

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 8, 2015

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

RE: April 2015 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 2015 and summaries of water quality sample results and flow data. The West Outlet began discharging at capacity on April 23 (**Figure 1**). The East Outlet was not operated to allow repairs at Tolna Dam, a downstream dam, to be completed.

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:MW/416-10
Enclosure

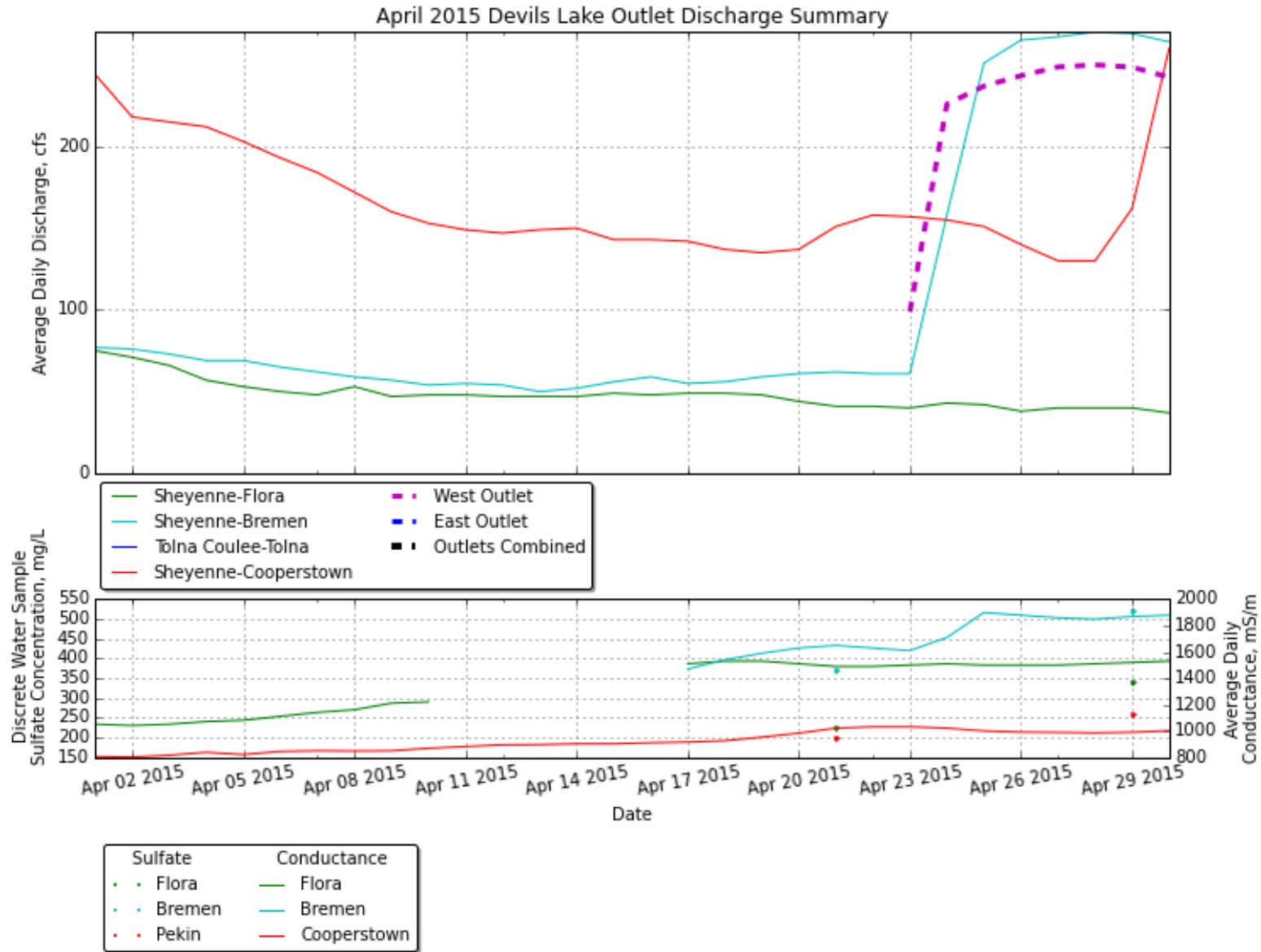


Figure 1: Devils Lake Outlet Discharge Summary

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
4/1/15	4/30/15

LOCATION: Benson Co, ND

Devils Lake West Outlet discharged 3,559 ac-ft over 8 Days

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.55	8.55	8.55	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	NA	NA	NA	µS/cm	Continuous	Recorder
SULFATE	527	527	527	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	527	527	527	mg/L	2 x Week	GRAB
OUTLET DISCHARGE	99	250	224	cfs	Continuous	Recorder
SIGNATURE				5/8/15	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: EAST END OUTLET

FACILITY: Devils Lake Outlet Project

MONITORING PERIOD	
START DATE	END DATE
4/1/15	4/30/15

LOCATION: Ramsey, Benson, Nelson, ND

Devils Lake East Outlet discharged 0 ac-ft over 0 Days

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	-	-	-	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	NA	NA	NA	µS/cm	Continuous	Recorder
SULFATE	-	-	-	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	-	-	-	mg/L	2 x Week	GRAB
OUTLET DISCHARGE	0	0	-	cfs	Continuous	Recorder
SIGNATURE				5/8/15	701-328-4948	
NAME AND TITLE				JONATHAN KELSCH, HEAD, CONSTRUCTION SECTION		

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
4/1/15	4/30/15

LOCATION: Benson Co, ND

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.54	8.58	8.56	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	1,040	1,530	1,344	µS/cm	Continuous	Recorder
SULFATE	224	342	283	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	224	342	283	mg/L	2 x Week	GRAB
FLOW, INSTREAM	37	75	48	cfs	Continuous	Recorder
SIGNATURE				5/8/15	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
4/1/15	4/30/15

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.56	8.66	8.61	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	1,470	1,900	1,719	µS/cm	Continuous	Recorder
SULFATE	373	521	447	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	373	521	447	mg/L	2 x Week	GRAB
FLOW, INSTREAM	50	270	105	cfs	Continuous	Recorder
SIGNATURE				5/8/15	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
4/1/15	4/30/15

LOCATION: Nelson Co, ND

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.46	8.49	8.48	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	NA	NA	NA	µS/cm	Continuous	Recorder
SULFATE	199	261	230	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	199	261	230	mg/L	2 x Week	GRAB
FLOW, INSTREAM	NA	NA	NA	cfs	Continuous	Recorder
SIGNATURE				5/8/15	701-328-4948	
NAME AND TITLE				JONATHAN KELSCH, HEAD, CONSTRUCTION SECTION		
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

**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 (ft³)	Average Streamflow USGS Gage (cfs)	Average Specific Conductance USGS Gage (µS/cm)	Average Daily Outlet Discharge (cfs)	Total Daily Volume (ft³)	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 (ft³)
4/1/15	75	1,050	-	-	77	-	-	-	-	-	244	804	-	-
4/2/15	71	1,040	-	-	76	-	-	-	-	-	218	800	-	-
4/3/15	66	1,050	-	-	73	-	-	-	-	-	215	814	-	-
4/4/15	57	1,070	-	-	69	-	-	-	-	-	212	836	-	-
4/5/15	53	1,080	-	-	69	-	-	-	-	-	203	819	-	-
4/6/15	50	1,110	-	-	65	-	-	-	-	-	193	843	-	-
4/7/15	48	1,140	-	-	62	-	-	-	-	-	184	848	-	-
4/8/15	53	1,160	-	-	59	-	-	-	-	-	172	846	-	-
4/9/15	47	1,210	-	-	57	-	-	-	-	-	160	848	-	-
4/10/15	48	1,220	-	-	54	-	-	-	-	-	153	867	-	-
4/11/15	48	-	-	-	55	-	-	-	-	-	149	880	-	-
4/12/15	47	-	-	-	54	-	-	-	-	-	147	893	-	-
4/13/15	47	-	-	-	50	-	-	-	-	-	149	895	-	-
4/14/15	47	-	-	-	52	-	-	-	-	-	150	901	-	-
4/15/15	49	-	-	-	56	-	-	-	-	-	143	901	-	-
4/16/15	48	-	-	-	59	-	-	-	-	-	143	909	-	-
4/17/15	49	1,510	-	-	55	1,470	-	-	-	-	142	914	-	-
4/18/15	49	1,530	-	-	56	1,540	-	-	-	-	137	924	-	-
4/19/15	48	1,530	-	-	59	1,590	-	-	-	-	135	952	-	-
4/20/15	44	1,510	-	-	61	1,630	-	-	-	-	137	982	-	-
4/21/15	41	1,490	-	-	62	1,650	-	-	-	-	151	1,020	-	-
4/22/15	41	1,490	-	-	61	1,630	-	-	-	-	158	1,030	-	-
4/23/15	40	1,500	99	8,545,000	61	1,610	-	-	-	-	157	1,030	99	8,545,000
4/24/15	43	1,510	226	19,514,000	158	1,710	-	-	-	-	155	1,020	226	19,514,000
4/25/15	42	1,500	237	20,464,000	251	1,900	-	-	-	-	151	999	237	20,464,000
4/26/15	38	1,500	243	21,014,000	265	1,880	-	-	-	-	140	990	243	21,014,000
4/27/15	40	1,500	249	21,481,000	267	1,860	-	-	-	-	130	988	249	21,481,000
4/28/15	40	1,510	250	21,588,000	270	1,850	-	-	-	-	130	984	250	21,588,000
4/29/15	40	1,520	248	21,470,000	269	1,870	-	-	-	-	162	989	248	21,470,000
4/30/15	37	1,530	242	20,935,000	264	1,880	-	-	-	1,090	260	1,000	242	20,935,000
Minimum	37	1,040	99	8,545,000	50	1,470	0	0	0	1,090	130	800	99	8,545,000
Maximum	75	1,530	250	21,588,000	270	1,900	0	0	0	1,090	260	1,030	250	21,588,000
Average	48	1,344	224	19,376,375	105	1,719	-	-	-	1,090	166	918	224	19,376,375
Notes:			Total (Mgal)	1,159			Total (Mgal)	0			Total (Mgal)	1,159		
			Total (Ac-ft)	3,559			Total (Ac-ft)	0			Total (Ac-ft)	3,559		

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)	No. of days included in the 7 day Rolling Average
4/1/15	-	-	-	-	-	-	-
4/2/15	-	-	-	-	-	-	-
4/3/15	-	-	-	-	-	-	-
4/4/15	-	-	-	-	-	-	-
4/5/15	-	-	-	-	-	-	-
4/6/15	-	-	-	-	-	-	-
4/7/15	-	-	-	-	-	-	-
4/8/15	-	-	-	-	-	-	-
4/9/15	-	-	-	-	-	-	-
4/10/15	-	-	-	-	-	-	-
4/11/15	-	-	-	-	-	-	-
4/12/15	-	-	-	-	-	-	-
4/13/15	-	-	-	-	-	-	-
4/14/15	-	-	-	-	-	-	-
4/15/15	-	-	-	-	-	-	-
4/16/15	-	-	-	-	-	-	-
4/17/15	-	-	-	-	-	-	-
4/18/15	-	-	-	-	-	-	-
4/19/15	-	-	-	-	-	-	-
4/20/15	-	-	-	-	-	-	-
4/21/15	8:05	1,490	8.58	224	224	30	7
4/22/15	-	-	-	-	-	-	-
4/23/15	-	-	-	-	-	-	-
4/24/15	-	-	-	-	-	-	-
4/25/15	-	-	-	-	-	-	-
4/26/15	-	-	-	-	-	-	-
4/27/15	-	-	-	-	-	-	-
4/28/15	-	-	-	-	-	-	-
4/29/15	8:14	1,510	8.54	342	342	NA	7
4/30/15	-	-	-	-	-	-	-
Minimum		1,490	8.54	224	224	30	
Maximum		1,510	8.58	342	342	30	
Average		1,500	8.56	283	283	30	

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	pH	Sulfate (mg/L)	7 Day Rolling Average of Sulfate (mg/L)	Total Suspended Solids (mg/L)	No. of days included in the 7 day Rolling Average
4/1/15	-	-	-	-	-	-
4/2/15	-	-	-	-	-	-
4/3/15	-	-	-	-	-	-
4/4/15	-	-	-	-	-	-
4/5/15	-	-	-	-	-	-
4/6/15	-	-	-	-	-	-
4/7/15	-	-	-	-	-	-
4/8/15	-	-	-	-	-	-
4/9/15	-	-	-	-	-	-
4/10/15	-	-	-	-	-	-
4/11/15	-	-	-	-	-	-
4/12/15	-	-	-	-	-	-
4/13/15	-	-	-	-	-	-
4/14/15	-	-	-	-	-	-
4/15/15	-	-	-	-	-	-
4/16/15	-	-	-	-	-	-
4/17/15	-	-	-	-	-	-
4/18/15	-	-	-	-	-	-
4/19/15	-	-	-	-	-	-
4/20/15	-	-	-	-	-	-
4/21/15	-	-	-	-	-	-
4/22/15	-	-	-	-	-	-
4/23/15	-	-	-	-	-	-
4/24/15	-	-	-	-	-	-
4/25/15	-	-	-	-	-	-
4/26/15	-	-	-	-	-	-
4/27/15	-	-	-	-	-	-
4/28/15	-	-	-	-	-	-
4/29/15	8:24	8.55	527	527	NA	7
4/30/15	-	-	-	-	-	-
Minimum		8.55	527	527	0	
Maximum		8.55	527	527	0	
Average		8.55	527	527	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 near Bremen
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)	No. of days included in the 7 day Rolling Average
4/1/15	-	-	-	-	-	-	-
4/2/15	-	-	-	-	-	-	-
4/3/15	-	-	-	-	-	-	-
4/4/15	-	-	-	-	-	-	-
4/5/15	-	-	-	-	-	-	-
4/6/15	-	-	-	-	-	-	-
4/7/15	-	-	-	-	-	-	-
4/8/15	-	-	-	-	-	-	-
4/9/15	-	-	-	-	-	-	-
4/10/15	-	-	-	-	-	-	-
4/11/15	-	-	-	-	-	-	-
4/12/15	-	-	-	-	-	-	-
4/13/15	-	-	-	-	-	-	-
4/14/15	-	-	-	-	-	-	-
4/15/15	-	-	-	-	-	-	-
4/16/15	-	-	-	-	-	-	-
4/17/15	-	-	-	-	-	-	-
4/18/15	-	-	-	-	-	-	-
4/19/15	-	-	-	-	-	-	-
4/20/15	-	-	-	-	-	-	-
4/21/15	7:35	1,650	8.66	373	373	26	7
4/22/15	-	-	-	-	-	-	-
4/23/15	-	-	-	-	-	-	-
4/24/15	-	-	-	-	-	-	-
4/25/15	-	-	-	-	-	-	-
4/26/15	-	-	-	-	-	-	-
4/27/15	-	-	-	-	-	-	-
4/28/15	-	-	-	-	-	-	-
4/29/15	7:40	1,860	8.56	521	521	NA	7
4/30/15	-	-	-	-	-	-	-
Minimum		1,650	8.56	373	373	26	
Maximum		1,860	8.66	521	521	26	
Average		1,755	8.61	447	447	26	

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

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

Date	Time	pH	Sulfate (mg/L)	7 Day Rolling Average of Sulfate (mg/L)	Total Suspended Solids (mg/L)	No. of days included in the 7 day Rolling Average
4/1/15	-	-	-	-	-	-
4/2/15	-	-	-	-	-	-
4/3/15	-	-	-	-	-	-
4/4/15	-	-	-	-	-	-
4/5/15	-	-	-	-	-	-
4/6/15	-	-	-	-	-	-
4/7/15	-	-	-	-	-	-
4/8/15	-	-	-	-	-	-
4/9/15	-	-	-	-	-	-
4/10/15	-	-	-	-	-	-
4/11/15	-	-	-	-	-	-
4/12/15	-	-	-	-	-	-
4/13/15	-	-	-	-	-	-
4/14/15	-	-	-	-	-	-
4/15/15	-	-	-	-	-	-
4/16/15	-	-	-	-	-	-
4/17/15	-	-	-	-	-	-
4/18/15	-	-	-	-	-	-
4/19/15	-	-	-	-	-	-
4/20/15	-	-	-	-	-	-
4/21/15	-	-	-	-	-	-
4/22/15	-	-	-	-	-	-
4/23/15	-	-	-	-	-	-
4/24/15	-	-	-	-	-	-
4/25/15	-	-	-	-	-	-
4/26/15	-	-	-	-	-	-
4/27/15	-	-	-	-	-	-
4/28/15	-	-	-	-	-	-
4/29/15	-	-	-	-	-	-
4/30/15	-	-	-	-	-	-
Minimum		-	-	-	-	
Maximum		-	-	-	-	
Average		-	-	-	-	

Notes:

mg/L - Milligrams per liter or parts per million
 NA - Not Analyzed due to operation constraints
 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	pH	Sulfate (mg/L)	7 Day Rolling Average of Sulfate (mg/L)	Total Suspended Solids (mg/L)	No. of days included in the 7 day Rolling Average
4/1/15	-	-	-	-	-	-
4/2/15	-	-	-	-	-	-
4/3/15	-	-	-	-	-	-
4/4/15	-	-	-	-	-	-
4/5/15	-	-	-	-	-	-
4/6/15	-	-	-	-	-	-
4/7/15	-	-	-	-	-	-
4/8/15	-	-	-	-	-	-
4/9/15	-	-	-	-	-	-
4/10/15	-	-	-	-	-	-
4/11/15	-	-	-	-	-	-
4/12/15	-	-	-	-	-	-
4/13/15	-	-	-	-	-	-
4/14/15	-	-	-	-	-	-
4/15/15	-	-	-	-	-	-
4/16/15	-	-	-	-	-	-
4/17/15	-	-	-	-	-	-
4/18/15	-	-	-	-	-	-
4/19/15	-	-	-	-	-	-
4/20/15	-	-	-	-	-	-
4/21/15	9:35	8.46	<i>199</i>	199	36	7
4/22/15	-	-	-	-	-	-
4/23/15	-	-	-	-	-	-
4/24/15	-	-	-	-	-	-
4/25/15	-	-	-	-	-	-
4/26/15	-	-	-	-	-	-
4/27/15	-	-	-	-	-	-
4/28/15	-	-	-	-	-	-
4/29/15	9:40	8.49	<i>261</i>	261	NA	7
4/30/15	-	-	-	-	-	-
Minimum		8.46	199	199	36	
Maximum		8.49	261	261	36	
Average		8.48	230	230	36	

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