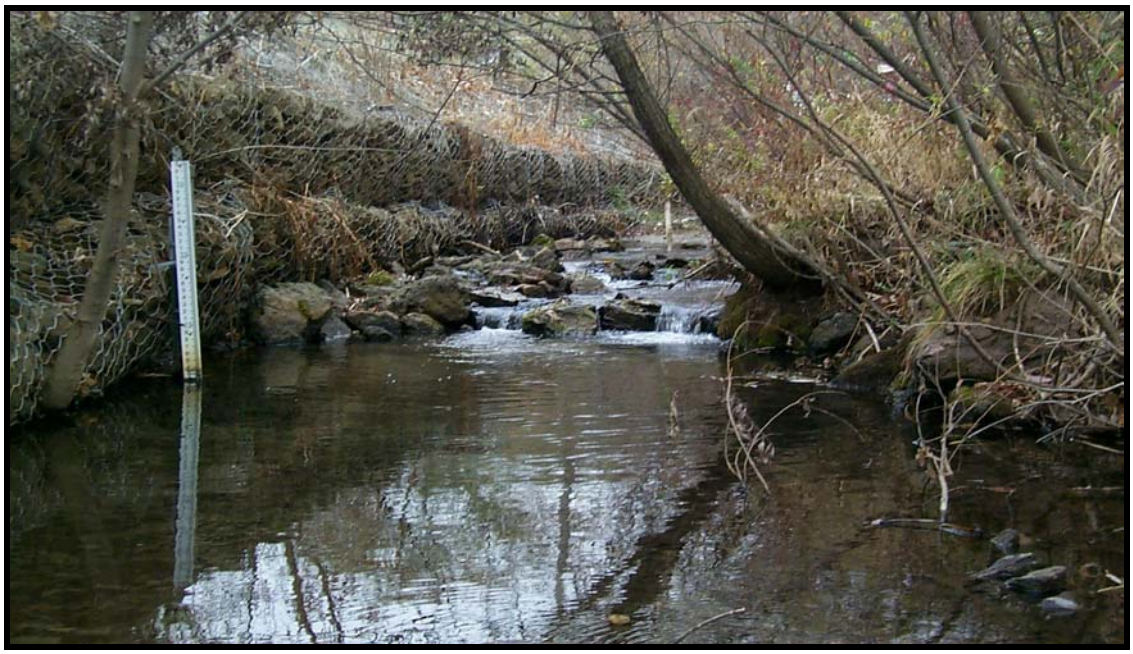
Table 1.BL. Bluff Creek Monitoring Station Information



Station Address: 781 Flying Cloud Drive, Chanhassen, MN
County: Carver
Major Basin: Minnesota River Basin
Watershed: Bluff Creek
Drainage Area: 8.9 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)
E-mail: timothy.pattock@metc.state.mn.us
mike.ahlf@metc.state.mn.us

Watershed District or Watershed Management Organization:
Riley-Purgatory-Bluff Creek Watershed District

Station Overview: MCES has conducted water quality monitoring of Bluff Creek since 1990. The monitoring station is located in Chanhassen, Minnesota, 3.5 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, Chanhassen Station Number 211448. High water conditions in Bluff Creek during the spring of 2001 rendered the

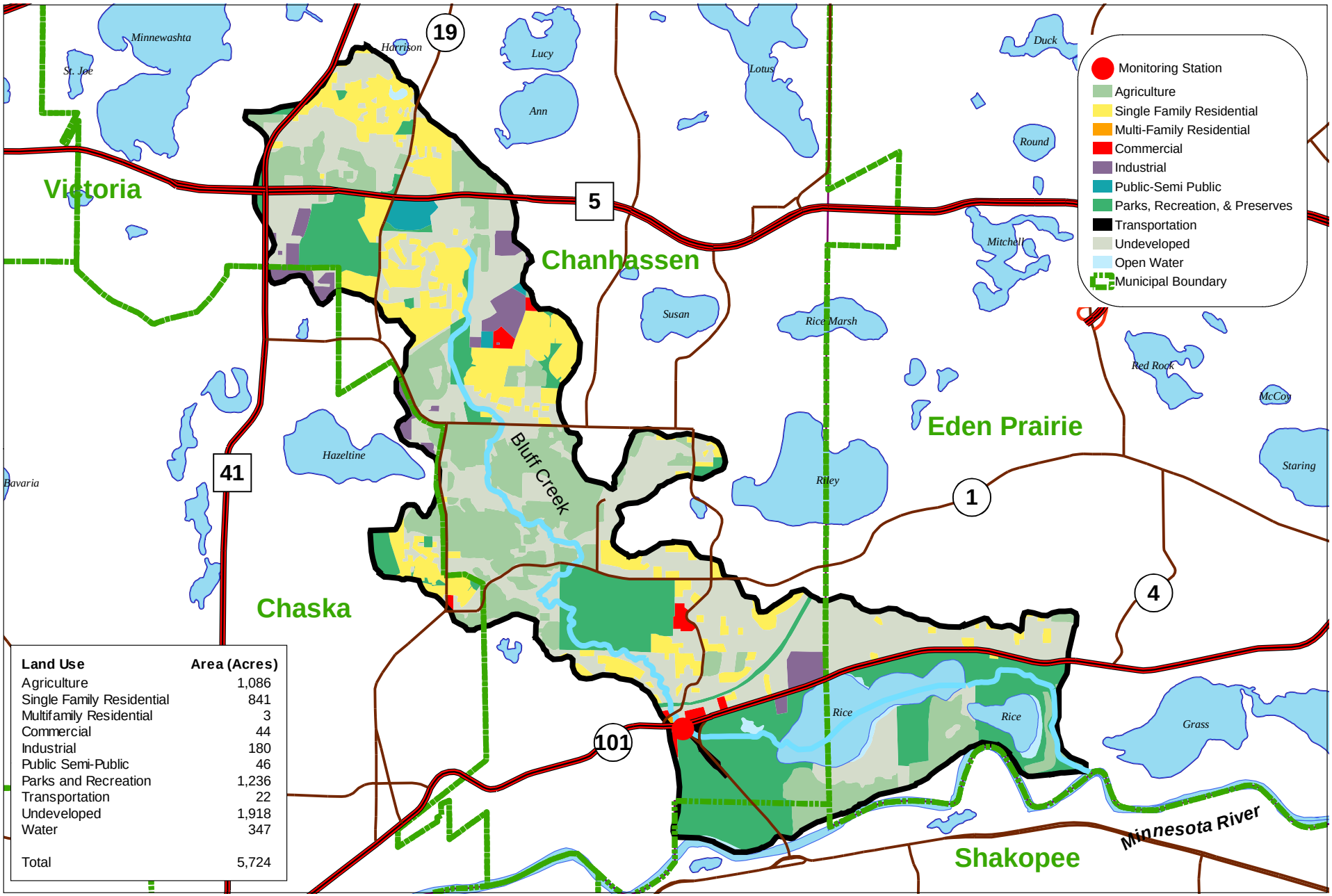
monitoring equipment useless and dramatically changed the rating curve. As a result, very little monitoring data are available for 2001. During the 1989-1990 period, MCES also operated a second monitoring station on Bluff Creek near the creek confluence with the Minnesota River (Mile 0.2).

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. A runoff event on May 11 produced a peak daily average flow of 36 cfs. This event generated the highest total suspended solids (TSS) concentration (2,430 mg/l) and the highest total phosphorus (TP) concentration (0.87 mg/l) measured at this station in 2003.

Sixteen samples were collected for water quality analysis during 2003, including 1 composite sample and 15 grab samples. Samples were obtained throughout the year during varying stream flow conditions, to most accurately characterize Bluff Creek water quality. Due to equipment problems caused by shifting gravel in the streambed, which occurred during periods of increased stream flow, only one composite sample was successfully collected. While composite sampling was not successful, grab samples were collected during runoff events whenever possible. 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 did not fully meet the goals of the MCES monitoring work plan, based on the very limited number of composite samples obtained.

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

Figure 1.BL. Bluff Creek Monitoring Station Location and Watershed Characteristics



Land Use	Area (Acres)
Agriculture	1,086
Single Family Residential	841
Multifamily Residential	3
Commercial	44
Industrial	180
Public Semi-Public	46
Parks and Recreation	1,236
Transportation	22
Undeveloped	1,918
Water	347
Total	5,724

Figure 2.BL. Bluff Creek 2003 Hydrograph, Precipitation and Sampling Information

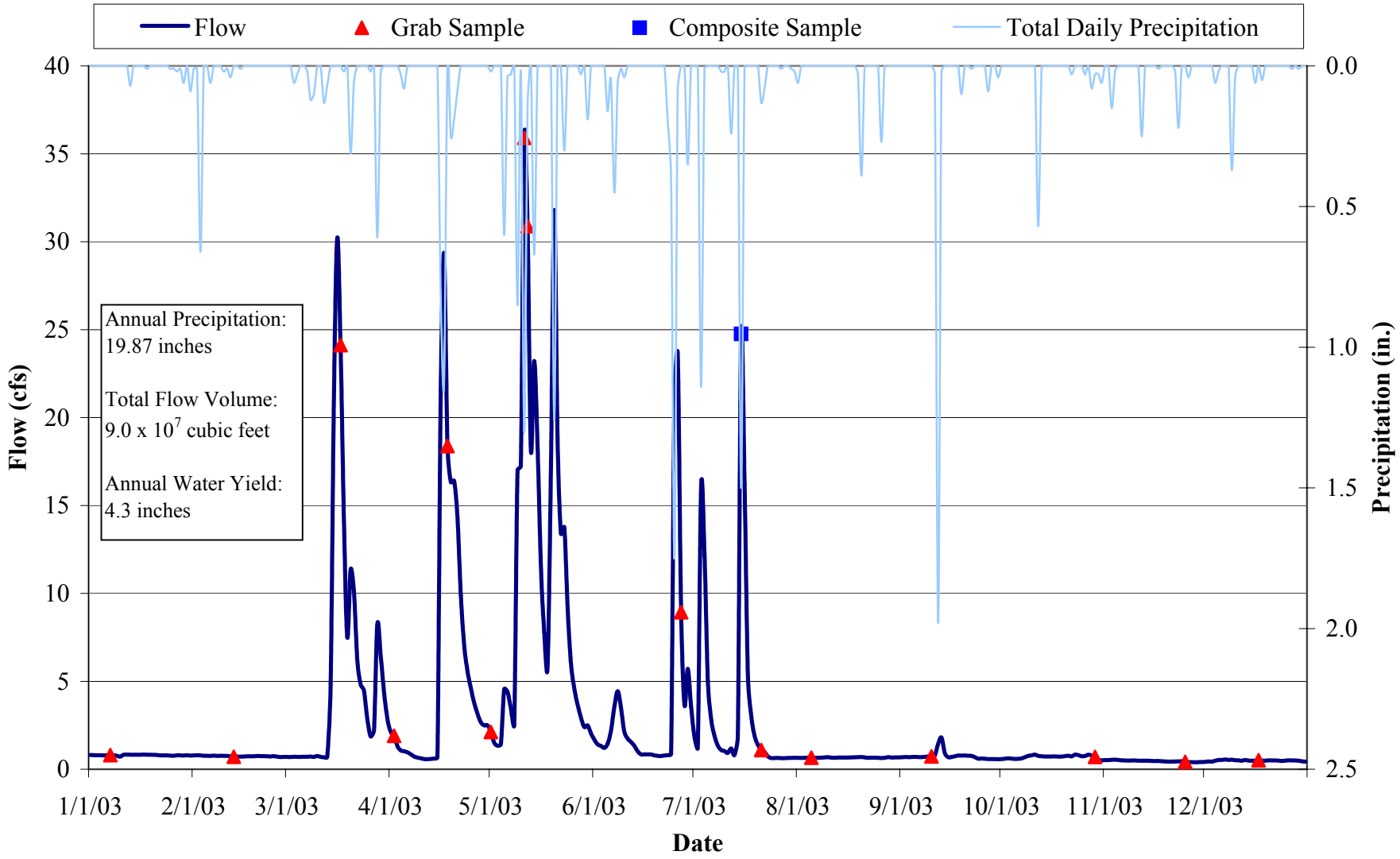


Table 2.BL. Bluff Creek 2003 Water Chemistry Information

Variable	N	Mean	Median	Minimum	Maximum	25%	75%	STD
Chloride, mg/L	16	67	59	42	133	58	66	23
Hardness, mg/L	5	295	322	206	382	214	352	81
Cadmium, ug/L	5	0.1	<0.1	<0.1	0.2	<0.1	0.2	0.1
Chromium, ug/L	5	1.7	0.3	0.1	5.6	0.2	2.5	2.4
Copper, ug/L	5	4.8	2.7	2.1	9.0	2.2	7.8	3.4
Lead, ug/L	5	1.9	0.2	<0.1	6.3	0.1	2.9	2.7
Nickel, ug/L	5	6.3	4.7	3.0	12.9	4.3	6.5	3.9
Zinc, ug/L	5	9.5	2.3	1.0	27.0	1.4	16.0	11.6
Total Kjeldahl Nitrogen, mg/L	16	0.89	0.54	0.12	3.70	0.23	1.13	0.97
Total Nitrate Nitrogen, mg/L	16	0.64	0.56	0.12	1.63	0.34	0.82	0.42
Total Phosphorus, mg/L	16	0.19	0.09	0.01	0.87	0.04	0.17	0.26
Total Dissolved Phosphorus, mg/L	16	0.09	0.06	0.01	0.53	0.02	0.09	0.13
Total Suspended Solids, mg/L	16	206	5	1	2430	3	69	602
Volatile Suspended Solids, mg/L	16	11	2	1	82	1	7	22
Turbidity, NTU	16	16	3	1	140	2	14	34

N: Sample Count

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

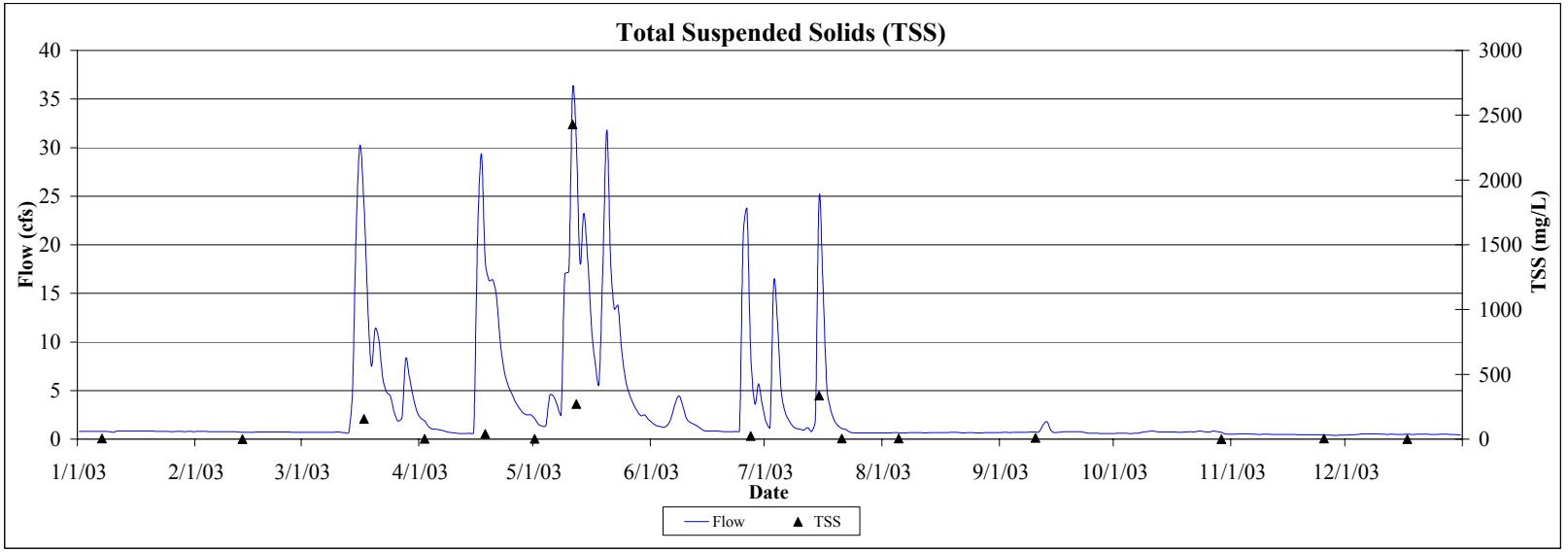
STD: Standard Deviation

Table 3.BL. Bluff 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	722	251	58	259
Total Phosphorus	0.97	0.34	0.08	0.35
Total Dissolved Phosphorus	0.45	0.16	0.04	0.16
Total Nitrate Nitrogen	2.11	0.73	0.17	0.75

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

Figure 3.BL. Bluff Creek 2003 Hydrograph with Total Suspended Solids and Nitrate Nitrogen Concentrations



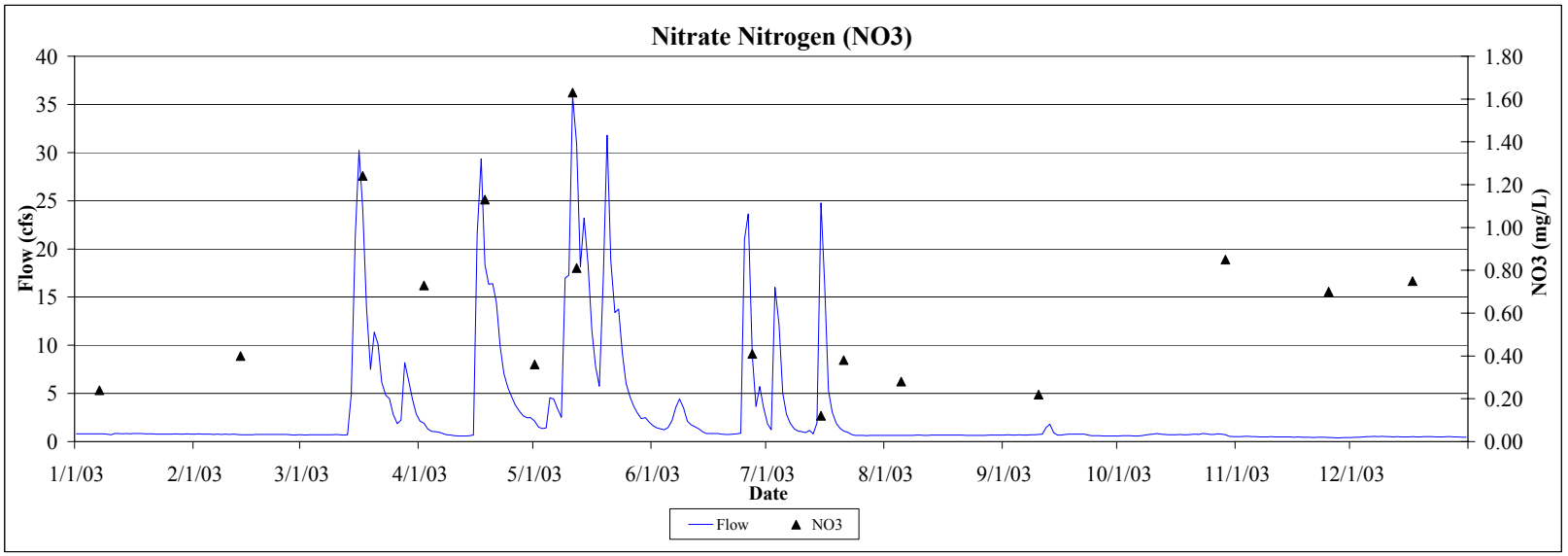
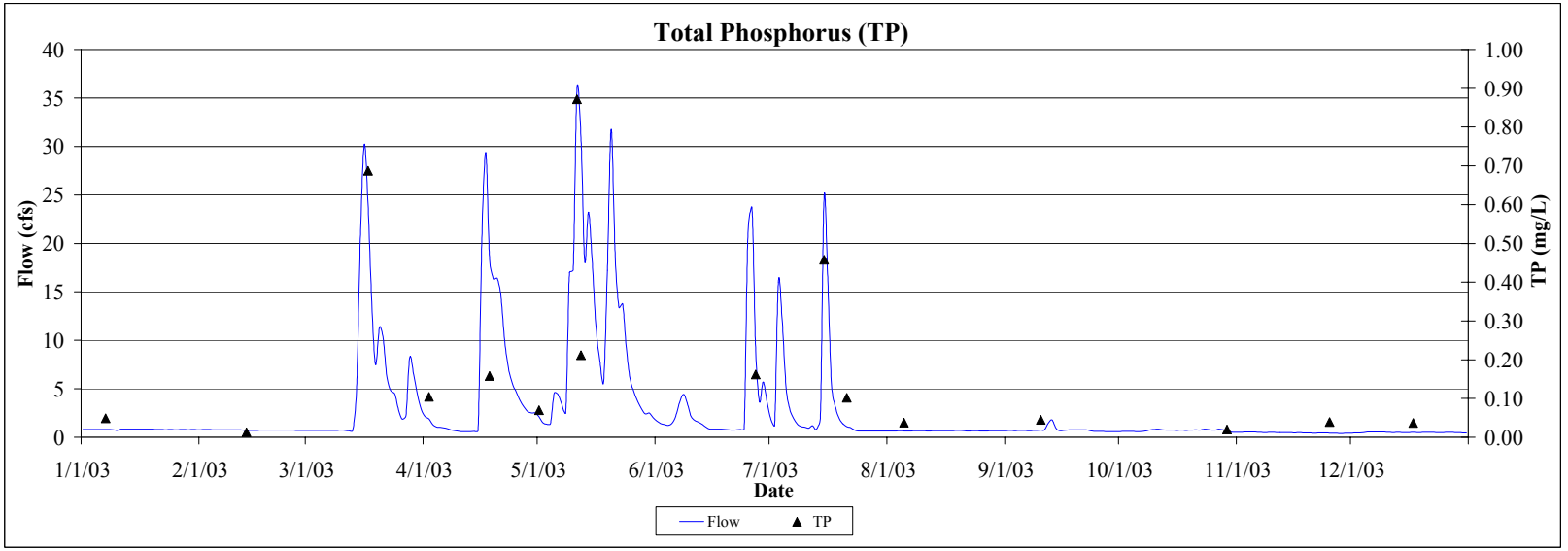


Figure 4.BL. Bluff Creek 2003 Hydrograph with Total and Dissolved Phosphorus Concentrations



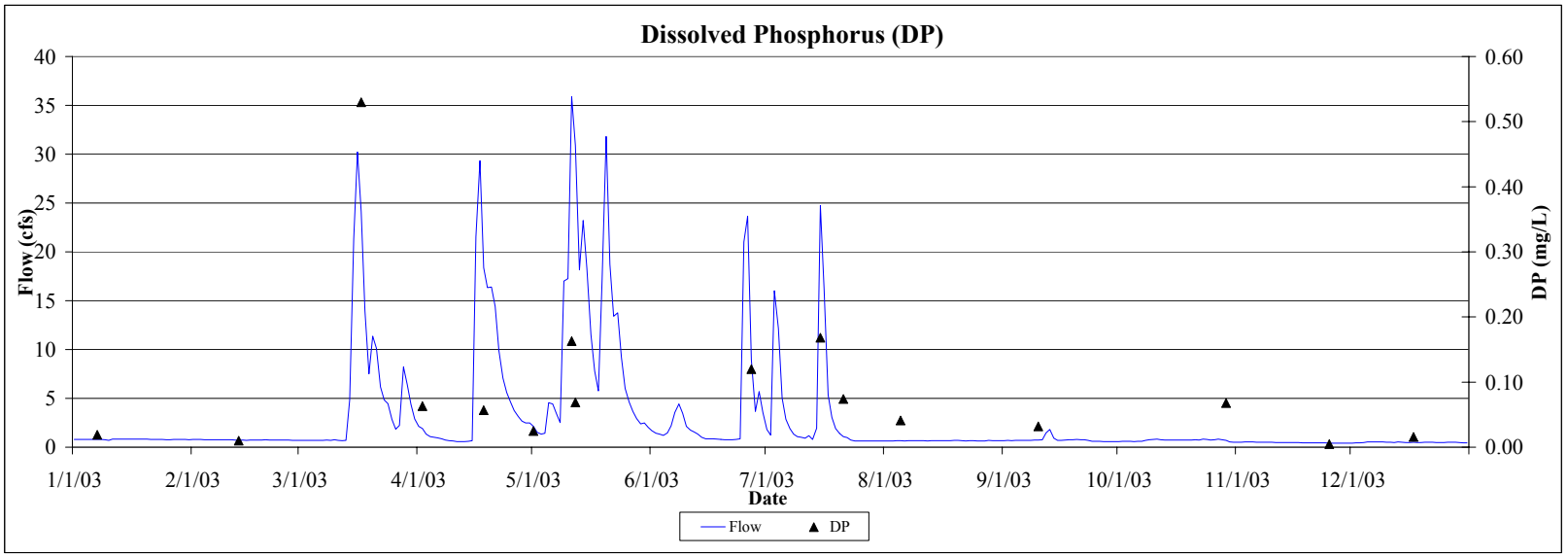


Table 4.BL. Bluff Creek: Comparison of 2001-2003 Hydrology and Water Chemistry

	2001	2002	2003
Hydrology			
Total Precipitation (inches)	27.99	36.18	19.87
Water Yield (inches)	insufficient data	6.5	4.3
Total Volume (cubic feet)	insufficient data	1.4×10^8	9.0×10^7
Annual Load (tons)			
Total Suspended Solids	insufficient data	1,610	722
Total Phosphorus	insufficient data	1.90	0.97
Total Dissolved Phosphorus	insufficient data	0.75	0.45
Total Nitrate Nitrogen	insufficient data	3.16	2.11
Annual Yield (lbs/acre)			
Total Suspended Solids	insufficient data	557	251
Total Phosphorus	insufficient data	0.66	0.34
Total Dissolved Phosphorus	insufficient data	0.26	0.16
Total Nitrate Nitrogen	insufficient data	1.10	0.73
Annual Normalized Yield (lbs/acre/inch of water)			
Total Suspended Solids	insufficient data	86	58
Total Phosphorus	insufficient data	0.10	0.08
Total Dissolved Phosphorus	insufficient data	0.04	0.04
Total Nitrate Nitrogen	insufficient data	0.17	0.17
Flow-Weighted Mean Concentration (mg/L)			
Total Suspended Solids	insufficient data	381	259
Total Phosphorus	insufficient data	0.45	0.35
Total Dissolved Phosphorus	insufficient data	0.18	0.16
Total Nitrate Nitrogen	insufficient data	0.75	0.75

Table 5.BL. Bluff Creek 2003 Macroinvertebrate Monitoring Results and Metrics

Monitoring Date 10/10/2003

Class	Order	Family	Common Name	Organism Count
Arthropoda	Amphipoda		Scuds	396
Arthropoda	Collembola	Isotomidae	Sowbugs	1
Gastropoda			Snails	12
Hirudinea			Leeches	1
Insecta	Coleoptera	Dytiscidae	Predaceous Diving Beetles	5
Insecta	Coleoptera	Elmidae	Riffle Beetles	2
Insecta	Coleoptera	Hydrophilidae	Water Scavenger Beetles	1
Insecta	Coleoptera	Noteridae	Burrowing Water Beetles	1
Insecta	Diptera	Chironomidae	Midges	72
Insecta	Diptera	Empididae	Aquatic Dance Flies	3
Insecta	Diptera	Muscidae	Hooded Case Makers	3
Insecta	Diptera	Simuliidae	Black Flies	6
Insecta	Diptera	Tipulidae	Crane Flies	11
Insecta	Ephemeroptera	Baetidae	Small Minnow Mayflies	365
Insecta	Hemiptera	Corixidae	Water Boatman	2
Insecta	Plecoptera	Capniidae	Slender Winter Stoneflies	8
Insecta	Trichoptera	Hydropsychidae	Common Netspinners	70

Macroinvertebrate Taxa Metrics

Total Taxa	17
EPT Taxa	3
% EPT Taxa	18
Diptera Taxa	5
% Diptera Taxa	29
Mean Tolerance Value	5.6

Macroinvertebrate Organism Metrics

Total Individuals	959
EPT Individuals	443
% EPT Individuals	46
Diptera Individuals	95
% Diptera Individuals	10
Chironomidae Individuals	72
% Chironomidae Individuals	8

		Water Quality	Degree of Organic Pollution
Family-Level Biotic Index	5.0	Good	Some Organic Pollution