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

November 27, 2013

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

RE: November 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 November 2013 and summaries of water quality sample results and flow data. The East End Outlet was operated at full capacity (350 cfs) for nine days before it was shutdown for the year due to the weather. The West End Outlet was shutdown for the season during October.

Sulfate concentrations above 750 mg/L were detected at the Pekin and Cooperstown monitoring stations on November 6th. The Cooperstown sample result is not included in this report.

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. Sampling locations located near Flora, Bremen, and the West End Outlet were not collected because the West End Outlet was not operating and due to time constraints from shutdown operations. 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,

Jon Kelsch

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: WEST END OUTLET

FACILITY: Devils Lake Outlet Project

LOCATION: Benson Co, ND

MONITORING PERIOD	
START DATE	END DATE
11/1/13	11/30/13

Devils Lake West Outlet discharged 0 **ac-ft over** 0 **Days**

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	-	-	-	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	-	-	-	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	0	cfs	Continuous	Recorder
SIGNATURE	Jon Kelsch			10/2/13	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: EAST END OUTLET

FACILITY: Devils Lake Outlet Project

LOCATION: Ramsey, Benson, Nelson, ND

MONITORING PERIOD	
START DATE	END DATE
11/1/13	11/30/13

Devils Lake East Outlet discharged 5,984 ac-ft over 9 Days

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.79	8.79	8.79	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	NA	NA	NA	µS/cm	Continuous	Recorder
SULFATE	978	978	978	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	978	978	978	mg/L	2 x Week	GRAB
OUTLET DISCHARGE	131	388	335	cfs	Continuous	Recorder
SIGNATURE	Jon Kelsch			10/2/13	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: DOWNSTREAM OF THE EAST END OUTLET (PEKIN)

FACILITY: Devils Lake Outlet Project

LOCATION: Nelson Co, ND

MONITORING PERIOD	
START DATE	END DATE
11/1/13	11/30/13

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.65	8.65	8.65	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	NA	NA	NA	µS/cm	Continuous	Recorder
SULFATE	809	809	809	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	809	809	809	mg/L	2 x Week	GRAB
FLOW, INSTREAM	NA	NA	NA	cfs	Continuous	Recorder
SIGNATURE	Jon Kelsch			10/2/13	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

	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	
Date	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)
11/1/13	60	1,570	-	-	Ssn	-	368	31,768,000	350	-	600	2,400
11/2/13	61	1,570	-	-	Ssn	-	353	30,496,000	335	-	607	2,410
11/3/13	59	1,570	-	-	Ssn	-	388	33,480,000	350	-	605	2,420
11/4/13	57	1,570	-	-	Ssn	-	367	31,741,000	352	-	601	2,410
11/5/13	56	1,590	-	-	Ssn	-	362	31,303,000	345	-	585	2,410
11/6/13	57	1,590	-	-	Ssn	-	357	30,851,000	339	-	580	2,410
11/7/13	52	1,590	-	-	Ssn	-	323	27,912,000	314	-	581	2,430
11/8/13	52	1,600	-	-	Ssn	-	368	31,762,000	348	-	571	2,440
11/9/13	51	1,590	-	-	Ssn	-	131	11,324,000	238	-	567	2,450
11/10/13	42	1,610	-	-	Ssn	-	-	4,000	-	-	548	2,440
11/11/13	45	1,680	-	-	Ssn	-	-	7,000	-	-	532	2,440
11/12/13	Ice	1,700	-	-	Ssn	-	-	-	-	-	376	2,470
11/13/13	Ice	1,680	-	-	Ssn	-	-	-	-	-	339	2,500
11/14/13	Ice	1,630	-	-	Ssn	-	-	-	-	-	301	2,410
11/15/13	Ice	1,620	-	-	Ssn	-	-	-	-	-	270	2,260
11/16/13	Ice	1,670	-	-	Ssn	-	-	-	-	-	194	-
11/17/13	Ice	1,640	-	-	Ssn	-	-	-	-	-	164	-
11/18/13	Ice	1,620	-	-	Ssn	-	-	-	-	-	152	-
11/19/13	Ice	1,620	-	-	Ssn	-	-	-	-	-	139	-
11/20/13	Ice	1,620	-	-	Ssn	-	-	-	-	-	123	1,660
11/21/13	Ice	1,640	-	-	Ssn	-	-	-	-	-	45	1,660
11/22/13	Ice	1,710	-	-	Ssn	-	-	-	-	-	Ice	1,700
11/23/13	Ice	1,750	-	-	Ssn	-	-	-	-	-	Ice	1,680
11/24/13	Ice	1,770	-	-	Ssn	-	-	-	-	-	Ice	1,670
11/25/13	Ice	1,800	-	-	Ssn	-	-	-	-	-	Ice	1,640
Minimum	42	1570	-	-	-	-	131	4,000	238	-	45	1640
Maximum	61	1800	-	-	-	-	388	33,480,000	352	-	607	2500
Average	54	1640	-	-	-	-	335	23,695,273	330	-	404	2205
			Total (ft^3)	0			**Total (ft^3)**	260,648,000				
			Total (Mgal)	0			**Total (Mgal)**	1,950				
			Total (Ac-ft)	0			**Total (Ac-ft)**	5,984				

Notes:

cfs - cubic feet per second
µS/cm - Microsiemens per Centimeter at 25 degrees Celsius
ft^3 - 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

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
11/1/13	-	-	-	-	-	-
11/2/13	-	-	-	-	-	-
11/3/13	-	-	-	-	-	-
11/4/13	-	-	-	-	-	-
11/5/13	-	-	-	-	-	-
11/6/13	12:31	*8.79*	*978*	*978*	*NA*	7
11/7/13	-	-	-	-	-	-
11/8/13	-	-	-	-	-	-
11/9/13	-	-	-	-	-	-
11/10/13	-	-	-	-	-	-
11/11/13	-	-	-	-	-	-
11/12/13	-	-	-	-	-	-
11/13/13	-	-	-	-	-	-
11/14/13	-	-	-	-	-	-
11/15/13	-	-	-	-	-	-
11/16/13	-	-	-	-	-	-
11/17/13	-	-	-	-	-	-
11/18/13	-	-	-	-	-	-
11/19/13	-	-	-	-	-	-
11/20/13	-	-	-	-	-	-
11/21/13	-	-	-	-	-	-
11/22/13	-	-	-	-	-	-
11/23/13	-	-	-	-	-	-
11/24/13	-	-	-	-	-	-
11/25/13	-	-	-	-	-	-
11/26/13	-	-	-	-	-	-
11/27/13	-	-	-	-	-	-
11/28/13	-	-	-	-	-	-
11/29/13	-	-	-	-	-	-
11/30/13	-	-	-	-	-	-
Minimum		8.79	978	978	-	
Maximum		8.79	978	978	-	
Average		8.79	978	978	-	

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
11/1/13	-	-	-	-	-	-
11/2/13	-	-	-	-	-	-
11/3/13	-	-	-	-	-	-
11/4/13	-	-	-	-	-	-
11/5/13	-	-	-	-	-	-
11/6/13	10:40	*8.65*	**809**	**809**	*NA*	7
11/7/13	-	-	-	-	-	-
11/8/13	-	-	-	-	-	-
11/9/13	-	-	-	-	-	-
11/10/13	-	-	-	-	-	-
11/11/13	-	-	-	-	-	-
11/12/13	-	-	-	-	-	-
11/13/13	-	-	-	-	-	-
11/14/13	-	-	-	-	-	-
11/15/13	-	-	-	-	-	-
11/16/13	-	-	-	-	-	-
11/17/13	-	-	-	-	-	-
11/18/13	-	-	-	-	-	-
11/19/13	-	-	-	-	-	-
11/20/13	-	-	-	-	-	-
11/21/13	-	-	-	-	-	-
11/22/13	-	-	-	-	-	-
11/23/13	-	-	-	-	-	-
11/24/13	-	-	-	-	-	-
11/25/13	-	-	-	-	-	-
11/26/13	-	-	-	-	-	-
11/27/13	-	-	-	-	-	-
11/28/13	-	-	-	-	-	-
11/29/13	-	-	-	-	-	-
11/30/13	-	-	-	-	-	-
Minimum		8.65	809	809	-	
Maximum		8.65	809	809	-	
Average		8.65	809	809	-	

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