

RAINY RIVER BASIN--Continued

05133500 RAINY RIVER AT MANITOU RAPIDS, MN
(International Gaging Station)

LOCATION.--Lat 48°38'04", long 93°54'47", in NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 36, T.160 N., R.26 W., Koochiching County, Hydrologic Unit 09030004, on left bank at Manitou Rapids, 4 mi west of Indus.

DRAINAGE AREA.--19,400 mi² (approximately).

PERIOD OF RECORD.--July 1928 to current year. Monthly discharge only for some periods, published in WSP 1308. October 1911 to October 1924 (gage heights only) at site near Birchdale in files of U.S. Army Corps of Engineers. Published as "near Birchdale" 1932-34.

GAGE.--Water-stage recorder. Datum of gage is 1,062.48 ft above sea level. Prior to Nov. 10, 1934, nonrecording gage at site near Birchdale, 7 mi. downstream at different datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Satellite telemeter at station. Diurnal fluctuation caused by power plant at International Falls. Some regulation at low and medium flows by Rainy and Namakan Lakes.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999
DAILY MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|--------|---------|
| 1 | 3840 | 5160 | 5070 | e3900 | e8500 | e5000 | 15600 | 18300 | 26500 | 16000 | 18500 | 6770 |
| 2 | 3830 | 5010 | 5150 | e3800 | e8500 | e5200 | 18100 | 18100 | 26000 | 15900 | 18300 | 6610 |
| 3 | 3810 | 4870 | 5360 | e3720 | e7930 | e5200 | 19000 | 17900 | 25600 | 16000 | 17300 | 8800 |
| 4 | 3790 | 4760 | 5550 | e3650 | e7580 | e5200 | 19800 | 17600 | 25400 | 16100 | 15700 | 12800 |
| 5 | 3800 | 4670 | 5600 | e3600 | e7020 | e5150 | 20900 | 17000 | 25200 | 16900 | 15000 | 16400 |
| 6 | 3880 | 4580 | e5580 | e3570 | e6930 | e5150 | 24200 | 16600 | 25100 | 18100 | 14700 | 18200 |
| 7 | 3860 | 4440 | e5600 | e3550 | e6200 | e4800 | 26800 | 16900 | 25100 | 23600 | 14500 | 16500 |
| 8 | 3880 | 4380 | e5700 | e3720 | e6400 | e4600 | 28400 | 17300 | 25200 | 26500 | 14400 | 19200 |
| 9 | 3780 | 4340 | e5700 | e3500 | e6600 | e4550 | 33100 | 17300 | 25300 | 27100 | 14300 | 19300 |
| 10 | 3780 | 4240 | e5600 | e4200 | e7000 | e5200 | 37700 | 19400 | 25700 | 28600 | 14200 | 19400 |
| 11 | 3830 | 4430 | e5500 | e4500 | e7200 | e5150 | 34200 | 24300 | 26700 | 28400 | 14200 | 19100 |
| 12 | 3860 | 4240 | e5450 | e4450 | e7400 | e5150 | 31200 | 30600 | 27100 | 27100 | 13900 | 18600 |
| 13 | 3940 | e4200 | e5200 | e4400 | e7300 | e5180 | 29500 | 38200 | 26800 | 29300 | 14500 | 18800 |
| 14 | 3940 | e4150 | e5000 | e6200 | e7000 | e5200 | 28900 | 40700 | 26200 | 27900 | 15800 | 20300 |
| 15 | 3940 | e4120 | e4900 | e6500 | e7300 | 5210 | 28200 | 39500 | 23700 | 29000 | 17500 | 21000 |
| 16 | 3990 | e4100 | e4800 | e6700 | e7650 | 6020 | 27600 | 37100 | 22300 | 31300 | 18300 | 21200 |
| 17 | 4150 | e4080 | e4700 | e5400 | e7730 | 6280 | 27000 | 34300 | 20600 | 32600 | 18400 | 21000 |
| 18 | 4300 | e4080 | e4350 | e5500 | e7370 | 7020 | 26100 | 32000 | 18200 | 32600 | 18000 | 21400 |
| 19 | 4750 | e4100 | e4300 | e7450 | e6200 | 7400 | 25300 | 30100 | 17500 | 32000 | 17400 | 21300 |
| 20 | 6180 | e4120 | e4270 | e7560 | e6300 | 6460 | 24600 | 27700 | 17300 | 31100 | 17200 | 20900 |
| 21 | 6920 | e4140 | e4250 | e7400 | e4500 | 5410 | 24100 | 27100 | 17000 | 28800 | 17500 | 19200 |
| 22 | 6950 | e4180 | e4230 | e7800 | e4600 | 5130 | 23800 | 28000 | 15700 | 25800 | 15700 | 17200 |
| 23 | 6800 | e4200 | e4210 | e7870 | e6000 | 4920 | 23300 | 28900 | 15300 | 24500 | 17100 | 16100 |
| 24 | 6490 | e4330 | e4150 | e6720 | e6400 | 4780 | 21800 | 30200 | 15200 | 22800 | 16600 | 15800 |
| 25 | 6160 | e4500 | e4080 | e7940 | e6000 | 4760 | 21000 | 30100 | 15200 | 22100 | 16300 | 15500 |
| 26 | 5890 | e4650 | e4030 | e8600 | e5700 | 5500 | 20500 | 30300 | 15100 | 21500 | 16200 | 15300 |
| 27 | 5710 | e4750 | e4000 | e9240 | e5500 | 5810 | 20000 | 29600 | 15100 | 20300 | 14900 | 15500 |
| 28 | 5640 | e4830 | e3980 | e8780 | e4900 | 7000 | 18600 | 28700 | 15000 | 19800 | 13000 | 16100 |
| 29 | 5510 | e4870 | e3970 | e8960 | --- | 10200 | 16500 | 27700 | 15300 | 18700 | 12000 | 16800 |
| 30 | 5360 | 4980 | e3960 | e8700 | --- | 14100 | 17800 | 26900 | 16000 | 18300 | 10900 | 16900 |
| 31 | 5310 | --- | e3950 | e8400 | --- | 16100 | --- | 26800 | --- | 18400 | 8060 | --- |
| TOTAL | 147870 | 133500 | 148190 | 186260 | 187710 | 192830 | 733600 | 825200 | 636400 | 747100 | 482160 | 511980 |
| MEAN | 4770 | 4450 | 4780 | 6008 | 6704 | 6220 | 24450 | 26620 | 21210 | 24100 | 15550 | 17070 |
| MAX | 6950 | 5160 | 5700 | 9240 | 8500 | 16100 | 37700 | 40700 | 27100 | 32600 | 18500 | 21400 |
| MIN | 3780 | 4080 | 3950 | 3500 | 4500 | 4550 | 15600 | 16600 | 15000 | 15900 | 8060 | 6610 |
| AC-FT | 293300 | 264800 | 293900 | 369400 | 372300 | 382500 | 1455000 | 1637000 | 1262000 | 1482000 | 956400 | 1016000 |
| CFSM | .25 | .23 | .25 | .31 | .35 | .32 | 1.26 | 1.37 | 1.09 | 1.24 | .80 | .88 |
| IN. | .28 | .26 | .28 | .36 | .36 | .37 | 1.41 | 1.58 | 1.22 | 1.43 | .92 | .98 |

e Estimated

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STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1999, BY WATER YEAR (WY)

| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| MEAN | 11860 | 11310 | 10190 | 9151 | 8736 | 8975 | 15600 | 19650 | 19860 | 16580 | 11400 | 11130 |
| MAX | 42410 | 37280 | 27790 | 18430 | 17240 | 16640 | 38100 | 52880 | 49480 | 47970 | 33700 | 30620 |
| (WY) | 1942 | 1972 | 1972 | 1972 | 1969 | 1945 | 1966 | 1950 | 1950 | 1950 | 1944 | 1988 |
| MIN | 4728 | 3796 | 3190 | 2900 | 3129 | 2926 | 4378 | 4106 | 3676 | 3483 | 3422 | 3746 |
| (WY) | 1981 | 1977 | 1930 | 1931 | 1931 | 1931 | 1977 | 1977 | 1980 | 1980 | 1980 | 1998 |

| SUMMARY STATISTICS | FOR 1998 CALENDAR YEAR | FOR 1999 WATER YEAR | WATER YEARS 1929 - 1999 |
|--------------------------|------------------------|---------------------|-------------------------|
| ANNUAL TOTAL | 2326230 | 4932800 | |
| ANNUAL MEAN | 6373 | 13510 | 12880 |
| HIGHEST ANNUAL MEAN | | | 23260 |
| LOWEST ANNUAL MEAN | | | 4470 |
| HIGHEST DAILY MEAN | 18600 | May 18 | 71300 |
| LOWEST DAILY MEAN | 3400 | Sep 11 | 928 |
| ANNUAL SEVEN-DAY MINIMUM | 3580 | Sep 9 | 1500 |
| INSTANTANEOUS PEAK FLOW | | | 71600 |
| INSTANTANEOUS PEAK STAGE | | | 21.04 |
| ANNUAL RUNOFF (AC-FT) | 4614000 | 9784000 | 9334000 |
| ANNUAL RUNOFF (CFSM) | .33 | .70 | .66 |
| ANNUAL RUNOFF (INCHES) | 4.46 | 9.46 | 9.02 |
| 10 PERCENT EXCEEDS | 9390 | 27600 | 25400 |
| 50 PERCENT EXCEEDS | 5750 | 9240 | 10300 |
| 90 PERCENT EXCEEDS | 3860 | 4110 | 5000 |

a Estimated.

