

North Dakota State Water Commission

900 EAST BOULEVARD AVENUE, DEPT 770 • BISMARCK, NORTH DAKOTA 58505-0850
(701)-328-2750 • TTY 1-800-366-6888 • FAX (701)-328-3696 • <http://swc.nd.gov>

WATER DEVELOPMENT DIVISION
(701) 328-2752

August 20, 2018

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

RE: July 2018 Devils Lake Outlets Monthly Discharge and Water Quality Report

Division of Water Quality:

Enclosed is the monthly discharge report for the Devils Lake Outlets for the month of July 2018. The West End Outlet discharge varied for the first half of the month because one pump remained off to allow electrical repairs. The outlet was also shut down for two days to allow canal maintenance to be performed. After July 21st, the West Outlet discharged steadily at 250 cfs (**Figure 1**).

The East End Outlet discharged continuously through July with the exception of a temporary power outage on July 4th. Discharge was limited to an average of 135 cfs to prevent exceedances of the downstream water quality limitations. The combined outlet discharge totaled 20,516 acre-feet in July and the 2018 season total discharge was 55,861 ac-ft as of July 31st.

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.
Section Chief of Construction

JK:TD/416-10
Enclosure

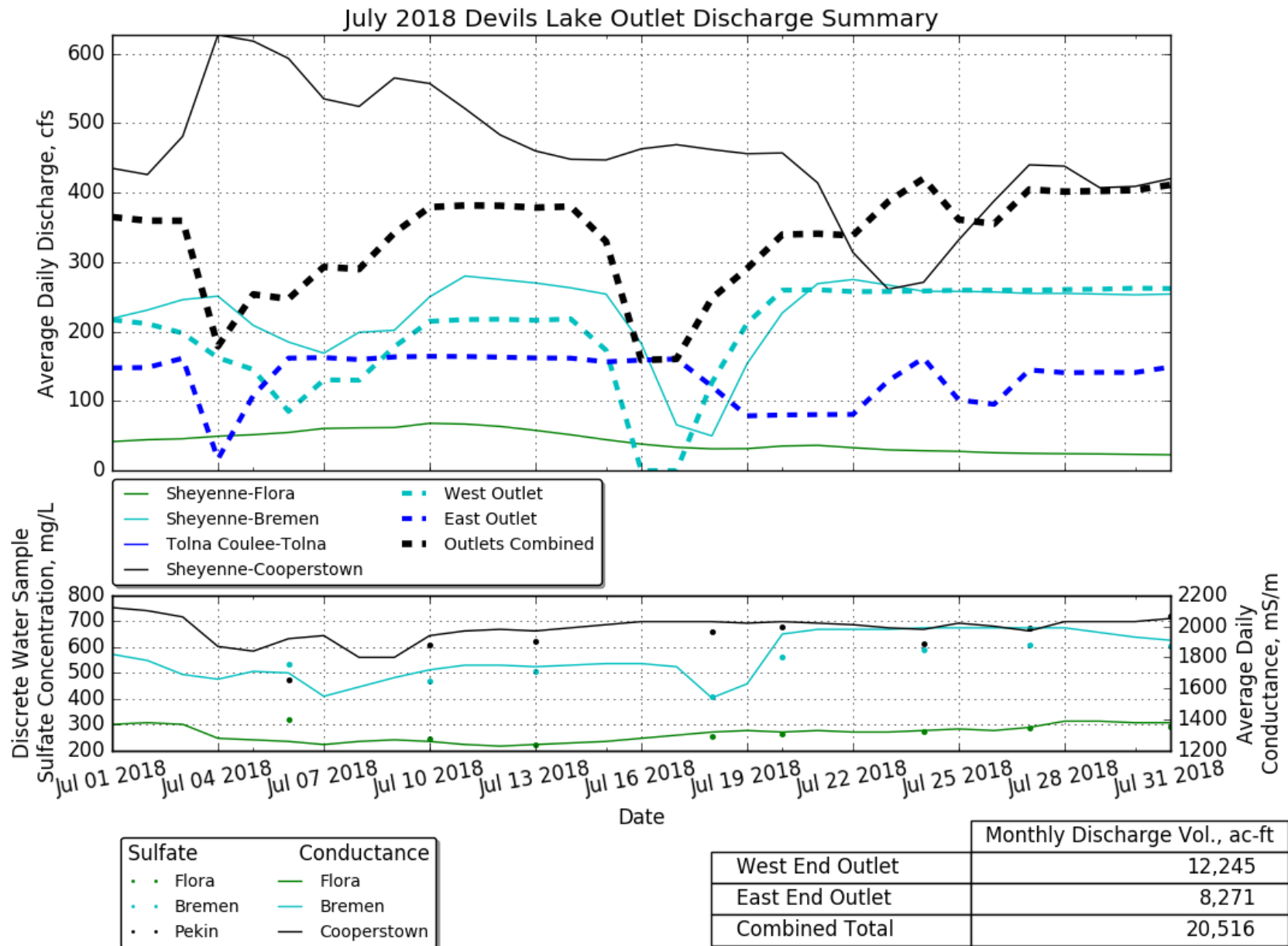


Figure 1: Devils Lake Outlet Discharge Summary

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 |
| 7/1/18 | 7/31/18 |

LOCATION: Benson Co, ND

Devils Lake West Outlet discharged 12,245 ac-ft over 29 Days

| PARAMETER | MINIMUM | MAXIMUM | AVERAGE | UNITS | SAMPLING FREQUENCY | TYPE |
|--------------------------|---|---------|---------|---------|--------------------|----------|
| pH | 8.66 | 8.96 | 8.80 | SU | 2 x Week | GRAB |
| SPECIFIC CONDUCTANCE | NA | NA | NA | µS/cm | Continuous | Recorder |
| SULFATE | 597 | 631 | 616 | mg/L | 2 x Week | GRAB |
| 7 DAY AVERAGE OF SULFATE | 605 | 631 | 616 | mg/L | Average | GRAB |
| OUTLET DISCHARGE | 0 | 262 | 199 | cfs | Continuous | Recorder |
| SIGNATURE |  | | | 8/20/18 | 701-328-4948 | |
| NAME AND TITLE | JONATHAN KELSCH, HEAD, CONSTRUCTION SECTION | | | 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 |
| 7/1/18 | 7/31/18 |

LOCATION: Ramsey, Benson, Nelson, ND

Devils Lake East Outlet discharged 8,271 ac-ft over 31 Days

| PARAMETER | MINIMUM | MAXIMUM | AVERAGE | UNITS | SAMPLING FREQUENCY | TYPE |
|---|---|---------|---------|---------|--------------------|----------|
| pH | 8.68 | 9.02 | 8.75 | SU | 2 x Week | GRAB |
| SPECIFIC CONDUCTANCE | 2810 | 2920 | 2886 | µS/cm | Continuous | Recorder |
| SULFATE | 830 | 981 | 953 | mg/L | 2 x Week | GRAB |
| 7 DAY AVERAGE OF SULFATE | 830 | 979 | 943 | mg/L | Average | GRAB |
| OUTLET DISCHARGE | 17 | 164 | 135 | cfs | Continuous | Recorder |
| SIGNATURE |  JONATHAN KELSCH, HEAD, CONSTRUCTION SECTION | | | 8/20/18 | 701-328-4948 | |
| NAME AND TITLE | | | | 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

LOCATION: Benson Co, ND

| MONITORING PERIOD | |
|-------------------|----------|
| START DATE | END DATE |
| 7/1/18 | 7/31/18 |

| PARAMETER | MINIMUM | MAXIMUM | AVERAGE | UNITS | SAMPLING FREQUENCY | TYPE |
|---|---|---------|---------|---------|--------------------|----------|
| pH | 8.20 | 8.62 | 8.37 | SU | 2 x Week | GRAB |
| SPECIFIC CONDUCTANCE | 1,230 | 1,390 | 1,309 | µS/cm | Continuous | Recorder |
| SULFATE | 224 | 319 | 270 | mg/L | 2 x Week | GRAB |
| 7 DAY AVERAGE OF SULFATE | 236 | 319 | 271 | mg/L | Average | GRAB |
| FLOW, INSTREAM | 23 | 68 | 42 | cfs | Continuous | Recorder |
| SIGNATURE |  | | | 8/20/18 | 701-328-4948 | |
| NAME AND TITLE | JONATHAN KELSCH, HEAD, CONSTRUCTION SECTION | | | 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 |
| 7/1/18 | 7/31/18 |

LOCATION: Eddy Co, ND

| PARAMETER | MINIMUM | MAXIMUM | AVERAGE | UNITS | SAMPLING FREQUENCY | TYPE |
|--------------------------|---|---------|---------|---------|--------------------|----------|
| pH | 8.37 | 9.00 | 8.72 | SU | 2 x Week | GRAB |
| SPECIFIC CONDUCTANCE | 1,540 | 1,990 | 1,805 | µS/cm | Continuous | Recorder |
| SULFATE | 409 | 608 | 535 | mg/L | 2 x Week | GRAB |
| 7 DAY AVERAGE OF SULFATE | 459 | 606 | 523 | mg/L | Average | GRAB |
| FLOW, INSTREAM | 50 | 280 | 227 | cfs | Continuous | Recorder |
| SIGNATURE |  JONATHAN KELSCH, HEAD, CONSTRUCTION SECTION | | | 8/20/18 | 701-328-4948 | |
| NAME AND TITLE | | | | 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 |
| 7/1/18 | 7/31/18 |

LOCATION: Nelson Co, ND

| PARAMETER | MINIMUM | MAXIMUM | AVERAGE | UNITS | SAMPLING FREQUENCY | TYPE |
|--------------------------|---|---------|---------|---------|--------------------|----------|
| pH | 8.50 | 8.92 | 8.67 | SU | 2 x Week | GRAB |
| SPECIFIC CONDUCTANCE | NA | NA | NA | µS/cm | Continuous | Recorder |
| SULFATE | 475 | 719 | 630 | mg/L | 2 x Week | GRAB |
| 7 DAY AVERAGE OF SULFATE | 475 | 695 | 616 | mg/L | Average | GRAB |
| FLOW, INSTREAM | NA | NA | NA | cfs | Continuous | Recorder |
| SIGNATURE |  JONATHAN KELSCH, HEAD, CONSTRUCTION SECTION | | | 8/20/18 | 701-328-4948 | |
| NAME AND TITLE | | | | 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

LOCATION: Griggs Co, ND

| MONITORING PERIOD | |
|-------------------|----------|
| START DATE | END DATE |
| 7/1/18 | 7/31/18 |

| PARAMETER | MINIMUM | MAXIMUM | AVERAGE | UNITS | SAMPLING FREQUENCY | TYPE |
|--|---|---------|---------|---------|--------------------|----------|
| pH | 8.44 | 8.65 | 8.55 | SU | Weekly | GRAB |
| SPECIFIC CONDUCTANCE | 1,800 | 2,120 | 1,986 | µS/cm | Continuous | Recorder |
| SULFATE | 563 | 645 | 612 | mg/L | Weekly | GRAB |
| 7 DAY AVERAGE OF SULFATE | 563 | 645 | 613 | mg/L | Average | GRAB |
| FLOW, INSTREAM | 261 | 627 | 456 | cfs | Continuous | Recorder |
| SIGNATURE |  | | | 8/20/18 | 701-328-4948 | |
| NAME AND TITLE | JONATHAN KELSCH, HEAD, CONSTRUCTION SECTION | | | 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) |
| 7/1/18 | 42 | 1,370 | 217 | 18,752,000 | 219 | 1,820 | 148 | 12,770,000 | - | 2,900 | 435 | 2,120 | 365 | 31,522,000 |
| 7/2/18 | 45 | 1,380 | 211 | 18,261,000 | 231 | 1,780 | 148 | 12,815,000 | - | 2,890 | 426 | 2,100 | 360 | 31,076,000 |
| 7/3/18 | 46 | 1,370 | 198 | 17,087,000 | 246 | 1,690 | 162 | 13,972,000 | - | 2,790 | 481 | 2,060 | 359 | 31,059,000 |
| 7/4/18 | 50 | 1,280 | 162 | 14,030,000 | 251 | 1,660 | 17 | 1,436,000 | - | 2,510 | 627 | 1,870 | 179 | 15,466,000 |
| 7/5/18 | 52 | 1,270 | 146 | 12,572,000 | 209 | 1,710 | 108 | 9,338,000 | - | - | 618 | 1,840 | 254 | 21,910,000 |
| 7/6/18 | 55 | 1,260 | 85 | 7,375,000 | 185 | 1,700 | 162 | 13,981,000 | - | - | 593 | 1,920 | 247 | 21,356,000 |
| 7/7/18 | 61 | 1,240 | 131 | 11,278,000 | 169 | 1,550 | 163 | 14,048,000 | - | 2,870 | 535 | 1,940 | 293 | 25,326,000 |
| 7/8/18 | 62 | 1,260 | 130 | 11,241,000 | 199 | 1,610 | 160 | 13,813,000 | - | - | 524 | 1,800 | 290 | 25,054,000 |
| 7/9/18 | 62 | 1,270 | 178 | 15,410,000 | 202 | 1,670 | 164 | 14,139,000 | - | - | 565 | 1,800 | 342 | 29,549,000 |
| 7/10/18 | 68 | 1,260 | 215 | 18,557,000 | 250 | 1,720 | 164 | 14,203,000 | - | 2,850 | 557 | 1,940 | 379 | 32,760,000 |
| 7/11/18 | 67 | 1,240 | 217 | 18,779,000 | 280 | 1,750 | 164 | 14,187,000 | - | 2,830 | 521 | 1,970 | 382 | 32,966,000 |
| 7/12/18 | 64 | 1,230 | 218 | 18,822,000 | 275 | 1,750 | 163 | 14,110,000 | - | 2,850 | 483 | 1,980 | 381 | 32,932,000 |
| 7/13/18 | 58 | 1,240 | 216 | 18,691,000 | 270 | 1,740 | 162 | 14,005,000 | - | 2,860 | 460 | 1,970 | 378 | 32,696,000 |
| 7/14/18 | 52 | 1,250 | 218 | 18,861,000 | 263 | 1,750 | 162 | 13,979,000 | - | 2,830 | 448 | 1,990 | 380 | 32,840,000 |
| 7/15/18 | 45 | 1,260 | 173 | 14,976,000 | 254 | 1,760 | 157 | 13,525,000 | - | 2,820 | 447 | 2,010 | 330 | 28,501,000 |
| 7/16/18 | 38 | 1,280 | 0 | 0 | 183 | 1,760 | 159 | 13,741,000 | - | 2,810 | 463 | 2,030 | 159 | 13,741,000 |
| 7/17/18 | 34 | 1,300 | 0 | 0 | 66 | 1,740 | 161 | 13,883,000 | - | 2,810 | 469 | 2,030 | 161 | 13,883,000 |
| 7/18/18 | 31 | 1,320 | 127 | 10,938,000 | 50 | 1,540 | 121 | 10,482,000 | - | 2,830 | 462 | 2,030 | 248 | 21,420,000 |
| 7/19/18 | 32 | 1,330 | 212 | 18,316,000 | 154 | 1,630 | 79 | 6,806,000 | - | 2,880 | 456 | 2,020 | 291 | 25,122,000 |
| 7/20/18 | 35 | 1,320 | 260 | 22,432,000 | 227 | 1,950 | 80 | 6,918,000 | - | 2,900 | 457 | 2,030 | 340 | 29,350,000 |
| 7/21/18 | 36 | 1,330 | 260 | 22,488,000 | 269 | 1,980 | 81 | 6,961,000 | - | 2,910 | 414 | 2,020 | 341 | 29,449,000 |
| 7/22/18 | 33 | 1,320 | 258 | 22,255,000 | 275 | 1,980 | 81 | 6,987,000 | - | 2,890 | 314 | 2,010 | 338 | 29,242,000 |
| 7/23/18 | 30 | 1,320 | 258 | 22,268,000 | 267 | 1,980 | 129 | 11,169,000 | - | 2,900 | 261 | 1,990 | 387 | 33,437,000 |
| 7/24/18 | 29 | 1,330 | 258 | 22,330,000 | 258 | 1,990 | 162 | 13,983,000 | - | 2,900 | 271 | 1,980 | 420 | 36,313,000 |
| 7/25/18 | 28 | 1,340 | 260 | 22,430,000 | 258 | 1,990 | 102 | 8,782,000 | - | 2,900 | 332 | 2,020 | 361 | 31,212,000 |
| 7/26/18 | 26 | 1,330 | 260 | 22,436,000 | 257 | 1,990 | 95 | 8,248,000 | - | 2,900 | 388 | 2,000 | 355 | 30,684,000 |
| 7/27/18 | 25 | 1,350 | 260 | 22,431,000 | 255 | 1,990 | 145 | 12,515,000 | - | 2,890 | 440 | 1,970 | 404 | 34,946,000 |
| 7/28/18 | 24 | 1,390 | 261 | 22,510,000 | 255 | 1,990 | 141 | 12,175,000 | - | 2,860 | 438 | 2,030 | 401 | 34,685,000 |
| 7/29/18 | 24 | 1,390 | 261 | 22,555,000 | 254 | 1,960 | 141 | 12,216,000 | - | 2,870 | 407 | 2,030 | 402 | 34,771,000 |
| 7/30/18 | 23 | 1,380 | 262 | 22,679,000 | 253 | 1,930 | 141 | 12,194,000 | - | 2,890 | 409 | 2,030 | 404 | 34,873,000 |
| 7/31/18 | 23 | 1,380 | 262 | 22,636,000 | 254 | 1,910 | 149 | 12,886,000 | - | - | 420 | 2,050 | 411 | 35,522,000 |
| Minimum | 23 | 1,230 | 0 | 0 | 50 | 1,540 | 17 | 1,436,000 | 0 | 2,510 | 261 | 1,800 | 159 | 13,741,000 |
| Maximum | 68 | 1,390 | 262 | 22,679,000 | 280 | 1,990 | 164 | 14,203,000 | 0 | 2,910 | 627 | 2,120 | 420 | 36,313,000 |
| Average | 42 | 1,309 | 199 | 17,206,323 | 227 | 1,805 | 135 | 11,621,516 | 0 | 2,852 | 456 | 1,986 | 334 | 28,827,839 |
| | | | Total (Mgal) | 3,990 | | | | Total (Mgal) | 2,695 | | | | Total (Mgal) | 6,685 |
| | | | Total (Ac-ft) | 12,245 | | | | Total (Ac-ft) | 8,271 | | | | Total (Ac-ft) | 20,516 |

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 |
|----------------|------|--|------|-------------------|--|--|--|
| 7/1/18 | - | - | - | - | - | - | - |
| 7/2/18 | - | - | - | - | - | - | - |
| 7/3/18 | - | - | - | - | - | - | - |
| 7/4/18 | - | - | - | - | - | - | - |
| 7/5/18 | - | - | - | - | - | - | - |
| 7/6/18 | 8:55 | 1,250 | 8.62 | 319 | 319 | NA | 1 |
| 7/7/18 | - | - | - | - | - | - | - |
| 7/8/18 | - | - | - | - | - | - | - |
| 7/9/18 | - | - | - | - | - | - | - |
| 7/10/18 | 8:05 | 1,260 | 8.23 | 247 | 283 | NA | 2 |
| 7/11/18 | - | - | - | - | - | - | - |
| 7/12/18 | - | - | - | - | - | - | - |
| 7/13/18 | 9:15 | 1,230 | 8.20 | 224 | 236 | NA | 2 |
| 7/14/18 | - | - | - | - | - | - | - |
| 7/15/18 | - | - | - | - | - | - | - |
| 7/16/18 | - | - | - | - | - | - | - |
| 7/17/18 | - | - | - | - | - | - | - |
| 7/18/18 | 7:50 | 1,310 | 8.38 | 254 | 239 | NA | 2 |
| 7/19/18 | - | - | - | - | - | - | - |
| 7/20/18 | 8:30 | 1,310 | 8.33 | 263 | 259 | NA | 2 |
| 7/21/18 | - | - | - | - | - | - | - |
| 7/22/18 | - | - | - | - | - | - | - |
| 7/23/18 | - | - | - | - | - | - | - |
| 7/24/18 | 8:00 | 1,320 | 8.37 | 276 | 264 | 51 | 3 |
| 7/25/18 | - | - | - | - | - | - | - |
| 7/26/18 | - | - | - | - | - | - | - |
| 7/27/18 | 9:30 | 1,330 | 8.37 | 286 | 281 | NA | 2 |
| 7/28/18 | - | - | - | - | - | - | - |
| 7/29/18 | - | - | - | - | - | - | - |
| 7/30/18 | - | - | - | - | - | - | - |
| 7/31/18 | 8:00 | 1,380 | 8.42 | 293 | 290 | NA | 2 |
| Minimum | | 1,230 | 8.20 | 224 | 236 | 51 | |
| Maximum | | 1,380 | 8.62 | 319 | 319 | 51 | |
| Average | | 1,299 | 8.37 | 270 | 271 | 51 | |

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 |
|----------------|------|--|------|----------------|---|-------------------------------|--|
| 7/1/18 | - | - | - | - | - | - | - |
| 7/2/18 | - | - | - | - | - | - | - |
| 7/3/18 | - | - | - | - | - | - | - |
| 7/4/18 | - | - | - | - | - | - | - |
| 7/5/18 | - | - | - | - | - | - | - |
| 7/6/18 | 9:10 | - | 8.96 | 613 | 613 | NA | 1 |
| 7/7/18 | - | - | - | - | - | - | - |
| 7/8/18 | - | - | - | - | - | - | - |
| 7/9/18 | - | - | - | - | - | - | - |
| 7/10/18 | 8:20 | - | 8.66 | 597 | 605 | NA | 2 |
| 7/11/18 | - | - | - | - | - | - | - |
| 7/12/18 | - | - | - | - | - | - | - |
| 7/13/18 | 9:25 | - | 8.76 | 612 | 605 | NA | 2 |
| 7/14/18 | - | - | - | - | - | - | - |
| 7/15/18 | - | - | - | - | - | - | - |
| 7/16/18 | - | - | - | - | - | - | - |
| 7/17/18 | - | - | - | - | - | - | - |
| 7/18/18 | - | - | - | - | - | - | - |
| 7/19/18 | - | - | - | - | - | - | - |
| 7/20/18 | 8:40 | - | 8.85 | 631 | 631 | NA | 1 |
| 7/21/18 | - | - | - | - | - | - | - |
| 7/22/18 | - | - | - | - | - | - | - |
| 7/23/18 | - | - | - | - | - | - | - |
| 7/24/18 | 8:15 | - | 8.70 | 617 | 624 | 31 | 2 |
| 7/25/18 | - | - | - | - | - | - | - |
| 7/26/18 | - | - | - | - | - | - | - |
| 7/27/18 | 9:44 | - | 8.85 | 614 | 616 | NA | 2 |
| 7/28/18 | - | - | - | - | - | - | - |
| 7/29/18 | - | - | - | - | - | - | - |
| 7/30/18 | - | - | - | - | - | - | - |
| 7/31/18 | 8:15 | - | 8.83 | 626 | 620 | NA | 2 |
| Minimum | | NA | 8.66 | 597 | 605 | 31 | |
| Maximum | | NA | 8.96 | 631 | 631 | 31 | |
| Average | | NA | 8.80 | 616 | 616 | 31 | |

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 |
|----------------|------|--|------|-------------------|--|--|--|
| 7/1/18 | - | - | - | - | - | - | - |
| 7/2/18 | - | - | - | - | - | - | - |
| 7/3/18 | - | - | - | - | - | - | - |
| 7/4/18 | - | - | - | - | - | - | - |
| 7/5/18 | - | - | - | - | - | - | - |
| 7/6/18 | 8:20 | 1,690 | 9.00 | 532 | 532 | NA | 1 |
| 7/7/18 | - | - | - | - | - | - | - |
| 7/8/18 | - | - | - | - | - | - | - |
| 7/9/18 | - | - | - | - | - | - | - |
| 7/10/18 | 7:45 | 1,680 | 8.49 | 468 | 500 | NA | 2 |
| 7/11/18 | - | - | - | - | - | - | - |
| 7/12/18 | - | - | - | - | - | - | - |
| 7/13/18 | 8:50 | 1,740 | 8.65 | 508 | 488 | NA | 2 |
| 7/14/18 | - | - | - | - | - | - | - |
| 7/15/18 | - | - | - | - | - | - | - |
| 7/16/18 | - | - | - | - | - | - | - |
| 7/17/18 | - | - | - | - | - | - | - |
| 7/18/18 | 7:25 | 1,600 | 8.37 | 409 | 459 | NA | 2 |
| 7/19/18 | - | - | - | - | - | - | - |
| 7/20/18 | 8:10 | 1,930 | 8.80 | 560 | 485 | NA | 2 |
| 7/21/18 | - | - | - | - | - | - | - |
| 7/22/18 | - | - | - | - | - | - | - |
| 7/23/18 | - | - | - | - | - | - | - |
| 7/24/18 | 7:40 | 1,990 | 8.69 | 589 | 519 | 49 | 3 |
| 7/25/18 | - | - | - | - | - | - | - |
| 7/26/18 | - | - | - | - | - | - | - |
| 7/27/18 | 9:10 | 2,000 | 8.92 | 608 | 599 | NA | 2 |
| 7/28/18 | - | - | - | - | - | - | - |
| 7/29/18 | - | - | - | - | - | - | - |
| 7/30/18 | - | - | - | - | - | - | - |
| 7/31/18 | 7:35 | 1,920 | 8.84 | 604 | 606 | NA | 2 |
| Minimum | | 1,600 | 8.37 | 409 | 459 | 49 | |
| Maximum | | 2,000 | 9.00 | 608 | 606 | 49 | |
| Average | | 1,819 | 8.72 | 535 | 523 | 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



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 |
|----------------|------|--|------|-------------------|--|--|--|
| 7/1/18 | - | - | - | - | - | - | - |
| 7/2/18 | - | - | - | - | - | - | - |
| 7/3/18 | - | - | - | - | - | - | - |
| 7/4/18 | - | - | - | - | - | - | - |
| 7/5/18 | - | - | - | - | - | - | - |
| 7/6/18 | 7:05 | 2900 | 9.02 | 830 | 830 | NA | 1 |
| 7/7/18 | - | - | - | - | - | - | - |
| 7/8/18 | - | - | - | - | - | - | - |
| 7/9/18 | - | - | - | - | - | - | - |
| 7/10/18 | 9:40 | 2860 | 8.69 | 965 | 898 | NA | 2 |
| 7/11/18 | - | - | - | - | - | - | - |
| 7/12/18 | - | - | - | - | - | - | - |
| 7/13/18 | 7:35 | - | 8.72 | 964 | 965 | NA | 2 |
| 7/14/18 | - | - | - | - | - | - | - |
| 7/15/18 | - | - | - | - | - | - | - |
| 7/16/18 | - | - | - | - | - | - | - |
| 7/17/18 | - | - | - | - | - | - | - |
| 7/18/18 | 9:29 | 2810 | 8.68 | 954 | 959 | NA | 2 |
| 7/19/18 | - | - | - | - | - | - | - |
| 7/20/18 | 6:50 | 2920 | 8.70 | 981 | 968 | NA | 2 |
| 7/21/18 | - | - | - | - | - | - | - |
| 7/22/18 | - | - | - | - | - | - | - |
| 7/23/18 | - | - | - | - | - | - | - |
| 7/24/18 | 9:30 | 2900 | 8.73 | 972 | 969 | <5 | 3 |
| 7/25/18 | - | - | - | - | - | - | - |
| 7/26/18 | - | - | - | - | - | - | - |
| 7/27/18 | 7:50 | 2900 | 8.71 | 979 | 976 | NA | 2 |
| 7/28/18 | - | - | - | - | - | - | - |
| 7/29/18 | - | - | - | - | - | - | - |
| 7/30/18 | - | - | - | - | - | - | - |
| 7/31/18 | 9:30 | 2910 | 8.73 | 979 | 979 | NA | 2 |
| Minimum | | 2810 | 8.68 | 830 | 830 | 0 | |
| Maximum | | 2920 | 9.02 | 981 | 979 | 0 | |
| Average | | 2886 | 8.75 | 953 | 943 | <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 |
|----------------|-------|--|------|----------------|---|-------------------------------|--|
| 7/1/18 | - | - | - | - | - | - | - |
| 7/2/18 | - | - | - | - | - | - | - |
| 7/3/18 | - | - | - | - | - | - | - |
| 7/4/18 | - | - | - | - | - | - | - |
| 7/5/18 | - | - | - | - | - | - | - |
| 7/6/18 | 7:30 | - | 8.92 | 475 | 475 | NA | 1 |
| 7/7/18 | - | - | - | - | - | - | - |
| 7/8/18 | - | - | - | - | - | - | - |
| 7/9/18 | - | - | - | - | - | - | - |
| 7/10/18 | 10:20 | - | 8.50 | 606 | 541 | NA | 2 |
| 7/11/18 | - | - | - | - | - | - | - |
| 7/12/18 | - | - | - | - | - | - | - |
| 7/13/18 | 7:55 | - | 8.70 | 620 | 613 | NA | 2 |
| 7/14/18 | - | - | - | - | - | - | - |
| 7/15/18 | - | - | - | - | - | - | - |
| 7/16/18 | - | - | - | - | - | - | - |
| 7/17/18 | - | - | - | - | - | - | - |
| 7/18/18 | 10:00 | - | 8.58 | 659 | 640 | NA | 2 |
| 7/19/18 | - | - | - | - | - | - | - |
| 7/20/18 | 7:10 | - | 8.72 | 678 | 669 | NA | 2 |
| 7/21/18 | - | - | - | - | - | - | - |
| 7/22/18 | - | - | - | - | - | - | - |
| 7/23/18 | - | - | - | - | - | - | - |
| 7/24/18 | 10:00 | - | 8.56 | 614 | 650 | 72 | 3 |
| 7/25/18 | - | - | - | - | - | - | - |
| 7/26/18 | - | - | - | - | - | - | - |
| 7/27/18 | 8:15 | - | 8.65 | 671 | 643 | NA | 2 |
| 7/28/18 | - | - | - | - | - | - | - |
| 7/29/18 | - | - | - | - | - | - | - |
| 7/30/18 | - | - | - | - | - | - | - |
| 7/31/18 | 9:55 | - | 8.69 | 719 | 695 | NA | 2 |
| Minimum | | | 8.50 | 475 | 475 | 72 | |
| Maximum | | | 8.92 | 719 | 695 | 72 | |
| Average | | | 8.67 | 630 | 616 | 72 | |

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 (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 |
|----------------|-------|--|------|-------------------|---|--|--|
| 7/1/18 | - | - | - | - | - | - | - |
| 7/2/18 | - | - | - | - | - | - | - |
| 7/3/18 | - | - | - | - | - | - | - |
| 7/4/18 | - | - | - | - | - | - | - |
| 7/5/18 | - | - | - | - | - | - | - |
| 7/6/18 | - | - | - | - | - | - | - |
| 7/7/18 | - | - | - | - | - | - | - |
| 7/8/18 | - | - | - | - | - | - | - |
| 7/9/18 | - | - | - | - | - | - | - |
| 7/10/18 | 11:05 | 1,780 | 8.44 | 563 | 563 | NA | 1 |
| 7/11/18 | - | - | - | - | - | - | - |
| 7/12/18 | - | - | - | - | - | - | - |
| 7/13/18 | - | - | - | - | - | - | - |
| 7/14/18 | - | - | - | - | - | - | - |
| 7/15/18 | - | - | - | - | - | - | - |
| 7/16/18 | - | - | - | - | - | - | - |
| 7/17/18 | - | - | - | - | - | - | - |
| 7/18/18 | 10:45 | 2,030 | 8.56 | 625 | 625 | NA | 1 |
| 7/19/18 | - | - | - | - | - | - | - |
| 7/20/18 | - | - | - | - | - | - | - |
| 7/21/18 | - | - | - | - | - | - | - |
| 7/22/18 | - | - | - | - | - | - | - |
| 7/23/18 | - | - | - | - | - | - | - |
| 7/24/18 | 10:47 | 1,970 | 8.56 | 613 | 619 | 77 | 2 |
| 7/25/18 | - | - | - | - | - | - | - |
| 7/26/18 | - | - | - | - | - | - | - |
| 7/27/18 | - | - | - | - | - | - | - |
| 7/28/18 | - | - | - | - | - | - | - |
| 7/29/18 | - | - | - | - | - | - | - |
| 7/30/18 | - | - | - | - | - | - | - |
| 7/31/18 | 10:45 | - | 8.65 | 645 | 645 | NA | 1 |
| Minimum | | 1,780 | 8.44 | 563 | 563 | 77 | |
| Maximum | | 2,030 | 8.65 | 645 | 645 | 77 | |
| Average | | 1,927 | 8.55 | 612 | 613 | 77 | |

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

