Water-Data Report 2009

# 05064000 WILD RICE RIVER AT HENDRUM, MN

Upper Red Basin
Eastern Wild Rice Subbasin

LOCATION.--Lat 47°16′05″, long 96°47′50″ referenced to North American Datum of 1927, in SE ¼ SE ¼ sec.19, T.144 N., R.48 W., Norman County, MN, Hydrologic Unit 09020108, on right bank 30 ft. below bridge on County Highway 25, 0.5 mi. east of Hendrum and 4 mi. upstream from mouth.

DRAINAGE AREA.--1,560 $mi^2$.

## SURFACE-WATER RECORDS

PERIOD OF RECORD.--March 1944 to September 1984 and May 1985 to current year. Operated as a high-flow partial-record station October 1984 to April 1985.

REVISED RECORDS.--WSP 1728: 1958. Unpublished, 2009: 2001(M), 2002(M), 2008(M).

GAGE.--Water-stage recorder. Datum of gage is 836.75 ft above sea level (NGVD of 1929, levels by U.S. Army Corps of Engineers). Prior to July 18, 1989, nonrecording gage at same site and datum.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Large part of high flow upstream is diverted into Marsh River Basin at overflow section approximately 15 miles upstream, and 3.5 mi east of Ada. Another diversion into the Marsh River basin formed in 1947, 1.5 mi southeast of Ada and diverted water at all stages 1947-51, after which it was closed except for a small regulated flow diverted for abatement of contamination from Ada sewage plant effluent. Amount of diversion not known.

**05064000 WILD RICE RIVER AT HENDRUM, MN—Continued**

**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 | 282 | 1,160 | e711 | e206 | e181 | e188 | e6,770 | e1,840 | 894 | 577 | 88 | 148 |
| 2 | 271 | 1,040 | e682 | e201 | e177 | e188 | e5,790 | e1,810 | 816 | 444 | 86 | 131 |
| 3 | 262 | 948 | e656 | e197 | e175 | e190 | e4,920 | e1,700 | 724 | 338 | 86 | 121 |
| 4 | 250 | 886 | e640 | e193 | e177 | e192 | e4,130 | e1,580 | 654 | 239 | 88 | 114 |
| 5 | 243 | 861 | e612 | e187 | e181 | e195 | e3,510 | e1,470 | 595 | 183 | 86 | 110 |
| 6 | 255 | 1,070 | e596 | e183 | e181 | e195 | e3,300 | e1,370 | 539 | 163 | 82 | 102 |
| 7 | 324 | 1,820 | e572 | e178 | e180 | e193 | e3,180 | e1,280 | 511 | 153 | 83 | 94 |
| 8 | 1,040 | 2,880 | e544 | e176 | e184 | e190 | e3,160 | e1,160 | 494 | 143 | 80 | 90 |
| 9 | 1,240 | 3,130 | e531 | e175 | e195 | e185 | e3,330 | e1,040 | 485 | 133 | 81 | 97 |
| 10 | 978 | 2,810 | e518 | e174 | e230 | e180 | e4,000 | e939 | 487 | 130 | 87 | 107 |
| 11 | 870 | 2,270 | e497 | e172 | e269 | e176 | e4,520 | e850 | 482 | 121 | 97 | 116 |
| 12 | 1,590 | 1,820 | e473 | e169 | e301 | e174 | e4,640 | e786 | 470 | 113 | 90 | 164 |
| 13 | 2,850 | 1,540 | e447 | e165 | e316 | e177 | e4,300 | e751 | 442 | 109 | 84 | 198 |
| 14 | 3,720 | 1,420 | e405 | e162 | e317 | e192 | e3,800 | e807 | 412 | 107 | 80 | 180 |
| 15 | 4,060 | 1,370 | e353 | e162 | e316 | e222 | e3,400 | e915 | 382 | 103 | 82 | 165 |
| 16 | 4,120 | 1,290 | e300 | e165 | e307 | e282 | e3,000 | e937 | 362 | 104 | 120 | 162 |
| 17 | 3,970 | 1,150 | e259 | e168 | e294 | e399 | e2,700 | e934 | 354 | 98 | 231 | 159 |
| 18 | 3,610 | 941 | e232 | e170 | e276 | e879 | e2,450 | e920 | 381 | 95 | 295 | 137 |
| 19 | 3,100 | e869 | e225 | e170 | e255 | e1,670 | e2,200 | e890 | 433 | 100 | 548 | 120 |
| 20 | 2,560 | e820 | e220 | e170 | e235 | e2,640 | e2,000 | e852 | 583 | 100 | 582 | 111 |
| 21 | 2,020 | e755 | e218 | e168 | e225 | e3,620 | e1,920 | e808 | 830 | 92 | 484 | 118 |
| 22 | 1,470 | e759 | e216 | e167 | e217 | e4,640 | e1,900 | e785 | 1,120 | 89 | 482 | 115 |
| 23 | 1,190 | e813 | e214 | e166 | e213 | e5,870 | e1,880 | e734 | 1,400 | 86 | 499 | 110 |
| 24 | 1,250 | e880 | e213 | e164 | e211 | e7,350 | e1,830 | e709 | 1,620 | 84 | 424 | 106 |
| 25 | 1,350 | e905 | e212 | e164 | e208 | e8,550 | e1,780 | e683 | 1,710 | 96 | 357 | 96 |
| 26 | 1,740 | e907 | e211 | e164 | e202 | 9,120 | e1,740 | e691 | 1,680 | 98 | 311 | 93 |
| 27 | 1,850 | e875 | e210 | e166 | e195 | 9,370 | e1,720 | e765 | 1,560 | 133 | 272 | 92 |
| 28 | 1,830 | e795 | e209 | e168 | e190 | 9,280 | e1,710 | 966 | 1,330 | 141 | 240 | 96 |
| 29 | 1,720 | e756 | e208 | e171 | --- | e8,970 | e1,710 | 1,040 | 1,080 | 111 | 208 | 91 |
| 30 | 1,500 | e722 | e207 | e180 | --- | e8,560 | e1,800 | 1,020 | 798 | 99 | 182 | 90 |
| 31 | 1,320 | --- | e206 | e189 | --- | e7,850 | --- | 965 | --- | 92 | 161 | --- |
| Total | 52,835 | 38,262 | 11,797 | 5,410 | 6,408 | 91,887 | 93,090 | 31,997 | 23,628 | 4,674 | 6,676 | 3,633 |
| Mean | 1,704 | 1,275 | 381 | 175 | 229 | 2,964 | 3,103 | 1,032 | 788 | 151 | 215 | 121 |
| Max | 4,120 | 3,130 | 711 | 206 | 317 | 9,370 | 6,770 | 1,840 | 1,710 | 577 | 582 | 198 |
| Min | 243 | 722 | 206 | 162 | 175 | 174 | 1,710 | 683 | 354 | 84 | 80 | 90 |
| Ac-ft | 104,800 | 75,890 | 23,400 | 10,730 | 12,710 | 182,300 | 184,600 | 63,470 | 46,870 | 9,270 | 13,240 | 7,210 |
| Cfsm | 1.09 | 0.82 | 0.24 | 0.11 | 0.15 | 1.90 | 1.99 | 0.66 | 0.50 | 0.10 | 0.14 | 0.08 |
| In. | 1.26 | 0.91 | 0.28 | 0.13 | 0.15 | 2.19 | 2.22 | 0.76 | 0.56 | 0.11 | 0.16 | 0.09 |

**STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2009, BY WATER YEAR (WY)**

| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean | 174 | 193 | 99.3 | 69.8 | 75.7 | 381 | 1,271 | 674 | 607 | 436 | 167 | 156 |
| Max | 1,704 | 1,654 | 390 | 245 | 767 | 2,964 | 5,115 | 2,137 | 4,228 | 3,323 | 1,833 | 1,329 |
| (WY) | (2009) | (2005) | (2001) | (2001) | (1998) | (2009) | (1997) | (1998) | (2002) | (2002) | (1993) | (1999) |
| Min | 0.44 | 3.32 | 1.08 | 0.09 | 0.22 | 0.46 | 106 | 56.1 | 9.15 | 8.82 | 1.07 | 0.18 |
| (WY) | (1949) | (1949) | (1977) | (1977) | (1977) | (1949) | (1981) | (1977) | (1952) | (1951) | (1977) | (1948) |

**05064000 WILD RICE RIVER AT HENDRUM, MN—Continued**

**SUMMARY STATISTICS**

| | Calendar Year 2008 | | Water Year 2009 | | Water Years 1944 - 2009 | |
|---|---|---|---|---|---|---|
| **Annual total** | 235,653 | | 370,297 | | | |
| **Annual mean** | 644 | | 1,015 | | [a]353 | |
| **Highest annual mean** | | | | | 1,015 | 2009 |
| **Lowest annual mean** | | | | | 28.9 | 1977 |
| **Highest daily mean** | 4,120 | Oct 16 | 9,370 | Mar 27 | 10,300 | Apr 18, 1997 |
| **Lowest daily mean** | 26 | Sep 1 | [b]80 | Aug 8 | [c]0.00 | Sep 13, 1948 |
| **Annual seven-day minimum** | 29 | Aug 26 | 84 | Aug 3 | 0.00 | Sep 27, 1948 |
| **Maximum peak flow** | | | [d]9,440 | Mar 27 | [e]10,600 | Apr 18, 1997 |
| **Maximum peak stage** | | | [f]33.56 | Mar 29 | [f]33.85 | Apr 18, 1997 |
| **Annual runoff (ac-ft)** | 467,400 | | 734,500 | | 256,100 | |
| **Annual runoff (cfsm)** | 0.413 | | 0.650 | | 0.227 | |
| **Annual runoff (inches)** | 5.62 | | 8.83 | | 3.08 | |
| **10 percent exceeds** | 1,540 | | 2,830 | | 825 | |
| **50 percent exceeds** | 359 | | 354 | | 112 | |
| **90 percent exceeds** | 70 | | 101 | | 19 | |

[a] Median of annual mean discharges is 310 $ft^3/s$.

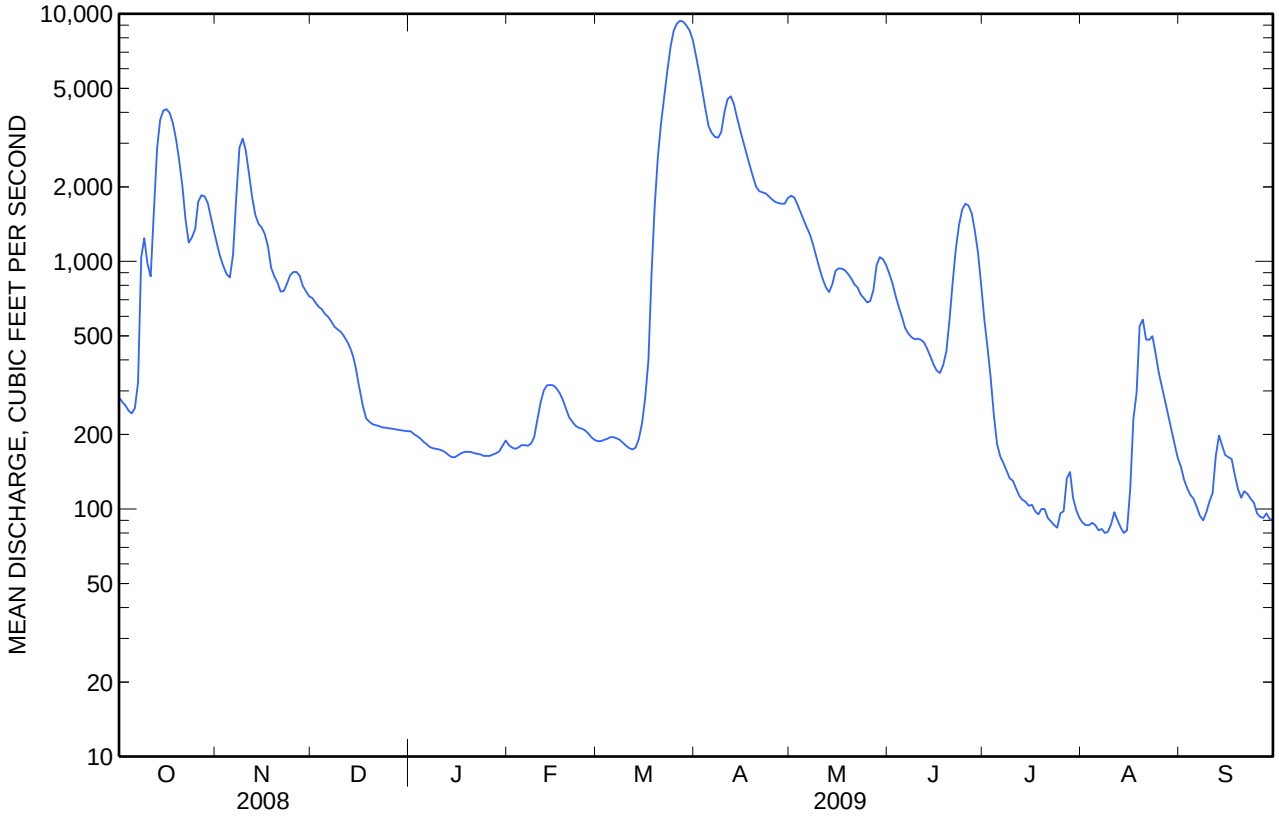
[b] Also occurred Aug. 14.

[c] Many days, September to October, 1948.

[d] Gage height, 33.00 ft. Affected to unknown degree by diversion into Marsh River basin.

[e] From measurement of discharge.

[f] Backwater from Red River of the North.



**05064000 WILD RICE RIVER AT HENDRUM, MN—Continued**

## WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--
WATER TEMPERATURES: July to August 2006.
SPECIFIC CONDUCTANCE: July to August 2006.
pH: July to August 2006.
DISSOLVED OXYGEN: July to August 2006.
DISSOLVED OXYGEN, % OF SATURATION: July to August 2006.

REMARKS.--This site is part of a sediment study of the Wild Rice River. The objectives of this study are to describe sediment concentration and load as a function of streamflow and season at selected sites in the Wild Rice River Basin. Also to describe the relationship between mean cross-sectional suspended sediment concentrations and point measurements of water transparency.

These sites will be operated for a period of five years to develop sediment-transport curves that can be used to determine long-term sediment transport relative to previous studies. These data also will be used to better understand how suspended sediment concentrations relate to total maximum daily loads (TMDLs) for turbidity along the Wild Rice River.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum, 612 µS/cm, August 8 2006 (maximum recorded, likely higher later in the day); minimum, 544 µS/cm, Aug. 1 2006.
pH: Maximum, 8.5, July 27-30 and Aug. 1, 2006; minimum, 8.3, July 26, 27, Aug. 2, 6, 2006.
WATER TEMPERATURES: Maximum, 30.5 C, July 30 2006; minimum, 22.0 C Aug. 6, 7 2006.
DISSOLVED OXYGEN: Maximum, 9.1 mg/L, July 27 2006; minimum, 6.3 mg/L, July 26 2006.
DISSOLVED OXYGEN, % OF SATURATION: Maximum, 122, July 27, 2006; minimum, 78, July 26, 2006.

**WATER-QUALITY DATA**
**WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009**

Part 1 of 2

| Date | Time | Medium name | Temperature, air, deg C (00020) | Instantaneous discharge, ft³/s (00061) | Specif. conductance, wat unf lab, µS/cm @ 25 degC (90095) | Specific conductance, wat unf µS/cm @ 25 degC (00095) | Temperature, water, deg C (00010) | Transparency wat unf transparency tube, cm (65225) | Turbdty white light, det ang 90+/-30 degrees NTU (63675) | Turbdty white light, det ang 90+/-30 corrctd NTRU (63676) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Oct** | | | | | | | | | | |
| **16...** | 1055 | Surface water | -- | 4,140 | -- | 522 | 10.6 | 8 | 100 | 91 |
| **Feb** | | | | | | | | | | |
| **24...** | 1121 | Surface water | .9 | 211 | -- | 663 | .5 | 55 | 17 | 12 |
| **Mar** | | | | | | | | | | |
| **30...** | 1320 | Surface water | -- | -- | -- | 309 | .2 | 10 | -- | 52 |
| **Apr** | | | | | | | | | | |
| **14...** | 1552 | Surface water | 13.9 | 3,700 | -- | 402 | 8.8 | 14 | 40 | 40 |
| **14...** | 1749 | Surface water | -- | 3,670 | 425 | -- | -- | -- | -- | -- |
| **14...** | 1751 | Surface water | -- | 3,670 | 425 | -- | -- | -- | -- | -- |
| **14...** | 1800 | Surface water | -- | 3,670 | -- | -- | -- | -- | -- | -- |
| **14...** | 1822 | Surface water | -- | 3,660 | -- | -- | -- | -- | -- | -- |
| **14...** | 1836 | Surface water | -- | 3,660 | -- | -- | -- | -- | -- | -- |
| **14...** | 1847 | Surface water | -- | 3,660 | 425 | -- | -- | -- | -- | -- |
| **14...** | 1849 | Surface water | -- | 3,650 | 426 | -- | -- | -- | -- | -- |
| **Jun** | | | | | | | | | | |
| **11...** | 1542 | Surface water | -- | 480 | -- | 545 | 18.6 | 23 | 42 | 32 |
| **Aug** | | | | | | | | | | |
| **05...** | 1322 | Surface water | 32.4 | 87 | -- | 580 | 22.3 | 12 | 69 | 69 |
| **Sep** | | | | | | | | | | |
| **15...** | 1005 | Surface water | -- | -- | -- | 534 | 22.0 | 24 | 33 | 28 |

**05064000 WILD RICE RIVER AT HENDRUM, MN—Continued**

**WATER-QUALITY DATA**
**WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009**

Part 2 of 2

| Date | Sampler type, code (84164) | Suspnd. sedimnt sieve diametr percent <0.0625 mm (70331) | Sus-pended sedi-ment concen-tration mg/L (80154) |
|---|---|---|---|
| **Oct** | | | |
| **16...** | US DH-95 plastic | 95 | 143 |
| **Feb** | | | |
| **24...** | Weighted-bottle | 76 | 29 |
| **Mar** | | | |
| **30...** | Sampler US D-74 | 95 | 64 |
| **Apr** | | | |
| **14...** | Weighted-bottle | -- | -- |
| **14...** | -- | -- | 41 |
| **14...** | -- | -- | 36 |
| **14...** | Sampler US D-74 | 97 | 73 |
| **14...** | Sampler US D-74 | 94 | 48 |
| **14...** | Sampler US D-74 | 82 | 57 |
| **14...** | -- | -- | 39 |
| **14...** | -- | -- | 38 |
| **Jun** | | | |
| **11...** | Weighted-bottle | 95 | 65 |
| **Aug** | | | |
| **05...** | Weighted-bottle | 98 | 98 |
| **Sep** | | | |
| **15...** | Weighted-bottle | 96 | 62 |