



North Dakota State Water Commission

900 EAST BOULEVARD AVENUE, DEPT 770 • BISMARCK, NORTH DAKOTA 58505-0850
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July 31, 2013

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

RE: June 2013 Devils Lake Outlets Monthly Discharge and Water Quality Report

Enclosed are the monthly discharge reports for the Devils Lake Outlets for the month of June 2013 and summaries of water quality sample results and flow data. The East End Outlet began testing in early June and official operation on June 18th. Flows were limited or suspended due to high flows in the Sheyenne River from spring storms. The West End Outlet was not operated during June.

Because of the intermittent operation of the East End Outlet a water quality sample was not obtained at the East End Outlet sample location. Samples were collected as usual from the downstream monitoring location at Pekin.

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.
Head, Construction Section
JK:MSW:416-10

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
6/1/13	6/30/13

LOCATION: Ramsey, Benson, Nelson, ND

Devils Lake East Outlet discharged 2,328 ac-ft over 30 Days

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	NA	NA	NA	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	NA	NA	NA	µS/cm	Continuous	Recorder
SULFATE	NA	NA	NA	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	NA	NA	NA	mg/L	2 x Week	GRAB
OUTLET DISCHARGE	0	220	39	cfs	Continuous	Recorder
SIGNATURE				7/31/13	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

LOCATION: Benson Co, ND

MONITORING PERIOD	
START DATE	END DATE
6/1/13	6/30/13

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.07	8.24	8.14	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	1,110	1,330	1,214	µS/cm	Continuous	Recorder
SULFATE	314	342	325	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	314	333	323	mg/L	2 x Week	GRAB
FLOW, INSTREAM	354	932	596	cfs	Continuous	Recorder
SIGNATURE				7/31/13	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
6/1/13	6/30/13

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.09	8.20	8.13	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	1,140	1,410	1,275	µS/cm	Continuous	Recorder
SULFATE	310	341	327	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	310	337	322	mg/L	2 x Week	GRAB
FLOW, INSTREAM	392	1060	693	cfs	Continuous	Recorder
SIGNATURE				7/31/13	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
6/1/13	6/30/13

LOCATION: Nelson Co, ND

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.08	8.23	8.12	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	NA	NA	NA	µS/cm	Continuous	Recorder
SULFATE	232	287	271	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	259	284	272	mg/L	2 x Week	GRAB
FLOW, INSTREAM	NA	NA	NA	cfs	Continuous	Recorder
SIGNATURE				7/31/13	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

**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	
	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)
6/1/13	719	1,200	-	-	817	1,230	0	0	6	Ssn	1310	1,060
6/2/13	759	1,160	-	-	882	1,230	0	1,000	1	Ssn	1260	1,090
6/3/13	777	1,150	-	-	917	1,190	0	0	0	Ssn	1200	1,110
6/4/13	779	1,160	-	-	916	1,190	0	1,000	1	Ssn	1160	1,120
6/5/13	862	1,150	-	-	974	1,190	1	112,000	6	Ssn	1120	1,140
6/6/13	932	1,120	-	-	1050	1,160	0	1,000	1	-	1090	1,140
6/7/13	913	1,110	-	-	1060	1,140	0	1,000	0	-	1070	1,170
6/8/13	847	1,130	-	-	1010	1,160	0	0	0	-	1070	1,180
6/9/13	804	1,140	-	-	943	1,170	0	1,000	0	-	1110	1,160
6/10/13	773	1,140	-	-	903	1,190	0	0	0	-	1180	1,140
6/11/13	737	1,160	-	-	859	1,200	0	1,000	2	-	1240	1,120
6/12/13	694	1,180	-	-	812	1,220	0	0	2	-	1300	1,130
6/13/13	653	1,200	-	-	759	1,240	0	0	0	-	1330	1,160
6/14/13	604	1,230	-	-	710	1,260	0	1,000	0	-	1330	1,160
6/15/13	559	1,260	-	-	656	1,290	0	1,000	0	-	1320	1,160
6/16/13	516	1,270	-	-	603	1,300	0	0	1	-	1300	1,170
6/17/13	479	-	-	-	-	-	0	1,000	0	-	1250	1,180
6/18/13	448	-	-	-	-	-	48	4,131,000	0	-	1190	1,190
6/19/13	419	1,310	-	-	493	1,330	112	9,667,000	0	-	1110	1,200
6/20/13	392	-	-	-	467	1,310	133	11,518,000	89	-	1070	1,190
6/21/13	373	-	-	-	438	1,340	0	0	76	-	1230	1,100
6/22/13	356	-	-	-	412	1,370	0	0	35	-	1060	1,160
6/23/13	354	-	-	-	393	1,390	0	0	16	2,540	991	1,190
6/24/13	374	-	-	-	392	1,400	100	8,605,000	17	2,490	958	1,190
6/25/13	454	1,310	-	-	427	1,410	158	13,636,000	35	2,620	918	1,190
6/26/13	530	1,280	-	-	510	1,360	0	0	83	2,770	1410	925
6/27/13	505	1,300	-	-	547	1,340	61	5,257,000	39	2,730	1270	953
6/28/13	458	1,310	-	-	523	1,360	170	14,731,000	100	2,770	1150	1,010
6/29/13	421	1,320	-	-	482	1,360	170	14,695,000	168	2,850	1050	1,110
6/30/13	382	1,330	-	-	440	1,370	220	19,051,000	201	2,840	945	1,190
Minimum	354	1110	NC	NC	392	1140	0	0	0	2490	918	925
Maximum	932	1330	NC	NC	1060	1410	220	19051000	201	2850	1410	1200
Average	596	1214	NC	NC	693	1275	39	3380400	29	2701	1166	1133

Total (ft³)	0
Total (Mgal)	0
Total (Ac-ft)	0
Total (ft³)	101,412,000
Total (Mgal)	759
Total (Ac-ft)	2,328

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)	No. of days included in the 7 day Rolling Average
6/1/13	-	-	-	-	-	-	-
6/2/13	-	-	-	-	-	-	-
6/3/13	-	-	-	-	-	-	-
6/4/13	-	-	-	-	-	-	-
6/5/13	-	-	-	-	-	-	-
6/6/13	-	-	-	-	-	-	-
6/7/13	-	-	-	-	-	-	-
6/8/13	-	-	-	-	-	-	-
6/9/13	-	-	-	-	-	-	-
6/10/13	-	-	-	-	-	-	-
6/11/13	-	-	-	-	-	-	-
6/12/13	-	-	-	-	-	-	-
6/13/13	-	-	-	-	-	-	-
6/14/13	-	-	-	-	-	-	-
6/15/13	-	-	-	-	-	-	-
6/16/13	-	-	-	-	-	-	-
6/17/13	-	-	-	-	-	-	-
6/18/13	-	-	-	-	-	-	-
6/19/13	8:20	1,300	8.07	314	314	NA	-
6/20/13	11:50	-	8.09	321	318	NA	-
6/21/13	-	-	-	-	-	-	-
6/22/13	-	-	-	-	-	-	-
6/23/13	-	-	-	-	-	-	-
6/24/13	-	-	-	-	-	-	-
6/25/13	8:35	1,340	8.17	342	326	34	7
6/26/13	-	-	-	-	-	-	-
6/27/13	14:00	1,310	8.24	324	333	NA	7
6/28/13	-	-	-	-	-	-	-
6/29/13	-	-	-	-	-	-	-
6/30/13	-	-	-	-	-	-	-
Minimum		1,300	8.07	314	314	34	
Maximum		1,340	8.24	342	333	34	
Average		1,317	8.14	325	323	34	

Notes:

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



**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
6/1/13	-	-	-	-	-	-	-
6/2/13	-	-	-	-	-	-	-
6/3/13	-	-	-	-	-	-	-
6/4/13	-	-	-	-	-	-	-
6/5/13	-	-	-	-	-	-	-
6/6/13	-	-	-	-	-	-	-
6/7/13	-	-	-	-	-	-	-
6/8/13	-	-	-	-	-	-	-
6/9/13	-	-	-	-	-	-	-
6/10/13	-	-	-	-	-	-	-
6/11/13	-	-	-	-	-	-	-
6/12/13	-	-	-	-	-	-	-
6/13/13	-	-	-	-	-	-	-
6/14/13	-	-	-	-	-	-	-
6/15/13	-	-	-	-	-	-	-
6/16/13	-	-	-	-	-	-	-
6/17/13	-	-	-	-	-	-	-
6/18/13	-	-	-	-	-	-	-
6/19/13	7:50	1,320	8.10	310	310	NA	7
6/20/13	12:15	1,300	8.09	325	318	NA	7
6/21/13	-	-	-	-	-	-	-
6/22/13	-	-	-	-	-	-	-
6/23/13	-	-	-	-	-	-	-
6/24/13	-	-	-	-	-	-	-
6/25/13	8:06	1,410	8.12	341	325	55	7
6/26/13	-	-	-	-	-	-	-
6/27/13	14:20	1,340	8.20	333	337	NA	7
6/28/13	-	-	-	-	-	-	-
6/29/13	-	-	-	-	-	-	-
6/30/13	-	-	-	-	-	-	-
Minimum		1,300	8.09	310	310	55	
Maximum		1,410	8.20	341	337	55	
Average		1,343	8.13	327	322	55	

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



**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
6/1/13	-	-	-	-	-	-
6/2/13	-	-	-	-	-	-
6/3/13	-	-	-	-	-	-
6/4/13	-	-	-	-	-	-
6/5/13	-	-	-	-	-	-
6/6/13	-	-	-	-	-	-
6/7/13	-	-	-	-	-	-
6/8/13	-	-	-	-	-	-
6/9/13	-	-	-	-	-	-
6/10/13	-	-	-	-	-	-
6/11/13	-	-	-	-	-	-
6/12/13	-	-	-	-	-	-
6/13/13	-	-	-	-	-	-
6/14/13	-	-	-	-	-	-
6/15/13	-	-	-	-	-	-
6/16/13	-	-	-	-	-	-
6/17/13	-	-	-	-	-	-
6/18/13	-	-	-	-	-	-
6/19/13	-	-	-	-	-	-
6/20/13	-	-	-	-	-	-
6/21/13	-	-	-	-	-	-
6/22/13	-	-	-	-	-	-
6/23/13	-	-	-	-	-	-
6/24/13	-	-	-	-	-	-
6/25/13	-	-	-	-	-	-
6/26/13	-	-	-	-	-	-
6/27/13	-	-	-	-	-	-
6/28/13	-	-	-	-	-	-
6/29/13	-	-	-	-	-	-
6/30/13	-	-	-	-	-	-
Minimum		NA	NA	NA	NA	
Maximum		NA	NA	NA	NA	
Average		NA	NA	NA	NA	

Notes:

mg/L - Milligrams per liter or parts per million
 NA - Not Analyzed due to operation constraints



**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
6/1/13	-	-	-	-	-	-
6/2/13	-	-	-	-	-	-
6/3/13	-	-	-	-	-	-
6/4/13	-	-	-	-	-	-
6/5/13	-	-	-	-	-	-
6/6/13	-	-	-	-	-	-
6/7/13	-	-	-	-	-	-
6/8/13	-	-	-	-	-	-
6/9/13	-	-	-	-	-	-
6/10/13	-	-	-	-	-	-
6/11/13	-	-	-	-	-	-
6/12/13	-	-	-	-	-	-
6/13/13	-	-	-	-	-	-
6/14/13	-	-	-	-	-	-
6/15/13	-	-	-	-	-	-
6/16/13	-	-	-	-	-	-
6/17/13	-	-	-	-	-	-
6/18/13	-	-	-	-	-	-
6/19/13	9:55	8.08	280	280	NA	-
6/20/13	13:15	8.08	287	284	NA	-
6/21/13	-	-	-	-	-	-
6/22/13	-	-	-	-	-	-
6/23/13	-	-	-	-	-	-
6/24/13	-	-	-	-	-	-
6/25/13	9:45	8.10	232	266	61	7
6/26/13	-	-	-	-	-	-
6/27/13	10:00	8.23	286	259	NA	7
6/28/13	-	-	-	-	-	-
6/29/13	-	-	-	-	-	-
6/30/13	-	-	-	-	-	-
Minimum		8.08	232	259	61	
Maximum		8.23	287	284	61	
Average		8.12	271	272	61	

Notes:

mg/L - Milligrams per liter or parts per million

NA - Not Analyzed

Italic font denotes preliminary result

Bold font and gray shading denotes sample sulfate concentration exceeds 750 mg/L

