

# North Dakota State Water Commission

900 EAST BOULEVARD AVENUE, DEPT 770 • BISMARCK, NORTH DAKOTA 58505-0850  
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August 25, 2011

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

RE: West End Devils Lake Outlet

Enclosed are the monthly discharge reports for the Devils Lake Outlet for the month of July 2011 and the summaries of the sample results and flow data. The outlet discharged continuously during the reported period.

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

If you have any questions, please contact me at 701-328-4948.

Sincerely,

A handwritten signature in blue ink that reads "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: AT OUTLET

FACILITY: Devils Lake Outlet Project

MONITORING PERIOD	
START DATE	END DATE
7/1/11	7/31/11

LOCATION: Benson Co, ND

Devils Lake Outlet discharged 13,283 ac-ft over 31 Days

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.47	9.03	8.73	SU	4 x Week	GRAB
SPECIFIC CONDUCTANCE	NA	NA	NA	umho/cm	Continuous	Recorder
SULFATE	103	536	440	mg/L	4 x Week	GRAB
7 DAY AVERAGE OF SULFATE	397	526	459	mg/L	4 x Week	GRAB
OUTLET DISCHARGE	124	246	215	cfs	Continuous	Recorder
SIGNATURE				8/25/11	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.						

NA - Not Available

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

<b>Date</b>	<b>Time</b>	<b>Sampler</b>	<b>Average Daily EC from Outlet Telemetry (µS/cm)</b>	<b>Lab pH</b>	<b>Lab Sulfate (mg/L)</b>	<b>7 Day Rolling Average of Sulfate for the operating period (mg/L)</b>	<b>Total Suspended Solids (mg/L)</b>	<b>No. of days included in the 7 day Rolling average</b>
7/1/11	-	-	-	-	-	-	-	-
7/2/11	-	-	-	-	-	-	-	-
7/3/11	-	-	-	-	-	-	-	-
7/4/11	-	-	-	-	-	-	-	-
7/5/11	16:15	NDSWC	NA	8.67	503	506	24	7
7/6/11	13:15	NDSWC	NA	8.47	493	497	-	7
7/7/11	10:15	NDSWC	NA	8.63	292	429	-	7
7/8/11	8:15	NDSWC	NA	8.72	500	447	-	7
7/9/11	-	-	-	-	-	-	-	-
7/10/11	-	-	-	-	-	-	-	-
7/11/11	15:50	NDSWC	NA	8.73	532	464	-	7
7/12/11	9:00	NDSWC	NA	8.56	490	461	-	7
7/13/11	8:40	NDSWC	NA	8.92	246	412	-	7
7/14/11	9:00	NDSWC	NA	8.54	348	423	-	7
7/15/11	-	-	-	-	-	-	-	-
7/16/11	-	-	-	-	-	-	-	-
7/17/11	-	-	-	-	-	-	-	-
7/18/11	16:20	NDSWC	NA	8.80	502	397	-	7
7/19/11	15:10	NDSWC	NA	8.82	502	400	-	7
7/20/11	8:45	NDSWC	NA	8.58	506	465	16	7
7/21/11	-	-	-	-	-	-	-	-
7/22/11	-	-	-	-	-	-	-	-
7/23/11	-	-	-	-	-	-	-	-
7/24/11	-	-	-	-	-	-	-	-
7/25/11	7:50	NDSWC	NA	9.03	536	515	-	7
7/26/11	15:00	NDSWC	NA	8.99	528	523	-	7
7/27/11	8:45	NDSWC	NA	8.60	515	526	-	7
7/28/11	16:00	NDSWC	NA	8.92	103	421	-	7
7/29/11	-	-	-	-	-	-	-	-
7/30/11	-	-	-	-	-	-	-	-
7/31/11	-	-	-	-	-	-	-	-
<b>Minimum</b>				8.47	103	397	16	
<b>Maximum</b>				9.03	536	526	24	
<b>Average</b>				8.73	440	459	20	

NA - Not Available

**Daily Outlet Discharge**

<b>Date</b>	<b>Average Daily Outlet Discharge (cfs)</b>	<b>Total Daily Volume (cu-ft)</b>	
7/1/11	221	19,085,701	
7/2/11	235	20,272,952	
7/3/11	229	19,814,826	
7/4/11	225	19,454,455	
7/5/11	226	19,560,480	
7/6/11	229	19,771,167	
7/7/11	232	20,050,380	
7/8/11	235	20,340,561	
7/9/11	237	20,454,533	
7/10/11	238	20,580,325	
7/11/11	242	20,869,336	
7/12/11	244	21,050,288	
7/13/11	241	20,854,262	
7/14/11	237	20,511,768	
7/15/11	242	20,925,961	
7/16/11	246	21,246,770	
7/17/11	246	21,286,087	
7/18/11	243	20,989,451	
7/19/11	219	18,899,070	
7/20/11	189	16,350,551	
7/21/11	128	11,089,717	
7/22/11	218	18,792,752	
7/23/11	185	16,010,390	
7/24/11	222	19,169,489	
7/25/11	133	11,507,933	
7/26/11	143	12,391,852	
7/27/11	124	10,735,436	
7/28/11	186	16,061,062	
7/29/11	235	20,288,297	
7/30/11	233	20,091,580	
7/31/11		20,086,931	
<b>Total</b>		<b>578,594,362</b>	<b>cu-ft</b>
<b>Total</b>		<b>4,328</b>	<b>Mgal</b>
<b>Total</b>		<b>13,283</b>	<b>Ac-ft</b>
<b>Minimum</b>	<b>124</b>	<b>cfs</b>	
<b>Maximum</b>	<b>246</b>	<b>cfs</b>	
<b>Average</b>	<b>215</b>	<b>cfs</b>	

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
7/1/11	7/31/11

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.17	8.54	8.34	SU	4 x Week	GRAB
SPECIFIC CONDUCTANCE	1,340	1,400	1,373	umho/cm	Continuous	Recorder
SULFATE	165	303	253	mg/L	4 x Week	GRAB
7 DAY AVERAGE OF SULFATE	216	336	257	mg/L	4 x Week	GRAB
FLOW, INSTREAM	121	288	164	cfs	Continuous	Recorder
SIGNATURE	 JONATHAN KELSCH, HEAD, CONSTRUCTION SECTION			8/25/11	701-328-4948	
NAME AND TITLE				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

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

<b>Date</b>	<b>Time</b>	<b>Sampler</b>	<b>USGS EC (<math>\mu</math>S/cm)</b>	<b>Lab pH</b>	<b>Lab Sulfate (mg/L)</b>	<b>7 Day Rolling Average of Sulfate for the operating period (mg/L)</b>	<b>Total Suspended Solids (mg/L)</b>	<b>No. of days included in the 7 day Rolling average</b>
7/1/11	--	--	--	--	--	--	--	--
7/2/11	--	--	--	--	--	--	--	--
7/3/11	--	--	--	--	--	--	--	--
7/4/11	--	--	--	--	--	--	--	--
7/5/11	16:50	NDSWC	1,370	8.35	273	336	16	7
7/6/11	13:30	--	1,380	8.51	217	286	--	7
7/7/11	10:00	--	1,380	8.50	207	232	--	7
7/8/11	8:30	--	1,380	8.54	165	216	--	7
7/9/11	--	--	--	--	--	--	--	--
7/10/11	--	--	--	--	--	--	--	--
7/11/11	16:00	--	1,380	8.29	303	233	--	7
7/12/11	9:20	NDSWC	1,370	8.24	280	234	--	7
7/13/11	8:30	NDSWC	1,370	8.29	215	234	--	7
7/14/11	8:45	NDSWC	1,360	8.52	188	230	--	7
7/15/11	--	--	--	--	--	--	--	--
7/16/11	--	--	--	--	--	--	--	--
7/17/11	--	--	--	--	--	--	--	--
7/18/11	16:35	NDSWC	1,400	8.23	277	240	--	7
7/19/11	15:20	NDSWC	1,400	8.17	278	240	--	7
7/20/11	9:00	NDSWC	1,350	8.30	280	256	95	7
7/21/11	--	--	--	--	--	--	--	--
7/22/11	--	--	--	--	--	--	--	--
7/23/11	--	--	--	--	--	--	--	--
7/24/11	--	--	--	--	--	--	--	--
7/25/11	7:40	NDSWC	1,400	8.32	279	279	--	7
7/26/11	15:15	NDSWC	1,360	8.25	274	278	--	7
7/27/11	9:05	--	1,350	8.34	284	279	--	7
7/28/11	16:15	NDSWC	1,350	8.18	271	277	--	7
7/29/11	--	--	--	--	--	--	--	--
7/30/11	--	--	--	--	--	--	--	--
7/31/11	--	--	--	--	--	--	--	--
<b>Minimum</b>			1,350	8.17	165	216	16	
<b>Maximum</b>			1,400	8.54	303	336	95	
<b>Average</b>			1,373	8.34	253	257	56	

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

<b>Date</b>	<b>Streamflow (cfs)</b>	<b>EC (<math>\mu</math>S/cm)</b>
7/1/11	288	1,390
7/2/11	268	1,370
7/3/11	246	1,370
7/4/11	227	1,370
7/5/11	208	1,370
7/6/11	193	1,370
7/7/11	181	1,380
7/8/11	170	1,380
7/9/11	175	1,390
7/10/11	180	1,380
7/11/11	176	1,380
7/12/11	168	1,380
7/13/11	157	1,370
7/14/11	142	1,370
7/15/11	135	1,380
7/16/11	128	1,390
7/17/11	124	1,390
7/18/11	135	1,400
7/19/11	142	1,390
7/20/11	140	1,380
7/21/11	130	1,380
7/22/11	121	1,370
7/23/11	126	1,360
7/24/11	143	1,380
7/25/11	147	1,390
7/26/11	144	1,360
7/27/11	141	1,360
7/28/11	134	1,350
7/29/11	134	1,340
7/30/11	135	1,340
7/31/11	133	1,340
<b>Minimum</b>	121	1,340
<b>Maximum</b>	288	1,400
<b>Average</b>	164	1,373

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
7/1/11	7/31/11

PARAMETER	MINIMUM	MAXIMUM	AVERAGE	UNITS	SAMPLING FREQUENCY	TYPE
pH	8.26	8.67	8.39	SU	4 x Week	GRAB
SPECIFIC CONDUCTANCE	1,490	1,620	1,566	umho/cm	Continuous	Recorder
SULFATE	184	429	376	mg/L	4 x Week	GRAB
7 DAY AVERAGE OF SULFATE	349	417	380	mg/L	4 x Week	GRAB
FLOW, INSTREAM	250	561	391	cfs	Continuous	Recorder
SIGNATURE	 JONATHAN KELSCH, HEAD, CONSTRUCTION SECTION			8/25/11	701-328-4948	
NAME AND TITLE				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



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

<b>Date</b>	<b>Time</b>	<b>Sampler</b>	<b>USGS EC (µS/cm)</b>	<b>Lab pH</b>	<b>Lab Sulfate (mg/L)</b>	<b>7 Day Rolling Average of Sulfate for the operating period (mg/L)</b>	<b>Total Suspended Solids (mg/L)</b>	<b>No. of days included in the 7 day Rolling average</b>
7/1/2011	--	--	--	--	--	--	--	--
7/2/2011	--	--	--	--	--	--	--	--
7/3/2011	--	--	--	--	--	--	--	--
7/4/2011	--	--	--	--	--	--	--	--
7/5/2011	17:20	NDSWC	1,530	8.38	403	414	16	7
7/6/11	14:00	NDSWC	1,590	8.67	281	367	--	7
7/7/11	10:30	NDSWC	1,600	8.66	363	349	--	7
7/8/11	9:00	NDSWC	1,620	8.34	401	362	--	7
7/9/11	--	--	--	--	--	--	--	--
7/10/11	--	--	--	--	--	--	--	--
7/11/11	17:00	NDSWC	1,600	8.43	429	375	--	7
7/12/2011	9:45	NDSWC	1,520	8.33	411	377	--	7
7/13/2011	8:00	NDSWC	1,520	8.33	408	402	--	7
7/14/2011	8:20	NDSWC	1,520	8.39	184	367	--	7
7/15/2011	--	--	--	--	--	--	--	--
7/16/2011	--	--	--	--	--	--	--	--
7/17/2011	--	--	--	--	--	--	--	--
7/18/2011	17:00	NDSWC	1,530	8.37	421	356	--	7
7/19/2011	15:43	NDSWC	1,620	8.39	420	358	--	7
7/20/2011	9:30	NDSWC	1,610	8.31	429	364	29	7
7/21/2011	--	--	--	--	--	--	--	--
7/22/2011	--	--	--	--	--	--	--	--
7/23/2011	--	--	--	--	--	--	--	--
7/24/2011	--	--	--	--	--	--	--	--
7/25/2011	7:15	NDSWC	1,610	8.32	403	417	--	7
7/26/2011	15:45	NDSWC	1,560	8.30	406	413	--	7
7/27/2011	9:40	NDSWC	1,570	8.38	419	409	--	7
7/28/2011	16:45	NDSWC	1,490	8.26	266	374	--	7
7/29/11	--	--	--	--	--	--	--	--
7/30/11	--	--	--	--	--	--	--	--
7/31/11	--	--	--	--	--	--	--	--
<b>Minimum</b>			1,490	8.26	184	349	16	
<b>Maximum</b>			1,620	8.67	429	417	29	
<b>Average</b>			1,566	8.39	376	380	23	

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

<b>Date</b>	<b>Streamflow (cfs)</b>	<b>EC (<math>\mu</math>S/cm)</b>
7/1/11	561	1,550
7/2/11	544	1,550
7/3/11	530	1,570
7/4/11	504	1,580
7/5/11	479	1,580
7/6/11	457	1,590
7/7/11	442	1,600
7/8/11	429	1,610
7/9/11	430	1,610
7/10/11	433	1,600
7/11/11	437	1,600
7/12/11	433	1,600
7/13/11	424	1,600
7/14/11	395	1,600
7/15/11	392	1,610
7/16/11	391	1,620
7/17/11	401	1,620
7/18/11	407	1,620
7/19/11	388	1,630
7/20/11	345	1,610
7/21/11	309	1,590
7/22/11	260	1,590
7/23/11	304	1,590
7/24/11	320	1,580
7/25/11	336	1,610
7/26/11	272	1,580
7/27/11	270	1,540
7/28/11	250	1,530
7/29/11	293	1,550
7/30/11	341	1,570
7/31/11	349	1,570
<b>Minimum</b>	250	1,530
<b>Maximum</b>	561	1,630
<b>Average</b>	391	1,589