

RECLAMATION

Managing Water in the West

Nebraska-Kansas Area Office

Report

To The

Republican River

Compact Administration

Lincoln, NE



**U.S. Department of the Interior
Bureau of Reclamation
Great Plains Region
Nebraska-Kansas Area Office**

August 27, 2015

REPUBLICAN RIVER COMPACT MEETING

August 27, 2015
Lincoln, Nebraska

2014 Operations

As shown on the attached Table 1, precipitation in the Republican River Basin varied from 81 percent of normal at Harlan County Dam to 137 percent of normal at Bonny Dam. Total precipitation at Reclamation project dams ranged from 18.46 inches at Enders Dam to 29.34 inches at Lovewell Dam.

Inflows varied from 26 percent of the most probable forecast at Bonny Reservoir to 175 percent of the most probable forecast at Harry Strunk Lake. Inflows into Bonny Reservoir totaled 2,664 AF while inflows at Harlan County Lake totaled 92,209 AF.

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

<u>District</u>	<u>Farm Delivery</u>
Frenchman Valley	0.0 inches
H&RW	0.0 inches
Frenchman-Cambridge	1.4 inches
Almena	1.2 inches
Bostwick in NE	0.0 inches
Kansas-Bostwick	7.3 inches

2014 Operation Notes

Bonny Reservoir – Remained empty at elevation 3638.00 feet, 34.0 feet below the top of conservation. The annual computed inflow totaled 2,664 AF. Reservoir inflows were bypassed the entire year as ordered by the State of Colorado. A total of 596 AF was bypassed into Hale Ditch from April 15th through July 18th.

Note – The Nebraska Department of Natural Resources (NDNR) declared a Compact Call Year on the Republican River Basin on January 1, 2014 and issued storage closing notices on Reclamation reservoirs in the Basin. On October 24, 2014, the NDNR notified Reclamation that storage in the reservoirs could resume.

Enders Reservoir – Started the year at elevation 3088.55 feet, 23.8 feet below the top of conservation. The 2014 computed inflow totaled 6,319 AF. No additional impoundment of water was allowed through October 24, 2014. Prior to the irrigation season, the Middle Republican Natural Resource District purchased all of the previously stored water in the irrigation pool to be used for compact compliance. The purchased water (4,380 AF) was released from Enders Reservoir during May. This release decreased the reservoir elevation to

3082.40 feet on May 29th, 2014. No water was released from Enders Reservoir for irrigation. This was the thirteenth consecutive year that H&RW Irrigation District did not divert water. It was also the eleventh consecutive year that storage releases were not made for Frenchman Valley Irrigation District. The district cooperated with the NDNR by allowing natural flows to remain in the stream to assist with compact compliance. The end of the year reservoir level was 29.6 feet (3082.72 feet) below the top of conservation.

Swanson Lake – Started the year at elevation 2729.45 feet, 22.6 feet below the top of conservation. The annual computed inflow totaled 33,083 AF (includes water pumped from the Rock Creek Augmentation Project and Colorado’s Compact Compliance Pipeline). No additional impoundment of water was allowed in the lake through October 24, 2014. The reservoir level decreased during the irrigation season reaching elevation 2726.95 feet on August 29th. The district diverted 8,035 AF into Meeker-Driftwood Canal from June 27th through August 29th. At the end of the year the reservoir level was 23.0 feet below the top of conservation at 2728.96 feet.

Hugh Butler Lake – Started the year at elevation 2555.06 feet, 26.7 feet below the top of conservation. The 2014 computed inflow was 9,588 AF. No additional impoundment of water was allowed through October 24, 2014. No irrigation releases were made from Hugh Butler Lake in 2014. The reservoir elevation at the end of year was 2556.88 feet, 24.9 feet below the top of conservation.

Harry Strunk Lake – Started the year at elevation 2356.34 feet, 9.8 feet below the top of conservation. The annual computed inflow totaled 65,044 AF (includes water pumped from the Nebraska Cooperative Republican Platte Enhancement Project). No additional impoundment of water was allowed in the lake through October 24, 2014. Irrigation releases began in early July and ran through September 4th reducing the reservoir level to elevation 2356.28 feet by early September. The district diverted 12,242 AF into Cambridge Canal. Late fall and early winter inflows increased the level of Harry Strunk Lake to 1.8 feet above the top of conservation at the end of the year (2367.85 feet).

Keith Sebelius Lake – Started the year at elevation 2290.78 feet, 13.5 feet below the top of conservation. The total 2014 computed inflow was 4,076 AF. The reservoir level slowly increased to elevation 2291.38 feet on June 11th. Irrigation releases were made during July reducing the lake level to 2289.02 feet. A total of 1,385 AF was diverted into Almena Canal. The reservoir level continued to gradually decrease the remainder of the year. Keith Sebelius Lake ended the year at elevation 2288.02 feet (16.3 feet below the top of conservation).

Harlan County Lake – Started the year at elevation 1927.85 feet, 17.9 feet below the top of conservation. The 2014 computed inflow totaled 92,209 AF (includes water that was bypassed from upstream reservoirs). The lake level peaked at elevation 1933.97 feet on July 2nd. Irrigation releases for Kansas Bostwick Irrigation District (KBID) began on June 20th and continued through September 4th decreasing the pool level to elevation 1930.49 feet. KBID entered into an Excess Capacity Contract (Warren Act Authority) with Reclamation for the use of “Compact Call” water stored in Harlan County Lake in 2014. A total of 16,487 AF was released under this contract during the irrigation season. Bostwick in Nebraska Irrigation District did not divert irrigation water in 2014. The district cooperated with the NDNR by

allowing natural flows to remain in the stream to assist with compact compliance. The reservoir elevation was 1930.81 feet (14.9 feet below the top of conservation) on December 31, 2014. A ten year summary of Harlan County Lake operations is shown on Table 3.

Lovewell Reservoir – Started the year at elevation 1577.56 feet, 5.0 feet below the top of conservation. The annual computed inflow total for 2014 was 48,535 AF. Republican River diversions were made via the Courtland Canal into Lovewell Reservoir during early January and resumed from mid-March through June. The pool level gradually increased to elevation 1582.89 feet on June 16th. Releases to the canal began on June 9th and continued through September 5th. The reservoir elevation at the end of the irrigation season was 1580.56 feet. Republican River diversions began again in mid-December. The Kansas Bostwick Irrigation District diverted a total of 47,633 AF in 2014. A total of 32,108 AF was diverted into Courtland Canal from Lovewell Reservoir. The reservoir level at the end of the year was 1580.46 feet (2.1 feet below top of conservation).

Current Operations (As of 7/31/15)

Bonny Reservoir – The reservoir is currently empty. Inflows continue to be bypassed through the reservoir as ordered by the State of Colorado. Approximately 980 AF has been released into Hale Ditch in 2015. Bonny Dam has recorded 17.20 inches of precipitation during the first seven months of the year (148% of average).

Enders Reservoir - The reservoir level is currently 27.6 feet below full and 2.2 feet above last year at this time. Enders Dam recorded 13.18 inches of precipitation during the first seven months of the year (102% of normal). Due to the water supply shortage, H&RW Irrigation District is not irrigating for the fourteenth year in a row. This is also the twelfth consecutive year that Frenchman Valley Irrigation District has not received storage water for irrigation.

Swanson Lake – The lake level is currently 14.9 feet from full and is 8.7 feet above last year at this time. Precipitation for the year is at 106% of normal (14.32 inches). Irrigation releases began on June 24th.

Hugh Butler Lake – The lake level is currently 19.3 feet below full. The precipitation total so far this year is 14.20 inches (111% of normal). The lake level is 7.5 feet above last year at this time. Irrigation releases are not being made from Hugh Butler Lake this season.

Harry Strunk Lake – The lake level is currently 1.5 feet below the top of conservation. Precipitation at the dam during the first seven months of the year was 14.79 inches (107% of normal). Irrigation releases began on June 29th. The lake level is currently 7.2 feet above last year at this time.

Keith Sebelius Lake – Currently 16.2 feet below full. Lake level is .7 foot below last year at this time. Due to a short water supply, irrigation releases are not being made in 2015. Precipitation at the dam during the first seven months of the year was 14.77 inches (91% of

normal).

Harlan County Lake – The current water surface level is approximately 11.2 feet below full. The lake level is 1.3 feet above last year at this time. Harlan County Dam has recorded 17.57 inches of precipitation so far this year (118% of normal). Irrigation releases began on June 21st. The available irrigation supply from Harlan County Lake on June 30, 2015 was 79,600 AF, indicating that “Water-Short Year Administration” would be in effect.

Lovewell Reservoir – The reservoir level is currently .5 foot below the top of conservation and approximately 3.6 feet above last year’s elevation at this time. Lovewell Dam recorded 24.16 inches of precipitation during the first seven months of the year (140% of average). Lovewell Dam recorded 7.78 inches of rainfall overnight on May 6th. The reservoir level increased 5.9 feet as a result of the storm runoff peaking at 7.2 feet into the flood pool. Flood releases were staged up to 1,250 cfs on May 9th and the reservoir level dropped to elevation 1584.60 feet (2.0 feet into the flood pool) on May 19th. Irrigation releases began on May 19th.

A summary of data for the first seven months of 2015 is shown on Table 2.

Other Items

Excess Capacity Contract – Harlan County Lake – An Excess Capacity Contract (Contract) was executed with Kansas Bostwick Irrigation District (KBID) to temporarily store inflows into Harlan County Lake under the State of Nebraska’s Compact Call water right administration. This Contract allowed up to 60,000 AF of water to be temporarily stored for KBID’s use during the 2014 irrigation season. The Contract was extended into 2015 allowing for the temporary storage of 14,100 AF for KBID’s use as agreed upon by KBID, Bostwick in Nebraska Irrigation District, Reclamation and the RRCA.

WaterSMART Basin Study Program - The States of Colorado, Nebraska, and Kansas and the U.S. Department of the Interior, Bureau of Reclamation are continuing work on the Republican River Basin Study. The Republican River Basin Study area covers the entire Republican River Basin in eastern Colorado, southern Nebraska, and northern Kansas down to the Clay Center gauging station in Kansas.

The Study evaluates the viability of water management strategies to optimize surface and groundwater use in consideration of meeting multiple demands and the potential effects of climate change/variability. It will:

- Project future water supply and demands in the Republican River Basin.
- Analyze how existing water operations and infrastructure will perform in the face of uncertain or variable water supply and/or demands.
- Identify and evaluate options to improve operations and infrastructure to address future water supply needs.
- Recommend options (operations and infrastructure) to supply adequate water in the future.

A draft report is currently being reviewed with the study completion date scheduled for November 2015.

TABLE 1
NEBRASKA-KANSAS PROJECTS
Summary of Precipitation, Reservoir Storage and Inflows
CALENDAR YEAR 2014

Reservoir	Total Precip.	Percent Of Average	Storage 12-31-13	Storage 12-31-14	Gain or Loss	Maximum Content	Storage Date	Minimum Content	Storage Date	Total Inflow	Percent Of Most Probable
	Inches	%	AF	AF	AF	AF		AF		AF	%
Box Butte	18.23	108	8,807	10,846	2,039	16,522	JUN 27	6,629	AUG 29	15,006	97
Merritt	24.15	118	60,831	61,100	269	68,191	JUN 9	40,537	AUG 22	190,509	103
Calamus	21.02	87	100,449	97,906	-2,543	121,304	JUN 30	79,960	OCT 16	249,858	91
Davis Creek	27.72	112	9,501	9,751	250	31,409	JUL 8	8,762	APR 15	51,779	113
Bonny	23.51	137	0	0	0	0	N/A	0	N/A	2,664	26
Enders	18.46	97	13,320	9,150	-4,170	13,666	MAR 9	8,829	OCT 16	6,319	72
Swanson	22.29	112	28,877	27,688	-1,189	31,255	JUN 30	22,673	OCT 15	33,083	116
Hugh Butler	19.42	99	6,961	8,141	1,180	8,141	DEC 31	6,892	JAN 7	9,588	71
Harry Strunk	25.40	123	20,382	37,984	17,602	38,004	DEC 30	19,690	AUG 24	65,044	175
Keith Sebelius	20.92	85	12,502	9,676	-2,826	13,191	JUN 11	9,504	DEC 1	4,076	50
Harlan County	18.53	81	124,522	148,842	24,320	178,030	JUL 2	124,221	JAN 27	92,209	74
Lovewell	29.34	107	22,495	29,620	7,125	36,539	JUN 16	21,126	AUG 9	48,535	73
Kirwin	18.68	79	50,011	41,266	-8,745	52,842	JUN 17	33,881	AUG 26	20,092	68
Webster	22.22	94	16,537	18,680	2,143	19,697	SEP 2	15,454	JUN 4	8,421	38
Waconda	21.78	85	187,122	191,097	3,975	206,663	JUL 1	186,897	JAN 6	65,510	43
Cedar Bluff	22.58	108	54,342	61,117	6,775	66,332	JUL 9	51,377	JUN 4	20,137	121

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

JANUARY - JULY 2015

Reservoir	Precip. Inches	Percent Of Average %	Storage 7/31/2014 AF	Storage 7/31/2015 AF	Gain or Loss AF	Inflow AF	Percent Of Most Probable %
Bonny	17.20	148	0	0	0	4,964	74
Enders	13.18	102	8,961	10,435	1,474	3,956	82
Swanson	14.32	106	26,312	50,540	24,228	38,001	172
Hugh Butler	14.20	111	6,961	12,501	5,540	6,984	81
Harry Strunk	14.79	107	21,758	32,025	10,267	35,615	145
Keith Sebelius	14.77	91	10,474	9,797	(677)	2,808	50
Harlan County	17.57	118	164,168	176,493	12,325	75,958	90
Lovewell	24.16	140	24,627	34,075	9,448	51,617	145

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

**TABLE 3
HARLAN COUNTY LAKE**

Year	Inflow (AF)	Outflow (AF)	Gross Evap. (AF)	Precip. (Inches)	Precip. (% of Average) (22.76 inches)	Rep. Basin Reclamation Dams (% of Average)	End of Year Content (AF)	Projected Irrig. Water Supply On June 30th (AF)
2005	53,682	0	32,620	22.51	99%	107%	128,111	14,100
2006	30,077	12,280	29,609	20.62	91%	101%	116,299	14,400
2007	198,528	21,237	38,197	26.92	118%	114%	255,393	111,700
2008	224,841	114,938	45,985	30.31	133%	131%	319,311	175,900
2009	136,747	94,079	41,721	24.50	108%	128%	320,258	156,000
2010	239,054	194,055	46,893	31.66	139%	119%	318,364	147,800
2011	174,830	120,989	49,241	30.69	135%	115%	322,964	157,700
2012	78,581	160,221	50,199	18.14	80%	64%	191,125	132,900
2013	48,794	75,355	40,042	17.46	77%	83%	124,522	81,400
2014	92,209	35,502	32,387	18.53	81%	105%	148,842	59,000

*NOTE: On June 30, 2015 Projected Irrigation Water Supply was 79,600 AF.