

Table 1.CWS. South Fork Crow River Monitoring Station Information



Station Address: 1420 State Highway 7, Mayer, MN
County: Carver
Major Basin: Mississippi River Basin
Watershed: Crow River
Drainage Area: 1,136.62 square miles

Station Operator: Carver County Environmental Services

Metropolitan Council Environmental Services Contact Information:

Contact Person: Casandra Champion
Address: 2400 Childs Road
St. Paul, MN 55106
Phone: 651-602-8745
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Watershed District or Watershed Management Organization:
Crow River Organization of Water (CROW)

Station Overview: MCES has supported water quality monitoring of the South Fork of the Crow River since 2001. The monitoring station is located in Mayer, Minnesota, 20.3 miles upstream from the South Fork confluence with the North Fork of the Crow River. Downstream from this confluence, the river is known as the Crow River. The South Fork of the Crow River flows from Ottertail Lake in Hutchinson and drains most of McLeod County and part of western Carver County before it reaches the station near Mayer.

MCES partners with the Minnesota Department of Natural Resources (MDNR) to maintain the station's stage measurement equipment and rain gauge. This station (MDNR Waters Station Number 19082001) is part of the MDNR's statewide flood-forecasting network. Flow has been measured at this location since 1999. MCES partners with Carver County Environmental Services to maintain the rating curve and operate the monitoring station. While the new MCES monitoring station was being built in 2001, the Minnesota Pollution Control Agency (MPCA), the Crow River Organization of Water (CROW), and MCES collected grab samples for water quality analysis. Installation of the MCES monitoring station was completed in November 2001.

2003 Monitoring Year: Daily average flows were estimated prior to March 24 and after November 8, 2003. Snowmelt began during the last week of March 2003. The peak daily average flow of 3,456 cfs occurred on July 2, 2002.

Because of equipment malfunction, water quality in 2003 was largely characterized by grab samples. Due to two large summer rain events, a significant runoff event occurred during the June 25 – August 4, 2003 period. A grab sample collected on August 1, near the end of this event, had the highest total suspended solids (TSS) concentration (104 mg/L) of all 2003 samples.

Sixteen samples were collected for water quality analysis during 2003, including 1 composite sample 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 2003 sampling scheme did not meet the goals of the MCES monitoring work plan. Baseflow conditions during the January-March period were not characterized with grab samples, and composite samples were not obtained during runoff events because of equipment malfunction. Necessary adjustments to the sampling scheme will be made prior to the 2004 monitoring year.

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

Figure 1.CWS. South Fork Crow River Monitoring Station Location and Watershed

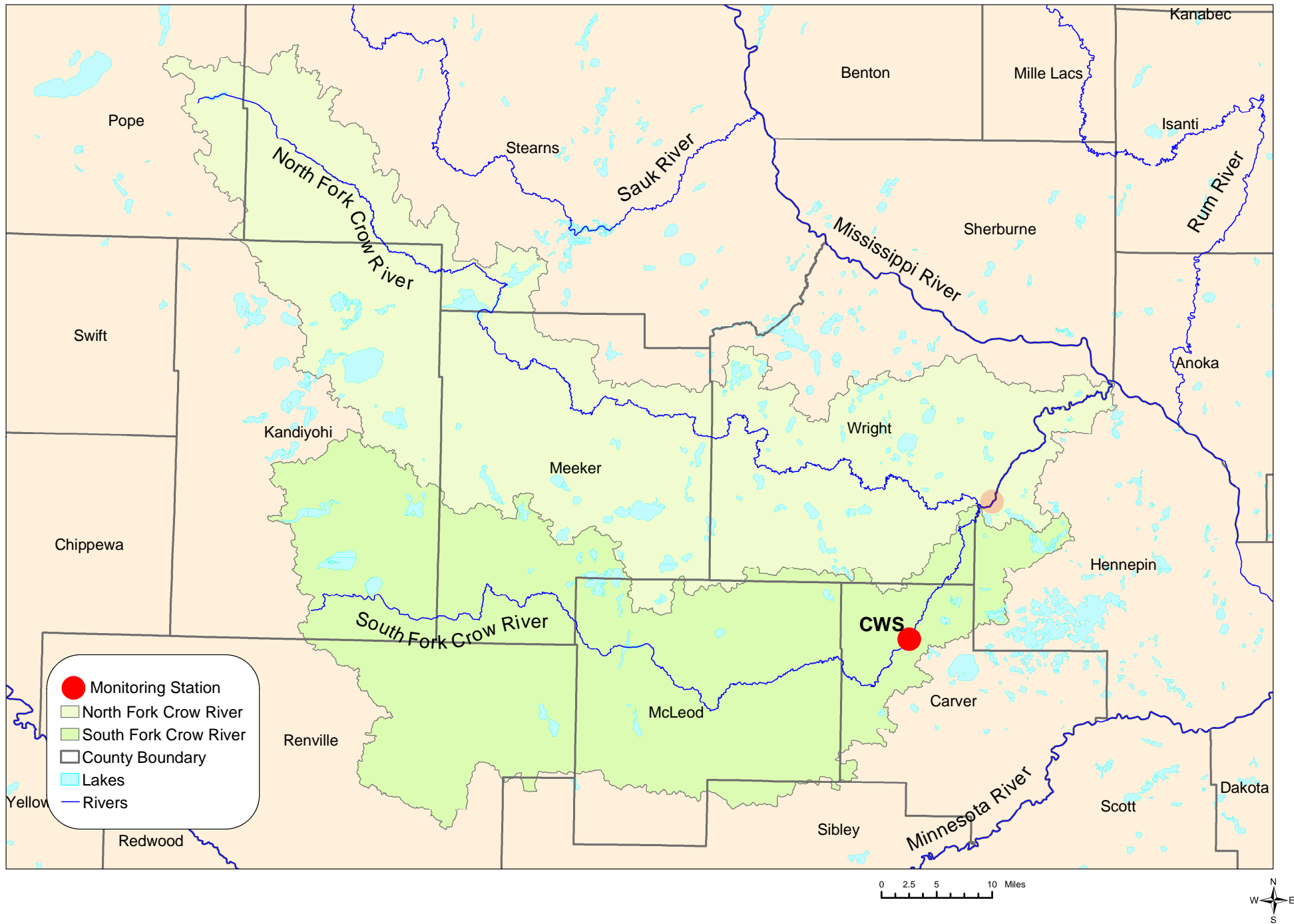


Figure 2.CWS. South Fork Crow River 2003 Hydrograph, Precipitation and Sampling Information

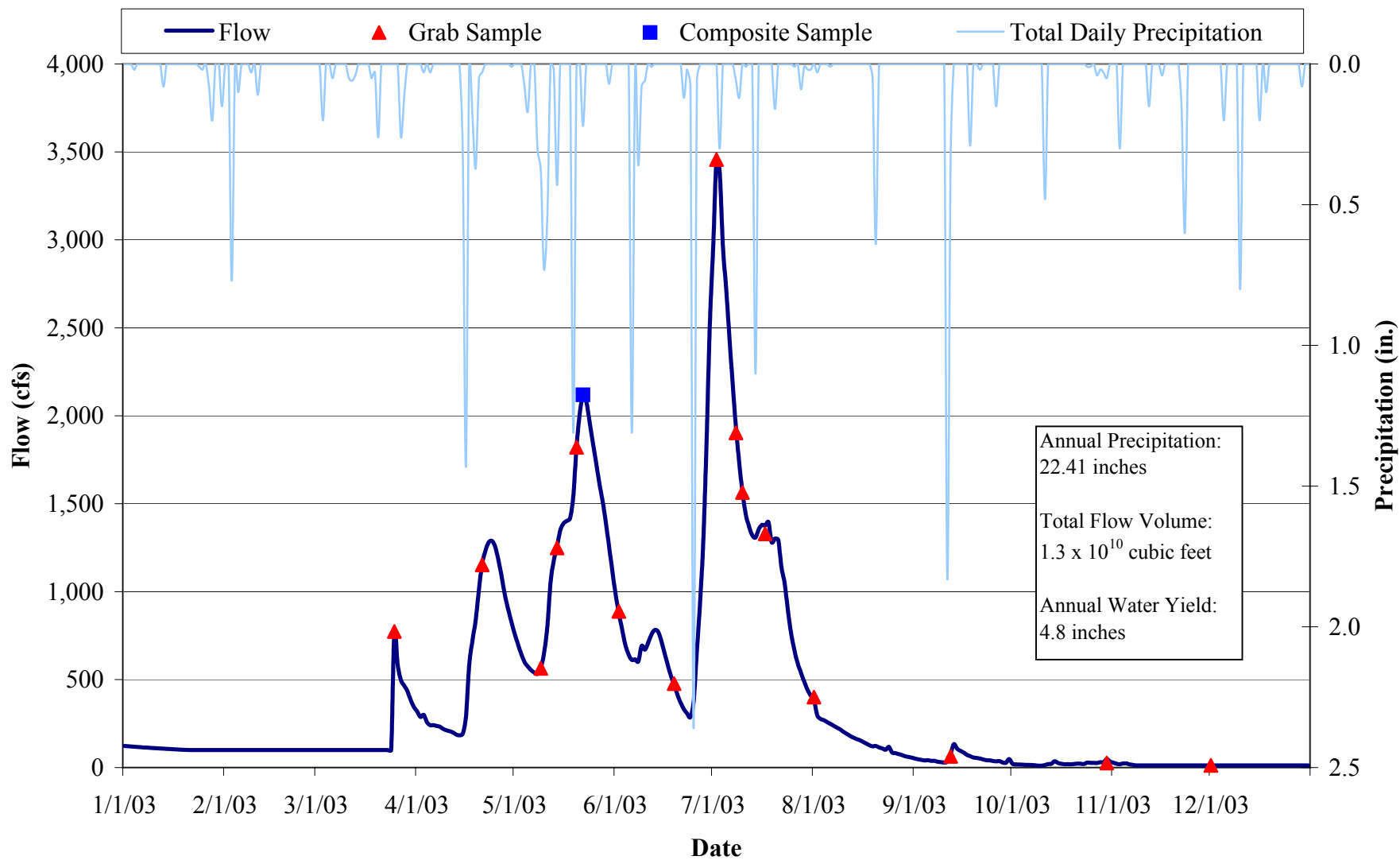


Table 2.CWS. South Fork Crow River 2003 Water Chemistry Information

| Variable | N | Mean | Median | Minimum | Maximum | 25% | 75% | STD |
|----------------------------------|----|------|--------|---------|---------|------|------|------|
| Chloride, mg/L | 16 | 67 | 31 | 14 | 379 | 23 | 36 | 103 |
| Hardness, mg/L | 16 | 343 | 368 | 206 | 414 | 282 | 407 | 69 |
| Cadmium, ug/L | 14 | 0.1 | 0.1 | <0.1 | 0.1 | <0.1 | 0.1 | <0.1 |
| Chromium, ug/L | 14 | 1.1 | 1.1 | 0.1 | 1.7 | 0.8 | 1.4 | 0.4 |
| Copper, ug/L | 14 | 4.0 | 3.1 | 2.1 | 9.7 | 2.8 | 4.0 | 2.3 |
| Lead, ug/L | 14 | 0.9 | 0.7 | 0.2 | 1.9 | 0.5 | 1.3 | 0.5 |
| Nickel, ug/L | 14 | 4.9 | 4.9 | 3.3 | 7.4 | 4.1 | 5.3 | 1.2 |
| Zinc, ug/L | 14 | 7.8 | 7.5 | 3.3 | 16.6 | 5.6 | 9.3 | 3.3 |
| Total Kjeldahl Nitrogen, mg/L | 16 | 2.04 | 1.90 | 1.40 | 3.40 | 1.70 | 2.40 | 0.53 |
| Total Nitrate Nitrogen, mg/L | 15 | 5.52 | 5.37 | 0.38 | 11.70 | 1.74 | 9.35 | 4.00 |
| Total Phosphorus, mg/L | 16 | 0.44 | 0.32 | 0.17 | 1.41 | 0.25 | 0.49 | 0.34 |
| Total Dissolved Phosphorus, mg/L | 15 | 0.39 | 0.26 | 0.08 | 1.77 | 0.10 | 0.38 | 0.49 |
| Total Suspended Solids, mg/L | 16 | 51 | 45 | 13 | 104 | 36 | 73 | 27 |
| Volatile Suspended Solids, mg/L | 16 | 11 | 11 | 5 | 22 | 7 | 14 | 5 |
| Turbidity, NTU | 16 | 13 | 11 | 2 | 29 | 8 | 20 | 8 |

N: Sample Count

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

STD: Standard Deviation

Table 3.CWS. South Fork Crow 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 | 23,000 | 63 | 13 | 58 |
| Total Phosphorus | 140 | 0.38 | 0.08 | 0.36 |
| Total Dissolved Phosphorus | 100 | 0.27 | 0.06 | 0.25 |
| Total Nitrate Nitrogen | 2,430 | 6.68 | 1.40 | 6.17 |

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

Figure 3.CWS. South Fork Crow River 2003 Hydrograph with Total Suspended Solids and Nitrate Nitrogen Concentrations

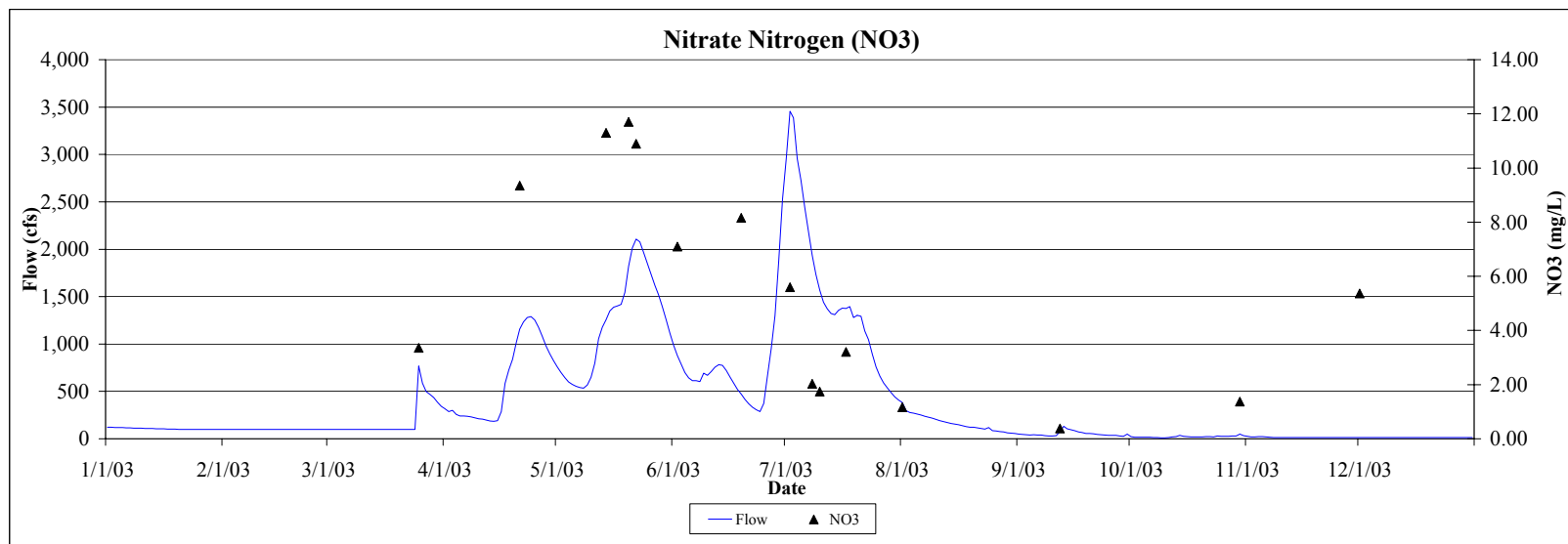
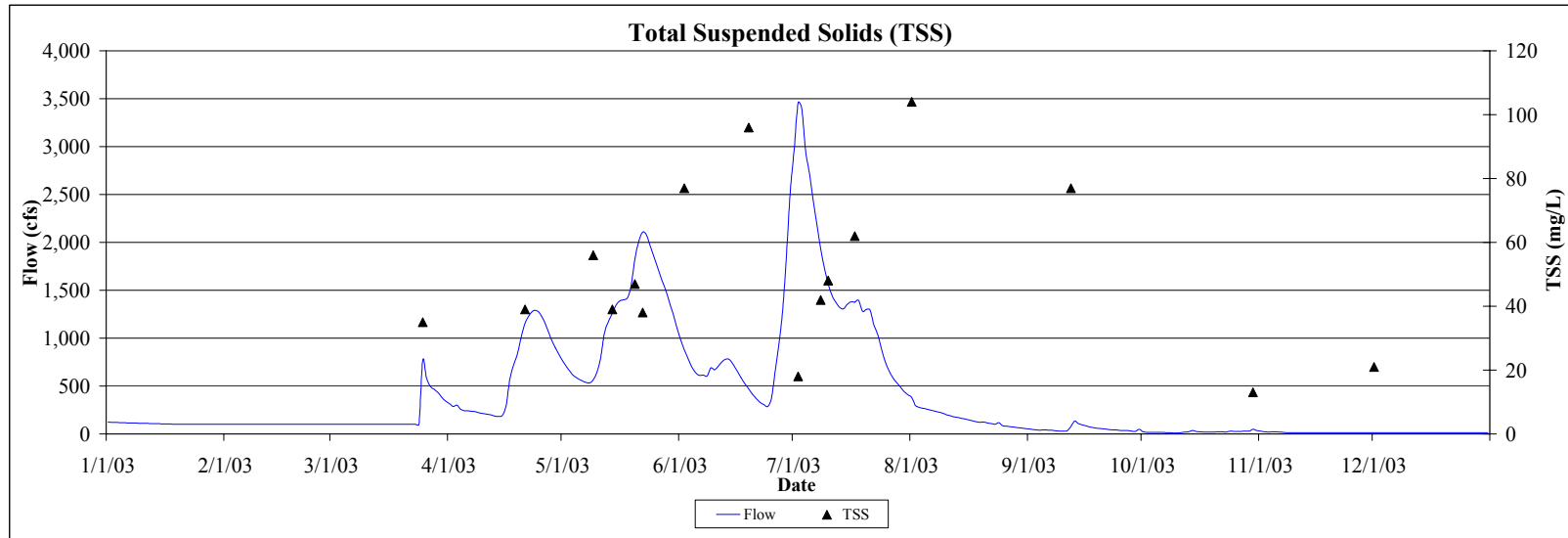


Figure 4.CWS. South Fork Crow River 2003 Hydrograph with Total and Dissolved Phosphorus Concentrations

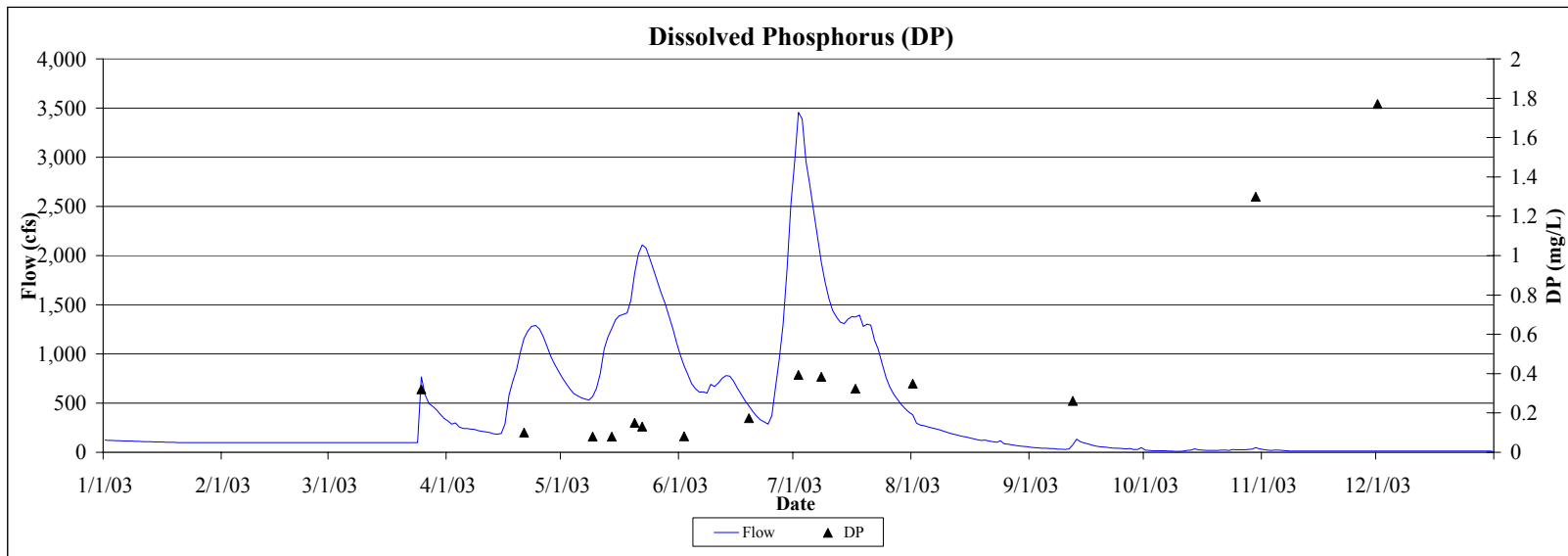
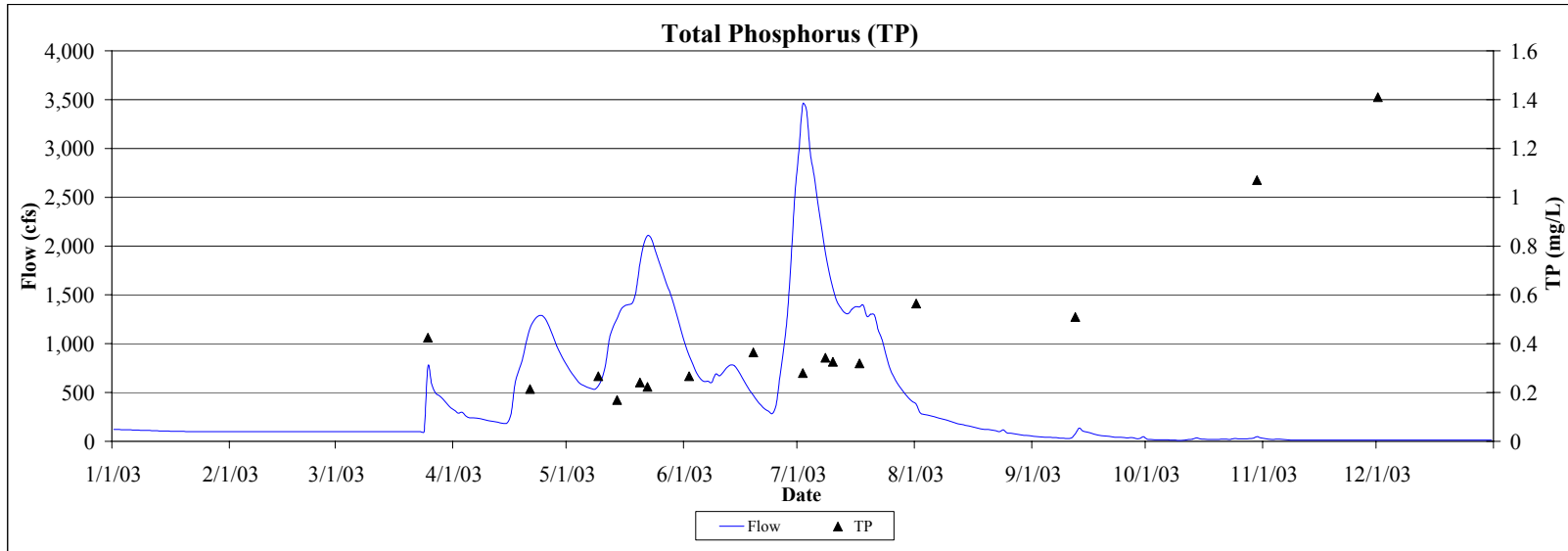


Table 4.CWS. South Fork Crow River: Comparison of 2001-2003 Hydrology and Water Chemistry

| | 2001 | 2002 | 2003 |
|---|----------------------|----------------------|----------------------|
| Hydrology | | | |
| Total Precipitation (inches) | 27.66 | 34.11 | 22.41 |
| Water Yield (inches) | 7.6 | 7.3 | 4.8 |
| Total Volume (cubic feet) | 2.0×10^{10} | 1.9×10^{10} | 1.3×10^{10} |
| Annual Load (tons) | | | |
| Total Suspended Solids | 13,900 | 27,100 | 23,000 |
| Total Phosphorus | 226 | 233 | 140 |
| Total Dissolved Phosphorus | insufficient data | 163 | 100 |
| Total Nitrate Nitrogen | 3,080 | 2,760 | 2,430 |
| Annual Yield (lbs/acre) | | | |
| Total Suspended Solids | 38 | 75 | 63 |
| Total Phosphorus | 0.62 | 0.64 | 0.38 |
| Total Dissolved Phosphorus | insufficient data | 0.45 | 0.27 |
| Total Nitrate Nitrogen | 8.47 | 7.59 | 6.68 |
| Annual Normalized Yield (lbs/acre/inch of water) | | | |
| Total Suspended Solids | 5 | 10 | 13 |
| Total Phosphorus | 0.08 | 0.09 | 0.08 |
| Total Dissolved Phosphorus | insufficient data | 0.06 | 0.06 |
| Total Nitrate Nitrogen | 1.12 | 1.04 | 1.40 |
| Flow-Weighted Mean Concentration (mg/L) | | | |
| Total Suspended Solids | 22 | 45 | 58 |
| Total Phosphorus | 0.36 | 0.39 | 0.36 |
| Total Dissolved Phosphorus | insufficient data | 0.27 | 0.25 |
| Total Nitrate Nitrogen | 4.93 | 4.59 | 6.17 |

Table 5.CWS. South Fork Crow River 2003 Macroinvertebrate Monitoring Results and Metrics

Monitoring Date 10/6/2003

| Class | Order | Family | Common Name | Organism Count |
|--------------|---------------|----------------|--------------------------|-----------------------|
| Insecta | Coleoptera | Elmidae | Riffle Beetles | 68 |
| Insecta | Coleoptera | Gyrinidae | Whirligig Beetles | 1 |
| Insecta | Coleoptera | Chrysomelidae | Aquatic Leaf Beetles | 1 |
| Insecta | Coleoptera | Noteridae | Burrowing Water Beetles | 3 |
| Insecta | Diptera | Tipulidae | Crane Flies | 4 |
| Insecta | Diptera | Chironomidae | Midges | 111 |
| Insecta | Diptera | Empididae | Aquatic Dance Flies | 1 |
| Insecta | Diptera | Simuliidae | Black Flies | 20 |
| Insecta | Ephemeroptera | Baetidae | Small Minnow Mayflies | 170 |
| Insecta | Ephemeroptera | Heptageniidae | Flatheaded Mayflies | 69 |
| Insecta | Ephemeroptera | Potamanthidae | Hackelgills | 4 |
| Insecta | Ephemeroptera | Caenidae | Small Squaregills | 6 |
| Insecta | Hemiptera | Belostomatidae | Giant Water Bugs | 1 |
| Insecta | Hemiptera | Corixidae | Water Boatman | 1 |
| Insecta | Hemiptera | Pleidae | Pygmy Backswimmer | 5 |
| Insecta | Odonata | Coenagrionidae | Narrowwinged Damselflies | 1 |
| Insecta | Plecoptera | Perlidae | Comon Stoneflies | 1 |
| Insecta | Plecoptera | | Stoneflies | 13 |
| Insecta | Trichoptera | Hydropsychidae | Common Netspinners | 315 |

Macroinvertebrate Taxa Metrics

| | |
|----------------------|-----|
| Total Taxa | 19 |
| EPT Taxa | 7 |
| % EPT Taxa | 37 |
| Diptera Taxa | 4 |
| % Diptera Taxa | 21 |
| Mean Tolerance Value | 4.8 |

Macroinvertebrate Organism Metrics

| | |
|----------------------------|-----|
| Total Individuals | 795 |
| EPT Individuals | 578 |
| % EPT Individuals | 73 |
| Diptera Individuals | 136 |
| % Diptera Individuals | 17 |
| Chironomidae Individuals | 111 |
| % Chironomidae Individuals | 14 |

Water Quality

Degree of Organic Pollution

| | | | |
|----------------------------------|-----|-----------|--------------------------|
| Family-Level Biotic Index | 4.4 | Very Good | Slight Organic Pollution |
|----------------------------------|-----|-----------|--------------------------|