RECLAMATION

Managing Water in the West

Nebraska-Kansas Area Office

Report

To The

Republican River

Compact Administration

Virtual Meeting

BUREAU OF RECLAMATION

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

August 21, 2020

REPUBLICAN RIVER COMPACT MEETING

August 21, 2020
Virtual Meeting

2019 Operations

As shown on the attached Table 1, precipitation in the Republican River Basin varied from 149 percent of normal at Red Willow Dam to 113 percent of normal at Trenton Dam. Total precipitation at Reclamation project dams ranged from 21.09 inches at Bonny Dam to 38.12 inches at Lovewell Dam.

Inflows varied from 60 percent of the most probable forecast at Bonny Reservoir to 385 percent of the most probable forecast at Harlan County Lake. Inflows into Bonny Reservoir totaled 3,990 AF while inflows at Harlan County Lake totaled 402,546 AF.

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

District	Farm Delivery
Frenchman Valley	0.4 inches
H&RW	0.0 inches
Frenchman-Cambridge	4.1 inches
Almena	1.2 inches
Bostwick in NE	2.2 inches
Kansas-Bostwick	3.5 inches

2019 Operation Notes

Bonny Reservoir – Remained empty at elevation 3638.00 feet, 34.0 feet below the top of conservation. The annual computed inflow totaled 3,990 AF. Reservoir inflows were bypassed the entire year as ordered by the State of Colorado. No water was bypassed into Hale Ditch in 2019.

Enders Reservoir – The start of the year elevation was 29.3 feet (elevation 3083.05 feet) below the top of conservation, the third lowest level ever recorded at the beginning of the year since initial filling. The 2019 computed inflow totaled 5,180 AF. The reservoir level increased gradually during the spring to a peak elevation of 3084.90 feet on June 9th. Evaporation decreased the reservoir level from June through early-October reaching elevation 3083.20 feet on October 28th. Due to the extremely low water supply available, no water was released from Enders Reservoir during the irrigation season. This was the eighteenth consecutive year that H&RW Irrigation District did not divert water. It was also the sixteenth consecutive year that storage releases were not made for Frenchman Valley Irrigation District. The end of the year reservoir level was 28.6 feet (3083.70 feet) below the top of conservation. This was the fourth lowest end of year level recorded since initial filling. Frenchman Valley

Irrigation District diverted 11,598 AF of natural flow between April 16th and October 15th into Culbertson Canal.

Swanson Lake – The lake level began the year at elevation 2739.74 feet (12.3 feet below the top of conservation) and gradually increased throughout the late winter and spring. The annual computed inflow totaled 34,954 AF. The peak elevation on June 26th was 2744.78 feet (7.2 feet below the top of conservation). The reservoir level decreased throughout the irrigation season and reached an elevation of 2739.01 feet on November 18th. The district diverted 16,468 AF into Meeker-Driftwood Canal from June 27th through September 9th. At the end of the year, the reservoir level was 12.0 feet below the top of conservation at 2740.00 feet.

Hugh Butler Lake –The reservoir level at the first of the year was 2569.75 feet, 12.1 feet below the top of conservation. Late winter, spring and summer inflows gradually increased the lake level to a summer peak of 2573.57 feet on July 12th. This was the highest elevation observed since 2009. For the first time in ten years, the district diverted 5,772 AF into Red Willow Canal. Late summer evaporation exceeded inflows, decreasing the lake level to 2570.02 feet on September 20th. The end of year elevation was 2572.31 feet, 9.5 feet below the top of conservation.

Harry Strunk Lake – The reservoir level at the beginning of the year was 3.4 feet below the top of conservation at 2362.74 feet. The reservoir filled to top of conservation on March 13th and began spilling over the uncontrolled spillway notch. The reservoir level peaked at elevation 2370.46 feet on May 31st. Releases over the uncontrolled spillway continued until the top of conservation was reached on August 22nd. Releases through the outlet works for additional irrigation demand began on July 28th, and continued through September 20th, reducing the reservoir level to 2,363.94 feet. The district diverted 24,399 AF into Cambridge Canal. Winter inflows increased the level of Harry Strunk Lake to elevation 2365.87 feet at the end of the year (0.2 feet below the top of conservation). The 2019 computed inflow was 61,478 AF.

Keith Sebelius Lake – The reservoir was 10.3 feet below the top of conservation pool at the first of the year (2294.05 feet). Late winter, spring and summer inflows gradually increased the lake level to a summer peak of 2,300.82 feet on June 24th. Approximately 1,718 AF was released from Norton Dam for irrigation of which 1,320 AF was diverted into the Almena Canal. Inflows exceeded evaporation for much of the fall and winter gradually increasing the elevation to the end of year elevation of 2299.94 feet, 4.4 feet below the top of conservation. The total 2019 computed inflow was 18,547 AF.

Harlan County Lake – Harlan County Lake began 2019 approximately 4.7 feet below the top of conservation pool, at 1941.05 feet. Harlan County filled the conservation pool on March 16th for the first time since 2012. Late winter, spring and summer inflows increased the lake level to a summer peak at elevation 1958.17 on July 23rd. This is 12.44 feet above the top of conservation (160% of full) with 189,551 AF stored in the flood pool (37.9%). This surpassed the previous all-time high set in 1960 by 2.51 feet.

The 2019 inflow of 402,546 AF was the largest yearly inflow since 1967. The projected irrigation supply at the end of June was 139,716 AF. It was determined that Water Short Year

Administration would not be in effect in 2019. Flood releases began in March and continued though out the year and totaled 272,471 AF. Both NBID and KBID were able to utilize some of the flood release for irrigation. Bostwick in Nebraska Irrigation District diverted 39,508 AF in 2019. A ten year summary of Harlan County Lake operations is shown on Table 3.

Lovewell Reservoir – The reservoir elevation at the beginning of 2019 was 1583.44 feet (0.8 foot above the top of conservation). The reservoir was drawn down to elevation 1577.59 during January to perform repairs to the north spillway gate cables. On July 15th, Lovewell Reservoir peaked at 10.39 feet above top of conservation which is 2.31 feet below the top of the spillway gates (surcharge pool) with nearly 80% of the flood pool filled. Canal releases from Lovewell Reservoir began on May 28th, with irrigation releases beginning in earnest on June 11th. Irrigation releases continued through September 19th. Releases to the river concurrently drew down the reservoir to a target of 1572.00. This elevation allowed maintenance crews to clean out the canal intake channel. Maintenance crews also worked on the south spillway gate while it was exposed. Republican River flow was diverted via the Courtland Canal into Lovewell Reservoir after the irrigation season to refill after the drawdown for dam maintenance. KBID diverted a total of 32,989 AF in 2019, including 19,275 AF from Lovewell Reservoir. The pool level at the end of the year was 1,582.68 feet (0.08 foot above top of conservation). The annual computed inflow total for 2019 was 132,470 AF.

Current Operations (As of 7/31/20)

Bonny Reservoir – The reservoir is currently empty. Inflows continue to be bypassed through the reservoir as ordered by the State of Colorado. No water has been released into Hale Ditch in 2020. Bonny Dam has recorded 9.36 inches of precipitation during the first seven months of the year (79% of average).

Enders Reservoir - The reservoir level is currently 28.9 feet below full and 1.1 feet below last year at this time. Enders Dam recorded 10.46 inches of precipitation during the first seven months of the year (79% of normal). Due to the water supply shortage, H&RW Irrigation District is not irrigating for the nineteenth year in a row. This is also the seventeenth consecutive year that Frenchman Valley Irrigation District has not received storage water for irrigation.

Swanson Lake – The lake level is currently 10.7 feet from full and is 1.4 feet below last year at this time. Precipitation for the year is at 62% of normal (8.46 inches). Irrigation releases began on June 15th.

Hugh Butler Lake – The lake level is currently 10.7 feet below full and is 1.29 feet above last year at this time. Irrigation releases began on June 26th. The precipitation total so far this year is 12.32 inches (95% of normal).

Harry Strunk Lake – The lake level is currently 5.4 feet below the top of conservation. Precipitation at the dam during the first seven months of the year was 17.68 inches (125% of normal). Releases were made during the spring to keep the lake level approximately one foot

below the uncontrolled spillway. Irrigation releases began on May 1st. The lake level is currently 7.0 feet below last year at this time.

Keith Sebelius Lake – The lake is currently 4.6 feet below full. Lake level is 0.6 feet below last year at this time. Irrigation releases began July 5th. Precipitation at the dam during the first seven months of the year was 17.22 inches (108% of normal).

Harlan County Lake – The current water surface level is approximately 0.3 feet below full. The lake level is 12.3 feet below last year at this time. Harlan County Dam has recorded 15.16 inches of precipitation so far this year (100% of normal). Flood releases started in 2019 and continued through June 15th of this year when the pool was split and irrigation releases commenced. The available irrigation supply from Harlan County Lake on June 30th was 143,392 AF.

Lovewell Reservoir – The reservoir level is currently 3.4 feet above the top of conservation and approximately 1.3 feet above last year's elevation at this time. Lovewell Dam recorded 16.51 inches of precipitation during the first seven months of the year (94% of average). Canal releases began on June 1st.

A summary of data for the first seven months of 2020 is shown on Table 2.

TABLE 1
NEBRASKA-KANSAS PROJECTS
Summary of Precipitation, Reservoir Storage and Inflows
CALENDAR YEAR 2019

Reservoir	Total Precip. Inches	Percent Of Average %	Storage 12-31-18 AF	Storage 12-31-19 AF	Gain or Loss AF	Maximum Content AF	Storage Date	Minimum Content AF	Storage Date	Total Inflow AF	Percent Of Most Probable %
Box Butte	23.88	138	9,478	21,979	12,501	26,424	JUL 14	9,521	JAN 1	29,379	191
Merritt	33.56	157	61,723	60,298	-1,425	68,368	JUL 9	58,322	AUG 2	246,759	132
Calamus	37.33	148	99,655	81,765	-17,890	125,237	MAY 24	75,147	OCT 13	411,224	154
Davis Creek	38.37	147	13,223	12,606	-617	31,204	JUN 19	12,395	MAR 11	43,365	90
Bonny	21.09	119	0	0	0	0	N/A	0	N/A	3,990	60
Enders	24.50	127	9,362	9,786	424	10,601	JUL 9	9,362	JAN 1	5,180	85
Swanson	22.86	113	59,359	60,264	905	78,152	JUN 21	56,858	NOV 19	30,954	119
Hugh Butler	29.73	149	19,619	22,620	3,001	24,201	JUL 12	19,619	JAN 1	12,904	114
Harry Strunk	31.01	146	28,994	34,226	5,232	43,400	JUL 11	29,085	JAN 1	61,478	155
Keith Sebelius	29.57	118	16,570	25,829	9,259	27,435	JUN 24	16,570	JAN 1	18,547	281
Harlan County	30.94	132	255,028	329,729	74,701	503,662	JUL 23	255,393	JAN 1	402,546	385
Lovewell	38.12	137	38,229	35,905	-2,324	74,979	JUL 15	11,406	OCT 1	132,470	239
Kirwin	23.23	97	104,832	98,255	-6,577	127,704	JUN 25	96,992	DEC 19	88,928	343
Webster	26.41	110	78,514	78,208	-306	105,877	MAY 31	75,556	MAR 1	135,053	785
Waconda	31.85	125	234,715	212,798	-21,917	376,669	AUG 29	203,886	FEB 11	776,754	638
Cedar Bluff	30.03	141	66,266	110,720	44,454	110,770	DEC 31	66,266	JAN 1	62,296	494

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

JANUARY - JULY 2020

Reservoir	Precip. Inches	Percent Of Average %	Storage 7/31/2019 AF	Storage 7/31/2020 AF	Gain or Loss AF	Inflow AF	Percent Of Most Probable %
Bonny	9.36	79	0	0	0	3,165	66
Enders	10.46	79	10,353	9,622	(731)	2,844	79
Swanson	8.46	62	70,200	64,905	(5,295)	23,645	113
Hugh Butler	12.32	95	22,682	21,146	(1,536)	5,409	73
Harry Strunk	17.68	125	37,767	25,997	(11,770)	24,652	93
Keith Sebelius	17.22	108	26,441	25,474	(967)	6,768	141
Harlan County	15.16	100	495,240	310,009	(185,231)	109,836	147
Lovewell	16.51	94	42,140	46,557	4,417	42,612	161

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		End of Year Content (AF)	**Projected Irrig. Water Supply On June 30th (AF)**
					Harlan County Dam* (% of Average)	Rep. Basin Dams (% of Average)		
2010	239,054	194,055	46,893	31.66	137%	119%	318,364	**147,800**
2011	174,830	120,989	49,241	30.69	133%	115%	322,964	**157,700**
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**

NOTE: On June 30, 2020 Projected Irrigation Water Supply was 143,392 AF.
* Average Annual Precipitation at Harlan County Dam is 23.13 inches