

Table 1.BR. Browns Creek Monitoring Station Information



Station Address: 14495 North Dellwood Road, Stillwater, MN
County: Washington
Major Basin: St. Croix River Basin
Watershed: Browns Creek
Drainage Area: 34.10 square miles

Station Operator: Washington County Soil and Water Conservation District

Metropolitan Council Environmental Services Contact Information:

Contact Person: Casandra Champion
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St. Paul, MN 55106
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Watershed District or Watershed Management Organization:
Browns Creek Watershed District

Station Overview: MCES has supported water quality monitoring of Browns Creek since 1998. The monitoring station is located in Stillwater, Minnesota, 0.3 mile upstream from the creek confluence with the St. Croix River. New monitoring equipment was installed at this station in 2000. Browns Creek is a MDNR designated trout stream.

The Minnesota Department of Natural Resources (MDNR) established a rating curve for this location between 1998 and 2001. Washington County Soil and Water Conservation District staff currently maintains the rating curve.

The rain gauge at this monitoring station collects rainfall data; however, supplemental winter precipitation data are obtained from the Minnesota Climatology Working Group, Stillwater Station Number 218037.

2002 Monitoring Year: Browns Creek is a groundwater-fed stream that typically remains ice-free during the winter, thereby allowing year-round flow measurement. Snowmelt began during the last week of March 2002. The peak daily average flow of 81 cfs occurred on May 9, 2002.

Runoff event-based composite sampling began in early May 2002 and continued through late October. A significant runoff event occurred during the July 9-24, 2002 period. A composite sample collected during this event (July 10) had the highest total suspended solids (TSS) concentration (4,240 mg/L) of all 2002 samples. The peak event flow of 44 cfs occurred on July 11, 2002.

Twenty-seven samples were collected for water quality analysis during 2002, including 12 composite samples and 15 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 2002 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/RiversLake.

Figure 1.BR. Browns Creek Monitoring Station Location and Watershed Characteristics

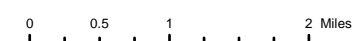
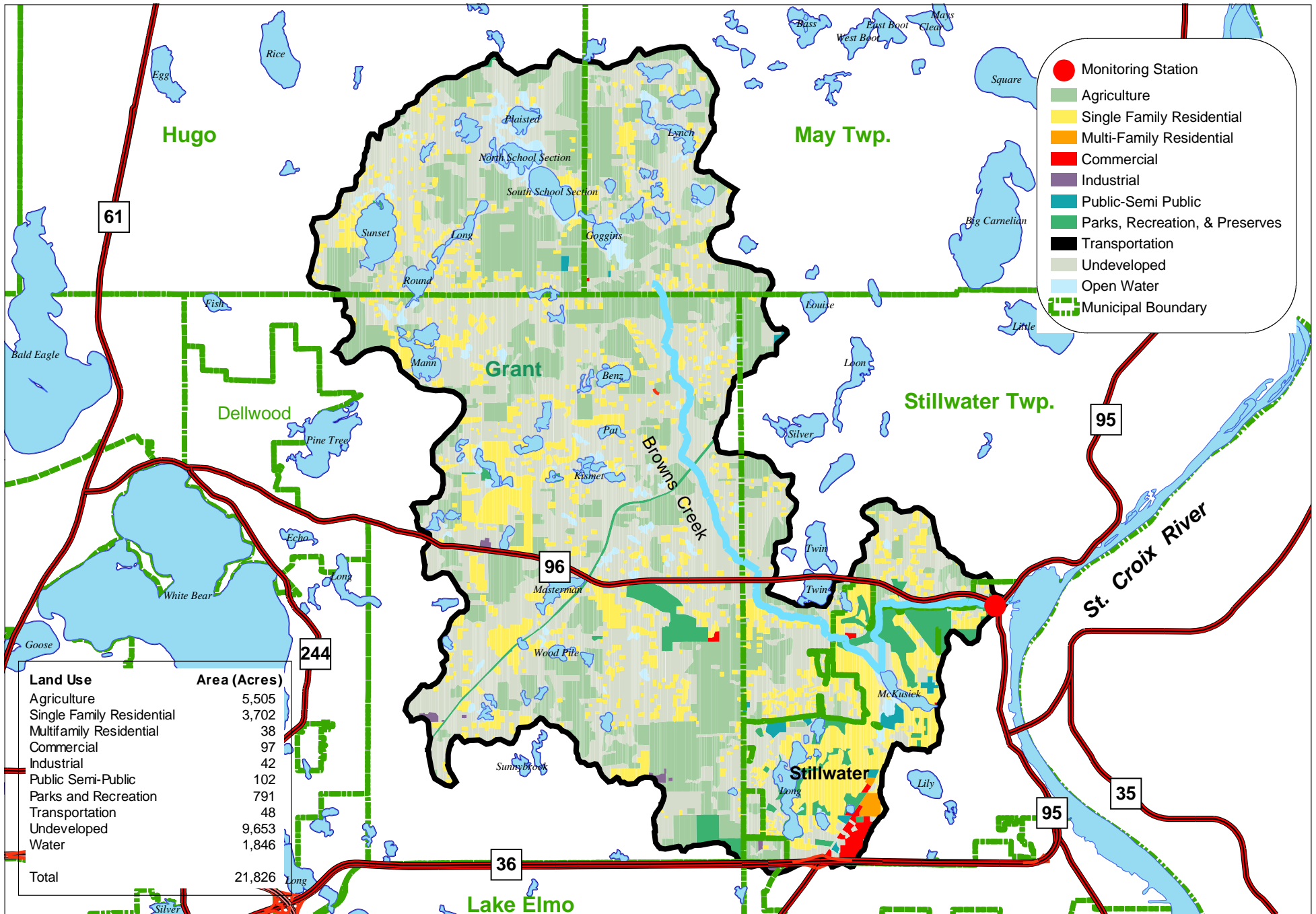


Figure 2.BR. Browns Creek 2002 Hydrograph, Precipitation and Sampling Information

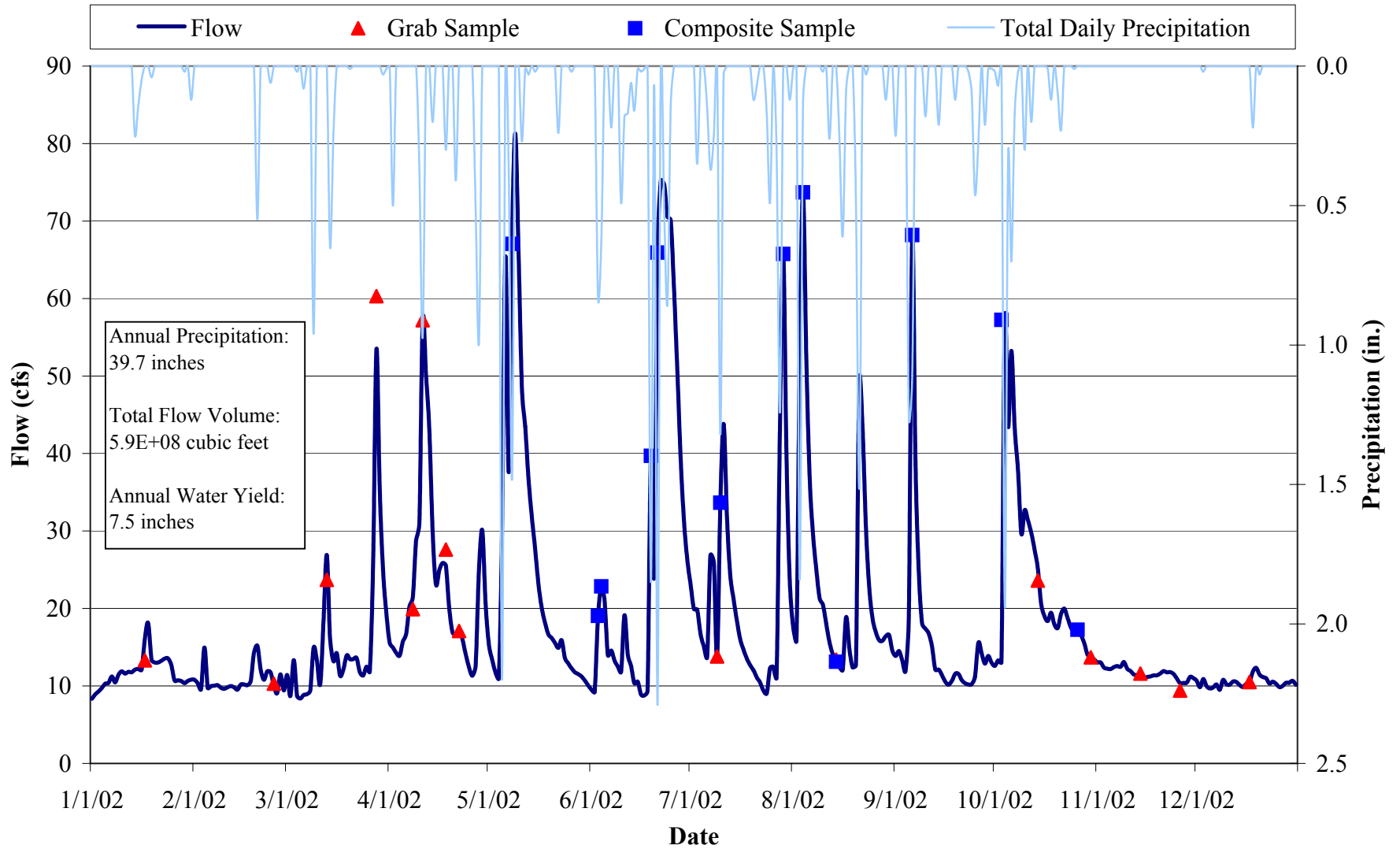


Table 2.BR. Browns Creek 2002 Water Chemistry Information

Variable	N	Mean	Median	Minimum	Maximum	25%	75%	STD
Chloride, mg/L	22	18	17	8	65	12	19	11
Hardness, mg/L	20	121	121	68	192	92	146	34
Cadmium, ug/L	21	0.2	0.2	<0.1	0.6	0.1	0.2	0.1
Chromium, ug/L	21	4.0	3.5	0.5	10.8	0.7	6.9	3.4
Copper, ug/L	21	5.4	5.1	0.7	14.6	1.8	7.9	3.9
Lead, ug/L	21	3.2	2.5	0.1	10.1	0.5	6.2	3.0
Nickel, ug/L	21	3.9	3.6	1.1	10.0	1.5	5.7	2.6
Zinc, ug/L	21	12.6	11.4	1.1	37.0	3.7	19.2	9.8
Total Kjeldahl Nitrogen, mg/L	22	1.73	1.70	0.19	3.90	0.57	2.73	1.20
Total Nitrate Nitrogen, mg/L	21	0.62	0.47	0.27	1.38	0.40	0.76	0.34
Total Phosphorus, mg/L	20	0.25	0.36	0.05	0.92	0.10	0.49	0.26
Total Dissolved Phosphorus, mg/L	20	0.07	0.06	0.02	0.17	0.03	0.11	0.05
Total Suspended Solids, mg/L	20	207	54	5	648	13	345	244
Volatile Suspended Solids, mg/L	20	45	20	2	108	6	65	33
Turbidity, NTU	20	29	23	3	85	5	49	25

N: Sample Count

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

STD: Standard Deviation

Table 3.BR. Browns Creek 2002 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	2,820	258	35	153
Total Phosphorus	4.54	0.42	0.06	0.25
Total Dissolved Phosphorus	1.03	0.09	0.01	0.06
Total Nitrate Nitrogen	13.6	1.25	0.17	0.73

* 2002 Annual Loading Information is provisional and may be subject to minor revisions.

Figure 3.BR. Browns Creek 2002 Hydrograph with Total Suspended Solids and Nitrate Nitrogen Concentrations

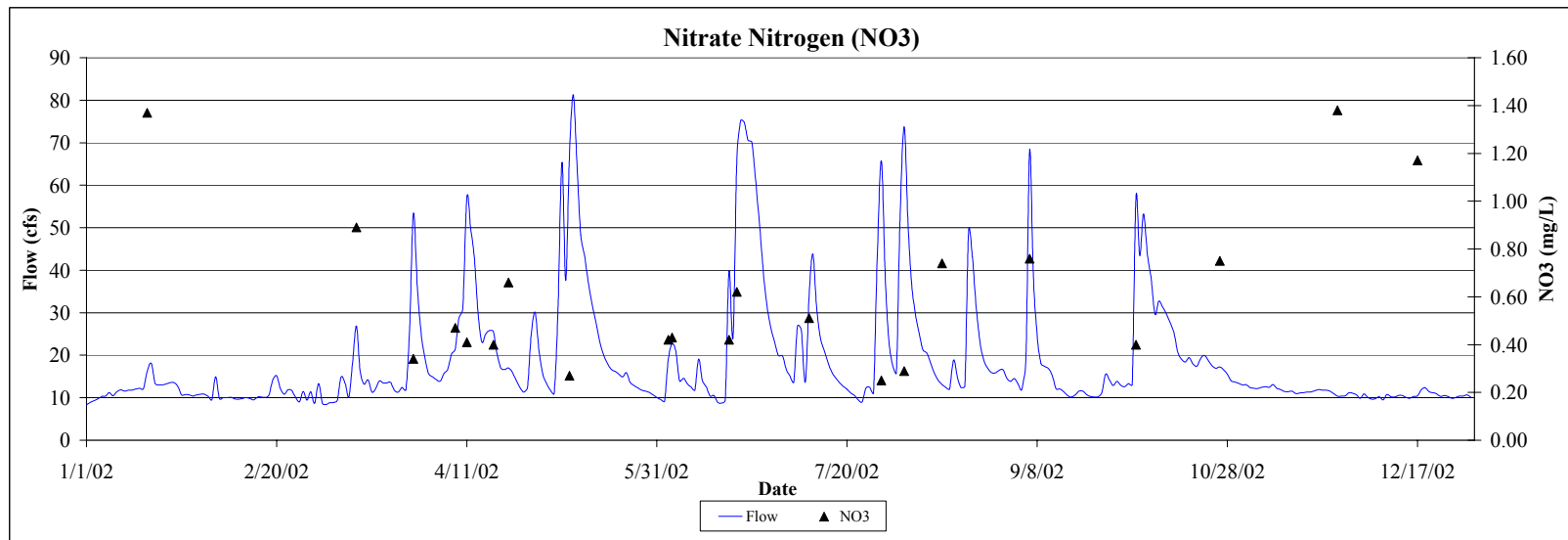
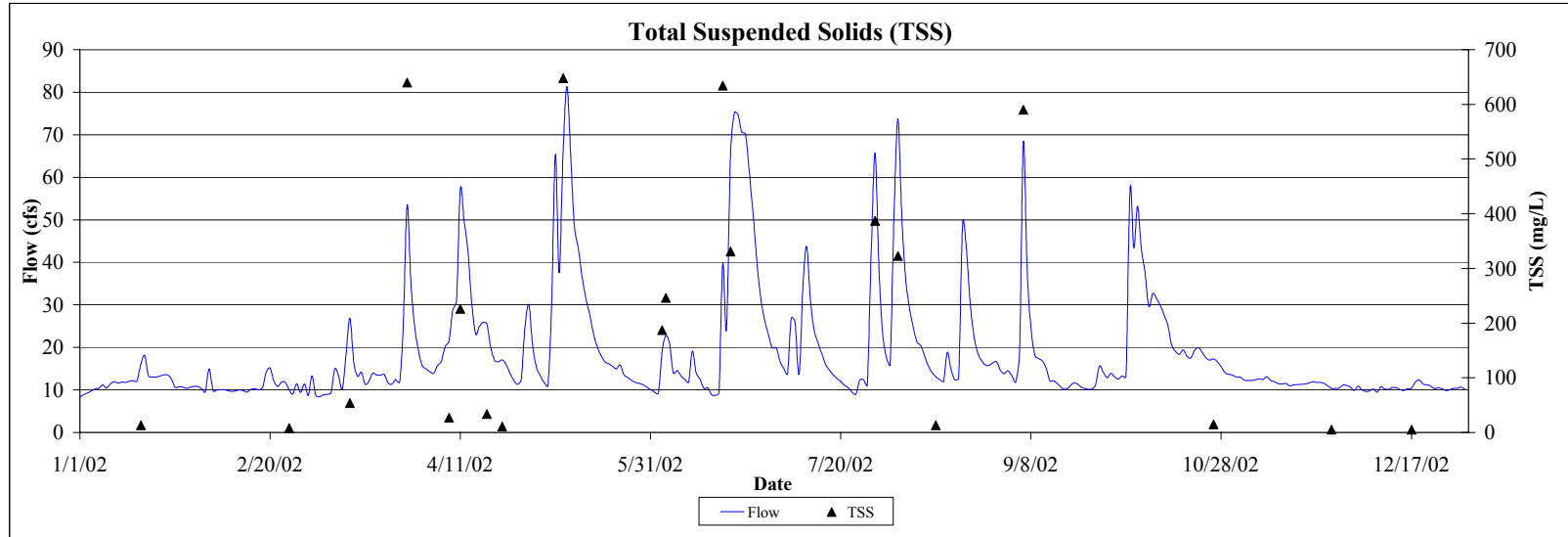


Figure 4.BR. Browns Creek 2002 Hydrograph with Total and Dissolved Phosphorus Concentrations

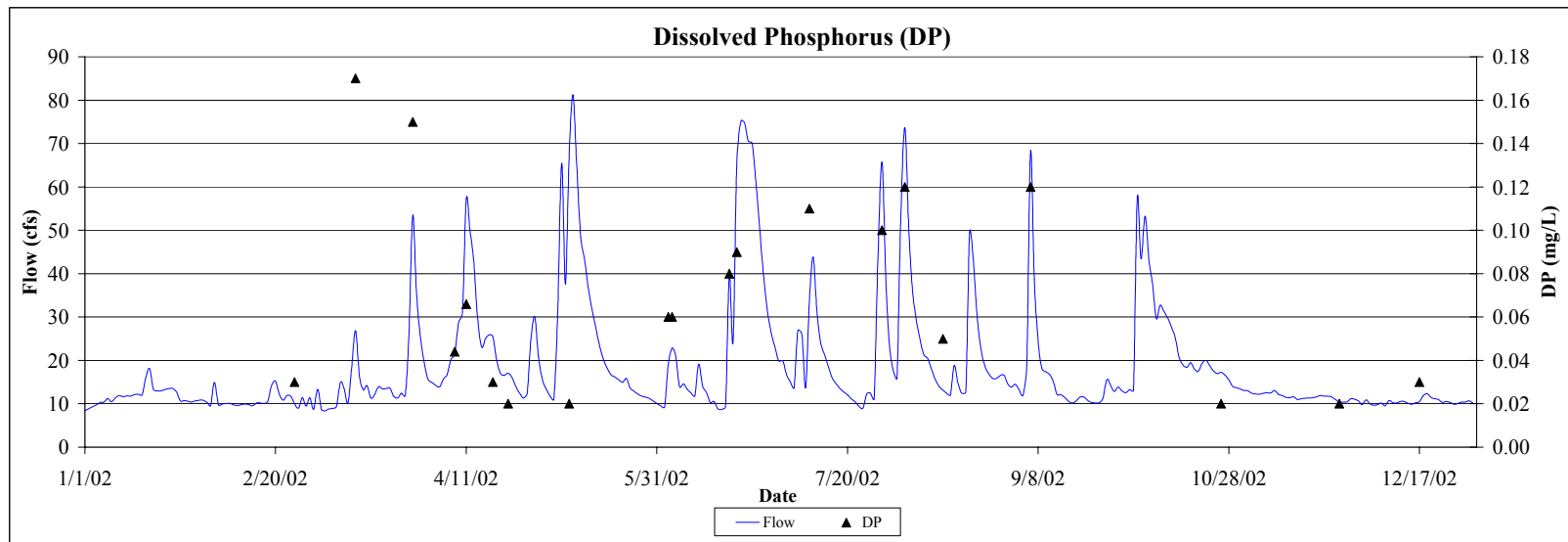
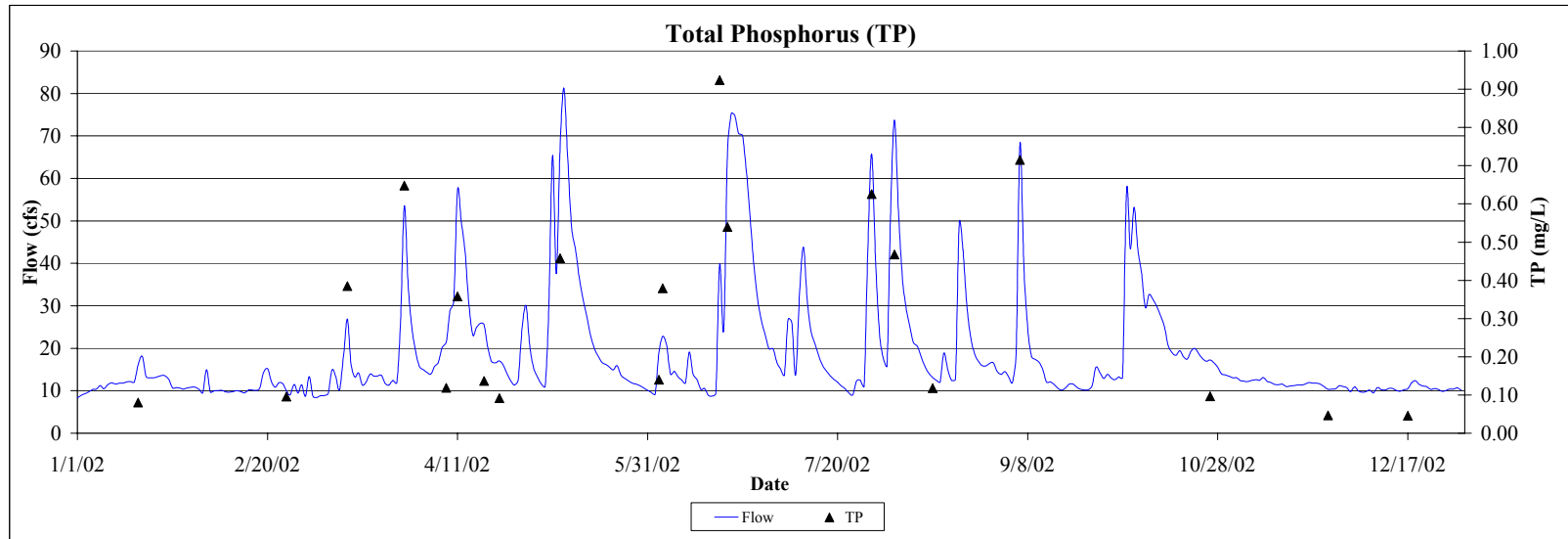


Table 4.BR. Browns Creek: Comparison of 2001-2002 Hydrology and Water Chemistry

	2001	2002
Hydrology		
Total Precipitation (in)	37.01	39.67
Water Yield (in)	6.2	7.5
Total Volume (cf)	4.9E+08	5.9E+08
Annual Load (tons)		
Solids, Total Suspended	1,510	2,820
Phosphorus, Total	3.95	4.54
Phosphorus, Total Dissolved	0.96	1.03
Nitrogen, Total Nitrate	10.6	13.6
Annual Yield (lbs/acre)		
Solids, Total Suspended	138	258
Phosphorus, Total	0.36	0.42
Phosphorus, Total Dissolved	0.09	0.09
Nitrogen, Total Nitrate	0.97	1.25
Annual Normalized Yield (lbs/acre/in of water)		
Solids, Total Suspended	22	35
Phosphorus, Total	0.06	0.06
Phosphorus, Total Dissolved	0.01	0.01
Nitrogen, Total Nitrate	0.16	0.17
Flow-Weighted Mean Concentration (mg/L)		
Solids, Total Suspended	98	153
Phosphorus, Total	0.26	0.25
Phosphorus, Total Dissolved	0.06	0.06
Nitrogen, Total Nitrate	0.69	0.73

Table 5.BR. Browns Creek 2002 Macroinvertebrate Monitoring Results and Metrics

Monitoring Date 6/5/2002

Class	Order	Family	Common Name	Life Stage	Organism Count
Crustacea	Amphipoda		Scuds	Adult	33
Crustacea	Isopoda		Sowbugs	Adult	8
Insecta	Coleoptera	Elmidae	Riffle Beetles	Larvae	10
Insecta	Coleoptera	Elmidae	Riffle Beetles	Adult	4
Insecta	Diptera	Chironomidae	Midges	Larvae	21
Insecta	Diptera	Simuliidae	Black Flies	Larvae	2
Insecta	Diptera	Tipulidae	Crane Flies	Larvae	2
Insecta	Ephemeroptera	Baetidae	Small Minnow Mayflies	Larvae	64
Insecta	Odonata	Aeshnidae	Darners	Larvae	7
Insecta	Odonata	Calopterygidae	Broadwinged Damselflies	Larvae	3
Insecta	Trichoptera	Hydropsychidae	Common Netspinners	Larvae	35
Insecta	Trichoptera	Limnephilidae	Northern Case Makers	Larvae	38

Macroinvertebrate Taxa Metrics

Total Taxa	12
EPT Taxa	3
% EPT Taxa	25
Diptera Taxa	3
% Diptera Taxa	25
Mean Tolerance Value	4.8

Macroinvertebrate Organism Metrics

Total Organisms	227
EPT Individuals	137
% EPT Individuals	60
Diptera Individuals	25
% Diptera Individuals	11
Chironomidae Individuals	21
% Chironomidae Individuals	9

Water Quality

Degree of Organic Pollution

Family-Level Biotic Index	4.6	Good	Some organic pollution probable
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