

Water-Data Report 2009

05094000 SOUTH BRANCH TWO RIVERS AT LAKE BRONSON, MN

Lower Red Basin
Two Rivers Subbasin

LOCATION.--Lat 48°43'57", long 96°40'02" referenced to North American Datum of 1927, in SW ¼ SW ¼ sec.30, T.161 N., R.46 W., Kittson County, MN, Hydrologic Unit 09020312, on left bank 70 ft upstream from culvert on U.S. Highway 59 at Lake Bronson and 3.4 mi downstream from dam at outlet of Bronson Lake.

DRAINAGE AREA.--422 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--September 1928 to November 1936, April to September 1937, April 1941 to October 1943, April to December 1944, April 1945 to September 1947, October 1953 to September 1981, April 1985 to current year. Monthly discharge only for some periods, published in WSP 1308. October 1981 to March 1985, annual maximums only. Published as South Fork Two Rivers at Bronson prior to 1941.

REVISED RECORDS.--WSP 1308: 1929(M), 1931(M), 1936(M), 1944(M), 1947(M). Unpublished 2009: 1970(M).

GAGE.--Water-stage recorder. Datum of gage is 928.53 ft above sea level (NGVD of 1929, Minnesota Department of Transportation benchmark). Prior to Nov. 23, 1953, nonrecording gage at bridge 100 ft downstream at datum 2.00 ft higher. Nov 23, 1953 to Oct. 5, 1963, water-stage recorder at same site at datum 2.00 ft higher.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Flow partly regulated since 1937 at Bronson Lake; usable capacity, 3,700 acre-ft.

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DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009
DAILY MEAN VALUES

[e, estimated]

| Day | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|--------------|---------|--------|-------|-------|-------|----------|--------|--------|--------|--------|-------|-------|
| 1 | 3.6 | 41 | e19 | e9.0 | e6.3 | e5.5 | 1,330 | 1,130 | 827 | 1,350 | 25 | 16 |
| 2 | 4.2 | 14 | e19 | e8.9 | e6.3 | e5.5 | 1,160 | 1,120 | 731 | e1,120 | 24 | 15 |
| 3 | 4.8 | 15 | e19 | e8.7 | e6.3 | e5.5 | 930 | 1,040 | 690 | 917 | 23 | 15 |
| 4 | 6.0 | 45 | e19 | e8.6 | e6.3 | e5.6 | 826 | 836 | 608 | 453 | 21 | 15 |
| 5 | 5.2 | 157 | e18 | e8.5 | e6.4 | e5.7 | 849 | 828 | 555 | 193 | 20 | 15 |
| 6 | 36 | 327 | e16 | e8.4 | e6.4 | e5.6 | 862 | 708 | 461 | 352 | 19 | 15 |
| 7 | 52 | 666 | e15 | e8.3 | e6.5 | e5.6 | 885 | 746 | 474 | 228 | 19 | 17 |
| 8 | 6.8 | 738 | e13 | e8.2 | e6.5 | e5.6 | 995 | 681 | 460 | 144 | 19 | 18 |
| 9 | 7.5 | 774 | e12 | e8.1 | e6.5 | e5.5 | 1,250 | 591 | 366 | 143 | 18 | 18 |
| 10 | 41 | 796 | e11 | e7.9 | e6.4 | e5.4 | 1,500 | 614 | 305 | 110 | 18 | 17 |
| 11 | 11 | 678 | e10 | e7.4 | e6.3 | e5.4 | 1,810 | 645 | 411 | 51 | 17 | 19 |
| 12 | 76 | 632 | e9.9 | e7.0 | e6.1 | e5.4 | 2,130 | 619 | 410 | 86 | 16 | 18 |
| 13 | 113 | e440 | e9.8 | e6.8 | e5.9 | e5.5 | 2,430 | 602 | 347 | 91 | 16 | 19 |
| 14 | 87 | e400 | e9.7 | e6.6 | e5.8 | e5.6 | 2,670 | 665 | 241 | 94 | 16 | 22 |
| 15 | 215 | e380 | e9.6 | e6.6 | e5.8 | e5.7 | 2,740 | 623 | 205 | 104 | 17 | 23 |
| 16 | 240 | e340 | e9.5 | e6.6 | e5.8 | e14 | 2,620 | 630 | 207 | 75 | 45 | 22 |
| 17 | 163 | e280 | e9.4 | e6.5 | e5.8 | e29 | e2,350 | 627 | 195 | 81 | 212 | 21 |
| 18 | 179 | e229 | e9.3 | e6.6 | e5.8 | e56 | e2,050 | 620 | 173 | 101 | 167 | 19 |
| 19 | 137 | e180 | e9.3 | e6.6 | e5.8 | e74 | e1,880 | 581 | 259 | 84 | 134 | 18 |
| 20 | 63 | e160 | e9.3 | e6.6 | e5.8 | e75 | e1,700 | 502 | 648 | 44 | 148 | 16 |
| 21 | 49 | e130 | e9.3 | e6.6 | e5.8 | e90 | e1,410 | 506 | 432 | 38 | 37 | 16 |
| 22 | 107 | e140 | e9.3 | e6.6 | e5.8 | e680 | 1,210 | 500 | 234 | 41 | 21 | 15 |
| 23 | 51 | e130 | e9.2 | e6.6 | e5.7 | e1,100 | 1,060 | 418 | 231 | 41 | 29 | 15 |
| 24 | 17 | e140 | e9.2 | e6.5 | e5.7 | e1,550 | 894 | 374 | 171 | 38 | 71 | 15 |
| 25 | 32 | e79 | e9.2 | e6.4 | e5.6 | e2,000 | 899 | 574 | 106 | 34 | 46 | 15 |
| 26 | 62 | e53 | e9.2 | e6.4 | e5.5 | e2,400 | 807 | 1,380 | 215 | 28 | 32 | 14 |
| 27 | 67 | e35 | e9.2 | e6.3 | e5.5 | e2,630 | 762 | 1,770 | 475 | 25 | 15 | 15 |
| 28 | 40 | e23 | e9.1 | e6.3 | e5.5 | e2,400 | 766 | 1,520 | 1,480 | 25 | 15 | 15 |
| 29 | 6.0 | e21 | e9.1 | e6.2 | --- | e1,980 | 792 | 1,400 | 1,500 | 25 | 17 | 15 |
| 30 | 41 | e20 | e9.1 | e6.2 | --- | e1,680 | 846 | 1,240 | 1,460 | 25 | 17 | 15 |
| 31 | 73 | --- | e9.1 | e6.2 | --- | e1,520 | --- | 1,120 | --- | 25 | 17 | --- |
| Total | 1,996.1 | 8,063 | 357.8 | 222.2 | 167.9 | 18,361.1 | 42,413 | 25,210 | 14,877 | 6,166 | 1,311 | 508 |
| Mean | 64.4 | 269 | 11.5 | 7.17 | 6.00 | 592 | 1,414 | 813 | 496 | 199 | 42.3 | 16.9 |
| Max | 240 | 796 | 19 | 9.0 | 6.5 | 2,630 | 2,740 | 1,770 | 1,500 | 1,350 | 212 | 23 |
| Min | 3.6 | 14 | 9.1 | 6.2 | 5.5 | 5.4 | 762 | 374 | 106 | 25 | 15 | 14 |
| Ac-ft | 3,960 | 15,990 | 710 | 441 | 333 | 36,420 | 84,130 | 50,000 | 29,510 | 12,230 | 2,600 | 1,010 |
| Cfsm | 0.15 | 0.64 | 0.03 | 0.02 | 0.01 | 1.40 | 3.35 | 1.93 | 1.18 | 0.47 | 0.10 | 0.04 |
| In. | 0.18 | 0.71 | 0.03 | 0.02 | 0.01 | 1.62 | 3.74 | 2.22 | 1.31 | 0.54 | 0.12 | 0.04 |

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 2009, BY WATER YEAR (WY)

| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Mean | 22.8 | 36.8 | 6.37 | 3.79 | 5.97 | 87.3 | 479 | 238 | 207 | 129 | 51.7 | 42.6 |
| Max | 153 | 1,132 | 37.9 | 16.6 | 93.1 | 689 | 1,977 | 1,500 | 1,336 | 1,136 | 1,349 | 525 |
| (WY) | (1958) | (2001) | (2001) | (2006) | (1998) | (1995) | (1966) | (1996) | (1970) | (1956) | (1993) | (1957) |
| Min | 0.40 | 0.38 | 0.13 | 0.12 | 0.12 | 0.66 | 0.54 | 0.98 | 1.43 | 0.44 | 0.09 | 0.00 |
| (WY) | (1991) | (1990) | (1987) | (1987) | (1987) | (1934) | (1991) | (1991) | (1980) | (1988) | (1988) | (1937) |

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SUMMARY STATISTICS

| | Calendar Year 2008 | | Water Year 2009 | | Water Years 1929 - 2009 | |
|---------------------------------|--------------------|--------|--------------------|--------|-------------------------|--------------|
| Annual total | 24,090.43 | | 119,653.1 | | | |
| Annual mean | 65.8 | | 328 | | ^a 111 | |
| Highest annual mean | | | | | 328 | 2009 |
| Lowest annual mean | | | | | 2.89 | 1934 |
| Highest daily mean | 796 | Nov 10 | 2,740 | Apr 15 | 5,290 | Apr 5, 1966 |
| Lowest daily mean | 0.82 | Feb 28 | 3.6 | Oct 1 | ^b 0.00 | Jul 25, 1937 |
| Annual seven-day minimum | 0.82 | Feb 28 | 5.5 | Mar 7 | 0.00 | Aug 2, 1937 |
| Maximum peak flow | | | ^c 2,790 | Apr 15 | 5,410 | Apr 5, 1966 |
| Maximum peak stage | | | ^d 14.58 | Mar 27 | 18.23 | Apr 5, 1966 |
| Annual runoff (ac-ft) | 47,780 | | 237,300 | | 80,070 | |
| Annual runoff (cfsm) | 0.156 | | 0.777 | | 0.262 | |
| Annual runoff (inches) | 2.12 | | 10.55 | | 3.56 | |
| 10 percent exceeds | 183 | | 1,120 | | 267 | |
| 50 percent exceeds | 13 | | 34 | | 5.9 | |
| 90 percent exceeds | 1.1 | | 6.0 | | 1.0 | |

^a Median of annual mean discharges is 71 ft³/s.

^b Many days, several years.

^c Gage height, 11.30 ft.

^d From highwater mark, backwater from ice. Date unknown but most likely between Mar. 24-27.

