Table 1.CR. Credit River Monitoring Station Information

Station Address: 4975 126th Street, Savage, MN 55378
County: Scott
Major Basin: Minnesota River Basin
Watershed: Credit River
Drainage Area: 51.4 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:

Station Overview: MCES has conducted water quality monitoring of the Credit River since 1989. The monitoring station is located in Savage, Minnesota, 0.9 mile upstream from the river confluence with the Minnesota River. Due to site logistical problems, the monitoring station was moved in 2000, from the former site at Credit River Mile 0.6 to the current location at Mile 0.9. 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, Bloomington Station Number 217538. Flow

and pollutant load data for 2002 are unavailable, due to monitoring equipment problems that persisted at this site for most of the 2002 monitoring year. However, 2002 water chemistry and biological monitoring data are available.

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-September. A runoff event on May 11 produced a peak daily average flow of 169 cfs. This event generated the highest total suspended solids (TSS) concentration (634 mg/l) measured at this station in 2003.

Twenty-three samples were collected for water quality analysis during 2003, including 3 composite samples and 20 grab samples. Due to continuing problems with flow monitoring equipment at the Credit River station during the first half of 2003, flow-weighted composite samples were not collected during all runoff events, as stipulated by the MCES monitoring work plan. However, when composite sampling was not possible, grab samples were collected instead. Samples were obtained throughout the year during varying stream flow conditions, to most accurately characterize Credit River 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 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.CR. Credit River Monitoring Station Location and Watershed Characteristics

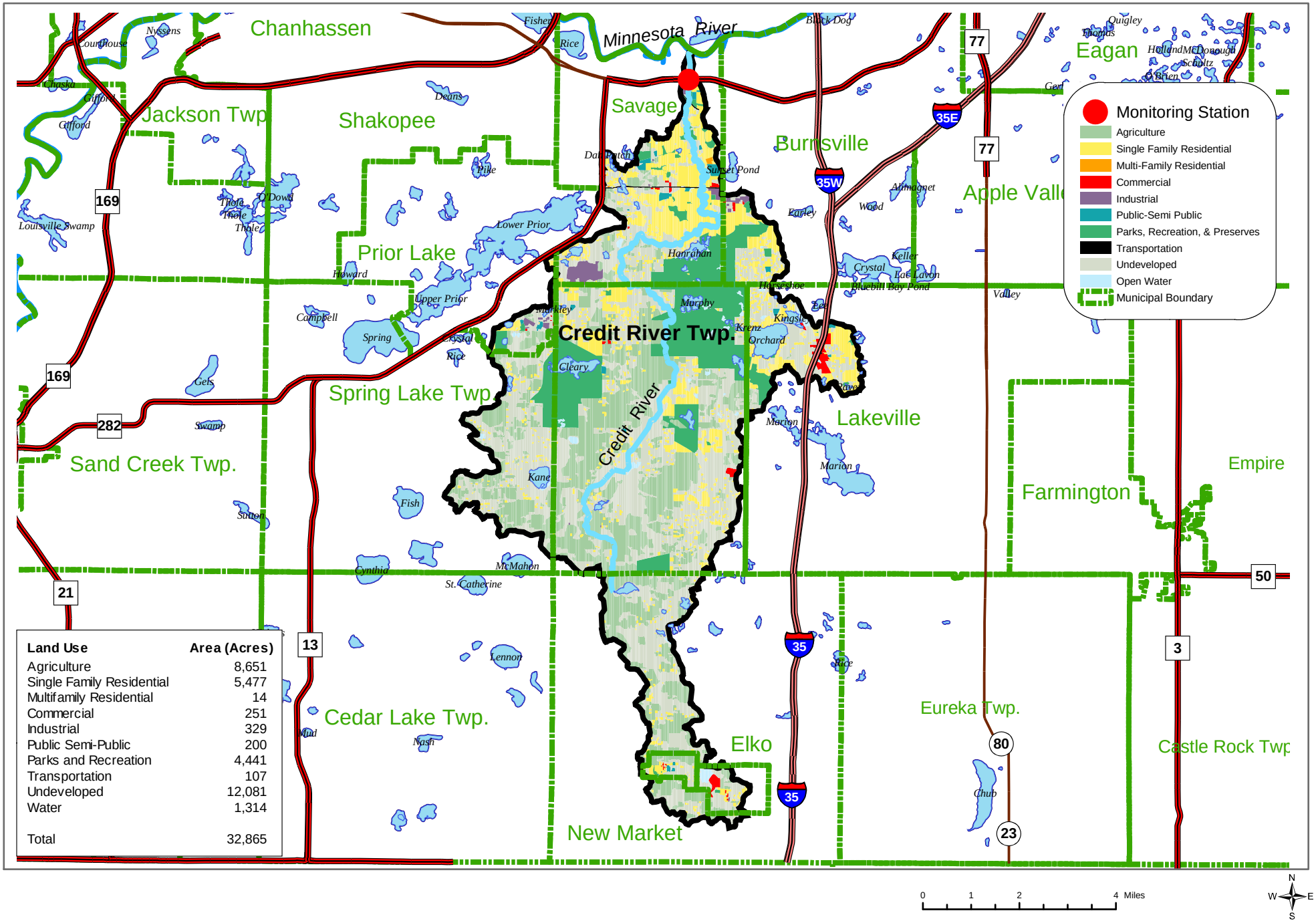


Figure 2.CR. Credit River 2003 Hydrograph, Precipitation and Sampling Information

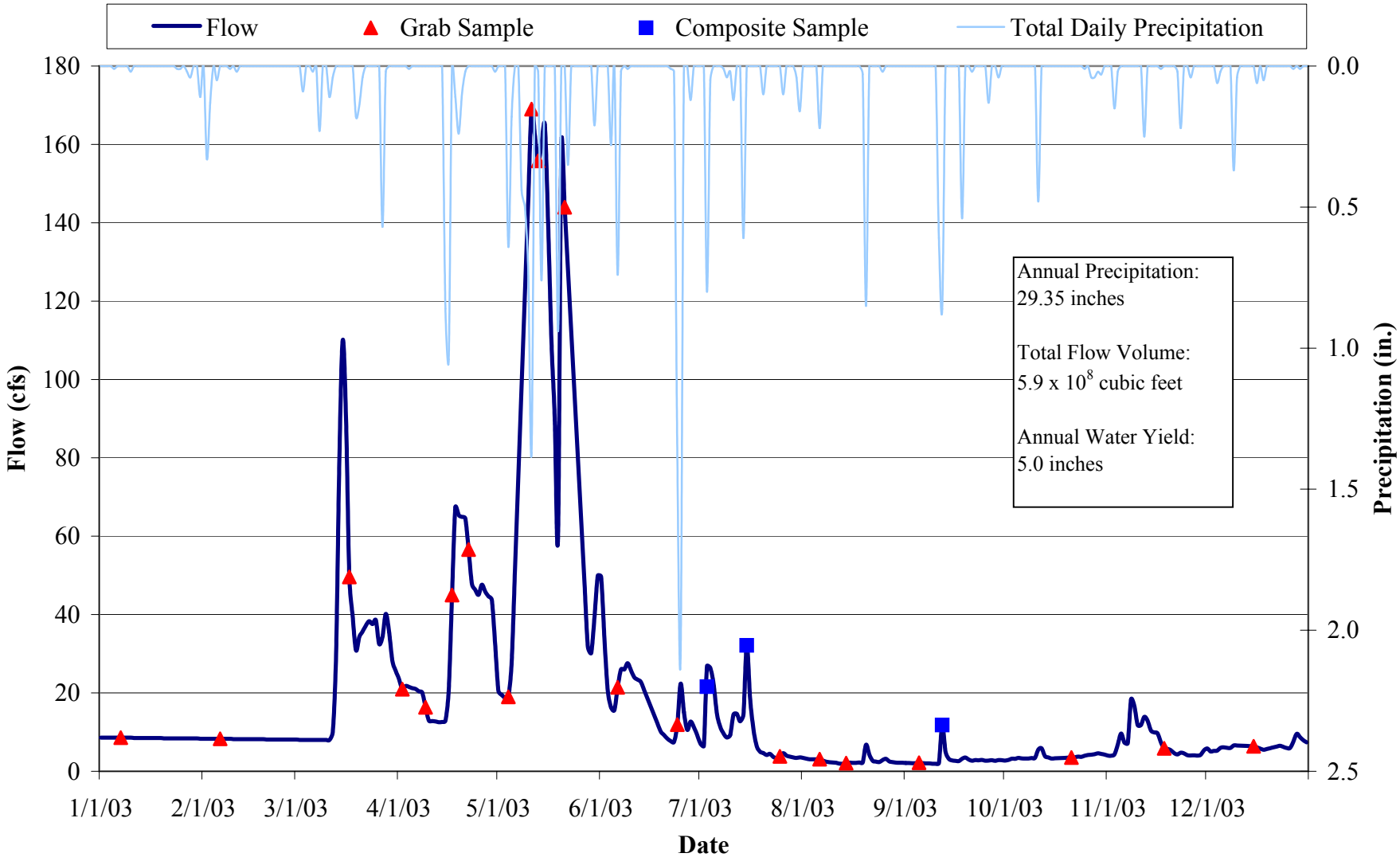


Table 2.CR. Credit River 2003 Water Chemistry Information

Variable	N	Mean	Median	Minimum	Maximum	25%	75%	STD
Chloride, mg/L	25	44	45	29	67	36	49	10
Hardness, mg/L	6	282	298	158	382	249	319	77
Cadmium, ug/L	5	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1
Chromium, ug/L	5	1.3	0.5	0.1	4.4	0.2	1.2	1.8
Copper, ug/L	5	2.7	2.1	<0.1	5.7	1.5	3.2	1.9
Lead, ug/L	5	0.9	0.5	1.0	3.0	<0.1	1.0	1.2
Nickel, ug/L	5	3.2	2.3	1.0	6.2	2.3	4.2	2
Zinc, ug/L	5	5.5	2.8	1.0	16.6	1.5	5.5	6.5
Total Kjeldahl Nitrogen, mg/L	24	0.96	0.83	0.07	4.40	0.37	1.23	0.90
Total Nitrate Nitrogen, mg/L	24	0.85	0.72	0.36	1.60	0.56	1.06	0.40
Total Phosphorus, mg/L	24	0.21	0.13	0.02	0.75	0.06	0.24	0.21
Total Dissolved Phosphorus, mg/L	24	0.08	0.05	0.01	0.53	0.04	0.08	0.10
Total Suspended Solids, mg/L	23	52	8	1	634	2	35	133
Volatile Suspended Solids, mg/L	23	7	3	1	46	1	9	10
Turbidity, NTU	24	9	4	1	60	1	12	14

N: Sample Count

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

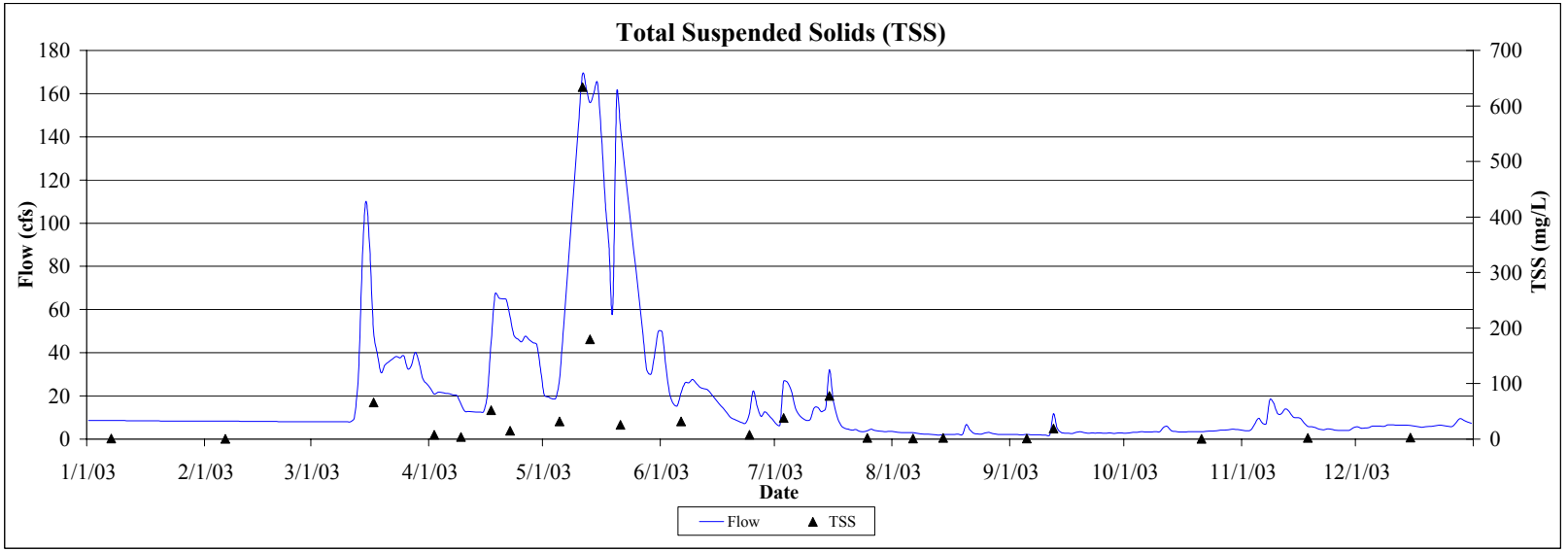
STD: Standard Deviation

Table 3.CR. Credit River 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	1,560	96	19	85
Total Phosphorus	4.39	0.27	0.05	0.24
Total Dissolved Phosphorus	1.91	0.12	0.02	0.10
Total Nitrate Nitrogen	22.2	1.36	0.27	1.21

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

Figure 3.CR. Credit River 2003 Hydrograph with Total Suspended Solids and Nitrate Nitrogen Concentrations



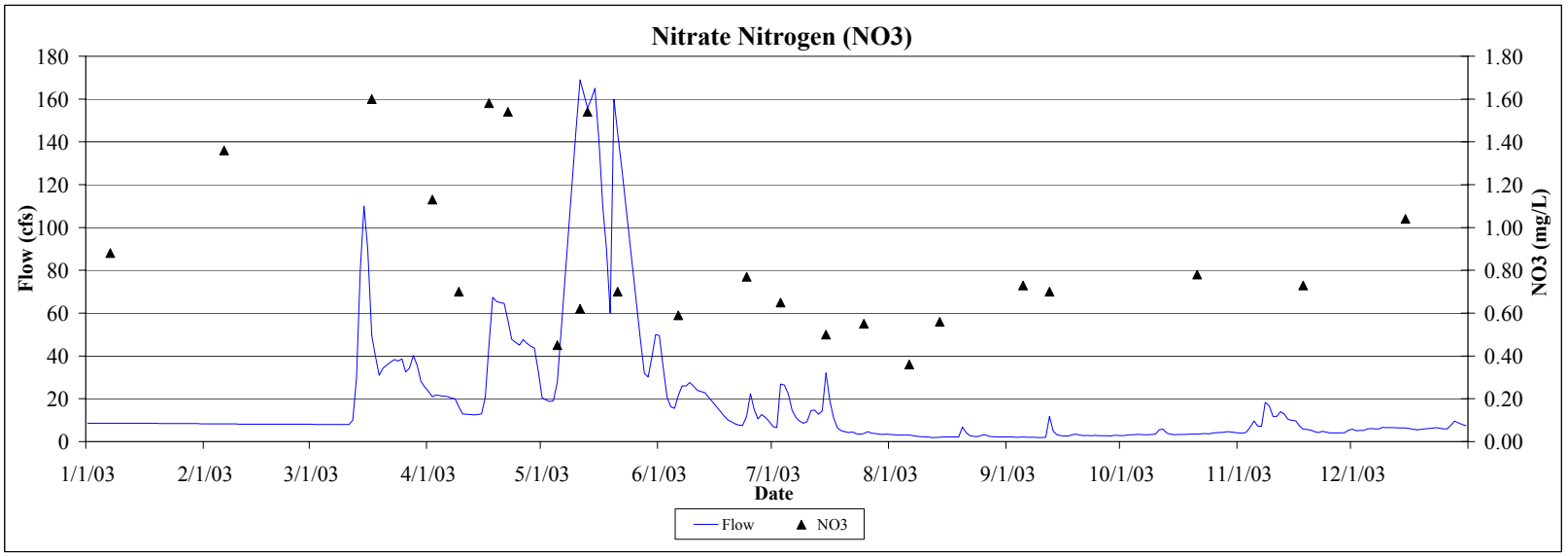
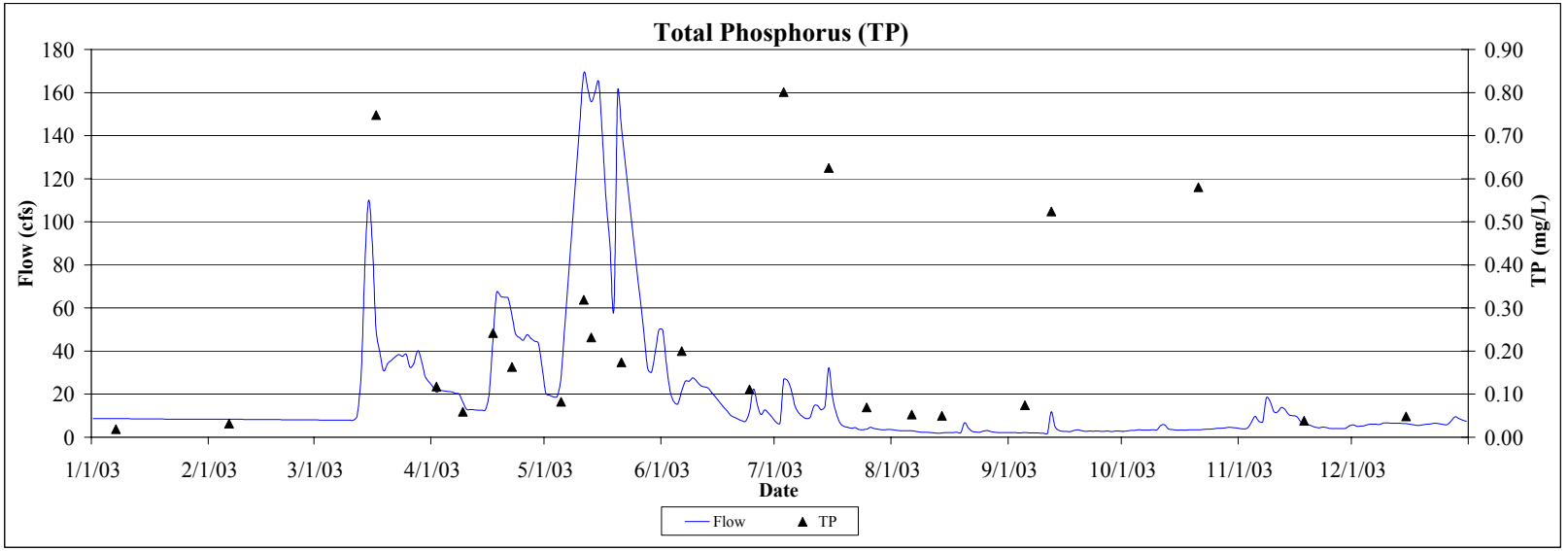


Figure 3.CR. Credit River 2003 Hydrograph with Total and Dissolved Phosphorus Concentrations



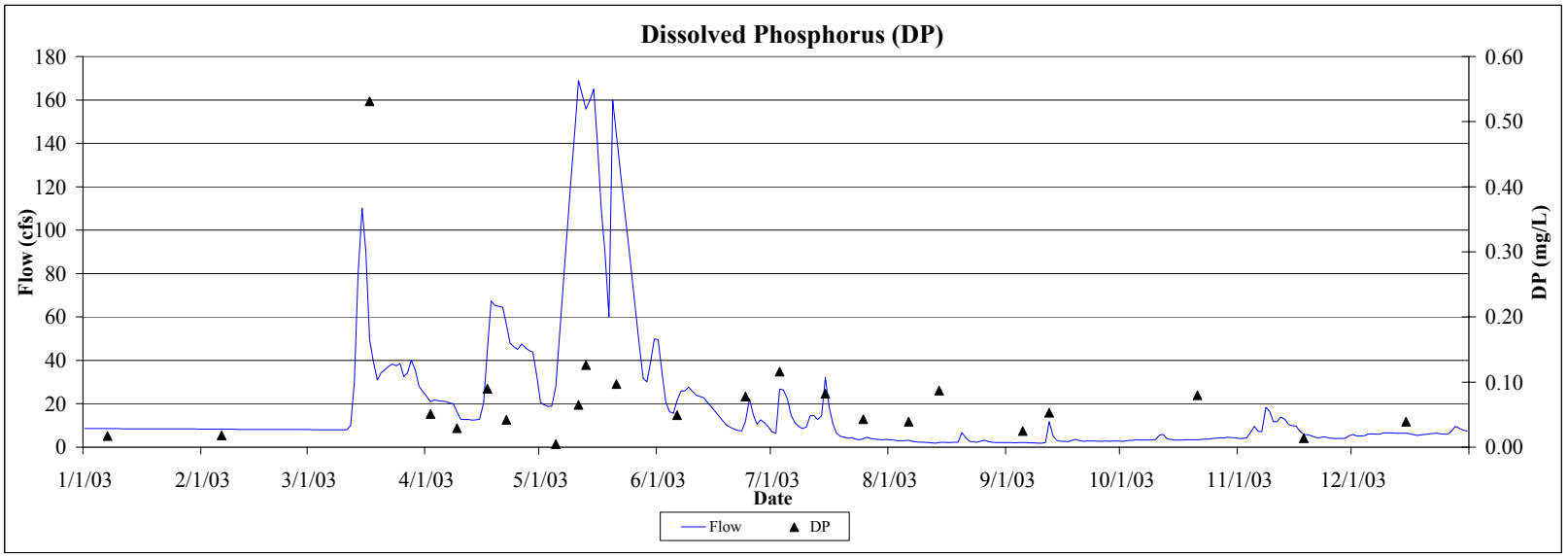


Table 4.CR. Credit River: Comparison of 2001-2003 Hydrology and Water Chemistry

	2001	2002	2003
Hydrology			
Total Precipitation (inches)	34.69	45.29	29.35
Water Yield (inches)	6.0	insufficient data	5.0
Total Volume (cubic feet)	7.1×10^8	insufficient data	5.9×10^8
Annual Load (tons)			
Total Suspended Solids	2,300	insufficient data	1,560
Total Phosphorus	5.74	insufficient data	4.39
Total Dissolved Phosphorus	2.55	insufficient data	1.91
Total Nitrate Nitrogen	29.5	insufficient data	22.2
Annual Yield (lbs/acre)			
Total Suspended Solids	141	insufficient data	96
Total Phosphorus	0.35	insufficient data	0.27
Total Dissolved Phosphorus	0.16	insufficient data	0.12
Total Nitrate Nitrogen	1.81	insufficient data	1.36
Annual Normalized Yield (lbs/acre/inch of water)			
Total Suspended Solids	24	insufficient data	19
Total Phosphorus	0.06	insufficient data	0.05
Total Dissolved Phosphorus	0.03	insufficient data	0.02
Total Nitrate Nitrogen	0.30	insufficient data	0.27
Flow-Weighted Mean Concentration (mg/L)			
Total Suspended Solids	104	insufficient data	85
Total Phosphorus	0.26	insufficient data	0.24
Total Dissolved Phosphorus	0.11	insufficient data	0.10
Total Nitrate Nitrogen	1.33	insufficient data	1.21

Table 5.CR. Credit River 2003 Macroinvertebrate Monitoring Results and Metrics

Monitoring Date 10/8/2003

Class	Order	Family	Common Name	Organism Count
Arthropoda	Amphipoda		Scuds	5
Insecta	Coleoptera	Dytiscidae	Predaceous Diving Beetles	1
Insecta	Coleoptera	Elmidae	Riffle Beetles	30
Insecta	Diptera	Athericidae	Watersnipe Flies	9
Insecta	Diptera	Chironomidae	Midges	4
Insecta	Diptera	Ephydridae	Shore Flies	1
Insecta	Diptera	Tipulidae	Crane Flies	1
Insecta	Ephemeroptera	Baetidae	Small Minnow Mayflies	1
Insecta	Ephemeroptera	Heptageniidae	Flatheaded Mayflies	2
Insecta	Plecoptera		Stoneflies	12
Insecta	Trichoptera	Hydropsychidae	Common Netspinners	9

Macroinvertebrate Taxa Metrics

Total Taxa	11
EPT Taxa	4
% EPT Taxa	36
Diptera Taxa	4
% Diptera Taxa	36
Mean Tolerance Value	4.4

Macroinvertebrate Organism Metrics

Total Individuals	75
EPT Individuals	24
% EPT Individuals	32
Diptera Individuals	15
% Diptera Individuals	20
Chironomidae Individuals	4
% Chironomidae Individuals	5