

Table 1.BU. Blue Earth River Monitoring Station Information



Station Address: County Road 9 Near the Rapidan Dam, Rapidan, MN 56079
County: Blue Earth
Major Basin: Minnesota River Basin
Watershed: Blue Earth River
Drainage Area: 1,550 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: MCEC and MDA have conducted water quality monitoring of the Blue Earth River since 1999. The monitoring station is located near Rapidan, Minnesota, 12 miles upstream from the river confluence with the Minnesota River. This location presents a unique challenge for monitoring because the station is situated just downstream from the Rapidan Dam, an operating hydroelectric dam. The Blue Earth River originates in Iowa and flows north-northeast through a region of gently rolling ground moraines. The Watonwan River, a major tributary, joins the Blue Earth River just upstream from the reservoir created by the Rapidan Dam. As such, the Blue Earth River station monitors any impacts of the Watonwan River on Blue Earth River flow and water quality.

MCES and MDA cooperatively operate this monitoring station, but partner with the USGS, which maintains the rating curve at this location. USGS has been monitoring river flow at this location, station number 05320000, since 1909. USGS has also intermittently collected water quality samples at this station, in 1960-1967, 1969, and 2000.

2001 Monitoring Year: Snowmelt began during the last week of March 2001. The Blue Earth River rose rapidly, with flow increasing from 2,000 to 16,000 cfs in less than five days. The peak daily average flow of 17,600 cfs, with a stage of 12.04 feet, occurred on April 14, 2001. This was the sixth highest peak flow on record, compared to the highest recorded daily average flow of 43,000 cfs, with a stage of 21.35 feet, on April 9, 1965.

Runoff event-based composite sampling began in early April and continued into early May, as high water conditions persisted throughout most of this time period. Composite samples were collected again in May and June following three significant storm events, two of which produced hydrograph peaks in May. In June, a rainfall event of over two inches resulted in the last large runoff event of 2001. Surrounding areas received even higher rainfall amounts, contributing runoff that caused the Blue Earth River to flow at approximately 15,000 cfs, almost equaling the flow peak observed in April 2001.

Thirty-eight samples were collected for water quality analysis during 2001, including 17 composite samples and 21 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 2001 sampling scheme met the goals of the MCES monitoring work plan.

Additional grab samples were obtained in 2001 due to failure of the in-stream pump, which occurred in late June. Without the use of the pump, no composite samples could be collected. Pump failure was attributed to above-normal use in April and May. Due to high water conditions throughout the summer and early fall, a new pump could not be installed until October 2001.

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

Figure 1.B.U. Blue Earth River Monitoring Station Location and Watershed



Blue Earth River
July 2002

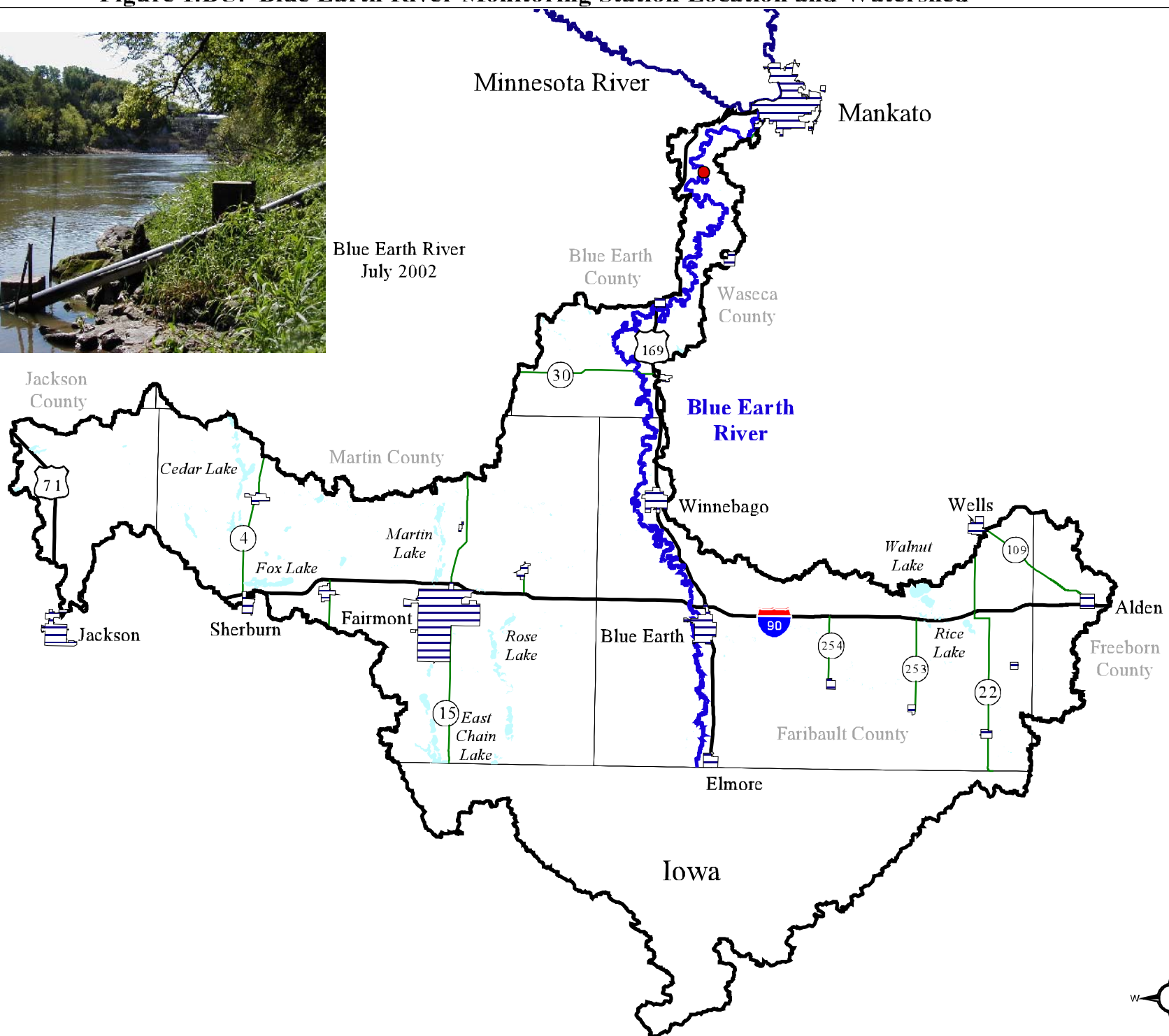


Figure 2.BU. Blue Earth River 2001 Hydrograph with Rainfall and Sampling Information

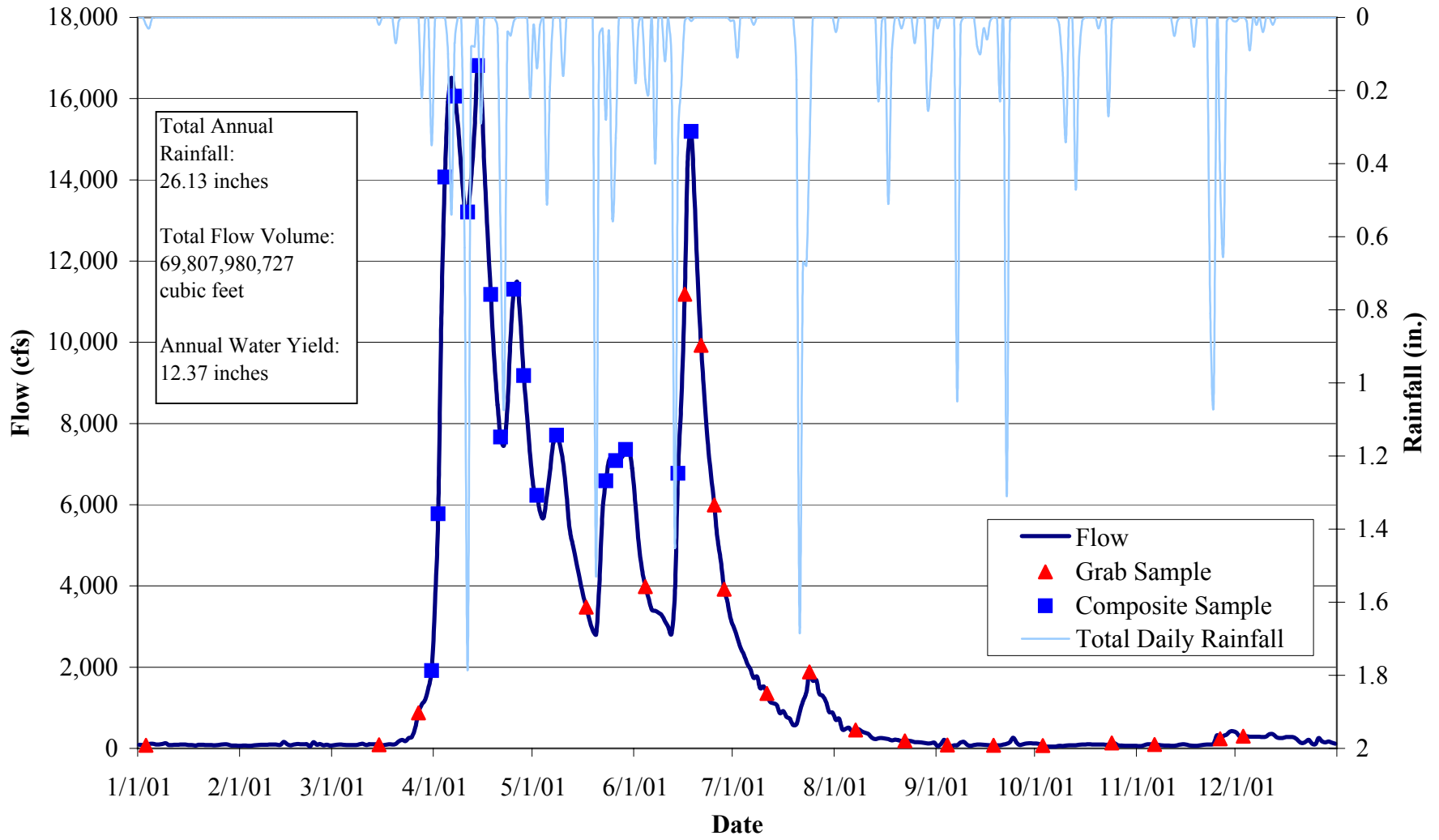


Table 2.BU. Blue Earth River 2001 Water Chemistry Information

Variable	N	Mean	Median	Minimum	Maximum	25%	75%	STD
Chloride, mg/L	33	22	19	7	56	15	28	12
Hardness, mg/L	35	260	259	136	434	221	300	66
Cadmium, ug/L	23	0.1	0.1	0.1	0.2	0.1	0.1	0
Chromium, ug/L	23	2.6	2	0.5	9	0.8	3.8	2.3
Copper, ug/L	23	5.8	4.5	2.4	15	3.5	7.2	3.3
Lead, ug/L	23	2.4	1.9	0.5	7.4	1.1	3.3	1.9
Nickel, ug/L	23	6.7	6.1	4	14.1	4.8	7.9	2.6
Zinc, ug/L	23	13	10	3	39	5	17	9
Nitrogen, Total Kjeldahl, mg/L	37	1.5	1.3	0.6	3.5	1.1	1.7	0.6
Nitrogen, Total Nitrate, mg/L	38	7.44	8.11	0.45	16.1	3.94	10.81	4.6
Phosphorus, Total, mg/L	37	0.35	0.29	0.11	1.1	0.16	0.53	0.24
Phosphorus, Total Dissolved, mg/L	37	0.14	0.15	0.01	0.36	0.05	0.22	0.1
Solids, Total Suspended, mg/L	38	142	118	3	628	48	196	135
Solids, Volatile Suspended, mg/L	38	17	14	2	60	9	21	13
Turbidity, NTU	37	51	31	2	200	16	73	54
Transparency Tube, cm	13	20	17	7	60	13	22	13

Table 3.BU. Blue Earth River 2001 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	448,920	577	47	206
Phosphorus, Total	1,006.57	1.29	0.10	0.46
Phosphorus, Total Dissolved	395.18	0.51	0.04	0.18
Nitrogen, Total Nitrate+Total Nitrite	20,290.39	26.09	2.11	9.48

* 2001 Annual Loading Information is provisional and may be subject to minor revisions.

Table 4.BU. Blue Earth River 2001 Macroinvertebrate Monitoring Results and Metrics

Monitoring Date 10/29/01

Class	Order	Family	Common Name	Life Stage	Organism Count
Insecta	Coleoptera	Elmidae	Riffle Beetles	Larvae	2
Insecta	Coleoptera	Elmidae	Riffle Beetles	Adult	1
Insecta	Diptera	Chironomidae	Midges	Larvae	9
Insecta	Diptera	Simuliidae	Black Flies	Larvae	33
Insecta	Ephemeroptera	Baetiscidae	Armored Mayflies	Larvae	2
Insecta	Ephemeroptera	Caenidae	Small Squaregills	Larvae	1
Insecta	Ephemeroptera	Heptageniidae	Flatheaded Mayflies	Larvae	30
Insecta	Ephemeroptera	Leptophlebiidae	Pronggills	Larvae	9
Insecta	Ephemeroptera	Potamanthidae	Hackelgills	Larvae	2
Insecta	Ephemeroptera	Siphonuridae	Primitive Minnow Mayflies	Larvae	1
Insecta	Ephemeroptera	Tricorythidae	Little Stout Crawlers	Larvae	1
Insecta	Hemiptera	Corixidae	Water Boatman	Adult	16
Insecta	Plecoptera	Perlidae	Comon Stoneflies	Larvae	1
Insecta	Plecoptera	Taeniopterygidae	Taeniopterygid Broadbacks	Larvae	4
Insecta	Trichoptera	Hydropsychidae	Common Netspinners	Larvae	129
Insecta	Trichoptera	Polycentropodidae		Larvae	1

Macroinvertebrate Taxa Metrics

Total Taxa	15
EPT Taxa	11
% EPT Taxa	73
Diptera Taxa	2
% Diptera Taxa	13
Mean Tolerance Value	4.53

Macroinvertebrate Organism Metrics

Total Organisms	242
EPT Individuals	181
% EPT Individuals	75
Diptera Individuals	42
% Diptera Individuals	17
Chironomidae Individuals	9
% Chironomidae Individuals	4

	Water Quality	Degree of Organic Pollution
Hilsenhoff Biotic Index	4.37 Very Good	Possible slight organic pollution