

Table 1.SI. Silver Creek Monitoring Station Information



Station Address: Silver Creek near Washington County Road 11, Stillwater, MN
County: Washington
Major Basin: St. Croix River Basin
Watershed: Silver Creek
Drainage Area: 7.62 square miles

Station Operator: Washington County Soil and Water Conservation District

Metropolitan Council Environmental Services Contact Information:

Contact Person: Casandra Champion
Address: 2400 Childs Road
St. Paul, MN 55106
Phone: 651-602-8745
E-mail: casandra.champion@metc.state.mn.us

Watershed District or Watershed Management Organization:
Carnelian Marine Watershed District

Station Overview: MCES has supported water quality monitoring of Silver Creek since 1998. In 2002, the monitoring station was moved to a more accessible location about one-half mile downstream from the previous station location. The new location, near Stillwater, Minnesota, is about 0.1 mile upstream from the creek confluence with the St. Croix River. MCES partners with the Washington County Soil and Water Conservation District to operate the Silver Creek monitoring station. There is no rain gauge at this

station; however, precipitation data are obtained from the Minnesota Climatology Working Group, Stillwater Station Number 218037.

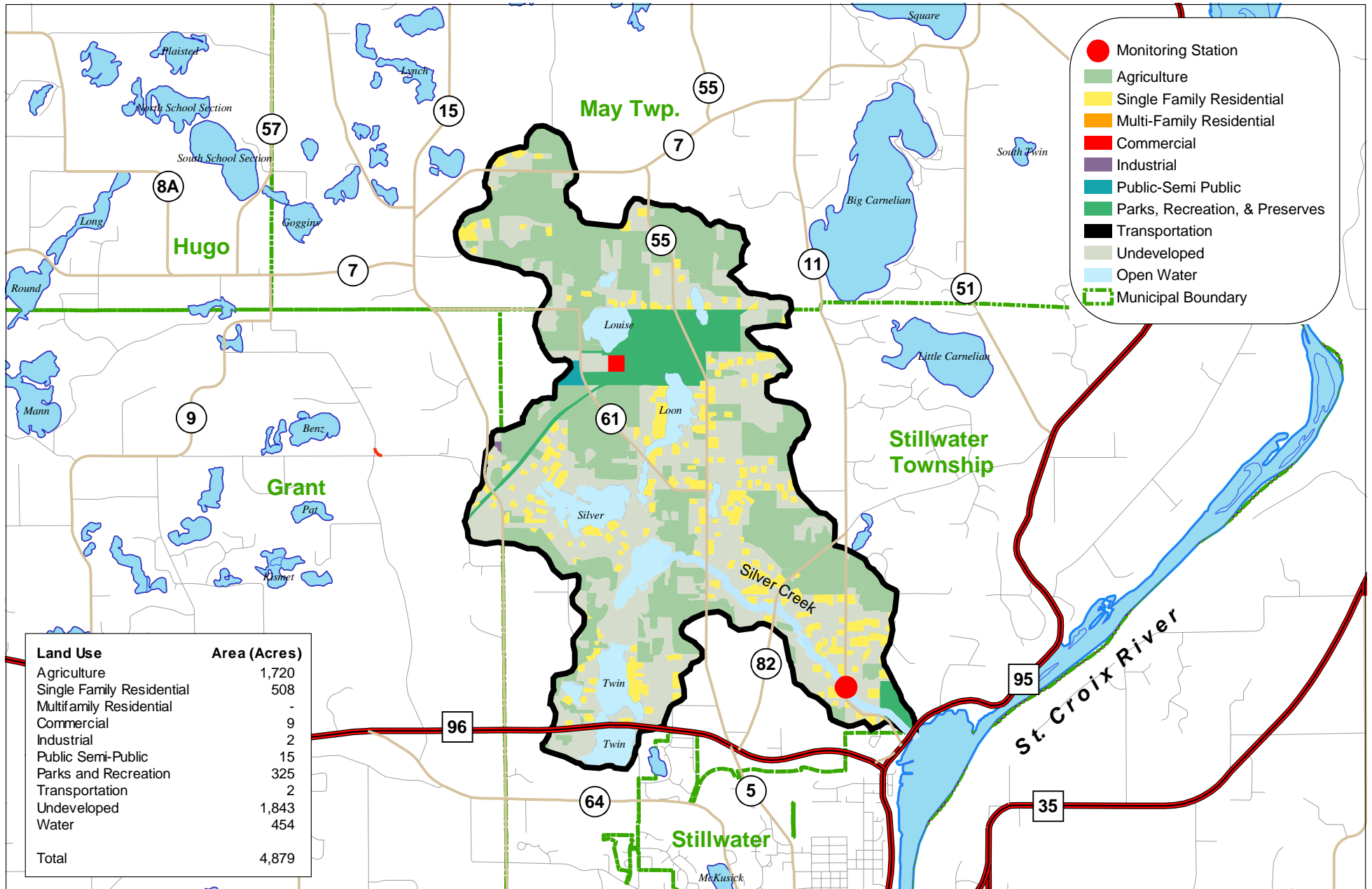
2003 Monitoring Year: Monitoring equipment was installed on March 18, 2003 and removed on November 4, 2003. Daily average flows were estimated during the January 1-March 17 period and after November 4. Snowmelt began in mid-March 2003. The peak daily average flow of 13.8 cfs occurred on May 11, 2003.

A large rainfall event of 1.48 inches on June 25, 2003 created a significant runoff event. A composite sample collected on June 25, on the rising limb and at the peak of the hydrograph for this runoff event, had the highest total suspended solids (TSS) concentration (460 mg/L) of all 2003 samples.

Twenty-six samples were collected for water quality analysis during 2003, including 13 composite samples and 13 grab samples. 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.SI. Silver Creek Monitoring Station Location and Watershed Characteristics



0 0.4 0.8 1.6 Miles



Figure 2.SI. Silver Creek 2003 Hydrograph, Precipitation and Sampling Information

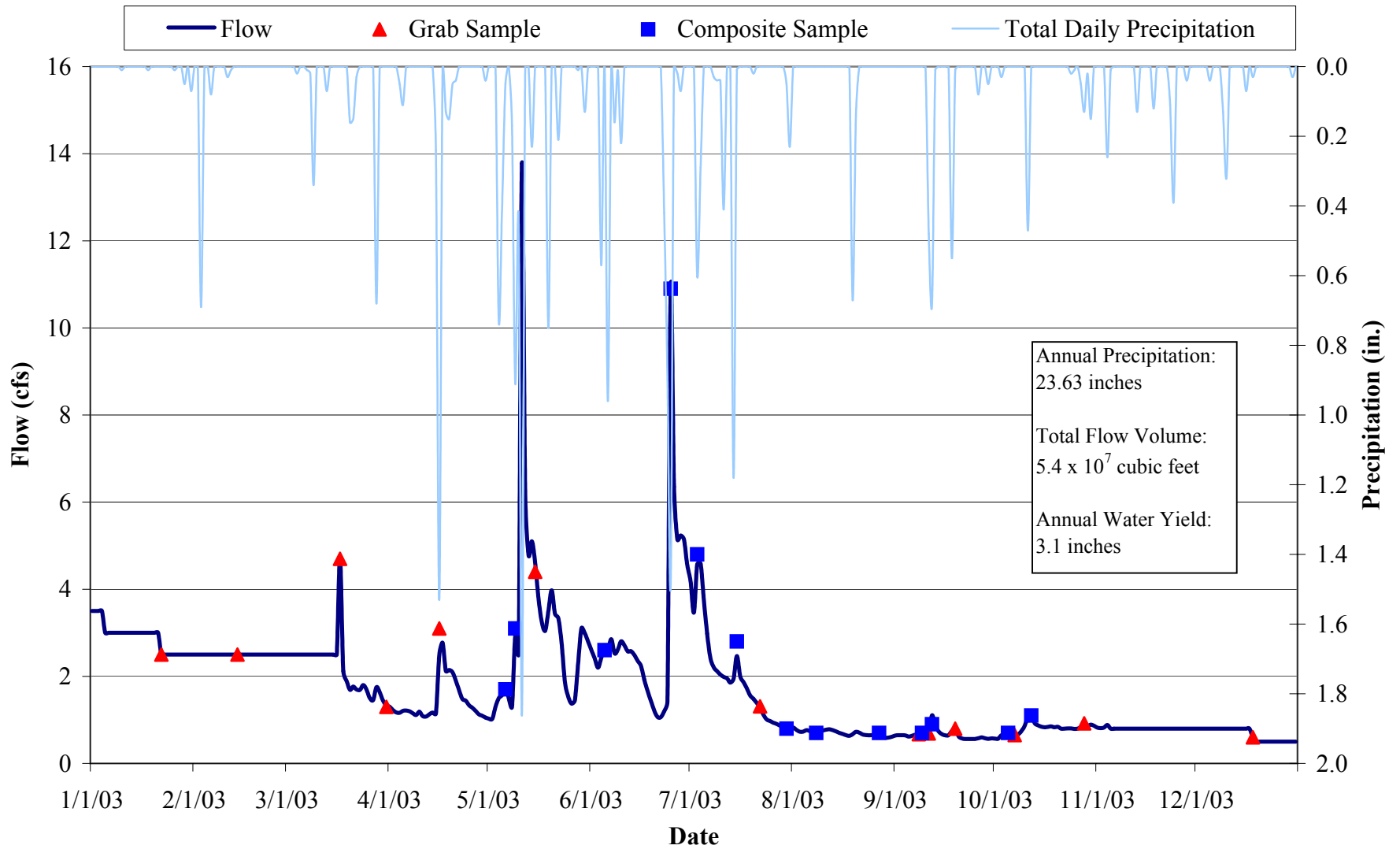


Table 2.SI. Silver Creek 2003 Water Chemistry Information

Variable	N	Mean	Median	Minimum	Maximum	25%	75%	STD
Chloride, mg/L	26	17	17	12	20	16	19	2
Hardness, mg/L	4	151	152	106	192	112	188	39
Cadmium, ug/L	4	0.1	<0.1	<0.1	0.4	<0.1	0.3	0.2
Chromium, ug/L	4	1.0	1.0	0.7	1.2	0.7	1.2	0.3
Copper, ug/L	4	1.4	1.2	0.9	2.3	0.9	2.1	0.7
Lead, ug/L	4	0.5	0.2	0.1	1.6	0.1	1.3	0.7
Nickel, ug/L	4	1.4	1.4	0.9	1.8	1.0	1.7	0.4
Zinc, ug/L	4	3.8	3.2	2.4	6.4	2.5	5.7	1.8
Total Kjeldahl Nitrogen, mg/L	26	0.40	0.30	0.02	2.00	0.14	0.44	0.43
Total Nitrate Nitrogen, mg/L	26	0.66	0.66	0.08	1.45	0.27	1.00	0.41
Total Phosphorus, mg/L	26	0.07	0.04	0.01	0.56	0.03	0.07	0.11
Total Dissolved Phosphorus, mg/L	26	0.02	0.02	<0.01	0.05	0.01	0.03	0.01
Total Suspended Solids, mg/L	26	31	6	1	460	2	19	90
Volatile Suspended Solids, mg/L	26	5	2	1	58	1	4	11
Turbidity, NTU	26	5	2	1	60	1	4	12

N: Sample Count

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

STD: Standard Deviation

Table 3.SI. Silver 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	39	16	5	23
Total Phosphorus	0.12	0.05	0.02	0.07
Total Dissolved Phosphorus	0.04	0.02	0.01	0.02
Total Nitrate Nitrogen	0.98	0.40	0.13	0.58

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

Figure 3.SI. Silver Creek 2003 Hydrograph with Total Suspended Solids and Nitrate Nitrogen Concentrations

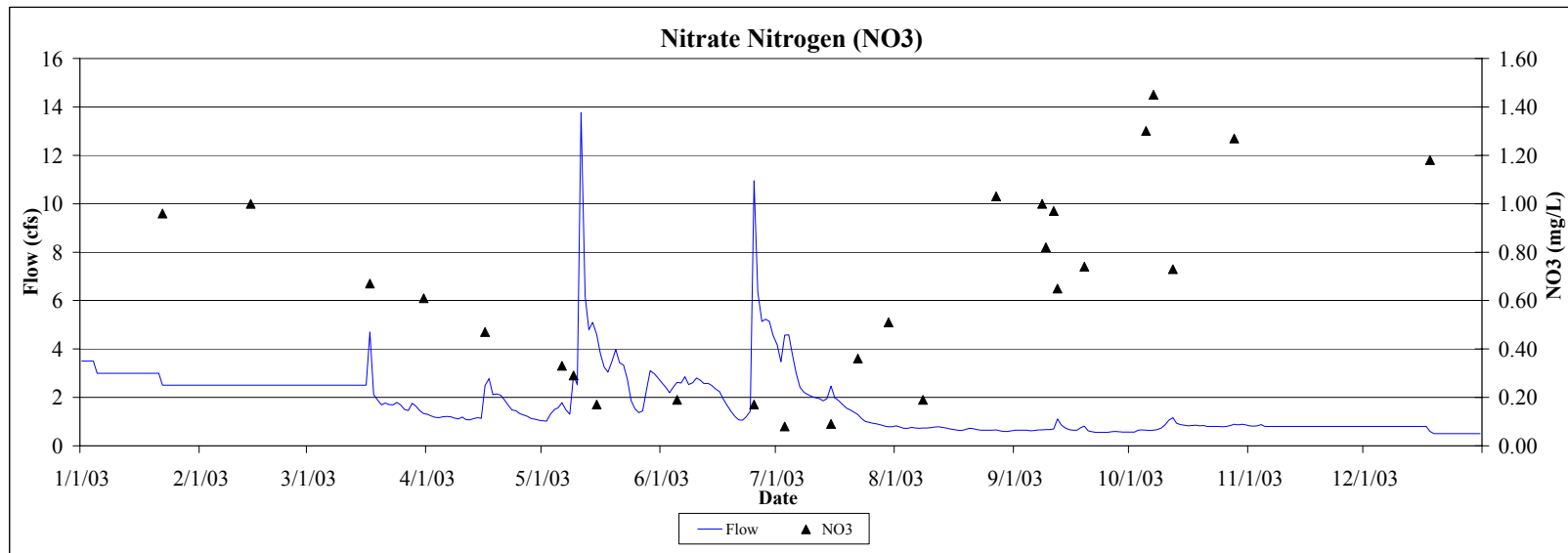
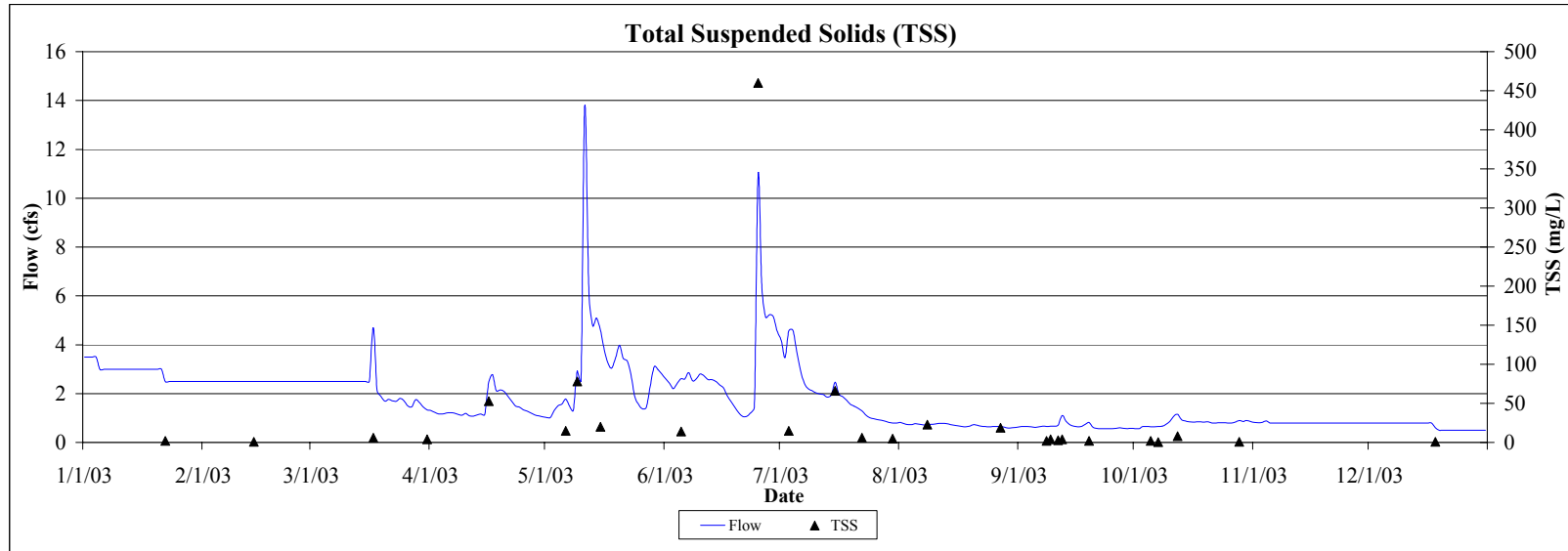


Figure 4.SI. Silver Creek 2003 Hydrograph with Total and Dissolved Phosphorus Concentrations

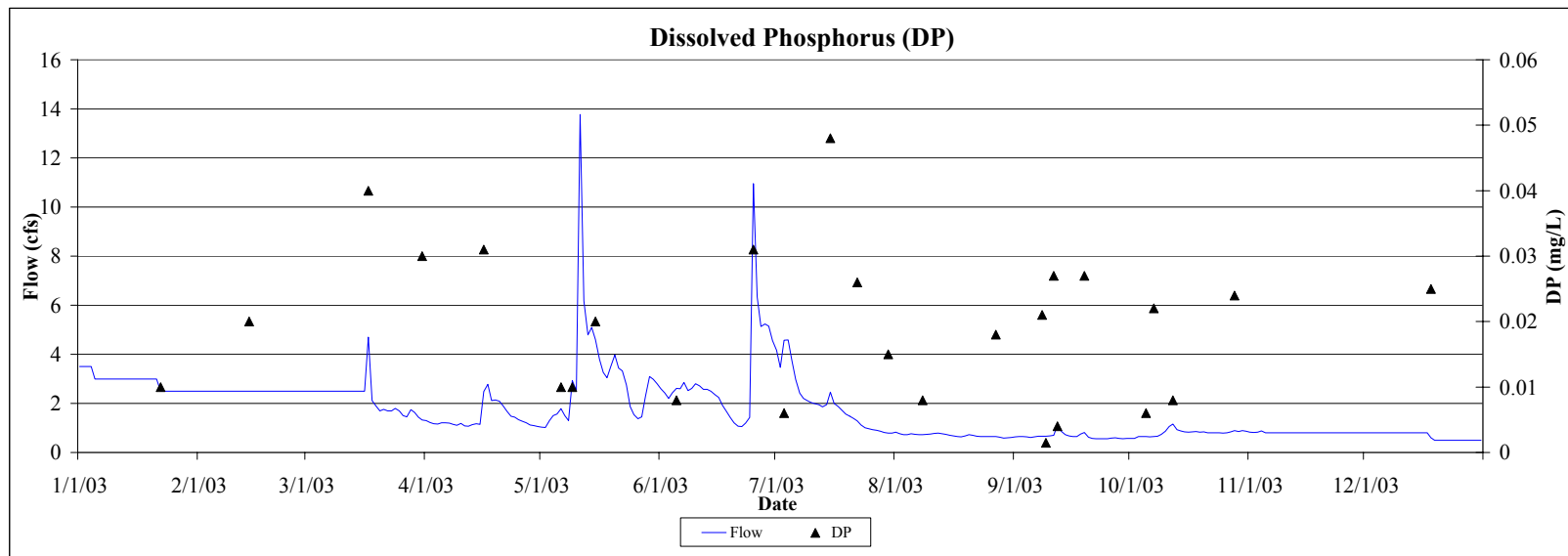
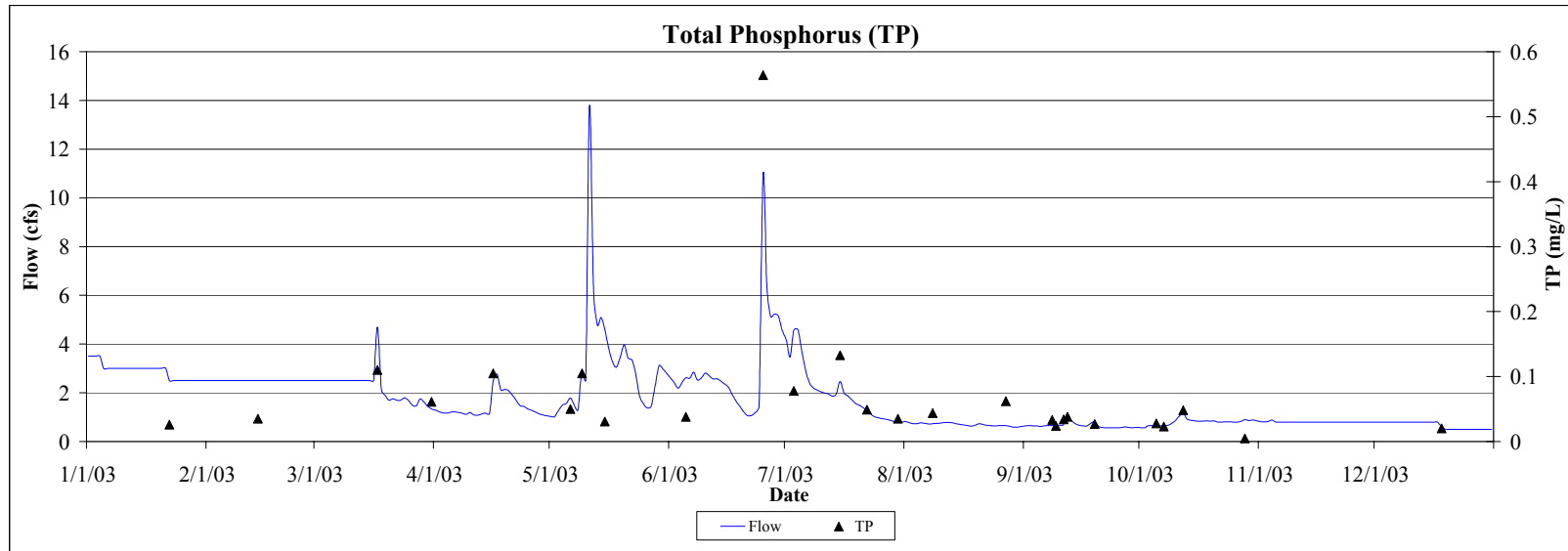


Table 4.SI. Silver Creek: Comparison of 2001-2003 Hydrology and Water Chemistry

	2001	2002	2003
Hydrology			
Total Precipitation (inches)	36.91	40.44	23.63
Water Yield (inches)	1.6	6.0	3.1
Total Volume (cubic feet)	2.7×10^7	1.1×10^8	5.4×10^7
Annual Load (tons)			
Total Suspended Solids	12	140	39
Total Phosphorus	0.05	0.32	0.12
Total Dissolved Phosphorus	0.02	0.10	0.04
Total Nitrate Nitrogen	0.15	1.01	0.98
Annual Yield (lbs/acre)			
Total Suspended Solids	5	57	16
Total Phosphorus	0.02	0.13	0.05
Total Dissolved Phosphorus	0.01	0.04	0.02
Total Nitrate Nitrogen	0.06	0.41	0.40
Annual Normalized Yield (lbs/acre/inch of water)			
Total Suspended Solids	3	10	5
Total Phosphorus	0.01	0.02	0.02
Total Dissolved Phosphorus	<0.01	0.01	0.01
Total Nitrate Nitrogen	0.04	0.07	0.13
Flow-Weighted Mean Concentration (mg/L)			
Total Suspended Solids	14	42	23
Total Phosphorus	0.06	0.09	0.07
Total Dissolved Phosphorus	0.02	0.03	0.02
Total Nitrate Nitrogen	0.18	0.30	0.58

Table 5.SI. Silver Creek 2003 Macroinvertebrate Monitoring Results and Metrics

Monitoring Date 6/5/2003

Class	Order	Family	Common Name	Organism Count
Arthropoda	Amphipoda		Scuds	20
Arthropoda	Isopoda		Sowbugs	1
Gastropoda			Snails	8
Insecta	Coleoptera	Elmidae	Riffle Beetles	80
Insecta	Coleoptera	Hydrophilidae	Water Scavenger Beetles	1
Insecta	Diptera	Athericidae	Watersnipe Flies	1
Insecta	Diptera	Tipulidae	Crane Flies	20
Insecta	Diptera	Chironomidae	Midges	41
Insecta	Diptera	Empididae	Aquatic Dance Flies	2
Insecta	Diptera	Simuliidae	Black Flies	158
Insecta	Ephemeroptera	Baetidae	Small Minnow Mayflies	58
Insecta	Odonata	Aeshnidae	Darners	2
Insecta	Plecoptera		Stoneflies	18
Insecta	Trichoptera	Glossosomatidae	Saddlecase Makers	96
Insecta	Trichoptera	Philopotamidae	Fingernet Caddisflies	18
Insecta	Trichoptera	Hydropsychidae	Common Netspinners	26
Insecta	Trichoptera	Limnephilidae	Northern Case Makers	5
Oligochaeta			Aquatic Earthworms	5
Pelecypoda			Clams and Mussels	1
Turbellaria	Tricladida	Planariidae	Planarians	1

Macroinvertebrate Taxa Metrics

Total Taxa	20
EPT Taxa	6
% EPT Taxa	30
Diptera Taxa	5
% Diptera Taxa	25
Mean Tolerance Value	4.8

Macroinvertebrate Organism Metrics

Total Individuals	562
EPT Individuals	221
% EPT Individuals	39
Diptera Individuals	222
% Diptera Individuals	40
Chironomidae Individuals	41
% Chironomidae Individuals	7

	Water Quality	Degree of Organic Pollution
Family-Level Biotic Index	4.1 Very Good	Slight Organic Pollution