

Table 1.LE. Le Sueur River Monitoring Station Information



Station Address: State Highway 66 Bridge, Mankato, MN 56001
County: Blue Earth
Major Basin: Minnesota River Basin
Watershed: Le Sueur River
Drainage Area: 1,100 square miles

Station Operators: Metropolitan Council Environmental Services
Minnesota Department of Agriculture (MDA)

Metropolitan Council Environmental Services Contact Information:

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Station Overview: MCES and MDA have conducted water quality monitoring of the Le Sueur River since 1999. The monitoring station is located near Mankato, Minnesota, 1.3 miles upstream from the river confluence with the Blue Earth River. The Le Sueur River flows north and west through mostly agricultural land in Freeborn, Waseca, and Blue Earth Counties.

MCES and MDA cooperatively operate this monitoring station, but partner with the USGS, which measures river flow at a station approximately one mile upstream from the MCES/MDA location. USGS has been monitoring flow at the upstream location, station

number 05320500, since 1939. USGS has also intermittently collected water quality samples at their station, in 1967-1969 and 1989-1993. A rain gauge at the MCES/MDA monitoring station collects rainfall data during the April-December period.

2002 Monitoring Year: Snowmelt began during the second week of March 2002. Spring runoff was minimal, however, resulting in only a small increase in the Le Sueur River flow, which peaked at 1,000 cfs. Spring monthly rainfall totals were also low, with 2.67 inches recorded in April and 1.67 inches recorded in May at the monitoring station.

Runoff event-based composite sampling began in June 2002. Storm events continued through this time period, and composite sampling of these June events extended into July. Composite sampling was conducted in response to three different storm events in August. River flow slowly receded to base flow conditions throughout September. At the beginning of October, a localized rainfall event resulted in the largest runoff event of the year. Approximately 1.38 inches of rain fell at the monitoring station on October 4, and Le Sueur River stage peaked at 9.20 feet (3,059 cfs) four days later. This was the last runoff event and composite sample for 2002. Monthly grab samples were obtained during the remainder of the year.

Thirty-eight samples were collected for water quality analysis during 2002, including 11 composite samples and 27 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.

Composite samples collected from the Le Sueur River during the October 2002 runoff event.



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

Figure 1.LE. Le Sueur River Monitoring Station Location and Watershed

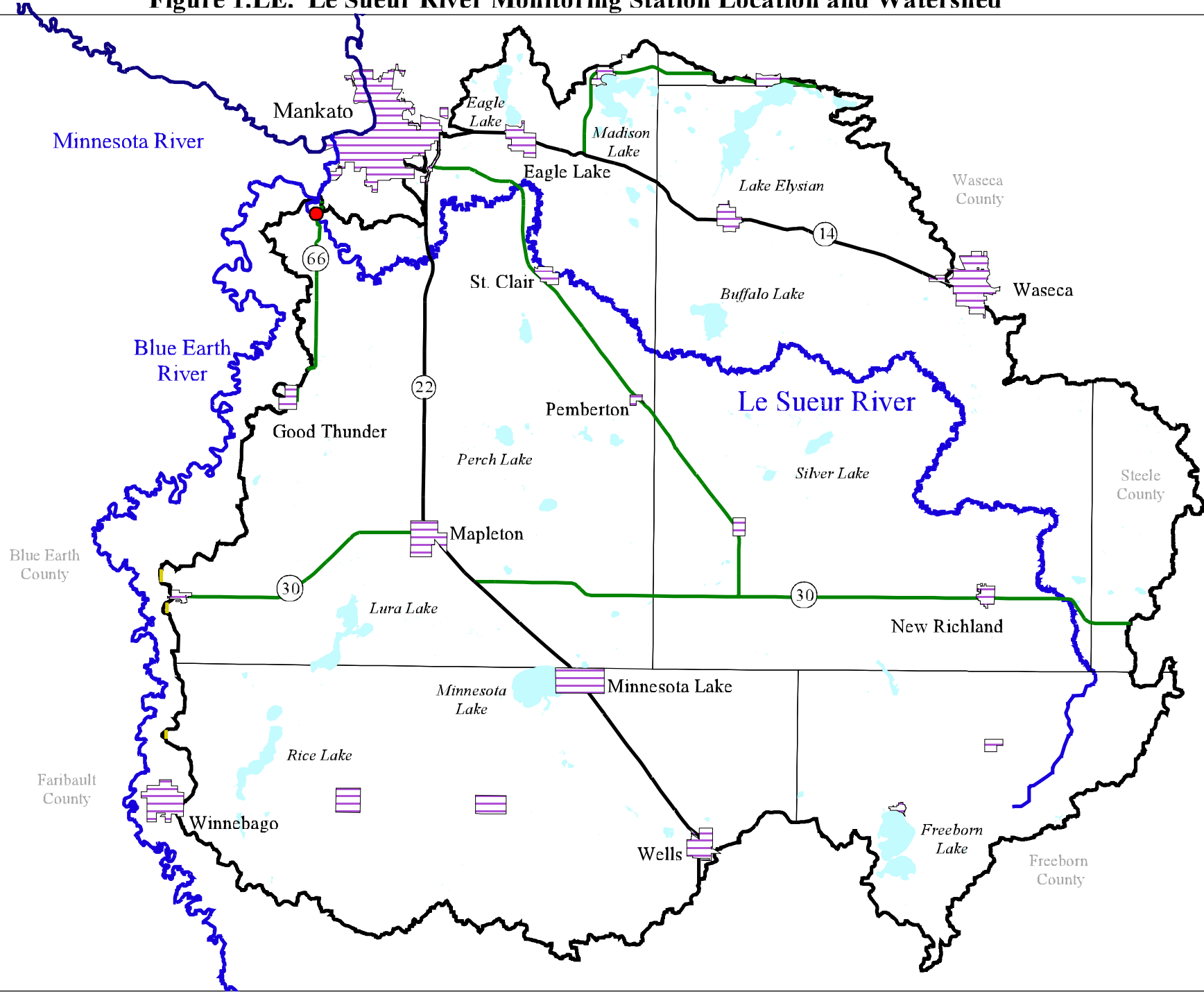


Figure 2. LE. Le Sueur River 2002 Hydrograph with Rainfall and Sampling Information

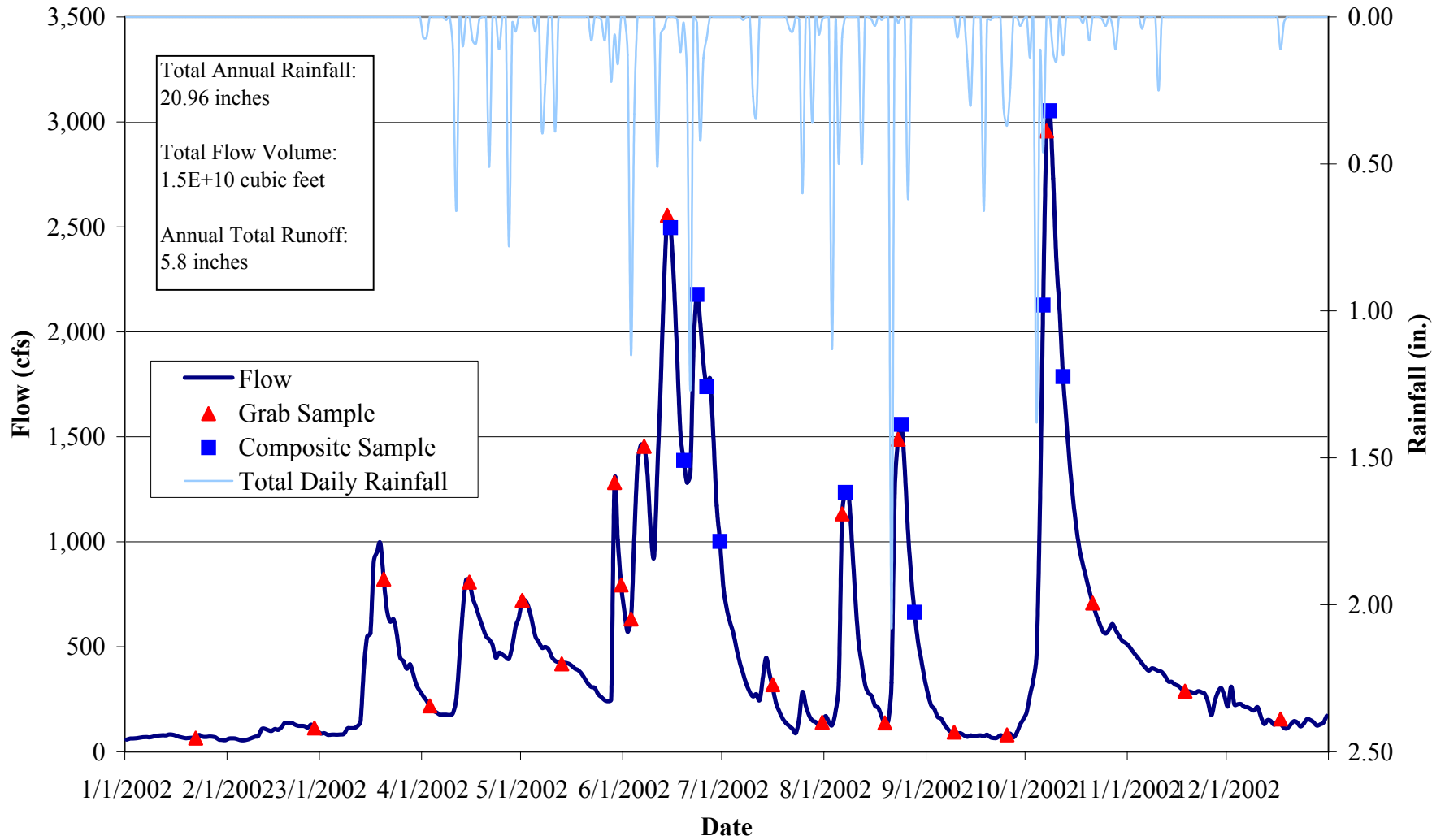


Table 2.LE. Le Sueur River 2002 Water Chemistry Information

Variable	N	Mean	Median	Minimum	Maximum	25%	75%	STD
Chloride, mg/L	36	19	17	11	35	13	23	7
Hardness, mg/L	19	253	250	170	394	216	294	60
Cadmium, ug/L	14	0.2	0.1	<0.1	1.0	0.1	0.3	0.3
Chromium, ug/L	14	8.0	1.6	0.3	42.0	0.5	7.1	14.6
Copper, ug/L	14	11.7	4.3	2.2	50.0	2.7	12.3	16.6
Lead, ug/L	14	6.7	1.3	0.1	34.0	0.5	7.3	11.8
Nickel, ug/L	14	15.1	5.9	3.5	64.0	4.2	14.9	20.9
Zinc, ug/L	14	34.5	6.5	1.4	179.0	3.0	32.0	61.1
Nitrogen, Total Kjeldahl, mg/L	37	2.00	1.60	0.37	9.80	1.05	2.40	1.77
Nitrogen, Total Nitrate, mg/L	37	9.99	11.20	1.20	18.10	7.17	13.10	4.08
Phosphorus, Total, mg/L	37	0.45	0.34	0.02	3.09	0.09	0.63	0.57
Phosphorus, Total Dissolved, mg/L	37	0.01	0.12	0.01	0.32	0.03	0.17	0.09
Solids, Total Suspended, mg/L	38	317	183	2	2420	36	449	449
Solids, Volatile Suspended, mg/L	38	35	26	2	240	8	49	45
Turbidity, NTU	37	96	55	2	750	12	125	157
Transparency Tube, cm	28	19	9	3	60	5	31	19

N: Sample Count

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

STD: Standard Deviation

Table 3.LE. Le Sueur River 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)
Solids, Total Suspended	135,000	380	66	292
Phosphorus, Total	182	0.51	0.09	0.39
Phosphorus, Total Dissolved	54.0	0.15	0.03	0.12
Nitrogen, Total Nitrate+Total Nitrite	5,260	14.8	2.57	11.4

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

Figure 3.LE. Le Sueur River 2002 Hydrograph with Total Suspended Solids and Nitrate Nitrogen Concentrations

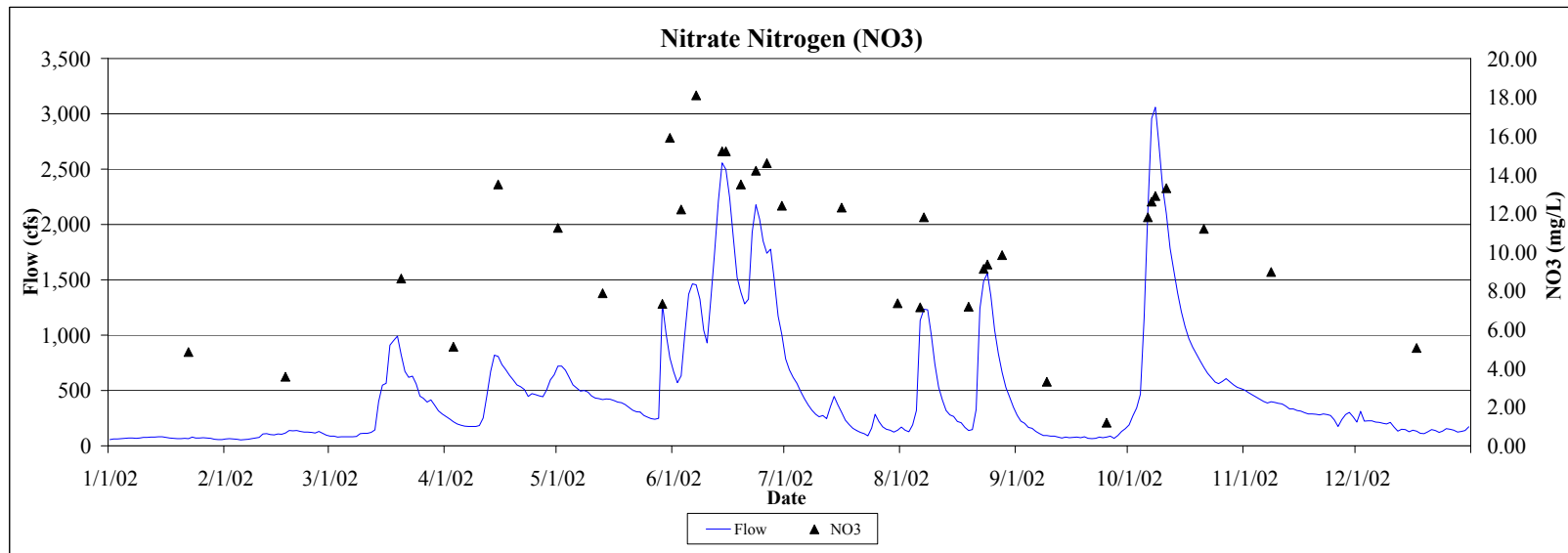
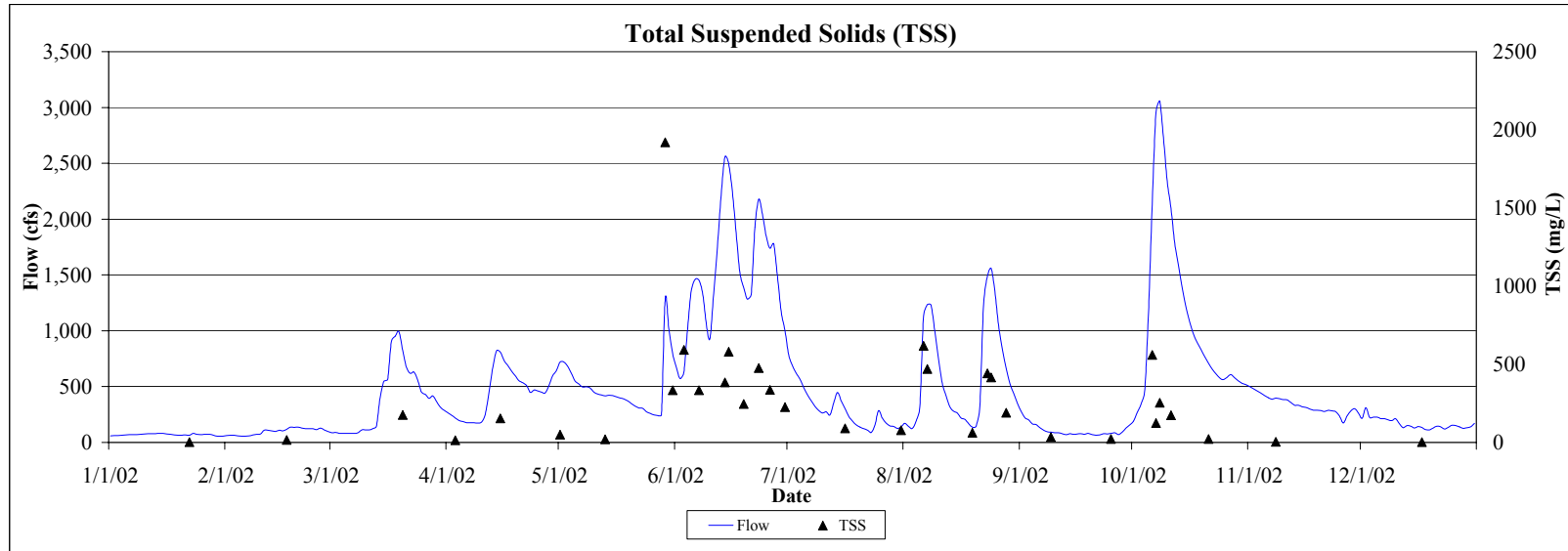


Figure 4.LE. Le Sueur River 2002 Hydrograph with Total and Dissolved Phosphorus Concentrations

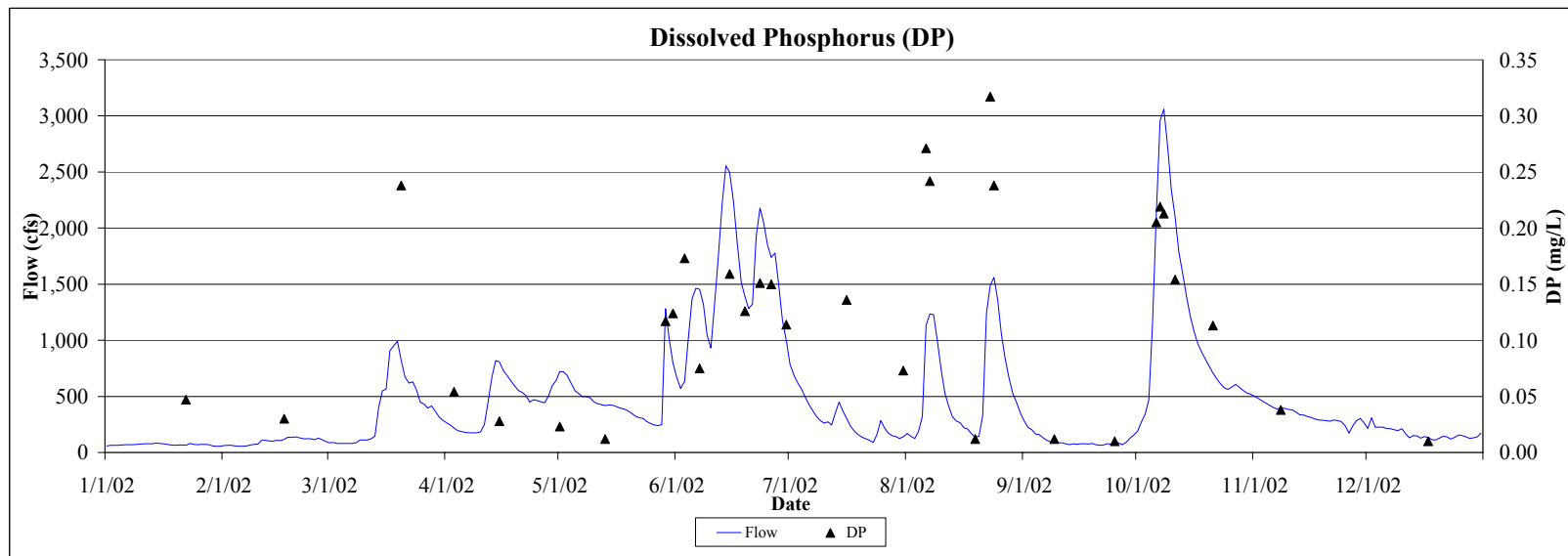
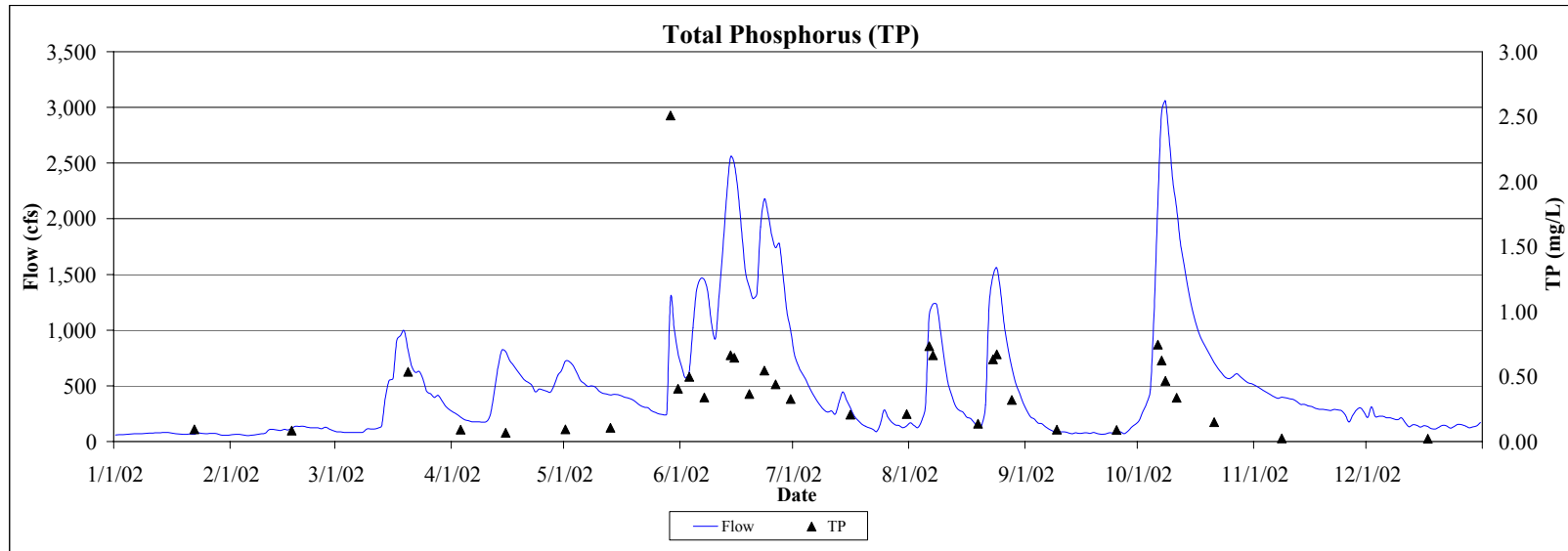


Table 4.LE. Le Sueur River: Comparison of 2001-2002 Hydrology and Water Chemistry

	2001	2002
Hydrology		
Total Precipitation (in)	24.36	20.96
Water Yield (in)	14.2	5.8
Total Volume (cf)	3.7E+10	1.5E+10
Annual Load (tons)		
Total Suspended Solids	397,000	135,000
Total Phosphorus	681	182
Total Dissolved Phosphorus	283	54.0
Total Nitrate + Total Nitrite Nitrogen	11,400	5,260
Annual Yield (lbs/acre)		
Total Suspended Solids	1,120	380
Total Phosphorus	1.93	0.51
Total Dissolved Phosphorus	0.80	0.15
Total Nitrate + Total Nitrite Nitrogen	32.0	14.8
Annual Normalized Yield (lbs/acre/in of water)		
Total Suspended Solids	79	66
Total Phosphorus	0.14	0.09
Total Dissolved Phosphorus	0.06	0.03
Total Nitrate + Total Nitrite Nitrogen	2.25	2.57
Flow-Weighted Mean Concentration (mg/L)		
Total Suspended Solids	348	292
Total Phosphorus	0.60	0.39
Total Dissolved Phosphorus	0.25	0.12
Total Nitrate + Total Nitrite Nitrogen	9.95	11.4

Table 5.LE. Le Sueur River 2002 Macroinvertebrate Monitoring Results and Metrics

Monitoring Date 11/4/2002

Class	Order	Family	Common Name	Life Stage	Organism Count
Crustacea	Amphipoda		Scuds	Adult	1
Gastropoda			Snails	Adult	1
Insecta	Coleoptera	Elmidae	Riffle Beetles	Larvae	7
Insecta	Coleoptera	Noteridae	Burrowing Water Beetles	Adult	1
Insecta	Diptera	Athericidae	Watersnipe Flies	Larvae	2
Insecta	Diptera	Chironomidae	Midges	Larvae	2
Insecta	Diptera	Tipulidae	Crane Flies	Larvae	2
Insecta	Ephemeroptera	Baetidae	Small Minnow Mayflies	Larvae	2
Insecta	Ephemeroptera	Caenidae	Small Squaregills	Larvae	2
Insecta	Ephemeroptera	Heptageniidae	Flatheaded Mayflies	Larvae	52
Insecta	Ephemeroptera	Potamanthidae	Hackelgills	Larvae	1
Insecta	Hemiptera	Belostomatidae	Giant Water Bugs	Adult	1
Insecta	Hemiptera	Corixidae	Water Boatman	Adult	12
Insecta	Odonata	Gomphidae	Clubtails	Larvae	1
Insecta	Plecoptera	Perlidae	Comon Stoneflies	Larvae	13
Insecta	Plecoptera	Perlodidae	Perlodidae	Larvae	2
Insecta	Trichoptera	Hydropsychidae	Common Netspinners	Larvae	76
Insecta	Trichoptera	Limnephilidae	Northern Case Makers	Larvae	7

Macroinvertebrate Taxa Metrics

Total Taxa	18
EPT Taxa	8
% EPT Taxa	44
Diptera Taxa	3
% Diptera Taxa	17
Mean Tolerance Value	3.9

Macroinvertebrate Organism Metrics

Total Organisms	185
EPT Individuals	155
% EPT Individuals	84
Diptera Individuals	6
% Diptera Individuals	3
Chironomidae Individuals	2
% Chironomidae Individuals	1

Water Quality

Degree of Organic Pollution

Family-Level Biotic Index	3.8	Very Good	Possible slight organic pollution
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