

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:

Contact Person: Heather Offerman
Address: Water Resources Center
Minnesota State University, Mankato
184 Trafton Science Center South
Mankato, MN 56001
Phone: 507-344-0145
E-mail: heather.offerman@metc.state.mn.us

Station Overview: MCES, with funding provided by the Minnesota Legislature via a grant from the Minnesota Pollution Control Agency (MPCA), has 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.

2003 Monitoring Year: Snowmelt began during the second week of March 2003. Like 2002, spring runoff was again minimal in 2003. The peak daily average flow during the 2003 snowmelt period was 920 cfs. Only 1.91 inches of rainfall were recorded at the monitoring station in April 2003, but 3.85 inches were recorded in May. The peak daily average flow of 3,829 cfs occurred on May 15, 2003. After the last runoff event in early August, the river receded slowly and remained at baseflow for the remainder of the year.

Runoff event-based composite sampling began in late March 2003 and continued into mid-July. A composite sample collected on May 15, at the peak of the hydrograph for the largest runoff event of the year, had the highest total suspended solids (TSS) concentration (958 mg/L) of all 2003 samples. After the last runoff event in early August, grab samples were obtained for the remainder of the year.

Thirty-two samples were collected for water quality analysis during 2003, including 14 composite samples and 18 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.LE. Le Sueur River Monitoring Station Location and Watershed

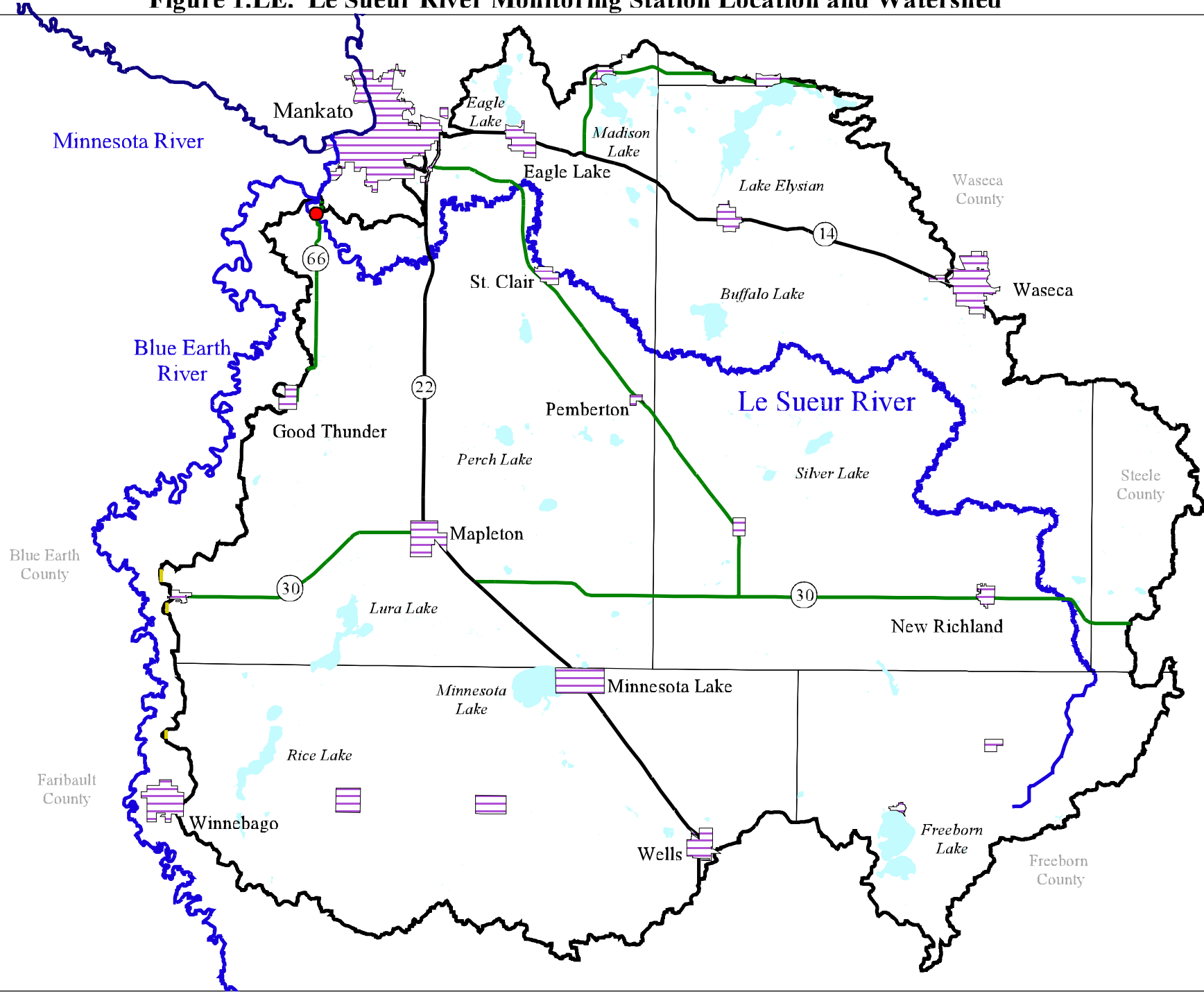


Figure 2.LE. Le Sueur River 2003 Hydrograph, Precipitation and Sampling Information

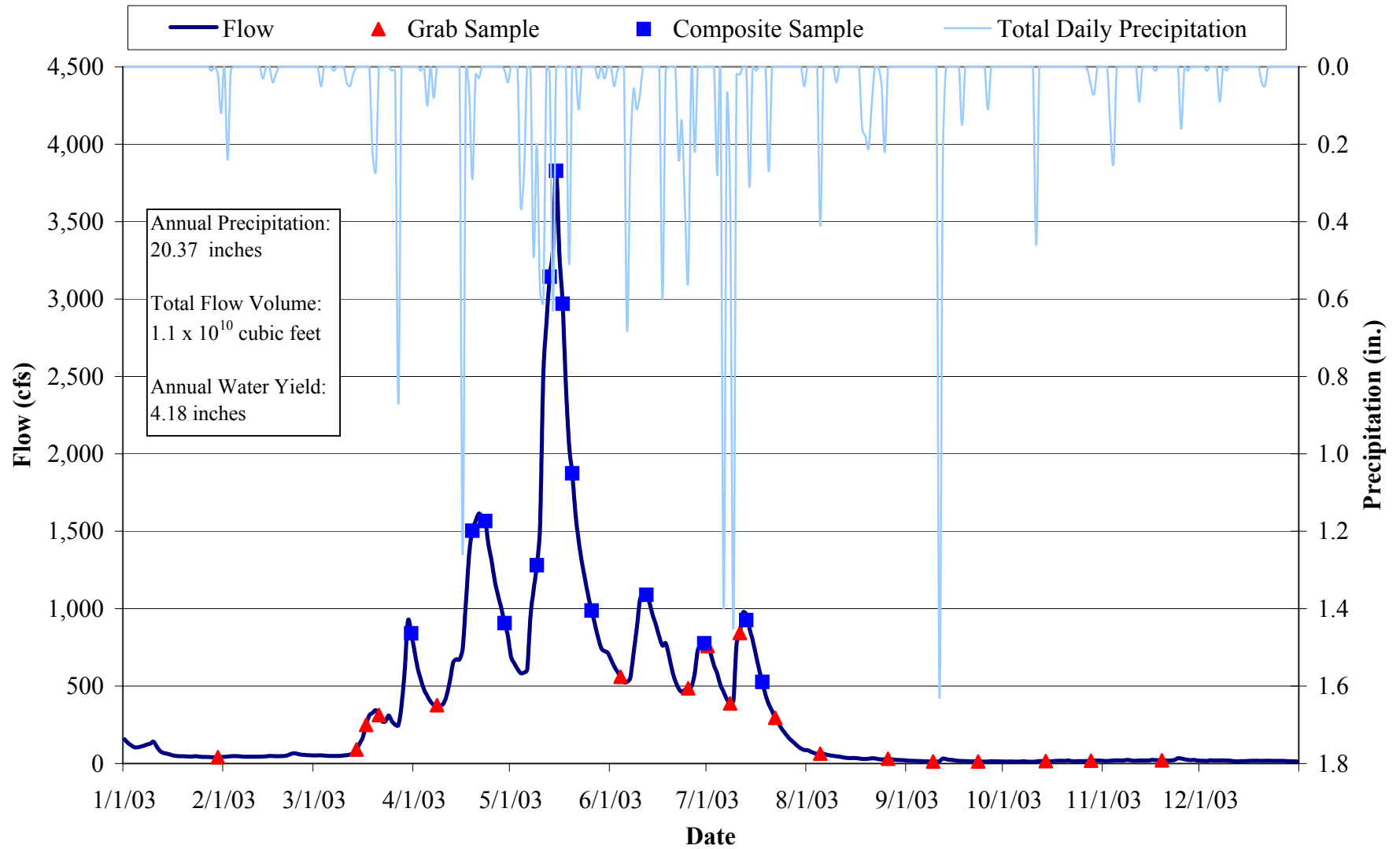


Table 2.LE. Le Sueur River 2003 Water Chemistry Information

Variable	N	Mean	Median	Minimum	Maximum	25%	75%	STD
Chloride, mg/L	30	26	21	15	62	18	32	12
Hardness, mg/L	7	272	276	184	354	246	296	51
Cadmium, ug/L	8	<0.1	<0.1	<0.1	0.1	<0.1	0.1	<0.1
Chromium, ug/L	8	0.7	0.4	0.1	2.1	0.1	1.3	0.7
Copper, ug/L	8	3.2	2.7	2.3	5.4	2.5	4.1	1.1
Lead, ug/L	8	0.6	0.4	0.1	1.9	0.2	0.9	0.6
Nickel, ug/L	8	4.5	4.7	3.4	5.3	3.9	5.2	0.7
Zinc, ug/L	8	3.5	2.3	1.2	8.4	1.3	6.6	2.9
Nitrogen, Total Kjeldahl, mg/L	32	1.36	1.30	0.21	3.30	0.72	1.78	0.74
Nitrogen, Total Nitrate, mg/L	32	9.50	11.50	0.10	18.50	2.85	14.48	5.97
Phosphorus, Total, mg/L	32	0.29	0.22	0.01	1.07	0.11	0.44	0.25
Phosphorus, Total Dissolved, mg/L	32	0.07	0.07	0.01	0.35	0.02	0.11	0.07
Solids, Total Suspended, mg/L	32	168	131	1	958	14	269	198
Solids, Volatile Suspended, mg/L	32	22	18	1	76	4	35	21
Turbidity, NTU	32	50	32	2	280	8	65	64
Transparency Tube, cm	26	25	11	2	60	6	56	23

N: Sample Count

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

STD: Standard Deviation

Table 3.LE. Le Sueur 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)
Solids, Total Suspended	80,800	227	54	240
Phosphorus, Total	114	0.32	0.08	0.34
Phosphorus, Total Dissolved	28.4	0.08	0.02	0.08
Nitrogen, Total Nitrate+Total Nitrite	4,330	12.2	3.07	12.9

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

Figure 3.LE. Le Sueur River 2003 Hydrograph with Total Suspended Solids and Nitrate Nitrogen Concentrations

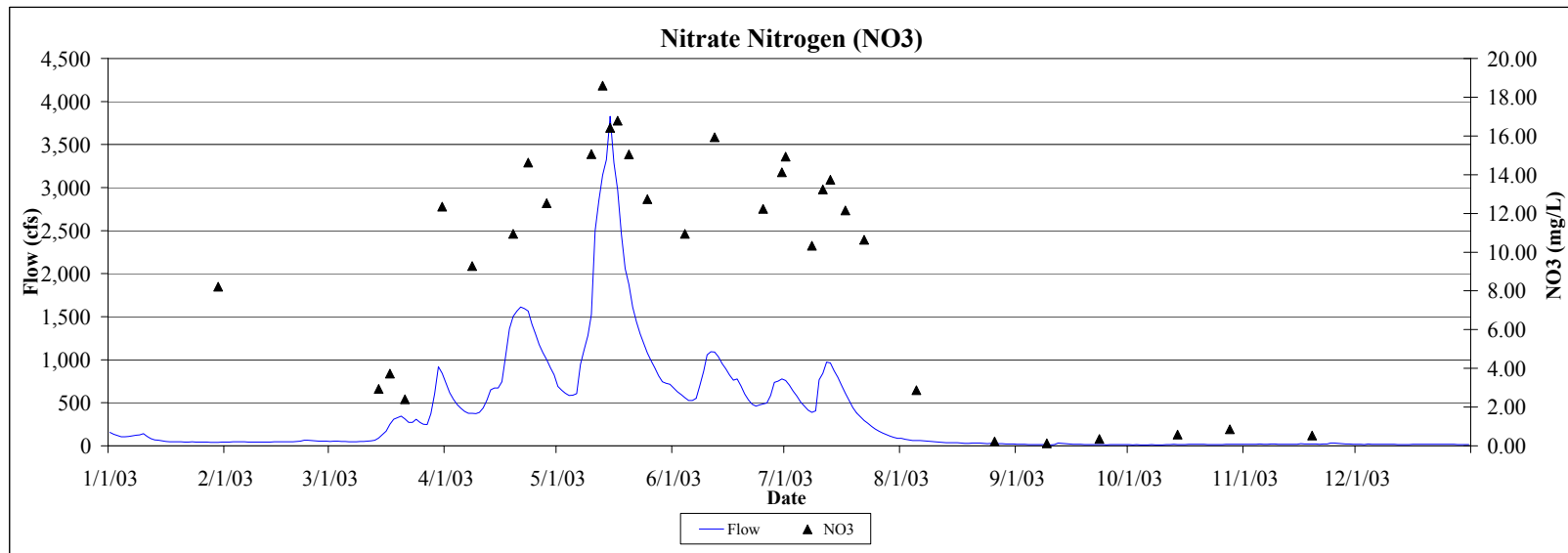
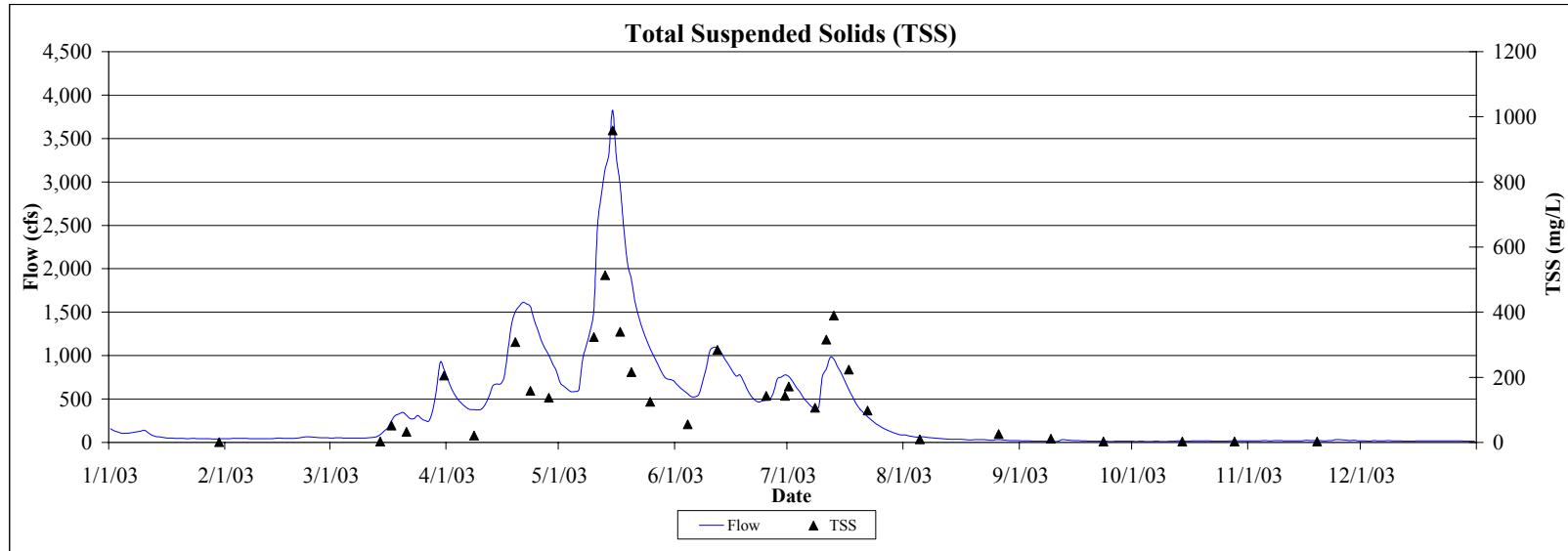


Figure 4.LE. Le Sueur River 2003 Hydrograph with Total and Dissolved Phosphorus Concentrations

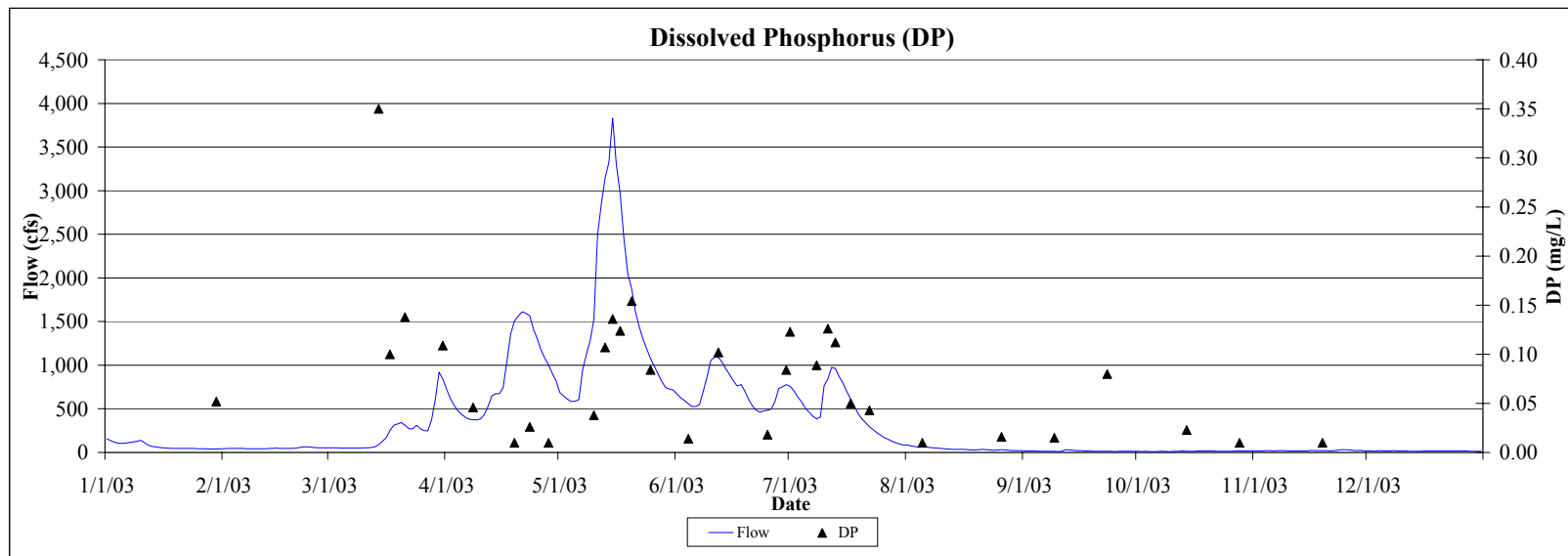
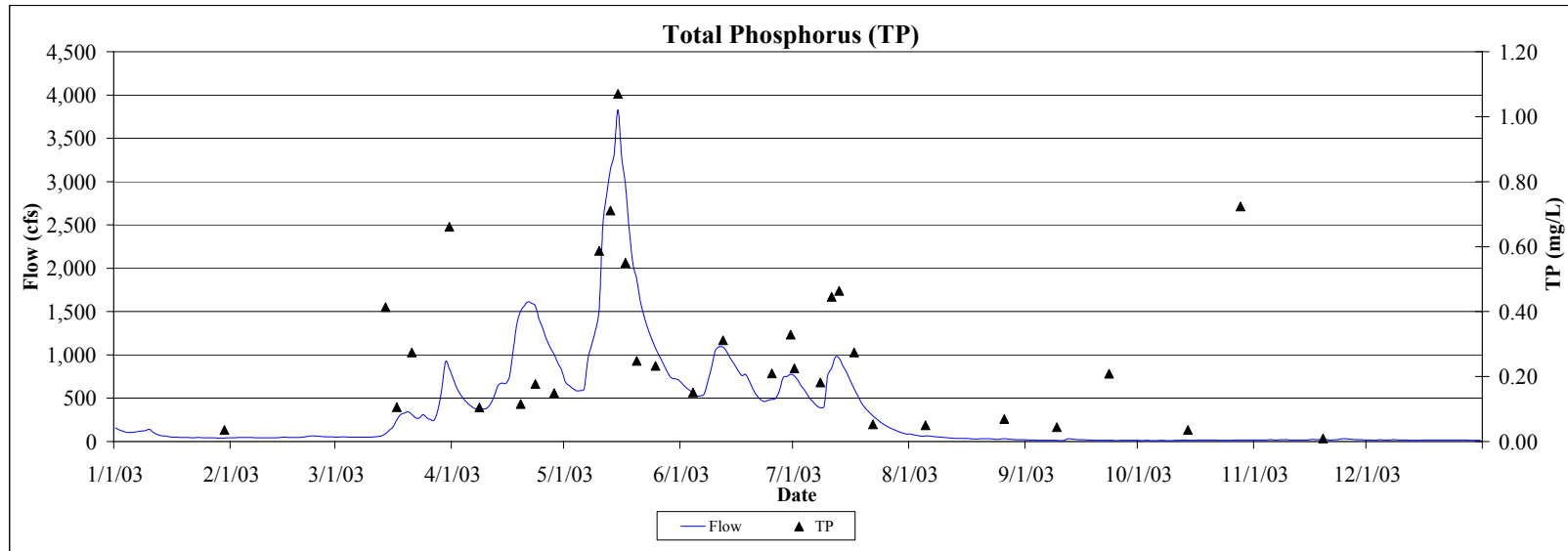


Table 4.LE. Le Sueur River: Comparison of 2001-2003 Hydrology and Water Chemistry

	2001	2002	2003
Hydrology			
Total Precipitation (inches)	24.36	20.96	20.37
Water Yield (inches)	14.2	5.8	4.2
Total Volume (cubic feet)	3.7×10^{10}	1.5×10^{10}	1.1×10^{10}
Annual Load (tons)			
Total Suspended Solids	397,000	135,000	80,800
Total Phosphorus	682	181	114
Total Dissolved Phosphorus	284	54.0	28.4
Total Nitrate + Nitrite Nitrogen	11,400	5,260	4,330
Annual Yield (lbs/acre)			
Total Suspended Solids	1,120	380	227
Total Phosphorus	1.92	0.51	0.32
Total Dissolved Phosphorus	0.80	0.15	0.08
Total Nitrate + Nitrite Nitrogen	32.0	14.8	12.2
Annual Normalized Yield (lbs/acre/inch of water)			
Total Suspended Solids	79	66	54
Total Phosphorus	0.14	0.09	0.08
Total Dissolved Phosphorus	0.06	0.03	0.02
Total Nitrate + Nitrite Nitrogen	2.25	2.58	3.07
Flow-Weighted Mean Concentration (mg/L)			
Total Suspended Solids	348	292	240
Total Phosphorus	0.60	0.39	0.34
Total Dissolved Phosphorus	0.25	0.12	0.08
Total Nitrate + Nitrite Nitrogen	9.95	11.4	12.9

Table 5.LE. Le Sueur River 2003 Macroinvertebrate Monitoring Results and Metrics

Monitoring Date 10/14/2003

Class	Order	Family	Common Name	Organism Count
Gastropoda			Snails	7
Insecta	Coleoptera	Elmidae	Riffle Beetles	7
Insecta	Diptera	Athericidae	Watersnipe Flies	1
Insecta	Diptera	Chironomidae	Midges	48
Insecta	Diptera	Simuliidae	Black Flies	11
Insecta	Diptera	Tipulidae	Crane Flies	6
Insecta	Diptera		True Flies	2
Insecta	Ephemeroptera	Baetidae	Small Minnow Mayflies	46
Insecta	Ephemeroptera	Caenidae	Small Squaregills	89
Insecta	Ephemeroptera	Heptageniidae	Flatheaded Mayflies	94
Insecta	Ephemeroptera	Oligoneuriidae	Brushlegged Mayflies	3
Insecta	Ephemeroptera	Potamanthidae	Hackelgills	3
Insecta	Plecoptera	Perlidae	Comon Stoneflies	7
Insecta	Plecoptera	Pteronarcyidae	Giant Stoneflies	1
Insecta	Plecoptera		Stoneflies	1
Insecta	Trichoptera	Hydropsychidae	Common Netspinners	373
Insecta	Trichoptera	Odontoceridae	Strongcase Makers	1

Macroinvertebrate Taxa Metrics

Total Taxa	17
EPT Taxa	10
% EPT Taxa	59
Diptera Taxa	5
% Diptera Taxa	29
Mean Tolerance Value	3.6

Macroinvertebrate Organism Metrics

Total Individuals	700
EPT Individuals	618
% EPT Individuals	88
Diptera Individuals	68
% Diptera Individuals	10
Chironomidae Individuals	48
% Chironomidae Individuals	7

Water Quality

Degree of Organic Pollution

Family-Level Biotic Index	4.5	Very Good	Slight Organic Pollution
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