



North Dakota State Water Commission

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

WATER DEVELOPMENT DIVISION
(701) 328-2752

May 18, 2016

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

RE: April 2016 Devils Lake Outlets Monthly Discharge and Water Quality Report

Dear Division of Water Quality:

Enclosed are the monthly discharge reports for the Devils Lake Outlets for the month of April 2016. The West Outlet began discharging at half capacity on April 18th (**Figure 1**). The East Outlet was not operated in April.

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

April 2016 Devils Lake Outlet Discharge Summary

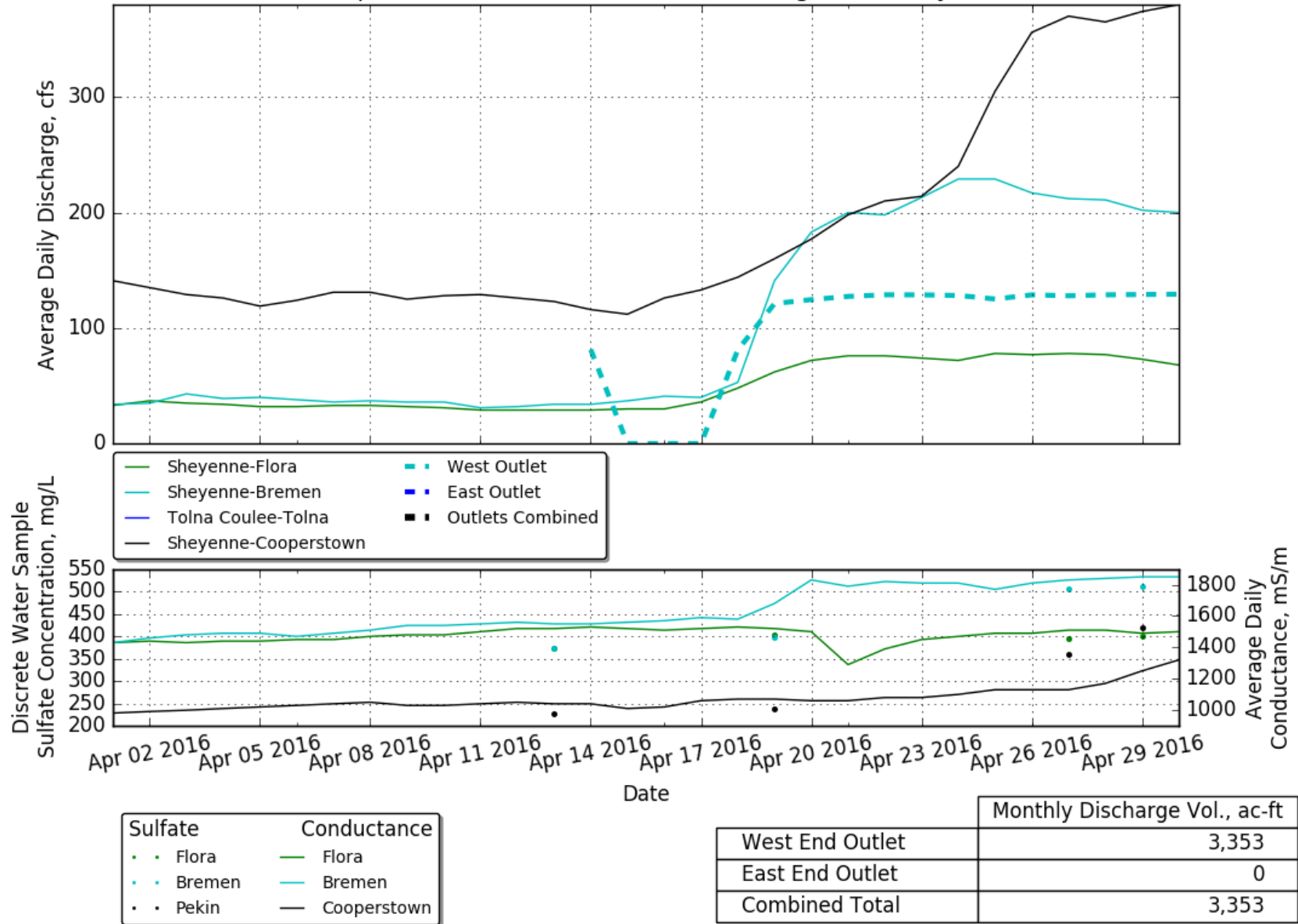


Figure 1: Devils Lake Outlet Discharge Summary

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
4/1/16	4/30/16

LOCATION: Benson Co, ND

Devils Lake West Outlet discharged 3,353 ac-ft over 14 Days

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.49	8.53	8.51	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	NA	NA	NA	µS/cm	Continuous	Recorder
SULFATE	570	593	582	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	570	582	576	mg/L	2 x Week	GRAB
OUTLET DISCHARGE	0	129	99	cfs	Continuous	Recorder
SIGNATURE				5/18/16	701-328-4948	
NAME AND TITLE	JONATHAN KELSCH, HEAD, CONSTRUCTION SECTION			DATE	TELEPHONE NUMBER	
COMMENT AND EXPLANATION OF ANY VIOLATIONS						
Summary of individual sample results and flow data for outlet, upstream & downstream monitoring locations 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
4/1/16	4/30/16

LOCATION: Benson Co, ND

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.40	8.50	8.44	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	1,290	1,530	1,476	µS/cm	Continuous	Recorder
SULFATE	373	402	393	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	373	398	389	mg/L	2 x Week	GRAB
FLOW, INSTREAM	29	78	49	cfs	Continuous	Recorder
SIGNATURE				5/18/16	701-328-4948	
NAME AND TITLE	JONATHAN KELSCH, HEAD, CONSTRUCTION SECTION			DATE	TELEPHONE NUMBER	
COMMENT AND EXPLANATION OF ANY VIOLATIONS						
Summary of individual sample results and flow data for outlet, upstream & downstream monitoring locations 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

LOCATION: Eddy Co, ND

MONITORING PERIOD	
START DATE	END DATE
4/1/16	4/30/16

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.48	8.56	8.52	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	1,430	1,850	1,637	µS/cm	Continuous	Recorder
SULFATE	372	510	446	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	372	508	442	mg/L	2 x Week	GRAB
FLOW, INSTREAM	31	229	104	cfs	Continuous	Recorder
SIGNATURE				5/18/16	701-328-4948	
NAME AND TITLE	JONATHAN KELSCH, HEAD, CONSTRUCTION SECTION			DATE	TELEPHONE NUMBER	
COMMENT AND EXPLANATION OF ANY VIOLATIONS						
Summary of individual sample results and flow data for outlet, upstream & downstream monitoring locations 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 EAST END OUTLET (PEKIN)

FACILITY: Devils Lake Outlet Project

MONITORING PERIOD	
START DATE	END DATE
4/1/16	4/30/16

LOCATION: Nelson Co, ND

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.45	8.48	8.47	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	NA	NA	NA	µS/cm	Continuous	Recorder
SULFATE	228	420	311	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	228	390	302	mg/L	2 x Week	GRAB
FLOW, INSTREAM	NA	NA	NA	cfs	Continuous	Recorder
SIGNATURE				5/18/16	701-328-4948	
NAME AND TITLE	JONATHAN KELSCH, HEAD, CONSTRUCTION SECTION			DATE	TELEPHONE NUMBER	
COMMENT AND EXPLANATION OF ANY VIOLATIONS						
Summary of individual sample results and flow data for outlet, upstream & downstream monitoring locations 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

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 - Toina 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)
4/1/16	33	1,430	-	-	34	1,430	-	-	-	817	141	981	-	-
4/2/16	37	1,440	-	-	35	1,460	-	-	-	800	135	991	-	-
4/3/16	35	1,430	-	-	43	1,480	-	-	-	822	129	999	-	-
4/4/16	34	1,440	-	-	39	1,490	-	-	-	768	126	1,010	-	-
4/5/16	32	1,440	-	-	40	1,490	-	-	-	776	119	1,020	-	-
4/6/16	32	1,450	-	-	38	1,470	-	-	-	793	124	1,030	-	-
4/7/16	33	1,450	-	-	36	1,490	-	-	-	851	131	1,040	-	-
4/8/16	33	1,470	-	-	37	1,510	-	-	-	888	131	1,050	-	-
4/9/16	32	1,480	-	-	36	1,540	-	-	-	806	125	1,030	-	-
4/10/16	31	1,480	-	-	36	1,540	-	-	-	778	128	1,030	-	-
4/11/16	29	1,500	-	-	31	1,550	-	-	-	821	129	1,040	-	-
4/12/16	29	1,520	-	-	32	1,560	-	-	-	841	126	1,050	-	-
4/13/16	29	1,520	-	-	34	1,550	-	-	-	-	123	1,040	-	-
4/14/16	29	1,530	81	7,034,000	34	1,550	-	-	-	771	116	1,040	-	-
4/15/16	30	1,520	0	0	37	1,560	-	-	-	769	112	1,010	-	-
4/16/16	30	1,510	0	0	41	1,570	-	-	-	943	126	1,020	-	-
4/17/16	36	1,520	0	0	40	1,590	-	-	-	911	133	1,060	-	-
4/18/16	48	1,530	81	7,001,823	53	1,580	-	-	-	978	144	1,070	-	-
4/19/16	62	1,520	121	10,472,000	141	1,680	-	-	-	948	160	1,070	-	-
4/20/16	72	1,500	125	10,766,000	183	1,830	-	-	-	1,000	177	1,060	-	-
4/21/16	76	1,290	127	11,006,000	200	1,790	-	-	-	944	198	1,060	-	-
4/22/16	76	1,390	129	11,128,000	198	1,820	-	-	-	1,010	210	1,080	-	-
4/23/16	74	1,450	129	11,122,000	213	1,810	-	-	-	-	214	1,080	-	-
4/24/16	72	1,470	128	11,078,000	229	1,810	-	-	-	932	240	1,100	-	-
4/25/16	78	1,490	125	10,812,000	229	1,770	-	-	-	994	305	1,130	-	-
4/26/16	77	1,490	129	11,123,000	217	1,810	-	-	-	987	356	1,130	-	-
4/27/16	78	1,510	128	11,056,000	212	1,830	-	-	-	946	370	1,130	-	-
4/28/16	77	1,510	129	11,125,000	211	1,840	-	-	-	888	365	1,170	-	-
4/29/16	73	1,490	129	11,150,000	202	1,850	-	-	-	843	374	1,250	-	-
4/30/16	68	1,500	129	11,170,000	200	1,850	-	-	-	836	380	1,320	-	-
Minimum	29	1,290	0	0	31	1,430	0	0	0	768	112	981	0	0
Maximum	78	1,530	129	11,170,000	229	1,850	0	0	0	1,010	380	1,320	0	0
Average	49	1,476	99	8,590,813	104	1,637	0	0	0	874	188	1,070	0	0
			Total (Mgal)	1,092			Total (Mgal)	0					Total (Mgal)	1,092
			Total (Ac-ft)	3,353			Total (Ac-ft)	0					Total (Ac-ft)	3,353

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 (µS/cm)	pH	Sulfate (mg/L)	7 Day Rolling Average of Sulfate (mg/L)	Total Suspended Solids (mg/L)	Total samples included in 7- day average
4/1/16	-	-	-	-	-	-	-
4/2/16	-	-	-	-	-	-	-
4/3/16	-	-	-	-	-	-	-
4/4/16	-	-	-	-	-	-	-
4/5/16	-	-	-	-	-	-	-
4/6/16	-	-	-	-	-	-	-
4/7/16	-	-	-	-	-	-	-
4/8/16	-	-	-	-	-	-	-
4/9/16	-	-	-	-	-	-	-
4/10/16	-	-	-	-	-	-	-
4/11/16	-	-	-	-	-	-	-
4/12/16	-	-	-	-	-	-	-
4/13/16	8:10	1,650	8.50	373	373	31	1
4/14/16	-	-	-	-	-	-	-
4/15/16	-	-	-	-	-	-	-
4/16/16	-	-	-	-	-	-	-
4/17/16	-	-	-	-	-	-	-
4/18/16	-	-	-	-	-	-	-
4/19/16	8:00	1,650	8.45	402	388	42	2
4/20/16	-	-	-	-	-	-	-
4/21/16	-	-	-	-	-	-	-
4/22/16	-	-	-	-	-	-	-
4/23/16	-	-	-	-	-	-	-
4/24/16	-	-	-	-	-	-	-
4/25/16	-	-	-	-	-	-	-
4/26/16	-	-	-	-	-	-	-
4/27/16	8:00	1,510	8.40	396	396	NA	1
4/28/16	-	-	-	-	-	-	-
4/29/16	8:35	1,490	8.42	399	398	NA	2
4/30/16	-	-	-	-	-	-	-
Minimum		1,490	8.40	373	373	31	
Maximum		1,650	8.50	402	398	42	
Average		1,575	8.44	393	389	37	

Notes:

µS/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)	Total samples included in 7- day average
4/1/16	-	-	-	-	-	-	-
4/2/16	-	-	-	-	-	-	-
4/3/16	-	-	-	-	-	-	-
4/4/16	-	-	-	-	-	-	-
4/5/16	-	-	-	-	-	-	-
4/6/16	-	-	-	-	-	-	-
4/7/16	-	-	-	-	-	-	-
4/8/16	-	-	-	-	-	-	-
4/9/16	-	-	-	-	-	-	-
4/10/16	-	-	-	-	-	-	-
4/11/16	-	-	-	-	-	-	-
4/12/16	-	-	-	-	-	-	-
4/13/16	-	-	-	-	-	-	-
4/14/16	-	-	-	-	-	-	-
4/15/16	-	-	-	-	-	-	-
4/16/16	-	-	-	-	-	-	-
4/17/16	-	-	-	-	-	-	-
4/18/16	-	-	-	-	-	-	-
4/19/16	-	-	-	-	-	-	-
4/20/16	-	-	-	-	-	-	-
4/21/16	-	-	-	-	-	-	-
4/22/16	-	-	-	-	-	-	-
4/23/16	-	-	-	-	-	-	-
4/24/16	-	-	-	-	-	-	-
4/25/16	-	-	-	-	-	-	-
4/26/16	-	-	-	-	-	-	-
4/27/16	8:12	-	8.49	570	570	NA	1
4/28/16	-	-	-	-	-	-	-
4/29/16	8:20	-	8.53	593	582	NA	2
4/30/16	-	-	-	-	-	-	-
Minimum		NA	8.49	570	570	0	
Maximum		NA	8.53	593	582	0	
Average		NA	8.51	582	576	NA	

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)	Total samples included in 7- day average
4/1/16	-	-	-	-	-	-	-
4/2/16	-	-	-	-	-	-	-
4/3/16	-	-	-	-	-	-	-
4/4/16	-	-	-	-	-	-	-
4/5/16	-	-	-	-	-	-	-
4/6/16	-	-	-	-	-	-	-
4/7/16	-	-	-	-	-	-	-
4/8/16	-	-	-	-	-	-	-
4/9/16	-	-	-	-	-	-	-
4/10/16	-	-	-	-	-	-	-
4/11/16	-	-	-	-	-	-	-
4/12/16	-	-	-	-	-	-	-
4/13/16	7:40	1,550	8.56	372	372	24	1
4/14/16	-	-	-	-	-	-	-
4/15/16	-	-	-	-	-	-	-
4/16/16	-	-	-	-	-	-	-
4/17/16	-	-	-	-	-	-	-
4/18/16	-	-	-	-	-	-	-
4/19/16	7:30	1,560	8.48	398	385	48	2
4/20/16	-	-	-	-	-	-	-
4/21/16	-	-	-	-	-	-	-
4/22/16	-	-	-	-	-	-	-
4/23/16	-	-	-	-	-	-	-
4/24/16	-	-	-	-	-	-	-
4/25/16	-	-	-	-	-	-	-
4/26/16	-	-	-	-	-	-	-
4/27/16	7:35	1,840	8.50	505	505	NA	1
4/28/16	-	-	-	-	-	-	-
4/29/16	9:10	1,850	8.52	510	508	NA	2
4/30/16	-	-	-	-	-	-	-
Minimum		1,550	8.48	372	372	24	
Maximum		1,850	8.56	510	508	48	
Average		1,700	8.52	446	442	36	

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

**Sheyenne River Downstream of East End Outlet 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)	Total samples included in 7- day average
4/1/16	-	-	-	-	-	-	-
4/2/16	-	-	-	-	-	-	-
4/3/16	-	-	-	-	-	-	-
4/4/16	-	-	-	-	-	-	-
4/5/16	-	-	-	-	-	-	-
4/6/16	-	-	-	-	-	-	-
4/7/16	-	-	-	-	-	-	-
4/8/16	-	-	-	-	-	-	-
4/9/16	-	-	-	-	-	-	-
4/10/16	-	-	-	-	-	-	-
4/11/16	-	-	-	-	-	-	-
4/12/16	-	-	-	-	-	-	-
4/13/16	9:35	-	8.48	228	228	7	1
4/14/16	-	-	-	-	-	-	-
4/15/16	-	-	-	-	-	-	-
4/16/16	-	-	-	-	-	-	-
4/17/16	-	-	-	-	-	-	-
4/18/16	-	-	-	-	-	-	-
4/19/16	9:30	-	8.45	238	233	14	2
4/20/16	-	-	-	-	-	-	-
4/21/16	-	-	-	-	-	-	-
4/22/16	-	-	-	-	-	-	-
4/23/16	-	-	-	-	-	-	-
4/24/16	-	-	-	-	-	-	-
4/25/16	-	-	-	-	-	-	-
4/26/16	-	-	-	-	-	-	-
4/27/16	9:35	-	8.47	359	359	NA	1
4/28/16	-	-	-	-	-	-	-
4/29/16	10:30	-	8.46	420	390	NA	2
4/30/16	-	-	-	-	-	-	-
Minimum		NA	8.45	228	228	7	
Maximum		NA	8.48	420	390	14	
Average		NA	8.47	311	302	11	

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