

September 17, 2019

North Dakota Department of Environmental Quality
Division of Water Quality
918 East Divide Avenue
Bismarck, ND 58501-1947

Re: August 2019 Devils Lake Outlets Monthly Discharge and Water Quality Report

Division of Water Quality:

The monthly discharge report for the Devils Lake Outlets for the month of August 2019 is enclosed. The West Outlet operated at an average rate of 187 cubic feet per second (cfs) for the month of August and was shut down between August 22nd and 25th. The East Outlet operation was similar with an average discharge rate of 77 cfs for the month. A total of 16,228 acre-feet were discharged in August which brings the 2019 discharge total to 50,864 acre-feet. Outlet discharge has been slightly reduced as the Devils Lake water surface elevation has slowly approached the 1,448.0-foot target elevation that was recommended by the Devils Lake Outlet Management Advisory Committee in May 2019.

The attached tables contain average daily outlet discharges and water quality results from samples collected from the outlets and the corresponding upstream and downstream locations. Also included are average daily stream flow data and conductivity data obtained from the USGS gaging stations located upstream and downstream of the outlets.

If you have any questions, please contact me at (701) 328-4948.

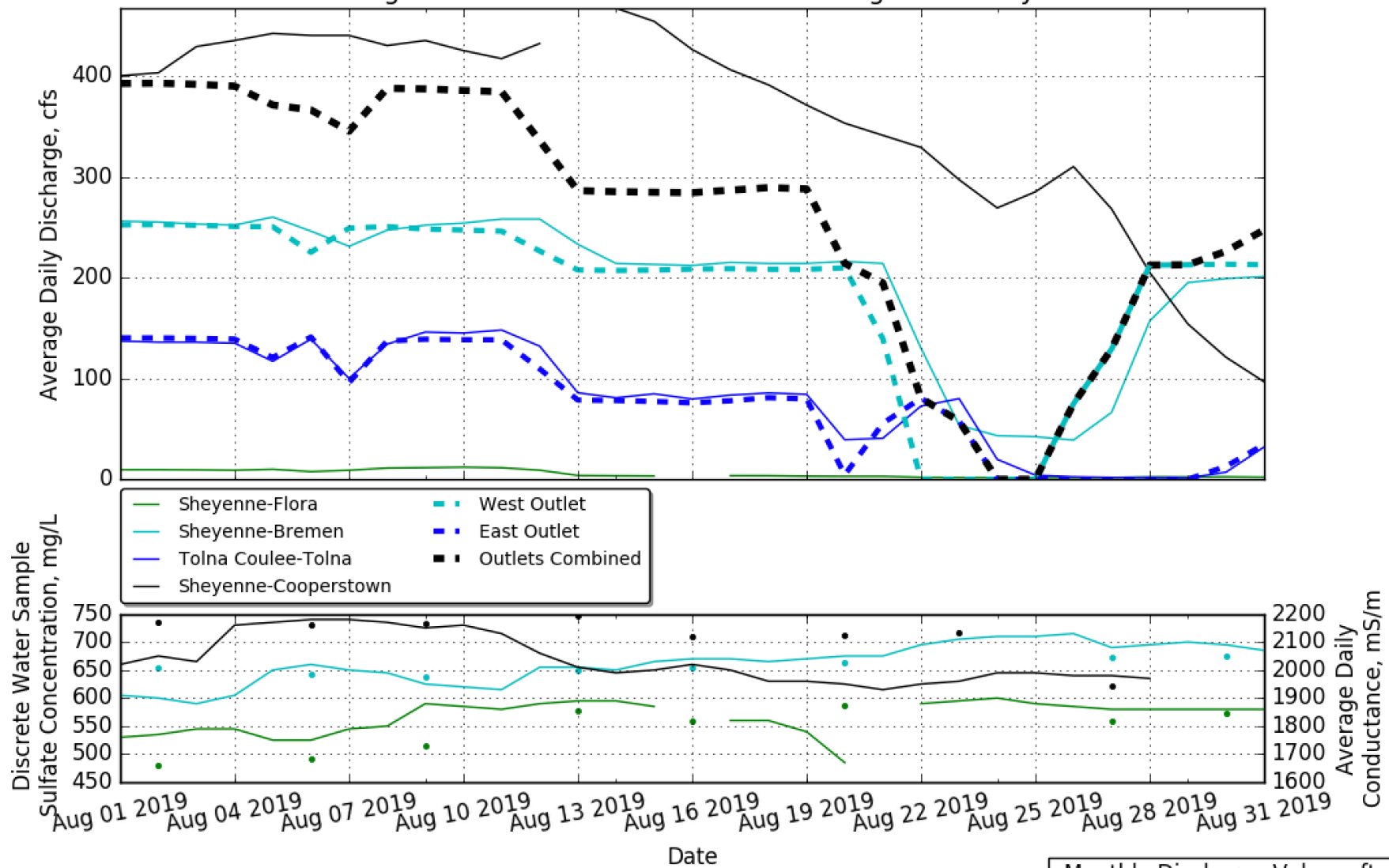
Sincerely,



Jonathan Kelsch P.E.
Director of Water Development

JK:TD/416-10
Enclosure

August 2019 Devils Lake Outlet Discharge Summary



| Sulfate | | Conductance | |
|---------|--------|-------------|-------------|
| • | Flora | — | Flora |
| • | Bremen | — | Bremen |
| • | Pekin | — | Cooperstown |

| | Monthly Discharge Vol., ac-ft |
|-----------------|-------------------------------|
| West End Outlet | 11,522 |
| East End Outlet | 4,706 |
| Combined Total | 16,228 |

Figure 1: Devils Lake Outlet Discharge Summary

OUTLET OPERATOR NAME/ADDRESS

NAME: ND State Water Commission
 ADDRESS: 900 E Boulevard Avenue,
 Bismarck ND 58505

MONTHLY DISCHARGE REPORT


LOCATION: WEST END OUTLET

FACILITY: Devils Lake Outlet Project

| MONITORING PERIOD | |
|-------------------|----------|
| START DATE | END DATE |
| 8/1/19 | 8/31/19 |

LOCATION: Benson Co, ND

Devils Lake West Outlet discharged 11,522 ac-ft over 27 Days

| PARAMETER | MINIMUM | MAXIMUM | AVERAGE | UNITS | SAMPLING FREQUENCY | TYPE |
|--|---|---------|---------|---------|--------------------|----------|
| pH | 8.75 | 8.92 | 8.81 | SU | 2 x Week | GRAB |
| SULFATE | 643 | 666 | 655 | mg/L | 2 x Week | GRAB |
| 7 DAY AVERAGE OF SULFATE | 645 | 663 | 655 | mg/L | Average | GRAB |
| OUTLET DISCHARGE | 0 | 253 | 187 | cfs | Continuous | Recorder |
| SIGNATURE |  | | | 9/17/19 | 701-328-4948 | |
| NAME AND TITLE | JONATHAN KELSCH, DIRECTOR, WATER DEVELOPMENT DIVISION | | | DATE | TELEPHONE NUMBER | |
| COMMENT AND EXPLANATION OF ANY VIOLATIONS | | | | | | |
| A summary of individual sample results and flow data for both outlets, and upstream & downstream monitoring locations is attached. | | | | | | |

Notes:

- ac-ft - Acre feet
- SU - Standard Units
- µS/cm - Microsiemens per Centimeter at 25 degrees Celsius
- mg/L - Milligrams per liter or parts per million
- cfs - Cubic feet per second
- NA - Not available

OUTLET OPERATOR NAME/ADDRESS

NAME: ND State Water Commission
 ADDRESS: 900 E Boulevard Avenue,
 Bismarck ND 58505

MONTHLY DISCHARGE REPORT


LOCATION: EAST END OUTLET

FACILITY: Devils Lake Outlet Project

| MONITORING PERIOD | |
|-------------------|----------|
| START DATE | END DATE |
| 8/1/19 | 8/31/19 |

LOCATION: Ramsey, Benson, Nelson, ND

Devils Lake East Outlet discharged 4,706 ac-ft over 25 Days

| PARAMETER | MINIMUM | MAXIMUM | AVERAGE | UNITS | SAMPLING FREQUENCY | TYPE |
|--------------------------|---|---------|---------|---------|--------------------|----------|
| pH | 8.57 | 8.76 | 8.68 | SU | 2 x Week | GRAB |
| SPECIFIC CONDUCTANCE | 2880 | 2970 | 2916 | µS/cm | Continuous | Recorder |
| SULFATE | 1010 | 1060 | 1025 | mg/L | 2 x Week | GRAB |
| 7 DAY AVERAGE OF SULFATE | 1010 | 1040 | 1021 | mg/L | Average | GRAB |
| OUTLET DISCHARGE | 0 | 141 | 77 | cfs | Continuous | Recorder |
| SIGNATURE |  | | | 9/17/19 | 701-328-4948 | |
| NAME AND TITLE | JONATHAN KELSCH, DIRECTOR, WATER DEVELOPMENT DIVISION | | | DATE | TELEPHONE NUMBER | |

COMMENT AND EXPLANATION OF ANY VIOLATIONS

A summary of individual sample results and flow data for both outlets, and upstream & downstream monitoring locations is attached.

Notes:

- ac-ft - Acre feet
- SU - Standard Units
- µS/cm - Microsiemens per Centimeter at 25 degrees Celsius
- mg/L - Milligrams per liter or parts per million
- cfs - Cubic feet per second
- NA - Not available

OUTLET OPERATOR NAME/ADDRESS

NAME: ND State Water Commission
 ADDRESS: 900 E Boulevard Avenue,
 Bismarck ND 58505


MONTHLY DISCHARGE REPORT

LOCATION: UPSTREAM OF THE WEST END OUTLET (FLORA)

FACILITY: Devils Lake Outlet Project

| MONITORING PERIOD | |
|-------------------|----------|
| START DATE | END DATE |
| 8/1/19 | 8/31/19 |

LOCATION: Benson Co, ND

| PARAMETER | MINIMUM | MAXIMUM | AVERAGE | UNITS | SAMPLING FREQUENCY | TYPE |
|---|---|---------|---------|---------|--------------------|----------|
| pH | 8.42 | 8.61 | 8.50 | SU | 2 x Week | GRAB |
| SPECIFIC CONDUCTANCE | 1,670 | 1,900 | 1,833 | µS/cm | Continuous | Recorder |
| SULFATE | 479 | 586 | 543 | mg/L | 2 x Week | GRAB |
| 7 DAY AVERAGE OF SULFATE | 467 | 573 | 534 | mg/L | Average | GRAB |
| FLOW, INSTREAM | 2 | 12 | 6 | cfs | Continuous | Recorder |
| SIGNATURE |  | | | 9/17/19 | 701-328-4948 | |
| NAME AND TITLE | JONATHAN KELSCH, DIRECTOR, WATER DEVELOPMENT DIVISION | | | DATE | TELEPHONE NUMBER | |
| COMMENT AND EXPLANATION OF ANY VIOLATIONS | | | | | | |
| A summary of individual sample results and flow data for both outlets, and upstream & downstream monitoring location is attached. | | | | | | |

Notes:

- SU - Standard Units
- µS/cm - Microsiemens per Centimeter at 25 degrees Celsius
- mg/L - Milligrams per liter or parts per million
- cfs - Cubic feet per second
- USGS streamflow and specific conductance data courtesy of the USGS
- USGS data are provisional and subject to revision

OUTLET OPERATOR NAME/ADDRESS

NAME: ND State Water Commission
 ADDRESS: 900 E Boulevard Avenue,
 Bismarck ND 58505


MONTHLY DISCHARGE REPORT

LOCATION: DOWNSTREAM OF THE WEST END OUTLET (BREMEN)
 UPSTREAM OF THE EAST END OUTLET

FACILITY: Devils Lake Outlet Project

| MONITORING PERIOD | |
|-------------------|----------|
| START DATE | END DATE |
| 8/1/19 | 8/31/19 |

LOCATION: Eddy Co, ND

| PARAMETER | MINIMUM | MAXIMUM | AVERAGE | UNITS | SAMPLING FREQUENCY | TYPE |
|--------------------------|---|---------|---------|---------|--------------------|----------|
| pH | 8.55 | 8.92 | 8.76 | SU | 2 x Week | GRAB |
| SPECIFIC CONDUCTANCE | 1,880 | 2,130 | 2,024 | µS/cm | Continuous | Recorder |
| SULFATE | 637 | 674 | 656 | mg/L | 2 x Week | GRAB |
| 7 DAY AVERAGE OF SULFATE | 640 | 673 | 654 | mg/L | Average | GRAB |
| FLOW, INSTREAM | 39 | 260 | 197 | cfs | Continuous | Recorder |
| SIGNATURE |  | | | 9/17/19 | 701-328-4948 | |
| NAME AND TITLE | JONATHAN KELSCH, DIRECTOR, WATER DEVELOPMENT DIVISION | | | DATE | TELEPHONE NUMBER | |

COMMENT AND EXPLANATION OF ANY VIOLATIONS

A summary of individual sample results and flow data for both outlets, and upstream & downstream monitoring locations is attached.

Notes:

- SU - Standard Units
- µS/cm - Microsiemens per Centimeter at 25 degrees Celsius
- mg/L - Milligrams per liter or parts per million
- cfs - Cubic feet per second
- USGS streamflow and specific conductance data courtesy of the USGS
- USGS data are provisional and subject to revision

OUTLET OPERATOR NAME/ADDRESS

NAME: ND State Water Commission
 ADDRESS: 900 E Boulevard Avenue,
 Bismarck ND 58505


MONTHLY DISCHARGE REPORT

LOCATION: DOWNSTREAM OF BOTH OUTLETS (PEKIN)

FACILITY: Devils Lake Outlet Project

| MONITORING PERIOD | |
|-------------------|----------|
| START DATE | END DATE |
| 8/1/19 | 8/31/19 |

LOCATION: Nelson Co, ND

| PARAMETER | MINIMUM | MAXIMUM | AVERAGE | UNITS | SAMPLING FREQUENCY | TYPE |
|--|---|---------|---------|---------|--------------------|----------|
| pH | 8.52 | 8.69 | 8.61 | SU | 2 x Week | GRAB |
| SULFATE | 621 | 748 | 713 | mg/L | 2 x Week | GRAB |
| 7 DAY AVERAGE OF SULFATE | 669 | 741 | 716 | mg/L | Average | GRAB |
| FLOW, INSTREAM | NA | NA | NA | cfs | Continuous | Recorder |
| SIGNATURE |  | | | 9/17/19 | 701-328-4948 | |
| NAME AND TITLE | JONATHAN KELSCH, DIRECTOR, WATER DEVELOPMENT DIVISION | | | DATE | TELEPHONE NUMBER | |
| COMMENT AND EXPLANATION OF ANY VIOLATIONS | | | | | | |
| A summary of individual sample results and flow data for both outlets, and upstream & downstream monitoring locations is attached. | | | | | | |

Notes:

- SU - Standard Units
- µS/cm - Microsiemens per Centimeter at 25 degrees Celsius
- mg/L - Milligrams per liter or parts per million
- cfs - Cubic feet per second
- NA - Not available

OUTLET OPERATOR NAME/ADDRESS

NAME: ND State Water Commission
 ADDRESS: 900 E Boulevard Avenue,
 Bismarck ND 58505


MONTHLY DISCHARGE REPORT

LOCATION: DOWNSTREAM OF BOTH OUTLETS (COOPERSTOWN)

FACILITY: Devils Lake Outlet Project

| MONITORING PERIOD | |
|-------------------|----------|
| START DATE | END DATE |
| 8/1/19 | 8/31/19 |

LOCATION: Griggs Co, ND

| PARAMETER | MINIMUM | MAXIMUM | AVERAGE | UNITS | SAMPLING FREQUENCY | TYPE |
|--|---|---------|---------|---------|--------------------|----------|
| pH | 8.52 | 8.60 | 8.55 | SU | Weekly | GRAB |
| SPECIFIC CONDUCTANCE | 1,930 | 2,180 | 2,039 | µS/cm | Continuous | Recorder |
| SULFATE | 657 | 719 | 683 | mg/L | Weekly | GRAB |
| 7 DAY AVERAGE OF SULFATE | 657 | 719 | 683 | mg/L | Average | GRAB |
| FLOW, INSTREAM | 97 | 467 | 356 | cfs | Continuous | Recorder |
| SIGNATURE |  | | | 9/17/19 | 701-328-4948 | |
| NAME AND TITLE | JONATHAN KELSCH, DIRECTOR, WATER DEVELOPMENT DIVISION | | | DATE | TELEPHONE NUMBER | |
| COMMENT AND EXPLANATION OF ANY VIOLATIONS | | | | | | |
| A summary of individual sample results and flow data for both outlets, and upstream & downstream monitoring locations is attached. | | | | | | |

Notes:

- SU - Standard Units
- µS/cm - Microsiemens per Centimeter at 25 degrees Celsius
- mg/L - Milligrams per liter or parts per million
- cfs - Cubic feet per second
- NA - Not available

Daily Outlet Discharge and Upstream and Downstream Flows Devils Lake Outlets

| Date | Above West End Outlet - Sheyenne River near Flora | | West End Outlet | | Below West End Outlet/Above East End Outlet -Sheyenne River near Bremen | | East End Outlet | | Below East End Outlet - Tolna Coulee near Tolna | | Below East End Outlet - Sheyenne River near Cooperstown | | Sum of Outlets | |
|----------------|---|--|---|--|--|--|---|--|--|--|---|--|---|--|
| | Average Streamflow USGS Gage (cfs) | Average Specific Conductance USGS Gage (µS/cm) | Average Daily Outlet Discharge (cfs) | Total Daily Volume (ft ³) | Average Streamflow USGS Gage (cfs) | Average Specific Conductance USGS Gage (µS/cm) | Average Daily Outlet Discharge (cfs) | Total Daily Volume (ft ³) | Average Streamflow USGS Gage (cfs) | Average Specific Conductance USGS Gage (µS/cm) | Average Streamflow USGS Gage (cfs) | Average Specific Conductance USGS Gage (µS/cm) | Average Daily Outlet Discharge (cfs) | Total Daily Volume (ft ³) |
| 8/1/19 | 10 | 1,760 | 252 | 21,795,000 | 256 | 1,910 | 140 | 12,110,000 | 137 | 2,840 | 400 | 2,020 | 392 | 33,905,000 |
| 8/2/19 | 10 | 1,770 | 253 | 21,821,000 | 255 | 1,900 | 140 | 12,108,000 | 136 | 2,850 | 403 | 2,050 | 393 | 33,929,000 |
| 8/3/19 | 9 | 1,790 | 252 | 21,759,000 | 253 | 1,880 | 140 | 12,072,000 | 136 | - | 429 | 2,030 | 392 | 33,831,000 |
| 8/4/19 | 9 | 1,790 | 251 | 21,658,000 | 252 | 1,910 | 139 | 12,010,000 | 135 | 2,940 | 435 | 2,160 | 390 | 33,668,000 |
| 8/5/19 | 10 | 1,750 | 250 | 21,627,000 | 260 | 2,000 | 121 | 10,431,000 | 117 | 2,920 | 442 | 2,170 | 371 | 32,058,000 |
| 8/6/19 | 8 | 1,750 | 225 | 19,447,000 | 246 | 2,020 | 141 | 12,187,000 | 139 | 2,940 | 440 | 2,180 | 366 | 31,634,000 |
| 8/7/19 | 9 | 1,790 | 249 | 21,513,000 | 231 | 2,000 | 96 | 8,292,000 | 100 | 2,920 | 440 | 2,180 | 345 | 29,805,000 |
| 8/8/19 | 11 | 1,800 | 250 | 21,641,000 | 247 | 1,990 | 137 | 11,850,000 | 134 | - | 430 | 2,170 | 388 | 33,491,000 |
| 8/9/19 | 12 | 1,880 | 248 | 21,436,000 | 252 | 1,950 | 139 | 11,998,000 | 146 | 2,860 | 435 | 2,150 | 387 | 33,434,000 |
| 8/10/19 | 12 | 1,870 | 247 | 21,351,000 | 254 | 1,940 | 138 | 11,953,000 | 145 | - | 425 | 2,160 | 385 | 33,304,000 |
| 8/11/19 | 12 | 1,860 | 246 | 21,252,000 | 258 | 1,930 | 138 | 11,945,000 | 148 | - | 417 | 2,130 | 384 | 33,197,000 |
| 8/12/19 | 9 | 1,880 | 226 | 19,555,000 | 258 | 2,010 | 109 | 9,458,000 | 132 | - | 432 | 2,060 | 336 | 29,013,000 |
| 8/13/19 | 4 | 1,890 | 208 | 17,931,000 | 233 | 2,010 | 79 | 6,789,000 | 86 | - | - | 2,010 | 286 | 24,720,000 |
| 8/14/19 | 4 | 1,890 | 207 | 17,886,000 | 214 | 2,000 | 78 | 6,746,000 | 81 | - | 467 | 1,990 | 285 | 24,632,000 |
| 8/15/19 | 3 | 1,870 | 207 | 17,922,000 | 213 | 2,030 | 77 | 6,665,000 | 85 | - | 454 | 2,000 | 285 | 24,587,000 |
| 8/16/19 | - | - | 208 | 18,000,000 | 212 | 2,040 | 76 | 6,554,000 | 80 | - | 426 | 2,020 | 284 | 24,554,000 |
| 8/17/19 | 4 | 1,820 | 209 | 18,035,000 | 215 | 2,040 | 78 | 6,727,000 | 84 | - | 406 | 2,000 | 287 | 24,762,000 |
| 8/18/19 | 4 | 1,820 | 208 | 17,988,000 | 214 | 2,030 | 81 | 6,992,000 | 86 | 2,910 | 391 | 1,960 | 289 | 24,980,000 |
| 8/19/19 | 3 | 1,780 | 208 | 17,981,000 | 214 | 2,040 | 80 | 6,892,000 | 84 | 2,920 | 371 | 1,960 | 288 | 24,873,000 |
| 8/20/19 | 3 | 1,670 | 210 | 18,109,000 | 216 | 2,050 | 4 | 384,000 | 39 | - | 353 | 1,950 | 214 | 18,493,000 |
| 8/21/19 | 3 | - | 139 | 12,039,000 | 214 | 2,050 | 55 | 4,792,000 | 41 | - | 341 | 1,930 | 195 | 16,831,000 |
| 8/22/19 | 2 | 1,880 | 0 | 0 | 130 | 2,090 | 80 | 6,945,000 | 73 | 2,910 | 329 | 1,950 | 80 | 6,945,000 |
| 8/23/19 | 2 | 1,890 | 0 | 0 | 54 | 2,110 | 58 | 4,998,000 | 80 | 2,960 | 297 | 1,960 | 58 | 4,998,000 |
| 8/24/19 | 2 | 1,900 | 0 | 0 | 43 | 2,120 | 0 | 0 | 20 | 2,950 | 269 | 1,990 | 0 | 0 |
| 8/25/19 | 2 | 1,880 | 0 | 0 | 42 | 2,120 | 0 | 0 | 4 | 2,870 | 285 | 1,990 | 0 | 0 |
| 8/26/19 | 2 | 1,870 | 75 | 6,474,000 | 39 | 2,130 | 0 | 0 | 2 | 2,660 | 310 | 1,980 | 75 | 6,474,000 |
| 8/27/19 | 2 | 1,860 | 129 | 11,162,000 | 66 | 2,080 | 0 | 0 | 2 | 2,620 | 268 | 1,980 | 129 | 11,162,000 |
| 8/28/19 | 2 | 1,860 | 212 | 18,348,000 | 157 | 2,090 | 0 | 0 | 1 | 2,470 | 205 | 1,970 | 212 | 18,348,000 |
| 8/29/19 | 2 | 1,860 | 213 | 18,375,000 | 195 | 2,100 | 0 | 0 | 1 | 2,400 | 154 | - | 213 | 18,375,000 |
| 8/30/19 | 3 | 1,860 | 213 | 18,421,000 | 199 | 2,090 | 13 | 1,109,000 | 7 | 2,330 | 121 | - | 226 | 19,530,000 |
| 8/31/19 | 2 | 1,860 | 213 | 18,378,000 | 201 | 2,070 | 35 | 2,988,000 | 32 | 2,790 | 97 | - | 247 | 21,366,000 |
| Minimum | 2 | 1,670 | 0 | 0 | 39 | 1,880 | 0 | 0 | 1 | 2,330 | 97 | 1,930 | 0 | 0 |
| Maximum | 12 | 1,900 | 253 | 21,821,000 | 260 | 2,130 | 141 | 12,187,000 | 148 | 2,960 | 467 | 2,180 | 393 | 33,929,000 |
| Average | 6 | 1,833 | 187 | 16,190,452 | 197 | 2,024 | 77 | 6,612,742 | 80 | 2,793 | 356 | 2,039 | 264 | 22,803,194 |
| | | | Total (Mgal) | 3,754 | | | | Total (Mgal) | 1,533 | | | | Total (Mgal) | 5,288 |
| | | | Total (Ac-ft) | 11,522 | | | | Total (Ac-ft) | 4,706 | | | | Total (Ac-ft) | 16,228 |

Notes:

- cfs - cubic feet per second
- µS/cm - Microsiemens per Centimeter at 25 degrees Celsius
- ft³ - cubic feet
- Mgal - Millions of Gallons
- Ac ft - Acre Feet
- USGS streamflow and specific conductance data are preliminary and courtesy of the USGS
- NC - Not calculated

**Sheyenne River Upstream of West End Outlet Near Flora
Monthly Water Quality Summary
Devils Lake Outlet Discharge Report**

| Date | Time | Specific Conductance USGS Gage (μ S/cm) | pH | Sulfate (mg/L) | 7 Day Rolling Average of Sulfate (mg/L) | Total Suspended Solids (mg/L) | Number of Samples included in 7- day Average |
|----------------|-------|--|------|-------------------|---|--|--|
| 8/1/19 | - | - | - | - | - | - | - |
| 8/2/19 | 9:40 | 1,760 | 8.58 | 479 | 467 | NA | 2 |
| 8/3/19 | - | - | - | - | - | - | - |
| 8/4/19 | - | - | - | - | - | - | - |
| 8/5/19 | - | - | - | - | - | - | - |
| 8/6/19 | 8:00 | 1,740 | 8.55 | 492 | 486 | NA | 2 |
| 8/7/19 | - | - | - | - | - | - | - |
| 8/8/19 | - | - | - | - | - | - | - |
| 8/9/19 | 10:00 | 1,890 | 8.61 | 516 | 504 | NA | 2 |
| 8/10/19 | - | - | - | - | - | - | - |
| 8/11/19 | - | - | - | - | - | - | - |
| 8/12/19 | - | - | - | - | - | - | - |
| 8/13/19 | 8:10 | 1,890 | 8.42 | 577 | 547 | 49 | 2 |
| 8/14/19 | - | - | - | - | - | - | - |
| 8/15/19 | - | - | - | - | - | - | - |
| 8/16/19 | 8:50 | 1,810 | 8.50 | 560 | 569 | NA | 2 |
| 8/17/19 | - | - | - | - | - | - | - |
| 8/18/19 | - | - | - | - | - | - | - |
| 8/19/19 | - | - | - | - | - | - | - |
| 8/20/19 | 8:15 | 1,750 | 8.43 | 586 | 573 | NA | 2 |
| 8/21/19 | - | - | - | - | - | - | - |
| 8/22/19 | - | - | - | - | - | - | - |
| 8/23/19 | - | - | - | - | - | - | - |
| 8/24/19 | - | - | - | - | - | - | - |
| 8/25/19 | - | - | - | - | - | - | - |
| 8/26/19 | - | - | - | - | - | - | - |
| 8/27/19 | 8:05 | 1,870 | 8.42 | 558 | 558 | NA | 1 |
| 8/28/19 | - | - | - | - | - | - | - |
| 8/29/19 | - | - | - | - | - | - | - |
| 8/30/19 | 8:00 | 1,850 | 8.51 | 574 | 566 | NA | 2 |
| 8/31/19 | - | - | - | - | - | - | - |
| Minimum | | 1,740 | 8.42 | 479 | 467 | 49 | |
| Maximum | | 1,890 | 8.61 | 586 | 573 | 49 | |
| Average | | 1,820 | 8.50 | 543 | 534 | 49 | |

Notes:

- μ S/cm - Microsiemens per Centimeter at 25 degrees Celsius
- mg/L - Milligrams per liter or parts per million
- NA - Not Analyzed
- USGS specific conductance data courtesy of the USGS
- USGS data are provisional and subject to revision
- Italic font denotes preliminary result

**West End Outlet
Monthly Water Quality Summary
Devils Lake Outlet Discharge Report**

| Date | Time | Specific Conductance from Telemetry System (µS/cm) | pH | Sulfate (mg/L) | 7 Day Rolling Average of Sulfate (mg/L) | Total Suspended Solids (mg/L) | Number of Samples included in 7- day Average |
|----------------|-------|--|------|----------------|---|-------------------------------|--|
| 8/1/19 | - | - | - | - | - | - | - |
| 8/2/19 | 10:05 | - | 8.80 | 662 | 656 | NA | 2 |
| 8/3/19 | - | - | - | - | - | - | - |
| 8/4/19 | - | - | - | - | - | - | - |
| 8/5/19 | - | - | - | - | - | - | - |
| 8/6/19 | 8:10 | - | 8.75 | 643 | 653 | NA | 2 |
| 8/7/19 | - | - | - | - | - | - | - |
| 8/8/19 | - | - | - | - | - | - | - |
| 8/9/19 | 10:12 | - | 8.89 | 647 | 645 | NA | 2 |
| 8/10/19 | - | - | - | - | - | - | - |
| 8/11/19 | - | - | - | - | - | - | - |
| 8/12/19 | - | - | - | - | - | - | - |
| 8/13/19 | 8:25 | - | 8.75 | 654 | 651 | 14 | 2 |
| 8/14/19 | - | - | - | - | - | - | - |
| 8/15/19 | - | - | - | - | - | - | - |
| 8/16/19 | 9:00 | - | 8.82 | 666 | 660 | NA | 2 |
| 8/17/19 | - | - | - | - | - | - | - |
| 8/18/19 | - | - | - | - | - | - | - |
| 8/19/19 | - | - | - | - | - | - | - |
| 8/20/19 | 8:25 | - | 8.76 | 650 | 658 | NA | 2 |
| 8/21/19 | - | - | - | - | - | - | - |
| 8/22/19 | - | - | - | - | - | - | - |
| 8/23/19 | - | - | - | - | - | - | - |
| 8/24/19 | - | - | - | - | - | - | - |
| 8/25/19 | - | - | - | - | - | - | - |
| 8/26/19 | - | - | - | - | - | - | - |
| 8/27/19 | - | - | - | - | - | - | - |
| 8/28/19 | - | - | - | - | - | - | - |
| 8/29/19 | - | - | - | - | - | - | - |
| 8/30/19 | 8:15 | - | 8.92 | 663 | 663 | NA | 1 |
| 8/31/19 | - | - | - | - | - | - | - |
| Minimum | | | 8.75 | 643 | 645 | 14 | |
| Maximum | | | 8.92 | 666 | 663 | 14 | |
| Average | | | 8.81 | 655 | 655 | 14 | |

Notes:

mg/L - Milligrams per liter or parts per million
 NA - Not Analyzed
 Italic font denotes preliminary result

Sheyenne River Downstream of West End Outlet/Upstream of East End Outlet (Bremen)
Monthly Water Quality Summary
Devils Lake Outlet Discharge Report

| Date | Time | Specific Conductance USGS Gage (μ S/cm) | pH | Sulfate (mg/L) | 7 Day Rolling Average of Sulfate (mg/L) | Total Suspended Solids (mg/L) | Number of samples included in 7- day Average |
|----------------|------|--|------|-------------------|--|--|--|
| 8/1/19 | - | - | - | - | - | - | - |
| 8/2/19 | 9:10 | 1,900 | 8.76 | 655 | 649 | NA | 2 |
| 8/3/19 | - | - | - | - | - | - | - |
| 8/4/19 | - | - | - | - | - | - | - |
| 8/5/19 | - | - | - | - | - | - | - |
| 8/6/19 | 7:33 | 2,010 | 8.70 | 642 | 649 | NA | 2 |
| 8/7/19 | - | - | - | - | - | - | - |
| 8/8/19 | - | - | - | - | - | - | - |
| 8/9/19 | 9:20 | 1,950 | 8.90 | 637 | 640 | NA | 2 |
| 8/10/19 | - | - | - | - | - | - | - |
| 8/11/19 | - | - | - | - | - | - | - |
| 8/12/19 | - | - | - | - | - | - | - |
| 8/13/19 | 7:42 | 2,010 | 8.74 | 649 | 643 | 32 | 2 |
| 8/14/19 | - | - | - | - | - | - | - |
| 8/15/19 | - | - | - | - | - | - | - |
| 8/16/19 | 8:30 | 2,040 | 8.79 | 653 | 651 | NA | 2 |
| 8/17/19 | - | - | - | - | - | - | - |
| 8/18/19 | - | - | - | - | - | - | - |
| 8/19/19 | - | - | - | - | - | - | - |
| 8/20/19 | 8:00 | 2,050 | 8.73 | 664 | 659 | NA | 2 |
| 8/21/19 | - | - | - | - | - | - | - |
| 8/22/19 | - | - | - | - | - | - | - |
| 8/23/19 | - | - | - | - | - | - | - |
| 8/24/19 | - | - | - | - | - | - | - |
| 8/25/19 | - | - | - | - | - | - | - |
| 8/26/19 | - | - | - | - | - | - | - |
| 8/27/19 | 7:32 | 2,140 | 8.55 | 672 | 672 | NA | 1 |
| 8/28/19 | - | - | - | - | - | - | - |
| 8/29/19 | - | - | - | - | - | - | - |
| 8/30/19 | 7:40 | 2,090 | 8.92 | 674 | 673 | NA | 2 |
| 8/31/19 | - | - | - | - | - | - | - |
| Minimum | | 1,900 | 8.55 | 637 | 640 | 32 | |
| Maximum | | 2,140 | 8.92 | 674 | 673 | 32 | |
| Average | | 2,024 | 8.76 | 656 | 654 | 32 | |

Notes:

μ S/cm - Microsiemens per Centimeter at 25 degrees Celsius
mg/L - Milligrams per liter or parts per million
NA - Not Analyzed
USGS specific conductance data courtesy of the USGS
USGS data are provisional and subject to revision
Italic font denotes preliminary result

**East End Outlet
Monthly Water Quality Summary
Devils Lake Discharge Report**

| Date | Time | Specific Conductance USGS Gage (μ S/cm) | pH | Sulfate (mg/L) | 7 Day Rolling Average of Sulfate (mg/L) | Total Suspended Solids (mg/L) | Number of samples included in 7- day Average |
|----------------|------|--|------|-------------------|--|--|--|
| 8/1/19 | - | - | - | - | - | - | - |
| 8/2/19 | 8:05 | 2880 | 8.76 | 1010 | 1010 | NA | 2 |
| 8/3/19 | - | - | - | - | - | - | - |
| 8/4/19 | - | - | - | - | - | - | - |
| 8/5/19 | - | - | - | - | - | - | - |
| 8/6/19 | 9:25 | 2950 | 8.71 | 1020 | 1015 | NA | 2 |
| 8/7/19 | - | - | - | - | - | - | - |
| 8/8/19 | - | - | - | - | - | - | - |
| 8/9/19 | 7:40 | 2880 | 8.70 | 1010 | 1015 | NA | 2 |
| 8/10/19 | - | - | - | - | - | - | - |
| 8/11/19 | - | - | - | - | - | - | - |
| 8/12/19 | - | - | - | - | - | - | - |
| 8/13/19 | 9:50 | - | 8.57 | 1010 | 1010 | <5 | 2 |
| 8/14/19 | - | - | - | - | - | - | - |
| 8/15/19 | - | - | - | - | - | - | - |
| 8/16/19 | 7:00 | 2900 | 8.61 | 1060 | 1035 | NA | 2 |
| 8/17/19 | - | - | - | - | - | - | - |
| 8/18/19 | - | - | - | - | - | - | - |
| 8/19/19 | - | - | - | - | - | - | - |
| 8/20/19 | - | - | - | - | - | - | - |
| 8/21/19 | - | - | - | - | - | - | - |
| 8/22/19 | - | - | - | - | - | - | - |
| 8/23/19 | 7:30 | 2970 | 8.72 | 1040 | 1040 | NA | 1 |
| 8/24/19 | - | - | - | - | - | - | - |
| 8/25/19 | - | - | - | - | - | - | - |
| 8/26/19 | - | - | - | - | - | - | - |
| 8/27/19 | - | - | - | - | - | - | - |
| 8/28/19 | - | - | - | - | - | - | - |
| 8/29/19 | - | - | - | - | - | - | - |
| 8/30/19 | - | - | - | - | - | - | - |
| 8/31/19 | - | - | - | - | - | - | - |
| Minimum | | 2880 | 8.57 | 1010 | 1010 | <5 | |
| Maximum | | 2970 | 8.76 | 1060 | 1040 | <5 | |
| Average | | 2916 | 8.68 | 1025 | 1021 | <5 | |

Notes:

mg/L - Milligrams per liter or parts per million
 NA - Not Analyzed
 Italic font denotes preliminary result

**Sheyenne River Downstream of Both Outlets near Pekin
Monthly Water Quality Summary
Devils Lake Outlet Discharge Report**

| Date | Time | Specific Conductance Laboratory Analysis (µS/cm) | pH | Sulfate (mg/L) | 7 Day Rolling Average of Sulfate (mg/L) | Total Suspended Solids (mg/L) | Number of samples included in 7- day Average |
|----------------|-------|--|------|----------------|---|-------------------------------|--|
| 8/1/19 | - | - | - | - | - | - | - |
| 8/2/19 | 7:40 | - | 8.63 | 735 | 699 | NA | 2 |
| 8/3/19 | - | - | - | - | - | - | - |
| 8/4/19 | - | - | - | - | - | - | - |
| 8/5/19 | - | - | - | - | - | - | - |
| 8/6/19 | 10:00 | - | 8.59 | 731 | 733 | NA | 2 |
| 8/7/19 | - | - | - | - | - | - | - |
| 8/8/19 | - | - | - | - | - | - | - |
| 8/9/19 | 7:15 | - | 8.65 | 733 | 732 | NA | 2 |
| 8/10/19 | - | - | - | - | - | - | - |
| 8/11/19 | - | - | - | - | - | - | - |
| 8/12/19 | - | - | - | - | - | - | - |
| 8/13/19 | 10:20 | - | 8.56 | 748 | 741 | 42 | 2 |
| 8/14/19 | - | - | - | - | - | - | - |
| 8/15/19 | - | - | - | - | - | - | - |
| 8/16/19 | 7:25 | - | 8.65 | 709 | 729 | NA | 2 |
| 8/17/19 | - | - | - | - | - | - | - |
| 8/18/19 | - | - | - | - | - | - | - |
| 8/19/19 | - | - | - | - | - | - | - |
| 8/20/19 | 9:25 | - | 8.58 | 711 | 710 | NA | 2 |
| 8/21/19 | - | - | - | - | - | - | - |
| 8/22/19 | - | - | - | - | - | - | - |
| 8/23/19 | 7:55 | - | 8.69 | 716 | 714 | NA | 2 |
| 8/24/19 | - | - | - | - | - | - | - |
| 8/25/19 | - | - | - | - | - | - | - |
| 8/26/19 | - | - | - | - | - | - | - |
| 8/27/19 | 9:30 | - | 8.52 | 621 | 669 | NA | 2 |
| 8/28/19 | - | - | - | - | - | - | - |
| 8/29/19 | - | - | - | - | - | - | - |
| 8/30/19 | - | - | - | - | - | - | - |
| 8/31/19 | - | - | - | - | - | - | - |
| Minimum | | | 8.52 | 621 | 669 | 42 | |
| Maximum | | | 8.69 | 748 | 741 | 42 | |
| Average | | | 8.61 | 713 | 716 | 42 | |

Notes:

mg/L - Milligrams per liter or parts per million

NA - Not Analyzed

Italic font denotes preliminary result

Bold font denotes sample sulfate concentration exceeds 750 mg/L

**Sheyenne River Downstream of Both Outlets near Cooperstown
Monthly Water Quality Summary
Devils Lake Outlet Discharge Report**

| Date | Time | Specific Conductance USGS Gage (µS/cm) | pH | Sulfate (mg/L) | 7 Day Rolling Average of Sulfate (mg/L) | Total Suspended Solids (mg/L) | Number of samples included in 7- day Average |
|----------------|-------|--|------|----------------|---|-------------------------------|--|
| 8/1/19 | - | - | - | - | - | - | - |
| 8/2/19 | - | - | - | - | - | - | - |
| 8/3/19 | - | - | - | - | - | - | - |
| 8/4/19 | - | - | - | - | - | - | - |
| 8/5/19 | - | - | - | - | - | - | - |
| 8/6/19 | 10:45 | 2,180 | 8.57 | 719 | 719 | NA | 1 |
| 8/7/19 | - | - | - | - | - | - | - |
| 8/8/19 | - | - | - | - | - | - | - |
| 8/9/19 | - | - | - | - | - | - | - |
| 8/10/19 | - | - | - | - | - | - | - |
| 8/11/19 | - | - | - | - | - | - | - |
| 8/12/19 | - | - | - | - | - | - | - |
| 8/13/19 | 11:10 | 2,010 | 8.52 | 685 | 685 | 96 | 1 |
| 8/14/19 | - | - | - | - | - | - | - |
| 8/15/19 | - | - | - | - | - | - | - |
| 8/16/19 | - | - | - | - | - | - | - |
| 8/17/19 | - | - | - | - | - | - | - |
| 8/18/19 | - | - | - | - | - | - | - |
| 8/19/19 | - | - | - | - | - | - | - |
| 8/20/19 | 10:05 | 1,940 | 8.60 | 669 | 669 | NA | 1 |
| 8/21/19 | - | - | - | - | - | - | - |
| 8/22/19 | - | - | - | - | - | - | - |
| 8/23/19 | - | - | - | - | - | - | - |
| 8/24/19 | - | - | - | - | - | - | - |
| 8/25/19 | - | - | - | - | - | - | - |
| 8/26/19 | - | - | - | - | - | - | - |
| 8/27/19 | 10:20 | 1,980 | 8.52 | 657 | 657 | NA | 1 |
| 8/28/19 | - | - | - | - | - | - | - |
| 8/29/19 | - | - | - | - | - | - | - |
| 8/30/19 | - | - | - | - | - | - | - |
| 8/31/19 | - | - | - | - | - | - | - |
| Minimum | | 1,940 | 8.52 | 657 | 657 | 96 | |
| Maximum | | 2,180 | 8.60 | 719 | 719 | 96 | |
| Average | | 2,028 | 8.55 | 683 | 683 | 96 | |

Notes:

mg/L - Milligrams per liter or parts per million

NA - Not Analyzed

Italic font denotes preliminary result

Bold font denotes sample sulfate concentration exceeds 750 mg/L