



North Dakota State Water Commission

900 EAST BOULEVARD AVENUE, DEPT 770 • BISMARCK, NORTH DAKOTA 58505-0850
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May 29, 2011

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

RE: April 2012 Devils Lake Outlet Monthly Discharge and Water Quality Reports

Enclosed are the monthly discharge reports for the Devils Lake Outlet for the month of April 2012 and summaries of sample results and flow data. The outlet began discharging on April 2nd; however measurable discharge to the Sheyenne River did not occur until April 4th because the gravity channel was relatively dry. The outlet was operated continuously throughout the remainder of April. Damaged pumps are currently being repaired, so discharges are somewhat limited. It is anticipated that the West End Outlet will be fully functional and the East End Outlet will begin operation during June 2012.

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 stations 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: WEST END OUTLET

FACILITY: Devils Lake Outlet Project

LOCATION: Benson Co, ND

MONITORING PERIOD	
START DATE	END DATE
4/1/12	4/30/12

Devils Lake Outlet discharged 6,263 ac-ft over 27 Days

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.09	8.90	8.53	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	NA	NA	NA	µS/cm	Continuous	Recorder
SULFATE	524	561	543	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	530	557	540	mg/L	2 x Week	GRAB
OUTLET DISCHARGE	66	125	117	cfs	Continuous	Recorder
SIGNATURE				5/29/12	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
4/1/12	4/30/12

LOCATION: Benson Co, ND

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.20	8.77	8.50	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	1,260	1,490	1,408	µS/cm	Continuous	Recorder
SULFATE	295	392	331	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	296	374	328	mg/L	2 x Week	GRAB
FLOW, INSTREAM	74	153	115	cfs	Continuous	Recorder
SIGNATURE				5/29/12	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
- 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)

FACILITY: Devils Lake Outlet Project

MONITORING PERIOD	
START DATE	END DATE
4/1/12	4/30/12

LOCATION: Benson Co, ND

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.26	8.75	8.53	SU	2 x Week	GRAB
SPECIFIC CONDUCTANCE	1,210	1,600	1,540	µS/cm	Continuous	Recorder
SULFATE	309	477	437	mg/L	2 x Week	GRAB
7 DAY AVERAGE OF SULFATE	309	468	418	mg/L	2 x Week	GRAB
FLOW, INSTREAM	105	283	232	cfs	Continuous	Recorder
SIGNATURE				5/29/12	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

Daily Outlet Discharge and Upstream and Downstream Flows Devils Lake West End Outlet

Date	Above West End Outlet - Sheyenne River near Flora		Below West End Outlet - Sheyenne River near Bremen		West End Outlet	
	Average Streamflow USGS Gage (cfs)	Average Specific Conductance USGS Gage (μ S/cm)	Average Streamflow USGS Gage (cfs)	Average Specific Conductance USGS Gage (μ S/cm)	Average Daily Outlet Discharge (cfs)	Total Daily Volume (ft ³)
4/1/12	92	1,260	106	1,210	-	-
4/2/12	93	1,290	105	1,240	-	-
4/3/12	91	1,300	153	1,320	-	-
4/4/12	88	1,300	205	1,480	66	5,650,509
4/5/12	85	1,310	208	1,490	120	10,344,709
4/6/12	81	1,320	210	1,500	120	10,335,795
4/7/12	77	1,330	201	1,530	118	10,197,061
4/8/12	74	1,330	189	1,540	116	10,040,647
4/9/12	80	1,330	190	1,560	115	9,952,291
4/10/12	84	1,340	199	1,550	116	10,044,940
4/11/12	86	1,370	205	1,550	118	10,141,406
4/12/12	87	1,410	211	1,580	117	10,073,671
4/13/12	99	1,420	228	1,580	119	10,231,912
4/14/12	122	1,450	235	1,600	120	10,363,025
4/15/12	143	1,460	257	1,600	120	10,337,870
4/16/12	153	1,470	276	1,590	116	10,026,846
4/17/12	150	1,460	279	1,600	119	10,226,151
4/18/12	147	1,450	283	1,590	119	10,249,065
4/19/12	149	1,440	278	1,590	119	10,278,017
4/20/12	149	1,430	281	1,580	119	10,265,309
4/21/12	147	1,440	281	1,580	118	10,175,258
4/22/12	145	1,450	275	1,580	120	10,377,432
4/23/12	141	1,460	271	1,580	122	10,498,539
4/24/12	136	1,490	267	1,580	124	10,673,551
4/25/12	132	1,490	266	1,600	124	10,728,330
4/26/12	126	1,490	259	1,600	120	10,343,516
4/27/12	122	1,490	263	1,600	118	10,161,289
4/28/12	121	1,490	265	1,600	117	10,086,017
4/29/12	126	1,490	258	1,600	119	10,255,899
4/30/12	131	1,490	255	1,600	125	10,761,723
Minimum	74	1,260	105	1,210	66	5,650,509
Maximum	153	1,490	283	1,600	125	10,761,723
Average	115	1,408	232	1,540	117	10,104,473
					Total (ft³)	272,820,780
					Total (Mgal)	2,041
					Total (Ac-ft)	6,263

Notes:

Outlet began discharging on 4/2/12, but because the gravity channel was relatively dry, measurable flows did not occur until 4/4/12.

cfs - cubic feet per second

μ S/cm - Microsiemens per Centimeter at 25 degrees Celsius

ft³ - cubic feet

Mgal - Millions of Gallons



**West End Outlet
Monthly Water Quality Summary
Devils Lake West End Outlet**

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
4/1/12	-	-	-	-	-	-
4/2/12	-	-	-	-	-	-
4/3/12	8:16	8.09	540	540	63	1
4/4/12	11:00	8.62	524	532	NA	2
4/5/12	8:30	8.61	527	530	NA	3
4/6/12	-	-	-	-	-	-
4/7/12	-	-	-	-	-	-
4/8/12	-	-	-	-	-	-
4/9/12	13:40	8.71	543	534	NA	7
4/10/12	8:10	8.21	543	534	NA	7
4/11/12	-	-	-	-	-	-
4/12/12	-	-	-	-	-	-
4/13/12	-	-	-	-	-	-
4/14/12	-	-	-	-	-	-
4/15/12	-	-	-	-	-	-
4/16/12	-	-	-	-	-	-
4/17/12	8:35	8.33	537	537	15	7
4/18/12	-	-	-	-	-	-
4/19/12	13:50	8.90	561	549	NA	7
4/20/12	-	-	-	-	-	-
4/21/12	-	-	-	-	-	-
4/22/12	-	-	-	-	-	-
4/23/12	12:00	8.89	556	551	NA	7
4/24/12	-	-	-	-	-	-
4/25/12	8:10	8.42	553	557	NA	7
4/26/12	-	-	-	-	-	-
4/27/12	-	-	-	-	-	-
4/28/12	-	-	-	-	-	-
4/29/12	-	-	-	-	-	-
4/30/12	-	-	-	-	-	-
Minimum		8.09	524	530	15	
Maximum		8.90	561	557	63	
Average		8.53	543	540	39	

Notes:

mg/L - Milligrams per liter or parts per million
NA - Not Analyzed



**Sheyenne River Upstream of West End Outlet near Flora
Monthly Water Quality Summary
Devils Lake West End Outlet**

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
3/27/12	8:45	1,160	8.30	247	-	18	-
4/1/12	-	-	-	-	-	-	-
4/2/12	-	-	-	-	-	-	-
4/3/12	8:35	1,300	8.20	296	296	15	7
4/4/12	11:20	1,300	8.64	300	298	NA	7
4/5/12	8:00	1,310	8.63	295	297	NA	7
4/6/12	-	-	-	-	-	-	-
4/7/12	-	-	-	-	-	-	-
4/8/12	-	-	-	-	-	-	-
4/9/12	13:50	1,340	8.77	298	297	NA	7
4/10/12	8:20	1,340	8.33	305	300	NA	7
4/11/12	-	-	-	-	-	-	-
4/12/12	-	-	-	-	-	-	-
4/13/12	-	-	-	-	-	-	-
4/14/12	-	-	-	-	-	-	-
4/15/12	-	-	-	-	-	-	-
4/16/12	-	-	-	-	-	-	-
4/17/12	8:20	1,470	8.28	364	364	10	7
4/18/12	-	-	-	-	-	-	-
4/19/12	13:50	1,440	8.67	363	364	NA	7
4/20/12	-	-	-	-	-	-	-
4/21/12	-	-	-	-	-	-	-
4/22/12	-	-	-	-	-	-	-
4/23/12	12:15	1,450	8.67	367	365	NA	7
4/24/12	-	-	-	-	-	-	-
4/25/12	7:55	1,490	8.34	392	374	NA	7
4/26/12	-	-	-	-	-	-	-
4/27/12	-	-	-	-	-	-	-
4/28/12	-	-	-	-	-	-	-
4/29/12	-	-	-	-	-	-	-
4/30/12	-	-	-	-	-	-	-
Minimum		1,300	8.20	295	296	10	
Maximum		1,490	8.77	392	374	15	
Average		1,382	8.50	331	328	12.5	

Background

Background

Notes:

Samples denoted as "Background" were collected before measureable flows were discharged to the Sheyenne River
 µS/cm - Microsiemens per Centimeter at 25 degrees Celsius
 mg/L - Milligrams per liter or parts per million
 NA - Not Analyzed
 USGS streamflow and specific conductance data courtesy of the USGS
 USGS data are provisional and subject to revision

**Sheyenne River Downstream of West End Outlet near Bremen
Monthly Water Quality Summary
Devils Lake West End Outlet**

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
3/27/12	9:20	1,070	8.32	245	-	10	-
4/1/12	-	-	-	-	-	-	-
4/2/12	-	-	-	-	-	-	-
4/3/12	9:10	1,260	8.26	309	309	35	7
4/4/12	11:45	1,480	8.59	432	371	NA	7
4/5/12	7:30	1,490	8.59	440	394	NA	7
4/6/12	-	-	-	-	-	-	-
4/7/12	-	-	-	-	-	-	-
4/8/12	-	-	-	-	-	-	-
4/9/12	14:10	1,550	8.75	454	409	NA	7
4/10/12	8:50	1,560	8.37	448	444	NA	7
4/11/12	-	-	-	-	-	-	-
4/12/12	-	-	-	-	-	-	-
4/13/12	-	-	-	-	-	-	-
4/14/12	-	-	-	-	-	-	-
4/15/12	-	-	-	-	-	-	-
4/16/12	-	-	-	-	-	-	-
4/17/12	7:55	1,610	8.33	449	449	20	7
4/18/12	-	-	-	-	-	-	-
4/19/12	14:10	1,590	8.69	465	457	NA	7
4/20/12	-	-	-	-	-	-	-
4/21/12	-	-	-	-	-	-	-
4/22/12	-	-	-	-	-	-	-
4/23/12	12:45	1,580	8.75	463	459	NA	7
4/24/12	-	-	-	-	-	-	-
4/25/12	7:30	1,590	8.44	477	468	NA	7
4/26/12	-	-	-	-	-	-	-
4/27/12	-	-	-	-	-	-	-
4/28/12	-	-	-	-	-	-	-
4/29/12	-	-	-	-	-	-	-
4/30/12	-	-	-	-	-	-	-
Minimum		1,260	8.26	309	309	20	
Maximum		1,610	8.75	477	468	35	
Average		1,523	8.53	437	418	27.5	

Background

Background

Notes:

Samples denoted as "Background" were collected before measureable flows were discharged to the Sheyenne River

µS/cm - Microsiemens per Centimeter at 25 degrees Celsius

mg/L - Milligrams per liter or parts per million

NA - Not Analyzed

USGS streamflow and specific conductance data courtesy of the USGS

USGS data are provisional and subject to revision

