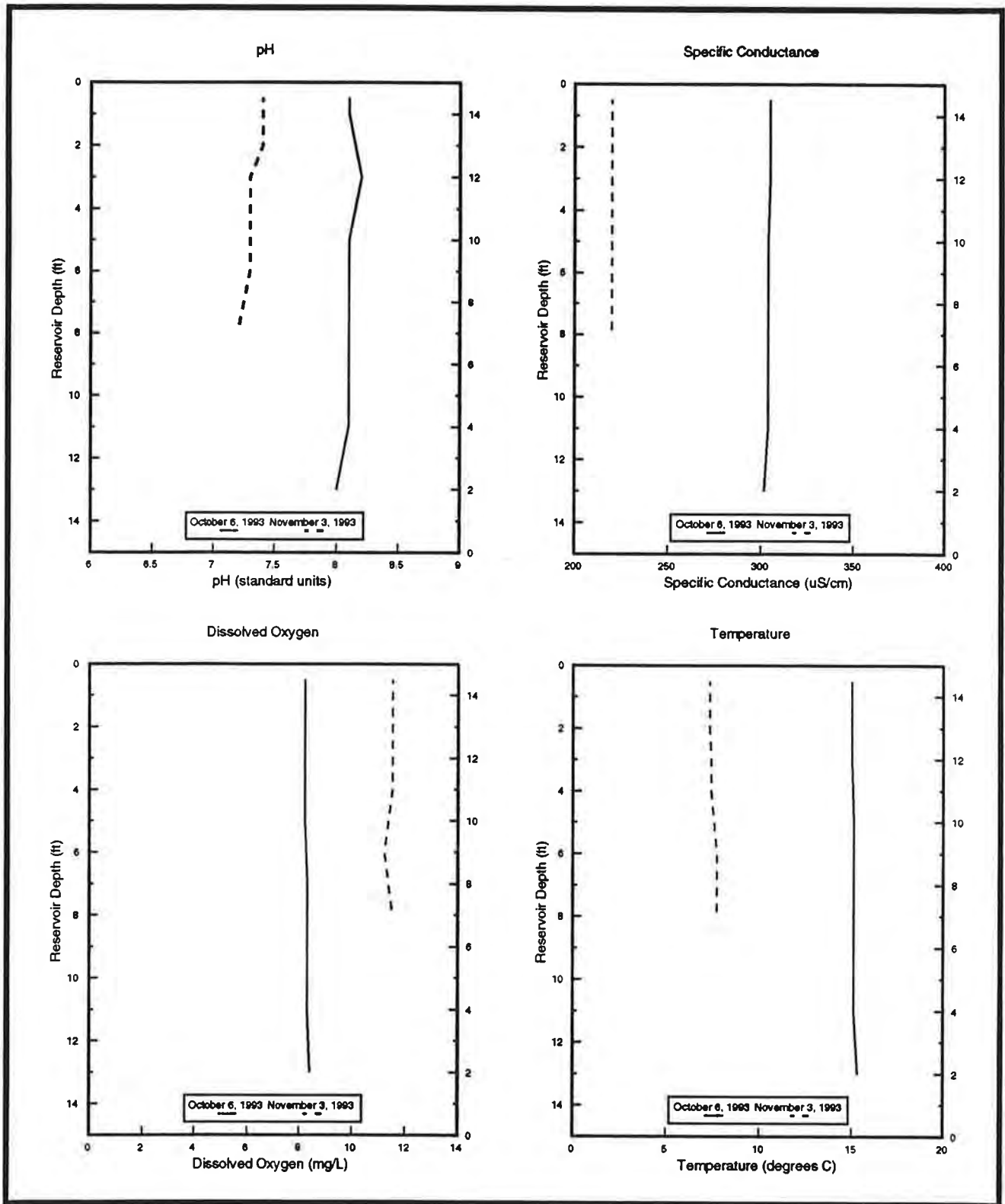
**IN-RESERVOIR DEPTH PROFILE DATA, SITE 8 (RP)  
CHATFIELD RESERVOIR 1993**



**CHATFIELD BASIN AND RESERVOIR  
WATER-QUALITY MONITORING PROGRAM**

Project No. 8969.30

Figure B-2C



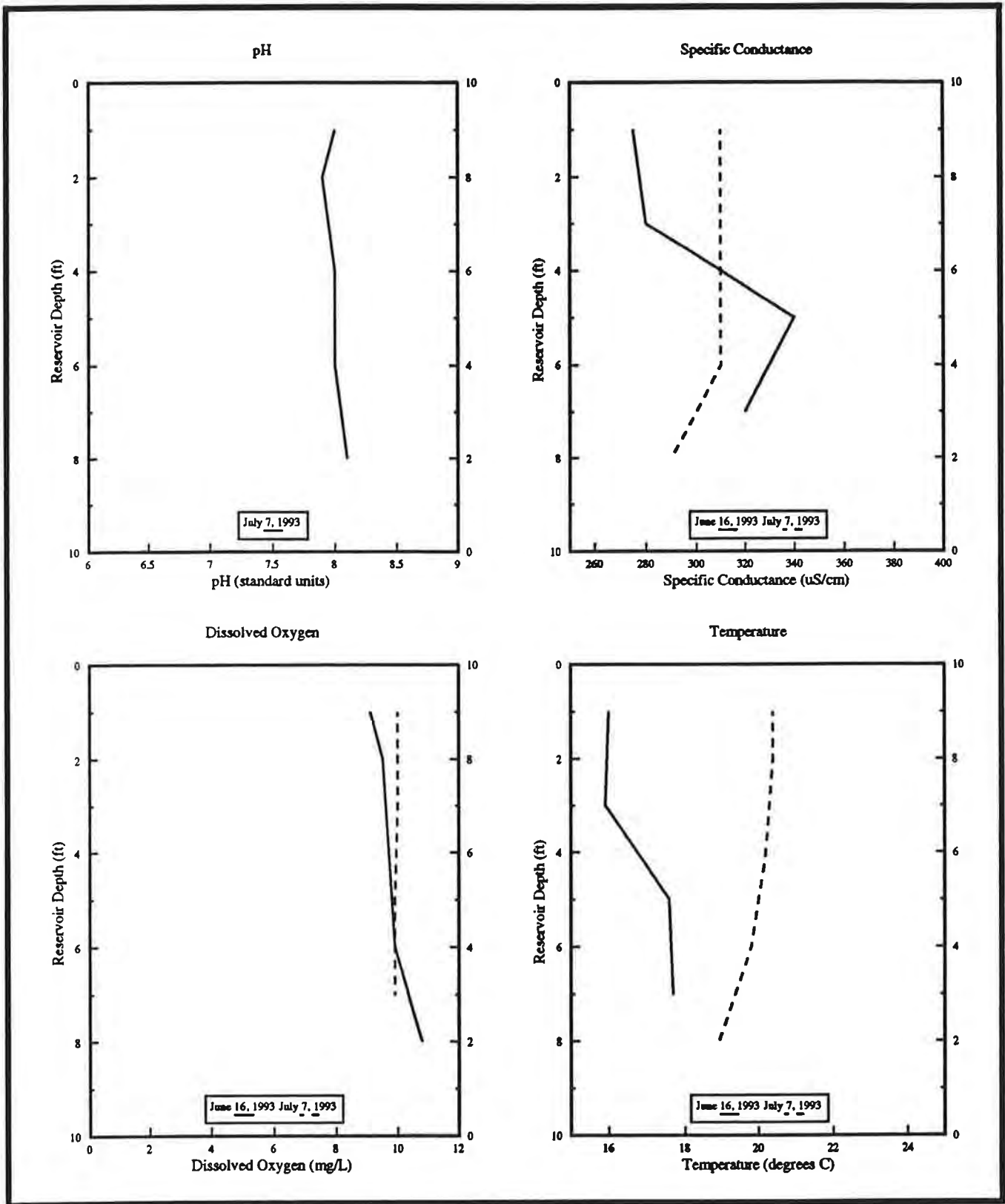
IN-RESERVOIR DEPTH PROFILE DATA, SITE 8 (RP)  
 CHATFIELD RESERVOIR 1993



CHATFIELD BASIN AND RESERVOIR  
 WATER-QUALITY MONITORING PROGRAM

Project No. 8969.30

Figure B-2D



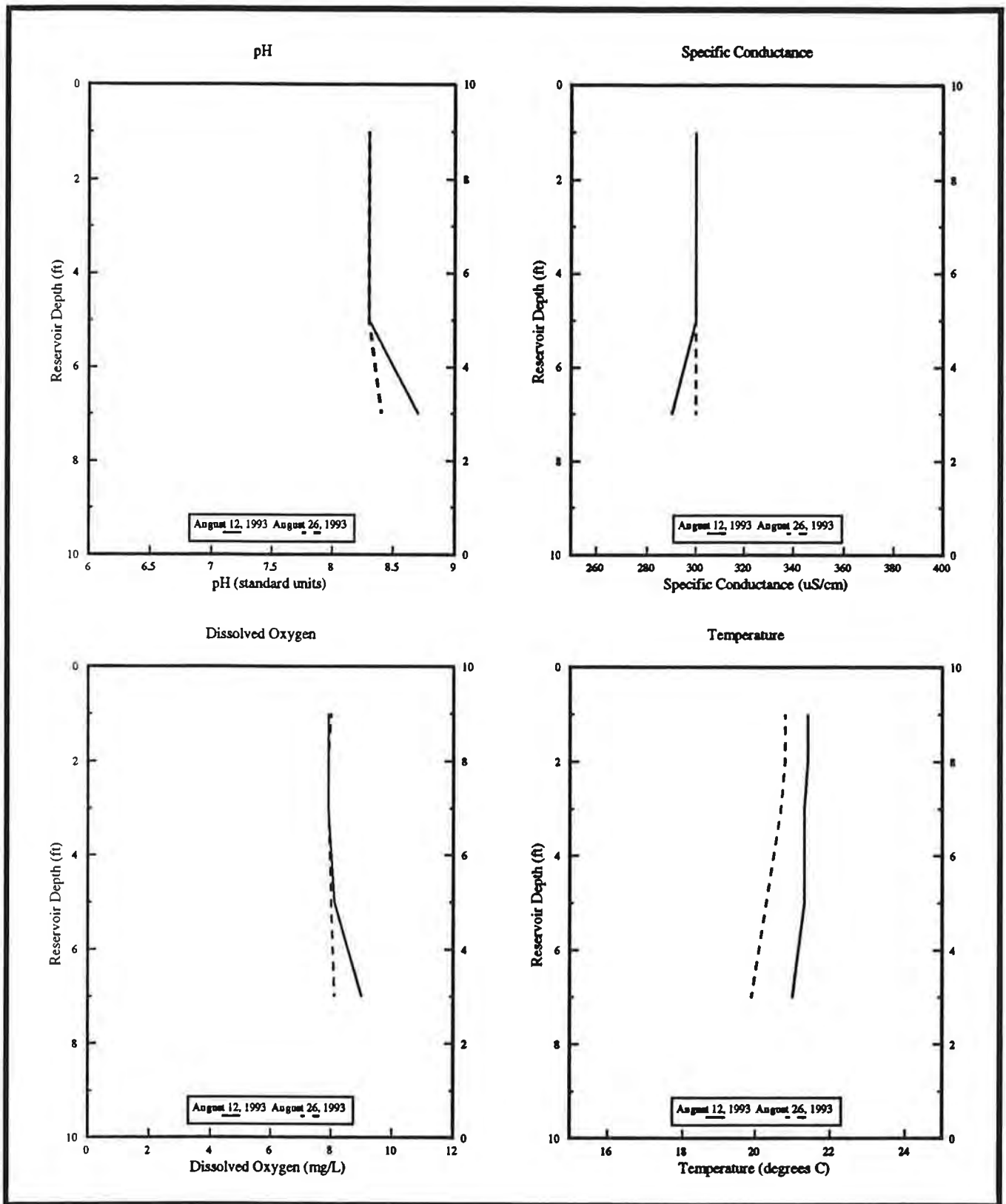
**IN-RESERVOIR DEPTH PROFILE DATA, SITE 9 (RS)  
CHATFIELD RESERVOIR 1993**



**CHATFIELD BASIN AND RESERVOIR  
WATER-QUALITY MONITORING PROGRAM**

Project No. 8969.30

Figure B-3A



**IN-RESERVOIR DEPTH PROFILE DATA, SITE 9 (RS)  
CHATFIELD RESERVOIR 1993**

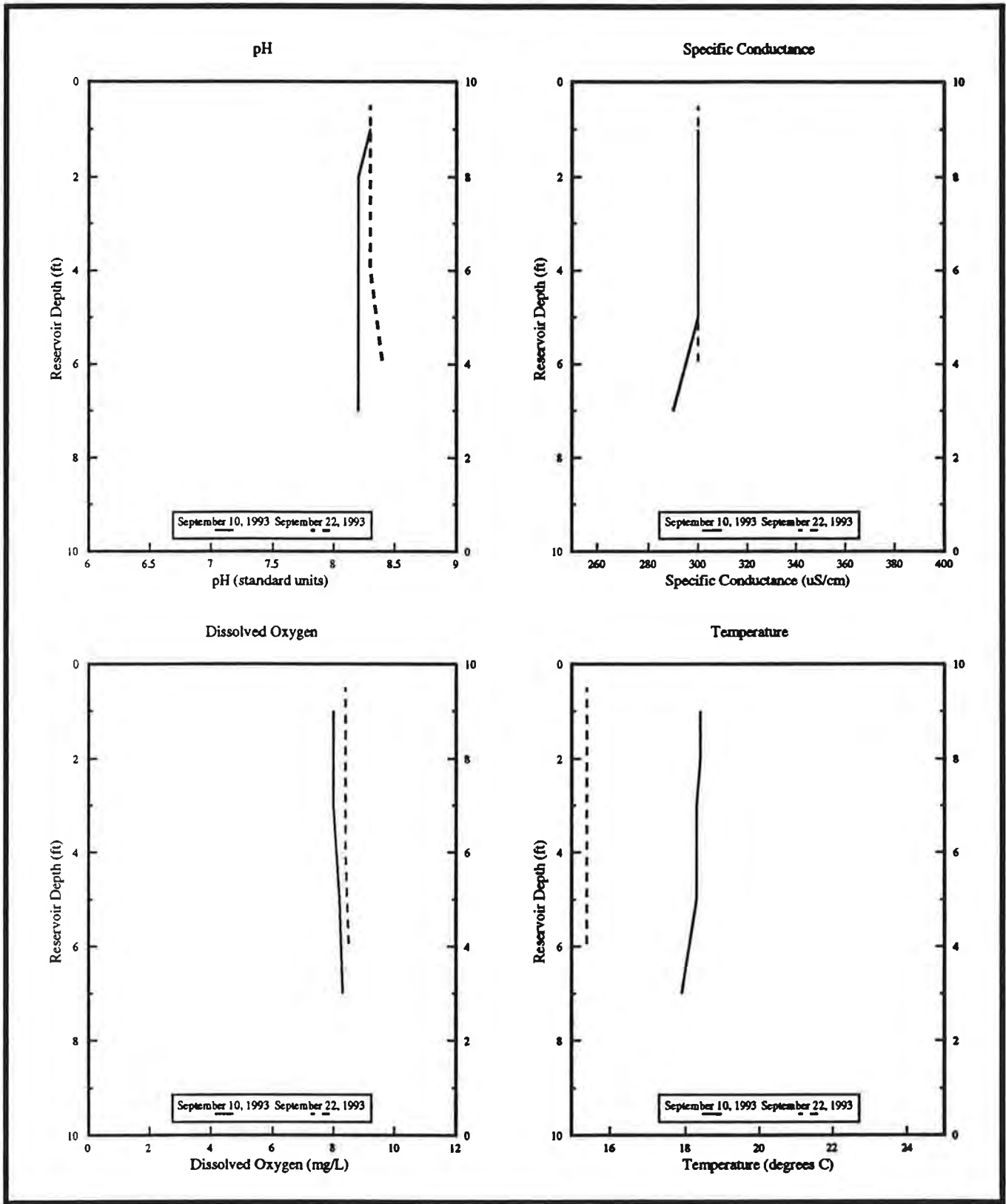


**CHATFIELD BASIN AND RESERVOIR  
WATER-QUALITY MONITORING PROGRAM**

Project No. 8969.30

Figure B-3B





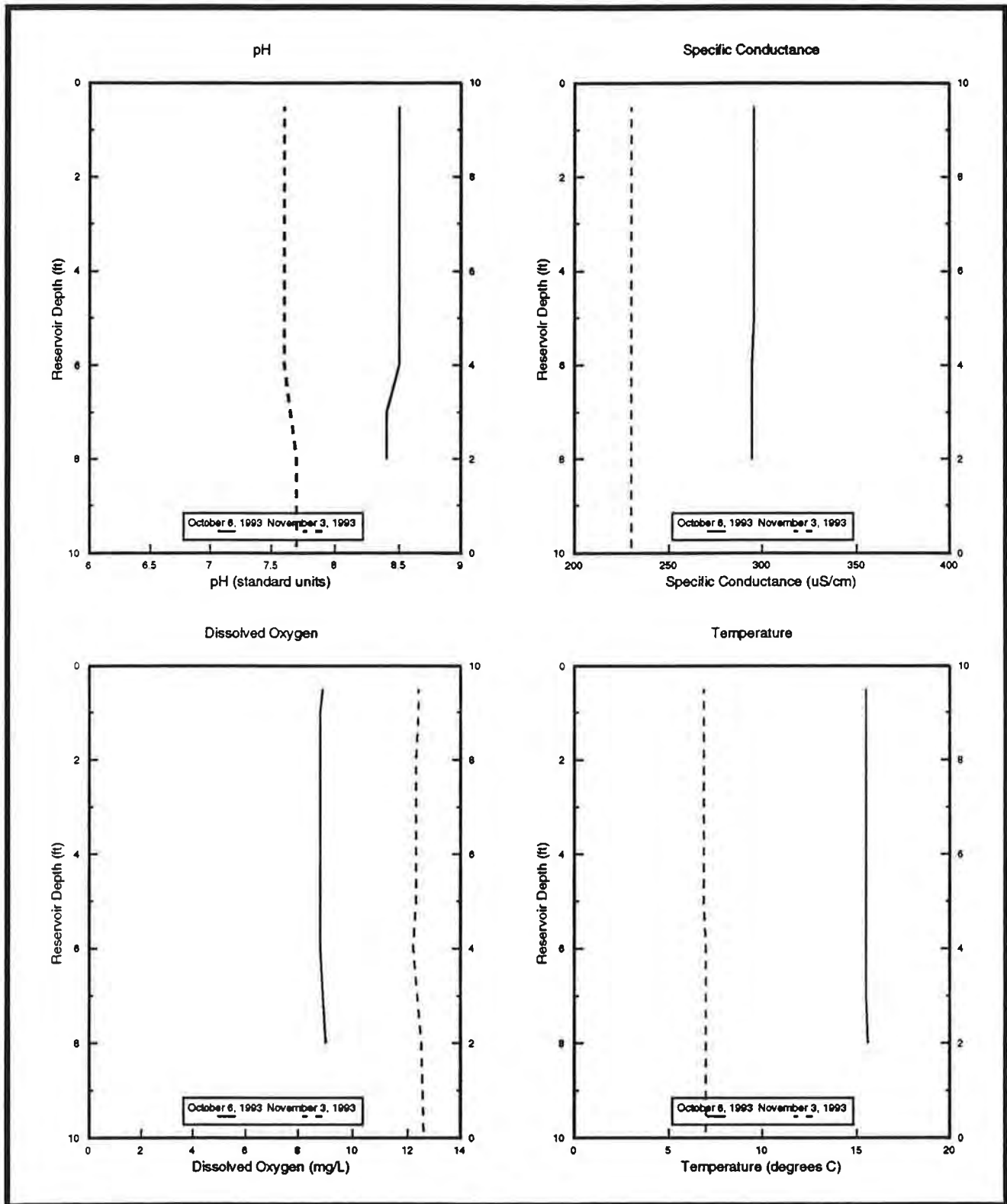
**IN-RESERVOIR DEPTH PROFILE DATA, SITE 9 (RS)  
CHATFIELD RESERVOIR 1993**



**CHATFIELD BASIN AND RESERVOIR  
WATER-QUALITY MONITORING PROGRAM**

Project No. 8969.30

Figure B-3C



**IN-RESERVOIR DEPTH PROFILE DATA, SITE 9 (RS)  
CHATFIELD RESERVOIR 1993**



**CHATFIELD BASIN AND RESERVOIR  
WATER-QUALITY MONITORING PROGRAM**

Project No. 8969.30

Figure B-3D

**TABLE B-1**  
**CHATFIELD IN-RESERVOIR DEPTH-PROFILE DATA**  
**SITE RM (7)**

June 16, 1993, 1140 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP. (deg C)
1.0	-	360	9.8	19.2
3.0	-	360	9.9	19.2
5.0	-	360	9.9	19.1
7.0	-	360	10.1	19.0
9.0	-	360	10.0	19.0
11.0	-	360	10.2	19.0
13.0	-	360	10.2	19.0
15.0	-	360	10.0	19.0
17.0	-	360	10.2	18.9
19.0	-	360	10.0	18.8
21.0	-	360	9.8	18.6
23.0	-	370	8.3	17.5
25.0	-	360	7.6	17.0
27.0	-	360	7.3	16.7
29.0	-	350	7.1	16.6
31.0	-	350	7.2	16.5
33.0	-	350	6.7	16.4
35.0	-	350	6.6	16.3

July 7, 1993, 1145 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP. (deg C)
1.0	7.9	320	8.6	18.8
3.0	7.9	320	8.5	18.7
5.0	7.8	320	8.6	18.7
7.0	7.8	320	8.9	18.8
9.0	7.8	320	9.0	18.9
11.0	7.8	320	9.0	18.9
13.0	7.8	320	9.1	19.0
15.0	7.8	320	9.1	19.0
17.0	7.7	320	9.1	19.2
19.0	7.7	320	9.1	19.3
21.0	7.6	320	9.2	19.4
23.0	7.6	320	9.2	19.5

**TABLE B-1  
CHATFIELD IN-RESERVOIR DEPTH-PROFILE DATA  
SITE RM (7)**

August 12, 1992, 1110 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP. (deg C)
1	8.0	310	9.2	20.9
2	8.0	310	9.2	20.9
4	8.0	310	9.2	20.8
7	8.0	310	9.3	20.7
10	7.8	310	9.2	20.6
13	7.6	310	9.0	20.5
16	7.5	310	8.8	20.3
19	7.4	310	8.4	20.2
22	7.3	310	8.0	20.2
25	7.3	310	7.9	20.1
28	7.3	310	7.6	20.1
32	7.1	310	5.1	19.6
34	7.1	310	4.3	19.3
36	7.1	310	3.7	19.2

August 26, 1993, 1055 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP. (deg C)
1	8.2	310.0	7.8	20.4
2	8.2	310.0	7.9	20.4
3	8.2	310.0	7.9	20.4
5	8.2	310.0	7.8	20.4
7	8.2	310.0	7.8	20.3
9	8.1	310.0	7.9	20.3
11	8.0	310.0	7.8	20.2
13	7.8	310.0	7.7	20.0
15	7.7	310.0	7.7	20.0
17	7.7	310.0	7.7	20.0
19	7.7	310.0	7.7	19.9
21	7.7	310.0	7.7	19.9
23	7.6	310.0	7.7	19.9
25	7.5	310.0	7.1	19.6
27	7.5	310.0	6.9	19.5
29	7.5	310.0	6.8	19.5
31	7.5	310.0	6.6	19.4
33	7.5	310.0	6.4	19.4
35.5	7.6	310.0	6.0	19.3

**TABLE B-1**  
**CHATFIELD IN-RESERVOIR DEPTH-PROFILE DATA**  
**SITE RM (7)**

September 10, 1993, 0910 hours					
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP. (deg C)	
0	8.2	310	8.1	17.8	17.8
3	8.2	310	8.1	17.8	17.8
6	8.2	310	8.1	17.8	17.8
9	8.1	310	8.1	17.8	17.8
12	8.1	310	7.9	17.7	17.7
15	8.1	310	7.8	17.6	17.6
18	8.1	310	7.8	17.6	17.6
21	8.1	310	7.8	17.6	17.6
24	8.1	310	7.8	17.5	17.5
27	8.2	310	7.8	17.5	17.5
30	8.2	310	7.7	17.5	17.5
33	8.2	310	7.6	17.5	17.5
35	8.2	320	7.6	17.4	17.4

September 22, 1993, 1010 hours					
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP. (deg C)	
1	8.2	310	7.8	15.5	15.5
2	8.1	310	7.8	15.5	15.5
3	8.1	310	7.8	15.5	15.5
7	8.1	310	7.8	15.6	15.6
11	8.1	310	7.8	15.5	15.5
15	8.1	310	7.8	15.5	15.5
19	8.1	310	7.8	15.5	15.5
21	8.1	310	7.8	15.5	15.5
23	8.1	310	7.8	15.5	15.5
25	8.1	310	7.8	15.5	15.5
27	8.1	310	7.8	15.4	15.4
29	8.0	310	7.8	15.4	15.4
31	8.0	310	7.8	15.4	15.4
33	8.0	310	7.8	15.4	15.4

**TABLE B-1**  
**CHATFIELD IN-RESERVOIR DEPTH-PROFILE DATA**  
**SITE RM (7)**

October 6, 1993, 1010 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP. (deg C)
0.5	8.2	306	8.4	14.9
2	8.2	306	8.3	14.9
4	8.2	306	8.3	14.9
6	8.2	306	8.3	14.9
8	8.2	306	8.4	14.9
10	8.1	306	8.4	14.9
12	8.1	306	8.3	14.9
14	8.1	306	8.3	14.9
16	8.1	306	8.3	14.9
18	8.0	306	8.3	14.9
20	8.0	307	8.3	14.9
22	8.0	307	8.3	14.8
24	8.0	307	8.3	14.8

No profile taken: November 3, 1993.

**TABLE B-2  
CHATFIELD IN-RESERVOIR DEPTH-PROFILE DATA  
SITE RP (8)**

June 16, 1993, 1100 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP. (deg C)
1.0	-	360	9.8	19.1
3.0	-	360	9.8	19.0
5.0	-	360	9.8	19.0
7.0	-	360	9.6	18.8
9.0	-	360	9.8	18.7
11.0	-	360	9.7	18.7

July 7, 1993, 1120 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP. (deg C)
0.5	7.9	320	9.1	19.7
2.5	7.9	320	9.0	19.7
4.5	7.9	320	9.0	19.3
6.5	7.8	320	8.9	19.0
8.5	7.8	320	8.7	18.8
10.5	7.7	320	8.2	18.7
12.5	7.6	320	7.9	18.7

August 12, 1993, 1040 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP. (deg C)
1	8.0	310	9.1	20.7
2	7.9	310	9.1	20.7
3	7.9	310	9.1	20.7
5	7.9	310	9.0	20.6
7	7.9	310	9.0	20.6
9	7.9	310	8.8	20.4
11	7.9	310	9.0	20.4

**TABLE B-2  
CHATFIELD IN-RESERVOIR DEPTH-PROFILE DATA  
SITE RP (8)**

August 26, 1993, 1125 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP. (deg C)
0.5	8.1	310	7.8	20.5
2	8.1	310	7.8	20.5
4	8.1	310	7.8	20.5
6	8.0	310	7.8	20.3
8	7.9	310	7.5	20.3
10	7.9	310	7.4	20.4

September 10, 1993, 1005 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP. (deg C)
0	8.2	310	8.2	17.9
2	8.3	310	8.2	17.9
4	8.3	310	8.2	17.8
6	8.3	310	8.2	17.8
8	8.3	310	8.2	17.8
10	8.3	310	8.1	17.7

September 22, 1993, 0950 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP. (deg C)
0.5	8.2	310	8.0	15.7
2	8.2	310	8.0	15.7
4	8.2	310	8.0	15.7
6	8.2	310	8.0	15.7
8	8.1	310	8.0	15.7
10	8.1	310	8.0	15.8
12	8.1	310	7.9	15.7



**TABLE B-2**  
**CHATFIELD IN-RESERVOIR DEPTH-PROFILE DATA**  
**SITE RP (8)**

October 6, 1993, 0945 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP. (deg C)
0.5	8.1	305	8.2	15.0
1	8.1	305	8.2	15.0
3	8.2	305	8.2	15.0
5	8.1	304	8.2	15.1
7	8.1	304	8.3	15.1
9	8.1	304	8.3	15.1
11	8.1	304	8.3	15.1
13	8.0	302	8.4	15.3

November 3, 1993, 1100 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP. (deg C)
0.5	7.4	220	11.5	7.3
1	7.4	220	11.5	7.3
2	7.4	220	11.5	7.3
3	7.3	220	11.5	7.4
4	7.3	220	11.5	7.4
6	7.3	220	11.2	7.7
8	7.2	220	11.5	7.7

**TABLE B-3**  
**CHATFIELD IN-RESERVOIR DEPTH-PROFILE DATA**  
**Site RS (9)**

June 16, 1993, 1310 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP (deg C)
1.0	-	275	10.0	16.0
3.0	-	280	10.0	15.9
5.0	-	340	9.9	17.6
7.0	-	320	9.9	17.7

July 7, 1993, 1230 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP (deg C)
1.0	8.0	310	9.1	20.4
2.0	7.9	310	9.5	20.4
4.0	8.0	310	9.7	20.2
6.0	8.0	310	9.9	19.8
8.0	8.1	290	10.8	18.9

August 12, 1993, 1130 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP (deg C)
1	8.3	300	7.9	21.4
2	8.3	300	7.9	21.4
3	8.3	300	7.9	21.3
5	8.3	300	8.1	21.3
7	8.7	290	9.0	21.0

**TABLE B-3**  
**CHATFIELD IN-RESERVOIR DEPTH-PROFILE DATA**  
**Site RS (9)**

August 26, 1993, 1125 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP (deg C)
1	8.3	300	8.0	20.8
2	8.3	300	7.9	20.8
3	8.3	300	7.9	20.7
5	8.3	300	8.0	20.3
7	8.4	300	8.1	19.9

September 10, 1993, 0840 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP (deg C)
1	8.3	300	8.0	18.4
2	8.2	300	8.0	18.4
3	8.2	300	8.0	18.3
5	8.2	300	8.2	18.3
7	8.2	290	8.3	17.9

September 22, 1993, 1045 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP (deg C)
0.5	8.3	300	8.4	15.4
2	8.3	300	8.4	15.4
4	8.3	300	8.4	15.4
6	8.4	300	8.5	15.4

**TABLE B-3**  
**CHATFIELD IN-RESERVOIR DEPTH-PROFILE DATA**  
**Site RS (9)**

October 6, 1993, 1045 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP (deg C)
0.5	8.5	296	8.9	15.5
1	8.5	296	8.8	15.5
2	8.5	296	8.8	15.5
3	8.5	296	8.8	15.5
4	8.5	296	8.8	15.5
5	8.5	296	8.8	15.5
6	8.5	295	8.8	15.5
7	8.4	295	8.9	15.5
8	8.4	295	9.0	15.6

November 3, 1993, 1210 hours				
DEPTH (ft)	pH (s.u.)	SC (uS/cm)	DO (mg/L)	TEMP (deg C)
0.5	7.6	230	12.4	6.9
1	7.6	230	12.4	6.9
2	7.6	230	12.3	6.9
3	7.6	230	12.3	6.9
4	7.6	230	12.3	6.9
5	7.6	230	12.3	6.9
6	7.6	230	12.2	7.0
8	7.7	230	12.5	7.0
10	7.7	230	12.6	7.0



**APPENDIX C**

**CHATFIELD RESERVOIR AND INFLOW/OUTFLOW DATA**  
**U.S. ARMY CORPS OF ENGINEERS**  
**September 1971 - August 1993**  
**COLORADO DEPARTMENT OF HEALTH**  
**June 1983 - September 1985**

TABLE C-Z  
CHATFIELD RESERVOIR (CDH SITE 3R)  
WATER-QUALITY DATA

DATE	DEPTH (FEET)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	TOTAL INOR- GANIC NITRO- GEN (MG/L)	CHLORO- PHYLL-A (UG/L)
09-Jun-83	3	0.055	0.021	0.125	4.2
30-Jun-83	3	0.028	0.005	0.055	4.3
12-Jul-83	3	0.010	0.005		8.2
26-Jul-83	3	0.040	3.000	0.070	10.9
09-Aug-83	3	0.074	0.011	0.037	17.1
24-Aug-83	3	0.020	0.005	0.069	21.8
04-Oct-83	3	0.058	0.009	0.370	28.5
10-Jul-84	3	0.041	0.005	0.147	
10-Jul-84	2	0.088	0.005	0.308	9.7
19-Jul-84	2	0.027	0.005	0.238	9.1
19-Jul-84	3	0.027	0.005	0.240	
31-Jul-84	3	0.099	0.005	0.099	
31-Jul-84	2	0.099	0.005	0.099	10.8
14-Aug-84	2	0.035	0.005	0.290	4.9
14-Aug-84	3	0.160	0.005	0.720	
28-Aug-84	3	0.098	0.030	0.250	
28-Aug-84	2	0.098	0.030	0.250	
10-Sep-84	3	0.040	0.005	0.126	
10-Sep-84	2	0.040	0.005	0.126	6.5
12-Sep-84	2	0.019	0.007	0.171	3.7
12-Sep-84	3	0.022	0.007	0.198	
07-Nov-84	3	0.050	0.010	0.640	
07-Nov-84	2	0.050	0.010	0.600	2.1
10-Jul-85	2	0.030	0.015	0.420	4.3
10-Jul-85	3	0.030	0.015	0.420	4.3
24-Jul-85	2	0.030	0.015	0.220	22.7
24-Jul-85	3	0.030	0.015	0.220	22.7
14-Aug-85	2	0.020	0.007	0.133	15.6
14-Aug-85	3	0.020	0.007	0.133	15.6
05-Sep-85	3	0.110	0.020	0.440	5.5
05-Sep-85	2	0.110	0.020	0.440	5.8

SOURCE: ASI (1991a, Table 13).



TABLE C-1  
 CHATFIELD LAKE NEAR DAM (selected data)  
 SITE 08CHL1 (39 33 05 latitude; 105 03 40 longitude)

DATA SOURCE: U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT  
 STORET DATA RETRIEVALS BY COLO. DEPT. OF HEALTH (REVISED 12/12/92 AND 12/13/93).

DATE	SECCHI DEPTH (m)	TOTAL NITRO- GEN (mg/L)	TOTAL PHOS- PHORUS (mg/L)	TOTAL INOR- GANIC NITRO- GEN (mg/L)	PHOS- PHORUS TOTAL ORTHO (mg/L)	(32216) UNCORR. CHLORO- PHYLL-A (ug/L)	(32211) CORRECTED CHLORO- PHYLL-A (ug/L)	RATIO	TOTAL IN-
								RATIO TOTAL NITRO- GEN/ PHOS- PHORUS	ORGANIC NITRO- GEN/ PHOS- PHORUS
14-Jul-77			0.02						
14-Apr-77			0.01						
13-Jul-77			0.02						
27-Oct-77		0.55	0.08	0.15		21.7			7
10-Jan-78		2.21	0.02	1.85		19.8			111
19-Apr-78		2.81	0.02	2.56		85.3			141
19-Aug-78		1.03	0.02	0.21		2.2			52
10-Jan-79		0.58	0.01	0.32		19.8			58
21-Jun-79		1.19	0.03	0.33		7			40
25-Jul-79		1.25	0.02	0.20					63
15-Aug-79		0.84	0.03	0.15		18			28
11-Feb-80		1.51	0.00	0.23	0.00	84			
25-Jun-80		1.14	0.04	0.09	0.01	7			29
23-Jul-80			0.06	0.18	0.00	9			
21-Aug-80			0.04	0.08	0.00	5			
12-Jan-81		1.32	0.04	0.78	0.00	27			33
10-Jun-81			0.03	0.45	0.00	9			
16-Jul-81			0.04	0.09	0.00	151			
26-Aug-81		2.90	0.04	0.05	0.01	83			73
18-Jun-82	2.8	0.72	0.03	0.48	0.01	0			24 3
14-Jul-82	1.7	2.41	0.07	0.27	0.00	0			34 1
19-Aug-82	1.4	2.43	0.05	0.15	0.01	28			49 1
15-Sep-82	1.3	1.12	0.04	0.30	0.01		55		28 7
15-Apr-83	1.0	0.63	0.03	0.55	0.00				21 2
09-Jun-83	0.45	0.78	0.08	0.28	0.03			3	10 1
04-Aug-83	8.0	1.05	0.07	0.30	0.02			12	15 11
15-Sep-83		0.74	0.03	0.07	0.01			17	25 22
08-Feb-84		0.85	0.04	0.55	0.00				21 14
23-May-84	0.4	1.02	0.14		0.01			0	7 35
13-Jun-84	0.5	0.84	0.05		0.01			1	17 34
25-Jul-84	2.1	0.77	0.01		0.00			0	77 45
05-Sep-84	1.2	0.84	0.03		0.01				28 40
29-Oct-84	1.0	0.72	0.03		0.01			12	24 25
20-Feb-85	3.5	1.05	0.07		0.01				15 23
13-Jun-85	3.0	0.37	0.03		0.01			0	12 27
15-Jul-85	1.5	0.84	0.03		0.01			0	28 8
06-Aug-85	3.0	1.00	0.03		0.02			5.5	33 21
10-Sep-85	1.0	0.77	0.01		0.01				77 9
08-Oct-85	0.8	1.35	0.05		0.01				27 14
19-Mar-86	1.9	0.54	0.07		0.01				8 9
21-May-86	2.0	0.88	0.01		0.01				88 12
18-Jun-86	1.4	0.48	0.04		0.01				12 12
24-Jul-86	1.8	0.31	0.03		0.01			1	10 77
27-Aug-86	1.5	0.24	0.01		0.01			9	24 18
05-Nov-86		0.48	0.05		0.01			9	10 12
04-Mar-87	1.8	0.58	0.02		0.01			19	29 23
12-May-87	0.2	0.78	0.10		0.06			1	8 17
30-Jun-87	2.0	0.32	0.02		0.01			10	16 5
05-Aug-87	1.6	0.78	0.04		0.03			1	20 11
11-Sep-87	1.7	0.33	0.07		0.07			1	5 2
22-Oct-87	1.2	0.96	0.05		0.01			1	19 7
09-Feb-88	1.8	0.94	0.03		0.01			82	31
11-May-88	0.8	0.40	0.04		0.01			8	10
02-Jun-88	0.7	0.60	0.04		0.02			14	15

TABLE C-1  
 CHATFIELD LAKE NEAR DAM (selected data)  
 SITE 08CHL1 (39 33 05 latitude; 105 03 40 longitude)

DATA SOURCE: U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT  
 STORET DATA RETRIEVALS BY COLO. DEPT. OF HEALTH (REVISED 12/12/92 AND 12/13/93).

DATE	SECCHI DEPTH (m)	TOTAL NITRO-GEN (mg/L)	TOTAL PHOS-PHORUS (mg/L)	TOTAL			(32216) UNCORR. CHLORO-PHYLL-A (ug/L)	(32211) CORRECTED CHLORO-PHYLL-A (ug/L)	RATIO	TOTAL IN-ORGANIC
				NITRO-GEN (mg/L)	PHOS-PHORUS (mg/L)	ORTHOPHOS-PHORUS (mg/L)			NITRO-GEN/PHOS-PHORUS	NITRO-GEN/DIS-SOLVED PHOS-PHORUS
13-Jul-88	1.7	0.85	0.01			0.01		31	85	
01-Sep-88	1.4	0.64	0.01			0.01		11	84	
12-Oct-88	2.0	0.93	0.06			0.01		1	16	
22-Feb-89	2.5	1.80	0.05			0.01		2	38	
09-May-89	2.4		0.04			0.01		4		
07-Jun-89	3.2		0.11			0.11		1		
07-Jul-89			0.02			0.01		3		
09-Aug-89	2.5		0.06			0.01		1		
13-Oct-89	2.2		0.05			0.01		1		
21-Mar-90	4.0		0.03			0.01		1		
15-May-90	3.0		0.04			0.01		9		
30-May-90	1.5		0.04			0.01		14		
12-Jul-90			0.06	0.25	0.03					
12-Jul-90			0.10	0.35	0.01					
12-Jul-90 C		0.79	0.06	0.36	0.01				79	
04-Sep-90			0.03		0.02					
04-Sep-90			0.04		0.03					
04-Sep-90 C			0.04		0.02					
23-Oct-90			0.04	0.67	-0.01					
23-Oct-90 C		1.90	0.05	1.32	-0.01			-1	38	
14-Jan-91		0.50	0.03	0.22	-0.01			6	17	
07-May-91		0.92	0.01	0.24	-0.01			-1	92	
03-Jun-91		0.41	-0.01	0.03	-0.01			1		
24-Jun-91	2.7		0.02	0.04	0.01					
24-Jun-91 C		1.00	0.05	0.24	-0.01			3	22	
08-Aug-91	3.0		0.06	0.14	0.02					
08-Aug-91 C		0.58	0.05	0.31	0.02			1	12	
23-Oct-91			-0.01	0.09	-0.01					
23-Oct-91 C		0.55	-0.01	0.07	-0.01			-1		
17-Mar-92		0.31	-0.01	0.05	-0.01			6		
18-May-92	1.9	0.46	0.02	0.10	0.02			8	23	
16-Jun-92	1.8	0.35	0.05	0.07	0.01			7	6	
06-Jul-92	2.7		0.03	0.03	-0.01					
06-Jul-92			0.04	0.03	0.04				10	
06-Jul-92 C		0.41	0.04	0.08	0.04			-1	10	
18-Aug-92			0.21	0.09	-0.01					
18-Aug-92			0.24	0.10	-0.01					
18-Aug-92 C	1.0		0.22	0.11	-0.01			8		
20-Oct-92			0.15	0.05	0.01					
20-Oct-92			0.19	0.05	0.01					
20-Oct-92 C		0.42	0.17	0.06	0.01			123	2	
03-Feb-93		0.41	0.17	0.03	0.01			3	2	
25-May-93		0.31	0.04	0.03	0.01				8	
15-Jun-93		0.41	0.01	0.03	0.01			5	41	
20-Jul-93			0.03	0.04	0.03					
20-Jul-93 C		0.59	0.02	0.05	0.02			6	30	
16-Aug-93			0.03	0.03	0.02					
19-Aug-93 C		0.63	0.08	0.04	0.02			-1	8	

C = composite (water column).

Note: For complete data set, see supplemental Appendix C STORET retrieval dated December 13, 1993.

**Historical COE Data  
1971-1993 Period of Record  
Four Sites (Inflow/Outflow, In-Reservoir)**

**(See Supplemental Appendices)**

TABLE C-X  
CHATFIELD RESERVOIR (CDH SITE 1R)  
WATER-QUALITY DATA

DATE	DEPTH (FEET)	PHOS- PHORUS, TOTAL (MG/L AS P)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	TOTAL INOR- GANIC NITRO- GEN (MG/L)	CHLORO- PHYLL-A (UG/L)
09-Jun-83	3	0.024	0.017	0.065	4.8
30-Jun-83	3	0.034	0.022	0.067	1.8
12-Jul-83	3	0.066	0.027		10.6
12-Jul-83	3				11.9
26-Jul-83	3				14.4
26-Jul-83	3	0.040		0.038	13.6
09-Aug-83	3				15.4
09-Aug-83	3	0.037	0.020	0.053	20.0
24-Aug-83	3	0.023	0.005	0.061	22.8
24-Aug-83	3				18.7
14-Sep-83	3	0.085	0.028	0.600	22.4
14-Sep-83	3	0.026	0.060	0.600	22.1
14-Sep-83	3				26.5
04-Oct-83	3				23.7
04-Oct-83	3				31.5
10-Jul-84	3	0.018	0.005	0.116	
10-Jul-84	2	0.019	0.005	0.162	6.3
10-Jul-84	3	0.017	0.005	0.129	
10-Jul-84	2	0.012	0.005	0.054	
19-Jul-84	2	0.037	0.005	0.271	5.8
18-Jul-84	3	0.015	0.005	0.359	
31-Jul-84	3	0.046	0.005	0.200	
31-Jul-84	2	0.037	0.006	0.295	4.0
14-Aug-84	3	0.028	0.007	0.134	
14-Aug-84	2	0.030	0.005	0.146	7.2
28-Aug-84	2	0.038	0.005	0.106	8.1
28-Aug-84	3	0.038	0.005	0.106	
10-Sep-84	3	0.030	0.005	0.150	
10-Sep-84	2	0.030	0.005	0.070	6.8
12-Sep-84	2	0.023	0.005	0.259	3.6
12-Sep-84	3	0.018	0.005	0.195	
07-Nov-84	2	0.050	0.010	0.610	2.4
07-Nov-84	3	0.050	0.010	0.630	
10-Jul-85	3	0.020	0.006	0.260	1.4
10-Jul-85	2	0.020	0.006	0.290	1.4
24-Jul-85	2	0.020	0.016	0.240	7.1
24-Jul-85	3	0.010	0.007	0.148	7.1
14-Aug-85	3	0.016	0.007	0.134	4.3
14-Aug-85	2	0.027	0.009	0.200	4.3
05-Sep-85	2	0.030	0.010	0.146	11.3
05-Sep-85	3	0.030	0.010	0.146	11.3

SOURCE: ASI (1991a, Table 11).



TABLE C-Y  
 CHATFIELD RESERVOIR (CDH SITE 2R)  
 WATER-QUALITY DATA

DATE	DEPTH (FEET)	PHOS- PHORUS, TOTAL (MGL AS P)	PHOS- PHORUS, ORTHO, TOTAL (MGL AS P)	TOTAL INOR- GANIC NITRO- GEN (MGL)	CHLORO- PHYLL-A (UG/L)
10-Jul-84	3	0.023	0.005	0.089	
10-Jul-84	2	0.023	0.005	0.089	5.1
19-Jul-84	2	0.035	0.005	0.124	5.1
19-Jul-84	3	0.035	0.005	0.124	
31-Jul-84	3	0.030	0.005	0.120	
31-Jul-84	2	0.030	0.005	0.123	5.8
14-Aug-84	3	0.021	0.005	0.085	
14-Aug-84	2	0.020	0.005	0.083	4.7
28-Aug-84	3	0.032	0.007	0.120	
28-Aug-84	2	0.034	0.005	0.060	7.1
10-Sep-84	3	0.020	0.005	0.140	3.4
10-Sep-84	3	0.030	0.005	0.175	
12-Sep-84	3	0.013	0.005	0.110	
12-Sep-84	2	0.013	0.005	0.110	2.0
07-Nov-84	2	0.050	0.010	0.600	
07-Nov-84	3	0.050	0.010	0.600	
10-Jul-85	3	0.010	0.007	0.300	2.8
10-Jul-85	2	0.010	0.007	0.300	2.8
24-Jul-85	2	0.020	0.008	0.150	5.7
24-Jul-85	3	0.010	0.006	0.120	5.7
14-Aug-85	2	0.017	0.007	0.114	7.1
14-Aug-85	3	0.017	0.007	0.114	7.1
05-Sep-85	2	0.030	0.010	0.099	14.2
05-Sep-85	3	0.020	0.010	0.082	14.2

SOURCE: ASI(1991a, Table 12).

**TABLE C-Z**  
**CHATFIELD RESERVOIR (CDH SITE 3R)**  
**WATER-QUALITY DATA**

DATE	DEPTH (FEET)	PHOS- PHORUS, TOTAL (MGL AS P)	PHOS- PHORUS, ORTHO, TOTAL (MGL AS P)	TOTAL INOR- GANIC NITRO- GEN (MGL)	CHLORO- PHYLL-A (UG/L)
09-Jun-83	3	0.055	0.021	0.125	4.2
30-Jun-83	3	0.028	0.005	0.055	4.3
12-Jul-83	3	0.010	0.005		8.2
26-Jul-83	3	0.040	3.000	0.070	10.9
09-Aug-83	3	0.074	0.011	0.037	17.1
24-Aug-83	3	0.020	0.005	0.069	21.8
04-Oct-83	3	0.058	0.009	0.370	28.5
10-Jul-84	3	0.041	0.005	0.147	
10-Jul-84	2	0.088	0.005	0.308	9.7
19-Jul-84	2	0.027	0.005	0.238	9.1
19-Jul-84	3	0.027	0.005	0.240	
31-Jul-84	3	0.099	0.005	0.099	
31-Jul-84	2	0.099	0.005	0.099	10.8
14-Aug-84	2	0.035	0.005	0.290	4.9
14-Aug-84	3	0.160	0.005	0.720	
28-Aug-84	3	0.098	0.030	0.250	
28-Aug-84	2	0.098	0.030	0.250	
10-Sep-84	3	0.040	0.005	0.125	
10-Sep-84	2	0.040	0.005	0.126	6.5
12-Sep-84	2	0.019	0.007	0.171	3.7
12-Sep-84	3	0.022	0.007	0.198	
07-Nov-84	3	0.050	0.010	0.640	
07-Nov-84	2	0.050	0.010	0.600	2.1
10-Jul-85	2	0.030	0.015	0.420	4.3
10-Jul-85	3	0.030	0.015	0.420	4.3
24-Jul-85	2	0.030	0.015	0.220	22.7
24-Jul-85	3	0.030	0.015	0.220	22.7
14-Aug-85	2	0.020	0.007	0.133	15.6
14-Aug-85	3	0.020	0.007	0.133	15.6
05-Sep-85	3	0.110	0.020	0.440	5.6
05-Sep-85	2	0.110	0.020	0.440	5.6

SOURCE: ASI (1991a, Table 13).





**APPENDIX D**

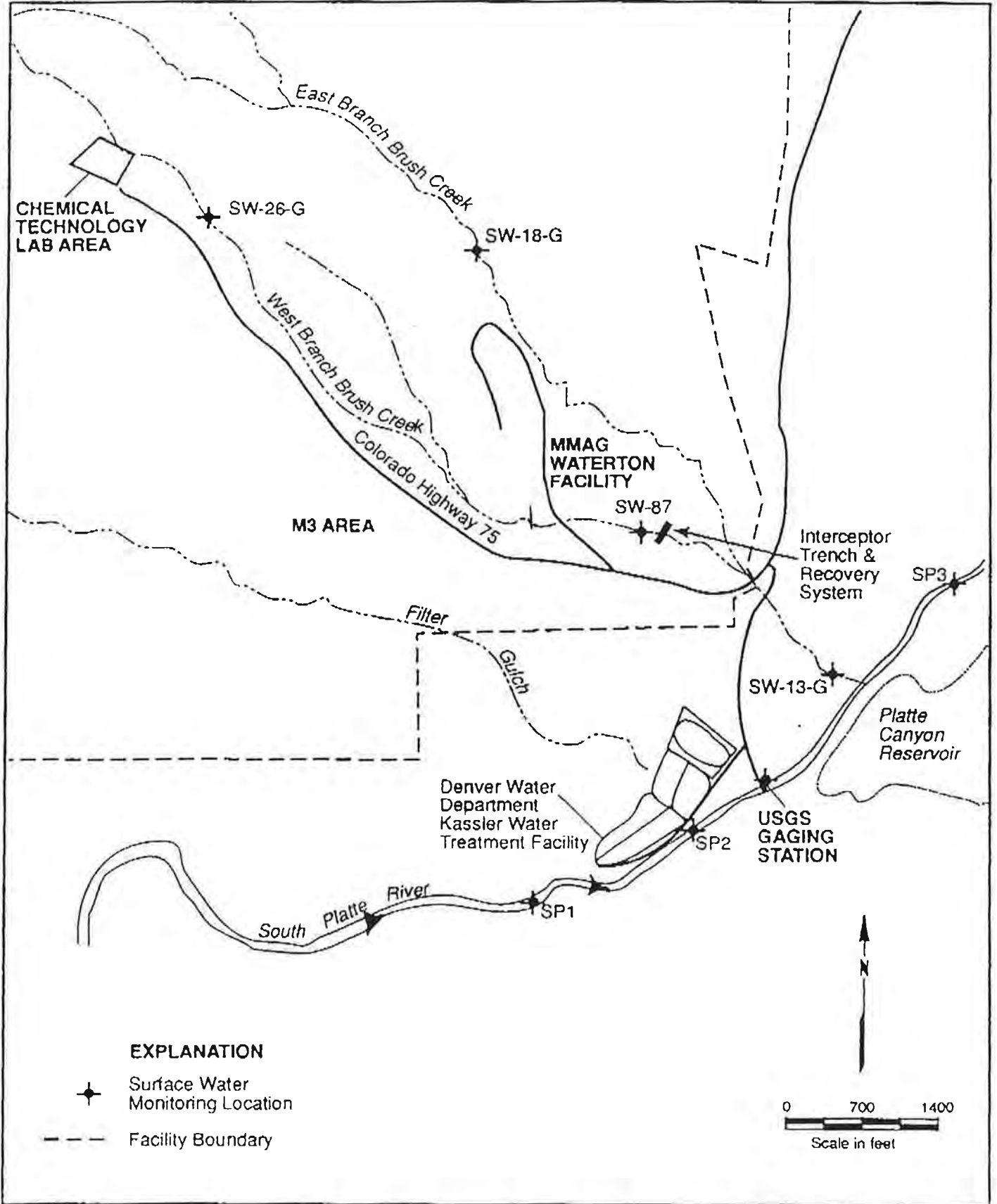
**SOUTH PLATTE RIVER,  
BRUSH CREEK AND FILTER GULCH,  
AND OTHER MISCELLANEOUS SOURCES  
Martin Marietta Aerospace Corporation**

TABLE D-1

PARAMETERS	MARTIN MARIETTA ASTRONAUTICS GROUP'S AVERAGE FOR JULY 1992-1993	Discharge to Chatfield Wetlands Source: Mark Zitkas, 02/04/94)
TRACE METALS		UNITS
Aluminum	0.16	mg/l
Cadmium	0.0002	mg/l
Chromium	ND	mg/l
Copper	0.02	mg/l
Lead	ND	mg/l
Nickel	ND	mg/l
Silver	0.0003	mg/l
Zinc	0.04	mg/l
INORGANIC PARAMETERS		
Ammonia as N	7.7	mg/l
BOD	7	mg/l
Chloride	125	mg/l
Fecal Coliform	291	Number/100ml
Fluoride	1.8	mg/l
Nitrate as N	4.4	mg/l
Nitrite as N	0.7	mg/l
pH	8.03	S.U.
Sulfate (1)	322	mg/l
Sulfide	ND	mg/l
Total Cyanide	0.03	mg/l
Total Organic Carbon	7	mg/l
Total Phosphorus	0.24	mg/l
Total Residual Chlorine	ND	mg/l
Total Suspended Solids	ND	mg/l
ORGANIC COMPOUNDS		
Benzene	ND	ug/l
Carbon tetrachloride	ND	ug/l
1,2-Dichloroethane	ND	ug/l
1,1-Dichloroethene	ND	ug/l
Tetrachloroethane	ND	ug/l
1,1,2-Trichloroethane	ND	ug/l
Trichloroethene	ND	ug/l
Vinyl chloride	ND	ug/l
Total Trihalomethanes	ND	ug/l

ND = Not Detected at Reporting Limits

(1) Sulfate is not regulated as Discharge Point 005. The permitted discharge point is located and monitored at the 5-Sided Well.



**Harding Lawson Associates**  
 Engineering and Environmental Services

**MMAG Quarterly Surface Water Sampling Locations**  
 MMAG Waterton Facility  
 Jefferson County, Colorado

FIGURE

D-1 **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
MMF	19824,004.10		11/91	

TABLE D-2  
 Martin Marietta Astronautics Group, Waterton Facility  
 Environmental Data System  
 SURFACE WATER STATION DESCRIPTIONS

Surface Station	Area	Surface Water Station Description
<b>Area: Brush Creek</b>		
SW13G	BC	Located 300 feet above the confluence with the South Platte River
SW14G	BC	Located immediately downstream from culvert under the road to the Kassler Plant
<b>Area: East Branch of Brush Creek</b>		
G1	EBBC	Located 150 feet above confluence of East and West branches of Brush Creek
SW17G	EBBC	Located below flammable materials storage building at the Space Support Building
SW18G	EBBC	Located near northeast corner of fence around north parking lot for Space Park
SW22G	EBBC	Located immediately above where paved road to Rifle Range crosses the creek
SW24G	EBBC	Behind T-8 overflow pond, and 130 feet north of monitoring well GM-89
<b>Area: Filter Gulch</b>		
SW9G	FG	Located approximately 50 feet upstream from the Filter Gulch Recovery System
<b>Area: Kassler Water Treatment Plant Area</b>		
SW10	K	Station is located in a stagnant pond across the road from SW11-G
<b>Area: Lariat Gulch</b>		
SW33G	LG	East of wells GM-48 and GM-48B, 15 feet upstream of confluence of tributary
<b>Area: South Platte River</b>		
SP1	SPR	On the bank of the So Platte River, inside Waterton Recreation Area.
<b>Area: West Branch of Brush Creek</b>		
SW15G	WBBC	Located just below monitoring well GM-70
SW16G	WBBC	Near monitoring well GM-6 and upstream from the walking path across the creek
SW42G	WBBC	Below west end of Aeration Pond
SW43G	WBBC	Below east end of Aeration Pond at juncture of overflow from pond into creek
SW87	WBBC	Located 150 feet downstream of SW43G (formerly known as SW43G+150W)

Source: Gary Parham, MM, February 14, 1994.

TABLE D-2 (continued)

Martin Marietta Astronautics Group, Waterton Facility  
Environmental Data Systems  
SURFACE WATER STATION DESCRIPTION REPORT

Well Name: SP1  
Date Installed: 06/21/91  
Active/Unused Active

Area: SPR  
Geographic Location: South Platte River

State Plane Coordinate: 601696.39 North  
2112166.77 East

Land Surface Elevation: 5501.00

Well Description:  
On the bank of the So Platte River, in- side Water  
ton Recreation Area.

Name and Description of Water Body Measured:  
South Platte River

Martin Marietta Astronautics Group, Waterton Facility  
Environmental Data Systems  
SURFACE WATER STATION DESCRIPTION REPORT

Well Name: SP2  
Date Installed: 09/01/91  
Active/Unused Active

Area: SPR  
Geographic Location: South Platte River

State Plane Coordinate: 602465.44 North  
2114162.18 East

Land Surface Elevation: 5489.00

Well Description:  
On the bank of the So Platte River, be- side the f  
ormer filtration ponds.

Name and Description of Water Body Measured:  
South Platte River

TABLE D-2 (continued)

Martin Marietta Astronautics Group, Waterton Facility  
Environmental Data Systems  
SURFACE WATER STATION DESCRIPTION REPORT

Well Name: SP3  
Date Installed: 09/01/91  
Active/Unused: Active  
Area: SPR  
Geographic Location: South Platte River

State Plane Coordinate: 604388.70 North  
2116225.11 East

Land Surface Elevation: 5478.00

Well Description:  
On the bank of So Platte River, across the road from Kassler, behind RR tracks.

Name and Description of Water Body Measured:  
South Platte River

Martin Marietta Astronautics Group, Waterton Facility  
Environmental Data Systems  
SURFACE WATER STATION DESCRIPTION REPORT

Well Name: SW13G  
Date Installed: 06/04/85  
Active/Unused: Active  
Area: BC  
Geographic Location: Brush Creek

State Plane Coordinate: 604087.47 North  
2115716.51 East

Land Surface Elevation: 5481.70

Well Description:  
Located 300 feet above the confluence with the South Platte River

Name and Description of Water Body Measured:  
Brush Creek

TABLE D-2 (continued)

Martin Marietta Astronautics Group, Waterton Facility  
Environmental Data Systems  
SURFACE WATER STATION DESCRIPTION REPORT

Well Name: SW18G  
Date Installed: 07/09/85  
Active/Unused Active  
  
Area: EBBC  
Geographic Location: East Branch of Brush Creek

State Plane Coordinate: 608584.29 North  
2111985.77 East

Land Surface Elevation: 5705.45

Well Description:  
Located near northeast corner of fence around north parking lot for Space Park

Name and Description of Water Body Measured:  
East Branch of Brush Creek

Martin Marietta Astronautics Group, Waterton Facility  
Environmental Data Systems  
SURFACE WATER STATION DESCRIPTION REPORT

Well Name: SW87  
Date Installed: 10/19/87  
Active/Unused Active  
  
Area: WBBC  
Geographic Location: West Branch of Brush Creek

State Plane Coordinate: 605608.90 North  
2113702.82 East

Land Surface Elevation: 5551.00

Well Description:  
Located 150 feet downstream of SW43G (formerly known as SW43G+150W)

Name and Description of Water Body Measured:  
West Branch of Brush Creek



TABLE D-3  
MARTIN MARIETTA DISCHARGE POINT 101, TOTAL-PHOSPHORUS CONCENTRATIONS

Date/Time	Total-Phosphorus Concentration (mg/L)	Date/Time	Total-Phosphorus Concentration (mg/L)
06/30/93 14:40	0.22	10/06/93 15:00	0.37
07/07/93 14:00	0.28	10/13/93 14:00	0.31
07/14/93 15:00	0.23	10/20/93 15:30	0.84
07/21/93 14:00	0.24	10/27/93 15:00	0.36
07/28/93 14:00	0.21	11/03/93 14:00	0.50
08/04/93 14:00	0.22	11/10/93 14:45	0.41
08/11/93 14:00	0.15	11/17/93 09:30	0.63
08/18/93 14:15	0.17	11/24/93 16:00	0.60
08/25/93 14:00	0.23	12/01/93 15:00	0.27
09/01/93 14:15	0.21	12/08/93 14:30	0.56
09/08/93 14:00	0.24	12/15/93 15:00	0.54
09/15/93 15:00	0.46	12/22/93 16:00	0.58
09/22/93 15:50	0.27	12/29/93 13:30	0.45
09/29/93 14:00	0.42		

SOURCE: Gary Parham, Martin Marietta, written commun., February 10, 1994.  
Note: Detection limit = 0.08 mg/L; EPA Method 200.7.

**Tables D-4 through D-7  
Martin Marietta 1991 Quarterly Surveys**

**(See Supplemental Appendices)**



**APPENDIX E**

**PLUM CREEK**

**EEC Construction Materials America, Inc.  
(Cooley Gravel Company)**

PRINT DATE: 01-Dec-93

TUTTLE APPLGATE, INC.  
 Consultants for Land, Mineral and Water Develop

Post-It™ brand fax transmittal memo 7671 # of pages > 6

To: <i>Tim Seale</i>	From: <i>AST</i>
Co:	Co:
Dept: <i>From</i>	Phone # <i>ECC</i>
Fax # <i>Rob Laird</i>	Fax # <i>AAA</i>

**Cooley Gravel Company**  
**Cherokee Ranch Water Quality Monitoring**

Sample Date	Ortho Phosphorus		Total Phosphorus		Suspended Solids	
	U/S	D/S	U/S	D/S	U/S	D/S
22-Jan-90	0.11	0.13	0.12	0.15	94	107
22-Feb-90	0.07	0.07	0.08	0.09	26	38
22-Mar-90			0.12	0.23	75	88
12-Apr-90	0.07	0.08	0.10	0.09	48	59
30-Apr-90	0.08	0.08	0.12	0.12	92	64
09-May-90	0.10	0.09	0.12	0.11	42	31
25-May-90	0.08	0.08	0.08	0.09	18	27
15-Jun-90	0.08	0.05	0.08	0.08	5	7
27-Jul-90	0.09	0.07	0.09	0.07	13	10
02-Aug-90	0.10	0.09	0.11	0.10	5	38
07-Sep-90	0.08	0.13	0.09	0.14	5	89
28-Sep-90	0.08	0.08	0.07	0.07	38	58
28-Oct-90	0.08	0.08	0.08	0.08	22	13
18-Nov-90	0.09	0.08	0.09	0.08	38	31
17-Dec-90	0.09	0.15	0.10	0.19	10	82
14-Jan-91	0.07	0.16	0.09	0.17	18	41
28-Feb-91	0.05	0.13	0.07	0.15	18	193
16-Apr-91	0.03	0.43	0.51	0.28	47	82
01-May-91					42	28
15-May-91					39	37
05-Jun-91					52	96
12-Jun-91					158	242
01-Jul-91					7	37
15-Jul-91	0.10	0.10	0.27	0.19	2	17
22-Jul-91	0.31	0.34	0.44	0.43	33	63
29-Jul-91	0.34	0.31	0.45	0.48	18	15
06-Sep-91	0.30	0.30	0.15	0.17	2	50
17-Sep-91	0.31	0.31	0.17	0.17	1	28
30-Sep-91					4	38
17-Oct-91	0.30	0.30	0.22	0.18	4	31
21-Nov-91	0.30	0.30	0.11	0.19	10	40

DRAFT

PRINT DATE: 01-Dec-93

## TUTTLE APPLGATE, INC.

Consultants for Land, Mineral and Water Development.

**Cooley Gravel Company**  
**Cherokee Ranch Water Quality Monitoring**

Sample Date	Ortho Phosphorus		Total Phosphorus		Suspended Solids	
	U/S	D/S	U/S	D/S	U/S	D/S
18-Dec-91	0.10	0.10	0.19	0.42	1	25
20-Jan-92	0.30	0.30	0.10	0.10	1	18
14-Feb-92	0.10	0.10	0.10	0.10	1	38
13-Mar-92	0.10	0.10	0.10	0.10	43	68
01-Apr-92	0.14	1.08	0.19	0.19	48	89
13-Apr-92	0.13	0.21	0.52	0.47	220	258
05-May-92	0.15	0.16	0.12	0.16	3	44
18-May-92	0.10	0.10	0.10	0.10	40	96
03-Jun-92	0.37	0.67	0.10	0.14	40	100
16-Jun-92	0.30	0.30	0.10	0.10	30	48
08-Jul-92	0.30	0.30	0.20	0.20	80	108
20-Jul-92	0.30	0.30	0.10	0.10	6	27
08-Aug-92	0.30	0.30	0.74	0.10	2	74
18-Aug-92	0.30	0.30	0.10	0.10	3	96
08-Sep-92	0.30	0.30	0.10	0.10	2	11
18-Sep-92	0.10	0.10	0.10	0.30	1	114
14-Oct-92	0.10	0.10	0.10	0.10	1	33
30-Nov-92	0.3		0.1		3	
28-Dec-92	0.2	0.2	0.5	0.4	9	50
06-Jan-93	0.2	0.6	0.5	0.7	1	35
12-Jan-93	0.1		0.5		2	
01-Feb-93	0.25	0.25	0.16	0.16	8	13.5
10-Mar-93	0.25	0.25	0.5	0.5	10	70.8
05-Apr-93	0.25	0.25	0.16	0.16	36.2	51.8
10-May-93	0.31	0.25	0.16	0.16	29	33
02-Jun-93	0.27	0.25	0.16	0.16	12	12.5
08-Jul-93	0.25	0.25	0.81	1.1	5	16.5
03-Aug-93	0.25	0.25	0.63	0.69	5	6.5
07-Sep-93	0.25	0.25	0.81	0.75	5	17.5
04-Oct-93	0.25	0.25	0.16	0.46	5	5

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PRINT DATE: 01-Dec-93

TUTTLE APPLGATE, INC.  
Consultants for Land, Mineral and Water Development

**Cooley Gravel Company  
Cherokee Ranch Water Quality Monitoring**

Sample Date	Ortho Phosphorus		Total Phosphorus		Suspended Solids	
	U/S	D/S	U/S	D/S	U/S	D/S
<b>AVERAGE</b>	0.18	0.23	0.22	0.23	26.48	66.21
<b>STD DEV</b>	0.10	0.18	0.20	0.21	37.79	50.20

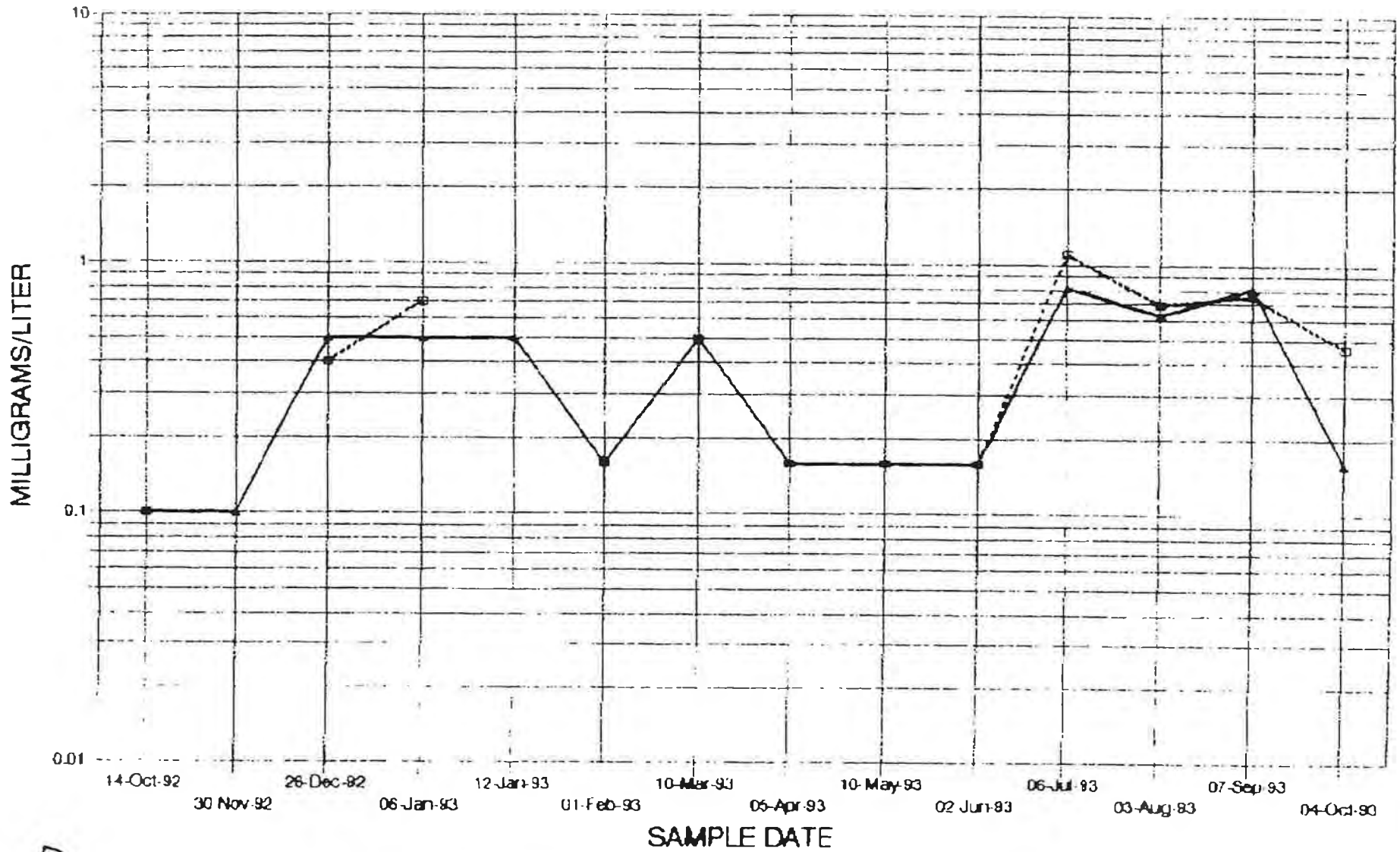
**LEGEND**

U/S denotes Upstream  
D/S denotes Downstream

**DRAFT**

# Cooley Gravel Company Cherokee Ranch

## Total Phosphorus Monitoring for 1993

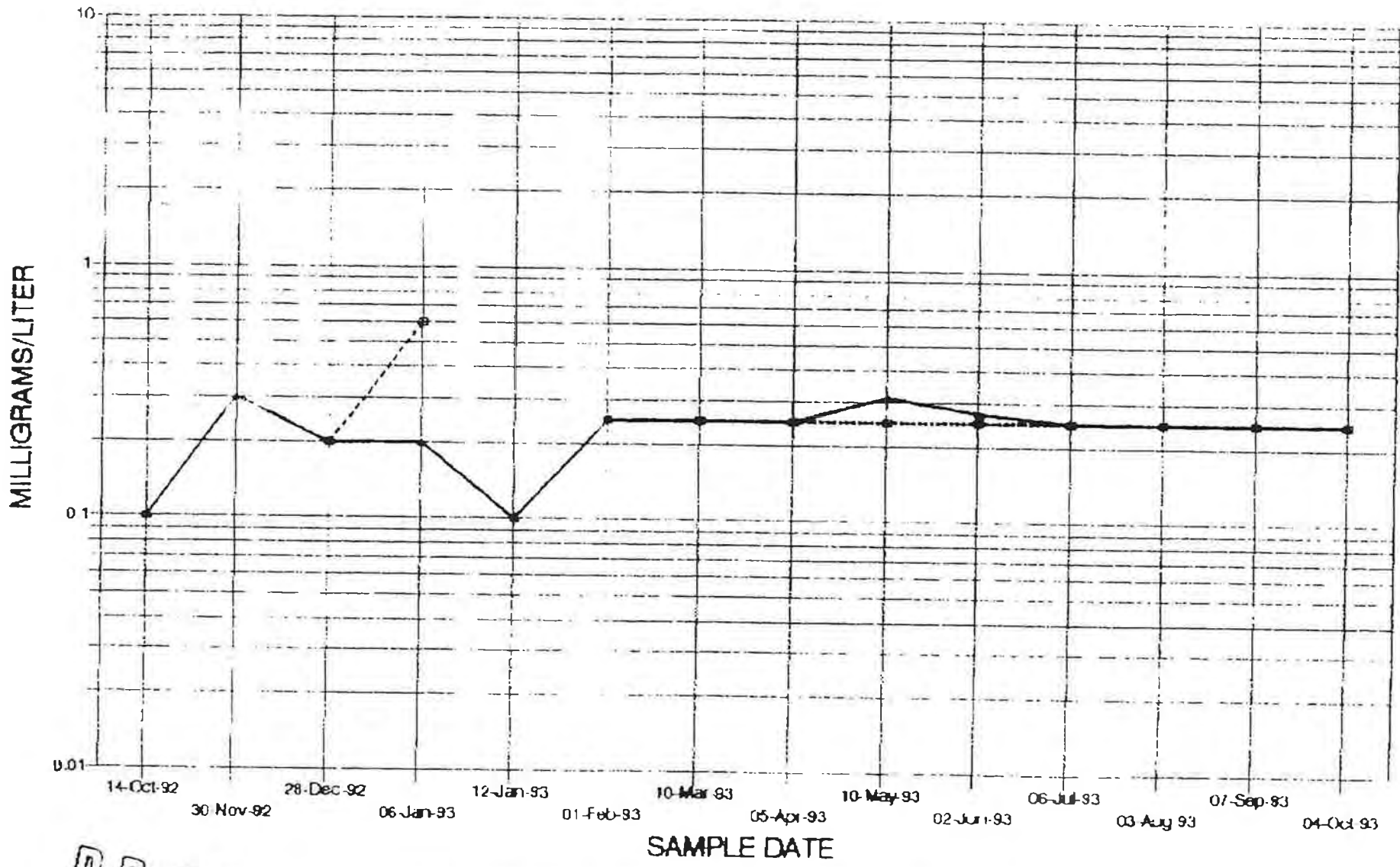


**DRAFT**

▲ Upstream of Mine    □ Downstream of Mine



# Cooley Gravel Company Cherokee Ranch Ortho Phosphorus Monitoring for 1993

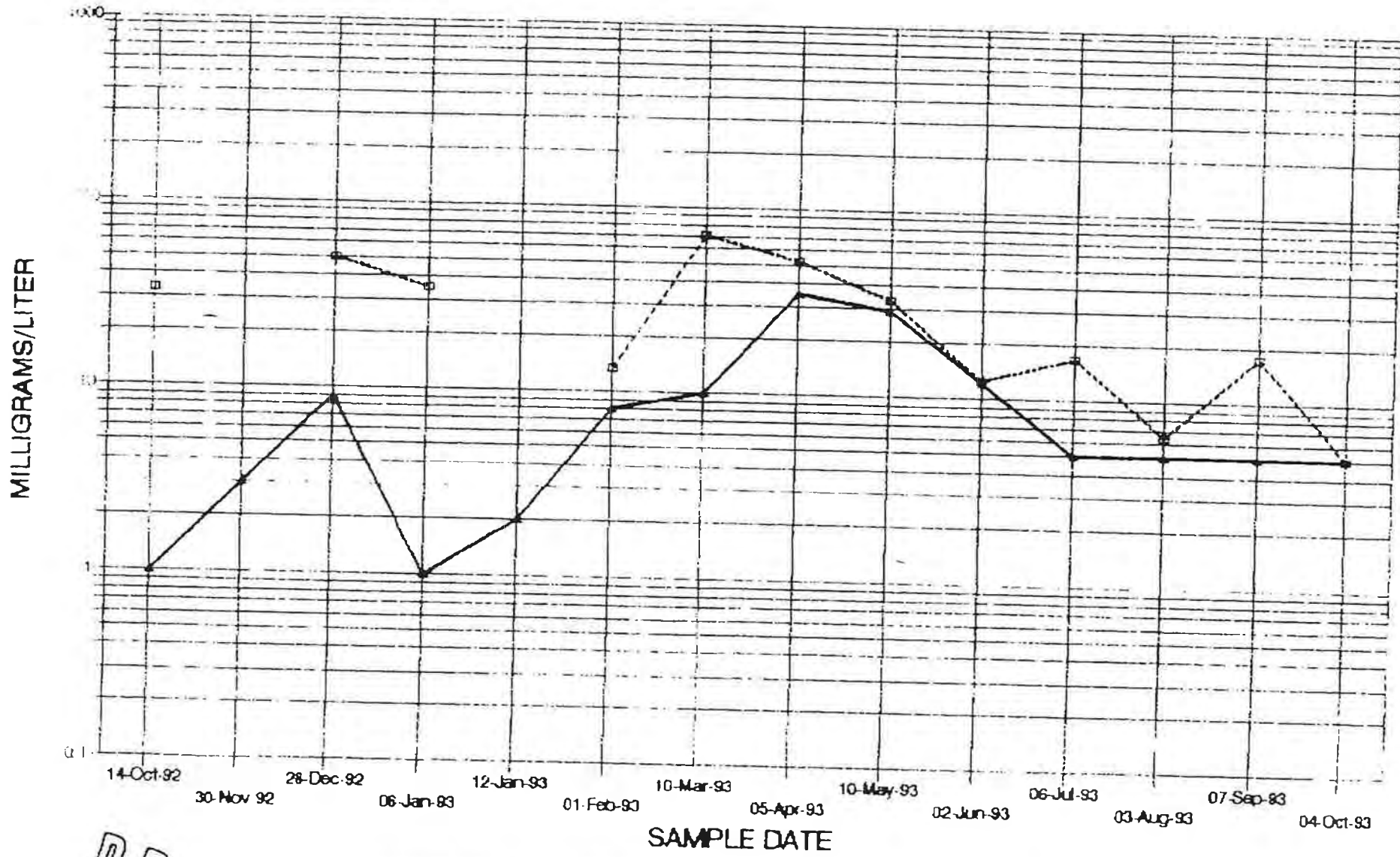


**DRAFT**

▲ Upstream of Mine      □ Downstream of Mine

# Cooley Gravel Company Cherokee Ranch

## Suspended Sediment Monitoring for 1993



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▲ Upstream of Mine    ◻ Downstream of Mine



**APPENDIX F**

**SOUTH PLATTE RIVER DATA  
Denver Water Department**

**(No data available for 1993)**