Water-Data Report 2008

# 05092000 RED RIVER OF THE NORTH AT DRAYTON, ND

Lower Red Basin
Lower Red Subbasin

LOCATION.--Lat 48°34′20″, long 97°08′50″ referenced to North American Datum of 1927, in SE ¼ SE ¼ SE ¼ sec.24, T.159 N., R.51 W., Pembina County, ND, Hydrologic Unit 09020311, on downstream side of bridge on North Dakota State Highway 66, at the North Dakota-Minnesota border, 1.5 mi northeast of Drayton, and at mile 206.7.

DRAINAGE AREA.--34,800 $mi^2$, approximately, includes 3,800 $mi^2$ in closed basins.

## SURFACE-WATER RECORDS

PERIOD OF RECORD.--DAILY DISCHARGE--April 1936 to June 1937, April 1941 to current year (fragmentary prior to April 1949).

PERIOD OF RECORD.--DAILY GAGE HEIGHT--October 2000 to current year.

REVISED RECORDS.--WSP 1388: 1949-50. WSP 1728: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 755.00 ft above National Geodetic Vertical Datum of 1929 (Minnesota highway benchmark). Prior to November 30, 1954, nonrecording gage at site 1.5 mi upstream at datum 1.59 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 1897 reached a stage of about 41 ft at site and datum in use prior to November 30, 1954.

**05092000 RED RIVER OF THE NORTH AT DRAYTON, ND—Continued**

**DISCHARGE, CUBIC FEET PER SECOND**
**WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008**
**DAILY MEAN VALUES**
[e, estimated]

| Day | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1,050 | 2,070 | e870 | e1,050 | e885 | e802 | e2,660 | 5,290 | 2,840 | 5,180 | 2,290 | 895 |
| 2 | 1,000 | 2,080 | e880 | e1,050 | e870 | e802 | e2,980 | 5,440 | 2,760 | 5,060 | e2,960 | 845 |
| 3 | 1,010 | 2,050 | e900 | e1,050 | e861 | e800 | e3,360 | 5,920 | 2,830 | 4,940 | e2,950 | 960 |
| 4 | 1,000 | 1,970 | e920 | e1,080 | e853 | e795 | e3,800 | 6,680 | 3,060 | 4,730 | 2,570 | 1,050 |
| 5 | 1,070 | 1,890 | e940 | e1,110 | e849 | e790 | e4,600 | 7,410 | 3,220 | 4,340 | 2,250 | 1,150 |
| 6 | 1,140 | 1,880 | e970 | e1,130 | e844 | e760 | e5,600 | 7,980 | 3,360 | 3,920 | 2,000 | 1,590 |
| 7 | 1,130 | 1,860 | e995 | e1,150 | e839 | e758 | e6,600 | 8,490 | 3,520 | 3,740 | 1,780 | 2,050 |
| 8 | 1,130 | 1,790 | e1,000 | e1,160 | e836 | e756 | e7,700 | 8,880 | 3,760 | 3,680 | 1,610 | 2,280 |
| 9 | 1,150 | 1,730 | e1,010 | e1,170 | e830 | e754 | e8,800 | 8,890 | 4,920 | 3,540 | 1,480 | 2,490 |
| 10 | 1,190 | 1,720 | e1,020 | e1,160 | e829 | e752 | e10,500 | 8,390 | 7,370 | 3,310 | 1,380 | 2,480 |
| 11 | 1,170 | 1,680 | e1,050 | e1,150 | e813 | e750 | e12,500 | 7,590 | 9,500 | 3,170 | 1,360 | 2,260 |
| 12 | 1,160 | 1,700 | e1,050 | e1,130 | e805 | e748 | e14,100 | 6,770 | 11,000 | 3,130 | e1,370 | 2,040 |
| 13 | 1,200 | 1,710 | e1,040 | e1,110 | e805 | e746 | e14,500 | 6,130 | 12,200 | 3,140 | e1,530 | 1,950 |
| 14 | 1,260 | 1,700 | e1,040 | e1,090 | e805 | e744 | e13,800 | 5,610 | 13,800 | 3,070 | 1,820 | 3,730 |
| 15 | 1,300 | 1,670 | e1,040 | e1,080 | e805 | e743 | 12,300 | 5,240 | 15,700 | 2,960 | 1,890 | 6,050 |
| 16 | 1,350 | 1,610 | e1,040 | e1,070 | e807 | e750 | 10,500 | 5,000 | 17,400 | 2,880 | 2,330 | 7,240 |
| 17 | 1,390 | 1,640 | e1,040 | e1,050 | e808 | e770 | 9,490 | 4,830 | 18,500 | 2,890 | 3,530 | 7,370 |
| 18 | 1,400 | 1,670 | e1,040 | e1,040 | e815 | e810 | 9,000 | 4,700 | 18,300 | 2,970 | 4,490 | 6,710 |
| 19 | 1,490 | 1,600 | e1,040 | e1,030 | e820 | e850 | 8,840 | 4,530 | 17,400 | 2,930 | 4,980 | 5,560 |
| 20 | 1,590 | 1,560 | e1,040 | e990 | e815 | e910 | 8,710 | 4,410 | 16,000 | 2,850 | 4,900 | 4,480 |
| 21 | 1,650 | 1,510 | e1,050 | e970 | e815 | e985 | 8,390 | 4,260 | 14,500 | 2,730 | 4,370 | 3,700 |
| 22 | 1,690 | 1,340 | e1,050 | e967 | e813 | e1,070 | 7,640 | 4,060 | 12,600 | 2,630 | 3,780 | 3,250 |
| 23 | 1,810 | 1,260 | e1,060 | e950 | e811 | e1,160 | 6,870 | 3,910 | 10,500 | 2,670 | 3,270 | 2,810 |
| 24 | 2,100 | 1,180 | e1,060 | e937 | e809 | e1,290 | 6,230 | 3,770 | 8,940 | 2,670 | 2,820 | 2,410 |
| 25 | 2,260 | 1,170 | e1,060 | e926 | e807 | e1,420 | 5,720 | 3,640 | 7,820 | 2,480 | 2,420 | 2,130 |
| 26 | 2,290 | 1,140 | e1,060 | e916 | e805 | e1,570 | 5,320 | 3,510 | 7,110 | 2,240 | 2,150 | 1,910 |
| 27 | 2,260 | 834 | e1,060 | e904 | e802 | e1,700 | 5,080 | 3,380 | 6,590 | 2,060 | 1,870 | 1,770 |
| 28 | 2,210 | e840 | e1,060 | e900 | e802 | e1,870 | 5,030 | 3,220 | 5,920 | 1,960 | 1,610 | 1,650 |
| 29 | 2,130 | e850 | e1,060 | e910 | e802 | e2,020 | 5,140 | 3,100 | 5,460 | 1,890 | 1,390 | 1,560 |
| 30 | 2,070 | e860 | e1,050 | e920 | --- | e2,200 | 5,250 | 2,990 | 5,250 | 1,940 | 1,210 | 1,530 |
| 31 | 2,040 | --- | e1,050 | e910 | --- | e2,450 | --- | 2,950 | --- | 2,000 | 1,050 | --- |
| Total | 46,690 | 46,564 | 31,545 | 32,060 | 23,860 | 33,325 | 231,010 | 166,970 | 272,130 | 97,700 | 75,410 | 85,900 |
| Mean | 1,506 | 1,552 | 1,018 | 1,034 | 823 | 1,075 | 7,700 | 5,386 | 9,071 | 3,152 | 2,433 | 2,863 |
| Max | 2,290 | 2,080 | 1,060 | 1,170 | 885 | 2,450 | 14,500 | 8,890 | 18,500 | 5,180 | 4,980 | 7,370 |
| Min | 1,000 | 834 | 870 | 900 | 802 | 743 | 2,660 | 2,950 | 2,760 | 1,890 | 1,050 | 845 |
| Ac-ft | 92,610 | 92,360 | 62,570 | 63,590 | 47,330 | 66,100 | 458,200 | 331,200 | 539,800 | 193,800 | 149,600 | 170,400 |

**STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1949 - 2008, BY WATER YEAR (WY)**

| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean | 2,011 | 2,051 | 1,483 | 1,229 | 1,179 | 3,391 | 15,770 | 9,451 | 6,721 | 5,685 | 2,685 | 2,213 |
| Max | 5,194 | 11,840 | 4,168 | 3,356 | 2,873 | 16,290 | 54,710 | 58,890 | 23,420 | 28,240 | 21,580 | 12,140 |
| (WY) | (1995) | (2001) | (1999) | (2006) | (2006) | (1998) | (1997) | (1950) | (1962) | (1975) | (1993) | (1999) |
| Min | 317 | 277 | 149 | 174 | 201 | 280 | 1,275 | 938 | 676 | 348 | 243 | 329 |
| (WY) | (1991) | (1977) | (1977) | (1990) | (1977) | (1962) | (1981) | (1977) | (1977) | (1988) | (1977) | (1988) |

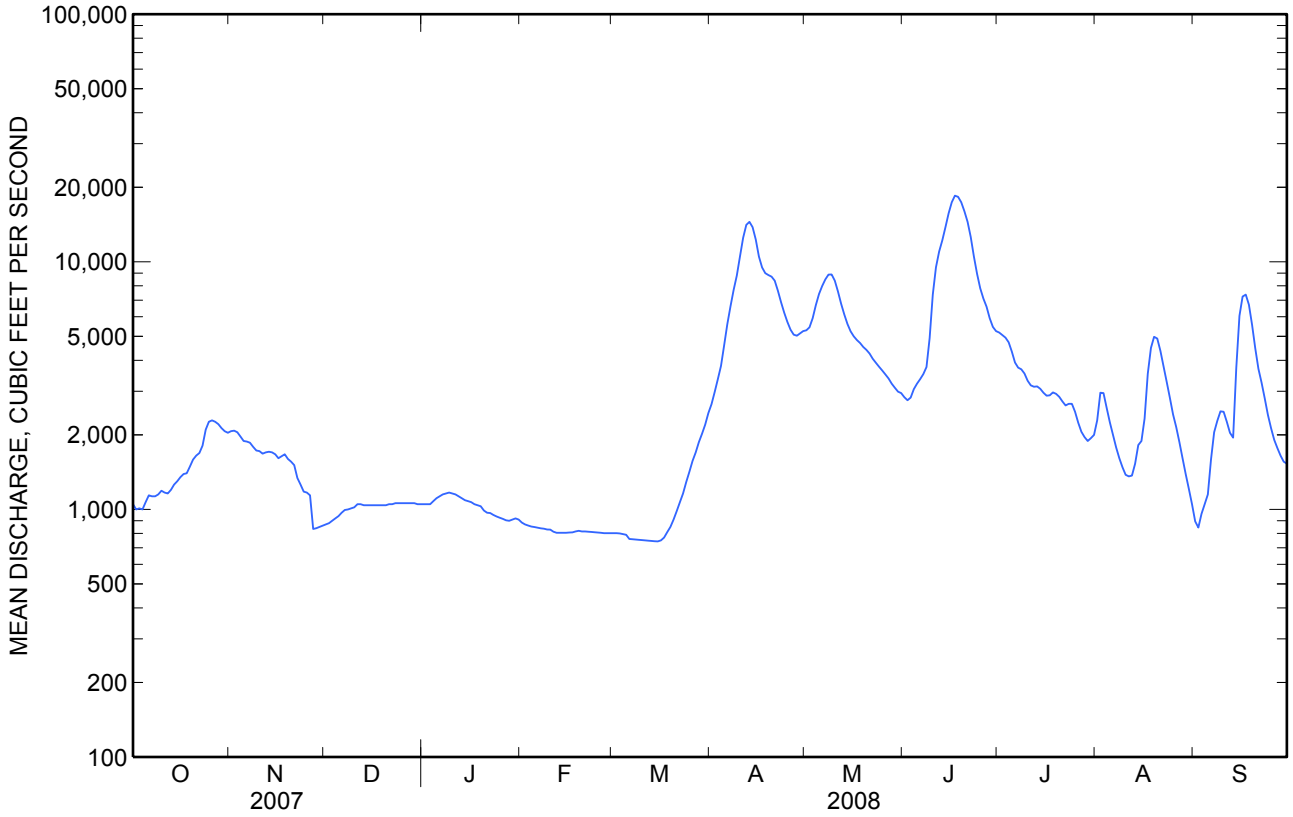
**05092000 RED RIVER OF THE NORTH AT DRAYTON, ND—Continued**

**SUMMARY STATISTICS**

| | Calendar Year 2007 | | Water Year 2008 | | Water Years 1949 - 2008 | |
|---|---|---|---|---|---|---|
| **Annual total** | 2,108,919 | | 1,143,164 | | | |
| **Annual mean** | 5,778 | | 3,123 | | 4,510 | |
| **Highest annual mean** | | | | | 11,280 | 1997 |
| **Lowest annual mean** | | | | | 536 | 1977 |
| **Highest daily mean** | 30,300 | Jun 23 | 18,500 | Jun 17 | 124,000 | Apr 24, 1997 |
| **Lowest daily mean** | 614 | Feb 19 | 743 | Mar 15 | 110 | Dec 23, 1989 |
| **Annual seven-day minimum** | 620 | Feb 14 | 748 | Mar 10 | 118 | Dec 28, 1989 |
| **Maximum peak flow** | | | [a]18,600 | Jun 17 | 124,000 | Apr 24, 1997 |
| **Maximum peak stage** | | | [b]24.99 | Apr 13 | 45.55 | Apr 24, 1997 |
| **Instantaneous low flow** | | | | | 7.7 | Oct 16, 1936 |
| **Annual runoff (ac-ft)** | 4,183,000 | | 2,267,000 | | 3,267,000 | |
| **10 percent exceeds** | 18,000 | | 7,460 | | 10,500 | |
| **50 percent exceeds** | 1,560 | | 1,780 | | 1,980 | |
| **90 percent exceeds** | 743 | | 818 | | 520 | |

[a] Gage height, 23.73 ft.

[b] Backwater from ice.

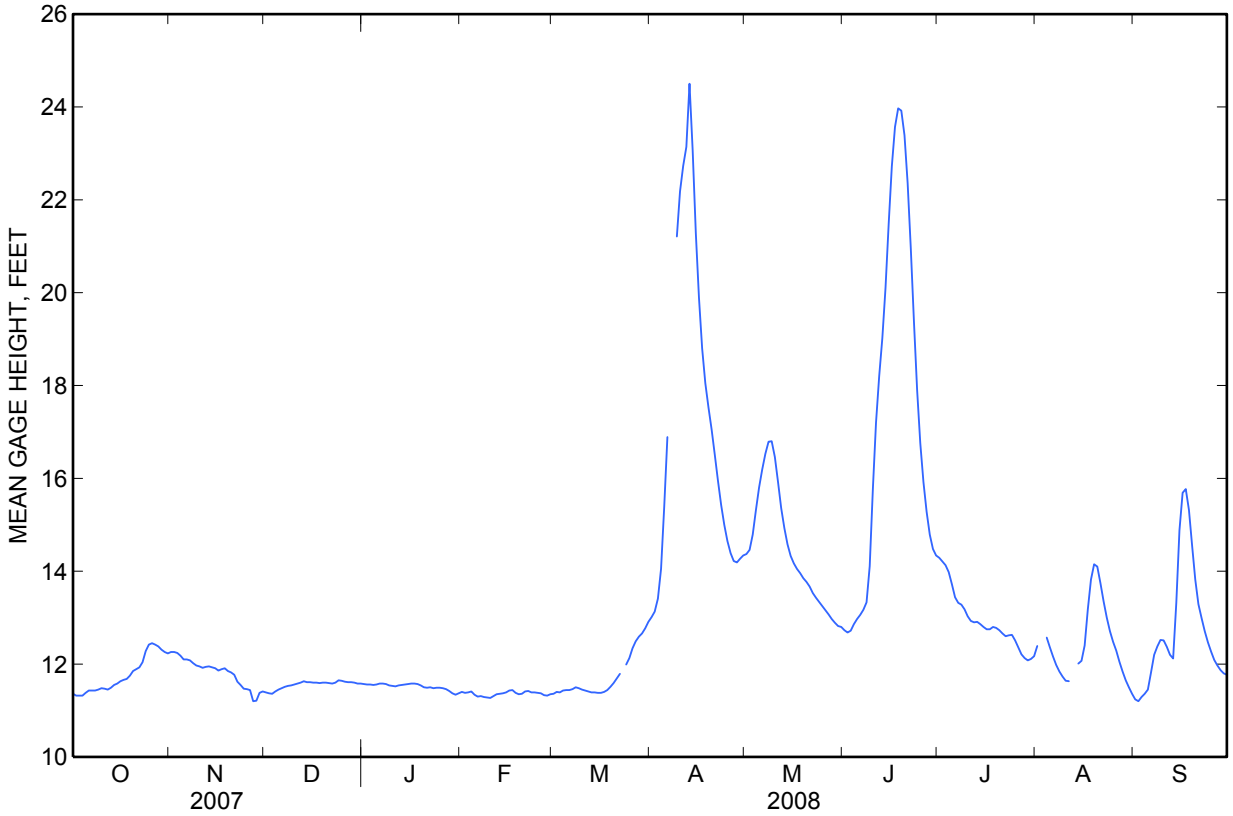


**05092000 RED RIVER OF THE NORTH AT DRAYTON, ND—Continued**

**GAGE HEIGHT, FEET**
**WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008**
**DAILY MEAN VALUES**

| Day | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 11.36 | 12.26 | 11.39 | 11.57 | 11.40 | 11.36 | 13.01 | 14.37 | 12.73 | 14.29 | 12.39 | 11.24 |
| 2 | 11.32 | 12.26 | 11.37 | 11.56 | 11.38 | 11.40 | 13.13 | 14.46 | 12.68 | 14.21 | --- | 11.20 |
| 3 | 11.32 | 12.24 | 11.36 | 11.56 | 11.39 | 11.39 | 13.41 | 14.79 | 12.72 | 14.13 | --- | 11.29 |
| 4 | 11.32 | 12.18 | 11.41 | 11.55 | 11.41 | 11.43 | 14.05 | 15.31 | 12.86 | 13.98 | 12.57 | 11.36 |
| 5 | 11.38 | 12.10 | 11.45 | 11.56 | 11.34 | 11.44 | 15.39 | 15.80 | 12.97 | 13.72 | 12.36 | 11.45 |
| 6 | 11.43 | 12.10 | 11.48 | 11.58 | 11.30 | 11.44 | 16.89 | 16.19 | 13.06 | 13.44 | 12.16 | 11.82 |
| 7 | 11.43 | 12.08 | 11.51 | 11.58 | 11.31 | 11.46 | --- | 16.53 | 13.17 | 13.32 | 11.98 | 12.20 |
| 8 | 11.43 | 12.02 | 11.53 | 11.57 | 11.29 | 11.50 | --- | 16.79 | 13.33 | 13.28 | 11.84 | 12.38 |
| 9 | 11.45 | 11.97 | 11.54 | 11.54 | 11.28 | 11.48 | 21.21 | 16.80 | 14.11 | 13.18 | 11.73 | 12.52 |
| 10 | 11.48 | 11.95 | 11.56 | 11.53 | 11.27 | 11.45 | 22.18 | 16.46 | 15.77 | 13.03 | 11.64 | 12.51 |
| 11 | 11.47 | 11.92 | 11.58 | 11.52 | 11.31 | 11.43 | 22.73 | 15.92 | 17.20 | 12.93 | 11.63 | 12.37 |
| 12 | 11.45 | 11.94 | 11.60 | 11.54 | 11.35 | 11.41 | 23.14 | 15.36 | 18.20 | 12.90 | --- | 12.20 |
| 13 | 11.49 | 11.95 | 11.63 | 11.55 | 11.36 | 11.39 | 24.50 | 14.93 | 19.02 | 12.91 | --- | 12.12 |
| 14 | 11.55 | 11.93 | 11.61 | 11.56 | 11.37 | 11.39 | 23.06 | 14.58 | 20.10 | 12.86 | 12.01 | 13.32 |
| 15 | 11.58 | 11.91 | 11.61 | 11.57 | 11.39 | 11.38 | 21.28 | 14.33 | 21.48 | 12.80 | 12.07 | 14.88 |
| 16 | 11.63 | 11.86 | 11.60 | 11.58 | 11.43 | 11.38 | 19.89 | 14.17 | 22.72 | 12.75 | 12.40 | 15.69 |
| 17 | 11.66 | 11.89 | 11.60 | 11.58 | 11.44 | 11.40 | 18.80 | 14.05 | 23.57 | 12.75 | 13.18 | 15.77 |
| 18 | 11.68 | 11.91 | 11.59 | 11.57 | 11.38 | 11.44 | 18.05 | 13.96 | 23.97 | 12.80 | 13.82 | 15.32 |
| 19 | 11.75 | 11.85 | 11.60 | 11.54 | 11.35 | 11.51 | 17.53 | 13.85 | 23.92 | 12.78 | 14.15 | 14.55 |
| 20 | 11.85 | 11.82 | 11.60 | 11.50 | 11.36 | 11.59 | 17.05 | 13.77 | 23.39 | 12.73 | 14.10 | 13.82 |
| 21 | 11.89 | 11.77 | 11.59 | 11.49 | 11.41 | 11.69 | 16.51 | 13.67 | 22.36 | 12.66 | 13.74 | 13.29 |
| 22 | 11.93 | 11.62 | 11.58 | 11.50 | 11.42 | 11.79 | 15.95 | 13.53 | 20.96 | 12.60 | 13.35 | 12.99 |
| 23 | 12.04 | 11.55 | 11.60 | 11.48 | 11.39 | --- | 15.43 | 13.43 | 19.37 | 12.62 | 13.00 | 12.71 |
| 24 | 12.28 | 11.47 | 11.65 | 11.49 | 11.39 | 11.99 | 15.00 | 13.34 | 17.90 | 12.63 | 12.71 | 12.47 |
| 25 | 12.42 | 11.46 | 11.64 | 11.49 | 11.38 | 12.13 | 14.65 | 13.25 | 16.76 | 12.51 | 12.48 | 12.27 |
| 26 | 12.45 | 11.44 | 11.62 | 11.48 | 11.37 | 12.34 | 14.39 | 13.16 | 15.92 | 12.36 | 12.29 | 12.09 |
| 27 | 12.42 | 11.20 | 11.61 | 11.46 | 11.33 | 12.49 | 14.22 | 13.07 | 15.28 | 12.21 | 12.05 | 11.97 |
| 28 | 12.38 | 11.21 | 11.61 | 11.42 | 11.32 | 12.59 | 14.19 | 12.97 | 14.79 | 12.13 | 11.84 | 11.87 |
| 29 | 12.31 | 11.38 | 11.60 | 11.37 | 11.35 | 12.66 | 14.27 | 12.89 | 14.48 | 12.08 | 11.65 | 11.80 |
| 30 | 12.26 | 11.41 | 11.58 | 11.34 | --- | 12.77 | 14.34 | 12.82 | 14.34 | 12.11 | 11.50 | 11.77 |
| 31 | 12.23 | --- | 11.58 | 11.37 | --- | 12.91 | --- | 12.80 | --- | 12.17 | 11.36 | --- |
| Mean | 11.76 | 11.82 | 11.56 | 11.52 | 11.36 | --- | --- | 14.43 | 17.30 | 12.93 | --- | 12.71 |
| Max | 12.45 | 12.26 | 11.65 | 11.58 | 11.44 | --- | --- | 16.80 | 23.97 | 14.29 | --- | 15.77 |
| Min | 11.32 | 11.20 | 11.36 | 11.34 | 11.27 | --- | --- | 12.80 | 12.68 | 12.08 | --- | 11.20 |

**05092000 RED RIVER OF THE NORTH AT DRAYTON, ND—Continued**



**05092000 RED RIVER OF THE NORTH AT DRAYTON, ND—Continued**

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water year 1972 to current year.

### WATER-QUALITY DATA
### WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Part 1 of 3

[Remark codes: <, less than. Null value qualifier codes: x, result failed quality assurance review.]

| Date | Time | Instantaneous discharge, ft3/s (00061) | pH, water, unfltrd field, std units (00400) | pH, water, unfltrd lab, std units (00403) | Specif. conductance, wat unf lab, µS/cm 25 degC (90095) | Specific conductance, wat unf µS/cm 25 degC (00095) | Temperature, air, deg C (00020) | Temperature, water, deg C (00010) | Hardness, water, mg/L as CaCO3 (00900) | Calcium water, fltrd, mg/L (00915) | Magnesium, water, fltrd, mg/L (00925) | Potassium, water, fltrd, mg/L (00935) | Sodium adsorption ratio (00931) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apr | | | | | | | | | | | | | |
| 16... | 1020 | 10,500 | 8.1 | --x | 645 | 651 | 6.5 | 4.1 | 260 | 57.0 | 27.7 | 6.27 | .9 |
| Aug | | | | | | | | | | | | | |
| 04... | 1035 | 2,570 | 8.1 | 8.3 | 747 | 756 | 20.4 | 23.9 | 290 | 59.6 | 34.5 | 8.62 | .9 |

### WATER-QUALITY DATA
### WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Part 2 of 3

[Remark codes: <, less than. Null value qualifier codes: x, result failed quality assurance review.]

| Date | Sodium fraction of cations percent (00932) | Sodium, water, fltrd, mg/L (00930) | ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410) | Chloride, water, fltrd, mg/L (00940) | Fluoride, water, fltrd, mg/L (00950) | Silica, water, fltrd, mg/L as SiO2 (00955) | Sulfate water, fltrd, mg/L (00945) | Residue water, fltrd, sum of constituents mg/L (70301) | Residue water, dissolved, tons/d (70302) | Aluminum, water, fltrd, µg/L (01106) | Antimony, water, fltrd, µg/L (01095) | Arsenic water, fltrd, µg/L (01000) | Barium, water, fltrd, µg/L (01005) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apr | | | | | | | | | | | | | |
| 16... | 22 | 33.0 | 158 | 40.7 | .16 | 13.7 | 106 | 400 | 10,800 | <50 | <1.00 | 3.5 | 38 |
| Aug | | | | | | | | | | | | | |
| 04... | 20 | 34.7 | 223 | 37.3 | .18 | 15.1 | 123 | 463 | 3,100 | <50 | <1.00 | 6.8 | 56 |

### WATER-QUALITY DATA
### WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Part 3 of 3

[Remark codes: <, less than. Null value qualifier codes: x, result failed quality assurance review.]

| Date | Beryllium, water, fltrd, µg/L (01010) | Boron, water, fltrd, µg/L (01020) | Cadmium water, fltrd, µg/L (01025) | Chromium, water, fltrd, µg/L (01030) | Copper, water, fltrd, µg/L (01040) | Iron, water, fltrd, µg/L (01046) | Lead, water, fltrd, µg/L (01049) | Manganese, water, fltrd, µg/L (01056) | Nickel, water, fltrd, µg/L (01065) | Selenium, water, fltrd, µg/L (01145) | Silver, water, fltrd, µg/L (01075) | Thallium, water, fltrd, µg/L (01057) | Zinc, water, fltrd, µg/L (01090) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Apr | | | | | | | | | | | | | |
| 16... | <1.00 | 57 | <1.00 | 1.8 | 2.4 | <50 | <1.00 | <10.0 | 3.1 | 1.2 | <1.0 | <1.00 | <1.0 |
| Aug | | | | | | | | | | | | | |
| 04... | <1.00 | 89 | <1.00 | <1.0 | 2.1 | <50 | <1.00 | <10.0 | 4.6 | 1.5 | <1.0 | <1.00 | <1.0 |