



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>

December 8, 2011

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

RE: November 2011 West End Devils Lake Outlet Monthly Discharge and Water Quality Reports

Enclosed are the monthly discharge reports for the Devils Lake Outlet for the month of November 2011 and the summaries of the sample results and flow data. The outlet discharged continuously until November 14, 2011 when it was shutdown for the winter season. Discharges remained limited; however, it is anticipated the outlet will be full functional again next spring. Because of the time constraints on staff related to restoration effort, sample frequency was reduced during the reported period.

Attached to the summaries are tables showing average daily outlet discharge rate and water quality results from samples collected from outlet, upstream, and downstream locations. Also included are average daily stream flow data and conductivity data obtained from the USGS gaging station at the upstream and the downstream locations.

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: AT OUTLET

FACILITY: Devils Lake Outlet Project

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

LOCATION: Benson Co, ND

Devils Lake Outlet discharged 2,970 ac-ft over 14 Days

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.45	8.85	8.60	SU	4 x Week	GRAB
SPECIFIC CONDUCTANCE	NA	NA	NA	umho/cm	Continuous	Recorder
SULFATE	545	548	547	mg/L	4 x Week	GRAB
7 DAY AVERAGE OF SULFATE	547	550	548	mg/L	4 x Week	GRAB
OUTLET DISCHARGE	77	111	107	cfs	Continuous	Recorder
SIGNATURE				12/8/11	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.

Daily Outlet Discharge

Date	Average Daily Outlet Discharge (cfs)	Total Daily Volume (cu-ft)
11/1/11	111	9,569,938
11/2/11	110	9,466,455
11/3/11	109	9,409,134
11/4/11	109	9,415,024
11/5/11	109	9,437,800
11/6/11	109	9,428,218
11/7/11	110	9,454,033
11/8/11	109	9,401,195
11/9/11	109	9,428,242
11/10/11	109	9,428,242
11/11/11	109	9,428,242
11/12/11	109	9,428,242
11/13/11	109	9,428,242
11/14/11	77	6,652,149
Total		129,375,157
Total		968
Total		2,970
Minimum	77	cfs
Maximum	111	cfs
Average	107	cfs

cu-ft
Mgal
Ac-ft

**Water Quality Results of the samples collected at the outlet
Devils Lake Outlet**

Date	Time	Sampler	Average Daily EC from Outlet Telemetry (µS/cm)	Lab pH	Lab Sulfate (mg/L)	7 Day Rolling Average of Sulfate for the operating period (mg/L)	Total Suspended Solids (mg/L)	No. of days included in the 7 day Rolling average
11/1/11	-	-	-	-	-	-	-	-
11/2/11	8:10	NDSWC	NA	8.50	548	550	-	7
11/3/11	-	-	-	-	-	-	-	-
11/4/11	-	-	-	-	-	-	-	-
11/5/11	-	-	-	-	-	-	-	-
11/6/11	-	-	-	-	-	-	-	-
11/7/11	13:30	NDSWC	NA	8.85	548	548	-	7
11/8/11	7:54	NDSWC	NA	8.45	545	547	13	7
11/9/11	-	-	-	-	-	-	-	-
11/10/11	-	-	-	-	-	-	-	-
11/11/11	-	-	-	-	-	-	-	-
11/12/11	-	-	-	-	-	-	-	-
11/13/11	-	-	-	-	-	-	-	-
11/14/11	-	-	-	-	-	-	-	-
11/15/11	-	-	-	-	-	-	-	-
11/16/11	-	-	-	-	-	-	-	-
11/17/11	-	-	-	-	-	-	-	-
11/18/11	-	-	-	-	-	-	-	-
11/19/11	-	-	-	-	-	-	-	-
11/20/11	-	-	-	-	-	-	-	-
11/21/11	-	-	-	-	-	-	-	-
11/22/11	-	-	-	-	-	-	-	-
11/23/11	-	-	-	-	-	-	-	-
11/24/11	-	-	-	-	-	-	-	-
11/25/11	-	-	-	-	-	-	-	-
11/26/11	-	-	-	-	-	-	-	-
11/27/11	-	-	-	-	-	-	-	-
11/28/11	-	-	-	-	-	-	-	-
11/29/11	-	-	-	-	-	-	-	-
11/30/11	-	-	-	-	-	-	-	-
Minimum			NA	8.45	545	547	13	
Maximum			NA	8.85	548	550	13	
Average			NA	8.60	547	548	13	

NA - Not Available

Note: Outlet discharged through 11/14/11

OUTLET OPERATOR NAME/ADDRESS

NAME: ND State Water Commission
 ADDRESS: 900 E Boulevard Avenue
 Bismarck ND 58505

MONTHLY DISCHARGE REPORT

LOCATION: UPSTREAM OF THE OUTLET (FLORA)

FACILITY: Devils Lake Outlet Project
 LOCATION: Benson Co, ND

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

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.42	8.74	8.56	SU	4 x Week	GRAB
SPECIFIC CONDUCTANCE	1,460	1,480	1,470	umho/cm	Continuous	Recorder
SULFATE	288	345	318	mg/L	4 x Week	GRAB
7 DAY AVERAGE OF SULFATE	297	327	317	mg/L	4 x Week	GRAB
FLOW, INSTREAM	33	76	49	cfs	Continuous	Recorder
SIGNATURE				12/8/11	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.
 Instream samples and measurements for this summary pertain only to time periods when outlet is actually operated.

NA - Not Available

**Average daily streamflow and conductivity data at the upstream location near Flora
 USGS Gaging Station Data
 Sheyenne River Above Devils Lake Outlet Near Flora**

Date	Streamflow (cfs)	EC (µS/cm)
11/1/11	76	1,460
11/2/11	56	1,460
11/3/11	50	1,480
11/4/11	47	1,480
11/5/11	45	1,480
11/6/11	45	1,470
11/7/11	43	1,470
11/8/11	54	1,460
11/9/11	47	1,480
11/10/11	33	1,490
11/11/11	46	1,460
11/12/11	48	1,440
11/13/11	46	1,440
11/14/11	45	1,450
11/15/11	Ice	1,450
11/16/11	Ice	1,510
11/17/11	Ice	1,570
11/18/11	Ice	1,570
11/19/11	Ice	1,620
11/20/11	Ice	1,660
11/21/11	Ice	1,700
11/22/11	Ice	1,720
11/23/11	Ice	1,750
11/24/11	Ice	1,810
11/25/11	Ice	1,820
11/26/11	Ice	1,790
11/27/11	Ice	1,800
11/28/11	Ice	1,760
11/29/11	Ice	1,740
11/30/11	Ice	1,720
Minimum	33	1,440
Maximum	76	1,820
Average	49	1,584

Note: Outlet discharged through 11/14/11

**Water Quality Results of the samples collected from the upstream location near Flora
Sheyenne River Above Devils Lake Outlet Near Flora**

Date	Time	Sampler	USGS EC (μ S/cm)	Lab pH	Lab Sulfate (mg/L)	7 Day Rolling Average of Sulfate for the operating period (mg/L)	Total Suspended Solids (mg/L)	No. of days included in the 7 day Rolling average
11/1/11	-	-	-	-	-	-	-	-
11/2/11	8:20	NDSWC	1,460	8.42	297	326	-	7
11/3/11	-	-	-	-	-	-	-	-
11/4/11	-	-	-	-	-	-	-	-
11/5/11	-	-	-	-	-	-	-	-
11/6/11	-	-	-	-	-	-	-	-
11/7/11	13:45	NDSWC	1,470	8.74	327	312	-	7
11/8/11	8:15	NDSWC	1,480	8.51	327	317	12	7
11/9/11	-	-	-	-	-	-	-	-
11/10/11	-	-	-	-	-	-	-	-
11/11/11	-	-	-	-	-	-	-	-
11/12/11	-	-	-	-	-	-	-	-
11/13/11	-	-	-	-	-	-	-	-
11/14/11	-	-	-	-	-	-	-	-
11/15/11	-	-	-	-	-	-	-	-
11/16/11	-	-	-	-	-	-	-	-
11/17/11	-	-	-	-	-	-	-	-
11/18/11	-	-	-	-	-	-	-	-
11/19/11	-	-	-	-	-	-	-	-
11/20/11	-	-	-	-	-	-	-	-
11/21/11	-	-	-	-	-	-	-	-
11/22/11	-	-	-	-	-	-	-	-
11/23/11	-	-	-	-	-	-	-	-
11/24/11	-	-	-	-	-	-	-	-
11/25/11	-	-	-	-	-	-	-	-
11/26/11	-	-	-	-	-	-	-	-
11/27/11	-	-	-	-	-	-	-	-
11/28/11	-	-	-	-	-	-	-	-
11/29/11	-	-	-	-	-	-	-	-
11/30/11	-	-	-	-	-	-	-	-
Minimum			1,460	8.42	297	312	12	
Maximum			1,480	8.74	327	326	12	
Average			1,470	8.56	317	318	12	

Note: Outlet discharged through 11/14/11

OUTLET OPERATOR NAME/ADDRESS

NAME: ND State Water Commission
 ADDRESS: 900 E Boulevard Avenue
 Bismarck ND 58505

MONTHLY DISCHARGE REPORT

LOCATION: DOWNSTREAM OF THE OUTLET (BREMEN)

FACILITY: Devils Lake Outlet Project

LOCATION: Benson Co, ND

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

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.48	8.71	8.57	SU	4 x Week	GRAB
SPECIFIC CONDUCTANCE	1,660	1,730	1,703	umho/cm	Continuous	Recorder
SULFATE	471	500	489	mg/L	4 x Week	GRAB
7 DAY AVERAGE OF SULFATE	465	489	480	mg/L	4 x Week	GRAB
FLOW, INSTREAM	150	188	165	cfs	Continuous	Recorder
SIGNATURE				12/8/11	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.						
Instream samples and measurements for this summary pertain only to time periods when outlet is actually operated.						

NA - Not Available

**Average daily streamflow and conductivity data at the downstream location near Bremen
USGS Gaging Station Data
Sheyenne River Below Devils Lake Outlet near Bremen**

Date	Streamflow (cfs)	EC (µS/cm)
11/1/11	188	1,660
11/2/11	180	1,660
11/3/11	166	1,690
11/4/11	162	1,700
11/5/11	162	1,710
11/6/11	156	1,720
11/7/11	150	1,730
11/8/11	161	1,720
11/9/11	171	1,720
11/10/11	160	1,720
11/11/11	158	1,720
11/12/11	167	1,710
11/13/11	166	1,690
11/14/11	163	1,690
11/15/11	NM	NM
11/16/11	NM	NM
11/17/11	NM	NM
11/18/11	NM	NM
11/19/11	NM	NM
11/20/11	NM	NM
11/21/11	NM	NM
11/22/11	NM	NM
11/23/11	NM	NM
11/24/11	NM	NM
11/25/11	NM	NM
11/26/11	NM	NM
11/27/11	NM	NM
11/28/11	NM	NM
11/29/11	NM	NM
11/30/11	NM	NM
Minimum	150	1,660
Maximum	188	1,730
Average	165	1,703

NM - Not Measured

Note: Outlet discharged through 11/14/11

**Water Quality Results of the samples collected from the downstream location near Bremen
 Sheyenne River Below Devils Lake Outlet Near Bremen**

Date	Time	Sampler	USGS EC (µS/cm)	Lab pH	Lab Sulfate (mg/L)	7 Day Rolling Average of Sulfate for the operating period (mg/L)	Total Suspended Solids (mg/L)	No. of days included in the 7 day Rolling average
11/1/11	-	-	-	-	-	-	-	-
11/2/11	8:45	NDSWC	1,660	8.48	471	465	-	7
11/3/11	-	-	-	-	-	-	-	-
11/4/11	-	-	-	-	-	-	-	-
11/5/11	-	-	-	-	-	-	-	-
11/6/11	-	-	-	-	-	-	-	-
11/7/11	14:15	NDSWC	1,720	8.71	500	486	-	7
11/8/11	8:55	NDSWC	1,730	8.51	497	489	18	7
11/9/11	-	-	-	-	-	-	-	-
11/10/11	-	-	-	-	-	-	-	-
11/11/11	-	-	-	-	-	-	-	-
11/12/11	-	-	-	-	-	-	-	-
11/13/11	-	-	-	-	-	-	-	-
11/14/11	-	-	-	-	-	-	-	-
11/15/11	-	-	-	-	-	-	-	-
11/16/11	-	-	-	-	-	-	-	-
11/17/11	-	-	-	-	-	-	-	-
11/18/11	-	-	-	-	-	-	-	-
11/19/11	-	-	-	-	-	-	-	-
11/20/11	-	-	-	-	-	-	-	-
11/21/11	-	-	-	-	-	-	-	-
11/22/11	-	-	-	-	-	-	-	-
11/23/11	-	-	-	-	-	-	-	-
11/24/11	-	-	-	-	-	-	-	-
11/25/11	-	-	-	-	-	-	-	-
11/26/11	-	-	-	-	-	-	-	-
11/27/11	-	-	-	-	-	-	-	-
11/28/11	-	-	-	-	-	-	-	-
11/29/11	-	-	-	-	-	-	-	-
11/30/11	-	-	-	-	-	-	-	-
Minimum			1,660	8.48	471	465	18	
Maximum			1,730	8.71	500	489	18	
Average			1,703	8.57	489	480	18	

Note: Outlet discharged through 11/14/11