



Nebraska Public Power District

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From: Brian Barels, Nebraska Public Power District
To: Gordon Fassett, Nebraska Department of Natural Resources
Re: Recharge Analysis for Temporary Appropriations A-19459 and A-19458
Date: November 3, 2017

Background

On August 19, 2016, the Nebraska Department of Natural Resources approved applications A-19459, Gothenburg Canal, and A-19458, Dawson County Canal, for recharge activities. These temporary appropriations expired one year from the order date. One condition included in each of the water appropriations was:

13. Within six months after the final date of diversion under this temporary permit, the appropriator shall file a map that depicts where the water was routed, and will provide in-depth quantitative analysis to the Department of the recharge achieved by utilizing the Gothenburg/Dawson County Canal, including all data provided for any contractual arrangements between NPPD, the Department or other persons.

With this technical memorandum, the Nebraska Public Power District (NPPD) intends to fulfill the provision. NPPD has a contract with the Platte River Recovery Program (PRRIP) for the recharge from the Dawson County and Gothenburg Canals and the information included in this report will be provided to PRRIP. Determination of the recharge at each of the canals is made from data collected including river diversions recorded at the canal head gates (NDNR provisional data) and NPPD used staff gages to determine diversions into canal laterals from the main canal and the water spilled from the canal systems. This date was used to determine the amount of water recharged.

Fall 2016 Operations

Gothenburg Canal

The Gothenburg Canal ceased operating for irrigation needs on September 9, 2016. Subsequently water was diverted into the canal for groundwater recharge from September 15-30, October 11-14, and November 16-December 5.

There was a total of 4,653 AF of water recharged. The Gothenburg Canal used various laterals during the period of groundwater recharge operations. The following summarizes the operation of the main canal and laterals for groundwater recharge:

Date	Total Canal Recharge (AF)			Lateral Information (AF)					
	River		Net	16		18		20	
	Diversion	Spill	Recharge	Diversion	Spill	Diversion	Spill	Diversion	Spill
9/15	85		85						
9/16	177		177						
9/17	171		171						
9/18	159		159						
9/19	145	-19	126	4	0.4	0.4	0	17.9	12.1
9/20	137	-12	125	4	1.2	0.4	0	19.0	4.2
9/21	131	-19	112	4	1.2	0.4	0	17.7	11.5
9/22	131	-18	113	4	0.8	0.4	0	15.7	10.7
9/23	131	-18	113	4	0.8	0.4	0	15.7	10.3
9/24	125	-17	108	4	0.8	0.4	0	15.7	10.3
9/25	123	-15	108	4	0.8	0.2	0	15.7	9.1
9/26	119	-13	106	4	0.8	0.2	0	15.7	9.1
9/27	117	-12	105	4	0.8	0	0	15.7	9.1
9/28	155	-12	143	4	0.8	0	0	15.7	9.1
9/29	184	-12	172	4	0.8	0	0	15.7	9.1
9/30	182	-16	166	4	0.8	0	0	15.7	9.1
10/11	77	0	77						
10/12	120	0	120						
10/13	119	0	119						
10/14	73	0	73						
11/16	141	0	141						
11/17	179	-48	131						
11/18	188	-48	141						
11/19	192	-79	113						
11/20	194	-117	77						
11/21	196	-99	97						
11/22	196	-99	97						
11/23	196	-99	97						
11/24	196	-99	97						
11/25	192	-77	115						
11/26	188	-69	119						
11/27	179	-69	109						
11/28	169	-58	111						
11/29	159	-54	105						
11/30	159	-46	113						
12/1	149	-32	117						
12/2	139	-32	107						
12/3	139	-20	119						
12/4	137	-20	117						
12/5	69	-20	50						
Total	6019	-1366	4653						

The portions of canal which recharged groundwater during this period can be found on the A-19459 Map below.

A-19459, Gothenburg Canal Recharge Map



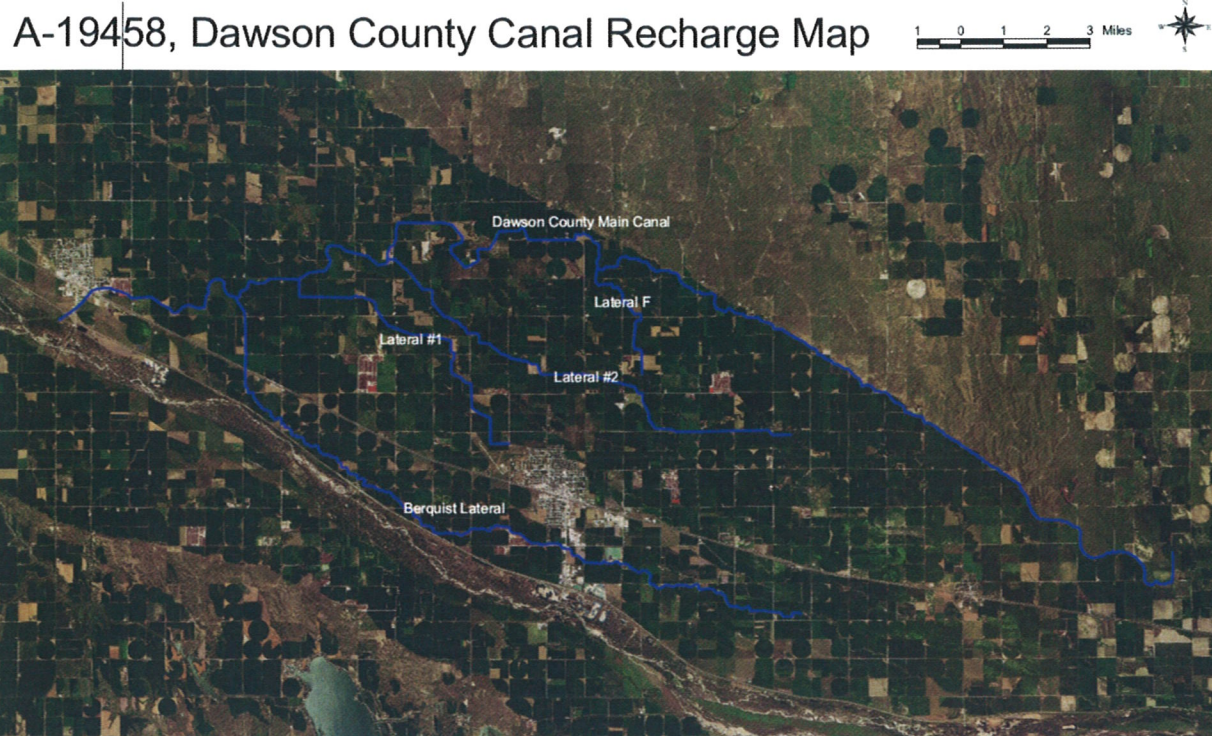
Dawson County Canal

The Dawson County Canal ceased operating for irrigation needs on September 9, 2016. Subsequently water was diverted into the canal for groundwater recharge from September 15-30 and November 16-December 5.

There was a total of 3,471 AF of water recharged. The Dawson County Canal used various laterals during the period of groundwater recharge operations. The following summarizes the operation for groundwater recharge:

Date	Total Canal Recharge (AF)			Lateral Information (AF)							
	River	Spill	Net	#2		Berquist		#1		F	
	Diversion		Recharge	Diversion	Spill	Diversion	Spill	Diversion	Spill	Diversion	Spill
9/15	141	0	141								
9/16	198	0	198	34	0	0	0	0	0	0	0
9/17	165	-7	158	34	7	0	0	0	0	0	0
9/18	146	-7	139	34	7	0	0	0	0	0	0
9/19	139	-10	130	34	7	18	2	50	0	0	0
9/20	125	-16	108	21	0	16	2	50	0	0	0
9/21	114	-46	68	8	0	10	2	0	0	6	0
9/22	112	-53	59	10	5	10	2	0	0	6	2
9/23	111	-49	63	15	4	10	0	14	7	6	2
9/24	105	-46	60	15	2	9	0	12	6	5	1
9/25	100	-42	58	14	0	8	0	10	4	4	0
9/26	96	-26	70	14	0	8	0	8	2	4	0
9/27	96	-22	74	12	0	8	2	8	8	4	0
9/28	91	-20	72	11	0	9	2	12	8	4	0
9/29	93	-22	71	10	4	10	0	15	8	4	0
9/30	92	-22	70	10	4	10	0	15	8	4	0
11/16	131	0	131								
11/17	198	0	198								
11/18	192	0	192	0	0	24	0				
11/19	194	-83	110	44	0	24	6				
11/20	198	-95	103	44	12	34	6				
11/21	197	-103	94	48	12	34	10				
11/22	197	-97	100	52	12	34	14				
11/23	197	-98	99	52	13	34	14				
11/24	197	-98	99	52	13	34	14				
11/25	197	-98	99	52	13	34	14				
11/26	197	-100	97	52	15	34	14				
11/27	196	-103	93	48	16	32	16				
11/28	192	-101	91	48	16	32	14				
11/29	188	-101	87	48	16	32	14				
11/30	188	-101	87	48	16	32	14				
12/1	188	-123	65	48	16	32	14				
12/2	187	-123	65	48	16	32	14				
12/3	181	-119	62	48	16	32	14				
12/4	179	-113	66	48	16	32	14				
12/5	109	-113	-4	48	16	32	14				
Total	5628	-2157	3471								

The portions of canal which recharged groundwater during this period can be found on the A-19458 Map below.



Spring 2017 Operations

Gothenburg Canal

The Gothenburg Canal did not operate for groundwater recharge in the spring of 2017.

Dawson County Canal

The Dawson County Canal did not operate for groundwater recharge in the spring of 2017.