

Table 1.SA. Sand Creek Monitoring Station Information



Station Address: 102 Creek Lane South, Jordan, MN 55352
County: Scott
Major Basin: Minnesota River Basin
Watershed: Sand Creek
Drainage Area: 254.8 square miles

Station Operator: Metropolitan Council Environmental Services

Metropolitan Council Environmental Services Contact Information:

Contact Person: Tim Pattock or Mike Ahlf
Address: 2400 Childs Road
St. Paul, MN 55106
Phone: 651-602-8084 (Tim) or 651-602-8082 (Mike)
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mike.ahlf@metc.state.mn.us

Watershed District or Watershed Management Organization:

Station Overview: MCES has conducted water quality monitoring of Sand Creek since 1989. The monitoring station is located in Jordan, Minnesota, 8.2 miles upstream from the creek confluence with the Minnesota River. MCES staff maintain the rating curve at this station. There is no rain gauge at this station; however, precipitation data are obtained from the Minnesota Climatology Working Group, Jordan Station Number 214176. During the 1989-1990 period, MCES also operated a second monitoring station

on Sand Creek in Louisville Swamp, near the creek confluence with the Minnesota River (Mile 1.6).

2003 Monitoring Year: Spring snowmelt and ice-free stream conditions occurred in mid-March 2003. Runoff event-based sampling began in mid-March and continued through mid-July; then baseflow conditions persisted until the end of the year. The peak daily average flow of 992 cfs occurred on May 12, 2003. This runoff event also produced the highest total suspended solids (TSS) concentration (4,380 mg/l) and the highest total phosphorus (TP) concentration (1.14 mg/l) measured at this station in 2003.

Thirty-three samples were collected for water quality analysis during 2003, including 12 composite samples and 21 grab samples. Samples were obtained throughout the year during varying stream flow conditions, to most accurately characterize Sand Creek water quality. The MCES annual water quality monitoring plan includes 12 monthly baseflow (“non-event”) grab samples and approximately 10 to 15 flow-weighted composite samples collected during all runoff events in the open water season (March-November). The 2003 sampling scheme met the goals of the MCES monitoring work plan.

For additional stream monitoring information and monitoring methods regarding this site, see www.metrocouncil.org/environment/RiversLakes.

Figure 1. SA. Sand Creek Monitoring Station Location and Watershed Characteristics

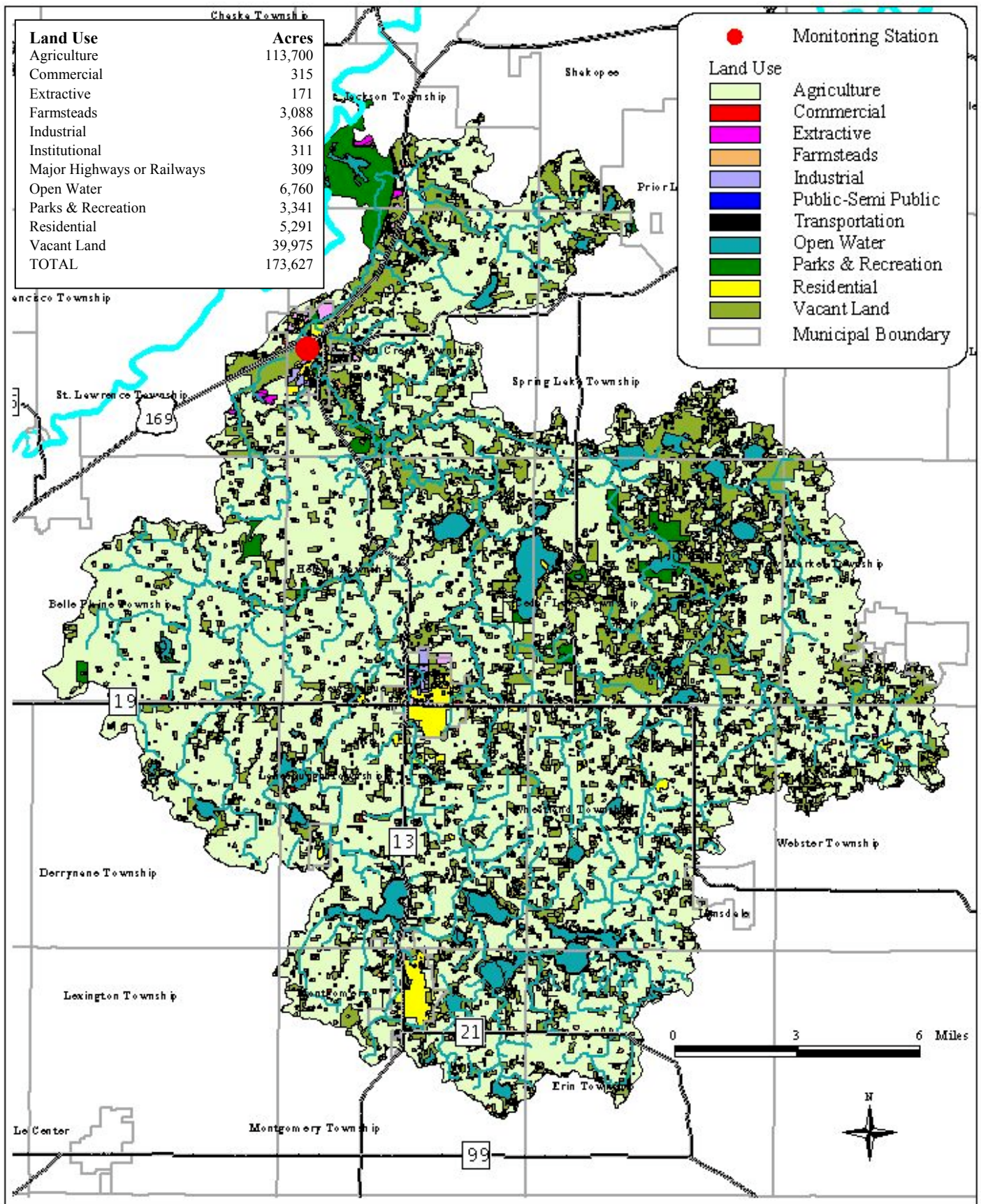


Figure 2.SA. Sand Creek 2003 Hydrograph, Precipitation and Sampling Information

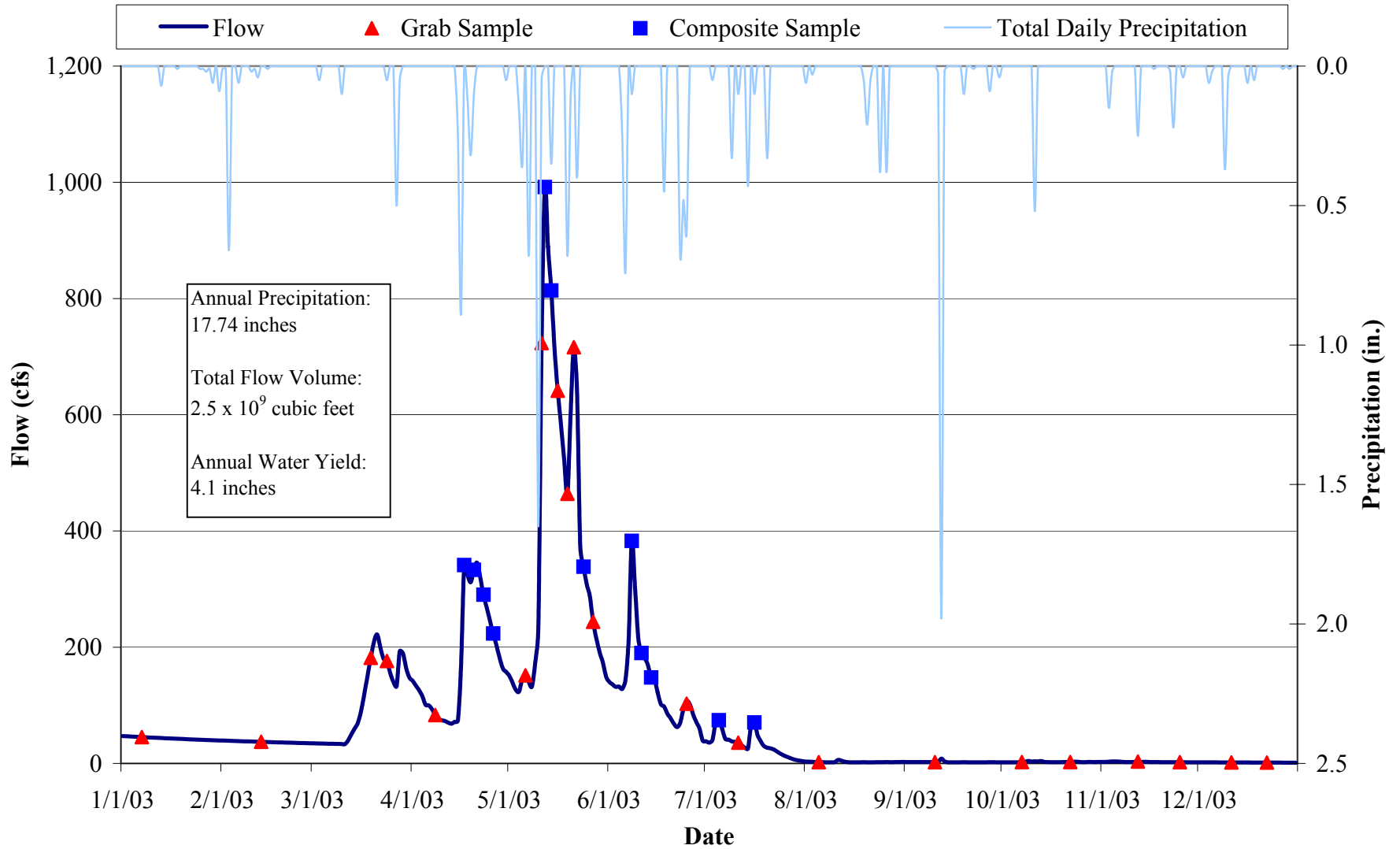


Table 2.SA. Sand Creek 2003 Water Chemistry Information

Variable	N	Mean	Median	Minimum	Maximum	25%	75%	STD
Chloride, mg/L	32	64	33	22	243	26	78	64
Hardness, mg/L	4	269	254	186	380	231	292	81
Cadmium, ug/L	5	0.1	<0.1	<0.1	0.3	0.1	0.3	0.1
Chromium, ug/L	5	3.4	1.1	0.2	8.9	0.3	6.7	4.1
Copper, ug/L	5	6.7	4.0	2.4	12.5	2.4	12.3	5.2
Lead, ug/L	5	3.7	0.5	0.2	9.3	0.3	8.1	4.6
Nickel, ug/L	5	8.8	6.1	4.2	16.3	4.2	13.1	5.6
Zinc, ug/L	5	78.7	7.1	1.4	337.0	5.2	43	145.3
Total Kjeldahl Nitrogen, mg/L	33	2.28	2.00	0.39	6.00	1.20	3.20	1.29
Total Nitrate Nitrogen, mg/L	33	3.02	2.60	0.09	8.48	1.94	4.08	2.00
Total Phosphorus, mg/L	33	0.51	0.40	0.08	1.14	0.25	0.74	0.31
Total Dissolved Phosphorus, mg/L	32	0.20	0.16	0.03	0.60	0.09	0.25	0.14
Total Suspended Solids, mg/L	31	464	84	1	4380	5	526	904
Volatile Suspended Solids, mg/L	31	40	12	1	180	2	75	54
Turbidity, NTU	33	38	18	2	170	3	55	46

N: Sample Count

25%, 75%: 25th and 75th Percentiles

STD: Standard Deviation

Table 3.SA. Sand Creek 2003 Annual Loading Information* for Suspended Solids and Nutrients

Variable	Annual Load (tons)	Annual Yield (lbs/acre)	Annual Normalized Yield (lbs/acre/in of water)	Flow Weighted Mean Concentration (mg/L)
Total Suspended Solids	23,700	291	71	311
Total Phosphorus	37.1	0.46	0.11	0.49
Total Dissolved Phosphorus	15.4	0.19	0.05	0.20
Total Nitrate Nitrogen	372	4.56	1.11	4.87

* 2003 Annual Loading Information is provisional and may be subject to minor revisions.

Figure 3.SA. Sand Creek 2003 Hydrograph with Total Suspended Solids and Nitrate Nitrogen Concentrations

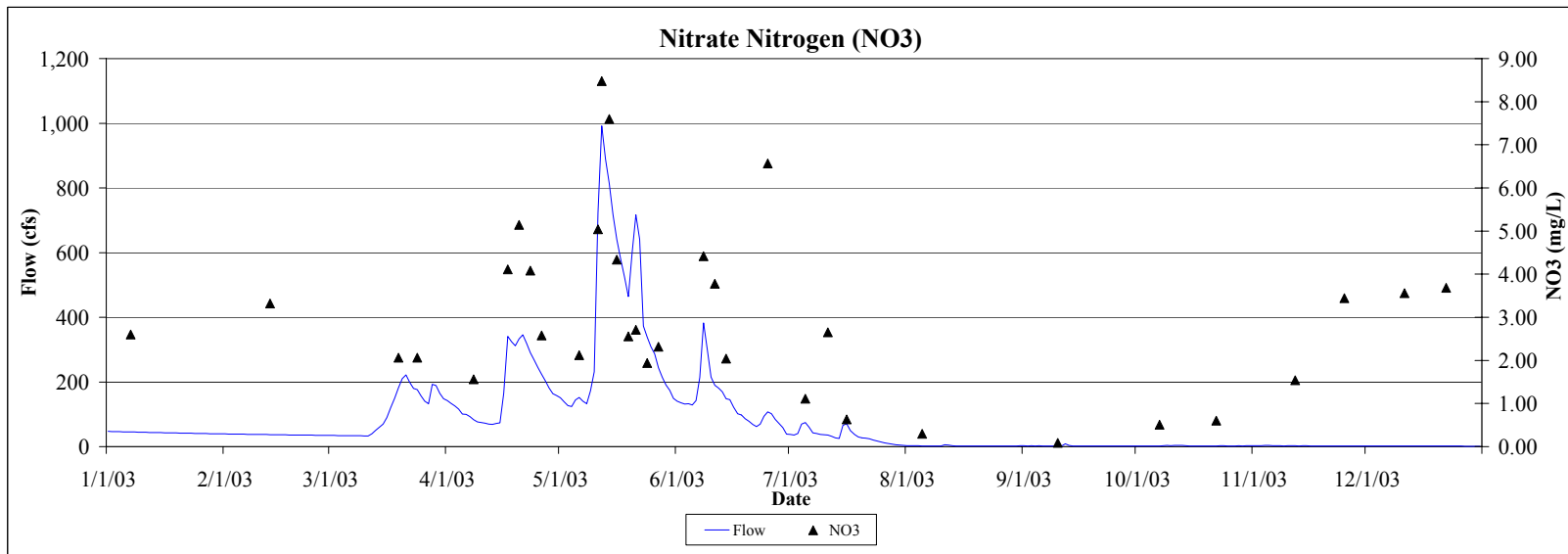
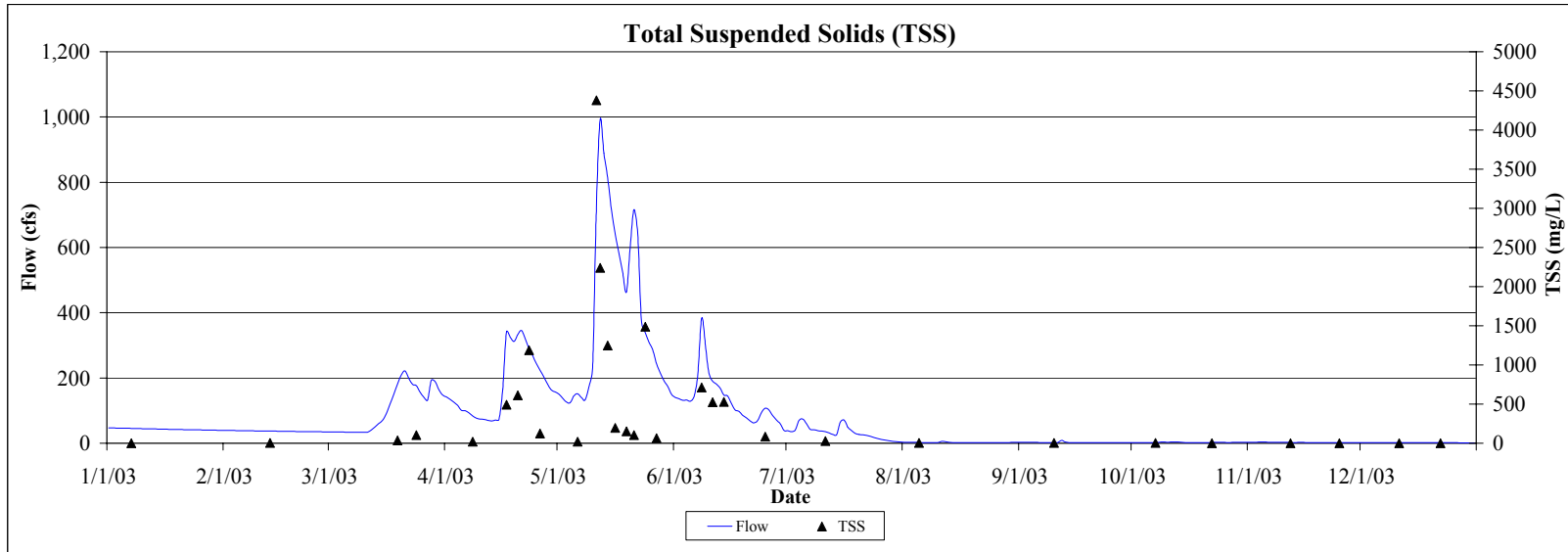


Figure 4.SA. Sand Creek 2003 Hydrograph with Total and Dissolved Phosphorus Concentrations

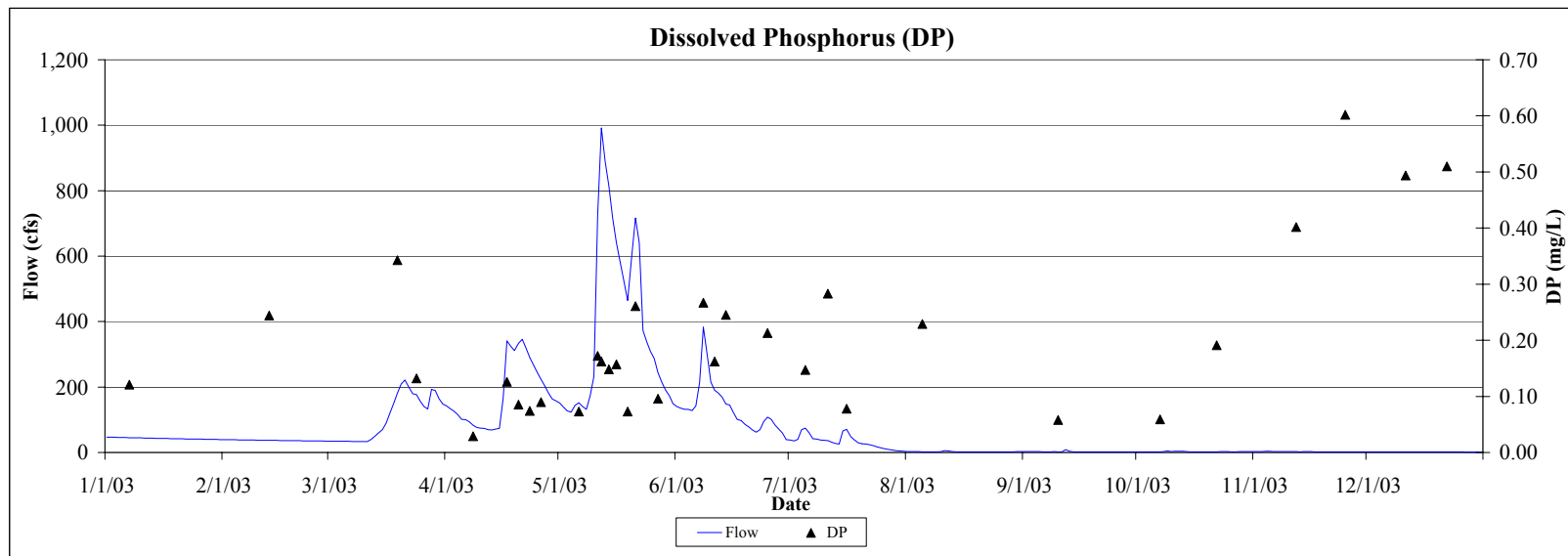
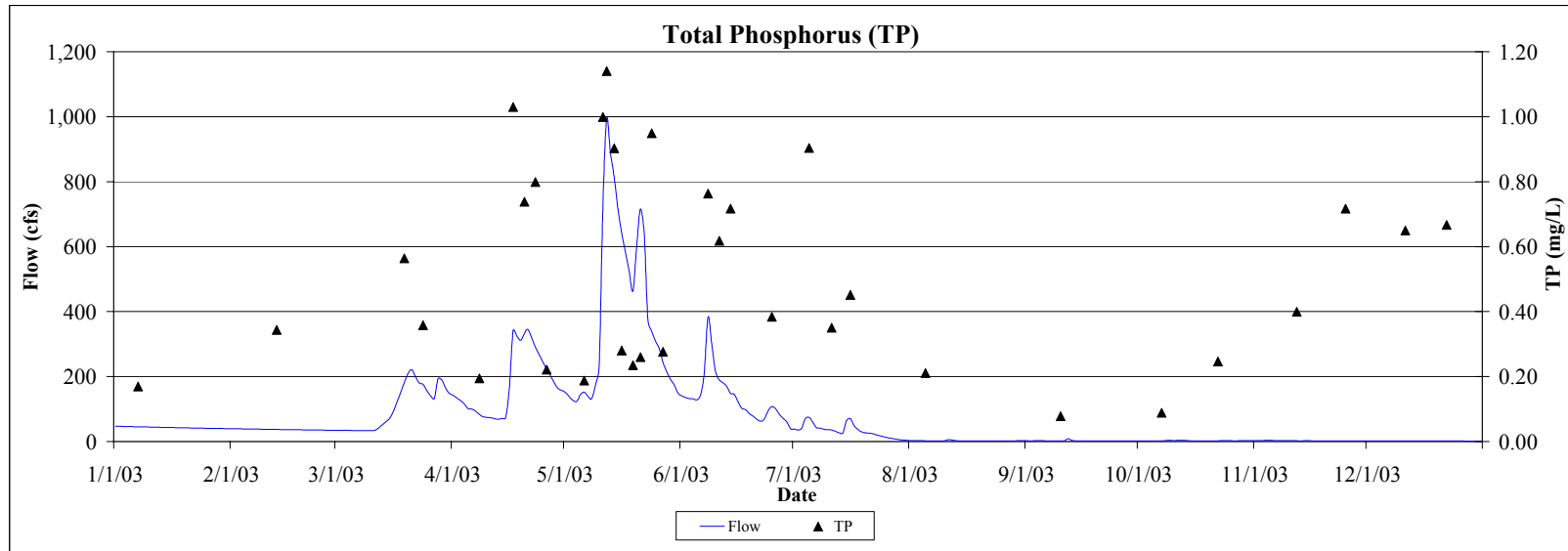


Table 4.SA. Sand Creek: Comparison of 2001-2003 Hydrology and Water Chemistry

	2001	2002	2003
Hydrology			
Total Precipitation (inches)	28.37	42.29	17.74
Water Yield (inches)	7.8	8.4	4.1
Total Volume (cubic feet)	4.6 x 10 ⁹	5.0 x 10 ⁹	2.5 x 10 ⁹
Annual Load (tons)			
Total Suspended Solids	71,900	57,500	23,700
Total Phosphorus	83.7	80.8	37.1
Total Dissolved Phosphorus	33.2	32.7	15.4
Total Nitrate Nitrogen	868	814	372
Annual Yield (lbs/acre)			
Total Suspended Solids	881	705	291
Total Phosphorus	1.03	0.99	0.46
Total Dissolved Phosphorus	0.41	0.40	0.19
Total Nitrate Nitrogen	10.63	9.98	4.56
Annual Normalized Yield (lbs/acre/inch of water)			
Total Suspended Solids	112	84	71
Total Phosphorus	0.13	0.12	0.11
Total Dissolved Phosphorus	0.05	0.05	0.05
Total Nitrate Nitrogen	1.36	1.19	1.11
Flow-Weighted Mean Concentration (mg/L)			
Total Suspended Solids	499	371	311
Total Phosphorus	0.58	0.52	0.49
Total Dissolved Phosphorus	0.23	0.21	0.20
Total Nitrate Nitrogen	6.02	5.25	4.87

Table 5.SA. Sand Creek 2003 Macroinvertebrate Monitoring Results and Metrics

Monitoring Date 10/9/2003

Class	Order	Family	Common Name	Organism Count
Hirudinea			Leeches	3
Insecta	Coleoptera	Elmidae	Riffle Beetles	13
Insecta	Coleoptera	Noteridae	Burrowing Water Beetles	1
Insecta	Diptera	Athericidae	Watersnipe Flies	1
Insecta	Diptera	Tipulidae	Crane Flies	1
Insecta	Diptera	Sialidae	Alderflies	1
Insecta	Diptera	Chironomidae	Midges	85
Insecta	Ephemeroptera	Leptophlebiidae	Pronggills	8
Insecta	Ephemeroptera	Baetidae	Small Minnow Mayflies	2
Insecta	Ephemeroptera	Heptageniidae	Flatheaded Mayflies	91
Insecta	Ephemeroptera	Caenidae	Small Squaregills	2
Insecta	Hemiptera	Belostomatidae	Giant Water Bugs	1
Insecta	Hemiptera	Nepidae	Water Scorpion	1
Insecta	Plecoptera		Stoneflies	1
Insecta	Trichoptera	Hydropsychidae	Common Netspinners	134
Insecta	Trichoptera	Limnephilidae	Northern Case Makers	1

Macroinvertebrate Taxa Metrics

Total Taxa	16
EPT Taxa	7
% EPT Taxa	44
Diptera Taxa	4
% Diptera Taxa	25
Mean Tolerance Value	4.5

Macroinvertebrate Organism Metrics

Total Individuals	346
EPT Individuals	239
% EPT Individuals	69
Diptera Individuals	88
% Diptera Individuals	25
Chironomidae Individuals	85
% Chironomidae Individuals	25

Water Quality

Degree of Organic Pollution

Family-Level Biotic Index	4.5	Good	Some Organic Pollution
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