

RECLAMATION

Managing Water in the West

Nebraska-Kansas Area Office

Report

To The

Republican River

Compact Administration

Burlington, Colorado



— BUREAU OF —
RECLAMATION

U.S. Department of the Interior
Bureau of Reclamation
Missouri Basin Region
Nebraska-Kansas Area Office

August 31, 2022

REPUBLICAN RIVER COMPACT MEETING

August 31, 2022
Burlington, Colorado

2021 Operations

As shown on the attached Table 1, precipitation in the Republican River Basin varied from 121 percent of normal at Harlan County Dam to 67 percent of normal at Trenton Dam. Total precipitation at Reclamation project dams ranged from 13.68 inches at Trenton Dam to 28.22 inches at Harlan County Dam.

Inflows varied from 34 percent of the most probable forecast at Bonny Reservoir to 125 percent of the most probable forecast at Harlan County Reservoir. Inflows into Bonny Reservoir totaled 2,295 AF while inflows at Harlan County Reservoir totaled 130,998 AF.

Average farm delivery values for total irrigable acres were as follows:

<u>District</u>	<u>Farm Delivery</u>
Frenchman Valley	0.2 inches
H&RW	0.0 inches
Frenchman-Cambridge	6.0 inches
Almena	2.3 inches
Bostwick in NE	4.6 inches
Kansas-Bostwick	10 inches

2021 Operation Notes

Bonny Reservoir – Remained empty at elevation 3638.00 feet, 34.0 feet below the top of conservation. The annual computed inflow totaled 2,295 AF, the lowest on record. Reservoir inflows were bypassed the entire year as ordered by the State of Colorado. No water was bypassed into Hale Ditch in 2021.

Enders Reservoir – The reservoir level began the year at a level of 3,081.93 feet (30.4 feet below the top of conservation). This was the second lowest level ever recorded on the first of January since initial filling. The reservoir level increased gradually during the spring to a peak elevation of 3,083.65 feet on June 2nd. Evaporation decreased the reservoir level from June through mid-November reaching elevation 3,080.69 feet on November 18th. This was the lowest elevation observed since 67 days after initial closure. Due to the extremely low water supply available, no water was released from Enders Reservoir during the irrigation season. The end of the year reservoir level was 3,080.81 feet (31.5 feet below the top of conservation). This was the lowest end of year level recorded since initial filling. The Frenchman Valley Irrigation District diverted 5,988 AF of natural flow from Frenchman Creek between April 22nd and October 15th. The H&RW Irrigation District did not divert

water into Culbertson Extension Canal in 2021. This was the nineteenth consecutive year that the district did not deliver water.

Swanson Lake – The lake level began the year at elevation 2,738.60 feet (13.4 feet below the top of conservation) and gradually increased throughout the late winter and spring. The peak elevation on June 11th was 2,743.30 feet (8.7 feet below the top of conservation). The reservoir level decreased throughout the irrigation season and reached an elevation of 2,735.65 feet on December 19th. The district diverted 18,654 AF into Meeker-Driftwood Canal from June 21st through September 3rd. At the end of the year, the reservoir level was at 2,735.70 feet (16.4 feet below the top of conservation).

Hugh Butler Lake – The reservoir level at the first of the year was 2,568.67 feet, 13.1 feet below the top of conservation. Late winter, spring and summer inflows gradually increased the lake level to a summer peak of 2,572.03 feet on June 3rd. The district diverted 5,161 AF into Red Willow Canal from May 1st through September 3rd. Late summer evaporation exceeded inflows, decreasing the lake level to 2,565.4 feet on September 29th. The end of year elevation was 2,566.13 feet (15.7 feet below the top of conservation).

Harry Strunk Lake – The reservoir level at the beginning the year was 2,359.72 feet (6.4 feet below the top of conservation). The reservoir filled to top of conservation on April 16th. Irrigation releases started May 10th. The reservoir level peaked at elevation 2,367.58 feet on May 28th. The district diverted 25,971 AF into Cambridge Canal from April 2nd through September 10th. The end of year elevation was 2,361.83 feet at the end of the year (4.3 feet below the top of conservation).

Keith Sebelius Lake – The reservoir elevation was 2,297.19 feet (7.1 feet below the top of conservation pool) at the first of the year. Late winter, spring and summer inflows gradually increased the lake level to a summer peak of 2,298.77 feet on May 31st. Irrigation releases began July 13th and finished for the season on July 30th. Approximately 2,815 AF was released from Norton Dam for irrigation of which 2,154 AF was diverted into the Almena Canal from July 15th through July 30th. Inflows in December exceeded evaporation gradually increasing the elevation to the end of year elevation of 2,294.90 feet (9.4 feet below the top of conservation).

Harlan County Lake – Harlan County Lake began 2021 at 1,943.05 feet (approximately 2.7 feet below the top of conservation pool). The Corps of Engineers made varying flood releases between April and June to keep the pool elevation near the top of conservation. Approximately 44,600 AF was released during that period. The conservation pool as well as the accumulated flood pool was split June 14th as irrigation releases began. The projected irrigation supply at the end of June was 141,404 AF. It was determined that Water Short Year Administration would not be in effect in 2021. Both NBID and KBID were able to utilize some of the flood release for irrigation. Bostwick in Nebraska Irrigation District diverted 33,723 AF in 2021. Kansas-Bostwick Irrigation District diverted 54,926 AF in 2021. A ten-year summary of Harlan County Lake operations is shown on Table 3.

Lovewell Reservoir – The reservoir elevation at the beginning of 2021 was 1,581.03 feet (1.6 feet below the top of conservation). Lovewell dam recorded 5.66 inches of precipitation in 10

days during mid to late March. This increased the lake elevation 2.3 feet to a yearly peak of 1584.34 (1.7 feet above top of conservation). Flood releases were staged up to 250 cfs. Flood waters were evacuated by April 12th. Lovewell dam recorded 4.47 inches of precipitation throughout mid to late May again raising the reservoir elevation into the flood pool. Flood releases of 250 cfs started June 1st and were maintained for about a week until irrigation releases into the canal increased. Flood releases ceased June 7th. Irrigation releases for canal seasoning/flushing began May 25th with releases in earnest beginning starting early-June and continued until September 10th. Irrigation releases lowered the lake to a yearly low of 1576.38 (6.2 feet below conservation) before a timely rain at the end of August allowed the lake to recover significantly by both reducing demand and increasing diversions into the Courtland Canal. Republican River flow was diverted via the Courtland Canal into Lovewell Reservoir after the irrigation season. The pool level at the end of the year was 1,580.92 feet (1.7 foot below top of conservation). KBID diverted a total of 54,926 AF in 2021.

Current Operations (As of 7/31/22)

Bonny Reservoir – The reservoir is currently empty. No inflows have been recorded in 2022. No water has been released into Hale Ditch in 2022. Bonny Dam has recorded 9.27 inches of precipitation during the first seven months of the year (78% of average).

Enders Reservoir - The reservoir level is currently 32.3 feet below full and 2.31 feet below last year at this time. Enders Dam recorded 7.90 inches of precipitation during the first seven months of the year (60% of normal). Due to the continuing water supply shortage, H&RW elected to not renew their water service contract in 2022. This is also the nineteenth consecutive year that Frenchman Valley Irrigation District has not received storage water for irrigation. Dead pool was reached on July 25th. The end of July elevation of 3079.99 was the lowest observed elevation since initial filling of the reservoir.

Swanson Lake – The lake level is currently 19.26 feet from full and is 7.07 feet below last year at this time. Precipitation for the year is at 48% of normal (6.56 inches). Irrigation releases began on June 14th.

Hugh Butler Lake – The lake level is currently 18.69 feet below full and is 5.50 feet below last year at this time. Irrigation releases began on June 19th. The precipitation total so far this year is 7.61 inches (58% of normal).

Harry Strunk Lake – The lake level is currently 6.80 feet below the top of conservation. Precipitation at the dam during the first seven months of the year was 13.16 inches (93% of normal). Irrigation releases began on April 21st. The lake level is currently 3.23 feet below last year at this time.

Keith Sebelius Lake – The lake is currently 12.14 feet below full. Lake level is 4.13 feet below last year at this time. Irrigation releases began July 3rd and finished July 19th. Precipitation at the dam during the first seven months of the year was 10.43 inches (65% of normal).

Harlan County Lake – The current water surface level is approximately 2.48 feet below full. The lake level is 0.94 feet below last year at this time. Harlan County Dam has recorded 11.60 inches of precipitation so far this year (77% of normal). Irrigation releases started on June 11th. The available irrigation supply from Harlan County Lake on June 30th was 130,834 AF.

Lovewell Reservoir – The reservoir level is currently 2.5 feet below the top of conservation and approximately 1.80 feet above last year's elevation at this time. Lovewell Dam recorded 15.00 inches of precipitation during the first seven months of the year (86% of average). Canal releases began on May 19th.

A summary of data for the first seven months of 2022 is shown on Table 2.

TABLE 1
NEBRASKA-KANSAS PROJECTS
Summary of Precipitation, Reservoir Storage and Inflows
CALENDAR YEAR 2021

Reservoir	Total Precip. Inches	Percent Of Average	Storage 12-31-20		Gain or Loss	Maximum Storage		Minimum Storage		Total Inflow AF	Percent Of Most Probable
			AF	%		Content	Date	Content	Date		
Box Butte	12.37	72	14,856	10,681	-4,175	22,601	6/4	7,285	9/1	21,968	146
Merritt	19.21	90	61,100	60,966	-134	65,655	5/17	48,207	8/19	223,085	118
Calamus	19.90	79	96,864	92,689	-4,175	121,202	5/17	62,401	9/19	313,821	117
Davis Creek	23.52	90	12,637	13,024	387	28,074	6/16	12,073	3/11	57,974	119
Bonny	17.93	101	0	0	0	0	#N/A	0	#N/A	2,295	34
Enders	16.09	83	8,638	7,983	-655	9,753	6/2	7,913	11/18	4,001	77
Swanson	13.68	67	55,478	46,186	-9,292	72,408	6/11	46,033	12/19	22,902	89
Hugh Butler	18.98	95	18,430	15,811	-2,619	22,279	6/3	15,106	9/29	8,731	85
Harry Strunk	19.35	91	24,696	27,646	2,950	37,454	5/28	20,575	9/9	31,212	76
Keith Sebelius	20.89	83	21,197	17,753	-3,444	23,792	5/31	17,710	12/5	6,222	94
Harlan County	28.22	121	279,631	280,385	754	326,076	6/1	270,202	8/22	130,998	125
Lovewell	24.55	88	31,163	30,861	-302	41,093	3/26	19,936	8/13	57,851	90
Kirwin	24.03	100	90,582	85,227	-5,355	106,054	6/21	83,978	9/27	36,820	130
Webster	22.39	94	69,098	62,254	-6,844	84,474	6/3	60,697	9/29	37,542	200
Waconda	22.55	88	208,367	220,177	11,810	251,969	5/20	206,057	1/22	248,810	183
Cedar Bluff	17.83	84	106,503	98,996	-7,507	111,370	6/4	98,996	12/30	14,480	121

TABLE 2
NEBRASKA-KANSAS AREA OFFICE
Summary of Precipitation, Reservoir Storage and Inflows

JANUARY - JULY 2022

Reservoir	Precip.	Percent Of Average %	Storage	Storage	Gain or Loss	Inflow	Percent Of Most Probable %
	Inches		7/31/2021	7/31/2022		AF	
Bonny	9.27	78	0	0	0	885	23
Enders	7.90	60	8,885	7,510	(1,375)	2,421	83
Swanson	6.56	48	59,602	37,523	(22,079)	13,859	69
Hugh Butler	7.61	58	18,701	12,999	(5,702)	4,251	63
Harry Strunk	13.16	93	28,676	24,133	(4,543)	19,538	73
Keith Sebelius	10.43	65	19,799	14,126	(5,673)	3,541	75
Harlan County	11.60	77	294,015	282,145	(11,870)	58,162	78
Lovewell	15.00	86	23,500	26,889	3,389	19,456	102

Inflow at Swanson Lake includes water from augmentation (pumping) projects.

**TABLE 3
HARLAN COUNTY LAKE**

Year	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	Precipitation		Rep. Basin Dams	End of Year Content (AF)	Projected Irrig. Water Supply On June 30th (AF)
					Harlan County Dam* (% of Average)	(% of Average)			
2012	78,581	160,221	50,199	18.14	78%	64%	191,125	132,900	
2013	48,794	75,355	40,042	17.46	75%	83%	124,522	81,400	
2014	92,209	35,502	32,387	18.53	80%	105%	148,842	59,000	
2015	106,728	54,502	33,652	28.85	125%	115%	167,416	79,600	
2016	126,679	63,972	35,920	27.82	120%	109%	194,203	103,500	
2017	118,889	52,764	36,081	26.60	115%	104%	224,247	111,600	
2018	120,146	53,451	35,914	29.61	128%	128%	255,028	106,600	
2019	402,546	272,471	55,374	30.94	134%	132%	329,729	139,716	
2020	125,674	130,068	45,704	17.38	75%	74%	279,631	143,392	
2021	130,998	88,222	42,022	28.22	121%	91%	280,385	141,404	

NOTE: On June 30, 2022 Projected Irrigation Water Supply was 130,834 AF.

* Average Annual Precipitation at Harlan County Dam is 23.13 inches

