RECLAMATION

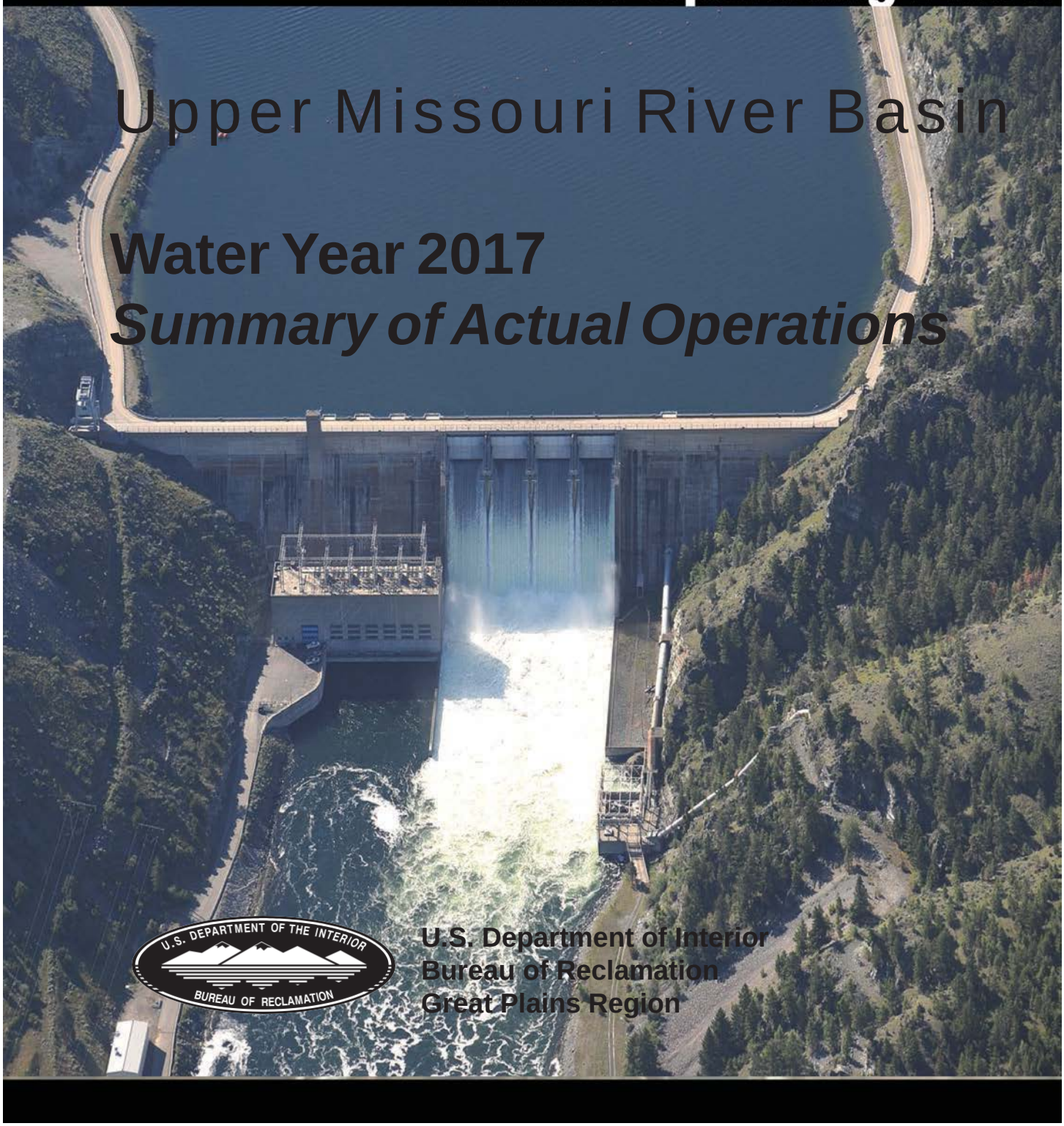
Managing Water in the West

Annual Operating Plans

Upper Missouri River Basin

Water Year 2017

Summary of Actual Operations



U.S. Department of Interior
Bureau of Reclamation
Great Plains Region

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SUMMARIES OF OPERATION FOR WATER YEAR 2017 FOR RESERVOIRS IN MONTANA, WYOMING AND THE DAKOTAS

INTRODUCTION

Annual reports on actual operations and operating plans for reservoir regulation activities were initiated in 1953. The Montana Area Office (MTAO), Wyoming Area Office (WYAO), Dakotas Area Office (DKAO) and the Regional Office are all responsible for preparing reports on actual operations and operating plans for reservoirs within the Upper Missouri River Basin above Sioux City, Iowa. This report briefly summarizes weather and streamflow conditions in the Upper Missouri River Basin during water year (WY) 2017, which are principal factors governing the pattern of reservoir operations. This report also describes operations during WY 2017 for reservoirs constructed by the Bureau of Reclamation for providing flood control and water supplies for power generation, irrigation, municipal and industrial uses, and to enhance recreation, fish and wildlife benefits.

A report section devoted to energy generation is included at the end of this report. The energy generation and water used for power at Reclamation and Corps of Engineers (CORPS) powerplants are discussed, and the energy generated in 2017 is compared graphically with that of previous years.

All references to a year in this report will mean the water year extending from October 1 through September 30, unless specifically stated otherwise.

SUMMARY

OF OPERATIONS

FOR WATER YEAR 2017

FOR RESERVOIRS

(CLARK CANYON, CANYON FERRY, HELENA VALLEY, SUN RIVER, LAKE ELWELL, MILK RIVER AND BIGHORN LAKE AND YELLOWTAIL POWERPLANT)

UNDER THE RESPONSIBILITY

OF THE

MONTANA AREA OFFICE

WY 2017 SUMMARY
HYDROLOGIC CONDITIONS AND FLOOD CONTROL

Water year 2017 started with varying storage levels. Gibson Reservoir was at 30 percent of average while Lake Sherburne was 147 percent of average. The reservoir with the most amount of carryover storage was Lake Elwell at 82 percent of full capacity. Temperatures were below average in the western part of Montana and average in eastern Montana and northern Wyoming. Above average precipitation occurred throughout Montana and Wyoming during September 2016.

October through December

Water year 2017 began in October with average to slightly above average temperatures in western and southern Montana, while temperatures 2 to 4 degrees cooler than average prevailed along the northern highline. October precipitation was well above average, producing records at Flattop Mountain SNOTEL and near record at Many Glacier in northwestern Montana. Rainfall amounts exceeded 1 inch over portions of central and southwest Montana.

November continued with warm temperatures, 6 to 12 degrees above average, and precipitation ranged from 25 to 90 percent throughout Montana. Precipitation was above average in the Bighorn Basin in Wyoming at 129 percent of average in the valley.

Below average temperatures dominated December with mixed precipitation patterns, Figure 1 and Figure 2. The year to date mountain precipitation from October through December ranged from 108 percent of average above Tiber Reservoir to 140 percent of average above Lima Reservoir. The valley precipitation ranged from 134 percent of average in the St. Mary's Basin to 345 percent of average in the Milk River Basin. Additional monthly data on valley and mountain precipitation per basin during WY 2017 can be found in Tables MTT1A and MTT1B.

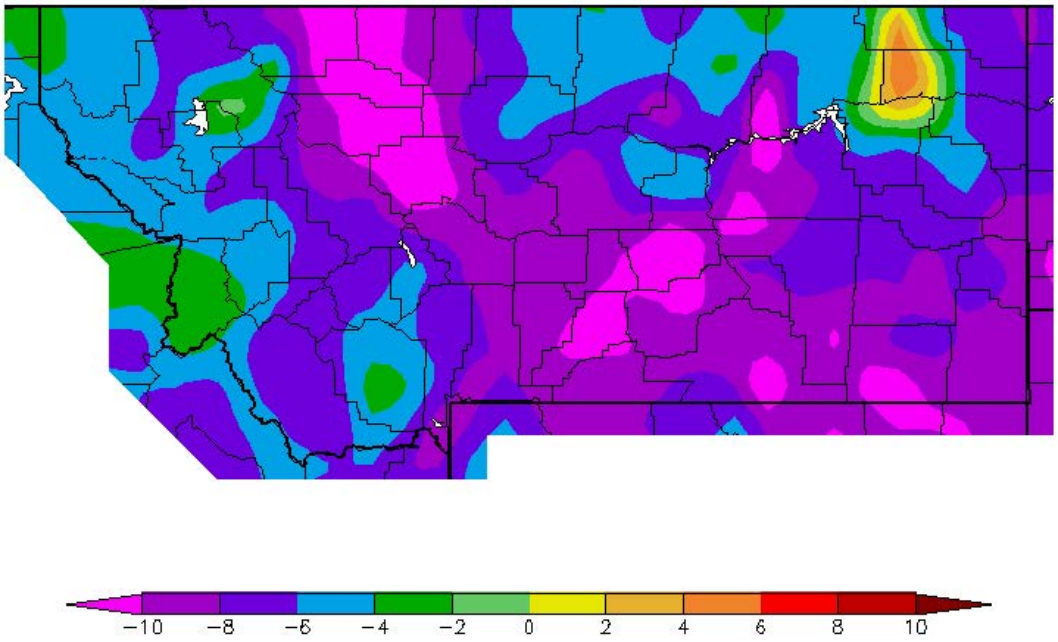


Figure 1. December 2016 temperature departures from average (°F) (Western Region Climate Center).

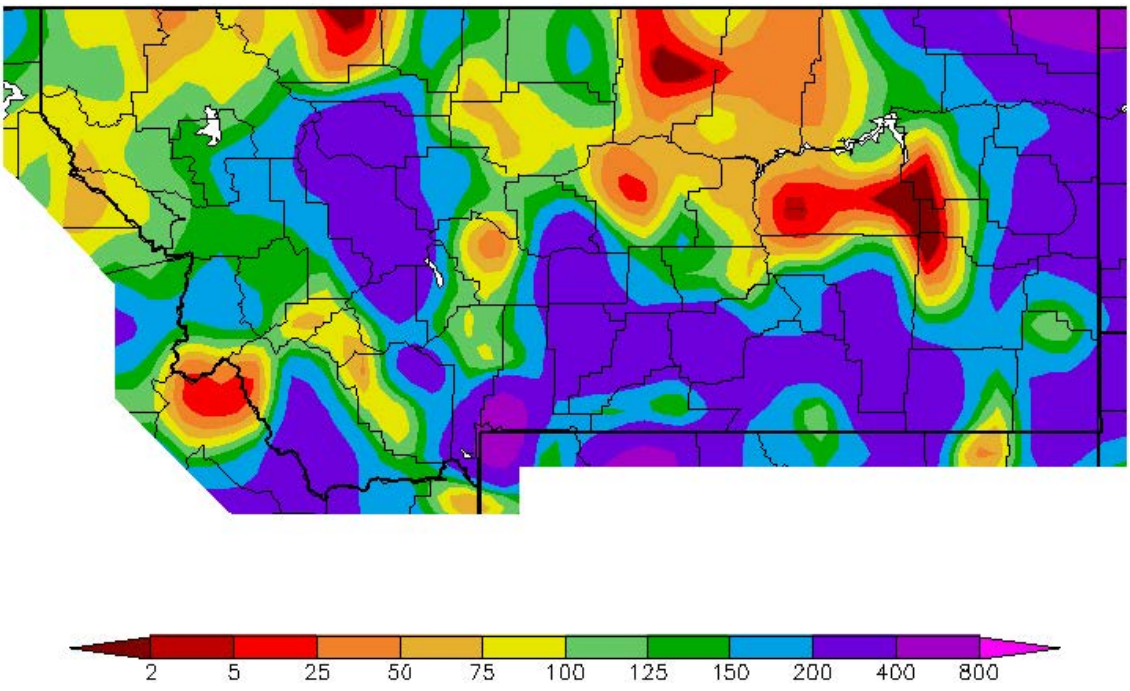


Figure 2. December 2016 precipitation departures from average (percent) (Western Region Climate Center).

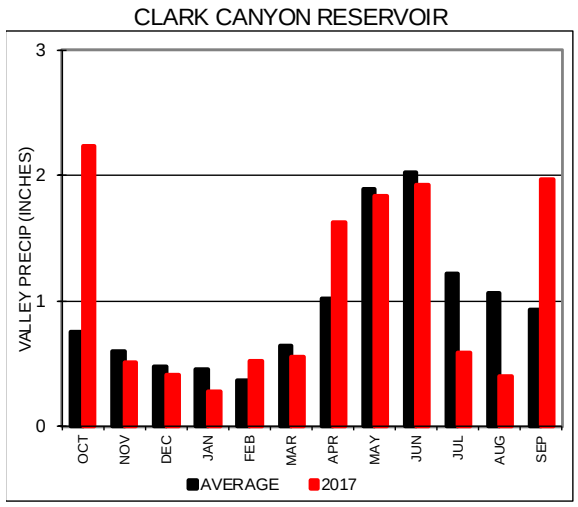
TABLE MTT1A
PRECIPITATION IN INCHES AND PERCENT OF AVERAGE
2017 VALLEY PRECIPITATION

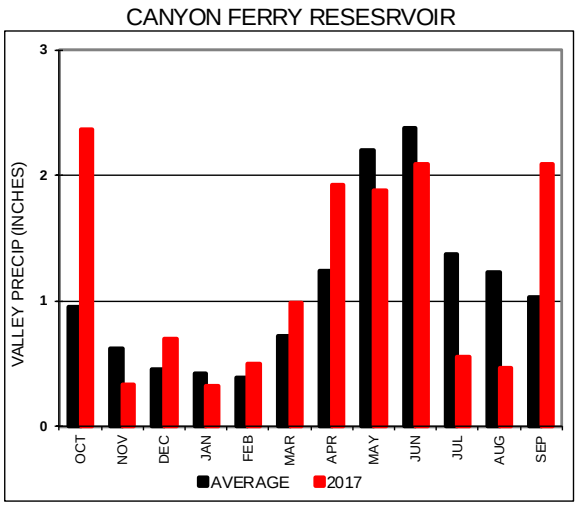
BASIN	OCT		NOV		DEC		JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP	
	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%
Beaverhead																								
Monthly Average Precip	0.75		0.60		0.48		0.46		0.37		0.64		1.03		1.89		2.02		1.22		1.06		0.94	
Monthly Precip and % of Average	2.23	297	0.51	85	0.42	87	0.29	63	0.52	141	0.56	87	1.63	159	1.84	97	1.93	95	0.59	49	0.40	38	1.98	211
Year-to-Date Precip and % of Average	2.23	297	2.74	203	3.16	173	3.44	151	3.96	149	4.52	137	6.14	142	7.98	129	9.90	120	10.49	111	10.89	104	12.87	113
Jefferson																								
Monthly Average Precip	0.71		0.56		0.43		0.41		0.33		0.58		0.93		1.92		2.07		1.36		1.15		0.95	
Monthly Precip and % of Average	1.90	266	0.36	64	0.44	103	0.27	66	0.41	122	0.50	86	1.26	135	1.56	81	1.85	89	0.58	43	0.27	23	1.59	167
Year-to-Date Precip and % of Average	1.90	266	2.26	177	2.70	159	2.97	141	3.38	138	3.88	128	5.13	130	6.69	114	8.54	107	9.12	98	9.39	90	10.98	96
Madison																								
Monthly Average Precip	1.27		0.71		0.55		0.48		0.48		0.91		1.64		2.54		2.72		1.37		1.38		1.13	
Monthly Precip and % of Average	3.22	254	0.36	51	1.11	201	0.35	72	0.65	136	1.84	203	2.61	160	2.04	80	2.55	94	0.72	52	0.80	58	3.01	266
Year-to-Date Precip and % of Average	3.22	254	3.58	181	4.69	186	5.03	167	5.68	163	7.51	171	10.12	168	12.16	142	14.71	130	15.42	122	16.22	116	19.23	127
Gallatin																								
Monthly Average Precip	1.38		0.90		0.54		0.55		0.54		1.03		1.78		2.81		2.78		1.41		1.21		1.26	
Monthly Precip and % of Average	2.81	204	0.50	56	0.86	159	0.52	95	0.63	117	1.48	144	2.59	146	2.56	91	2.23	80	0.11	8	0.56	46	2.65	210
Year-to-Date Precip and % of Average	2.81	204	3.31	145	4.17	148	4.69	139	5.32	136	6.80	138	9.39	140	11.95	125	14.18	115	14.29	104	14.85	99	17.50	108
Missouri Above Toston																								
Monthly Precip Average	0.95		0.62		0.46		0.42		0.39		0.72		1.24		2.20		2.38		1.37		1.23		1.03	
Monthly Precip and % of Average	2.36	249	0.33	53	0.70	153	0.32	76	0.50	131	0.99	136	1.92	155	1.88	85	2.10	88	0.55	40	0.47	38	2.09	202
Year-to-Date Precip and % of Average	2.36	249	2.69	172	3.40	168	3.72	152	4.23	149	5.21	146	7.14	149	9.01	129	11.11	118	11.66	108	12.13	101	14.22	109
Sun-Teton																								
Monthly Average Precip	1.15		1.18		0.96		1.01		0.90		1.13		1.45		2.30		2.83		1.28		1.44		1.48	
Monthly Precip and % of Average	2.95	256	0.72	61	1.06	110	0.72	71	1.37	152	1.71	152	1.68	116	2.19	95	2.34	83	0.18	14	0.22	16	1.89	128
Year-to-Date Precip and % of Average	2.95	256	3.67	157	4.72	144	5.45	127	6.81	131	8.52	135	10.20	131	12.39	123	14.73	114	14.91	105	15.14	97	17.03	100
Marias																								
Monthly Average Precip	0.52		0.38		0.39		0.31		0.29		0.62		0.98		1.91		2.58		1.35		1.26		1.23	
Monthly Precip and % of Average	1.38	266	0.22	57	0.58	151	0.79	254	0.73	255	0.66	106	2.41	247	1.48	78	2.31	90	0.27	20	0.07	6	1.13	91
Year-to-Date Precip and % of Average	1.38	266	1.59	178	2.17	170	2.97	186	3.70	196	4.36	174	6.77	194	8.25	153	10.57	133	10.83	116	10.90	103	12.03	102
Milk																								
Monthly Average Precip	0.69		0.42		0.36		0.34		0.24		0.42		0.93		2.26		2.63		1.49		1.35		1.09	
Monthly Precip and % of Average	4.60	665	0.22	53	0.28	77	0.35	104	0.39	167	0.24	57	0.72	78	0.52	23	0.71	27	0.45	30	0.28	21	0.74	68
Year-to-Date Precip and % of Average	4.60	665	4.82	433	5.10	345	5.46	300	5.85	285	6.09	246	6.82	200	7.34	129	8.05	97	8.50	87	8.78	79	9.52	78
St. Mary																								
Monthly Average Precip	1.57		2.52		2.03		2.13		1.77		1.94		1.70		2.62		3.30		1.93		1.32		1.89	
Monthly Precip and % of Average	3.73	237	1.92	76	2.55	125	1.90	89	6.05	342	3.62	187	1.65	97	1.79	68	1.94	59	0.11	5	0.38	29	0.71	37
Year-to-Date Precip and % of Average	3.73	237	5.64	138	8.19	134	10.08	122	16.13	161	19.74	165	21.39	157	23.18	143	25.12	128	25.22	117	25.60	112	26.31	107
Bighorn Above Yellowtail																								
Monthly Average Precip	0.87		0.49		0.37		0.30		0.35		0.55		1.04		1.71		1.37		0.90		0.61		1.02	
Monthly Precip and % of Average	1.95	224	0.64	129	1.05	287	0.69	227	0.95	276	1.46	265	2.78	267	1.34	78	0.76	56	0.57	63	0.73	120	2.60	256
Year-to-Date Precip and % of Average	1.95	224	2.59	190	3.64	211	4.32	213	5.28	222	6.73	230	9.51	240	10.85	191	11.61	165	12.18	153	12.91	151	15.51	162

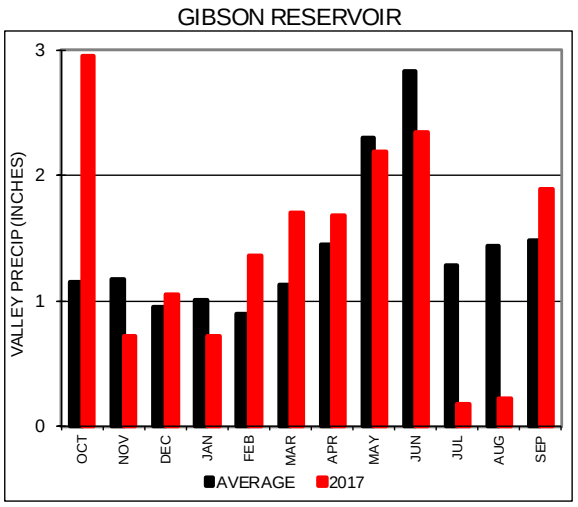
A composite of the following National Weather Service stations was used to determine monthly valley precipitation and percent of average for the drainage basins:

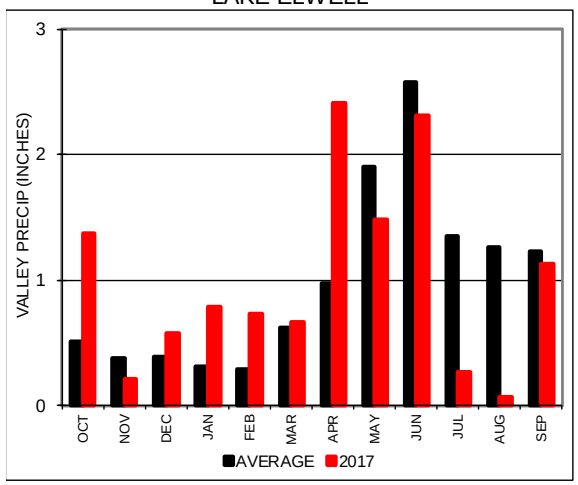
Beaverhead.....Wisdom and Dillon
Jefferson.....Wisdom, Dillon, and Boulder
Madison.....Ennis and Norris Madison Powerhouse
Gallatin.....Bozeman
Missouri Above Toston.....Townsend, Wisdom, Dillon, Boulder, Ennis, Norris Madison Powerplant, and Bozeman
Sun-Teton.....Summit, Choteau, Fairfield, Augusta, and Gibson
Marias.....Cut Bank, Conrad, Gold Butte, Shelby and Chester
Milk.....Big Flat, Havre, Chinook, Harlem, Malta, and Glasgow
St. Mary.....St Mary and East Glacier
Bighorn Above Yellowtail....Cody, Sunshine, Boysen Dam, Dubois, Pavillion, Wapiti, Lander, Riverton, Shell, Basin, Lovell, Thermopolis, and Worland

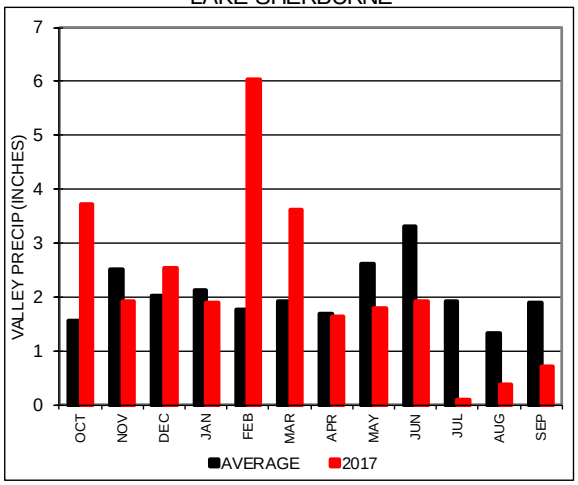
FIGURE MTT1A-1
PRECIPITATION IN INCHES AND PERCENT OF AVERAGE
2017 VALLEY PRECIPITATION











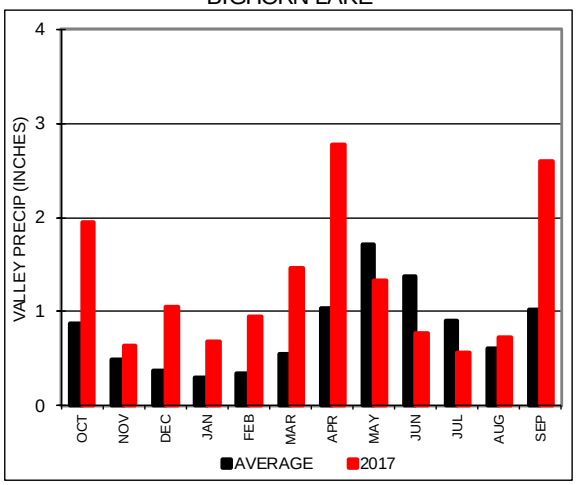


TABLE MTT1B
PRECIPITATION IN INCHES AND PERCENT OF AVERAGE
2017 MOUNTAIN PRECIPITATION

BASIN	OCT		NOV		DEC		JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP	
	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%
Lima Reservoir																								
Monthly Average Precip	2.05		2.43		2.80		2.52		2.14		2.57		2.57		3.05		2.81		1.61		1.36		1.50	
Monthly Precip and % of Average	5.62	274	1.24	51	3.32	118	2.28	90	4.32	202	2.14	83	4.32	168	1.90	62	2.38	85	0.42	26	0.70	51	3.20	213
Year-to-Date Precip and % of Average	5.62	274	6.86	153	10.18	140	12.46	127	16.78	140	18.92	130	23.24	136	25.14	125	27.52	120	27.94	114	28.64	111	31.84	116
Clark Canyon Reservoir																								
Monthly Average Precip	2.18		2.61		2.55		2.43		2.03		2.64		2.98		3.42		3.01		1.51		1.47		1.64	
Monthly Precip and % of Average	4.13	190	1.23	47	3.69	145	1.94	80	3.74	184	2.57	97	4.00	134	3.01	88	3.40	113	0.31	21	0.57	39	2.97	181
Year-to-Date Precip and % of Average	4.13	190	5.36	112	9.04	123	10.99	113	14.73	125	17.30	120	21.30	122	24.31	117	27.71	116	28.03	111	28.60	107	31.57	111
Jefferson Drainage																								
Monthly Average Precip	2.15		2.63		2.64		2.52		2.10		2.64		2.99		3.38		2.97		1.56		1.55		1.67	
Monthly Precip and % of Average	3.53	164	1.15	44	3.70	140	1.84	73	3.61	172	2.96	112	3.84	129	2.95	87	3.43	115	0.53	34	0.88	57	2.88	173
Year-to-Date Precip and % of Average	3.53	164	4.68	98	8.38	113	10.23	103	13.84	115	16.80	114	20.64	117	23.59	112	27.02	113	27.55	108	28.43	105	31.31	109
Madison Drainage																								
Monthly Average Precip	2.89		3.83		4.20		3.94		3.27		3.75		3.81		4.03		3.21		1.79		1.68		1.83	
Monthly Precip and % of Average	7.28	252	2.13	55	5.50	131	3.23	82	6.74	206	4.64	124	5.55	146	2.24	56	2.94	91	0.73	41	1.16	69	3.80	207
Year-to-Date Precip and % of Average	7.28	252	9.40	140	14.90	136	18.13	122	24.86	137	29.50	135	35.05	136	37.29	125	40.23	122	40.95	118	42.11	116	45.91	120
Gallatin Drainage																								
Monthly Average Precip	3.07		3.43		3.45		3.25		2.96		3.93		4.58		4.94		4.11		2.20		2.00		2.14	
Monthly Precip and % of Average	7.23	236	2.63	77	3.97	115	1.93	59	5.63	190	3.80	97	7.87	172	3.20	65	2.53	62	0.87	39	0.93	47	3.73	174
Year-to-Date Precip and % of Average	7.23	236	9.87	152	13.83	139	15.77	120	21.40	132	25.20	125	33.07	134	36.27	122	38.80	115	39.67	110	40.60	107	44.33	111
Canyon Ferry Reservoir																								
Monthly Average Precip	2.41		3.04		3.16		3.01		2.51		3.04		3.32		3.67		3.12		1.64		1.59		1.73	
Monthly Precip and % of Average	4.99	207	1.65	54	4.43	140	2.31	77	4.80	191	3.56	117	4.73	143	2.87	78	3.37	108	0.60	37	0.95	60	3.29	190
Year-to-Date Precip and % of Average	4.99	207	6.63	122	11.07	129	13.38	115	18.18	129	21.74	127	26.47	129	29.34	121	32.71	120	33.32	115	34.27	112	37.56	116
Gibson Reservoir																								
Monthly Average Precip	2.52		3.14		3.02		2.79		2.42		2.72		2.75		3.66		3.68		1.78		2.08		2.17	
Monthly Precip and % of Average	3.55	141	2.00	64	3.95	131	1.55	56	5.93	245	3.98	146	2.13	77	3.58	98	3.25	88	0.10	6	0.23	11	1.55	72
Year-to-Date Precip and % of Average	3.55	141	5.55	98	9.50	109	11.05	96	16.98	122	20.95	126	23.08	119	26.65	116	29.90	112	30.00	105	30.23	99	31.78	97
Lake Elwell Reservoir																								
Monthly Average Precip	3.14		4.22		4.09		4.08		3.29		3.65		3.41		4.15		4.02		1.89		2.12		2.40	
Monthly Precip and % of Average	4.54	145	2.74	65	5.08	124	2.04	50	6.40	194	5.46	150	2.54	74	4.18	101	3.42	85	0.06	3	0.24	11	1.78	74
Year-to-Date Precip and % of Average	4.54	145	7.28	99	12.36	108	14.40	93	20.80	111	26.26	117	28.80	111	32.98	110	36.40	107	36.46	101	36.70	96	38.48	95
Sherburne Reservoir																								
Monthly Average Precip	4.85		7.53		6.84		7.42		5.11		5.35		4.51		4.67		5.12		2.46		1.97		3.23	
Monthly Precip and % of Average	11.80	243	7.15	95	6.65	97	2.85	38	10.60	207	11.70	219	5.20	115	2.75	59	3.65	71	0.00	0	0.30	15	0.95	29
Year-to-Date Precip and % of Average	11.80	243	18.95	153	25.60	133	28.45	107	39.05	123	50.75	137	55.95	134	58.70	127	62.35	121	62.35	116	62.65	112	63.60	108
Bighorn Lake																								
Monthly Average Precip	2.42		2.32		2.14		2.09		1.83		2.64		3.16		3.61		2.85		1.80		1.31		2.14	
Monthly Precip and % of Average	3.79	157	1.55	67	3.73	174	2.12	101	3.51	191	3.87	147	5.53	175	2.55	71	2.75	97	1.50	83	1.22	93	3.93	184
Year-to-Date Precip and % of Average	3.79	157	5.34	113	9.06	132	11.18	125	14.69	136	18.56	138	24.09	145	26.64	132	29.39	127	30.89	124	32.11	123	36.04	127

A composite of the following Natural Resources Conservation Service SNOTEL sites was used to determine monthly mountain precipitation and percent of average for the drainage basins:

Lima Reservoir.....Crab Creek, Island Park, Tepee Creek, Divide, and Lakeview Ridge

Clark Canyon Reservoir.....Beagle Springs, Darkhorse Lake, Lemhi Ridge, Tepee Creek, Divide, Bloody Dick, and Lakeview Ridge

Jefferson Drainage.....Beagle Springs, Clover Meadow, Darkhorse Lake, Mule Creek, Lemhi Ridge, Rocker Peak, Tepee Creek, Clavert Creek, Saddle Mountain, Lower Twin, Divide, Bloody Dick, Lakeview Ridge, Short Creek, Frohner Meadow, and Moose Creek

Madison Drainage.....Carrot Basin, Clover Meadow, Tepee Creek, Black Bear, Lower Twin, Beaver Creek, Madison Plateau, and Whiskey Creek

Gallatin Drainage.....Carrot Basin, Shower Falls, and Lick Creek

Canyon Ferry Reservoir.....Beagle Springs, Darkhorse Lake, Carrot Basin, Clover Meadow, Shower Falls, Mule Creek, Rocker Peak, Black Bear, Saddle Mountain, Lower Twin, Beaver Creek, Madison Plateau, Short Creek, Lick Creek, Whiskey Creek, Frohner Meadow, Calvert Creek, Moose Creek, Lemhi Ridge, Tepee Creek, Divide, Bloody Dick, and Lakeview Ridge

Gibson Reservoir.....Mount Lockhart, Wood Creek, Dupuyer Creek, and Waldron

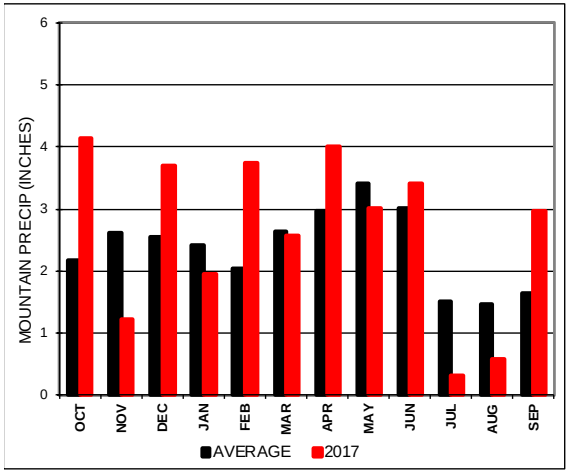
Lake Elwell Reservoir.....Mount Lockhart, Badger Pass, Pike Creek, Dupuyer Creek, and Waldron

Sherburne Reservoir.....Flattop Mountain and Many Glacier

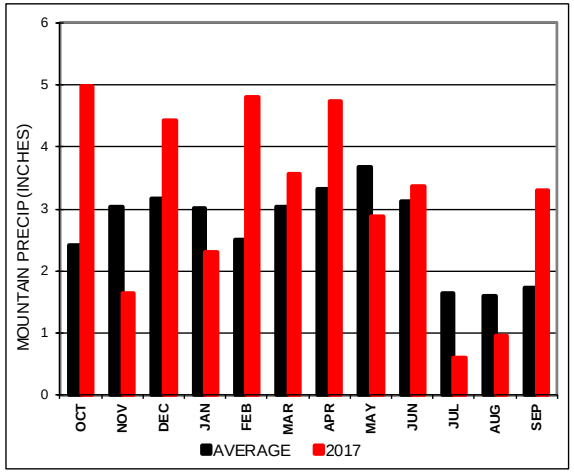
Bighorn Lake.....Kirwin, Blackwater, Evening Star, Shell Creek, Powder River, Bald Mountain, Bone Springs Divide, Owl Creek, Sucker Creek, Dome Lake, Hansen Sawmill, Timber Creek, Bear Trap Meadow, Burgess Junction, Middle Powder, Sylvan Lake, and Sylvan Road

FIGURE MTT1B-1
PRECIPITATION IN INCHES AND PERCENT OF AVERAGE
2017 MOUNTAIN PRECIPITATION

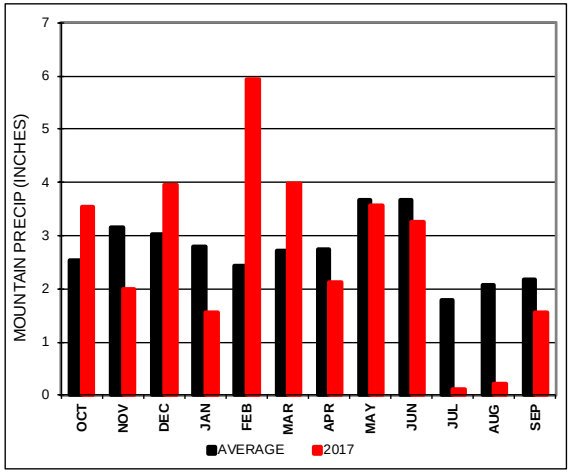
CLARK CANYON RESERVOIR



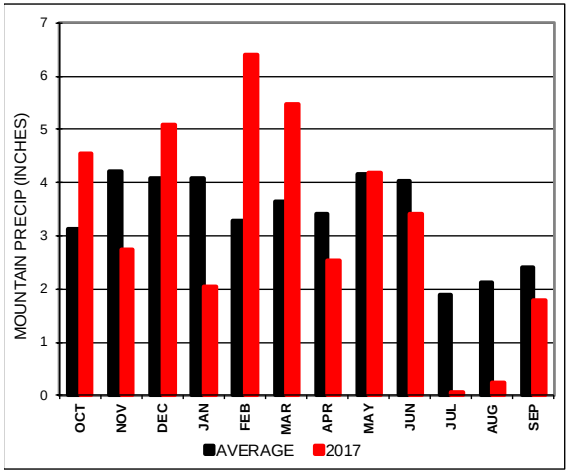
CANYON FERRY RESESRVOIR



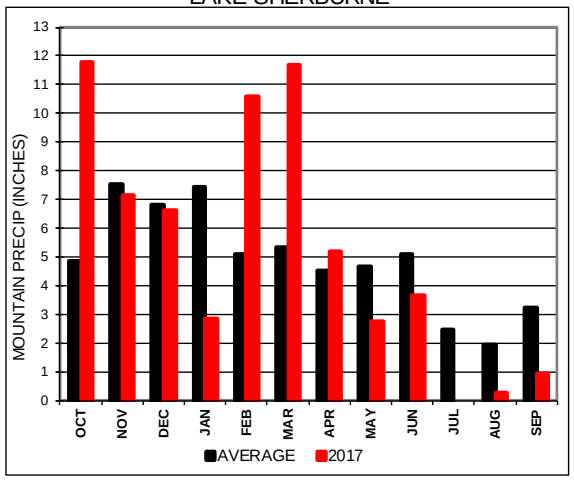
GIBSON RESERVOIR



LAKE ELWELL



LAKE SHERBURNE



BIGHORN LAKE

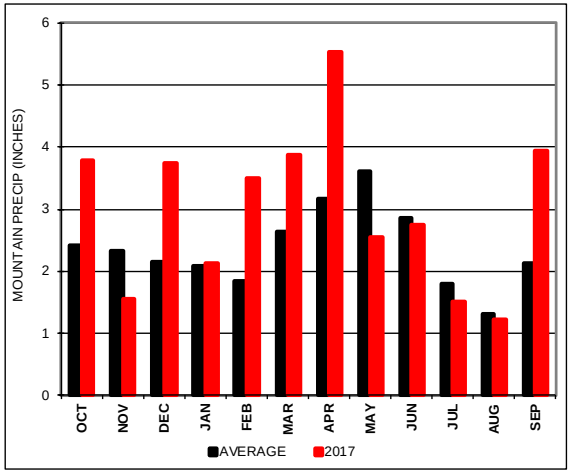


TABLE MTT2
2017 MOUNTAIN SNOW WATER CONTENT
AS A PERCENT OF MEDIAN

DRAINAGE BASIN	JAN 1	FEB 1	MAR 1	APR 1	MAY 1
Jefferson	76	79	103	100	113
Madison	79	87	113	104	119
Gallatin	78	78	98	87	110
Headwaters Mainstem Missouri	85	85	100	92	90
Sun-Teton-Marias	96	82	115	116	129
St. Mary - Milk River	102	73	98	92	124
Lower Yellowstone (Bighorn Basin)	113	125	152	145	172

TABLE MTT3
2017 WATER SUPPLY FORECASTS

RESERVOIR	JAN 1[1/]		FEB 1[1/]		MAR 1[1/]		APR 1[2/]		MAY 1[3/]		JUN 1[4/]		ACTUAL APRIL-JULY[5/]		% OF APRIL FORE-CAST REC'D
	1,000 AC-FT	% OF AVG	1,000 AC-FT	% OF AVG	1,000 AC-FT	% OF AVG	1,000 AC-FT	% OF AVG	1,000 AC-FT	% OF AVG	1,000 AC-FT	% OF AVG	1,000 AC-FT	% OF AVG	
Clark Canyon	69.1	93	61.3	82	89.6	120	67.9	87	58.0	94	36.0	79	75.5	101	111
Canyon Ferry	1,493.6	89	1,398.1	83	1,691.6	101	1,603.5	94	1,533.0	110	898.0	99	1,922.7	115	120
Gibson	390.3	97	370.0	92	462.4	115	487.5	119	400.0	112	242.5	115	459.7	115	94
Tiber	320.0	87	286.0	78	372.0	101	413.0	112	356.0	114	169.0	95	370.2	101	90
Sherburne	100.7	102	86.5	87	100.0	102	103.0	104	100.0	114	67.0	117	101.7	103	99
Fresno	76.0	94	66.3	82	81.4	101	84.1	134	58.6	134	39.1	161	54.4	67	67
Yellowtail	1,383.8	127	1,654.3	151	2,099.2	192	2,231.8	204	2,454.2	259	1,083.5	161	2,953.1	270	132

1/ Runoff Forecast for April-July; Fresno Reservoir is March-September.
2/ Runoff Forecast for April-July; Fresno Reservoir is April-September
3/ Runoff Forecast for May-July; Fresno Reservoir is May-September
4/ Runoff Forecast for June-July; Fresno Reservoir is June-September
5/ Actual Runoff for April-July; Fresno Reservoir is March-September.

January through March

On January 1, 2017 the Natural Resource Conservation Service (NRCS) began reporting mountain snowpack or snow water equivalent (SWE) throughout Montana. The NRCS mountain SWE ranged from 76 percent of normal in the Jefferson Basin to 113 percent of normal in the Yellowstone River Basin, Figure 3. A tabular report of the SWE is also shown on Table MTT2. Forecasting began January 1, 2017 for the April-July spring runoff volumes for the reservoirs east of the Continental Divide. The water supply forecasts prepared indicated the April-July runoff volumes varying from 87 percent of average at Tiber Dam to 127 percent of average at Yellowtail Dam, Table MTT3.

Continuing the trend from December, statewide composite for Montana temperatures averaged much below average for January. Temperature averages were as much as 4 to 20 degrees below normal in southwestern Montana. Snow amounts were variable, with East Glacier receiving up to 28 inches, the average snowfall across Montana was above normal. The Lower Yellowstone River Basin saw relatively consistent snowfall since mid-November and received one of its largest storms during the second week of January. During this storm Big Horn SNOTEL sites received up to 12 inches of snow and southern Wind SNOTEL sites received over 30 inches. Overall these basins were near normal. However, the Wind River Basin had a well above average snowpack.

The first week of February continued a cold pattern that started at the end of January. Temperatures returned to below zero after a weather system brought heavy snow to southern Montana. Meanwhile, heavy snow started falling over northwestern Montana. By the morning of February 7, 2017, over 5 feet of snow had accumulated at East Glacier and St Mary and 52 inches was reported at Marias Pass. The SWE ranged from 4 to 5 inches over 4 days. Abundant snow fell during the month that blanketed the Lower Yellowstone Basin, specifically the Wind River Basin. The Wind River Basin reported the highest or second highest snowpack on record by February's end. The snowpack in the Shoshone Basin was also well above normal as storm systems also favored this region, but not quite record conditions. The Bighorn Range was variable with several SNOTEL sites reporting well above normal snowfall while others reported below normal snowfall. By the end of February, the year to date mountain precipitation resulted in a low of 111 percent of average at Lake Elwell and a high of 136 percent of average at Bighorn Lake.

With the excess of precipitation in February, all the April-July water supply forecasts increased or remained the same for the March 1 forecast. Forecasts ranged from 101 to 192 percent of average.

After a cold winter period, temperatures rebounded in March. Temperatures ranged from 4 to 8 degrees warmer than average across Montana. Snow amounts were generally below normal across most of Montana as the warmer temperatures caused much of the precipitation to fall as rain. The warm conditions also brought on flooding along rivers in eastern Montana, specifically, the Milk River. By the end of March, the year to date mountain precipitation varied from a low at 117 percent of average above Tiber Reservoir to 138 percent of average above Bighorn Lake. The year to date valley precipitation varied from a low at 128 percent of average in the Jefferson Basin to 146 percent of in the Milk River Basin.

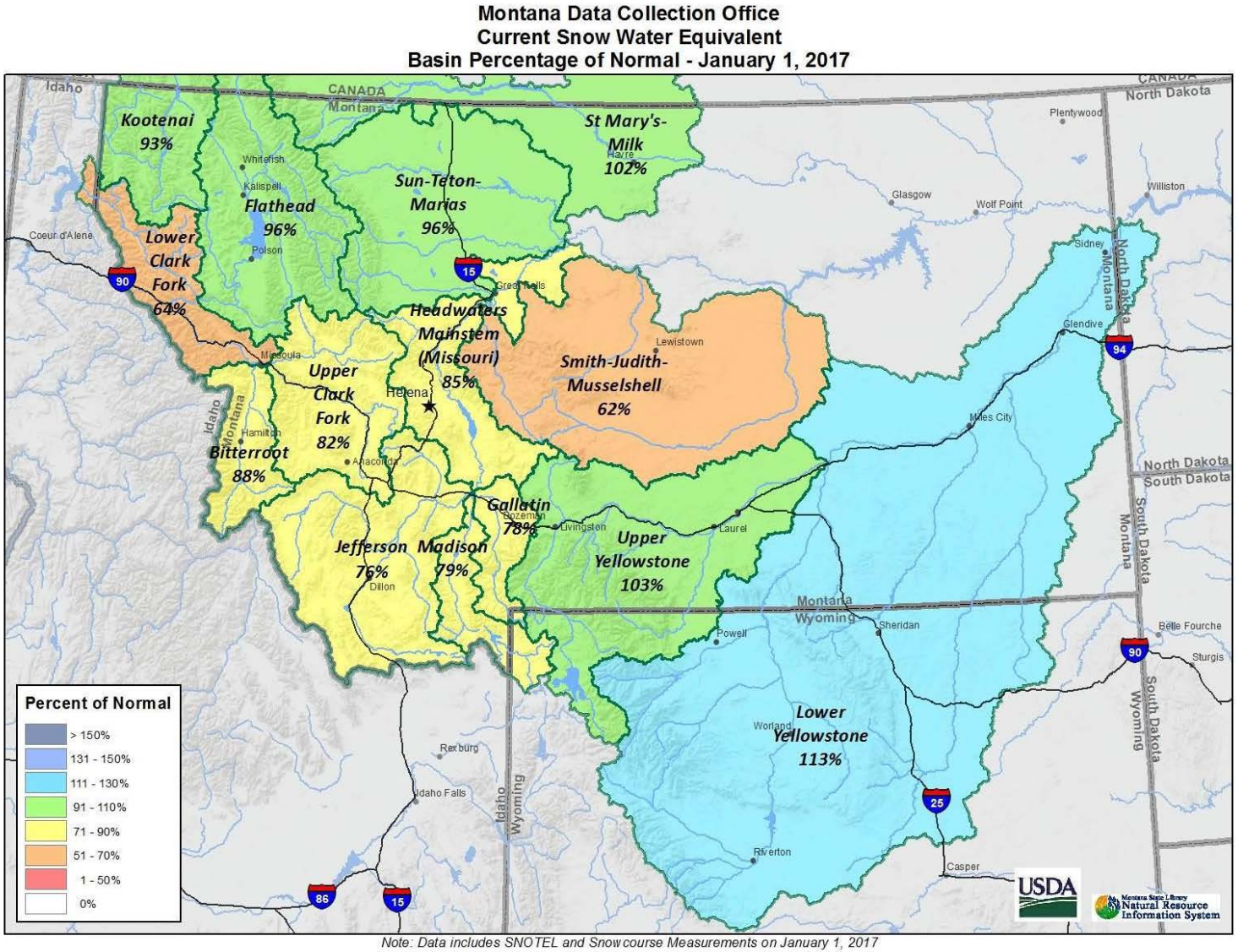


Figure 3. January 1, 2017 Snow Water Equivalent, Percent of Normal (Natural Resource Conservation Service).

April through June

As depicted in the NRCS map shown in Figure 4, the April 1 month to date SWE varied across Montana and northern Wyoming, however, most sites showed above average conditions. The resulting April-July forecasted runoff volumes ranged from 87 percent of average into Clark Canyon Reservoir to 204 percent of average into Yellowtail Dam. All reservoirs reached their peak snowpack for the year by April 30, 2017, Table MTG1.

Precipitation was near average in the Missouri River headwaters with above average precipitation along the Milk River Basin. Daily maximum temperatures were well above freezing at low elevation SNOTEL sites during the month and most of the precipitation arrived as rain at those elevations. This resulted in significant melt of the low elevation snowpack. The basin wide snowpack appeared to have peaked during mid-March, however a storm during the second week of April added to the high elevation snow and it peaked a second time.

April brought snow in the Lower Yellowstone River Basin with record breaking snowfall in the Wind River and Shoshone River Basins. April yielded above normal snowfall, increasing the snowpack percentiles and improving snowpack totals in the Bighorn Range by the end of April. Very little melt had occurred, leaving the bulk of the water to enter the river system. Streamflow forecasts for the Bighorn Basin reflected the above normal, or record breaking, snowpack and the abundance of precipitation through WY 2017 as the forecasts were well above average.

Temperatures in May were average with varied precipitation throughout Montana. Significant precipitation fell in the Sun and Marias River Basin which produced over 20 inches of snow at the upper elevations and nearly 2 inches of rain at lower elevations. The Milk River Basin started to see signs of dry conditions. Snowpack across the Bighorn Basin peaked at the beginning of May, with well above normal to record snowpack levels. The varied temperatures in May resulted in an ideal snowmelt runoff. Ideal runoff is an on again/off again release of snowmelt in phases rather than of one big surge of water, keeping river levels manageable. By the end of May, the year to date mountain precipitation varied from a low of 110 percent of average above Tiber Reservoir to 132 percent of average above Bighorn Lake. The year to date valley precipitation varied from a low at 114 percent of average in the Jefferson Basin to 191 percent of in the Bighorn River Basin.

By June 1, 2017 the snowmelt runoff resulted in reservoir storage that was near or above average for all river basins, except for Bighorn Lake. The remaining June 1 SWE ranged from average to much above average conditions in Bighorn Basin, Figure 5. Temperatures in June were average with varied precipitation throughout Montana. Little to no precipitation fell in the Milk River Basin where many locations received less than half an inch of precipitation and was ranked in the top five driest Junes of record. More precipitation fell in the Sun and Marias Basin early in the month. The inflows into Reclamation facilities for the month of June ranged from 59 percent of average at Fresno Reservoir to a high of 217 percent of average at Bighorn Lake.

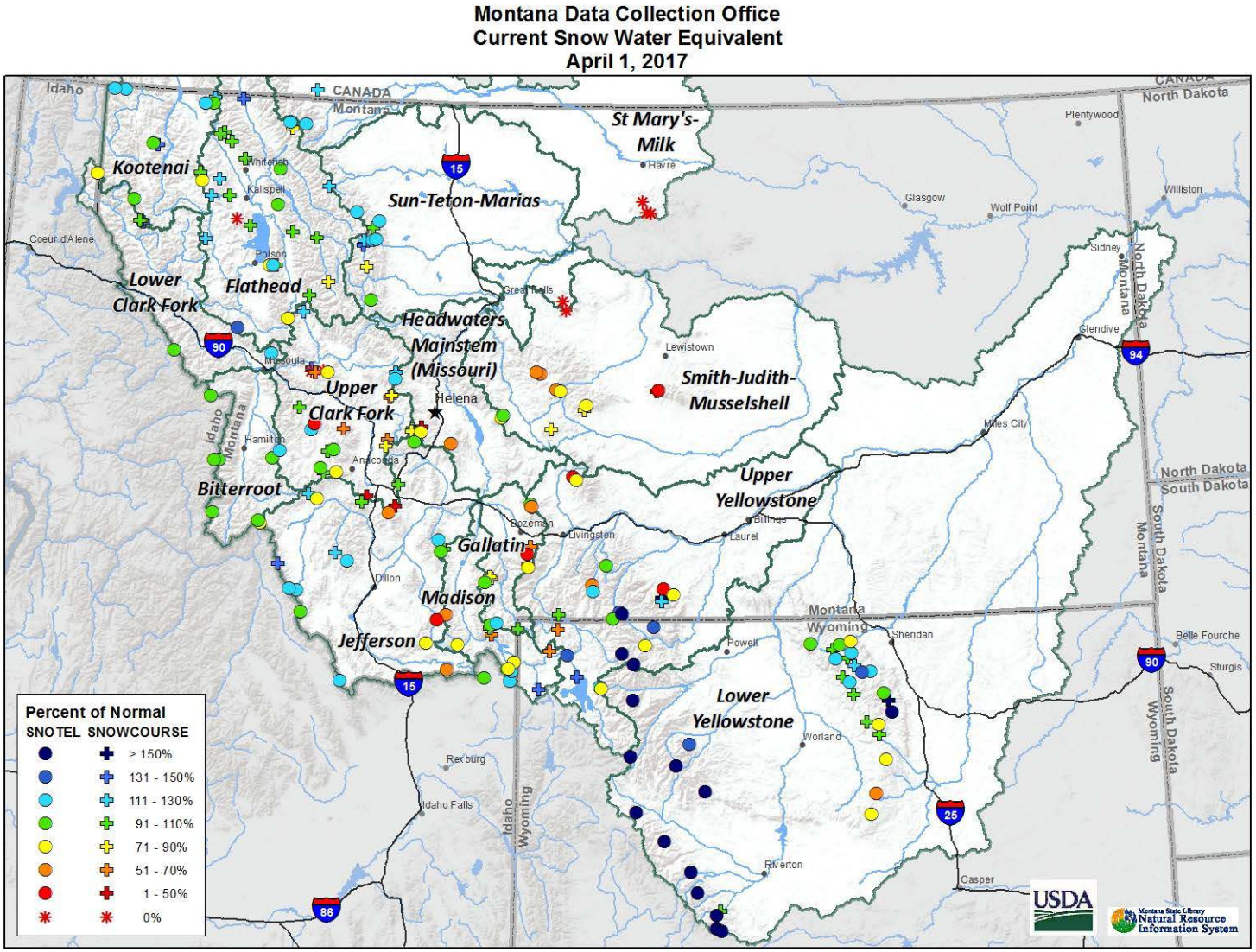
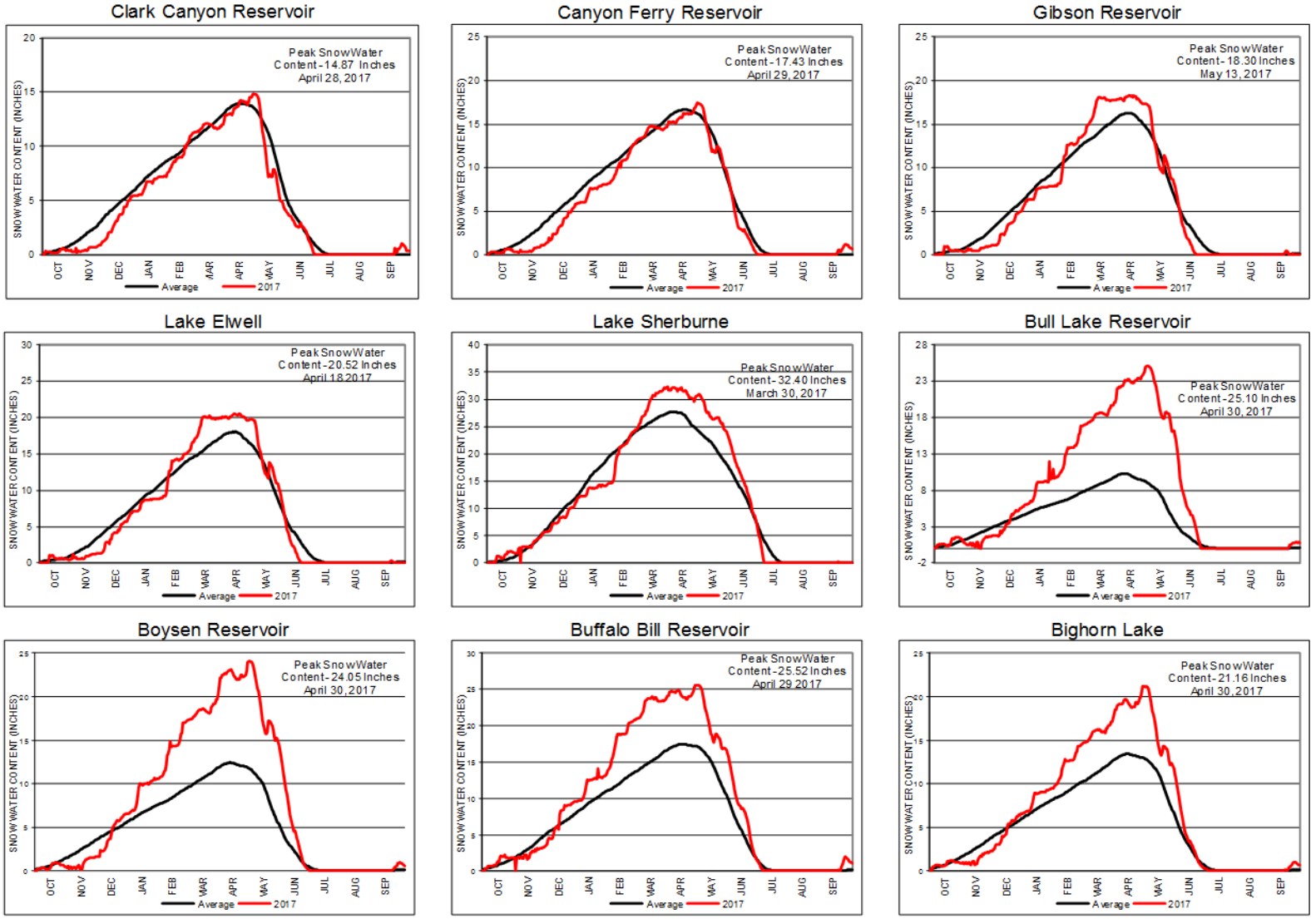


Figure 4. April 1, 2017 Snow Water Equivalent, Percent of Normal (Natural Resource Conservation Service).

Figure MTG1
WATER YEAR 2017
SNOW WATER CONTENT



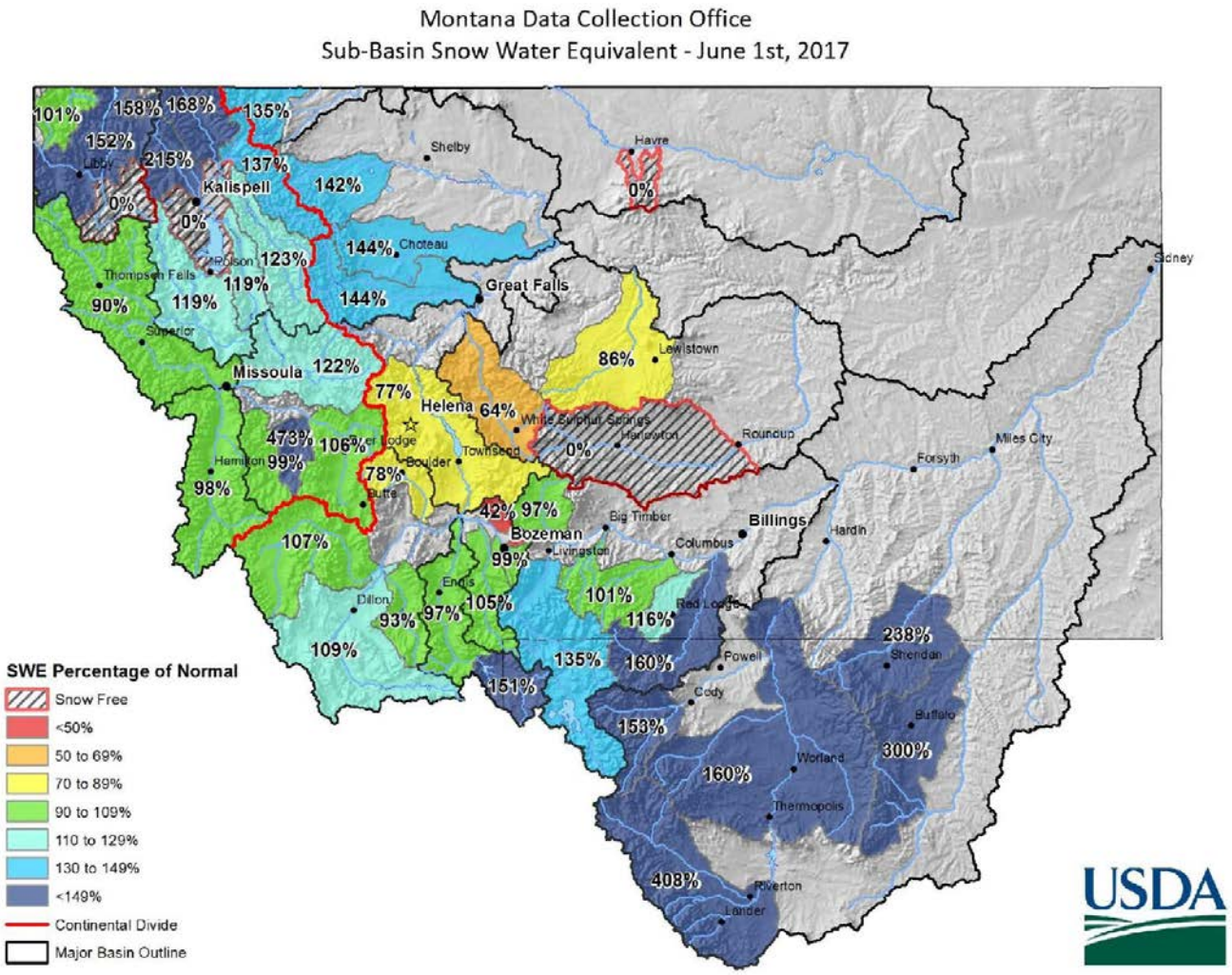


Figure 5. June 1, 2017 Snow Water Equivalent, Percent of Normal (Natural Resource Conservation Service).

July through September

July delivered hot temperatures and little precipitation, Figures 6a and 6b. Many locations in Montana saw less than one quarter of an inch of precipitation, which ranked in the top five driest Julys of record. Irrigators continued to draw on reservoir storage to satisfy their needs. By the end of July, the actual April-July runoff volumes for WY 2017 ranged from 67 percent of average into Fresno Reservoir to 270 percent of average into Yellowtail Dam, Table MTT3.

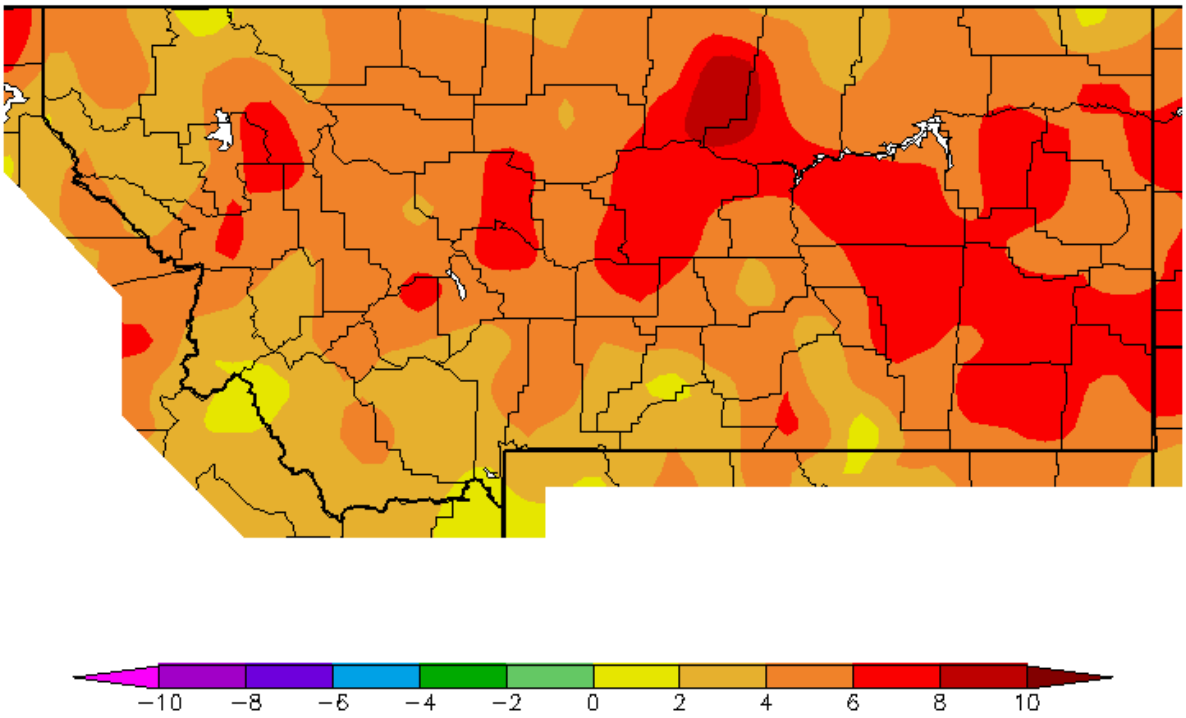


Figure 6a. July 2017 temperature departures from average (°F) (Western Region Climate Center).

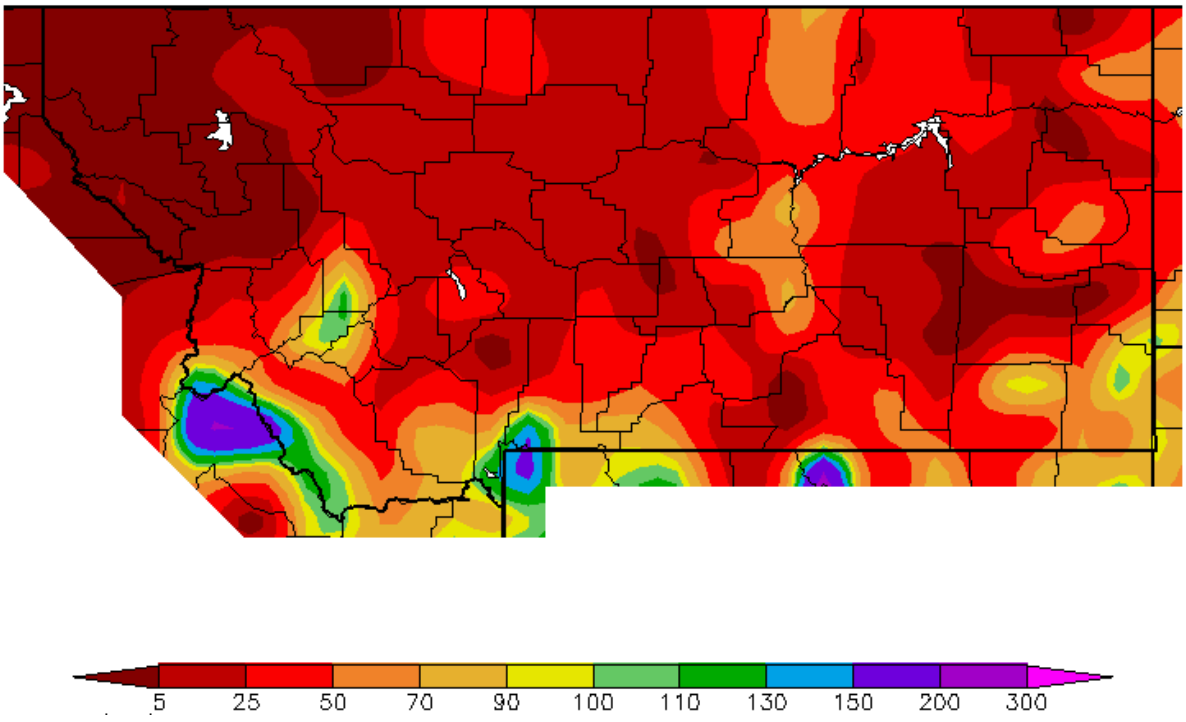


Figure 6b. July 2017 precipitation departures from average (percent) (Western Region Climate Center).

August continued to deliver warm temperatures and slim precipitation throughout Montana, however the Bighorn Basin remained in an above average precipitation status.

Due to dry conditions during July and August, the September 1 Montana drought status was updated to moderately dry in the southwest to exceptionally dry in the northeast, see Figure 7. September started off warm and dry, but then became quite wet by the middle of the month. Several storms produced 1.0 to 2.5 inches of rain over most of the state. Overall, the month was wetter than normal with near average temperatures across Montana. Even though wetter conditions persisted, much of Montana was still in a drought status by the month's end.

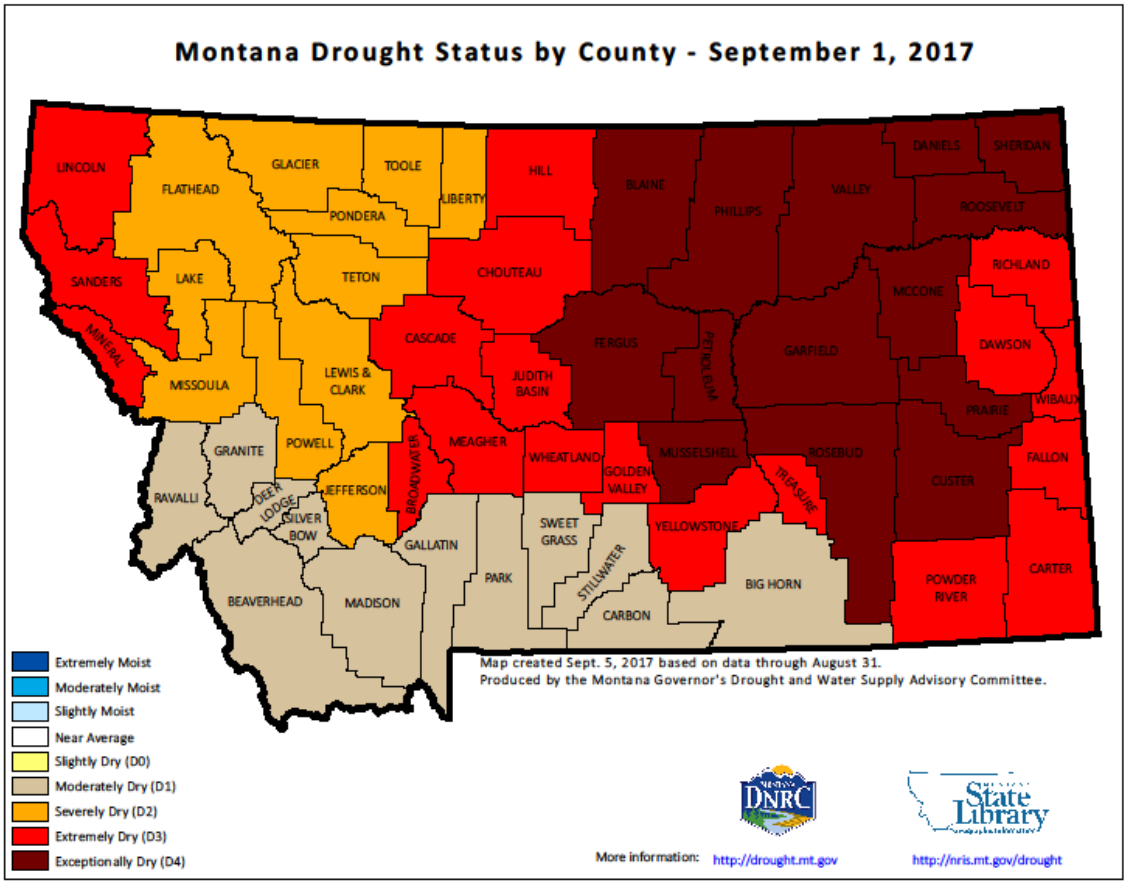


Figure 7. Montana Drought Status Map, September 1, 2017, produced by the Montana Governor's Drought and Water Supply Advisory Committee.

Water year 2017 ended with varied storage levels. Gibson Reservoir was at 31 percent of average while Clark Canyon was 133 percent of average. The reservoir with the greatest amount of carryover storage was Bighorn Lake at 99 percent of capacity. Total inflows into Reclamation facilities in Montana east of the Continental Divide ranged from 87 percent of average at Fresno Dam to 210 percent of average at Bighorn Lake.

The CORPS reported the operations of Reclamation projects under the jurisdiction of the MTAO east of the Continental Divide prevented approximately $17.1 million in total flood damages during WY 2017. The damages prevented were credited to the operations of Clark Canyon, Canyon Ferry, Tiber, Fresno and Yellowtail/Bighorn Lake. The total flood damages prevented by MTAO's facilities since 1950 is approximately $568.2 million.

FLOOD BENEFITS

The CORPS evaluated reservoir regulation data pertaining to Reclamation reservoirs within the jurisdiction of the MTAO and indicated that five reservoirs provided flood relief during WY 2017. They were: Clark Canyon Reservoir on the Beaverhead River near Dillon; Canyon Ferry Reservoir on the Missouri River near Helena; Bighorn Lake on the Bighorn River near Fort Smith; Lake Elwell on the Marias River near Chester; and Fresno Reservoir on the Milk River near Havre. The most notable examples of peak flows regulated by Reclamation reservoirs during spring runoff are as follows:

Reservoir	Peak Inflow (cfs)	River Discharge (cfs)	Date
Clark Canyon	795	309	06/15/17
Canyon Ferry	17,432	8,918	06/07/17
Bighorn Lake	18,344	11,997	06/11/17
Lake Elwell	9,224	515	03/16/17
Fresno	4,640	165	03/19/17

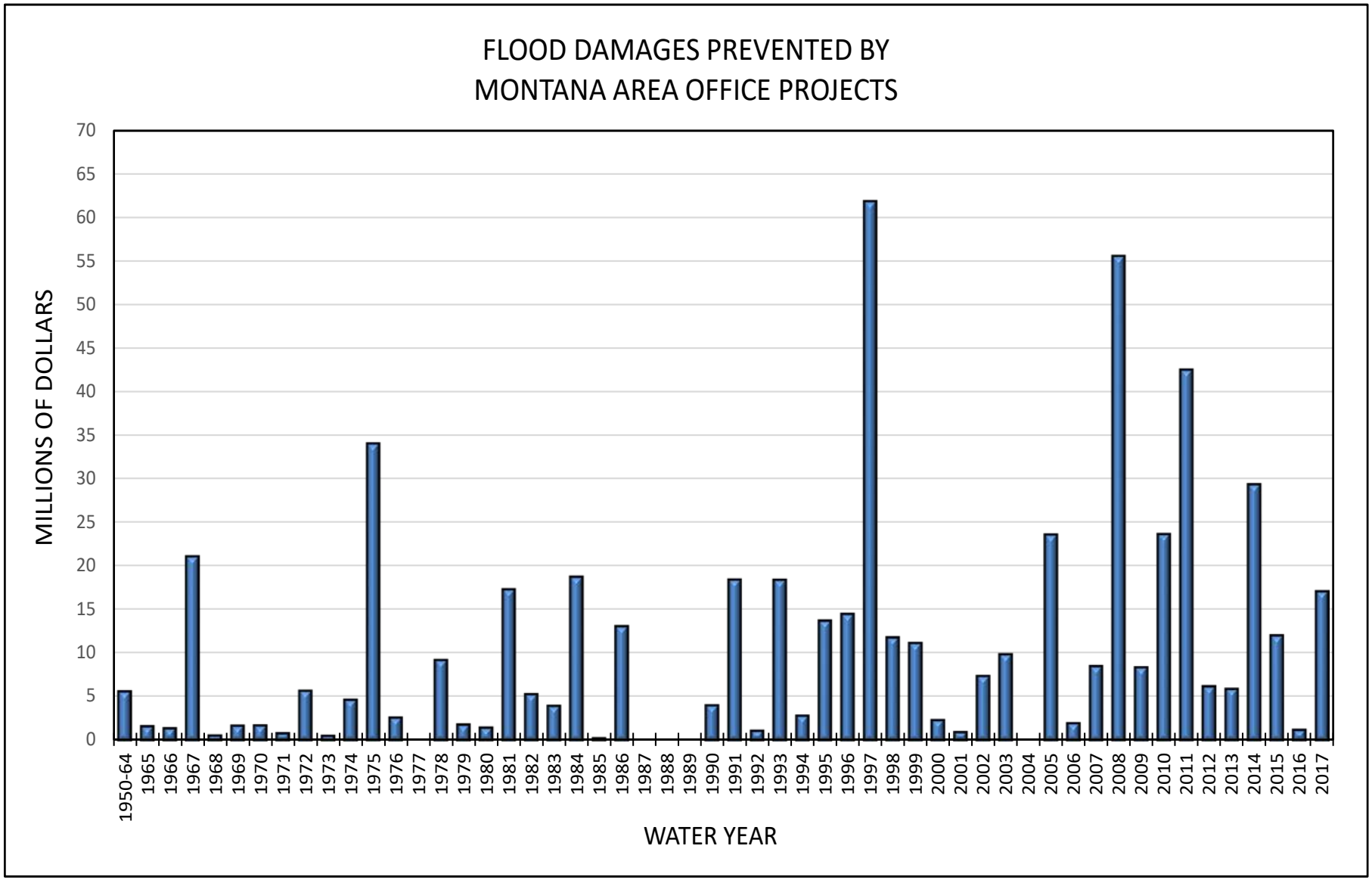
The CORPS estimated the operations of Reclamation reservoirs in Montana during WY 2017 reduced flood damages by $17,114,300. Some of these benefits were derived by reducing local damages and other benefits were derived by storing water which would have contributed to flooding downstream on the main stem of the Missouri River below Fort Peck Reservoir. The flood damages prevented are listed in Table MTT4. For additional information on the operations of the reservoirs within the jurisdiction of the MTAO, refer to the individual "Summary of Operations for 2017" for each reservoir in this report. Figure MTG2 shows the annual flood damages prevented by MTAO reservoirs since 1950.

TABLE MTT4
FLOOD DAMAGES PREVENTED
(THOUSANDS OF DOLLARS)

Reservoir	Local	Main Stem	2017 Total	Prev. Accum.	1950-2017 Accum. Total
Clark Canyon	$ 288.4	$ 21.7	$ 310.1	$ 16,127.7	$ 16,437.8
Canyon Ferry	718.3	5,198.4	5,916.7	238,564.9	244,481.6
Bighorn Lake	248.2	8,192.9	8,441.1	170,758.0	179,199.1
Lake Elwell	0.0	247.1	247.1	96,646.1	96,893.2
Fresno	2,199.3	0.0	2,199.3	15,520.6	17,719.9
Gibson[1]	0.0	0.0	0.0	3,085.6	3,085.6
Lake Sherburne[2]	0.0	0.0	0.0	10,412.0	10,412.0
Total	$ 3,454.2	$ 13,660.1	$ 17,114.3	$551,114.9	$568,229.2

1. No space allocated to flood control, but some flood protection provided by operation for other purposes.
2. Now includes historical flood damages prevented by Lake Sherburne since 1950 based on estimates provided by the Corps of Engineers.

FIGURE MTG2


FLOOD DAMAGES PREVENTED BY
MONTANA AREA OFFICE PROJECTS
MILLIONS OF DOLLARS
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WATER YEAR

UNIT OPERATIONAL SUMMARIES FOR WY 2017

Clark Canyon Reservoir

Clark Canyon Reservoir, a Pick-Sloan Missouri River Basin Program (P-S MBP) project, is located on the Beaverhead River 20 miles upstream from Dillon, Montana with a capacity of 257,152 acre-feet (AF) (255,643 AF active). The reservoir is the storage facility for the East Bench Unit providing water supply for irrigation of 21,800 acres and a supplemental supply for about 28,000 acres. Flood control, recreation, and fish and wildlife are among the other functions served by the reservoir.

In 2000, Clark Canyon Reservoir was surveyed to develop an area-capacity table. The data were used to calculate capacity lost due to sediment accumulation since dam closure in August of 1964. The survey determined that Clark Canyon Reservoir has a storage capacity of 174,367 AF and a surface area of 5,151 acres at elevation 5546.10 feet. Since closure the reservoir has accumulated a sediment volume of 4,106 AF below elevation 5546.10 feet. This represents a 2.3 percent reduction in capacity and an average annual reduction of 114.7 AF. The revised area-capacity table was put into effect on October 1, 2001, reflecting the new storage levels.

October started with a storage of 52,040 AF, 70 percent of average at elevation 5514.72 feet. Temperatures were warm, 2 to 4 degrees above average, and much above average precipitation, up to 400 percent. This precipitation brought soil moisture to above normal conditions and inflows into Clark Canyon increased to above 300 cubic feet per second (cfs), 130 percent of average. November was warm with temperatures averaging 6 to 9 degrees above average and 50 to 70 percent below average for precipitation. Inflows into Clark Canyon decreased from 350 cfs to 200 cfs. December brought colder than average temperatures and above average precipitation with the SWE at 39 percent of average. By the end of the month the SWE increased to 90 percent of average. The valley precipitation in the Clark Canyon Basin had reached a year to date average of 173 percent while mountain precipitation was 123 percent of average.

On January 1, 2017 the snowpack near Clark Canyon was 89 percent of average. Colder air from the northwest brought below zero temperatures. with a monthly average of 12 to 16 degrees below average. January was a mix of above to below average precipitation. With this, the February 1, 2017 snowpack declined to 83 percent of average. February brought a two week stretch of warmer than average temperatures, however much above average mountain and valley precipitation during the month brought the SWE to 105 percent of average. By the end of February, the year to date mountain and valley precipitation was 125 and 149 percent of average, respectively.

The March 1, 2017 measured snowpack was 105 percent of average. The runoff projection for the April-July period was 89,600 AF, or 120 percent of the 30-year average. The East Bench Unit Joint Board (Joint Board), consisting of three representatives from each water user entity, met on March 7, 2017 to discuss the water supply outlook for the 2017 irrigation season. The forecast projected above average storage levels, therefore the Joint Board tentatively set full allotments (Clark Canyon Water Supply Company (CCWSC) 4.0 AF per acre, East Bench Irrigation District (EBID) 3.1 AF per acre).

Temperatures in March were 4 to 6 degrees above average. The low to mid-level elevation snow melted which resulted in inflows increasing from 186 cfs to near 630 cfs. The Clark Canyon SWE decreased mid-month, but above average precipitation in southwestern Montana mountain ranges late in the month brought the SWE back to near average by month's end. Mountain precipitation resulted in a monthly average of 83 percent while valley precipitation was 87 percent of average. Inflow into Clark Canyon Reservoir for October through March was 90,400 AF, 101 percent of the 30-year average. Due to average inflows, the end of March reservoir elevation was recorded at 5536.34 feet, approximately 9.8 feet below full pool.

On April 1, 2017 the mountain snowpack declined to 97 percent of average, and the water supply forecast predicted the April-July runoff into Clark Canyon Reservoir would be 87 percent of average, totaling approximately 67,900 AF. Even though this forecast was reduced from the previous month, operation plans still indicated full allotments due to the increased storage during March. On April 11, 2017 the Joint Board set full allotments for the 2017 irrigation season. Valley and mountain precipitation was much above average during April. The snowpack steadily increased throughout the month and reached a peak SWE of 14.87 inches, 110 percent of average. Inflow remained steady at 14,400 AF, 103 percent of average.

On May 1, 2017 the measured mountain snowpack increased to 112 percent of average, and the water supply forecast predicted the May through July runoff into Clark Canyon Reservoir would be 94 percent of average, totaling approximately 58,000 AF.

Fine sediment was deposited throughout the Beaverhead River from the mouth of Clark Canyon Creek to several hundred yards below High Bridge between April 28 and May 1, 2017. On May 3, 2017 representatives of the East Bench Unit and Montana Fish, Wildlife, and Parks (MFWP) met on-site and confirmed that a sediment event had occurred and that, although the event was smaller than those in previous years, a flushing flow was warranted. Reclamation concurred with the recommendation and a flushing flow was scheduled to commence on May 5, 2017 as per the 2017 memorandum of understanding (MOU) between the Joint Board, Reclamation, and MFWP. The flushing flow was to follow the hydrograph described by AGI (2014) and transition directly into irrigation releases based on water orders the East Bench Unit had received. On May 4, 2017 MFWP posted signs at Beaverhead River fishing access sites and notified guides and outfitters of the flushing flow via email.

The flushing flow was initiated on May 5, 2017 and concluded on May 8, 2017. Discharge was increased from winter releases of 43 cfs to 600 cfs over a 36-hour period. The peak flow of 600 cfs occurred for 12 hours then discharges were reduced to irrigation demand of 247 cfs over the next 56 hours. Twelve hours after the flushing flow began a second sediment event from Clark Canyon Creek occurred; high flows and sediment were transported into the Beaverhead River for about 24 to 48 hours coinciding with the rising limb of the hydrograph and peak of the flushing flow. The flushing flow successfully mobilized sediment deposited by Clark Canyon Creek and prevented deposits of additional sediment.

The mountain snowpack melted quickly, 112 percent on May 1 to 80 percent of average on May 31, 2017. The valley and mountains of the Red Rocks and Beaverhead Basins were dry. By

the end of May the inflow was 18,100 AF, 125 percent of the 30-year average. By the end of May, Clark Canyon Reservoir was 120 percent of the 30-year average, at 5539.86 feet.

Average temperatures returned in June while drier conditions persisted in the watershed. Inflows totaled 25,600 AF or 104 percent of average. The remaining 4 inches of SWE melted by the end of the month. Inflow during July totaled 17,300 AF, or 82 percent of average. Temperatures were 2 to 4 degrees warmer than average and precipitation across the basin was highly variable. By the end of July, the reservoir was at elevation 5534.25 feet or 117,867 AF, 133 percent of average.

Snowmelt runoff during April-July was average at 101 percent of the 30-year average, totaling an inflow of 75,400 AF. Daily inflows into Clark Canyon Reservoir averaged 242 cfs during April, 295 cfs during May, 430 cfs during June, and 281 cfs during July. Releases during the April-July time period averaged 43 cfs during April, 222 cfs during May, 446 cfs during June, and 680 cfs during July. Storage reached the peak for the year of 147,154 AF at elevation 5540.66 feet on June 20, 2017. On July 15, 2017 the peak release from Clark Canyon Reservoir was 793 cfs to meet downstream irrigation demands.

Lima Reservoir is a private irrigation facility located upstream of Clark Canyon Reservoir on the Red Rock River, a tributary of the Beaverhead River. Lima Reservoir filled to the top of the conservation pool and spilled over the spillway crest. The reservoir peaked on May 28, 2017 at 76,440 AF at elevation 6581.49 feet. On September 21, 2017 all irrigation releases out of Lima Reservoir were discontinued for the year, except for senior water right holders, with storage at 31,525 AF, elevation 6570.69 feet. The drainage area above Lima Reservoir accounts for about 25 percent of the total drainage area above Clark Canyon Reservoir.

Temperatures were above average during August and precipitation ranged from 40 to 50 percent of average throughout the basin. Even though dry conditions occurred during July and August, Clark Canyon Reservoir only drafted to 5530.17 feet by August 31, 2017. September brought much needed precipitation, up to 181 percent of average precipitation in the mountains and up to 211 percent of average in the Beaverhead Basin valley.

On September 7, 2017 the Joint Board held a meeting to discuss winter releases, guidelines, fishery concerns, basin conditions, and winter forecasts. Reclamation provided reservoir operation plans with minimum, maximum, and most probable inflows with a 100 cfs winter release. The Joint Board settled on winter flows at 85 cfs with a reduction to 75 cfs to store water for two separate 2017 Spring flushing flows. MFWP participated in the discussions and agreed with the Joint Board.

In response, Reclamation’s letter dated October 3, 2017 stated that under Article 6.g and Exhibit D of Reclamation's Contract Nos. 069F670010 and 069F6700009 with the EBID and CCWSC, provisions are included which encourage working with third parties such as the State of Montana to enhance the environmental health of the Beaverhead River. Measures that could be considered appropriate include, among other considerations, storing water for enhancement purposes and providing a minimum release from Clark Canyon Reservoir that is not less than 25 cfs. In accordance with these contracts, Reclamation concurred that a reduction in winter flows from 85 cfs to 75 cfs for storing water for several Spring 2017 flushing flows was acceptable, provided

all parties agree. It was anticipated that the reduction would result in approximately 4,200 AF of banked water. An MOU would have to be created to identify and determine the specific requirements of the flushing flow. Therefore, the winter release from Clark Canyon Reservoir was set at 75 cfs on October 3, 2017.

Water released from Clark Canyon Reservoir from May 5 through September 30, 2017 was to meet downstream irrigation demands. Beginning May 5, 2017 storage declined from 139,349 AF at elevation 5539.03 feet to 99,111 AF at elevation 5529.63 feet on September 30, 2017. The EBID water users received 69,099 AF at the point of diversion, leaving 1,596 AF of their allotment in the reservoir and CCWSC used 88,690 AF, leaving 13,137 AF of their allotment in the reservoir. The total May 7 to September 30, 2017 irrigation deliveries recorded by the river commissioner for the "non-signer" users on the Beaverhead River was 40,618 AF on 7,370 acres.

Inflow to Clark Canyon Reservoir during WY 2017 was 101 percent of the 30-year average, totaling 195,200 AF. The annual release to the Beaverhead River from Clark Canyon Reservoir was 148,084 AF. By the end of September, the cumulative valley precipitation for WY 2017 was 113 percent of average, while the cumulative mountain precipitation was 116 percent of average.

The CORPS determined that during WY 2017, Clark Canyon Reservoir prevented $288,400 in local flood damages and $21,700 in main stem flood damages.

Important Events – WY 2017

October 1, 2016: Clark Canyon Reservoir enters WY 2017 with 52,040 AF of storage at elevation 5514.72 feet. Following the 2016 irrigation season, releases from Clark Canyon Reservoir to the Beaverhead River were reduced to 42 cfs for a winter release.

May 5-8, 2017: A flushing flow was initiated on May 5 and concluded on May 8, 2018. After the flush, releases from Clark Canyon Reservoir were increased as needed to meet irrigation demands.

June 15, 2017: Inflows into Clark Canyon Reservoir peaked at 795 cfs.

June 20, 2017: Clark Canyon Reservoir peak storage was 147,154 AF at elevation 5540.66 feet, which was 5.5 feet below full pool.

July 15, 2017: Releases from Clark Canyon Reservoir peaked at 792 cfs to meet downstream water demands from the Beaverhead River.

September 30, 2017: Clark Canyon Reservoir ended WY 2017 with 99,111 AF of storage at elevation 5529.63 feet.

Additional hydrologic and statistical information pertaining to the operation of Clark Canyon Reservoir during WY 2017 can be found in Table MTT5 and Figure MTG3.

TABLE MTT5
HYDROLOGIC DATA FOR WY 2017
CLARK CANYON - EAST BENCH UNIT
NEW SEDIMENT SURVEY DATA EFFECTIVE 10/1/2001

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	5470.60	1,061	1,061
TOP OF ACTIVE CONSERVATION	5535.70	124,160	123,099
TOP OF JOINT USE	5546.10	174,367	50,207
TOP OF EXCLUSIVE FLOOD CONTROL	5560.40	253,442	79,075

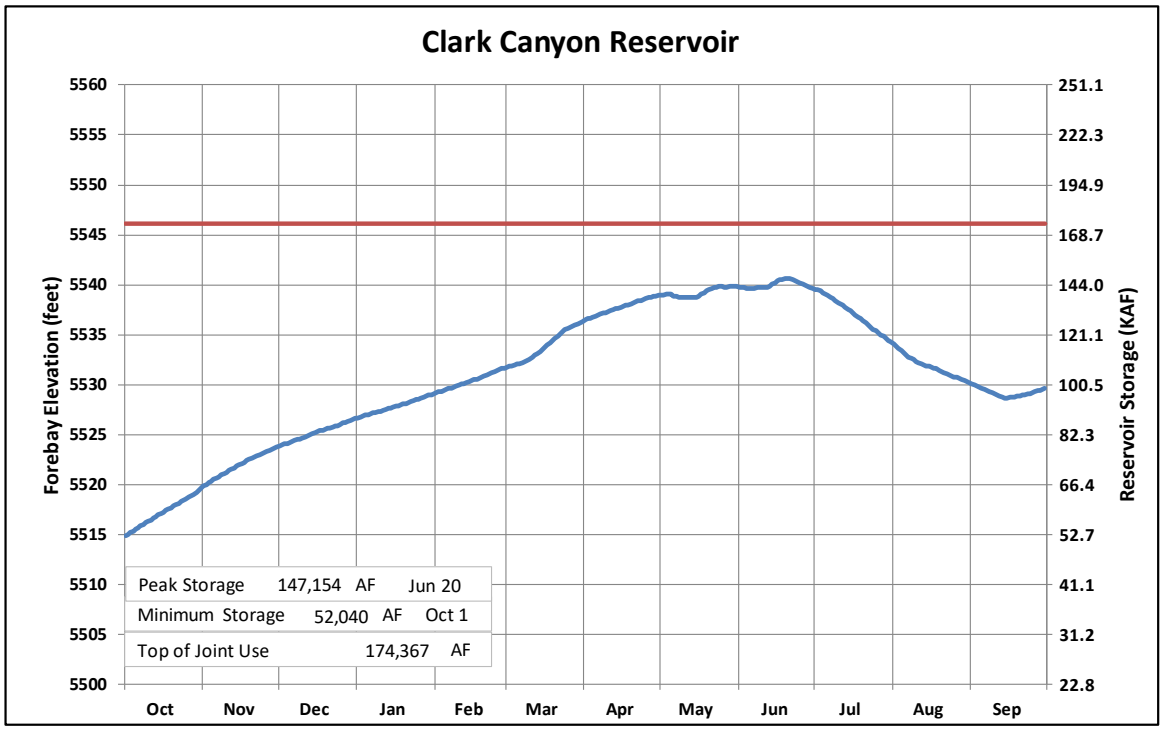
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	5514.72	52,040	OCT 01, 2016
END OF YEAR	5529.63	99,111	SEP 30, 2017
ANNUAL LOW	5514.72	52,040	OCT 01, 2016
ANNUAL HIGH	5540.66	147,154	JUN 20, 2017
HISTORIC HIGH	5564.70	283,073	JUN 25, 1984

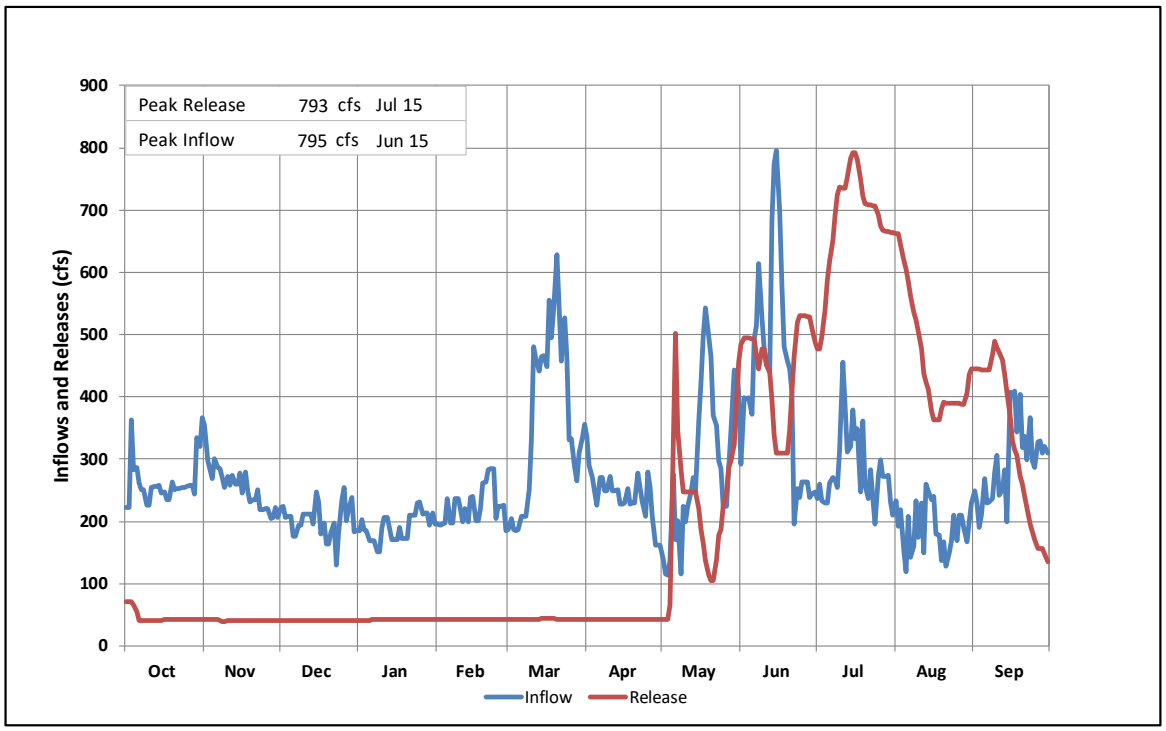
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	195,155	OCT 16-SEP 17	148,084	OCT 16-SEP 17
DAILY PEAK (CFS)	795	JUN 15, 2017	793	JUL 15, 2017
DAILY MINIMUM (CFS)	114	MAY 03, 2017	40	NOV 08, 2016
PEAK SPILL (CFS)			0	NONE
TOTAL SPILL (AF)			0	NONE

MONTH	INFLOW		OUTFLOW*		CONTENT	
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG
OCTOBER	16.2	94	2.8	21	65.4	77
NOVEMBER	15.2	87	2.4	20	78.1	82
DECEMBER	12.4	83	2.5	22	87.9	85
JANUARY	11.7	90	2.6	26	97.1	88
FEBRUARY	12.4	105	2.4	27	107.1	92
MARCH	22.5	153	2.6	28	127.0	101
APRIL	14.4	103	2.6	22	138.8	106
MAY	18.1	125	13.7	51	143.3	116
JUNE	25.6	104	26.5	70	142.3	126
JULY	17.3	82	41.8	92	117.9	133
AUGUST	11.7	79	28.4	76	101.2	139
SEPTEMBER	14.5	121	19.7	97	99.1	133
ANNUAL	192.7	101	148.1	61		
APRIL-JULY	75.4	101				

* Average for the 1965-2017 period.

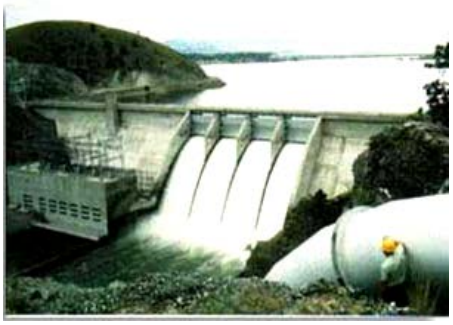
FIGURE MTG3





Water Year 2017

Canyon Ferry Lake and Powerplant



Canyon Ferry Lake P-S MBP, formed by Canyon Ferry Dam, is located on the Missouri River near Helena, Montana. It has a total capacity of 1,992,977 AF. The top 3 feet were allocated to exclusive flood control in February 1966. The next 27 feet are allocated to joint conservation and flood control purposes. The joint use space is evacuated for flood control purposes, only to the extent that refill during the spring runoff is reasonably assured. The conservation storage is operated mainly for power generation and to provide replacement storage for several new irrigation developments located on the Missouri River and its tributaries above Great Falls, Montana. To date, however, the conservation storage has been used primarily for power production. The only new areas under irrigation are 5,000 acres on the Crow Creek Unit P-S MBP, 13,900 acres on the Helena Valley Unit P-S MBP, and 28,000 acres on the East Bench Unit P-S MBP. In addition, about 5,200 acres in the Helena Valley Unit that was once irrigated by pumping from Lake Helena and from other streams are now irrigated by pumping from Canyon Ferry Reservoir. About 33,700 acres on the East Bench Unit also receive supplemental water supply. A small amount of municipal water is also furnished to the city of Helena, Montana, through facilities for the Helena Valley Unit.

In 1997, Canyon Ferry Lake was surveyed to develop an area-capacity table and curve. The survey determined that Canyon Ferry Lake had a storage capacity of 1,992,977 AF and a surface area of 34,048 acres at elevation 3800.00 feet. Since closure in 1953, the reservoir has accumulated a sediment volume of 59,746 AF below reservoir elevation 3800.00 feet. This volume represents a 2.91 percent reduction in capacity and average annual reduction of 1,345.6 AF. The revised area-capacity table was put into effect on October 1, 1998, reflecting the new storage levels.

Water year 2017 started with a content of 1,485,407 AF at elevation 3784.30 feet, 95 percent of average, and releases near 3,500 cfs below Holter Dam.

Temperatures in October were warmer with much above average precipitation, up to 250 percent. Inflows averaged 3,430 cfs while releases remained near 3,500 cfs below Holter Dam. November temperatures were 6 to 9 degrees above average and had 50 percent of average precipitation in the basin. By the end of November, the SWE was only 36 percent of average. Inflows had increased to 4,120 cfs, 100 percent of average, and flows below Holter Dam were increased to 3,700 cfs.

December temperatures were 4 to 8 degrees below average, with mountain and valley precipitation near 150 percent of average. With the extreme cold temperatures, Northwestern Energy requested additional flow for anticipated river icing per their FERC License 2188 Article 403 (extreme winter weather operation). Releases from Canyon Ferry varied up to a maximum of 5,650 cfs from December 9 through December 19, 2016. By the end of December, the valley precipitation had a year to date of 113 percent of average in the Jefferson, 136 percent of average in the Madison, and 139 percent of average in the Gallatin. On December 31, 2016 the storage of Canyon Ferry Reservoir was at 1,449,904 AF at elevation 3783.12 feet with inflows near 2,900 cfs and releases near 3,650 cfs.

On January 1, 2017 the mountain snowpack above Canyon Ferry Reservoir was 81 percent of average. With cold temperatures January Northwestern Energy requested additional flow for anticipated river icing. Releases varied up to a maximum of 4,300 cfs from January 1 through January 8, 2017. Snow accumulation continued to build throughout the month at near average rates. On January 31, 2017 the storage of Canyon Ferry Reservoir was at 1,418,530 AF at elevation 3782.06 feet with inflows near 3,150 cfs and releases near 3,300 cfs.

On February 1, 2017 the mountain snowpack measured 80 percent of average. February brought warmer temperatures and above average mountain precipitation. The warmer temperatures triggered the valley snow to melt causing inflows into Canyon Ferry to rise to near 5,100 cfs and thus increasing storage by 2.5 feet, or 46,000 AF by February 28, 2017. The snow storms resulted in a monthly mountain precipitation of 172 percent in the Jefferson, 206 percent in the Madison, and 190 percent in the Gallatin. These storms increased the SWE above Canyon Ferry Reservoir from 80 percent to 100 percent of normal.

With the major snow storms that occurred during February, the March 1, 2017 mountain SWE was measured at 101 percent of average. The forecasted April-July inflow volume was 1,691 KAF, or 101 percent of the 30-year average. Inflows rose from 4,000 cfs on March 11 to 7,900 cfs by March 22, 2017. Temperature increases caused the low to mid-elevation snow to melt along with above average valley precipitation, 131 percent. Releases from Canyon Ferry Reservoir increased from 3,550 cfs to near 4,200 cfs. The additional inflow volume caused the reservoir to gain 3 feet resulting in an end of month elevation of 3786.60 feet. As the month progressed, the snowpack accumulated at a slower rate. By the end of the month, the snowpack reached 15.23 inches of SWE or 95 percent of average for the Upper Missouri Basin.

On April 1, 2017 the mountain snowpack slightly decreased to 95 percent of average, while April-July forecasted inflow volume also decreased to 94 percent of average (1,603 KAF). Due to the higher than average reservoir elevation and near average runoff conditions, releases were increased to 4,500 cfs. Diversions for the Helena Valley Irrigation District (HVID) to the Helena Valley Reservoir began on April 7, 2017. Inflows remained high for the duration of the month, near 5,700 cfs (100 to 145 percent of average). Additional storms brought more precipitation to the basin resulting in a peak SWE on April 31, 2017 at 17.34 inches. Due to increased precipitation and mountain snowpack, high reservoir content, and higher than average inflows, releases to the Missouri River were increased to 7,300 cfs by the month's end to draft the reservoir.

May had near average temperatures, however, the wet precipitation pattern that had occurred over the past three months had expired. The basin valley precipitation averaged 85 percent, while the mountain precipitation declined to 87 percent of average. The snowmelt runoff season started May 7, 2017 as the mid elevation mountain temperatures increased. This increased inflows from 4,580 cfs on May 6 to a peak for the month near 15,000 cfs on May 14, 2017, 230 percent of average. Inflows slowly declined to 11,000 cfs by the end of May, which was near average inflows. The elevation and content of the reservoir continued to remain higher than normal, therefore releases were increased. Releases to the Missouri River were increased and held at a 10,000 to 11,000 cfs flow from May 20 to May 25, 2017 to control the rate of fill. Releases were gradually reduced to 8,000 cfs in anticipation of filling the remaining content of Canyon Ferry

Lake. The elevation was at 3790.3 feet, 6.7 feet from full pool and 2.6 feet higher than average, and the remaining snowpack was measured at 8.2 inches, which is average for the end of May.

Early June brought hot temperatures, causing the high elevation snow to melt. Inflows increased from 11,700 cfs on June 1 to a peak inflow of 17,500 cfs on June 7, 2017. During this time forecasts predicted a possible peak inflow above 20,000 cfs, therefore in preparation for this possible event, releases were increased to 9,300 cfs by June 8, 2017. The peaked passed and the predicted peak inflow of above 20,000 cfs did not occur, so releases were decreased to 8,200 cfs on June 10, 2017 to fill the remaining 3 feet of reservoir. A quick developing storm system brought 1.0 to 2.0 inches of rain to the Upper Missouri Basin from June 12 through June 15, 2017. This storm caused river flows to increase to 14,000 to 15,500 cfs for 5 days with most of the runoff occurring in the Big Hole and Jefferson Basins. The river flow increase was a result of a combination of rain runoff volume as well as a reduction in irrigation diversions. In response to the rain storm, releases were once again increased to near 11,500 cfs to control the rate of fill. Releases were decreased in step with the declining inflows as the reservoir was near full pool. The reservoir filled to the top of the joint use, elevation 3797.00 feet on July 1, 2017 with a river release of 6,200 cfs and inflows near 6,700 cfs and declining.

July exhibited average temperatures and much below average precipitation (40 percent of average) in the basin. Inflows into the reservoir for the month averaged 3,200 cfs (72 percent of average). Releases to the Missouri River below Holter Dam were gradually decreased to 4,100 cfs. The April-July runoff into Canyon Ferry Lake during WY 2017 was 115 percent of average, totaling approximately 1,922,600 AF, with 72 percent of that volume occurring during May and June.

August exhibited above average temperatures with half of average precipitation. Due to the lack of precipitation the Jefferson, Gallatin, and Madison Basins drought status was labeled as moderately dry by the end of August. Canyon Ferry Reservoir continued to draft as inflows declined to 1,600 cfs while releases to the Missouri River below Holter Dam were maintained near 4,100 cfs.

September forecasts projected below average inflows, therefore to conserve storage, releases were reduced mid-month to 3,800 cfs below Holter Dam. Temperatures in early September were warm with below average inflows. Later in the month a cool front came and produced precipitation that increased inflows, along with irrigation slowly turning off in the basin, to rebound inflows to above average conditions. This allowed the reservoir to remain near a steady elevation for the remainder of the month. The HVID discontinued diversions on October 2, 2017.

Canyon Ferry Lake had a storage of 1,544,696 AF at elevation 3786.23 feet, 99 percent of average, with inflows averaging near 3,300 cfs and releases near 3,800 cfs below Holter Dam by the end of WY 2017. The annual inflow to Canyon Ferry Lake was 106 percent of average, totaling 3,547,040 AF.

During WY 2017, Canyon Ferry powerplant generated 336,681,000 kilowatt-hours, 89 percent of the long-term average dating back to 1967. The powerplant used 2,782,041 AF, or 80 percent of the total water released from the dam. The other 20 percent was released to meet irrigation needs

for HVID (203,339 AF), 178,663 AF spilled through the river outlet gates and 323,948 AF spilled through the spillway gates.

The CORPS estimated that during WY 2017, Canyon Ferry Dam prevented $718,300 in local flood damages and $5,198,400 in flood damages downstream on the Missouri River main stem.

Important Events -WY 2017

October 11-14, 2016: Canyon Ferry personnel conducted maintenance on Unit 2. Turbine releases were restricted and limited to a two-unit capacity. Flows below Holter Dam to the Missouri River were being maintained near 3,500 cfs.

November 7, 2016: November operational plans indicated releases out of Canyon Ferry Reservoir would be increased to meet reservoir elevations. Flows below Holter Dam would be maintained near 3,700 cfs.

December 1, 2016: Operational plans indicated releases out of Canyon Ferry Reservoir needed to be increased to meet targeted reservoir elevations. Flows below Holter Dam would be maintained near 3,800 cfs.

December 4, 2016: Northwestern Energy called for a 1,000 cfs release increase from Canyon Ferry Reservoir to the Missouri River. The increased volume is part of Northwestern Energy's water right. Total release from Canyon Ferry was increased to 4,650 cfs.

December 9, 2016: Due to the extended cold weather forecasted, Northwestern Energy requested additional flow for anticipated river icing per FERC License 2188 Article 403 (extreme winter weather operation). Generation was limited and restricted to a two Unit load. Total release from Canyon Ferry was increased to 5,650 cfs.

December 13-19, 2017: Temperatures were forecasted to return therefore, releases out of Canyon Ferry were gradually reduced. In coordination with Northwestern Energy, releases out of Canyon Ferry were reduced to a flow of 3,650 cfs.

December 20, 2017: A restriction of 13.4 MW was placed on Unit No. 1 until further notice.

January 1-3, 2017: Due to cold weather forecasted, Northwestern Energy requested additional flow for anticipated river icing per FERC License 2188 Article 403 (extreme winter weather operation). Flow releases out of Canyon Ferry Reservoir would be near 4,300 cfs. A restriction of 15.5 MW was placed on Unit No. 1 until further notice.

January 4-8, 2017: Temperatures were forecasted to return to normal, therefore, releases out of Canyon Ferry were gradually reduced to 3,500 cfs.

January 9, 2017: January runoff forecasts indicated releases out of Canyon Ferry Reservoir needed to be decreased to meet target reservoir elevations by early spring. (approximately 3,400 cfs through the powerplant). Flows were adjusted to maintain 3,500 cfs below Holter Dam.

March 9, 2017: Based upon the March 1 operational forecast, Canyon Ferry releases were increased to meet reservoir elevations. Flows below Holter Dam on the Missouri River would be maintained near 3,800 cfs.

March 18-28, 2017: Flows below Holter Dam on the Missouri River were gradually increased to 4,300 cfs to control the rate of fill due to low elevation snowmelt runoff.

April 6, 2017: The April 1, 2017 forecast indicated releases from Canyon Ferry Reservoir needed to be increased to store the anticipated April-July runoff volume. Releases from Canyon Ferry were increased to 4,500 cfs.

April 7, 2017: HVID started pumping water to the Helena Valley Reservoir. Diversion from Canyon Ferry Reservoir were adjusted throughout the season to meet irrigation demands from the Helena Valley Reservoir.

April 10, 2017: Releases from Canyon Ferry to the Missouri River were increased to 4,800 cfs to control the rate of fill.

April 15-20, 2017: Releases from Canyon Ferry to the Missouri River were increased to 6,850 cfs to control the rate of fill.

April 29-30, 2017: Releases from Canyon Ferry to the Missouri River were increased to 7,300 cfs to control the rate of fill.

May 13-15, 2017: Releases from Canyon Ferry to the Missouri River were increased to 8,800 cfs to control the rate of fill.

May 18-19, 2017: Releases from Canyon Ferry to the Missouri River were increased to 9,800 cfs to control the rate of fill.

May 20-21, 2017: Inflows during the month of May ranged from 100 to 230 percent of average. To continue to control the rate of fill at Canyon Ferry Reservoir, releases to the Missouri River were increased to 10,800 cfs.

May 24-25, 2017: Operational plans indicated releases needed to be reduced to gradually fill Canyon Ferry Reservoir to the top of the joint use pool. Canyon Ferry Reservoir releases to the Missouri River were decreased to 9,700 cfs.

May 27-31, 2017: In coordination with MFWP, operational plans indicate releases needed to be reduced to fill Canyon Ferry Reservoir to the top of the joint use pool. Releases from Canyon Ferry to the Missouri River were slowly decreased to 7,700 cfs.

June 6-8, 2017: Above average temperatures caused inflows into Canyon Ferry Reservoir to reach nearly 150 percent of average. Canyon Ferry Reservoir releases to the Missouri River were gradually increased to 9,500 to control the rate of fill.

June 9, 2017: Inflows into Canyon Ferry Reservoir peaked, therefore Canyon Ferry Reservoir releases to the Missouri River were decreased to 8,200 cfs.

June 13-16, 2017: A rain event of 1 to 2 inches in the Upper Missouri Basin caused the river to rise. Releases from Canyon Ferry to the Missouri River were gradually increased to 11,500 cfs.

June 19-20, 2017: Inflows into Canyon Ferry peaked from the recent rain event and were declining, therefore releases from Canyon Ferry Reservoir to the Missouri River were reduced to 9,500 cfs.

June 21-22, 2017: Releases from Canyon Ferry Reservoir to the Missouri River are reduced to 7,900 cfs.

June 25-28, 2017: Releases from Canyon Ferry Reservoir to the Missouri River were gradually reduced to 6,200 cfs as inflows continued to decline.

July 5-12, 2017: Releases from Canyon Ferry Reservoir to the Missouri River were gradually reduced to 4,000 cfs as inflows continued to decline.

July 5-10, 2017: Releases from Canyon Ferry Reservoir to the Missouri River were gradually reduced to 3,900 cfs as inflows continued to decline. Flows below Holter Dam were being maintained at or above 4,100 cfs

September 12-14, 2017: Unit maintenance occurred therefore flows were bypassed through the river outlet works.

September 18, 2017: To conserve storage at Canyon Ferry Reservoir, releases from Canyon Ferry to the Missouri River were decreased to 3,650 cfs.

October 2, 2017: HVID discontinued all diversions to Helena Valley Reservoir. Flows below Holter Dam were maintained near 3,700 cfs.

Additional statistical information of Canyon Ferry Reservoir and its operations during WY 2017 can be found on Table MTT6 and Figure MTG4.

TABLE MTT6
HYDROLOGIC DATA FOR WY 2017
CANYON FERRY RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	3728.00	396,031	396,031
TOP OF ACTIVE CONSERVATION	3770.00	1,097,599	701,568
TOP OF JOINT USE	3797.00	1,891,888	794,289
TOP OF EXCLUSIVE FLOOD CONTROL	3800.00	1,992,977	101,089

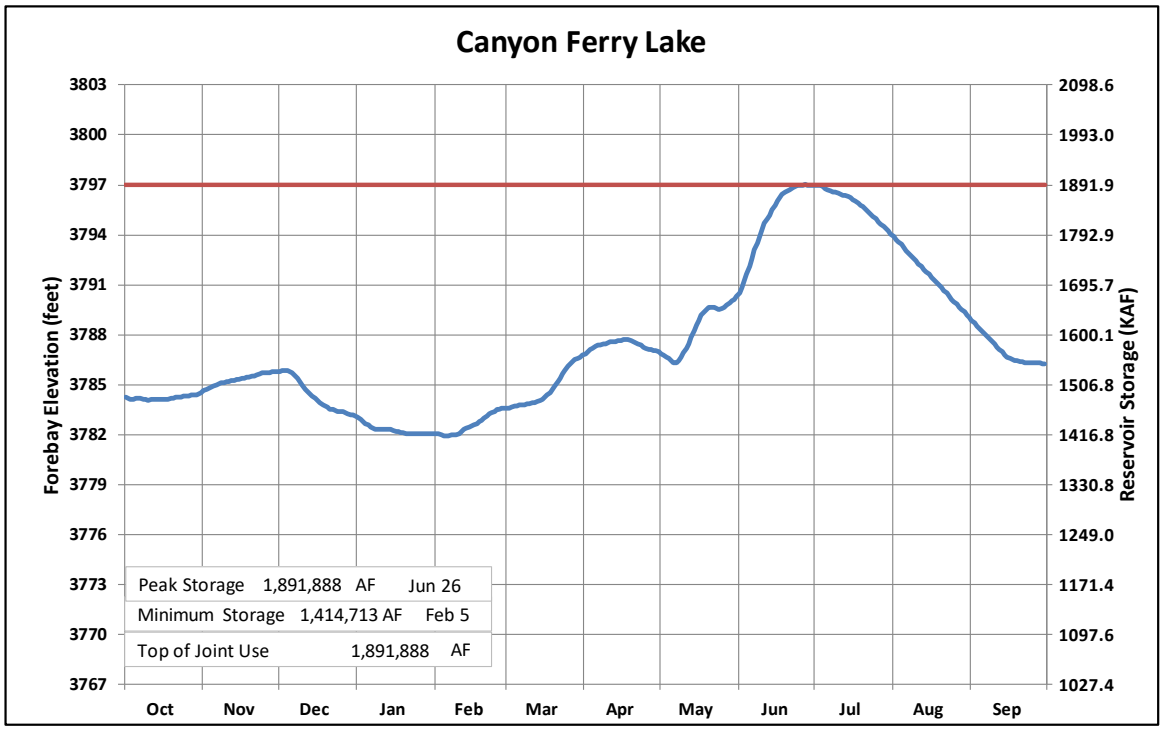
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	3794.30	1,485,407	OCT 01, 2016
END OF YEAR	3786.23	1,544,696	SEP 30, 2017
ANNUAL LOW	3781.93	1,414,713	FEB 05, 2017
ANNUAL HIGH	3797.01	1,891,888	JUN 26, 2016
HISTORIC HIGH	3800.00	2,050,900	JUN 23, 1964

INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	3,547,040	OCT 16-SEP 17	3,487,750	OCT 16-SEP 17
DAILY PEAK (CFS)	17,432	JUN 07, 2017	11,559	JUN 18, 2017
DAILY MINIMUM (CFS)	1,330	AUG 01, 2017	3,215	OCT 05, 2016
PEAK SPILL (CFS)			6,477	JUN 18, 2017
TOTAL SPILL (AF)			502,611	12/04-19/2016 3/22-07/06/2017

MONTH	INFLOW		OUTFLOW*				CONTENT	
	KAF	% OF AVG	PUMPED TO HELENA VALLEY (KAF)	% OF AVG	RIVER KAF	% OF AVG	KAF	% OF AVG
OCTOBER	210.8	92	0.6	75	203.2	80	1,492.4	95
NOVEMBER	244.9	100	0.0	---	206.2	78	1,531.1	96
DECEMBER	181.1	87	0.0	---	262.2	91	1,449.9	94
JANUARY	185.9	90	0.0	---	217.3	75	1,418.5	95
FEBRUARY	229.0	115	0.0	---	183.5	70	1,464.0	101
MARCH	325.3	132	0.0	---	227.8	78	1,561.5	110
APRIL	341.3	115	6.8	107	328.7	109	1,567.4	109
MAY	647.2	136	17.6	121	523.5	144	1,673.5	106
JUNE	738.4	116	20.0	118	500.3	106	1,891.6	105
JULY	195.8	73	23.5	125	268.6	75	1,795.2	103
AUGUST	99.0	72	22.1	126	239.7	96	1,632.4	100
SEPTEMBER	148.4	94	12.5	138	223.7	97	1,544.7	99
ANNUAL	3,307.4	107	103.2	122	3,384.7	93		
APRIL-JULY	1,922.7	114						

* Average for the 1955-2017 period.

FIGURE MTG4



Water Year 2017

Helena Valley Reservoir

Helena Valley Reservoir is a regulating off-stream reservoir for Helena Valley Unit P-S MBP, located west of Canyon Ferry Reservoir. It has a total capacity of 10,451 AF, which is used for irrigation and furnishing a supplemental municipal water supply to the city of Helena, Montana. Helena Valley Reservoir receives its entire water supply by pumping from Canyon Ferry Reservoir. When fully developed, Helena Valley Unit can irrigate about 14,100 acres of full-service land and 3,500 acres of supplemental service lands. Present development services about 13,867 full-service acres, including 5,200 acres previously irrigated by pumping from Helena Valley Reservoir or from other streams.

At the beginning of WY 2017, storage in Helena Valley Reservoir was 9,080 AF at elevation 3817.30 feet. The reservoir reached a low for the year, 7,236 AF, at elevation 3813.04 feet on April 6, 2017. New operating criteria goals were to fill Helena Valley Reservoir by May 1, 2017 and maintain it nearly full through June. In response, diversions to the Helena Valley Unit from Canyon Ferry Reservoir was started on April 7, 2017. Storage in Helena Valley Reservoir steadily increased to a peak for the year of 10,153 AF at elevation 3819.49 feet on April 30, 2017. Helena Valley Reservoir ended with a storage of 8,968 AF at elevation 3817.06 feet. During WY 2017, 103,172 AF of water was pumped to Helena Valley Reservoir from Canyon Ferry Reservoir. HVID released 82,300 AF for irrigation. All irrigation deliveries were discontinued for the 2017 season on October 2, 2017.

The reservoir provided an adequate water supply to satisfy all irrigation requirements for the Helena Valley Unit and supplement the city of Helena's municipal water supply.

Statistical information pertaining to Helena Valley Reservoir is shown in Table MTT7.

TABLE MTT7
HYDROLOGIC DATA FOR WY 2017

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
Top of Inactive Storage	3805.00	4,554	4,554
Top of Active Conservation Storage	3820.07	10,451	5,897
STORAGE ELEVATION DATA	**ELEVATION (FEET)**	**STORAGE (AF)**	**DATE**
Beginning of Year	3817.30	9,080	10/01/16
End of Year	3817.06	8,968	09/30/17
Annual Low	3813.04	7,236	04/06/17
Annual High	3819.49	10,153	04/30/17
Historic High	3820.60	10,738	6/02/75
INFLOW-OUTFLOW DATA			**ANNUAL**
Pumped from Canyon Ferry to Helena Valley Unit			103,172 AC-FT
Released from reservoir for irrigation			82,300 AC-FT
Delivered to the City of Helena for municipal use			1,886 AC-FT

MONTH	RESERVOIR		
	FOREBAY ELEVATION (FEET)	STORAGE CONTENT (KAF)	PUMPED TO HELENA VALLEY (KAF)
OCTOBER	3816.35	8.6	0.6
NOVEMBER	3815.40	8.2	0
DECEMBER	3814.86	7.9	0
JANUARY	3814.21	7.7	0
FEBRUARY	3813.72	7.5	0
MARCH	3813.20	7.3	0
APRIL	3819.49	10.1	6.7
MAY	3818.18	9.5	17.6
JUNE	3818.65	9.7	20.1
JULY	3814.78	7.9	23.5
AUGUST	3818.36	9.6	22.1
SEPTEMBER	3817.06	8.9	12.5
ANNUAL			103.1

Sun River Project

Storage for the Sun River Project is provided by Gibson, Willow Creek, and Pishkun Reservoirs, which are all single purpose irrigation structures. The project serves 95,000 acres on the Greenfields and Fort Shaw Irrigation Districts. A diversion dam is located on the Sun River about three miles below Gibson Reservoir to divert flows down the Pishkun Supply Canal to Pishkun Reservoir, or down the Willow Creek Feeder Canal to Willow Creek Reservoir. Releases are made from Pishkun Reservoir to supply Greenfields Irrigation District. Releases from Willow Creek Reservoir re-enter the Sun River where they can be diverted at the Fort Shaw Diversion Dam to supply Fort Shaw Irrigation District.

Gibson Reservoir is located on the Sun River west of Augusta, Montana, and has a total capacity of 96,477 AF. In 2009, a survey was conducted to measure reservoir volume, resulting in an updated elevation-area capacity table and curve. The previous survey, completed in 1996 measured the reservoir volume lost due to sediment accumulations after major forest fires in 1988.

The 2009 survey data yielded a capacity increase of 2,211 AF at elevation 4724.0 feet from the previous survey conducted in 1996. The increase was likely due to more detailed data collection and improved geographic information system capabilities since 1996. The revised area-capacity table established a storage capacity of 98,688 AF and a surface area of 1,334 acres at elevation 4724.0 feet (top of active conservation). Since closure in 1929, the reservoir accumulated 6,172 AF of sediment below reservoir elevation 4724.0 feet. The revised area-capacity table was placed into effect January 1, 2013.

The spillway crest is at elevation 4712.0 feet (83,248 AF). Depending on runoff conditions and reservoir levels, spillway gates remain open during spring runoff, until inflows and remaining snowpack indicate that the runoff is receding. Once runoff has peaked, the spillway gates are progressively closed to fill the reservoir another 12 feet to the top of the conservation pool at elevation 4724.0 feet (98,688 AF).

Gibson Reservoir began WY 2017 with a content of 5,459 AF at elevation 4610.06 feet, which is near the minimum reservoir elevation before sediment is sluiced through the river outlet works. At the end of the 2016 irrigation season, fall releases from Gibson Reservoir were diverted to Willow Creek Reservoir bringing the reservoir storage to desired winter carry-over levels, as well as preventing the need to move water after snow settles in the canals. All diversions to Willow Creek Reservoir were discontinued on December 1, 2017. After diversions ceased, the winter releases to the Sun River were reduced and maintained between 100 to 120 cfs.

Precipitation was plentiful during the start of WY 2017. The month of October yielded valley and mountain precipitation at 256 and 141 percent of average, respectively. Precipitation trailed off to near average conditions in November and December in the Sun River Basin. The cumulative valley precipitation for October through December was at 144 percent of average while the cumulative mountain precipitation was 109 percent of average.

On January 1, 2017 the mountain snowpack SWE above Gibson Reservoir was at 91 percent of average. January temperatures remained very cold, up to 12 degrees below average while precipitation amounts varied throughout the Sun River Basin. The snowpack above Gibson reservoir declined throughout the month, which resulted in a February 1, 2017 mountain snowpack at 81 percent of average.

A large snowstorm passed through the Sun River Basin February 4 through February 7, 2017. The snowstorm increased Gibson reservoir's SWE from 8.2 inches, 80 percent of average, up to 11.3 inches, 105 percent of average. Cool temperatures and average precipitation during the remainder of the month resulted in a March 1, 2017 mountain snowpack at 109 percent of average.

Temperatures during March were 2 to 4 degrees above average and mixed precipitation fell in the Sun River Basins. Inflows during the first half of March remained steady near 200 cfs with average temperatures. However, as temperatures began to warm up significantly, the lower elevation snow started to melt starting on March 14, 2017. This resulted with inflows rising to near 1300 cfs on March 19, 2017 and then gradually tapering off to near 800 cfs by the end of the month. Gibson reservoir ended the month at elevation 4670.93 feet.

The slightly above average precipitation accumulation during March resulted in an April 1 SWE being recorded at 113 percent of average. On April 10, 2017 the combined Reclamation and NRCS forecast for the April-July runoff volume into Gibson Reservoir was 487,500 AF, 119 percent of average. Due to the above average forecast, the Joint Board set full allotments for the upcoming irrigation season.

April inflows into Gibson Reservoir increased from 800 cfs to 1,400 cfs as temperatures increased and above average precipitation. The average monthly inflow was 1,100 cfs, 171 percent of average. The SWE peaked on April 18, 2017 at 18.28 inches. Greenfield Irrigation District (GID) began refilling Pishkun Reservoir through the Pishkun Supply Canal on April 26, 2017. By April 30, 2017 the storage level of Gibson Reservoir was at elevation 4677.43 feet, 46.6 feet below the top of the conservation pool. The SWE at the end of April was near 17.3 inches, or 120 percent of average.

The high daily temperatures during the first week of May increased from 45 degrees to 75 degrees and the low daily temperatures increased from 32 degrees to 42 degrees. These higher temperatures triggered the snowmelt runoff and inflows into Gibson raised from 1,200 cfs to near 5,000 cfs on May 7, 2017. To control the rate of fill at Gibson Reservoir, flows to the Sun River below diversion dam were increased by GID from 200 cfs to near 3,000 cfs. The inflows continued to fluctuate as the high and low temperatures oscillated. A storm system passed through the Sun River Basin on May18, 2017 which bumped up the SWE several inches. However, this snow quickly melted, and inflows again rose to near 4,500 cfs on May 24, 2017. GID and Reclamation continued to monitor inflows, releases, and the remaining snowpack. Releases to the Sun River over the Sun River Diversion Dam during May fluctuated between 2,000 cfs to 1,400 cfs to control the rate of fill in Gibson Reservoir. By the end of May, the reservoir reached elevation 4717.79 feet, 6.2 feet from the top of conservation pool with 6.78 inch of SWE remaining in the mountains.

Inflows the last few days of May and into June raised to 5,200 cfs with warmer temperatures in the mountains. In response, flows to the Sun River were increased by GID to 3,500 cfs as Gibson Reservoir was only 6 feet from full. Inflows slowly declined from 5,200 cfs to 2,100 cfs through June 12, 2017. At this time only 1.5 inches of SWE remained. A large storm system passed through the Sun River Basin producing between 1 to 3 inches of rain. This stormed caused the daily average inflow to peak at 3,900 cfs on June 14, 2017. At this time Gibson Reservoir was full, at elevation 4723.9 feet, therefore inflows had to be passed downstream to the Sun River. Diversions to Pishkun Reservoir. Therefore, the flows on the Sun River below diversion dam were increased from 800 cfs on the June 13, 2017, to a peak of 3,200 cfs on June 14, 2017. Once the storm passed, inflows gradually declined to 1,000 cfs by month's end. For the remainder of the runoff season, releases were adjusted to meet irrigation demands while keeping the reservoir full.

Warm temperatures and little to no precipitation fell in July (14 percent of average). Irrigation demands far exceeded inflows into Gibson Reservoir. Due to the lack of precipitation, Gibson Reservoir was drawn down to elevation 4669.9 feet, or 88 percent of average. The above average snowpack generated an actual April-July runoff total of 455,600 AF, 112 percent of average. Inflows during April, May, June, and July were 143, 128, 105, and 64 percent of average, respectively.

Conditions during August did not improve. Valley precipitation was 16 percent of average, while mountain precipitation was 11 percent of average. Diversions from the Sun River to the Pishkun Supply Canal were discontinued on August 23, 2017. From this point forward, releases from Gibson Reservoir were adjusted to meet downstream senior water rights and minimum river flows. Gibson Reservoir reached a storage of 5,472 AF on August 30, 2017.

Temperatures in September were average with dry conditions until mid-month when much needed precipitation fell in the basin. The August through September inflow to Gibson Reservoir totaled 28,944 AF, 75 percent of average. Gibson Reservoir ended WY 2017 with a content of 5,639.0 AF of storage at elevation 4610.63 feet on September 30, 2017. This was 33 percent of average and 6 percent of normal full. Total annual inflow to Gibson Reservoir for WY 2017 was 595,200 AF, 113 percent of average.

Even though no space is allocated to flood control in Gibson Reservoir, the CORPS still estimates flood damages prevented by Gibson Reservoir. The CORPS determined that during WY 2017, Gibson Reservoir did not contribute to the reduction of flood damages locally or downstream on the Missouri River. Since 1950 Gibson Reservoir has prevented $3,085,600 in flood damages.

Pishkun Reservoir, near Augusta, Montana, is an off-stream reservoir supplied by a feeder canal which diverts water from Sun River below Gibson Reservoir. The reservoir serves the 81,000-acre Greenfields Division. The capacity of the reservoir is 46,670 AF at elevation 4370.0 feet.

In 2002, Reclamation surveyed Pishkun Reservoir to develop an area-capacity table. Data was used to calculate reservoir capacity lost to sediment accumulation since the previous

survey, completed in 1940. The 2002 survey determined that Pishkun Reservoir has a storage capacity of 46,694 AF and a surface area of 1,522 acres at reservoir elevation 4370.0 feet. Comparisons show the total reservoir capacity in 2002 was slightly greater than the original volume computed in 1940. It was the general conclusion that the difference between the surveys was due to differences in the detail of the two surveys. The revised area-capacity table was put into effect on October 1, 2005, reflecting the new storage levels.

The content in Pishkun Reservoir at the beginning of WY 2017 was 20,082 AF at elevation 4347.29 feet. Storage during the fall and winter was maintained near 20,100 AF due to the district constructing a dike separating the upper and lower part of the lake. The dike was removed in the spring and diversions from the Sun River started refilling the reservoir on April 26, 2017. On May 10, 2017 irrigation releases from Pishkun Reservoir began and storage reached the top of active conservation pool at elevation 4370.0 feet.

Once irrigation releases began, storage fluctuated, based on irrigation demands. On June 4, 2017 a maximum release of 1,692 cfs was recorded as well as the maximum inflow of 1,399 cfs. All diversions from the Sun River into Pishkun Reservoir were discontinued on August 29, 2017. All irrigation releases out of Pishkun Reservoir were discontinued on September 7, 2017 due to water supply limitations.

GID delivered a full allotment (2.0 AF per acre) to its water users in 2017 due to the average water supply. Approximately 270,000 AF of water was released from Pishkun Reservoir from May 10 through September 7, 2017 to help meet irrigation demands on the Sun River Project. By the end of WY 2017, the reservoir storage was 19,700 AF at elevation 4346.83 feet, 70 percent of average and 42 percent of full capacity.

Additional hydrologic and statistical data pertaining to Pishkun Reservoir can be found in Table MTT8-B and Figure MTG6.

Willow Creek Reservoir obtains its water supply from Willow Creek and the Sun River via the Willow Creek Feeder Canal. The total reservoir capacity is 32,300 AF at elevation 4142.0 feet. Releases from Willow Creek Reservoir enter the Sun River and can be diverted for irrigation at the Fort Shaw Diversion Dam, the Floweree Canal of the Broken O Ranch, and other downstream senior water users.

In 2002, Reclamation surveyed Willow Creek Reservoir to develop an area-capacity table. Data were used to calculate reservoir capacity changes since dam closure in 1911. The 2002 survey determined that Willow Creek Reservoir has a storage capacity of 34,819 AF and a surface area of 1,509 acres at elevation 4144.00 feet. Since closure in 1911, the reservoir had an estimated volume change of 431 AF below reservoir elevation 4144.00 feet. This volume represents a 1.2 percent change in total capacity at this elevation. The revised area-capacity table was put into effect on October 1, 2005, reflecting the new storage levels.

Reservoir content at the beginning of WY 2017 was 16,829 AF at elevation 4130.52 feet. Storage in Willow Creek Reservoir was lower than average, so diversions continued until December 1, 2017. Diversions throughout the fall and early winter gained approximately 10,600 AF of storage or 8.3 feet in reservoir elevation.

Willow Creek Reservoir continued to receive diverted water through the Willow Creek Feeder Canal from May 1 through June 15, 2017. The reservoir reached a peak storage of 32,316 AF at elevation 4142.32 feet on June 16, 2017. This storage level was 110 percent of average and 101 percent of full capacity. To meet irrigation demands within the Sun River Irrigation Project releases were made from Willow Creek Reservoir from June 16 through August 23, 2017 totaling 17,300 AF.

To refill Willow Creek Reservoir, diversions from the Sun River were initiated on September 13, 2017 at a rate of approximately 75 cfs. The reservoir ended with a storage of 17,330 AF at elevation 4130.98 feet. This was 89 percent of average and 54 percent of normal full capacity. Fall and winter diversions continued into Willow Creek Reservoir in attempt to refill the reservoir to a content of 28,000 AF.

Additional hydrologic and statistical data pertaining to Willow Creek Reservoir can be found in Table MTT8-C and Figure MTG7.

Important Events – WY 2017

December 2, 2015: Diversion to Willow Creek was discontinued.

January 1, 2016: NRCS snowpack was reported at 83 percent of median.

February 1, 2016: NRCS snowpack was reported at 68 percent of median.

March 1, 2016: NRCS snowpack was reported at 68 percent of median.

April 1, 2016: NRCS snowpack was reported at 64 percent of median. The snowpack in the Sun River Basin reached a peak accumulation of 10.72 inches SWE.

April 11, 2016: Diversions to the Pishkun Supply Canal were initiated.

May 1, 2016: NRCS snowpack was reported at 31 percent of median.

May 23, 2016: Storage in Pishkun Reservoir reached peak content for the year of 46,938 AF at elevation 4370.16 feet.

May 9, 2016: Inflows into Gibson Reservoir peaked at 2,767 cfs.

June 8, 2016: Peak outflow from Gibson Reservoir was 2,189 cfs. Storage in Gibson Reservoir reached the top of the conservation pool at elevation 4724.0 feet.

June 20, 2016: Releases out of Willow Creek Reservoir were initiated.

July 7, 2015: Willow Creek Reservoir peak release of 198 cfs.

August 2, 2015: Diversions to Pishkun Supply Canal were discontinued for the year.

August 10, 2015: Releases from Willow Creek Reservoir were discontinued for the season.

August 11, 2015: Releases from Pishkun Reservoir for irrigation deliveries were discontinued for the season.

September 8, 2016: Diversion from the Sun River Diversion Dam to the Willow Creek Feeder Canal was initiated for the year.

TABLE MTT8-A
HYDROLOGIC DATA FOR WY 2017
GIBSON RESERVOIR (SUN RIVER PROJECT)
NEW SEDIMENT SURVEY DATA EFFECTIVE 01/01/2013

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	4557.50	0	0
TOP OF ACTIVE CONSERVATION	4724.00	98,687	98,687

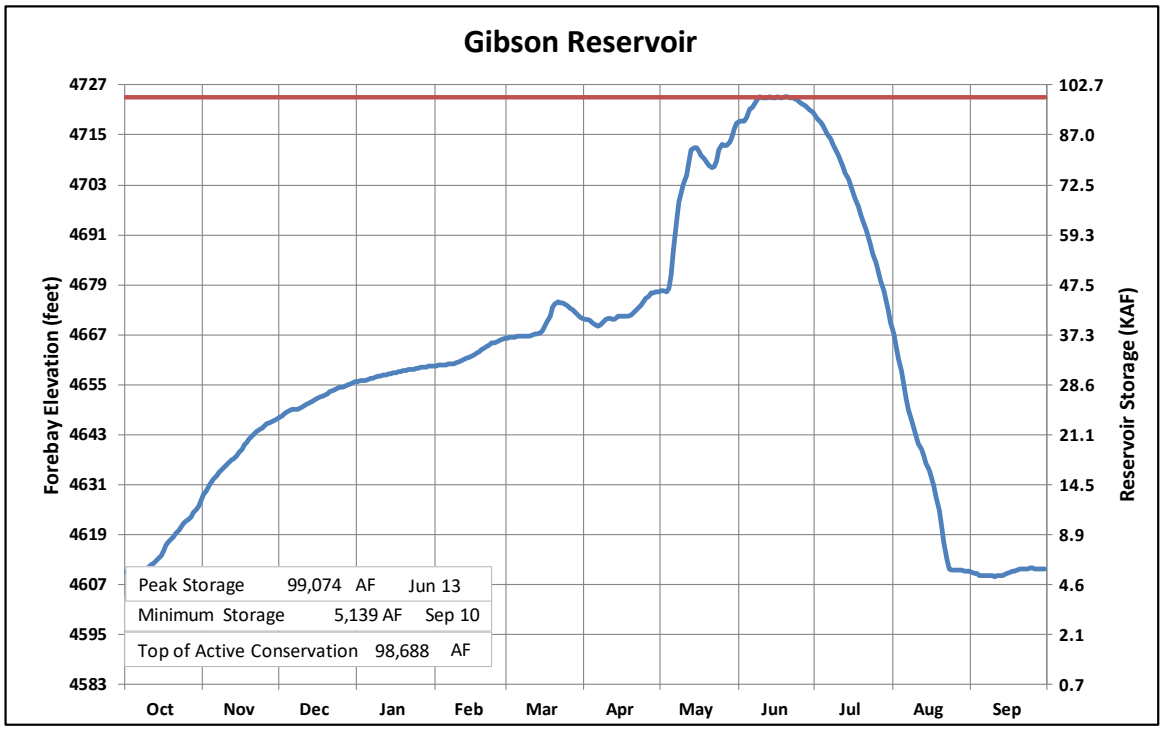
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	4610.06	5,459	OCT 01, 2016
END OF YEAR	4610.63	5,639	SEP 30, 2017
ANNUAL LOW	4608.97	5,139	SEP 10, 2017
ANNUAL HIGH	4724.29	99,074	JUN 13, 2017
HISTORIC HIGH	4732.23	116,400	JUN 08, 1964

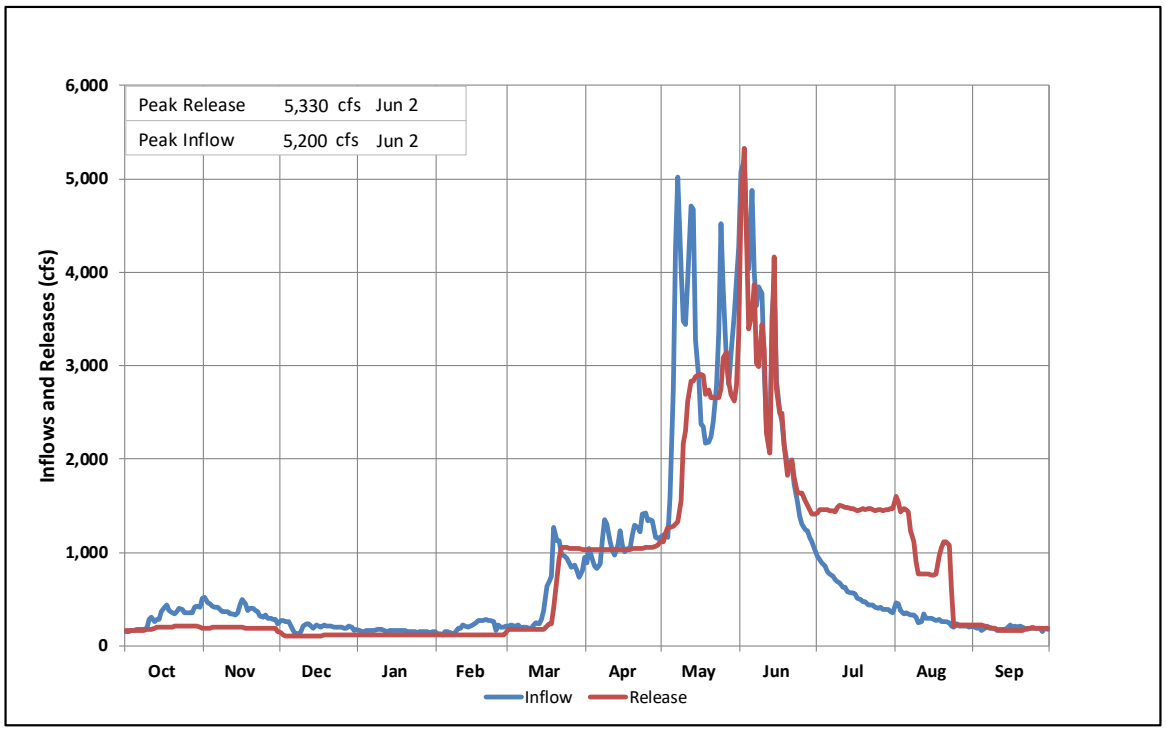
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	595,254	OCT 16-SEP 17	595,062	OCT 16-SEP 17
DAILY PEAK (CFS)	5,200	JUNE 02, 2017	5,329	JUNE 02, 2017
DAILY MINIMUM (CFS)	124	FEB 03, 2017	110	DEC 03, 2016

MONTH	INFLOW		OUTFLOW*				CONTENT	
	KAF	% OF AVG	TOTAL CANAL KAF	% OF AVG	RIVER KAF	% OF AVG	KAF	% OF AVG
OCTOBER	19.1	135	6.5	175	5.1	53	12.6	53
NOVEMBER	22.3	148	6.8	413	4.7	45	23.3	88
DECEMBER	12.7	102	0.0	---	6.8	62	29.1	98
JANUARY	9.9	90	0.0	---	6.6	67	31.8	98
FEBRUARY	11.4	113	0.0	---	6.4	77	36.5	104
MARCH	35.3	244	0.0	---	31.9	318	40.4	99
APRIL	67.7	148	6.9	75	58.1	263	46.0	80
MAY	195.4	133	51.7	128	107.4	112	90.6	100
JUNE	160.9	105	77.8	135	86.8	67	94.0	104
JULY	35.7	63	83.8	114	6.9	26	39.6	85
AUGUST	17.5	76	42.4	104	9.0	69	5.5	26
SEPTEMBER	11.4	74	3.3	28	8.9	89	5.6	31
ANNUAL	599.3	116	279.2	116	338.9	95		
APRIL-JULY	459.7	114						

* Average for the 1931-2017 period.

FIGURE MTG5





Water Year 2017

TABLE MTT8-B
HYDROLOGIC DATA FOR WY 2017
PISHKUN RESERVOIR (SUN RIVER PROJECT)
NEW SEDIMENT SURVEY DATA EFFECTIVE 10/01/2005

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	4342.00	16,008	16,008
TOP OF ACTIVE CONSERVATION	4370.00	46,694	30,686

STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	4347.28	20,074	OCT 01, 2016
END OF YEAR	4346.83	19,706	SEP 30, 2017
ANNUAL LOW	4346.75	19,641	SEP 23, 2017
ANNUAL HIGH	4370.39	47,291	MAY 12, 2017
HISTORIC HIGH	4371.40	48,950	JUL 04, 1953

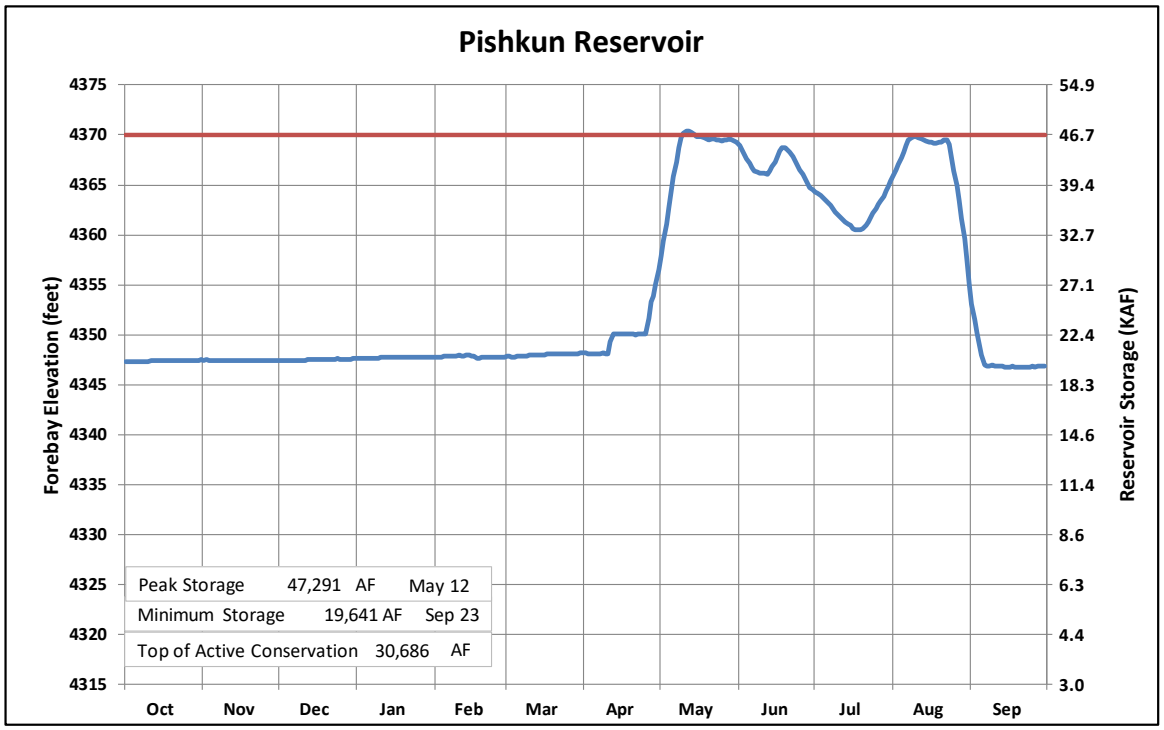
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	258,282	OCT 16-SEP 17	270,219	OCT 16-SEP 17
DAILY PEAK (CFS)	1,440	JUN 13, 2017	1,693	JUN 06, 2017
DAILY MINIMUM (CFS)	0	*	0	*

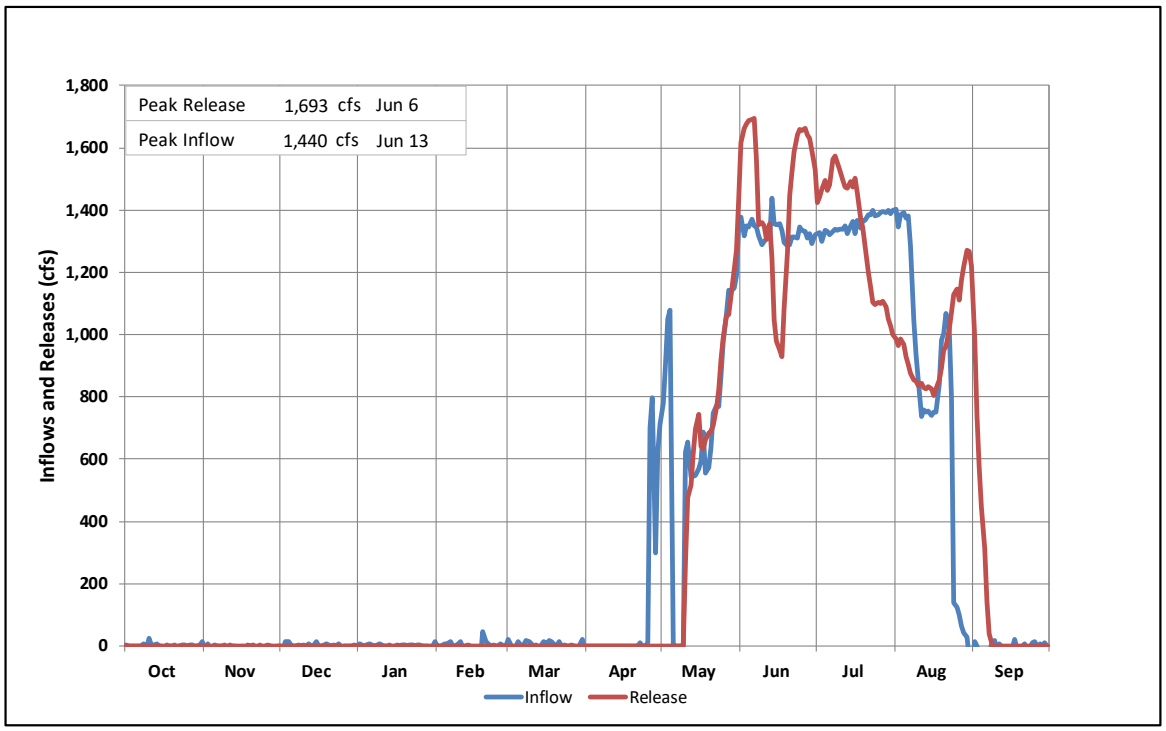
* During nonirrigation season

MONTH	INFLOW*		OUTFLOW*		CONTENT	
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG
OCTOBER	0.0	---	0.0	---	20.2	68
NOVEMBER	0.0	---	0.0	---	20.2	65
DECEMBER	0.0	---	0.0	---	20.3	66
JANUARY	0.0	---	0.0	---	20.5	67
FEBRUARY	0.0	---	0.0	---	20.5	67
MARCH	0.0	---	0.0	---	20.8	65
APRIL	6.2	86	0.0	---	28.6	74
MAY	42.7	115	35.7	115	45.6	99
JUNE	79.1	135	86.1	137	38.6	96
JULY	83.5	117	82.1	109	40.0	109
AUGUST	47.1	114	60.0	137	27.2	79
SEPTEMBER	0.0	---	6.4	41	19.7	69
ANNUAL	258.3	112	270.2	117		
APRIL-JULY	211.5	121				

* Average for the 1947-2017 period.

FIGURE MTG6





Water Year 2017

TABLE MTT8-C
HYDROLOGIC DATA FOR WY 2017
WILLOW CREEK RESERVOIR (SUN RIVER PROJECT)
NEW SEDIMENT SURVEY DATA EFFECTIVE 10/01/2005

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	4085.28	1	1
TOP OF ACTIVE CONSERVATION	4142.00	31,848	31,847

STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	4130.53	16,829	OCT 01, 2016
END OF YEAR	4130.98	17,330	SEP 30, 2017
ANNUAL LOW	4129.16	15,407	SEP 13, 2017
ANNUAL HIGH	4142.32	32,316	JUN 16, 2017
HISTORIC HIGH	4144.00	35,300	JUN 22, 1975

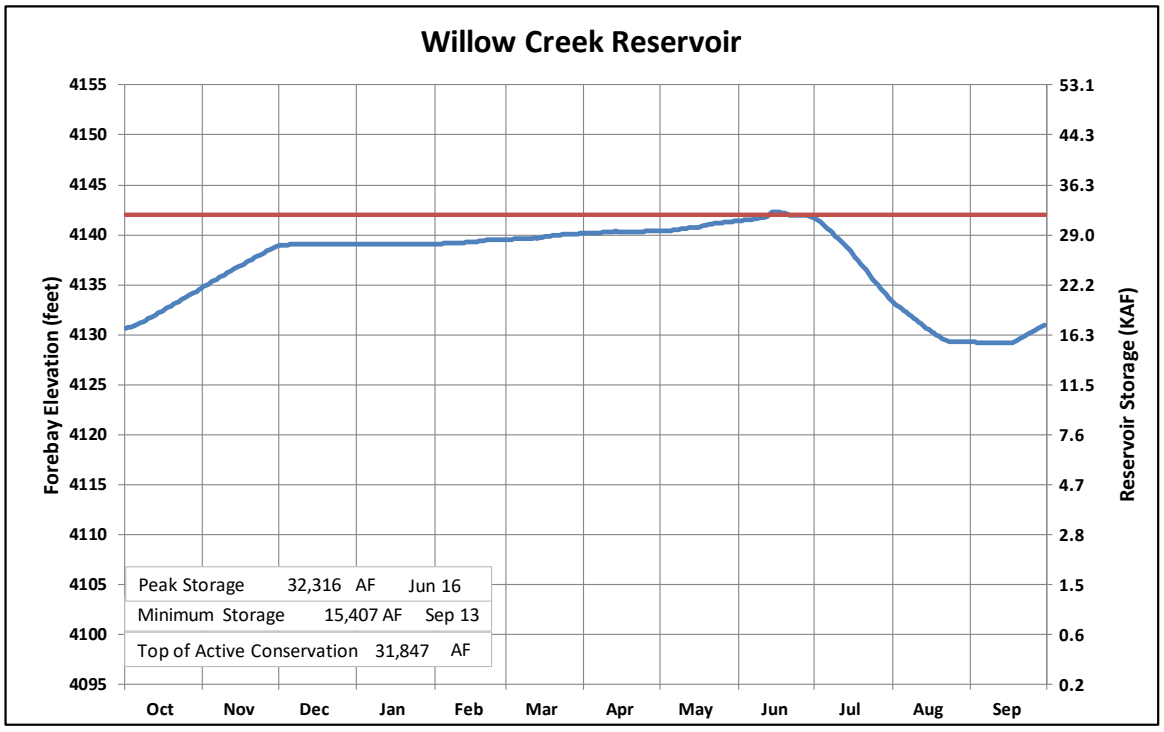
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	15,812	OCT 16-SEP 17	17,221	OCT 16-SEP 17
DAILY PEAK (CFS)	199	JUN 13, 2017	203	JUL 24, 2017
DAILY MINIMUM (CFS)	0	*	0	*

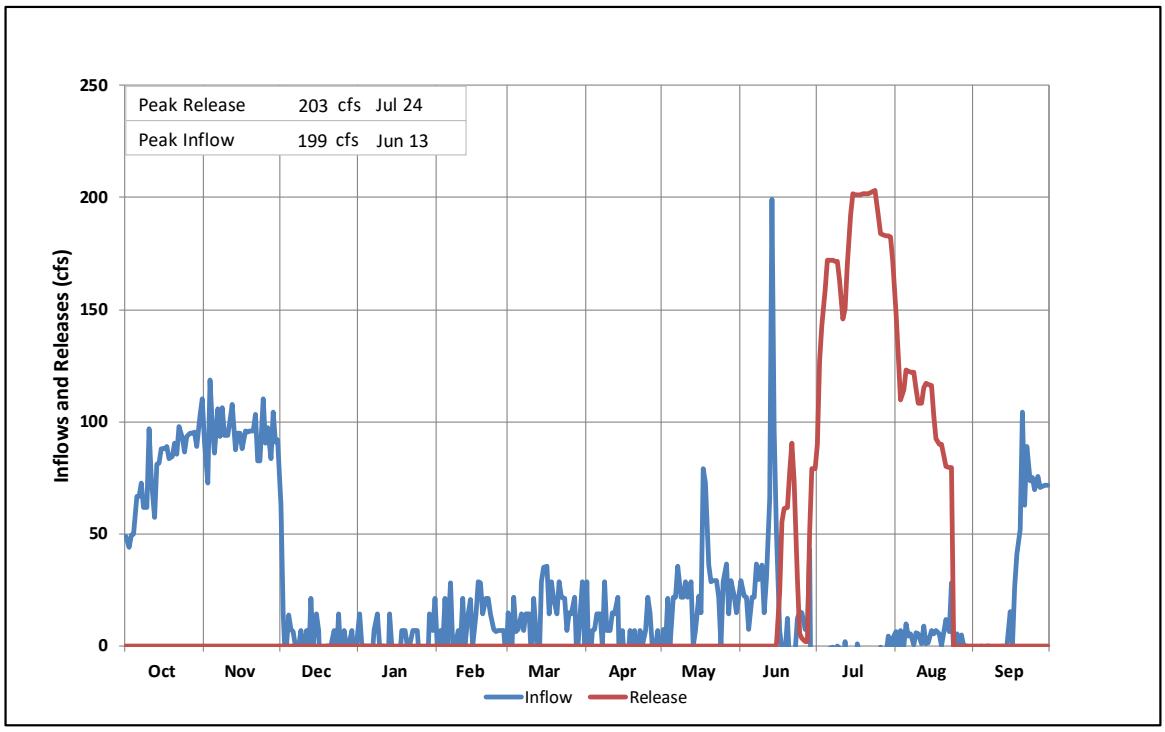
* During nonirrigation season

MONTH	INFLOW*		OUTFLOW*		CONTENT	
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG
OCTOBER	4.9	490	0.0	---	21.8	104
NOVEMBER	5.7	570	0.0	---	27.4	124
DECEMBER	0.2	50	0.0	---	27.6	122
JANUARY	0.1	33	0.0	---	27.7	120
FEBRUARY	0.6	150	0.0	---	28.3	120
MARCH	0.9	125	0.0	---	29.2	121
APRIL	0.3	16	0.0	---	29.5	114
MAY	1.5	40	0.0	---	30.9	109
JUNE	1.2	33	1.4	47	31.5	110
JULY	-1.5	---	10.9	198	20.2	87
AUGUST	0.2	---	4.9	136	15.5	78
SEPTEMBER	1.8	360	0.0	---	17.3	88
ANNUAL	15.8	12	17.2	123		

* Average for the 1952-2017 period.

FIGURE MTG7





Water Year 2017

Lake Elwell (Tiber Dam)

Tiber Dam P-S MBP is located on the Marias River near Chester, Montana. It was built to provide adequate water supply for 127,000 acres in the Lower Marias Unit and for flood control. The crest section of Tiber Dam spillway began settling in 1956, following initial filling of the reservoir. Restrictions were placed on reservoir operating levels in the late 1950s to safeguard the structure until repairs could be made. The rate of settlement increased following the flood of 1964 and the heavy runoff of 1965. The settlement was attributed to a weakness of the underlying shale formation in which small lenses of gypsum slowly dissolved as water passed through the shale. Measures to protect the structure were approved by Congress, and construction was initiated in 1967 and completed in 1970. The construction consisted of modifying the canal outlet works for use as an auxiliary outlet works and closing the entrance channel of the spillway by a temporary earth fill cofferdam. To accommodate these changed conditions, the reservoir operating criteria were further revised, and the active capacity was eliminated. Work on modification of the spillway to restore active conservation capacity started in 1976 and was completed in October 1981. The construction consisted of replacing the upstream section of the spillway and raising the dam 5 feet. Since that time, all restrictions on operating levels have been lifted and normal operations restored at Lake Elwell.

Because the irrigation distribution works have not yet been constructed, the reservoir is operated for flood control, fishery and recreation benefits. The reservoir does provide irrigation water to several individual operators by water service contracts and provides about 1,500 AF to the Tiber County Water District for municipal, industrial, rural domestic, and livestock use. The city of Chester, Montana, receives a small amount of water from the reservoir annually for municipal use. Approximately 3,000 acres are irrigated by contract from Lake Elwell storage.

In 2002, Reclamation surveyed Lake Elwell to develop an area-capacity table. Data were used to calculate reservoir capacity changes since dam closure in October of 1957. The 2002 survey determined that Lake Elwell has a storage capacity of 925,649 AF and a surface area of 18,275 acres at elevation 2993.00 feet. Since closure in 1957, the reservoir has accumulated a sediment volume of 42,179 AF below an elevation of 2993.00 feet. This volume represents a 4.4 percent change in total capacity at this elevation. The revised area-capacity table was put into effect on October 1, 2005, reflecting the new storage levels.

In September of 2003, construction of a powerplant was permitted by the Federal Energy Regulatory Commission. The river outlet works underwent extensive modification to incorporate the addition of a 7.5-megawatt powerplant, owned by Tiber Montana, LLC. A bifurcation pipe was installed in the downstream end of the river outlet works tunnel to divert flow from the existing 72-inch outlet pipe through a bifurcation and 96-inch butterfly valve to the powerplant. Construction of the powerplant was completed and brought on-line in June 2004.

By the end of WY 2016, normal operations of Lake Elwell drafted storage to 755,270 AF at elevation 2982.51 feet. This was 96 percent of normal. Releases were kept at 500 cfs throughout WY 2016 due to below average inflow conditions.

Water year 2017 started off very wet in October followed by warm and dry November. December was wet and cool, and snow accumulated in the mountains at an above average rate. Cumulative valley precipitation through December was 170 percent of average and mountain precipitation was 108 percent of average. Inflow during this period totaled 83,235 AF, 154 percent of average. Releases were maintained at 500 cfs, by the end of December 2016, Lake Elwell storage was 748,383 AF, 101 percent of average.

On January 1, 2017 the NRCS reported the mountain snowpack SWE in the Marias River Basin above Lake Elwell was at 92 percent of average. The January 1, 2017 water supply forecast indicated the April-July runoff into Lake Elwell would be 320,000 AF, 87 percent of average. During January 2017 valley precipitation was much above average at 254 percent but mountain precipitation was only 50 percent of average.

On February 1, 2017 the NRCS reported the mountain snowpack SWE was 81 percent of average. The water supply forecast indicated the April-July runoff would be about 286,000 AF, 78 percent of average. The lowest storage for the year occurred on February 14, 2017 at 725,678 AF, at elevation 2980.42 feet.

Precipitation was much above average in February and on March 1, 2017 the NRCS reported the mountain snowpack SWE was 110 percent of average. The water supply forecast indicated the April-July runoff would be 372,000 AF, 101 percent of average. Warm temperatures about mid-March rapidly melted snow that fell on the plains in the early part of March. Inflows increased from a daily average of 590 cfs on March 14 to a daily average of 9,224 cfs on March 16, 2017. Releases were increased to powerplant capacity, 680 cfs on March 23. This was first time since September 2, 2015, that the release from Lake Elwell was something different than 500 cfs.

On April 1, 2017 the mountain snowpack SWE was 115 percent of average. The water supply forecast prepared in April 2016 indicated the April-July runoff was expected to be 112 percent of average, totaling 413,000 AF. On April 10, 2017 releases were decreased to 550 cfs to accommodate MFWP streambank stabilization construction project along Sanford Park. On April 12, 2017 forecasts and planned operations of Tiber Dam were presented at the Marias River Water Management Committee's annual meeting. On April 21, 2017 releases were increased back to powerplant capacity and on April 26, 2017 releases were increased to 1,000 cfs to control the rate of fill. A powerplant bypass releases was started through spillway.

April 2017 precipitation was above average in the valley and below average in the mountains. On May 1, 2017 the NRCS indicated the mountain snowpack SWE decreased to 124 percent of average because by May not much of the snowpack melted. The May 1, 2017 water supply forecast indicated May to July 2017 runoff would be 356,000 AF, 114 percent of average. Lake Elwell was forecasted to fill by the end of June. Releases were increased on May 3 to 4, 2017 to 1,500 cfs. On May 12, 2017 releases were increased again to 1,800 cfs and were increased once more on May 25, 2017 to 2,200 cfs. Precipitation in May 2017 was 78 and 101 percent of average in the valley and mountains, respectively. Inflow during May was 153,200 AF, 123 percent of average.

Monthly precipitation percentages for June 2017 were below average at 90 and 85 percent of average for the valley and mountains, respectively. Releases were decreased to 2,000 cfs on June 8, 2017 to increase the rate of fill. Storage peaked on June 16, 2017 at 926,013 AF, at elevation 2993.02 feet.

On June 20, 2017 the bypass releases were switched from the spillway to the auxiliary outlet works to allow for a scheduled inspection of the spillway. The releases were kept through the auxiliary outlet works following the inspection to keep river temperatures lower. June 22 to 28, 2017 releases were reduced to 1,035 cfs to conserve storage in Lake Elwell. Inflows dramatically decreased from 2,000 cfs to 670 cfs for approximately the same time. Total June inflow ended up below average at 85 percent of average as conditions in the area started to turn dry.

July through August 2017 precipitation was only 13 percent of average in the valley and 7 percent of average in the mountains. Inflow was only 27 percent of average. The term coined for what Montana was experiencing during the latter part of summer was flash drought. Water supply conditions were good for the first part of the summer then conditions turned very dry. Releases were decreased to 750 cfs, powerplant capacity, on July 7, 2017 to conserve storage. Releases were reduced by 150 cfs on August 8, 2017 and by 100 cfs on September 6, 2017 to 500 cfs to conserve storage. Precipitation was better in September but was still below average.

Total annual valley precipitation and mountain precipitation were 102 and 95 percent of average, respectively. The April-July runoff into Lake Elwell during WY 2017 was 101 percent of average, totaling 370,172 AF. This was 166,662 AF more than the April-July inflow experienced in 2016. The total annual inflow was 120 percent of average, totaling 628,700 AF. This was 323,900 AF more than the total annual inflow experienced in WY 2016. By the end of WY 2017, Lake Elwell storage was 814,891 AF at elevation 2986.51 feet. This was 103 percent of normal and 59,621 AF or 4.00 feet higher than reported on September 30, 2016.

The CORPS determined that during WY 2017, Lake Elwell did not prevent any local flood damages but prevented $247,100 in flood damages downstream on the Missouri River below Fort Peck Reservoir. Since closure of Tiber Dam in 1954, Lake Elwell has reduced flood damages by a total of $96,893,200.

Important Events – WY 2017

January 1, 2017: NRCS reported a mountain snowpack SWE in the watershed above Lake Elwell were about 92 percent of average. The April-July runoff into Lake Elwell was forecasted for 320,000 AF, 87 percent of average.

February 1, 2017: NRCS reported snowpack conditions in the watershed above Lake Elwell were about 81 percent of average. The February water supply forecast indicates the April-July runoff into Lake Elwell would be 286,000 AF which was 78 percent of average.

February 14, 2017: Storage was drafted to a low of 725,678 AF, at elevation 2980.42 feet.

March 1, 2017: NRCS reported snowpack conditions in the Marias River Basin upstream of Lake Elwell were about 110 percent of average. The March water supply forecast indicates the April-July runoff into Lake Elwell would be 372,000 AF which is 101 percent of average.

March 16, 2017: Inflow peaked at 9,224 cfs.

March 23, 2017: Inflows were remaining well above average. Releases were increased to manage storage levels in Lake Elwell. Releases were increased from the winter release rate of 500 cfs to 680 cfs, powerplant capacity.

April 1, 2017: NRCS reported snowpack conditions in the watershed above Lake Elwell were 115 percent of average. Water supply forecast indicated the April-July runoff into Lake Elwell would be 413,000 AF or 112 percent of average.

April 10, 2017: Releases decreased to 550 cfs to accommodate MFWP streambank stabilization construction project along Stanford Park.

April 21, 2017: Releases were increased to 700 cfs, powerplant capacity, to manage storage in Lake Elwell.

April 26, 2017: Releases were increased to 1,000 cfs to manage storage in Lake Elwell. Powerplant bypass was released through the spillway.

May 1, 2017: NRCS reported snowpack conditions in the watershed above Lake Elwell were 124 percent of average. The water supply forecast indicated the May through July runoff into Lake Elwell would be 356,000 AF which is 114 percent of average.

May 3-4, 2017: Releases were increased to 1,500 cfs to manage storage in Lake Elwell. Powerplant bypass was released through the spillway.

May 12, 2017: Releases were increased to 1,800 cfs to manage the rate of fill of Lake Elwell. Powerplant bypass was released through the spillway.

May 13, 2017: Inflow from mountain snowmelt runoff peaked at 3,700 cfs.

May 25, 2017: Releases were increased to 2,200 cfs to manage the rate of fill of Lake Elwell. Powerplant bypass was released through the spillway.

June 1, 2017: NRCS reported snowpack conditions in the watershed above Lake Elwell were 115 percent of average. The water supply forecast indicated the June to July runoff into Lake Elwell would be 169,000 AF which is 95 percent of average.

June 8, 2017: Releases were decreased to 2,000 cfs to manage the rate of fill of Lake Elwell. Powerplant bypass was released through the spillway.

June 16, 2017: Storage peaked for WY 2017 at 926,013 AF, at elevation 2993.02 feet.

June 20, 2017: The bypass release through the spillway was discontinued and was initiated through the auxiliary outlet works to allow for normally scheduled inspection of the spillway.

June 22, 2017: Releases were decreased to 1,700 cfs to conserve storage in Lake Elwell. Powerplant bypass was released through the auxiliary outlet works.

June 26-28, 2017: Releases were decreased to 1,035 cfs to conserve storage in Lake Elwell. Powerplant bypass was released through the auxiliary outlet works.

July 7, 2017: Releases were decreased to 750 cfs, powerplant capacity, to conserve storage in Lake Elwell.

July 18, 2017: An efficiency test was conducted on the powerplant turbine. Releases were briefly decreased to 550, 600 and 650 cfs for the test.

August 8, 2017: Releases were decreased to 600 cfs to conserve storage in Lake Elwell.

September 6, 2017: Releases were decreased to 500 cfs to conserve storage in Lake Elwell.

September 13, 2017: An efficiency test was conducted on the powerplant turbine. Releases were briefly increased to 550 and 600 cfs for the test.

Additional hydrologic and statistical information pertaining to the operation of Lake Elwell during WY 2017 can be found in Table MTT9 and Figure MTG8.

TABLE MTT9
HYDROLOGIC DATA FOR WY 2017
LAKE ELWELL (TIBER DAM)
NEW SEDIMENT SURVEY DATA EFFECTIVE 10/01/2005

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	2966.40	554,330	554,330
TOP OF ACTIVE CONSERVATION	2976.00	667,213	112,883
TOP OF JOINT USE	2993.00	925,649	258,436
TOP OF EXCLUSIVE FLOOD CONTROL	3012.50	1,328,723	403,074

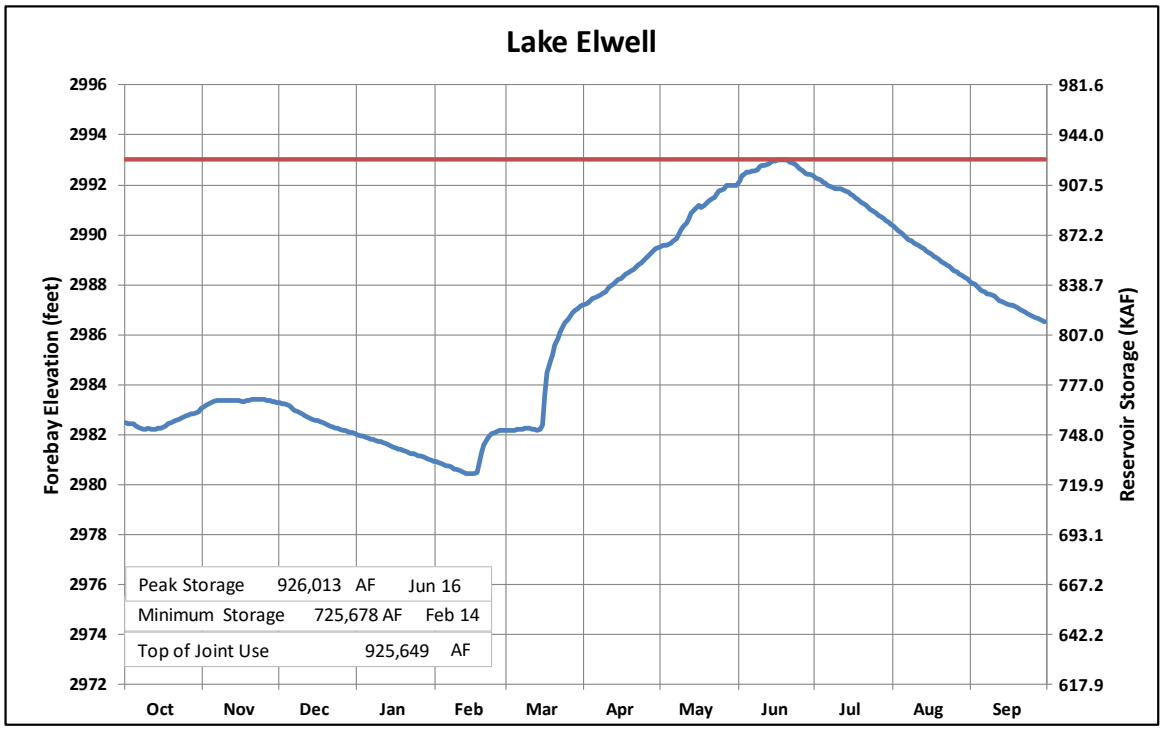
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	2982.51	755,270	OCT 01, 2016
END OF YEAR	2986.51	814,891	SEP 30, 2017
ANNUAL LOW	2980.42	725,678	FEB 14, 2017
ANNUAL HIGH	2993.02	926,013	JUN 16, 2017
HISTORIC HIGH	3011.42	1,303,858	JUL 19, 2011

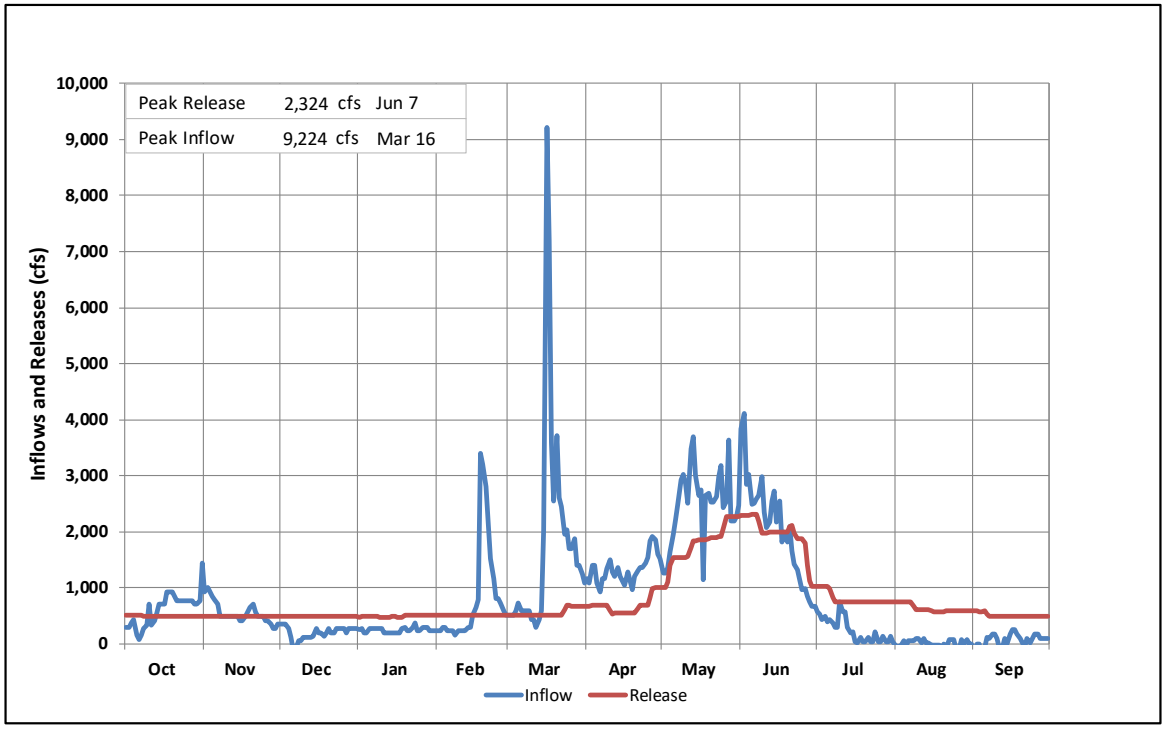
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	628,657	OCT 16-SEP17	569,036	OCT 16-SEP 17
DAILY PEAK (CFS)	9,224	MAR 16, 2017	2,324	JUN 07, 2017
DAILY MINIMUM (CFS)	-319	SEP 04, 2017	482	JAN 12, 2017
PEAK SPILL (CFS)			1,594	JUN 07, 2017
TOTAL SPILL (AF)			121,504	4/26-6/20/2017

MONTH	INFLOW		OUTFLOW*		CONTENT	
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG
OCTOBER	38.2	251	30.4	68	763.1	100
NOVEMBER	33.0	158	29.5	83	766.6	102
DECEMBER	12.1	67	30.2	106	748.4	101
JANUARY	15.3	94	30.6	114	733.1	102
FEBRUARY	45.9	229	28.6	110	750.4	105
MARCH	109.5	272	34.6	99	825.3	115
APRIL	79.1	147	40.6	93	863.8	118
MAY	153.2	123	109.7	168	907.3	112
JUNE	122.7	85	116.1	127	914.0	104
JULY	15.1	34	49.6	69	879.5	102
AUGUST	0.8	6	38.8	67	841.5	102
SEPTEMBER	3.8	36	30.4	60	814.9	103
ANNUAL	628.7	120	569.0	98		
APRIL-JULY	370.1	101				

* Average for the 1957-2017 period.

FIGURE MTG8





Water Year 2017

Milk River Project

The 117,000-acre Milk River Project, located in north-central Montana, is served by Sherburne, Fresno, and Nelson Reservoirs. Sherburne and Nelson Reservoirs are single-purpose irrigation structures. Fresno Reservoir has joint-use flood control space, provides a municipal water supply to several municipalities on or near the project, and serves as the primary irrigation storage structure for the Milk River Project. Approximately 101,500 acres are served by irrigation districts, 9,500 acres are served by private facilities and between 5,000 and 6,000 acres are served supplemental water by the Fort Belknap Indian Irrigation Project.

Lake Sherburne is in Glacier National Park on Swiftcurrent Creek, a tributary of the St. Mary River in the Hudson Bay Drainage Basin. Lake Sherburne has a total capacity of 66,147 AF at elevation 4788.0 feet. The use of boundary waters of the St. Mary and Milk Rivers are divided between Canada and the United States by the 1909 Boundary Waters Treaty. The United States utilizes its entitlement to St. Mary River water by regulating flows through storage in Lake Sherburne and diverting St. Mary River flows through the St. Mary Canal to the Milk River Basin. The river outlet works has a capacity of 2,100 cfs at elevation 4788.0 feet. The maximum combined discharge of the spillway and river outlet works is 4,000 cfs at a maximum water surface elevation of 4810.0 feet.

In 2002, Reclamation surveyed Lake Sherburne to develop an area-capacity table. The data was used to calculate reservoir capacity changes since dam closure in 1919. The data determined a storage capacity of 66,147 AF, surface area of 1,719 acres at elevation 4788.0 feet. Since dam closure in 1919, the volume change at elevation 4788.0 feet was estimated to be an increase of 1,707 AF between the 1983 and 2002 surveys. It is assumed the volume differences between the surveys were due to survey methods and the vertical datum. The revised area-capacity table was put into effect on October 1, 2005, reflecting the new storage levels.

Lake Sherburne storage on September 30, 2016, was 23,589 AF, at elevation 4756.84 feet, which is 147 percent of average. Precipitation in October 2016 was 237 and 243 percent of average in the valley and mountains, respectively and inflow was much above average at 292 percent. Precipitation conditions in the mountains were near average in November and December 2016. Cumulative mountain precipitation through December was 133 percent of average. October through December 2016 inflows were 185 percent of average.

Due to the high inflows in October and November, releases from Lake Sherburne started again on November 16, 2016 to evacuate some storage from Lake Sherburne. Releases were ramped up to 325 cfs and held there through November 28, 2016 then releases were ramped back down, and the gates were closed on December 5, 2016. This was an unusual operation to evacuate storage this late in the year, but storage was at record levels during the first part of November. Storage in Lake Sherburne by the end of December was still running high at 47,770 AF at elevation 4776.54 feet, 172 percent of average.

On January 1, 2017 the NRCS reported mountain snowpack SWE in the St. Mary Basin was 94 percent of average. The April-July runoff forecast for January 1, 2017 was 100,700 AF, 102 percent of average.

Precipitation in the mountains was much below average during January 2017 and as a result, the February 1, 2017 mountain snowpack SWE for the St. Mary Basin dropped to 74 percent of average. February precipitation was much above average and the SWE increased to 101 percent of average by March 1, 2017. The April-July runoff forecast for March 1, 2017 was 100,000 AF, 102 percent of average.

March precipitation was 219 and 187 percent of average in the mountains and valley, respectively. A March snowstorm in the St. Mary Basin resulted in about 4 feet of snow in areas. This resulted in high runoff during the middle part of March including inflows into Lake Sherburne. Total March inflow was 8,900 AF which was 235 percent of average. Releases from Lake Sherburne were initiated on March 20, 2017 due to the high storage from the high inflows during October, November, and March. Releases were increased to 250 cfs by the end of the month.

Diversions to the St. Mary Canal started on April 10, 2017 and were slowly ramped up to 300 cfs by April 18, 2017. Diversions were not needed any earlier due to Fresno Reservoir reaching normal full pool from natural runoff in the Milk River Basin.

Mountain snowpack SWE was at 115 percent of average on April 1, 2017. The runoff forecast for April-July was 103,000 AF, 104 percent of average. Based on the forecast, Lake Sherburne was expected to fill to the normal full pool elevation of 4788.0 feet, 66,147 AF.

The maximum drawdown on storage during the runoff season was 48,764 AF, an elevation of 4777.32 feet. This occurred on May 4, 2017 when inflows from snowmelt runoff started to exceed the 300 cfs release. Sherburne releases were increased to approximately 720 cfs to control the rate of fill with the plan to fill the reservoir to normal full pool by end of June. May precipitation was below average at only 68 and 59 percent of average in the valley and mountains, respectively. However, inflows into Lake Sherburne from snowmelt runoff were 126 percent of average. Diversions to the St. Mary Canal were increased to 600 cfs by the end of May as irrigation demands in the Milk River Basin were increasing and releases from Fresno continued to increase.

In accordance with the natural flow calculations of the St. Mary and Milk River Basins (Procedures Manual) and the Letter of Intent, deficit deliveries to Canada are allowed during March, April and May. A deficit delivery of St. Mary water to Canada did not occur before May 31, 2017 which meant no St. Mary water would have to be repaid in September or October 2017.

Releases from Lake Sherburne were reduced to 300 cfs in June and to 270 cfs in July to increase the rate of fill as inflows continued to decline. Inflow in June was 107 percent of average at 40,700 AF as the remaining snow melted out while precipitation in June was below average in the valley and mountains. Inflow peaked at 1,215 cfs on June 2, 2017. Lake Sherburne peaked in storage on July 8 at 65,632 AF or elevation 4787.70 feet.

Precipitation remained well below average from June through September with 37 percent of average in the valley and 38 percent of average in the mountains. Inflow was well below average in July, August and September at 63 percent of average.

Due to the continued demand for water in the Milk River Basin, releases from Lake Sherburne were kept high into September while inflows remained low. Much of the storage from Lake Sherburne was being used to keep flows above 550 cfs in the St. Mary Canal. While trying to continue with operations into mid-September and later, releases from Lake Sherburne became difficult due to the sediment and debris piled up in front of the outlet works. Releases were reduced to less than 50 cfs capacity until early October when a crew was able to clean out some of the debris and sediment.

Due to the extreme dry conditions during the summer, there ended up being no natural flow in the Milk River during late June and July and a deficit delivery to the United States was indicated, according to the accounting used in the Procedures Manual. It was agreed during a Letter of Intent conference call with the International Joint Commission (IJC) Field Representatives to create a deficit in the St. Mary Basin by providing less water to Canada to offset the deficit in the Milk River Basin. Due to the issues with releases at Lake Sherburne, a larger than intended deficit was created in September but was corrected in October.

The cumulative precipitation was 108 and 107 percent of average for mountain and valley areas, respectively. Inflow for WY 2017 was 155,679 AF, 111 percent of average. This was 29,660 AF more than the inflow experienced during WY 2016. The actual April-July runoff was 103 percent of average, totaling 101,682 AF. On September 30, 2017 the storage in Lake Sherburne was 11,134 AF at elevation 4743.41 feet, 69 percent of average.

According to preliminary data, diversions from the St. Mary River to the Milk River totaled 169,203 AF, 112 percent of average. The largest annual diversion recorded was 277,500 AF during 1989. Releases from Lake Sherburne were not discontinued until October 18, 2017 to balance water delivery deficits under IJC water accounting. Canal diversions from the St. Mary River to the Milk River were discontinued on September 22, 2017. The release from Lake Sherburne discontinued due to lack of available water to divert from the St. Mary River Basin to the Milk River Basin.

During the 2017 irrigation season several conference calls were conducted with the IJC Field Representatives to discuss accumulated deficits by the United States and Canada on the St. Mary and Milk Rivers, respectively. Due to the lack of an early deficit on the St. Mary and a deficit occurring on the Milk River and the early shutdown to the irrigation seasons, more coordination than normal was needed to work out the details on how to balance water between the two nations.

During WY 2017, Lake Sherburne did not contribute to the reduction of local flood damages. Since 1950 Lake Sherburne has prevented $10,412,000 in flood damages.

Additional hydrologic and statistical information pertaining to the operation of Sherburne Reservoir during WY 2017 can be found in Table MTT10-A and Figure MTG9.

Fresno Reservoir is located above all project lands on the Milk River near Havre, Montana. A sediment survey in 2010 and finalized in 2013 determined the normal full pool capacity was 91,746 AF, a reduction of 1,134 AF from the previous survey. Reclamation started using the revised elevation-area capacity tables on October 1, 2013.

The top 33,841 AF of storage is used jointly for flood control and conservation and is not filled until the start of spring runoff. Fresno Reservoir stores the natural flow of the Milk River along with water diverted into the Milk River from the St. Mary River and Lake Sherburne. Stored water is used principally for irrigation but Havre and Chinook, Montana have a contract for a minimum flow in the river of 25 cfs during the winter to maintain suitable water for municipal use. The city of Harlem and the Hill County Water District also have contracts for municipal water use.

At the end of WY 2016, storage in Fresno Reservoir slowly drafted to a storage of 57,556 AF, at elevation 2566.90 feet. This was 138 percent of average and 63 percent of normal full capacity.

Valley precipitation for October was well above average at 665 percent. The precipitation fell mainly downstream of Fresno Dam as inflows into Fresno did not change much in October but flows in the Milk River downstream of Fresno were very high in early October. November and December 2016 precipitation were below average. Precipitation from October through December was 345 percent of average. Reservoir inflow was only 69 percent of average from October through December. Although inflow was below average, due to above average carryover, end of December storage was 56,690 AF at elevation 2566.65 feet, 139 percent of average.

By January 1, 2017 the NRCS reported mountain snowpack SWE in the Bear Paw Mountains was 100 percent of average. The SWE was reported as 91 percent of average on February 1, 2017 and 90 percent of average on March 1, 2017. Spring runoff season generally occurs during March through June 2017, therefore, the peak snowpack and most reliable water supply runoff forecast for the Milk River Basin is March 1, 2017.

The March 1, 2017 forecast for natural runoff above Fresno Reservoir for March through September 2017 was 81,400 AF, 101 percent of median. This forecast is provided by Alberta Environment and Parks. Based on this forecast and expected St. Mary Canal operations, storage in Fresno Reservoir was expected to fill to the top of the conservation pool at elevation 2575.0 feet by the end of April.

A warmup at the end of February did cause some of the snow on the plains to melt. Inflows peaked at about 1,240 cfs during this warmup. Downstream gages on the Milk River also saw increases with the warmup but both the inflow and the downstream gages decreased in flow as temperatures dropped to below normal conditions in early part of March.

A rapid warmup in March caused inflows to Fresno Reservoir to peak at 4,640 cfs. This also caused very high flows on tributaries to the Milk River and the Milk River downstream of Fresno Reservoir. Ice was still on the river and some flooding in the Milk River Basin did occur at different locations. To control the rate of fill releases were increased from the winter release of 45 cfs on March 17 to 915 cfs by March 24, 2017. Reductions were started on March 26 and were back down to 370 cfs by March 30, 2017. Fresno Reservoir filled to normal full pool on March 23, 2017, and by the end of March the snowmelt runoff in the Milk River Basin was over.

On April 18, 2017 the Milk River Joint Board of Control (MRJBC) set the initial irrigation allotment for the 2017 irrigation season at 2.3 AF per acre based on water supply information provided by Reclamation. This is considered essentially a full allotment.

Fresno Reservoir releases were increased on April 19, 2017 to transfer water to Nelson Reservoir. Releases were increased May 11 and 12, 2017 from 350 cfs to 650 cfs to meet irrigation demands for the first time in WY 2017. Fresno Reservoir was full through this date with water from the St. Mary Basin through the St. Mary Canal reaching Fresno Reservoir on April 20, 2017. Storage peaked on March 23, 2017 at 90,974 AF at elevation 2574.85 feet and again on May 11, 2017 at 90,616 AF, at elevation of 2574.78 feet.

Starting in April, dry conditions started in the east part of the Milk River Basin. Those dry conditions continued to move across the basin to the west. Water supply conditions were good for the first part of the summer then conditions turned very dry. Precipitation from May through August was well below average in the basin. Natural flow above Fresno Reservoir went to zero cfs on June 22, 2017 based on the accounting used in the Procedures Manual. All the water coming into Fresno Reservoir from June 22 through August 2017 was from the St. Mary Canal.

On July 11, 2017 Reclamation gave an updated water supply report to the MRJBC. The outlook was for reaching minimum allowable storage on August 3, 2017. The MRJBC voted that the last day of the irrigation season would be August 3, 2017. Inflows improved a bit during July and the irrigation season was extended to August 7, 2017 and was the start date to ramp down releases from Fresno Reservoir. Releases were reduced to 150 cfs by August 17, 2017 which was 125 cfs for the Fort Belknap Indian Irrigation Project and 25 cfs for the municipal and industrial use.

Irrigation demands were strong the end of May early June and all of July. The high irrigation demands, and below average inflows resulted in drafting the reservoir down to 20,081 AF at elevation 2550.5.8 feet by the end of July. The reservoir was drafted to a low of 12,100 AF at elevation 2545.14 feet on August 10, 2017. The reservoir bounced back with the shortened irrigation season and the St. Mary Canal diversions continuing through September 22, 2017.

The actual March through September 2017 inflow for Fresno Reservoir, excluding St. Mary Canal water was approximately 54,363 AF, 76 percent of average, based on the Procedures Manual computation for natural flow at the Milk River at Eastern Crossing gaging station.

The valley precipitation through the end of September 2017 was 78 percent of average. Total inflow into Fresno Reservoir for WY 2017 was 219,846 AF, 87 percent of average. Diversions from the St. Mary River Basin to the Milk River Basin accounted for about 69 percent of the inflow to Fresno Reservoir during WY 2017. After the irrigation season for the Fort Belknap Indian Irrigation Project ended, releases from Fresno Reservoir were reduced to a winter release rate of 40 cfs on September 12, 2017. Storage in Fresno Reservoir at the end of WY 2017 was 42,965 AF, at elevation 2561.96 feet, 103 percent of average and 63 percent of normal full capacity.

The CORPS determined that during WY 2017, Fresno Reservoir prevented $2,199,300 in local flood damage and no main stem flood damages on the Missouri River below Fort Peck Reservoir. Since 1950 Fresno Dam and Reservoir has reduced flood damages by a total of $17,719,900.

Additional hydrologic and statistical information pertaining to the operation of Fresno Reservoir during WY 2017 can be found in Table MTT10-B and Figure MTG10.

Nelson Reservoir, located near Malta, Montana, is an off-stream reservoir, receiving its water supply from the Milk River by diversion through the Dodson South Canal. Nelson Reservoir is the only source of supply for the lower portion of the Malta Irrigation District and serves the Glasgow Irrigation District when water is not available from Fresno Reservoir. In 1999 a sediment survey was performed and finalized in 2001. Since Nelson Reservoir operation began in 1916, the measured total volume reduction was 446 AF. The new revised elevation-area capacity data was implemented on October 1, 2001. Nelson Reservoir has a total capacity of 78,950 AF and an active capacity of 60,810 AF.

Storage on September 30, 2016 was 26,115 AF at elevation 2204.48 feet, 46 percent of average and 33 percent of normal full capacity. The extremely low carryover was due to the required drawdown for the Safety of Dams modification around the outlet works.

A small amount of water was stored in Nelson Reservoir following heavy rain in October 2016 but work on the Safety of Dams modification was not far enough along to allow water to be diverted from the Milk River to Nelson Reservoir before the start of winter. Malta Irrigation District started diverting water to Nelson Reservoir on February 27, 2017, and the diversions reached Nelson Reservoir on March 2, 2017.

Starting March 2, 2017 storage increased until Nelson Reservoir reached near full pool on May 21, 2017. Releases for irrigation demands and to control storage levels started on May 15, 2017. Storage in Nelson Reservoir peaked at 76,424 AF, at elevation 2221.01 feet on May 22, 2017 which was approximately 0.59 feet below normal full pool. The district prefers to keep the reservoir about one foot below full pool to reduce wave action on the dikes. Storage on August 11, 2017 was 26,115 AF at elevation 2209.56 feet, when the irrigation season ended early.

Releases were reduced June 30 through July 9, 2017 for de-mossing then ramped back up to 500 cfs. Releases were still made for Glasgow Irrigation District during this time frame. Inflows into Nelson Reservoir stopped around September 29, 2017 and storage on September 30, 2017 was 50,665 AF at elevation 2214.24 feet, 93 percent of average and 64 percent of full capacity. Total net inflow to Nelson Reservoir during WY 2017 was 90,410 AF.

Additional hydrologic and statistical information pertaining to the operation of Nelson Reservoir during WY 2017 can be found in Table MTT10-C and Figure MTG11.

Important Events – WY 2017

February 27, 2017: Diversion to Dodson South Canal is initiated to move water to Nelson Reservoir.

March 1, 2017: Milk River runoff forecast indicated March through September runoff to be 101 percent of average. Lake Sherburne April-July inflow forecast was 102 percent of average.

March 17, 2017: Fresno Reservoir releases were increased to control the rate of fill.

March 19, 2017: Inflow to Fresno Reservoir peaked at 4,640 cfs.

March 20, 2017: Releases begin from Lake Sherburne due to high storage content.

March 23, 2017: Fresno Reservoir peaked at elevation 2574.85 feet, near normal full pool.

April 1, 2017: Lake Sherburne runoff forecast indicated April-July runoff to be 104 percent of average.

April 10, 2017: Diversion to St. Mary Canal were started to move water to the Milk River Basin.

April 18, 2017: MRJBC set the irrigation allotment to 2.3 AF per acre based on a full water supply forecast.

April 19, 2017: Fresno Reservoir releases were increased to transfer water to Nelson Reservoir.

May 1, 2017: Lake Sherburne runoff forecast indicated May-July runoff to be 100 percent of average.

May 11, 2017: Fresno Reservoir peaked again at 2574.78 feet before irrigation demands started drafting Fresno Reservoir.

May 15, 2017: Releases were initiated from Nelson Reservoir for irrigation demands and to manage storage.

May 21, 2017: Storage in Nelson Reservoir reached a peak content for the year of 76,424 AF, at elevation 2221.01 feet, 0.59 feet below normal full pool.

June 2, 2017: Inflow to Lake Sherburne peaked at 1,216 cfs.

June 8, 2017: Storage in Lake Sherburne reached a peak content for the year, 65,632 AF, at elevation 4787.70 feet, 0.30 feet below normal full pool.

July 11, 2017: A conference call was held with the IJC Field Representatives to discuss St. Mary and Milk River apportionments.

July 17, 2017: A conference call was held with the IJC Field Representatives to discuss St. Mary and Milk River apportionments.

August 11, 2017: Releases from Nelson Reservoir were discontinued, final day of the irrigation 2017 season.

August 22, 2017: A conference call was held with the IJC Field Representatives to discuss St. Mary and Milk River apportionments.

September 26, 2017: A conference call was held with the IJC Field Representatives to discuss St. Mary and Milk River apportionments.

September 12, 2017: Releases from Fresno Reservoir are set at approximately 40 cfs for the duration of the winter after releases were shut off for Fort Belknap Indian Irrigation Project.

September 22, 2017: St. Mary Canal diversions were discontinued.

October 18, 2017: Lake Sherburne releases were discontinued.

TABLE MTT10-A
HYDROLOGIC DATA FOR WY 2017
SHERBURNE RESERVOIR (MILK RIVER PROJECT)
NEW SEDIMENT SURVEY DATA EFFECTIVE 10/01/2005

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	4729.30	1,899	1,899
TOP OF ACTIVE CONSERVATION	4788.00	66,147	64,248

STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	4756.84	23,589	OCT 01, 2016
END OF YEAR	4743.41	11,134	SEP 30, 2017
ANNUAL LOW	4742.99	10,797	SEP 20, 2017
ANNUAL HIGH	4787.70	65,632	JUL 08, 2017
HISTORIC HIGH	4788.30	68,371	JUN 30, 1986

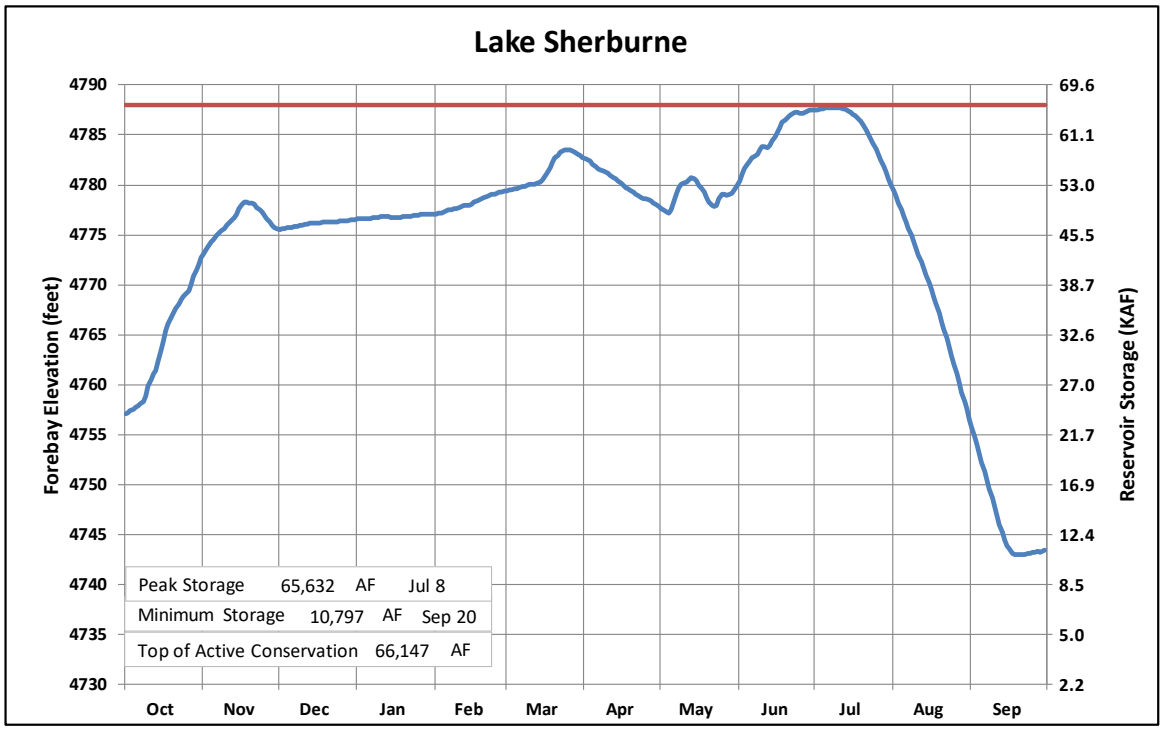
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	155,679	OCT 16-SEP 17	168,126	OCT 16-SEP 17
DAILY PEAK (CFS)	1,216	JUN 02, 2017	723	MAY 17, 2017
DAILY MINIMUM (CFS)	0	*	0	*

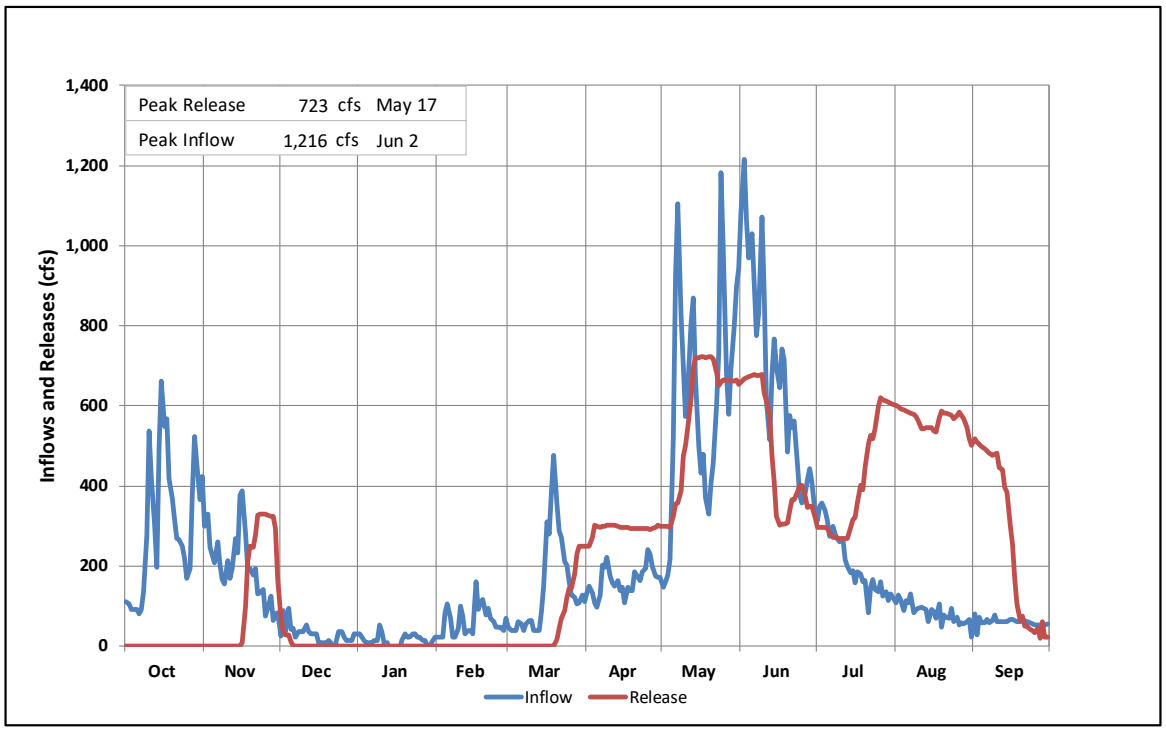
* During nonirrigation season

MONTH	INFLOW		OUTFLOW*		CONTENT	
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG
OCTOBER	18.7	292	0.0	---	42.3	218
NOVEMBER	11.7	160	7.6	668	46.3	185
DECEMBER	1.8	49	0.3	93	47.8	172
JANUARY	0.8	29	0.0	---	48.6	159
FEBRUARY	3.5	145	0.0	---	52.0	159
MARCH	8.9	235	3.5	75	57.4	189
APRIL	9.8	88	17.4	112	49.7	227
MAY	38.5	126	35.4	172	52.8	149
JUNE	40.7	107	28.3	146	65.2	116
JULY	12.7	66	24.9	95	53.1	108
AUGUST	5.1	55	34.8	106	23.3	85
SEPTEMBER	3.6	64	15.8	77	11.1	69
ANNUAL	155.7	111	168.1	116		
APRIL-JULY	101.7	103				

* Average for the 1955-2017 period.

FIGURE MTG9





Water Year 2017

TABLE MTT10-B
HYDROLOGIC DATA FOR WY 2017
FRESNO RESERVOIR (MILK RIVER PROJECT)
NEW SEDIMENT SURVEY DATA EFFECTIVE 10/1/2013

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	2530.00	158	158
TOP OF ACTIVE CONSERVATION	2567.00	57,905	57,747
TOP OF JOINT USE	2575.00	91,746	33,841

STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	2566.90	57,556	OCT 01, 2016
END OF YEAR	2561.96	42,965	SEP 30, 2017
ANNUAL LOW	2545.14	12,100	AUG 10, 2017
ANNUAL HIGH	2574.85	90,974	MAR 23, 2017
HISTORIC HIGH	2579.35	154,023	APR 03, 1952

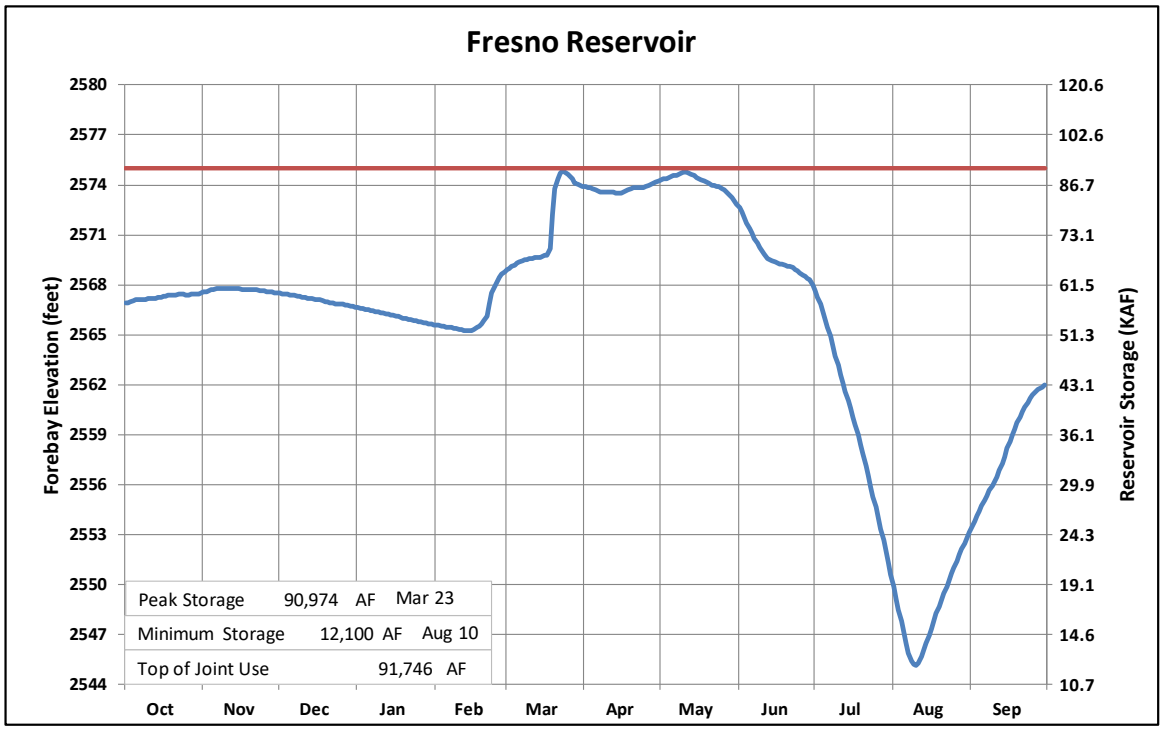
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	219,846	OCT 16-SEP 17	234,437	OCT 16-SEP 17
DAILY PEAK (CFS)	4,640	MAR 19, 2017	1,202	JUL 08, 2017
DAILY MINIMUM (CFS)	0	*	40	SEP 13, 2017

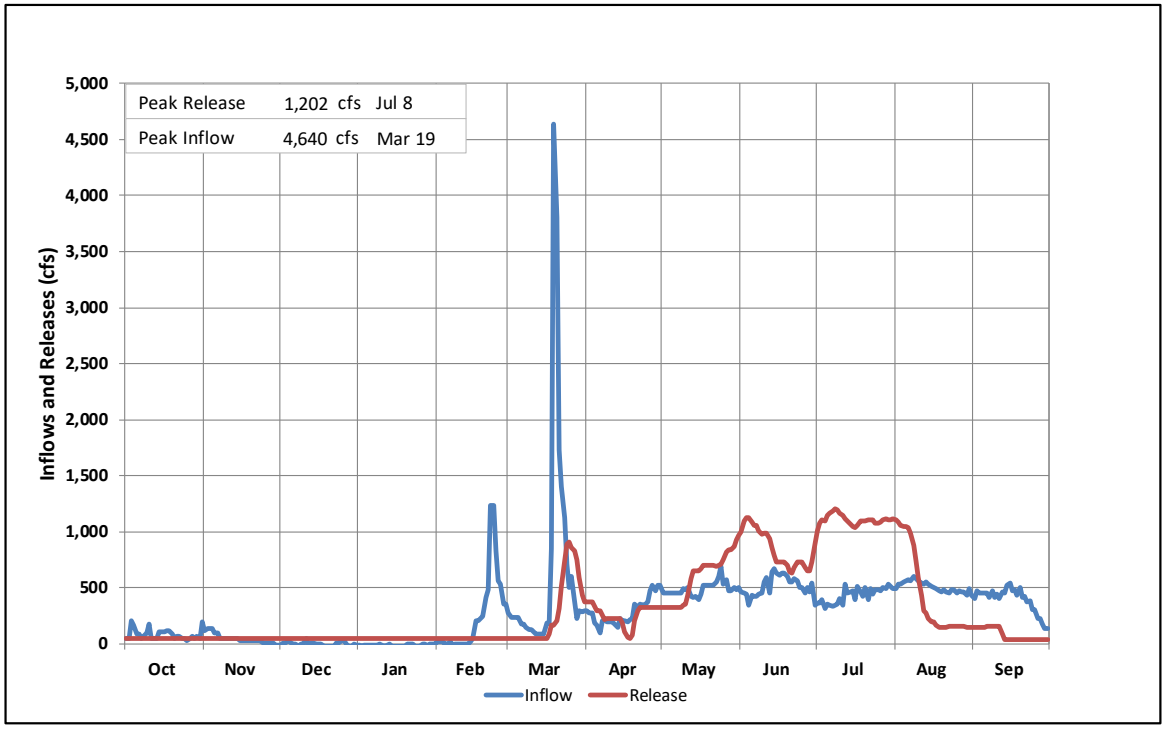
* During non-irrigation season

MONTH	INFLOW		OUTFLOW*		CONTENT	
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG
OCTOBER	5.2	70	3.1	43	59.7	142
NOVEMBER	2.8	111	2.8	88	59.7	144
DECEMBER	0.0	---	3.0	111	56.7	141
JANUARY	-0.7	---	2.8	104	53.2	137
FEBRUARY	14.0	341	2.8	112	64.4	163
MARCH	39.0	160	17.1	241	86.3	164
APRIL	17.0	56	15.4	78	87.9	129
MAY	30.2	69	36.9	77	81.3	124
JUNE	30.8	59	50.6	103	61.5	88
JULY	26.8	83	68.2	124	20.1	39
AUGUST	31.3	104	26.9	60	24.5	61
SEPTEMBER	23.5	110	5.0	23	43.0	103
ANNUAL	219.8	87	234.4	89		
APRIL-JULY	104.8	64				

* Average for the 1949-2017 period.

FIGURE MTG10





Water Year 2017

TABLE MTT10-C
HYDROLOGIC DATA FOR WY 2017
NELSON RESERVOIR (MILK RIVER PROJECT)
NEW SEDIMENT SURVEY DATA EFFECTIVE 10/1/2001

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	2200.00	18,140	18,140
TOP OF ACTIVE CONSERVATION	2221.60	78,950	60,810

STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	2204.48	26,115	OCT 01, 2016
END OF YEAR	2214.24	50,665	SEP 30, 2017
ANNUAL LOW	2204.48	26,056	OCT 02, 2017
ANNUAL HIGH	2221.01	76,424	MAY 21, 2017
HISTORIC HIGH	2221.68	79,297	JUN 01, 2007

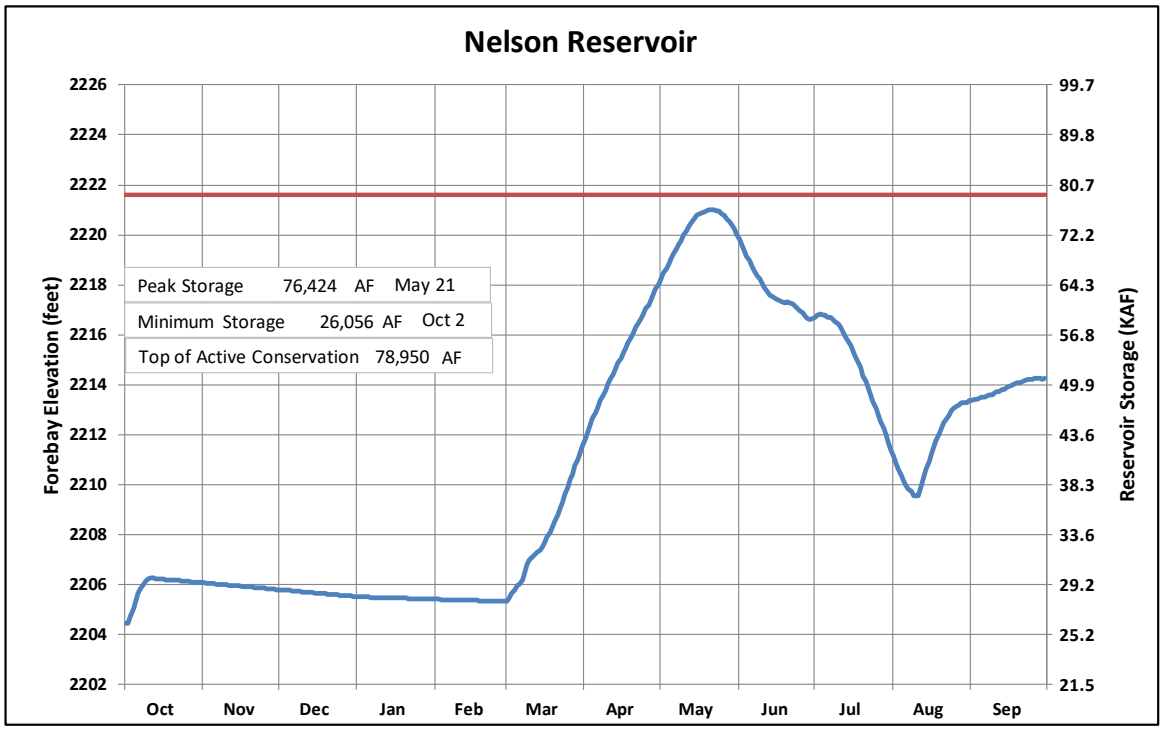
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	85,525	OCT 16-SEP 17	64,967	OCT 16-SEP 17
DAILY PEAK (CFS)	531	AUG 12, 2017	510	JUL 18, 2017
DAILY MINIMUM (CFS)	0	*	0	*

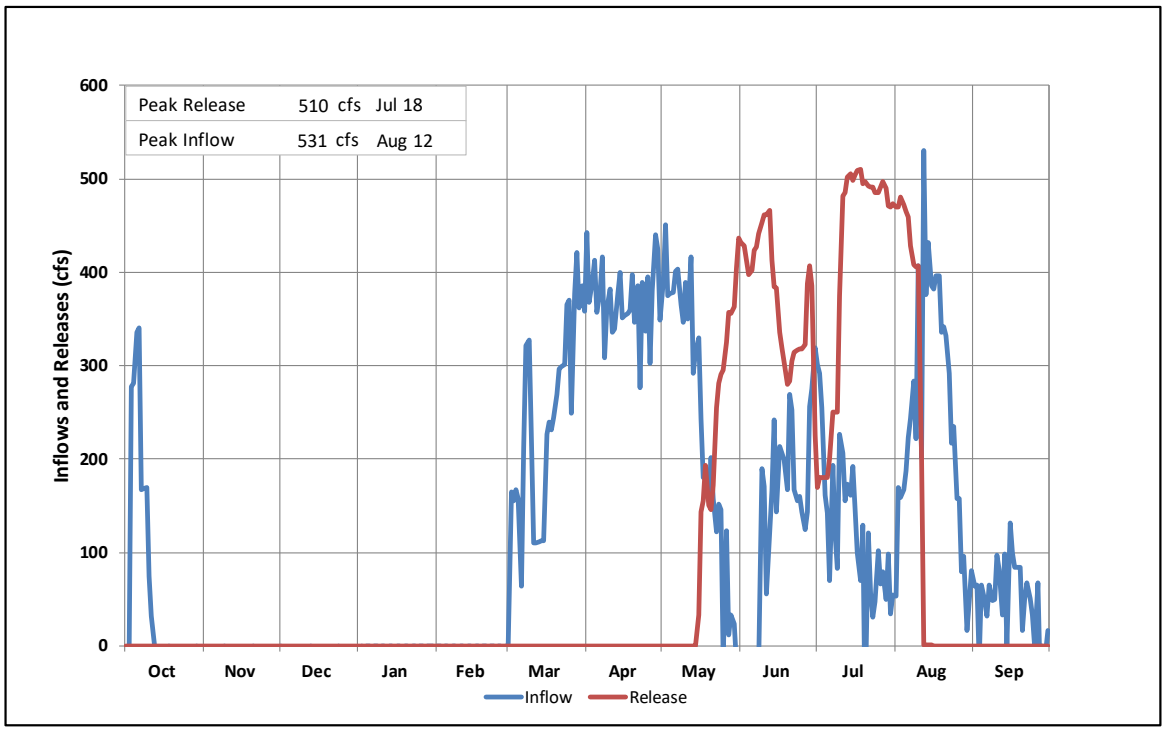
* During nonirrigation season

MONTH	INFLOW*		OUTFLOW*		CONTENT	
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG
OCTOBER	3.2	87	0.0	---	29.4	52
NOVEMBER	-0.6	---	0.0	---	28.8	52
DECEMBER	-0.6	---	0.0	---	28.2	53
JANUARY	-0.2	---	0.0	---	28.0	54
FEBRUARY	-0.2	---	0.0	---	27.8	55
MARCH	14.6	817	0.0	---	42.4	78
APRIL	22.0	283	0.0	---	64.4	102
MAY	16.7	232	8.8	114	72.3	118
JUNE	9.3	116	22.5	277	59.2	97
JULY	8.0	151	25.2	225	41.9	77
AUGUST	15.2	197	9.4	110	47.8	89
SEPTEMBER	2.9	46	0.0	---	50.7	90
ANNUAL	90.4	211	65,861	155		
APRIL-JULY	56.0	198				

* Average for the 1947-2017 period.

FIGURE MTG11





Water Year 2017

Bighorn Lake and Yellowtail Powerplant

Bighorn Lake P-S MBP is located on the Bighorn River about 45 miles southwest of Hardin, Montana. It has a total capacity of 1,331,725 AF. The dam and reservoir were built for power generation, irrigation, flood control, fish and wildlife, and recreation. The nameplate capacity of Yellowtail Powerplant is 250,000 kilowatts. Reclamation has a storage allocation agreement with the Northern Cheyenne Tribe for 30,000 AF and the Crow Tribe for up to 300,000 AF of water. Reclamation has an industrial water service contract with Talen Energy for 6,000 AF. No additional water can be contracted out of Yellowtail Dam after the passage of the Crow Tribe Water Rights Settlement Act of 2010. Bull Lake, Boysen, and Buffalo Bill Reservoirs are three major tributary reservoirs located in Wyoming upstream of Bighorn Lake. These reservoirs are operated and managed by the WYAO and all reservoir and river operations in the Bighorn River Basin are closely coordinated between the MTAO and WYAO.

In July 2007 a survey was conducted, and a new elevation-area capacity table was developed. The survey determined that Bighorn Lake has a storage capacity of 1,278,896 AF, a surface area of 17,279 acres at elevation 3657.0 feet. Since closure of the dam in November 1965, Bighorn Reservoir had accumulated a sediment volume of 103,415 AF below elevation 3657.0 feet. This represents a 7.5 percent reduction in capacity and an average annual reduction of 2,480 AF from 1965 to 2007. The revised area-capacity table was put into effect on January 1, 2011.

Storage in Bighorn Lake peaked at 960,852 AF on June 30, 2016. Following the peak, storage in Bighorn Lake slowly and steadily declined and ended the year with a content of 942,447 AF at elevation 3633.20 feet, 107 percent of average. Releases to the Bighorn River were decreased to 2,250 cfs on July 5, 2016 and were maintained at 2,250 cfs through the end of WY 2016.

Valley and mountain precipitation in September 2016 was well above average at 251 and 160 percent, respectively. Precipitation was much above average in October. Inflows into Bighorn Lake increased to 10,000 cfs on September 25 and to 11,700 cfs on October 4, 2016. Storage substantially increased in Bighorn Lake and peaked at 1,001,679 AF at elevation 3638.47 feet on October 17, 2016. Releases were increased twice during the month to 2,750 cfs to control the rate of fill.

At the end of WY 2016, storage in Boysen and Buffalo Bill Reservoirs, located on the Wind and Shoshone Rivers, was at 108 and 94 percent of average, respectively. The WYAO established the winter release out of Boysen Reservoir at 825 cfs during the middle of September 2016 with plans for a flushing flow in March 2017 at the request of Wyoming Game and Fish. In the middle of November, the release was increased to 925 cfs due to higher than average inflows. The winter release rate from Buffalo Bill Reservoir was set to 200 cfs on October 14, 2016.

Snowpack started accumulating in October. Valley and mountain precipitation were below average in November and snowpack was only 61 percent of average by the end of November. Temperatures during October were above average and much above average during November.

On November 17, 2016 Reclamation hosted a public meeting in Billings, Montana to discuss the water supply outlook, projected fall and winter operations of the Bighorn River Basin and review

of the operating criteria. On November 2, 2016 releases to Bighorn River was reduced to 2,510 cfs, the expected winter release rate. The release increased from Boysen Reservoir on November 17, 2017, so releases to the Bighorn River were increased to 2,610 cfs on November 22, 2017. Forecasted gains, planned winter releases out of Boysen and Buffalo Bill Reservoirs, and an end of March 2017 elevation target of 3617.0 feet are used to calculate the fall and winter release.

Precipitation was above average, and temperatures were below average in December. Cumulative precipitation was 211 and 132 percent of average in the valley and mountains, respectively. Inflow into Bighorn Lake was above average. The October through December inflow was 118 percent of average. Gains over the three-month period were 146 percent of average.

Snow accumulated at an above average rate in December and on January 1, 2017 the NRCS measured mountain snowpack SWE at 109 percent of average. Inflows in November and December were higher than what was forecasted on November 1, 2016 due to gains being higher. Therefore, storage in Bighorn Lake on January 1, 2017 was higher than projected at 937,335 AF at elevation 3632.70 feet. Releases to the Bighorn River were increased by 190 cfs to 2,800 cfs on January 11, 2017 to continue drafting storage towards an end of March elevation of 3617 feet.

During January, the mountain snowpack was much above average while temperatures were below average. On February 1, 2017 the NRCS measured the mountain snowpack SWE at 117 percent of average. Releases to the Bighorn River were increased again to 3,000 cfs on February 2, 2017 based on snowpack and higher end of January storage than projected.

The February snowpack accumulated at a much above average rate. Releases were increased to 3,400 cfs on February 8, 2017 due to the snowpack storage in Bighorn Lake. With the cold conditions in December and January, ice conditions downstream on the Yellowstone River was of concern when increases were being made. Contact with Disaster and Emergency Services offices were made prior to the increases.

During December, January, and beginning of February, snowpack was accumulating in the mountains, and on the plains at lower elevations. By February, the plains above Yellowtail, varied between 2 to 4 inches. A mid-February warm up melted most of the low elevation snow and inflows to Yellowtail increased to greater than 7,400 cfs. Releases from Yellowtail were increased weekly to evacuate the additional storage and continue drawing down the reservoir based on the above average snowpack. Downstream ice conditions were still of concern during this time which kept release changes smaller. By early March releases were 6,000 cfs, record releases for this time of year. During this time, releases from Boysen and Buffalo Bill Dams were still at original winter release rates due to downstream ice conditions and ice jam flooding concerns.

Valley precipitation was 227 and 276 percent of average in January and February 2017, and inflow into Bighorn Lake was 159 percent of average for January and February. On March 1, 2017, the NRCS measured mountain snowpack SWE at 142 percent of average and the April-July runoff was forecasted to be 2,099,200 AF, 192 percent of average. Bighorn Lake was at 918,659 AF, at elevation 3630.79 feet, 118 percent of average.

Under the operating criteria, on March 1, 2017 the end of month target changed from March 31 to April 30, 2017. The end of April target is based on April-July runoff forecast and the operating rule curves. Based on the inflow forecast, the end of April target was 3603.4 feet. Releases were increased 7,000 cfs on March 7 and 8, 2017, to continue drafting the reservoir.

March 2017 temperatures were much above average, and the Bighorn River Basin was much wetter than average. Mountain and valley precipitation at 147 and 265 percent of average respectively. Releases to the Bighorn River were increased several more times during March to continue the evacuation of storage in preparation of the expected runoff. By the end of March releases to the Bighorn River were at 9,000 cfs.

Storage in Bighorn Lake on April 1, 2017 was 769,235 AF at elevation 3610.90 feet. The SWE above Bighorn Lake was much above normal at 144 percent of average. The April 1, 2017 forecasted April-July runoff was 2,231,800 AF, 204 percent of average, so the end of April target was lowered to 3602.2 feet and the river release was increased to 10,000 cfs. Precipitation continued through April and ended with 265 percent of average in the mountains and 175 percent of average in the valley. Temperatures in April were near average. The SWE above Yellowtail Dam peaked about two weeks later than normal, on April 30, 2017 at 158 percent of the average peak that normally occurs on April 13. This was an extraordinary high snowpack in the Bighorn River Basin with many of NRCS SNOTEL sites upstream of Boysen Reservoir at record levels.

By May 1, 2017 storage in Bighorn Lake decreased to 747,489 AF, at elevation 3607.08 feet. Mountain snowpack SWE on May 1, 2017 was 165 percent of average and the May through July runoff was forecasted to be 2,454,200 AF or 259 percent of average. Along with actual April inflow, the April-July runoff was expected to be a record amount of 3,057,600 AF. Based on the forecast, releases to the Bighorn River were increased to 13,000 cfs on May 1 and 2, 2017.

On May 10, 2017 diversions to the Bighorn Canal started at 75 cfs and were increased to 150 cfs for a day and decreased to 75 cfs until irrigation demands started to increase around May 24, 2017. Throughout the remainder of the year diversion to the Bighorn Canal was adjusted as needed to meet irrigation demands.

During May, conditions in the basin turned dry while temperatures remained near average. The mountain and valley precipitation were 71 and 78 percent of average, respectively. However, due to the high releases from Boysen and Buffalo Bill and the desire to keep the reservoir from filling too soon, releases were kept at 13,000 cfs, which was the maximum that could physically be released for several days during May. Releases through the Yellowtail Powerplant were at the maximum desired by Western Area Power Administration at approximately 4,500 cfs and the river outlet works were at the maximum desired release of 2,500 cfs while the remaining 6,000 cfs was going through the spillway. The elevation of Bighorn Lake was 3603.44 feet on May 9, 2017. At this low elevation the gates on the spillway were free boarding, which meant they were completely out of the water and the amount of water going through the spillway was dependent only on the elevation of the reservoir.

The maximum allowable release was approximately 13,000 cfs until inflows started to increase near mid-May due to increasing snowmelt runoff. The increased runoff allowed releases from

Boysen and Buffalo Bill to increase because they were drafted to low elevations in preparation of the expected snowmelt runoff. With the increased inflows, releases to the Bighorn River were increased to 14,000 cfs on May 21 and 22, 2017. Inflows during March, April, and May were the highest monthly volumes on record and were 216, 411 and 296 percent of average respectively.

On June 1, 2017, storage in Bighorn Lake was 740,400 AF, at elevation 3605.78 feet, 90 percent of average. Snowpack SWE was 182 percent of average. The June 1, 2017 forecast for June through July runoff was 1,083,500 AF, 161 percent of average. To start filling Bighorn Lake based on forecasted remaining snowmelt runoff, river releases were decreased to 13,500 cfs on June 3, 2017. Releases were decreased several more times between June 5 and 9, 2017 to 11,500 cfs based on projected inflows and rate of fill of Bighorn Lake. The daily average inflow into Bighorn Lake peaked at 18,344 cfs on June 11, 2017. After the peak runoff, inflows remained high due to much above average releases from Boysen and Buffalo Bill Dams.

From June 12 through 16, 2017 releases to the Bighorn River were decreased to 9,000 cfs based on expected inflows and rate of fill. Due to increasing inflows, releases from Boysen and Buffalo Bill Dams were increased in the later part of June. Due to those releases being higher than expected, releases to the Bighorn River were increased to 9,500 cfs on June 29, 2017. In addition, storage in Bighorn Lake increased and entered the exclusive flood control pool on July 2, 2017. Precipitation was below average during June while temperatures were above average.

Through coordination with the CORPS, releases were kept at 9,500 cfs until July 20, 2017. Releases were gradually decreased from July 20 through August 5, 2017, to 4,250 cfs due to concerns with the river bank sloughing following the high releases during runoff.

Storage peaked in Bighorn Lake on July 15, 2017 at 1,116,926 AF, at elevation 3646.97 feet or 6.97 feet into the exclusive flood control pool. July precipitation was again below average for the third month in a row at 63 percent in the valley and 83 percent in the mountains while temperatures were well above average. Operations through snowmelt runoff were closely coordinated between Reclamation's Regional Office, MTAO, WYAO, CORPS, and MFWP.

Storage in Bighorn Lake was 1,044,886 AF at elevation 3641.88 feet, 115 percent of average on August 1, 2017. Releases to the Bighorn River were slowly being decreased while still evacuating storage out of the exclusive flood control pool. The desire was to decrease releases at a slow enough rate to minimize streambank sloughing and to time the decreases well enough to not use much of the active conservation storage to ramp down releases. All the storage in the exclusive flood control pool was evacuated as of August 10, 2017. Releases were decreased to 4,000 cfs on August 10, 2017 and were held at that rate for a few days before being reduced to 3,250 cfs during August 14 through 16, 2017. Inflows into Bighorn Lake during August were 216,400 AF, 147 percent of average, mainly because of higher than average releases from Boysen.

Inflows continued to stay above average through September. The river release was increased towards the end of the month back to 4,250 cfs. Several shift changes to the river gage were required to keep up with the algae growth. Valley and mountain precipitation in September were 256 and 184 percent of average, respectively. Mountain precipitation was above average with valley precipitation being above average in August and September.

Storage in Bighorn Lake ended with a content of 1,014,564 AF at elevation 3639.52 feet. This was 115 percent of average and 72,117 AF or 6.32 feet higher than at the end of WY 2016. Winter release was set to 4,000 cfs in late November but Boysen and Buffalo Bill releases were not set at the winter release rate until December 2017.

Inflows into Bighorn Lake during April-July were 270 percent of average, totaling 2,953,100 AF. This was the highest April-July inflow and was 380,800 AF higher than the previous record set in 2011. The April-July inflow in WY 2017 was 1,921,325 AF higher than the April-July inflow that occurred in WY 2016. The runoff into Bighorn Lake during WY 2017 totaled 4,480,500 AF, or 210 percent of average. This was the highest annual inflow into Bighorn Lake on record and was 663,500 AF higher than the previous record set in WY 2011.

The total amount of water released to the Bighorn River during WY 2017 was 4,360,500 AF or 210 percent of average. This was 2,326,012 AF higher than what was released to the Bighorn River in WY 2016. This was also a record release and was 667,224 AF more than the previous record set in WY 2011.

The water levels of Bighorn Lake during WY 2017 allowed for full service recreation at all marinas for most of the recreation season, from Memorial Day through Labor Day. The exception to this is Black Canyon Campground had to be closed for most of July due to the water level in Bighorn Lake being above elevation 3642 feet which is the elevation in which the campground starts to become inundated.

Total generation produced at Yellowtail Powerplant during WY 2017 was 991,494 megawatt-hours, 132 percent of average. This was 111,824 megawatt-hours more than what was generated in WY 2016. Approximately 59 percent of all water released from Yellowtail Dam was released through the powerplant, 2,612,900 AF. The remainder, 1,795,500 AF, was released either through the river outlet gates or the spillway gates.

The CORPS estimated that during WY 2017, Bighorn Lake prevented $248,200 in local flood damages and $8,192,900 in flood damages downstream on the Missouri River below Fort Peck Reservoir. Since construction of Yellowtail Dam in 1965, Bighorn Lake has reduced flood damages by a total of $179,199,100.

Important Events - WY 2017

All of WY 2017: Yellowtail Powerplant was limited to three units for the major rewind project with Unit 1 currently the unit that is unavailable.

October 4, 2016: Precipitation in September and early part of October dramatically increased inflows to above 11,500 cfs. Releases to the Bighorn River were increased to 2,500 cfs to control the rate of fill. (2,500 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

October 18, 2016: Emergency power testing of the Yellowtail Powerplant was conducted. All four units of the Yellowtail Powerplant were offline for approximately 3 hours. The Yellowtail Powerplant is restarted in black start using the standby generator.

October 27, 2016: Releases to the Bighorn River were increased to 2,750 cfs. (2,750 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

November 2, 2016: Based on the operating criteria, Reclamation set the fall and winter release rate to the Bighorn River at 2,510 cfs. (2,510 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

November 17, 2016: Reclamation hosted a combined annual fall water supply meeting and Bighorn River System Issues Group meeting in Billings, Montana to discuss operations and operating criteria for the Bighorn River Basin.

November 22, 2016: Based on the operating criteria, Reclamation increased the fall and winter release rate to the Bighorn River to 2,610 cfs due to a 100 cfs increase in the winter release from Boysen Dam. (2,610 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

January 1, 2017: NRCS snowpack SWE was reported at 109 percent of average. The first April-July runoff forecast for 2017 for Bighorn Lake inflow was 1,383,800 AF, 127 percent of average.

January 11, 2017: Inflows during November and December were higher than forecasted. Releases to the Bighorn River were increased to 2,800 cfs to continue drafting Bighorn Lake to 3617 feet by end of March. (2,800 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

February 1, 2017: NRCS reported the mountain snowpack SWE at 117 percent of average. The April-July snowmelt runoff forecast was 1,654,300 AF, 151 percent of average.

February 2, 2017: Inflows during January were higher than forecasted. Releases to the Bighorn River were increased to 3,000 cfs to continue drafting Bighorn Lake to 3617 feet by end of March. (3,000 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

February 8, 2017: Due to increasing snowpack, releases to the Bighorn River were increased to 3,400 cfs to continue drafting Bighorn Lake. (3,400 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

February 15, 2017: Snowpack continued to increase in the mountains while low elevation snowpack was melting which resulted in increased inflows. Releases to the Bighorn River were increased to 3,650 cfs. Releases were cautiously increased due to concerns with downstream ice conditions on the Yellowstone River. (3,650 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

February 23, 2017: Snowpack continued to increase in the mountains while low elevation snowpack was melting which resulted in increased inflows. Releases to the Bighorn River were increased to 4,000 cfs. Releases were cautiously increased due to concerns with downstream ice conditions on the Yellowstone River. (4,000 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

February 28 through March 2, 2017: Snowpack continued to increase in the mountains. Releases to the Bighorn River were increased from 4,000 to 6,000 cfs over a four-day period. Bypass of the Yellowtail Powerplant started on March 1. (6,000 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

March 1, 2017: NRCS snowpack SWE was reported at 142 percent of average. The April-July snowmelt runoff forecast was 2,099,200 AF, 192 percent of average.

March 7-8, 2017: Snowpack continued to increase in the mountains. Due to the much above average expected runoff, releases to the Bighorn River were increased to 7,000 cfs over a two-day period to continue evacuating storage from Bighorn Lake. (7,000 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

March 13-14, 2017: Snowpack continued to increase in the mountains. Due to the much above average expected runoff, releases to the Bighorn River were increased to 8,000 cfs over a two-day period to continue evacuating storage from Bighorn Lake. (8,000 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

March 22, 2017: Snowpack continued to increase in the mountains. Due to the much above average expected runoff, releases to the Bighorn River were increased to 8,500 cfs to continue evacuating storage from Bighorn Lake. (8,500 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

March 29, 2017: Snowpack continued to increase in the mountains. Due to the much above average expected runoff, releases to the Bighorn River were increased to 9,000 cfs to continue evacuating storage from Bighorn Lake. (9,000 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

April 1, 2017: NRCS reported mountain snowpack SWE at 144 percent of average. The April-July snowmelt runoff forecast was 2,231,800 AF, 204 percent of average.

April 3-14, 2017: Semi-annual maintenance of the Yellowtail Afterbay Dam sluicegates required the Yellowtail Afterbay Reservoir be maintained between elevations 3186.0 and 3190.0 feet to maintain river flows through the radial gates.

April 5-6, 2017: Due to the much above average expected runoff, releases to the Bighorn River were increased to 10,000 cfs over a two-day period to continue evacuating storage from Bighorn Lake. (10,000 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

April 12, 2017: Due to the much above average expected runoff, releases to the Bighorn River were increased to 10,500 cfs to continue evacuating storage from Bighorn Lake. (10,500 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

April 19-20, 2017: Due to the much above average expected runoff, releases to the Bighorn River were increased to 11,500 cfs over a two-day period to continue evacuating storage from Bighorn Lake. (11,500 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

April 26, 2017: Due to the much above average expected runoff, releases to the Bighorn River were increased from 12,000 cfs to continue evacuating storage from Bighorn Lake. (12,000 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

May 1, 2017: NRCS reported mountain snowpack SWE at 165 percent of average. The May through July snowmelt runoff forecast was 2,454,200 AF, 259 percent of average.

May 1-2, 2017: Due to high inflows and much above average expected runoff, releases to the Bighorn River were increased to 13,000 cfs over a two-day period to continue evacuating storage from Bighorn Lake. (13,000 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

May 10-16, 2017: Diversions to the Bighorn Canal were started on May 10 and ramped up to 150 cfs on May 15, then diversions were decreased to 75 cfs on May 16. (13,000 cfs to the Bighorn River and 75 cfs to the Bighorn Canal) Throughout the remainder of the irrigation season, diversion to the Bighorn Canal was adjusted as needed to meet the irrigation demands.

May 21-22, 2017: Due to high inflows, releases to the Bighorn River were increased to 14,000 cfs over a two-day period to continue evacuating storage from Bighorn Lake. (14,000 cfs to the Bighorn River and 75 cfs to the Bighorn Canal)

June 1, 2017: NRCS reported mountain snowpack SWE at 182 percent of average. The June through July runoff forecast for Bighorn Lake inflow was 1,083,500 AF, 161 percent of average.

June 3, 2017: Based on water supply conditions and the June 1, 2016 inflow forecast, releases to the Bighorn River were decreased to 13,500 cfs. (13,500 cfs to the Bighorn River and 350 cfs to the Bighorn Canal)

June 5-6, 2017: Based on water supply conditions, releases to the Bighorn River were decreased to 12,500 cfs over a two-day period. (12,500 cfs to the Bighorn River and 480 cfs to the Bighorn Canal)

June 8-9, 2017: Based on water supply conditions, releases to the Bighorn River were decreased to 11,500 cfs over a two-day period. (11,500 cfs to the Bighorn River and 480 cfs to the Bighorn Canal)

June 12-16, 2017: Based on water supply conditions and declining inflow, releases to the Bighorn River were decreased over several days to 9,000 cfs. (9,000 cfs to the Bighorn River and 480 cfs to the Bighorn Canal)

June 22-28, 2017: Diversion to the Bighorn Canal was decreased and maintained at 300 cfs to allow for chemical treatment of heavy algae growth. Diversion to the Bighorn Canal was increased to 500 cfs following the chemical treatment. (9,000 cfs to the Bighorn River and 500 cfs to the Bighorn Canal)

June 29, 2017: Based on water supply conditions, releases to the Bighorn River were increased to 9,500 cfs. (9,500 cfs to the Bighorn River and 500 cfs to the Bighorn Canal)

July 20 through August 5, 2017: Based on water supply conditions and declining inflow, releases to the Bighorn River were decreased over several days to 4,250 cfs. Bypass of the Yellowtail Powerplant stopped on August 4. (4,250 cfs to the Bighorn River and 300 cfs to the Bighorn Canal)

August 10, 2017: Based on water supply conditions, releases to the Bighorn River were decreased to 4,000 cfs. (4,000 cfs to the Bighorn River and 475 cfs to the Bighorn Canal)

August 14-16, 2017: Based on water supply conditions, releases to the Bighorn River were decreased over several days to 3,250 cfs. Yellowtail Powerplant was limited to two units during August 15-17 for the installation of vibration analysis equipment. (3,250 cfs to the Bighorn River and 475 cfs to the Bighorn Canal)

August 21 through September 1, 2017: Semi-annual maintenance of the Yellowtail Afterbay Dam sluicegates required the Yellowtail Afterbay Reservoir be maintained between elevations 3186.0-3190.0 feet to maintain river flows through the radial gates but below the top of the stoplogs.

August 28, 2017: Based on water supply conditions, releases to the Bighorn River were decreased to 3,000 cfs. (3,000 cfs to the Bighorn River and 450 cfs to the Bighorn Canal)

September 5-22, 2017: The Yellowtail Dam tailrace was limited to 3190.0 feet to allow for the maintenance and inspection of the Yellowtail Spillway.

September 11-12, 2017: Annual maintenance was conducted on the Yellowtail Afterbay Dam radial gates along with inspection of the river outlet works and Yellowtail Dam spillway stilling basin. The Yellowtail Afterbay Reservoir had to be maintained between elevation 3176.0 and 3178.5 feet.

September 19-21, 2017: Based on precipitation and increasing inflows, releases to the Bighorn River were increased to 4,250 cfs. (4,250 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

September 25, 2016: The Bighorn Canal was shut down for the irrigation season.

September 25, 2017: Based on precipitation and increasing inflows, releases to the Bighorn River were increased over three days to 3,750 cfs. (3,750 cfs to the Bighorn River and 200 cfs to the Bighorn Canal)

Additional hydrologic and statistical information pertaining to the operations of Bighorn Lake during WY 2017 can be found on Table MTT11 and MTG12.

For more detailed information on the operations of Boysen and Buffalo Bill Reservoirs during WY 2017, refer to the narratives for Boysen Reservoir and Powerplant and Shoshone Project under the responsibility of the WYAO.

TABLE MTT11
HYDROLOGIC DATA FOR WY 2017
BIGHORN LAKE (YELLOWTAIL DAM)
NEW SEDIMENT SURVEY DATA EFFECTIVE 01/01/2011

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	3547.00	469,910	469,910
TOP OF ACTIVE CONSERVATION	3614.00	788,208	318,298
TOP OF JOINT USE	3640.00	1,020,573	232,365
TOP OF EXCLUSIVE FLOOD CONTROL	3657.00	1,278,896	258,323

STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	3633.20	942,447	OCT 01, 2016
END OF YEAR	3639.52	1,014,564	SEP 30, 2017
ANNUAL LOW	3603.44	727,946	MAY 09, 2017
ANNUAL HIGH	3646.97	1,116,926	JUL 15, 2017
HISTORIC HIGH	3656.43	1,365,198	JUL 06, 1967

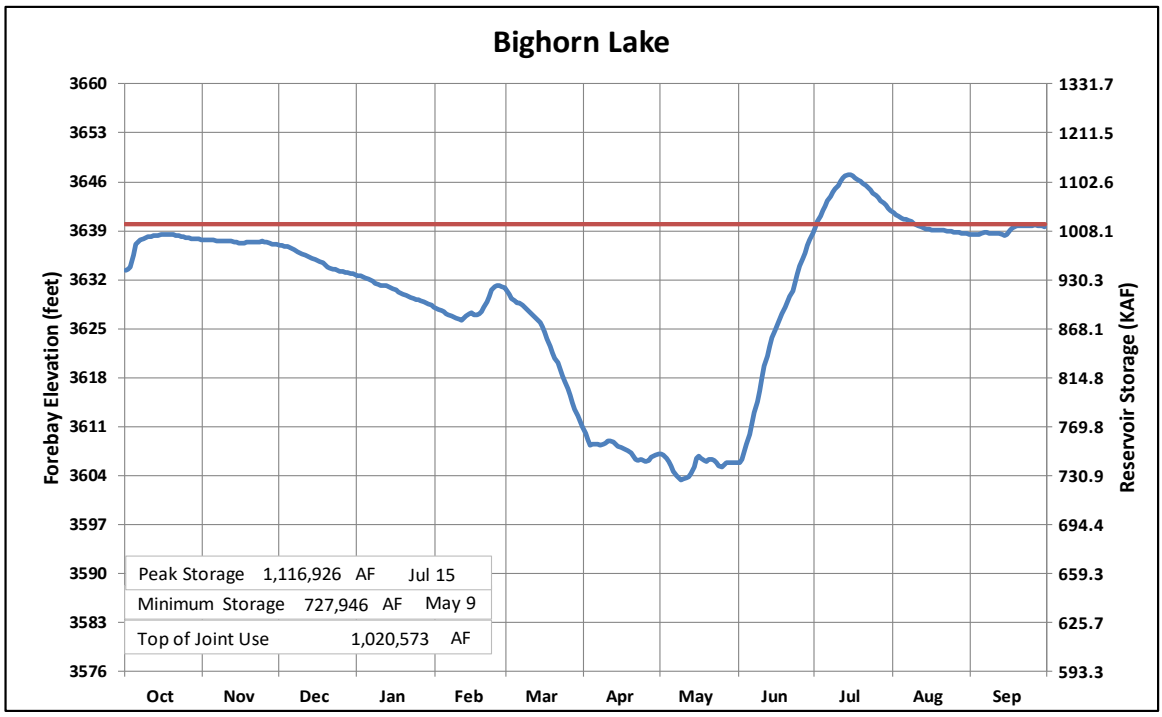
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW*	DATE
ANNUAL TOTAL (AF)	4,480,502	OCT 16-SEP 17	4,360,472	OCT 16-SEP 17
DAILY PEAK (CFS)	18,344	JUN 11, 2017	14,070	MAY 29, 2017
DAILY MINIMUM (CFS)	710	DEC 20, 2016	2,281	OCT 01, 2016
PEAK SPILL (CFS)			9,810	May 30, 2017
TOTAL SPILL (KAF)			1,791,194	March 1, 2017 -August 2, 2017

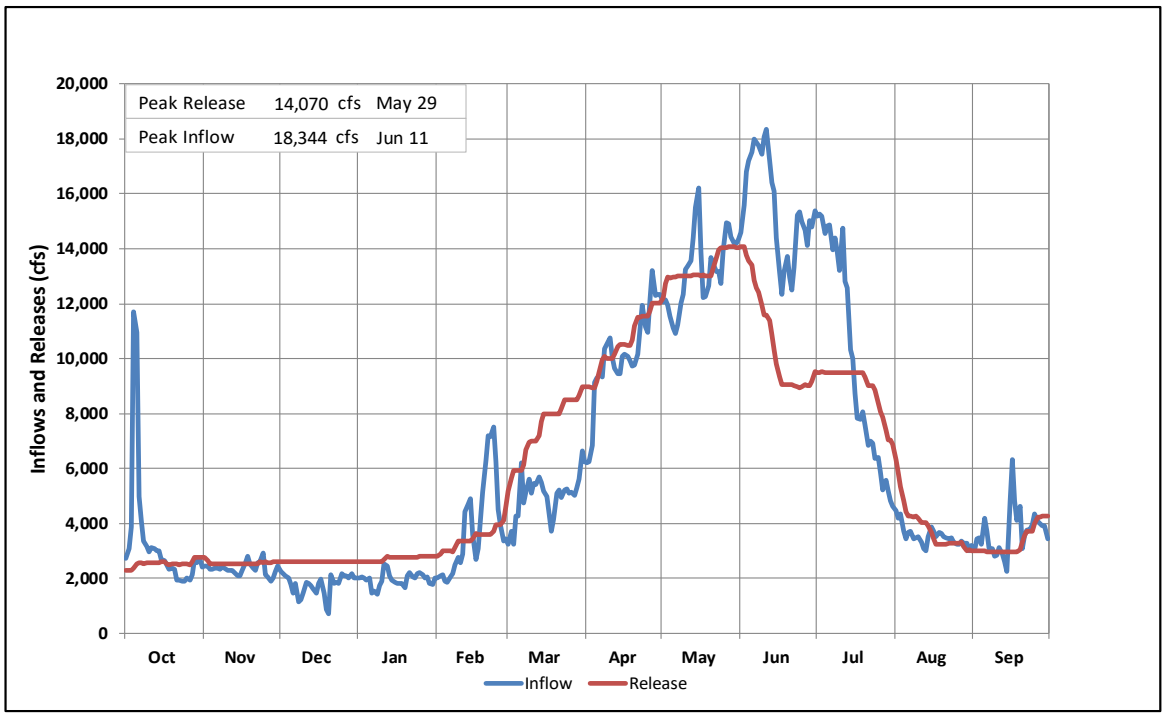
*Discharge to the Bighorn River

MONTH	INFLOW		OUTFLOW*				CONTENT	
	KAF	% OF AVG	CANAL KAF	% OF AVG	RIVER KAF	% OF AVG	KAF	% OF AVG
OCTOBER	202.6	127	0.0	---	156.4	92	992.9	112
NOVEMBER	139.9	116	0.0	---	152.6	89	984.6	113
DECEMBER	109.2	106	0.0	---	160.6	90	937.3	113
JANUARY	120.5	117	0.0	---	167.8	95	894.4	113
FEBRUARY	212.9	200	0.0	---	192.7	120	918.7	119
MARCH	306.7	216	0.0	---	460.1	246	769.2	101
APRIL	603.4	411	0.0	---	629.3	332	747.5	100
MAY	813.0	296	6.1	54	818.3	390	740.4	91
JUNE	920.4	217	25.6	119	635.9	214	1,003.5	108
JULY	616.3	249	27.3	98	551.9	196	1,044.9	115
AUGUST	216.4	147	26.7	101	236.7	137	1,002.5	114
SEPTEMBER	219.0	135	13.0	72	198.4	130	1,014.6	115
ANNUAL	4,480.5	210	98.6	90	4,360.5	186		
APRIL-JULY	2,953.1	270						

* Average for the 1967-2017 period.

FIGURE MTG12





Water Year 2017

SUMMARY

OF OPERATIONS

FOR WATER YEAR 2017

FOR BIGHORN BASIN RESERVOIRS

(BULL LAKE, PILOT BUTTE, BOYSEN, ANCHOR, BUFFALO BILL)

UNDER THE RESPONSIBILITY

OF THE

WYOMING AREA OFFICE

WIND RIVER AND SHOSHONE RIVER BASIN CLIMATE SUMMARIES

The following section contains climate summaries prepared by Reclamation from data collected by the National Weather Service Riverton Office, High Plains Regional Climate Center, University of Wyoming Water Resources Data System, and Wyoming State Climate Office. The compiled data serves as a summary of climate conditions during WY 2017 for the Wind River and Shoshone River Basins.

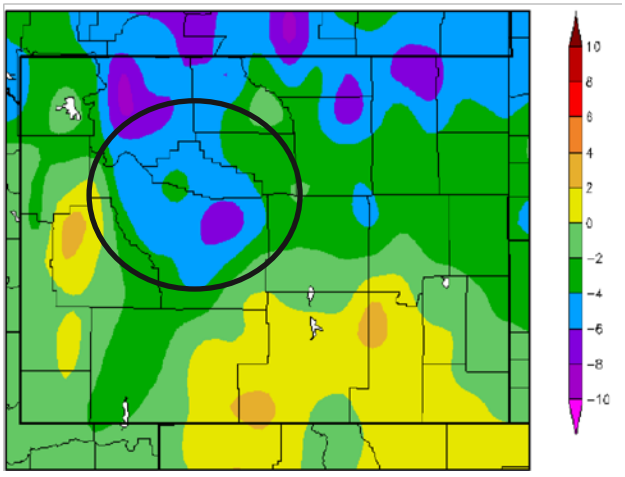
Fall: October through November

October had above average temperatures for most locations within the Wind River drainage. The Wind River drainage climate stations reported an average of 45.2 degrees, which is 3.4 degrees higher than the twentieth century average. Similar climate trends occurred in the Shoshone River Basin with temperatures averaging 46 degrees, which is also 3.4 degrees above the average. November 2016 brought above average temperatures around the region with both basins recording their third warmest Novembers of their respective 123-year period of records. Precipitation during October was well above average, with the Wind River and Shoshone drainages experiencing their nineteenth and eighth wettest Octobers respectively. November rainfall accumulations were near average for both basins.

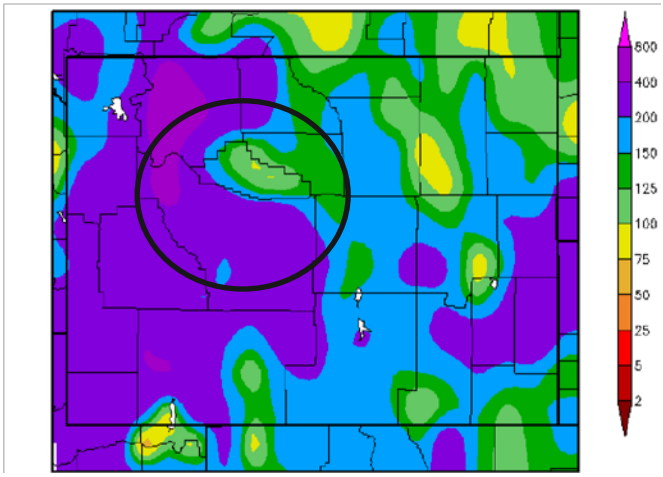
Winter: December through February

Temperatures in the Wind River region were below average and accompanied by very wet conditions. Temperatures across the basin were generally 4 to 6 degrees below average. The winter ranked as the seventh coldest winter for Riverton and sixteenth coldest for the basin station. The wet conditions resulted in most locations accumulating 200 to 400 percent of their averages. Several locations including Riverton and Dubois recorded their wettest and snowiest winters on record. Most locations received 200 to 400 percent of their average precipitation with many day and monthly records being broken. Two major events causing the wet and snowy conditions were two severe blizzards, which passed through the region during January and February. Both storms dropped large amounts of snow on the Wind River and Absaroka ranges. The SWE for the Wind River Basin at the end of February ranked as the second highest on record.

Departure from Normal Temperature (°F)
December 1, 2016 - February 28, 2017



Percent of Normal Precipitation (%)
December 1, 2016 - February 28, 2017



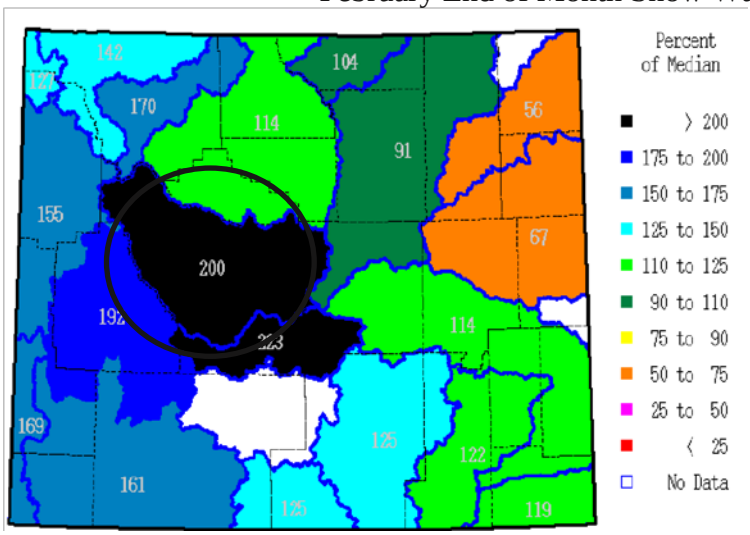
Maps produced by the High Plains Regional Climate Center and are available at: http://www.hprcc.unl.edu/maps/current

Summary of Station Data (December 2016-February 2017)

Station	Average Temp. (°F)	Dep. From Normal Temp. (°F)	Temp. Rank	Total Precip. (in.)	Dep. From Normal Precip. (in.)	Percent of Normal Precip.	Precip. Rank	Period of Record
Basin	18.0	-1.7	16th coolest	1.41	0.58	170	13th wettest	1898-present
Black Mtn[1]	24.5	-4.0	-	2.65	0.82	145	7th wettest	1963-present
Boysen Dam	14.7	-5.6	-	1.22	0.34	139	11th wettest	1948-present
Burris	20.7*	-3.7	-	1.88*	1.20	276	WETTEST	1963-present
Diversion Dam	16.1	-6.3	-	2.42	1.95	515	WETTEST	1920-present
Dubois	20.0*	-4.0	-	3.95*	3.05	439	WETTEST	1905-present
Lander 1N	15.7*	-4.3	-	3.27	1.79	221	-	1999-present
Riverton	13.6	-6.5	7th coolest	3.01	2.16	354	WETTEST	1907-present
Thermopolis	23.3	-4.0	-	1.26	0	100	near normal	1899-present
Worland	18.1	-2.0	-	1.61	0.90	227	6th wettest	1907-present

A dash (-) indicates insufficient data for calculation. An asterisk (*) indicates some missing data for this period.
All data are preliminary and subject to change.
Data were retrieved from the Applied Climate Information System (ACIS): rcc-acis.org
[1]The Black Mtn station is east of Thermopolis and does not refer to Black Mountain in the Owl Creek Mountains (northwest part of the reservation).

February End of Month Snow Water Equivalent



SNOTEL Site	SWE (% of median)
Cold Springs	215
Deer Park	251
Hobbs Park	226
Owl Creek	171
St. Lawrence ALT	148

On the map above, the percent of median value for the Wind River Basin is based on all reporting SNOTEL sites in the basin. The table above lists SWE by SNOTEL site in and around the Wind River Reservation. Reference period for average comparison is 1981-2010. Map provided by the Wyoming Water Resources Data System: http://www.wrds.uwyo.edu/wrds/nrcs/snowrept/snowrept.html. SNOTEL data provided by the Natural Resources Conservation Service: http://www.wcc.nrcs.usda.gov/snow/.

Spring/Summer: March through September

Spring of 2017 brought variable climate conditions to the Wind River and Shoshone River Basins. Much above average precipitation occurred during the early spring months of March and April. March precipitation was accompanied by above average temperature. April brought below average temperatures to the basin with several cold fronts passing through the area, which built up and compacted the already massive snowpack. Total precipitation records were set in the areas near Riverton and Lander during March. A powerful storm system travelled through the region on March 31, 2017, setting new 24-hour precipitation records at several locations within the basin. Near average precipitation totals were observed in the Shoshone River Basin during March, however much above average precipitation occurred in April. The cool and wet April climate increased the density and added to the substantial snowpack causing the respective basins SWE to reach record levels.

Overall climate conditions during May for the Bighorn and Wind River drainage were near average to below average for precipitation and temperature respectively. However, a record-breaking late spring storm named "Valerie" brought a record-breaking precipitation event near the middle of the month. The spring storm broke month of May record amounts of snowfall and liquid precipitation across the state. During the storm, Lander and similar high elevation locations accumulated approximately 20 inches of wet snow. Late snow and precipitation brought record-breaking runoff totals and wide spread flood risk would occur in the following months. The snowpack in both basins was primed for record-breaking water supply volumes.

The climate trends shifted slightly for the months of June and July. During this time, precipitation within the Wind River Basin amounted to only 60 and 55 percent of average. The below average

precipitation was accompanied by above average temperatures. The precipitation and temperatures are slightly misleading to the actual events as the summer began with cooler temperatures and then much warmer temperatures later in the season. During June, a significant rain on snow event occurred mid-month in the northern region of both basins. This rain on snow event sparked a record breaking event for magnitude and volume of runoff. Flooding resulted in basins both above and below the reservoirs.

August and September continued the warm and dry conditions of June and July. An exception to this trend occurred mid-late September when several cold fronts passed through the region bringing significant rainfall, snow, and cooler temperatures. The late precipitation added to the previous totals and resulted in the Shoshone and Wind River Basins ranking as their second wettest water year on record. Climate conditions during WY 2017 resulted in record setting runoff for Bull Lake, Boysen, and Buffalo Bill Reservoirs.

The SWE for the reservoirs within the Bighorn Drainage Basin are shown in Table WYT1. The official forecasted runoff volumes by the WYAO are shown in Table WYT2. Watershed precipitation data is shown in WYT3, WYT5, and WYT6 for the respective reservoirs.

Table WYT1
2017 Mountain Snow Water Content

DRAINAGE BASIN	January 1, 2017		February 1, 2017		March 1, 2017		April 1, 2017		May 1, 2017	
	INCHES	%	INCHES	%	INCHES	%	INCHES	%	INCHES	%
BULL LAKE	6.03	108	9.83	135	17.07	234	21.90	184	25.03	209
BOYSEN	7.56	128	11.44	137	19.14	229	24.10	186	25.87	189
BUFFALO BILL	10.14	123	14.14	122	21.74	188	25.17	147	27.39	155

[1] A composite of the following Natural Resources Conservation Service SNOTEL sites was used to determine snow water content and percent of average for the basins:
Bull Lake.....Elkhart Park, Hobbs Park, and Little Warm;
Boysen.....Burroughs Creek, Kirwin, Togwotee Pass, Townsend Creek, Younts Peak, Hobbs Park, and Little Warm, Togwotee Pass
and Townsend Creek
Buffalo Bill.....Blackwater, Evening Star, Marquette, Sylvan Lake, Sylvan Road, Togwotee Pass and Younts Peak

Table WYT2
2017 Water Supply Forecasts of April-July Snowmelt Runoff

Drainage Basin	JAN		FEB		MAR		APR		MAY		JUN		WY.17	APR-JUL	% OF APRIL
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG	ACT. KAF	% OF AVG	FORECAST RECEIVED
BULL LAKE	160	118	180	132	220	162	220	162	250	184	225	165	263	194	120
BOYSEN	730	135	850	157	1100	204	1100	204	1500	278	1250	231	1636	303	149
BUFFALO BILL	780	115	900	133	1100	162	1100	162	1250	185	1100	162	1262	186	115

Table WYT3
Boysen Watershed Precipitation

Location	*Oct*	*%AVG*	*Nov*	*%AVG*	*Dec*	*%AVG*	*Jan*	*%AVG*	*Feb*	*%AVG*	*Mar*	*%AVG*	*Apr*	*%AVG*	*May*	*%AVG*	*Jun*	*%AVG*	*Jul*	*%AVG*	*Aug*	*%AVG*	*Sep*	*%AVG*
Burris	0.88	119%	0.80	237%	0.60	318%	0.59	404%	0.69	232%	1.25	297%	0.35	32%	0.75	38%	2.24	197%	0.38	47%	0.66	112%	3.09	345%
DiversionDam	2.03	234%	0.37	105%	0.66	302%	0.86	667%	0.90	320%	2.65	479%	2.04	182%	1.58	71%	0.63	49%	0.53	65%	0.39	59%	1.95	212%
Dubois	1.79	209%	0.50	92%	1.05	330%	0.84	321%	2.06	543%	1.84	422%	1.01	88%	1.12	57%	1.59	135%	1.09	105%	1.16	137%	4.10	360%
Lander 1N ASOS	1.09	76%	1.61	217%	0.67	116%	1.21	297%	1.39	212%	2.62	222%	5.45	286%	2.13	81%	0.35	30%	0.29	46%	1.40	239%	1.70	161%
Riverton	1.55	171%	0.75	222%	0.93	356%	1.12	388%	0.96	250%	2.45	414%	4.70	439%	1.34	72%	0.49	44%	0.37	54%	1.09	229%	1.71	213%
Boysen	2.74	333%	0.27	92%	0.40	135%	0.35	161%	0.47	175%	1.53	255%	4.14	416%	1.40	69%	0.39	35%	0.49	62%	0.73	155%	2.58	294%
Totals	**10.08**	**179%**	**4.30**	**165%**	**4.31**	**232%**	**4.97**	**343%**	**6.47**	**285%**	**12.34**	**326%**	**17.69**	**241%**	**8.32**	**65%**	**5.69**	**81%**	**3.15**	**66%**	**5.43**	**150%**	**15.13**	**266%**
Site Avg	**1.68**	**179%**	**0.72**	**165%**	**0.72**	**232%**	**0.83**	**343%**	**1.08**	**285%**	**2.06**	**326%**	**2.95**	**241%**	**1.39**	**65%**	**0.95**	**81%**	**0.53**	**66%**	**0.91**	**150%**	**2.52**	**266%**
Cumulative	**1.68**	**179%**	**2.40**	**175%**	**3.12**	**186%**	**3.95**	**206%**	**5.03**	**219%**	**7.09**	**242%**	**10.04**	**242%**	**11.43**	**182%**	**12.38**	**166%**	**12.91**	**157%**	**13.82**	**156%**	**16.34**	**167%**

- Percent of average is based on 30 year averages (1987-2016)

Table WYT4
Buffalo Bill Watershed Precipitation

Location	*Oct*	*%AVG*	*Nov*	*%AVG*	*Dec*	*%AVG*	*Jan*	*%AVG*	*Feb*	*%AVG*	*Mar*	*%AVG*	*Apr*	*%AVG*	*May*	*%AVG*	*Jun*	*%AVG*	*Jul*	*%AVG*	*Aug*	*%AVG*	*Sep*	*%AVG*
Buffalo Bill	3.50	384%	0.60	147%	2.17	756%	1.38	479%	0.96	280%	0.40	73%	2.02	176%	2.10	92%	0.94	54%	1.46	188%	0.61	81%	1.90	203%
Lake Yellowstone	5.78	414%	1.34	77%	3.10	177%	2.69	141%	7.55	519%	2.49	129%	3.39	177%	1.09	46%	1.98	82%	1.80	120%	1.31	86%	3.33	236%
Tower Falls	2.89	231%	1.02	81%	1.40	111%	0.97	86%	1.87	268%	0.53	51%	2.00	150%	1.15	59%	1.26	65%	0.90	60%	0.55	39%	4.42	394%
Totals	**12.17**	**342%**	**2.96**	**87%**	**6.67**	**202%**	**5.04**	**151%**	**10.38**	**416%**	**3.42**	**97%**	**7.41**	**168%**	**4.34**	**65%**	**4.18**	**69%**	**4.16**	**110%**	**2.47**	**67%**	**9.65**	**278%**
Site Average	**4.06**	**342%**	**0.99**	**87%**	**2.22**	**202%**	**1.68**	**151%**	**3.46**	**416%**	**1.14**	**97%**	**2.47**	**168%**	**1.45**	**65%**	**1.39**	**69%**	**1.39**	**110%**	**0.82**	**67%**	**3.22**	**278%**
Cumulative	**4.06**	**341%**	**5.05**	**218%**	**7.27**	**213%**	**8.95**	**198%**	**12.41**	**232%**	**13.55**	**208%**	**16.02**	**200%**	**17.47**	**171%**	**18.86**	**154%**	**20.25**	**150%**	**21.07**	**143%**	**24.29**	**153%**

- Percent of average is based on 30-year averages (1987-2016)

Table WYT5
Bull Lake Watershed Precipitation

Location	*Oct*	*%AVG*	*Nov*	*%AVG*	*Dec*	*%AVG*	*Jan*	*%AVG*	*Feb*	*%AVG*	*Mar*	*%AVG*	*Apr*	*%AVG*	*May*	*%AVG*	*Jun*	*%AVG*	*Jul*	*%AVG*	*Aug*	*%AVG*	*Sep*	*%AVG*
Burris	0.88	119%	0.80	237%	0.60	318%	0.59	404%	0.69	232%	1.25	297%	0.35	32%	0.75	38%	2.24	197%	0.38	47%	0.66	112%	3.09	345%
DiversionDam	2.03	234%	0.37	105%	0.66	302%	0.86	667%	0.90	320%	2.65	479%	2.04	182%	1.58	71%	0.63	49%	0.53	65%	0.39	59%	1.95	212%
Dubois	1.79	209%	0.50	92%	1.05	330%	0.84	321%	2.06	543%	1.84	422%	1.01	88%	1.12	57%	1.59	135%	1.09	105%	1.16	137%	4.10	360%
Total	**4.70**	**191%**	**1.67**	**135%**	**2.31**	**318%**	**2.29**	**427%**	**3.65**	**381%**	**5.74**	**407%**	**3.40**	**101%**	**3.45**	**56%**	**4.46**	**124%**	**2.00**	**75%**	**2.21**	**106%**	**9.14**	**309%**
Site Average	**1.57**	**191%**	**0.56**	**135%**	**0.77**	**318%**	**0.76**	**427%**	**1.22**	**381%**	**1.91**	**407%**	**1.13**	**101%**	**1.15**	**56%**	**1.49**	**124%**	**0.67**	**75%**	**0.74**	**106%**	**3.05**	**309%**
Cumulative	**1.57**	**191%**	**2.13**	**173%**	**2.90**	**197%**	**3.66**	**222%**	**4.88**	**248%**	**6.79**	**278%**	**7.92**	**222%**	**9.07**	**161%**	**10.56**	**155%**	**11.23**	**146%**	**11.97**	**142%**	**15.02**	**160%**

- Percent of average is based on 30 year averages (1987-2016)

FLOOD BENEFITS

Flood Damage Prevented in the Wind/Bighorn and Shoshone River Systems[1]					
Reservoir	**Local**	**Main Stem**	**2017 Total**	**Previous Accumulation [3]**	**1950 - 2017 Accumulation Total**
Bull Lake[2]	$148,600	$0	$148,600	$3,582,300	$3,730,900
Boysen	$2,830,400	$11,095,400	$13,925,800	$122,818,000	$136,743,800
Buffalo Bill[2]	$2,799,200	$0	$2,799,200	$32,102,900	$34,902,100

1/ This data is received from the Army Corps of Engineers Omaha District Office and is revised every October. The period of assessment is 1950 - 2017.
2/ No space is allocated to flood control, but some flood protection is provided by operation for other purposes.
3/ Adjusted in 2006 by 0.1 to 0.5 to account for previous rounding of cumulative total to nearest 1.0.
4/ In 2012, flood damages prevented in 2011 at Boysen Reservoir were revised. The accumulated total for Boysen Reservoir has been corrected to reflect the revision.

Reservoir Summary: Riverton Unit

The Riverton Project was reauthorized as the Riverton Unit P-S MBP on September 25, 1970. Major facilities of this unit are Bull Lake Reservoir, Wind River Diversion Dam, Wyoming Canal, Pilot Butte Powerplant, Pilot Butte Reservoir, and Pilot Butte Canal. The major facilities provide water for irrigation of about 73,000 acres on the Midvale Irrigation District (Midvale). The water supply comes partly from the natural flow of the Wind River and partly from water stored in Bull Lake and Pilot Butte Reservoirs.

Bull Lake Reservoir

Bull Lake Reservoir is located on Bull Lake Creek, a tributary of the Wind River near Crowheart, Wyoming. Bull Lake has an active capacity of 151,737 AF and is above all unit land. It is the principal storage facility for the unit and is operated by Midvale under contract with Reclamation. A small amount of flood control benefit is provided by normal operation for other purposes. However, the Bull Lake Spillway is not operational and peak releases are limited to that of the outlet works which is approximately 2,400 cfs. The status of the spillway requires adaptation of normal flood control operations as it is necessary to increase outflow as the inflows increase.

Bull Lake Reservoir carried 38,288 AF of storage into WY 2017, which is 25 percent of the reservoir's active storage capacity. The reservoir was drafted to facilitate maintenance and inspection of the dam's spillway.

October inflows into Bull Lake amounted to 17,556 AF, which is 308 percent of the average and a new record for the reservoir. Releases during the same time span averaged 426 cfs for a total release of 26,162 AF. End of month storage in Bull Lake decreased to 29,682 AF, which is

39 percent of average. November and December inflows were 306 and 200 percent of average, respectively. The November inflow volume set a record for the reservoir. The Bull Lake Winter Release Agreement accounting was initiated October 19, 2016 and sustained through March 31, 2017. The end of December storage in Bull Lake equaled 40,566 AF, which stood as 52 percent of average.

On January 1, 2017 SWE as represented by the SNOTEL sites within the basin above Bull Lake reported at 108 percent of the average. Water supply forecasts for the April-July snowmelt runoff are prepared by the WYAO beginning in January and continue through June. The January 1, 2017 forecast projected an April-July snowmelt runoff of approximately 160,000 AF, which was 118 percent of average April-July volume of 139,000 AF. Total inflow during January amounted to 4,385 AF, which was 209 percent of average. The liquid precipitation average in the basin amounted to 427 percent of average.

The above average liquid precipitation and snow in January resulted in an increased February 1, 2017 April-July runoff forecast of approximately 180,000 AF. Inflow during February continued a much above average trend and amounted to 310 percent of the average. The end of month content for the reservoir was 46,750 AF (60 percent of average). February precipitation was again well above average at 381 percent of average. The mountains above Bull Lake had built up a SWE approximately 135 percent of average.

The much above average liquid precipitation and snowpack again demanded an increased runoff forecast, and on March 1, 2017 Reclamation projected an April-July runoff volume of 220,000 AF (162 percent of average). The record setting trends for inflow and moisture continued into March. Monthly total inflow amounted to 404 percent of average, but reservoir levels allowed releases to be maintained at the winter release agreement of 25 cfs throughout the month. The March 2017 inflow volume set a record for the reservoir. The high inflow volume and sustained releases positively affected the reservoir and its end of month content was 52,381 AF. Above average moisture continued in March with liquid precipitation at 407 percent of average and the basin's SWE at 234 percent of average.

On April 1, 2017 Reclamation issued an April-July runoff volume forecast of 220,000 AF. The snowpack reported on April 1, 2017, 184 percent of average, a 22 percent increase from March 1, 2017. Midvale began diverting water into the Wyoming Canal on April 10, 2017 to flush the canal system and finish filling Pilot Butte and other storage locations within the district. Bull Lake's inflow total was 257 percent of average and ranked as the second highest April volume on record. Liquid precipitation reported at average totals, but the snowpack again experienced above average accumulations. Releases were increased from the winter agreement flows beginning April 28, 2017. On April 30, 2017 Bull Lake held 60,863 AF of water.

The Bull Lake Reservoir SWE on May 1, 2017 was 209 percent of average and the reservoir operations team in the WYAO determined that the runoff forecast would increase to approximately 250,000 AF. Inflows during the month surged briefly during a rain and snow event that occurred near the middle of the month. Inflows to the reservoir exceeded 1,000 cfs from May 10 to May 15, 2017. The inflows remain elevated above the average for the remainder of the month, the mid-month storm seemed to break loose the snowpack and inflows totaled 46,288 AF, which set a

record for the basin. Midvale increased the reservoir release during the storm event and then subsequently decreased to range of 100-300 cfs. The end of month storage equaled 91,763 AF, which was a monthly increase of 15,000 AF.

By June 1, 2017 the snowpack had climbed to 277 percent of average, but the June 1, 2017 forecast was decreased to 225,000 AF, which was 165 percent of average. Inflows quickly jumped to 1,700 cfs on June 1, 2017 and reached a peak of 3,721 cfs on June 17, 2017. Releases from the dam were increased June 2, 2017 to slow the rate of fill and peaked at 2,895 cfs. Midvale closely monitored the rate of fill, as they were aware of unusable status of the dam's spillway. Bull Lake's storage at the end of the month was 128,027 AF with a pool elevation of 5,796.95 feet. In total, the June inflow amounted to 125,591 AF, which is 210 percent of average.

During July, Bull Lake inflows continued to be well above average. The peak inflow for the month occurred on July 12, 2017 with a computed flow rate of 1,849 cfs. Releases began the month below 1,000 cfs but as the inflows continued to be high, the releases were adjusted to manage the reservoir's rate of fill. The peak storage for WY 2017 of 149,628 AF was measured on July 21 and 22, 2017. July inflows amounted to 81, 217 AF, which is 185 percent of average. The April-July inflow volume of 263,392 AF eclipsed the previous record by over 46,000 AF.

Diversions into the Wyoming Canal began on April 10, 2017 and continued through September 30, 2017. The peak diversion of 1,558 cfs occurred on July 12, 2017. Bull Lake's August end of month storage was 141,864 AF, at elevation 5801.6 feet, which was 140 percent of average.

Total inflow to Bull Lake was 360,115 AF, which is 199 percent of average, and a new record for the reservoir. The discharge volume of the Wind River above Bull Lake Creek during WY 2017 was estimated to be 154 percent of average, totaling 922,000 AF. The total diversion into the Wyoming Canal for the irrigation periods was 354,438 AF, which was approximately 54,211 AF more than WY 2016.

Additional hydrologic and statistical information pertaining to Bull Lake operations during WY 2017 can be found in Table WYT4 and Figure WYG1.

Pilot Butte Reservoir

Pilot Butte Reservoir is an off-stream reservoir near Kinnear, Wyoming, and receives its water supply from the Wind River via the Wyoming Canal. Pilot Butte Reservoir has a total capacity of 33,721 AF. Of this amount 3,803 AF is inactive and 29,918 AF is active conservation storage. Pilot Butte Dam and the Wyoming Canal, which supplies the reservoir, are operated by Midvale under contract with Reclamation. The turbines at the inlet of the Wyoming canal are currently in mothballed status.

Pilot Butte Reservoir began WY 2017 with a total storage of approximately 7,396 AF, which is a pool elevation of 5,420.69 feet above sea level. Irrigation deliveries for the Wyoming Canal and Pilot Canal ended the 2016 irrigation season on September 16, 2018. During October the annual Bull Lake exchange agreement took place. The agreement allows Midvale to divert and store an additional 10,000 AF of water from Bull Lake to Pilot Butte Reservoir via the Wyoming Canal.

The agreement simultaneously transfers an equal amount of Boysen storage into Bull Lake Reservoir. The purpose of the agreement is to maintain a flow of no less than 20 cfs in Bull Lake Creek during the winter months. Bull Lake Creek is a prized fishery and the agreement insures its production. With the 10,000 AF of exchange water, and additional storage operations, Pilot Butte Reservoir ended October with a storage of 29,751 AF, which is 109 percent of average.

Releases to Pilot Canal from the reservoir began on April 20, 2017, at which time Pilot Butte had a storage of 29,836 AF. Storage in Pilot Butte peaked on August 15, 2017, with a content of 30,781 AF and elevation 5456.67 feet. The peak release to the canal during the irrigation season occurred on July 24, 2017 for a flow rate of 724 cfs. Irrigation releases continued through the end of WY 2017 and totaled 158,940 AF of releases to the canal for irrigation use. The reservoir ended WY 2017 by being lowered to a content of 17,956 AF, which leaves enough room for the Bull Lake Exchange to occur.

Additional hydrologic and statistical information pertaining to Pilot Butte Reservoir during WY 2017 can be found in Table WYT6 and Figure WYG2.

TABLE WYT6
HYDROLOGIC DATA FOR WY 2017
BULL LAKE RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	5739.00	722	722
TOP OF ACTIVE CONSERVATION	5805.00	152,459	151,737

STORAGE-ELEVATION DATA	ELEVATION (FEET)	STORAGE (AF)	DATE
BEGINNING OF YEAR	5760.80	38,288	OCT 01, 2016
END OF YEAR	5794.45	120,528	SEP 30, 2017
ANNUAL LOW	5753.15	23,927	OCT 13, 2016
HISTORIC LOW*	5743.03	6,228	MAR 31, 1950
ANNUAL HIGH	5804.10	149,628	JUL 21, 2017
HISTORIC HIGH	5805.70	154,677	AUG 10, 1965

* Prior to 1952 daily records are not available. End of month data was used to determine the historic low.

INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	360,115	OCT 16-SEP 17	279,981	OCT 16-SEP 17
DAILY PEAK (cfs)	3,721	JUN 18, 2017	2,896	JUN 23, 2017
DAILY MINIMUM (cfs)	38	Jan 27, 2017	19	OCT 19, 2016
PEAK SPILLWAY FLOW (cfs)			0	
TOTAL SPILLWAY FLOW (AF)			0	

MONTH	INFLOW		OUTFLOW		CONTENT	
	KAF	% of Avg*	KAF	% of Avg*	KAF	% of Avg*
OCTOBER	17.6	308	26.2	459	29.7	39
NOVEMBER	9.2	306	1.5	62	37.4	48
DECEMBER	4.8	200	1.6	80	40.6	52
JANUARY	4.4	209	1.7	84	43.3	56
FEBRUARY	5.0	310	1.5	87	46.7	60
MARCH	7.3	404	1.6	91	52.4	67
APRIL	10.3	257	1.8	49	60.9	78
MAY	46.3	162	21.5	162	85.6	92
JUNE	125.6	210	85.3	348	128.0	100
JULY	81.2	185	60.3	142	149.0	115
AUGUST	30.5	162	37.7	79	141.9	140
SEPTEMBER	18.0	190	39.4	111	120.5	161
Water Year Summary	360.1	199%	280.0	153%		

* Average for the 1987-2016 period

FIGURE WYG1

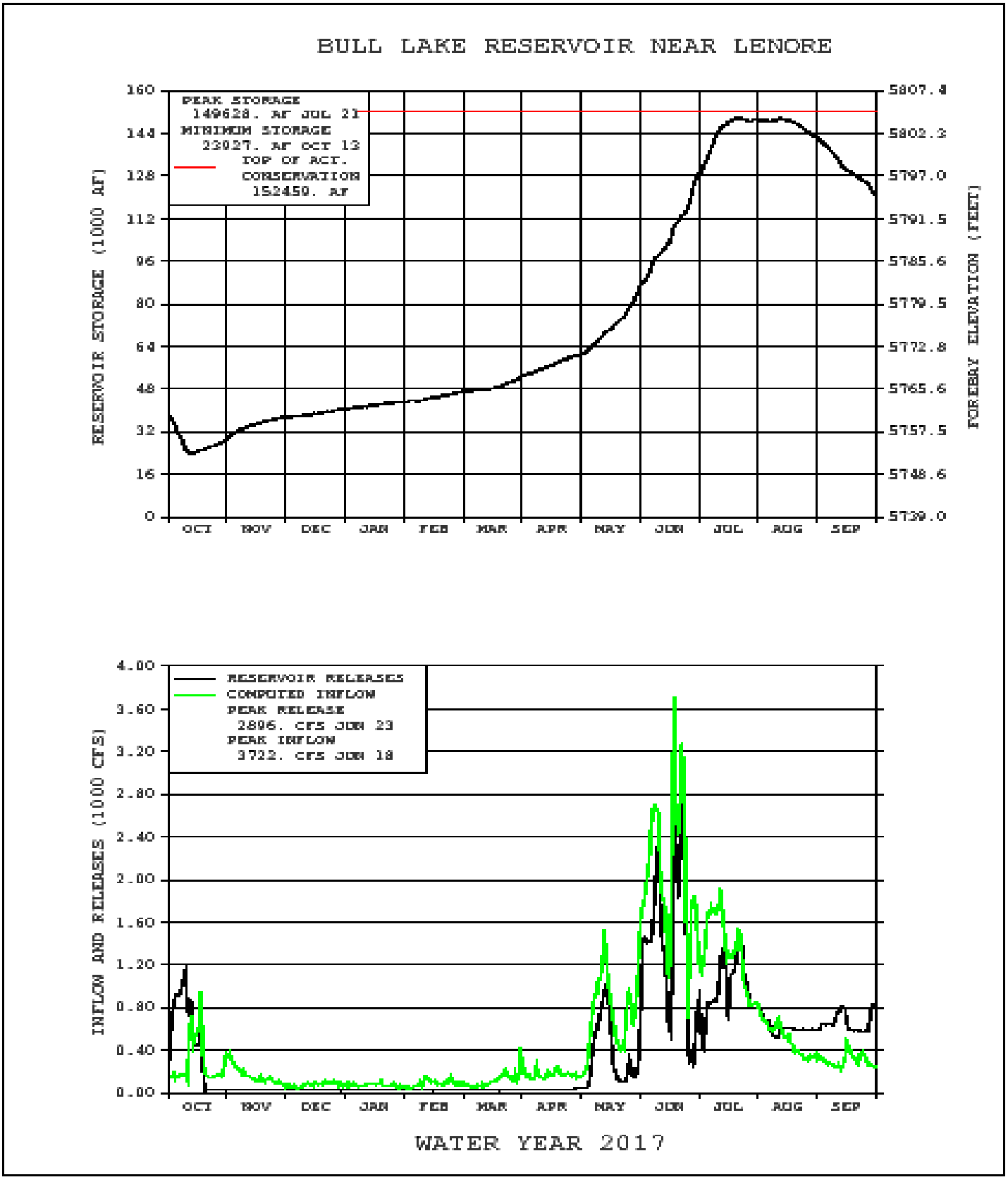

BULL LAKE RESERVOIR NEAR LENORE
PEAK STORAGE
149628. AF JUL 21
MINIMUM STORAGE
22027. AF OCT 12
TOP OF ACT.
CONSERVATION
152459. AF
RESERVOIR STORAGE (1000 AF)
FOREBAY ELEVATION (FEET)
160
144
128
112
96
80
64
48
32
16
0
5807.4
5802.3
5797.0
5791.5
5785.6
5779.5
5772.8
5765.6
5757.5
5748.6
5739.0
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
RESERVOIR RELEASES
COMPUTED INFLOW
PEAK RELEASE
2896. CFS JUN 23
PEAK INFLOW
3722. CFS JUN 18
INFLOW AND RELEASES (1000 CFS)
4.00
3.60
3.20
2.80
2.40
2.00
1.60
1.20
0.80
0.40
0.00
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
WATER YEAR 2017

TABLE WYT7
HYDROLOGIC DATA FOR WY 2017
PILOT BUTTE RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	5410.00	3,803	3,803
TOP OF ACTIVE CONSERVATION	5460.00	33,721	29,918
STORAGE-ELEVATION DATA	**ELEVATION (FEET)**	**STORAGE (AF)**	**DATE**
BEGINNING OF YEAR	5420.69	7,396	OCT 01, 2016
END OF YEAR	5440.05	17,956	SEP 30, 2017
ANNUAL LOW	5419.71	7,767	OCT 01, 2016
HISTORIC LOW	5409.80	3,748	DEC 01, 2007
ANNUAL HIGH	5456.67	30,781	AUG 15, 2017
HISTORIC HIGH	5460.60		APR 20, 1988

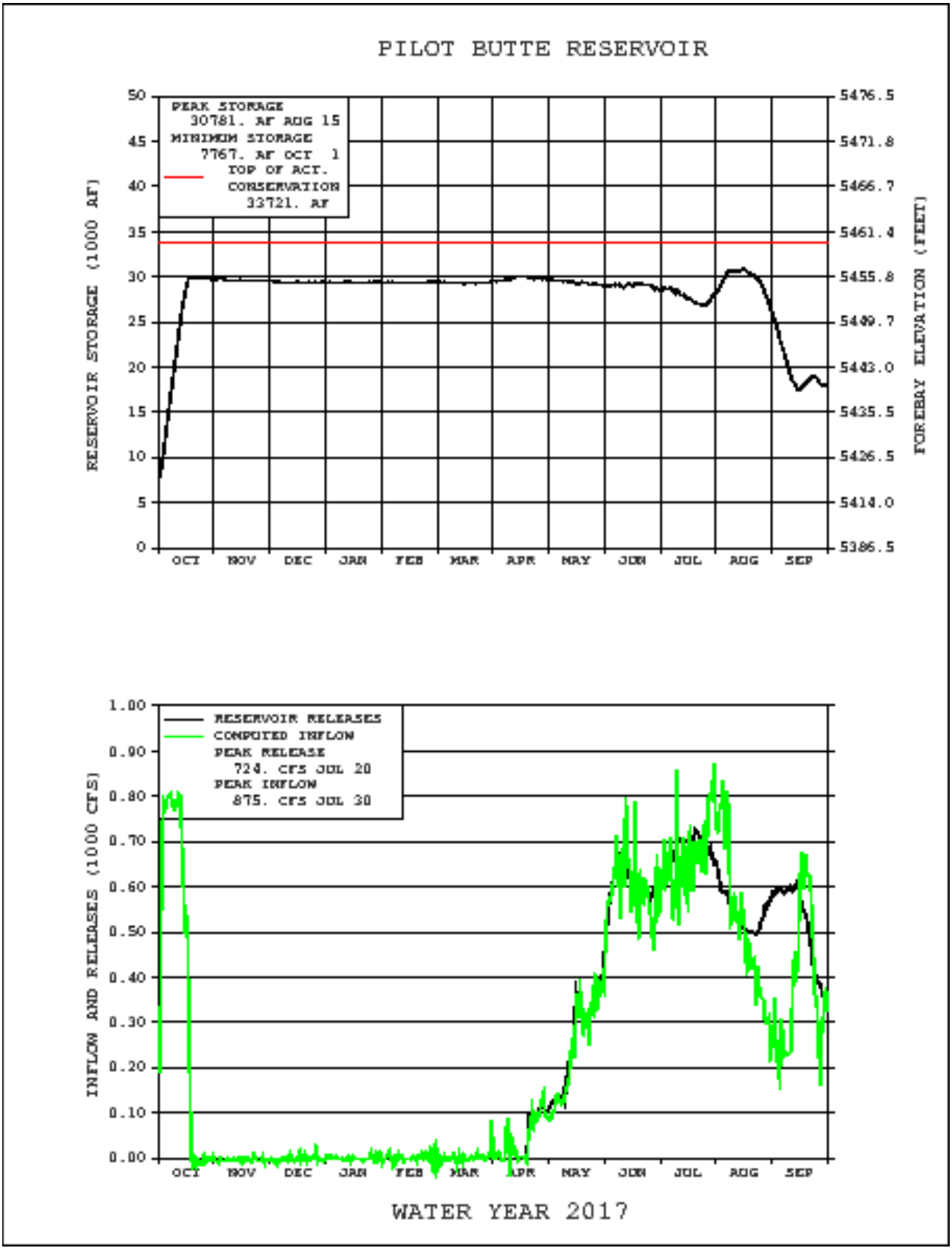
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	170,559	OCT 16-SEP 17	159,599	OCT 16-SEP 17
DAILY PEAK (cfs)	875	JUL 30, 2017	724	JUL 20, 2017
DAILY MINIMUM (cfs)	0	WINTER MONTHS	0	WINTER MONTHS
PEAK SPILLWAY FLOW (cfs)			0	
TOTAL SPILLWAY FLOW (AF)			0	

MONTH	INFLOW		OUTFLOW		CONTENT	
	KAF	% of Avg*	KAF	% of Avg*	KAF	% of Avg*
OCTOBER	22.4	176	0.0	0	29.8	109
NOVEMBER	0.0	0	0.0	0	29.5	104
DECEMBER	0.0	0	0.0	0	29.4	104
JANUARY	0.0	0	0.0	0	29.4	103
FEBRUARY	0.0	0	0.0	0	29.4	103
MARCH	0.2	23	0.0	0	29.5	101
APRIL	2.4	37	2.2	39	29.7	99
MAY	15.1	66	15.9	60	29.7	112
JUNE	35.6	101	35.9	111	28.6	97
JULY	41.3	108	41.6	95	28.3	117
AUGUST	30.9	98	33.4	92	25.8	132
SEPTEMBER	22.7	100	30.6	130	18.0	109
Water Year Summary	170.6	99%	159.5988	94%		

* Negative values are the result of calculated inflow based on reservoir release and change in reservoir content.

** Average for the 1987-2016 period

FIGURE WYG2


PILOT BUTTE RESERVOIR
PEAK STORAGE
30781. AF AUG 15
MINIMUM STORAGE
7767. AF OCT 1
TOP OF ACT. CONSERVATION
33721. AF
RESERVOIR STORAGE (1000 AF)
FOREBAY ELEVATION (FEET)
50
45
40
35
30
25
20
15
10
5
0
5476.5
5471.8
5466.7
5461.4
5455.8
5449.7
5443.0
5435.5
5426.5
5414.0
5386.5
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP
RESERVOIR RELEASES
COMPUTED INFLOW
PEAK RELEASE
724. CFS JUL 20
PEAK INFLOW
875. CFS JUL 30
INFLOW AND RELEASES (1000 CFS)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP
WATER YEAR 2017

Boysen Reservoir and Powerplant

Boysen Reservoir P-S MBP is located on the Wind River above Thermopolis, Wyoming. The dam and reservoir were built for flood control, power generation, irrigation, recreation, and fish and wildlife. Boysen Reservoir has a total capacity of 892,226 AF. Of this amount, 219,181 AF are allocated for inactive and dead storage, 522,413 AF is for active conservation storage, and 150,632 AF is for exclusive flood control storage. Of the amount allocated for active conservation, 144,229 AF are specifically allocated for joint-use flood control storage. All of the joint-use space is located between elevation 4717.00 feet and elevation 4725.00 feet, which is the top of the spillway gates when closed. The exclusive flood control space is located between elevation 4725.00 feet and elevation 4732.20 feet. When the reservoir rises above elevation 4724.50 feet, the spillway gates are operated to maintain 6 inches of clearance above the reservoir level for prevention of over-topping the gates. When all flood control space is filled, releases cannot be controlled to less than 14,000 cfs due to the required gate clearance.

Irrigation water is provided from the reservoir for several units, both upstream and downstream of Boysen Dam. Water is furnished downstream to about 7,500 acres in the Hanover-Bluff Unit P-S MBP and 3,400 acres on the Lucerne Canal in the Owl Creek Unit P-S MBP. Supplemental water is furnished to other irrigation districts and to several individual water users below the dam. The Bighorn Canal Irrigation District and Hanover Irrigation District, receive water under long-term contracts with Reclamation. Depending on availability, water is provided to Bluff Irrigation District, Kirby Ditch Irrigation District, Lower Hanover Canal Association, Bighorn Canal Irrigation District, and Hanover Irrigation District utilizing temporary water service contracts.

2017 Summary

Boysen 2016 reservoir storage carried forward into WY 2017 amounted to 624,793 AF, which is 108 percent of the thirty-year average. The corresponding reservoir elevation of 4718.65 feet is within the joint-use pool, and 6.35 feet below the exclusive flood pool elevation. Fall release rates needed to be increased to the winter flow rate of 925 cfs on November 18, 2016. The winter flow rate was maintained through March 1, 2017. During the winter flow months, via an agreement with the Wyoming Game and Fish, 25 cfs of the winter flow was being stored for use during flushing flows which are requested each year. October inflows were 143 percent of average, and reservoir storage increased by 23,000 AF during the month of October for an end of month content equaling 648,184 AF, which is 112 percent of average.

Inflows continued to be high through November and December, amounting to 135 percent and 107 percent of average totals. November's end of month storage was 661,014 AF, which was 114 percent of average. The rate of storage increase in the reservoir was one of the motivators for increasing fall flow rates to the winter flow rate. December's end of month storage was 644,653 AF, which is 113 percent of average.

Beginning January 1 of each year, Reclamation and other agencies prepare a monthly inflow forecast for the upcoming season. On January 1, 2017 the snowpack within the Boysen watershed, as calculated from a composite of SNOTEL sites within the basin, had built up to be 128 percent of the median. After additional analysis of the snowpack and review of the output from the

forecasting models, the WYAO issued a forecast for an April-July runoff volume of 730,000 AF, which would be 157 percent of the average.

During the month of January, inflow was above average with 117 percent of the average volume flowing into the reservoir. Operators in the control center maintained the winter flow rate of 925 cfs below the dam. January's end of month content was 630,728 AF, which is 113 percent of average.

On February 1, 2017 the WYAO prepared a runoff forecast, which is derived from modeling programs and statistical analysis of the period of record. On February 1, 2017 the snowpack above Boysen Reservoir amounted to 137 percent of median, which was a slight increase from the previous month. After analysis of the data, the office released a forecast for an April-July runoff volume of 850,000 AF, which is 157 percent of the thirty-year average.

During February, several significant storms precipitated wet and heavy snow throughout the watershed. Low-level snowmelt caused inflows during February to be record setting and 219 percent of average. The winter release rates were maintained through the end of the month and the end of month reservoir content was 660,295 AF, which is 120 percent of average.

The WYAO issued an updated runoff forecast on March 1, 2017. The watershed snowpack had significantly increased to 229 percent of the median. Consequently, the April-July forecast increased to 1,100,000 AF, which is 204 percent of the average. The previous April-July inflow volume record was observed in 1967, with an inflow volume of 1,297,000 AF. There was some evidence the WY 2017 SWE would surpass 1967, however composite SNOTEL records only go back to 1980 for the Wind River Basin.

During March, above average temperatures and Spring storms continued to drive the well above average trend for inflows and water supply. During March, the computed reservoir inflow amounted to 165 percent of average. Releases from the reservoir were increased on March 3, 2017 to a flow rate of approximately 2,000 cfs below the dam. This flow rate was held through March 27, 2017 at which time a flushing flow was completed, and reservoir releases were set at 3,000 cfs going into April. Reservoir discharge during March amounted to 246 percent of average. The end of month reservoir content was 618,270 AF, which is 112 percent of average and nearly 42,000 AF lower than February's end of month content.

On April 1, 2017, the watershed's SWE showed a slight decrease relative to the median from the previous month. The basins computed SWE was 186 percent of the median. Although the snow accumulation had slowed down, more snow was in the forecast and inflows were very high. Considering this information, the office determined the previous month's forecast of 1,100,000 AF would be carried forward. This amount would be 204 percent of the average.

During April, the basin's SWE reached a new record high. Inflows continued to increase as the spring weather came to the region, causing low-level snow to flow into the rivers. For the month, inflows totaled 132,802 AF, which is 277 percent of average. Releases from Boysen were increased from 3,000 cfs to 5,500 cfs during the month. A decrease in release was made to facilitate a penstock inspection, a decrease to 4,000 cfs occurred April 9-13, 2017, after which the

flow rate below the dam was set to 5,500 cfs. Total releases during this month amounted to 479 percent of average. The reservoir's end of month content was 464,983 AF, which is 86 percent of average and 153,287 AF lower than the previous month's end of month content. The corresponding end of month pool elevation was 4,707.95 feet above sea level, which is 9 feet below the joint-use pool.

A powerful storm system passed through the region in late April and into early May. With the storm, large quantities of snow accumulated in the mountain range. The record SWE was observed on May 1, 2017. Reclamation issued an increased storage to a projected April-July inflow volume of 1,500,000 AF, which is 278 percent of average and would set a record for the reservoir. The WYAO forecast matched the forecasts issued by several other agencies including the NRCS and CORPS.

During May, the trend of well above average inflows continued as the above normal amounts of low elevation snow melted quickly due to the above average temperatures and rain on snow events during the month. Inflows for the month totaled 132,802 AF, which is 277 percent of average. Releases at the beginning of the month were approximately 5,500 cfs. At the request of the Wyoming Department of Transportation, releases were decreased to 3,000 cfs from May 15-17, 2018 to facilitate the repair of a road embankment in the canyon downstream of the dam. After completion of the repair, flows were increased to 6,000 cfs and subsequently increased to 7,000 cfs on May 24, 2017. The 7,000 cfs was maintained through the end of the month.

Wet and warm climate trends continued into June 2017, and the magnitude of the hydrologic conditions increased in severity. On June 9, 2017 a new stream discharge record was recorded at the Wind River Crowheart gage above Boysen Reservoir. During June, the flow rates and volumes recorded on the major tributaries above the reservoir exceeded the calculated 100-year flood levels and were at levels not seen since the 1920's, which is before the dam was constructed. The extreme conditions were catalyzed by widespread warm temperatures and two rains on snow events. The rain on snow events broke loose the 270 percent of average SWE in the basin. Although liquid precipitation catalyzed the extreme hydrologic conditions during June, the basin's average accumulation was only 81 percent of normal. The extreme stream flows that were observed can be more appropriately attributed to the timing and widespread nature of the precipitation. Such as, above average temperatures when it rained, antecedent soil moisture, and snowpack conditions.

During June, two extreme inflow peaks at the beginning and end of the month were separated by a cooler climate trend during the middle of the month. Inflow began the month at computed flow rates of nearly 9,000 cfs, which came from the warm temperatures and above average releases out of Bull Lake. By June 6, 2017 the computed inflows were above 15,000 cfs and continuing increases resulted in a new record computed inflow rate of 20,284 cfs on June 9, 2017. Also, on June 9, 2017 the Wind River near Riverton cut through the banks of the Riverton Valley Canal and flooded that area. Riverton Valley Irrigation District was actively fortifying the dike protecting the canal, but their work was overcome by the extreme flows coming down the river. The reservoir began the month at a pool elevation of 4,709.32 feet, which is nearly 16 feet below the top of the joint use pool, and reservoir release rate of approximately 7,000 cfs. By June 10, 2017 the reservoir had gained 10 feet of pool elevation and nearly 150,000 AF of storage. Reservoir releases were increased from 7,000 cfs to 8,000 cfs on June 7, 2017. Inflows began to

decrease on June 11, 2017 from nearly 19,000 cfs to 8,300 cfs on Saturday, June 17, 2017 which is near the flow rate at the beginning of the month. The June 17, 2017 reservoir conditions were at pool elevation of 4,723.2 feet, which is 1.8 feet below the top of the joint-use pool, and a reservoir release rate of 8,000 cfs. However, upstream of the reservoir a rain on snow event brought a surge of runoff into the streams. Before leaving for the weekend on Friday, June 16, 2017 the WYAO reservoir operators in coordination CORPS made the decision to increase the flow rate to 9,000 cfs below the dam. At this flow rate, the water level was less than a foot below a water line that spans the river near Thermopolis, and within a foot of overtopping a newly installed canal diversion downstream. The 9,000 cfs would be the peak release for WY 2017, which is nearly 12,000 cfs lower than the peak inflow. The anticipated inflow surge arrived at the reservoir two days after the decision to increase the releases. On Monday, June 19, 2017 the computed inflow rate was 10,000 cfs more than just two days prior with computed flow rate of 18,902 cfs. For the next six days, the computed inflow average over 17,000 cfs and the reservoir entered the exclusive flood control pool and reached the annual peak elevation of 4,728.89 on June 27, 2017. The peak pool elevation was nearly 4 feet into the flood pool and amounted to 79,045 AF of flood-pool-storage space being used. Inflows again dropped to the 8,000 cfs level by the end of the month. The reservoirs box score for June 2017 contains a new daily inflow rate record, monthly volume record, and the fourth highest pool elevation. June's monthly inflow amounted to 818,984 AF, which is 285 percent of average, and nearly 280,000 AF, 151percent more than the basin's 30-year average for April-July inflow volume. The reservoirs end of month pool elevation was 4,728.71 feet, which correlates to a storage of 816,860 AF. The peak release rate of 9,000 cfs was maintained through the end of the month, which slightly drafted the reservoir from the peak storage and provided some relief in the case of another significant weather event occurring in July.

Warm and drier climate trends in the watershed above Boysen Reservoir were observed during July 2017, and hydrologic conditions moderated in comparison to those observed in June. During the month, observed precipitation at the sites used by Reclamation to determine watershed precipitation amounted to 69 percent of average. Temperatures were nearly 3 degrees warmer than average. The warm temperatures contributed to well above average flow rates being observed in the tributaries above Boysen.

During July, reservoir inflows were influenced by the temperature trends. Inflows began the month with computed flow rates of 6,000-7,000 cfs. The peak inflow rate of 7,207 cfs was observed on July 6, 2017. Inflows gradually declined for the remainder of the month as the snowpack melted out of the high elevations. By the end of July, the inflows had dropped below 3,000 cfs. The release rate below the dam coming into the month was approximately 9,000 cfs. As the month progressed, releases were adjusted to stay slightly above the inflows. At the end of the month, the release rate was down to 3,000 cfs. The pool elevation decreased 4.25 feet through the month, and the reservoir exited the exclusive flood pool space on July 25, 2017. Some of the considerations the WYAO reservoir operators weighed in their decision to decrease the release as the inflow decreased was to limit the spill/waste, and to mitigate the flood pool occupation downstream at Yellowtail Reservoir. The July inflow volume for Boysen amounted to 314,275 AF, which is 244 percent of average. The reservoir end of month pool elevation was 4,724.46 feet, which is near the year-to-year end of July reservoir target of 4,724.5 feet.

The observed inflow volume for the April-July period totaled 1,636,222 AF, which is 303 percent of average. The 2017 runoff season volume broke the previous record set in 1967 by over 300,000 AF. Also, of note, the 2017 April-July volume came within 40,000 AF of breaking the previous record for annual inflow, which was also set in 1967. The volume of water that came down the Wind River above Boysen from April 1 through July 31 had not been observed in the basin since 1924 when approximately 1,696,000 AF at the stream gage near Thermopolis.

Total inflow to Boysen during WY 2017 was 2,218,969 AF, 248 percent of the thirty-year average. The September 30, 2017 forebay elevation was 4,723.73 feet. The peak inflow for the year of 20,284 cfs occurred on June 10, 2017 and the maximum release from the reservoir was 9,000 cfs from June 20 to July 4, 2017. During WY 2017, Boysen Powerplant had a gross generation of approximately 86,266 MWh of electricity, which is 142 percent of average. Of the 2,125,545 AF of water released from Boysen during WY 2017, approximately 1,020,569 AF of that amount was bypass release. During WY 2017, bypass release comprised 48 percent of the total release. The estimated lost revenue of the bypass is $3,306,548.

Important Events – WY 2017

October 1, 2016: Winter flow rate was set at 825 cfs.

November 18, 2016: Winter flow rate increased to 925 cfs.

March 21, 2017: Boysen Reservoir spring water information meeting reviewing WY 2016, 2017 water supply, and projected operations.

March 28, 2017: Wyoming Game and Fish sediment flushing operations below Boysen Dam.

April 1, 2017: Initiated a release above powerplant capacity to evacuate storage for runoff.

June 10, 2016: A new record observed for computed inflow, with a flow rate of 20,284 cfs.

June 20, 2017: Boysen Reservoir entered the reservoirs designated flood control pool.

June 20, 2017: Reservoir releases increased to the annual peak release target of 9,000 cfs.

June 27, 2017: Peak end of day forebay elevation observed with a pool elevation of 4,728.89 feet.

September 17, 2017: Reservoir releases were decreased to facilitate removal of an island near the town of Worland. The island had been the cause of damaging ice jams in the past.

Additional hydrologic and statistical information pertaining to the operation of Boysen Reservoir can be found in Table WYT8 and Figure WYG3.

TABLE WYT8
HYDROLOGIC DATA FOR WY 2017
BOYSEN RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	4685.00	219,181	219,181
TOP OF ACTIVE CONSERVATION	4717.00	597,365	378,184
TOP OF JOINT USE	4725.00	741,594	144,229
TOP OF EXCLUSIVE FLOOD CONTROL	4732.20	892,226	150,632

STORAGE-ELEVATION DATA	ELEVATION (FEET)	STORAGE (AF)	DATE
BEGINNING OF YEAR	4718.65	624,893	OCT 01, 2016
END OF YEAR	4723.73	717,007	SEP 30, 2017
ANNUAL LOW	4705.18	429,491	MAY 8, 2017
HISTORIC LOW ELEVATION *	4684.18		MAR 18, 1956
HISTORIC LOW CONTENT *		235,737	SEP 24, 2002
ANNUAL HIGH	4728.89	820,645	JUNE 27, 2017
HISTORIC HIGH	4730.83	922,406	JUL 06, 1967

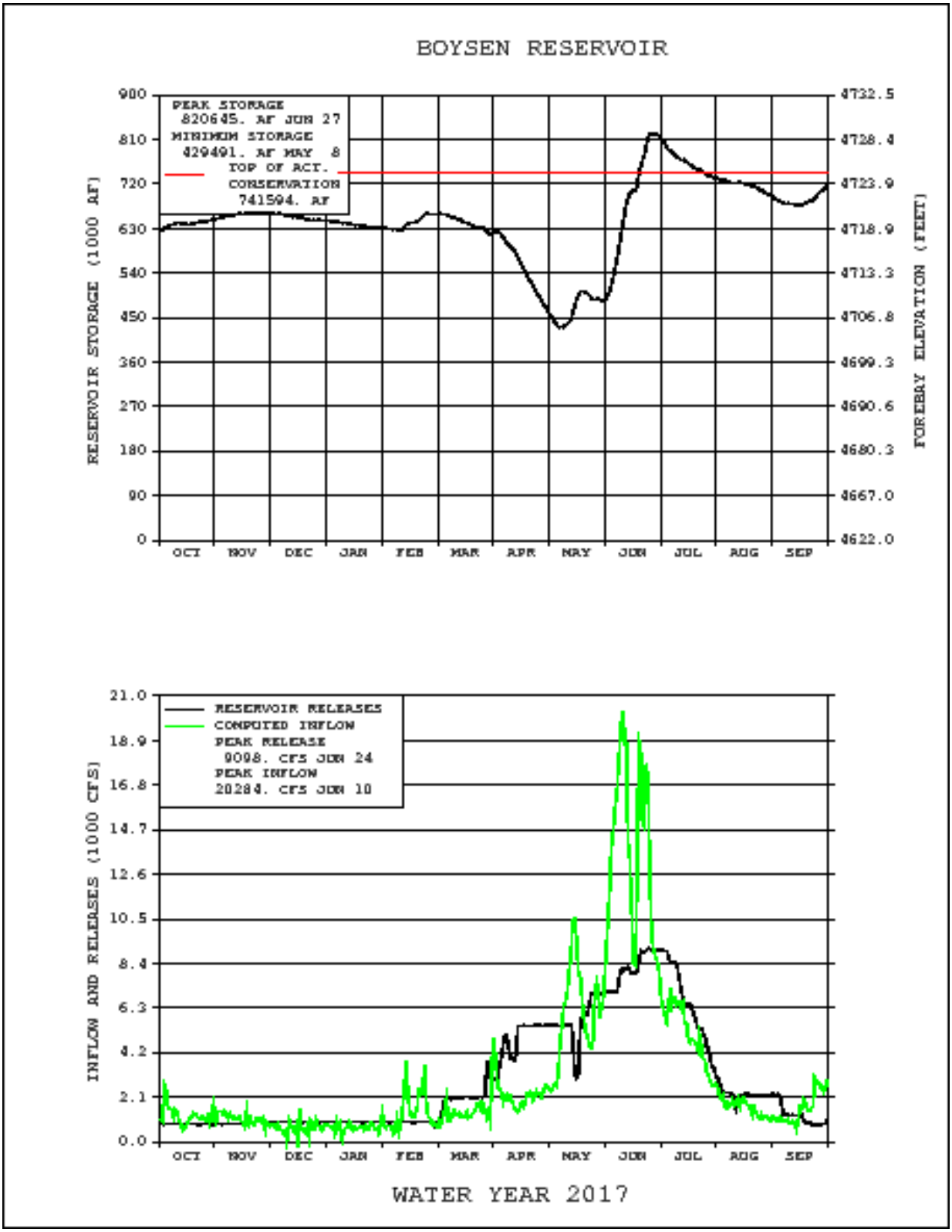
*Because storage space in a reservoir is lost as sediment is trapped behind the dam, reservoirs are resurveyed periodically to determine actual capacity. Based on the 1994 resurvey of Boysen Reservoir, the historic low content of 235,737 AF occurred at an elevation that was 2.69 feet higher than the historic low elevation.

INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	2,218,970	OCT 16-SEP 17	2,125,545	OCT 16-SEP 17
DAILY PEAK (cfs)	20,284	JUN 10, 2017	9,098	JUN 24, 2017
DAILY MINIMUM (cfs)	122*	Jan 8, 2017	692	FEB 28, 2017
PEAK SPILLWAY FLOW (cfs)			8,308	JUN 27, 2017
TOTAL SPILLWAY FLOW (AF)			969,906	OCT 16-SEP 17

* High winds can affect the forebay reading used to calculate inflow.

MONTH	INFLOW		OUTFLOW		CONTENT	
	KAF	% of Avg*	KAF	% of Avg*	KAF	% of Avg*
OCTOBER	75.5	143	50.5	98	648.2	112
NOVEMBER	64.0	135	51.2	111	661.0	114
DECEMBER	40.1	107	56.4	117	644.7	113
JANUARY	42.4	117	56.3	120	630.7	113
FEBRUARY	79.9	219	50.3	119	660.3	120
MARCH	85.1	165	127.8	246	618.3	112
APRIL	132.8	277	285.9	479	465.0	86
MAY	370.2	304	351.8	333	483.4	87
JUNE	819.0	331	485.5	300	816.9	127
JULY	314.3	256	400.1	297	731.1	116
AUGUST	99.8	205	138.0	163	692.9	117
SEPTEMBER	96.0	210	71.8	112	717.0	125
April - July	1,636	303%				
Water Year Summary	2,219.0	99%	2,125.5	94%		

FIGURE WYG3


BOYSEN RESERVOIR
PEAK STORAGE
820645. AF JUN 27
MINIMUM STORAGE
429491. AF MAY 8
TOP OF ACT. CONSERVATION
741594. AF
RESERVOIR STORAGE (1000 AF)
FOREBAY ELEVATION (FEET)
900
810
720
630
540
450
360
270
180
90
0
4732.5
4728.4
4723.9
4718.9
4713.3
4706.8
4699.3
4690.6
4680.3
4667.0
4622.0
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP
RESERVOIR RELEASES
COMPUTED INFLOW
PEAK RELEASE
9098. CFS JUN 24
PEAK INFLOW
20284. CFS JUN 10
INFLOW AND RELEASES (1000 CFS)
21.0
18.9
16.8
14.7
12.6
10.5
8.4
6.3
4.2
2.1
0.0
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP
WATER YEAR 2017

Anchor Reservoir

Anchor Reservoir P-S MBP is located on the South Fork of Owl Creek, a tributary of the Bighorn River near Thermopolis, Wyoming. It has a total storage capacity of 17,228 AF, of which, 17,160 AF is active storage. Construction of the dam provides supplemental irrigation supply for the Owl Creek Unit P-S MBP. The dam was completed in November 1960. However, several major sinkholes developed in the lower portion of the reservoir after it began to fill, and corrective work to plug the sinkholes has not been successful. Two dikes, in service since 1979, partition off the portions of the reservoir with high seepage losses. The top of the dikes are at elevation 6415.00 feet. However, when the reservoir rises above elevation 6412.80 feet, water flows through a notch in one of the dikes into the sinkhole area. The reservoir is operated to not exceed an elevation of 6412.80 feet. Operation and maintenance of Anchor Dam is performed by Owl Creek Irrigation District under contract with Reclamation. Reclamation requires notification from the irrigation district any time the reservoir level is expected to exceed elevation 6400.00 feet. Operation above 6400.00 feet will be directed by WYAO staff to avoid overtopping of the dikes.

The storage of Anchor Reservoir at the beginning of WY 2017 was 548 AF. Releases for storage evacuation and irrigation began in May. Storage at the end of April was 1,429 AF. As snow runoff commenced, releases above demand were made from the reservoir as necessary to manage the rate of fill. Storage in the reservoir peaked on June 8, 2017 at 8,034 AF. From that point forward, the reservoir was operated to manage additional runoff and deliver water supply to irrigators.

Hydrologic and statistical data pertaining to Anchor Reservoir operations during 2017 can be found in Table WYT7 and Figure WYG4. The negative inflows displayed in Figure WYG4 are the result of the calculated inflow, which is subject to the wind influencing the pool elevation reading in addition to the normal seepage from the reservoir.

TABLE WYT7
HYDROLOGIC DATA FOR WY 2017
ANCHOR RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	6343.75	68	68
TOP OF ACTIVE CONSERVATION*	6441.00	17,228	17,160

* District operation has been restricted to elevation 6400.00 feet or less to prevent damage to the dikes and to minimize the chance of creating new sinkholes. Operations above elevation 6400.00 feet are directed by Reclamation.

STORAGE-ELEVATION DATA	ELEVATION (FEET)	STORAGE (AF)	DATE
BEGINNING OF YEAR	6363.29	548	OCT 01, 2016
END OF YEAR	6373.63	1,174	SEP 30, 2017
ANNUAL LOW	6359.29	389	JAN 30, 2017
HISTORIC LOW			
ANNUAL HIGH	6414.57	8,034	JUN 08, 2017
HISTORIC HIGH	6418.52	9,252	JUL 03, 1967

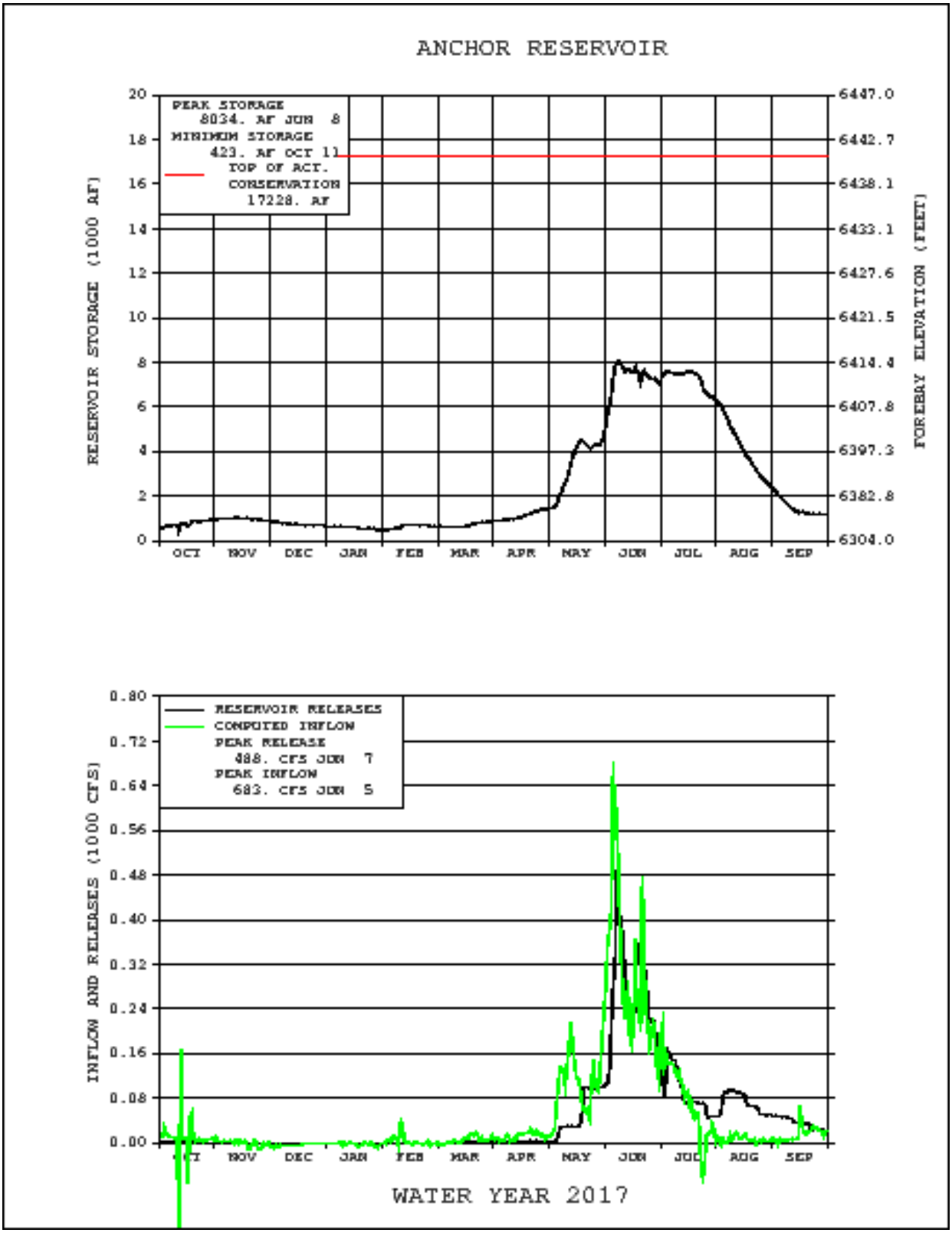
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW*	DATE
ANNUAL TOTAL (AF)	31,499	OCT 16-SEP 17	31,360	OCT 16-SEP 17
DAILY PEAK (cfs)	683	June 5, 2017	488	JUN 07, 2017
DAILY MINIMUM (cfs)	0	WINTER MONTHS	0	WINTER MONTHS
PEAK SPILLWAY FLOW (cfs)			0	
TOTAL SPILLWAY FLOW (AF)			0	

* Outflow is water released from the Dam to Owl Creek. When the reservoir level rises above approximately 6412.80 feet, water flows through a notch in one of the dikes into the sinkhole area. This water is neither measured nor accounted for. Water flowed over the v-notch a total of approximately 13 days during Water Year 2017.

	INFLOW		OUTFLOW*		CONTENT	
MONTH	KAF	% of Avg*	KAF	% of Avg*	KAF	% of Avg*
OCTOBER	0.508	89	0.090	15	0.966	310
NOVEMBER	0	-	0.085	28	0.881	330
DECEMBER	0	-	0.228	144	0.653	251
JANUARY	0	-	0.173	244	0.480	186
FEBRUARY	0.160	150	0	0	0.640	224
MARCH	0.281	101	0.045	26	0.875	224
APRIL	0.698	122	0.144	29	1.429	288
MAY	6.522	173	3.181	122	4.770	289
JUNE	17.855	264	15.571	316	7.055	202
JULY	4.723	232	5.484	164	6.294	292
AUGUST	0.346	121	4.317	232	2.323	411
SEPTEMBER	0.893	156	2.042	264	1.174	334
ANNUAL	31.499	202	31.360	201		

* Average is for the 1991-2016 period. This period is used because of the availability of data at Anchor Reservoir

FIGURE WYG4


ANCHOR RESERVOIR
PEAK STORAGE
8034. AF JUN 8
MINIMUM STORAGE
423. AF OCT 11
TOP OF ACT. CONSERVATION
17228. AF
RESERVOIR STORAGE (1000 AF)
FOREBAY ELEVATION (FEET)
0
2
4
6
8
10
12
14
16
18
20
6304.0
6382.8
6397.3
6407.8
6414.4
6421.5
6427.6
6433.1
6438.1
6442.7
6447.0
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
RESERVOIR RELEASES
COMPUTED INFLOW
PEAK RELEASE
488. CFS JUN 7
PEAK INFLOW
683. CFS JUN 5
INFLOW AND RELEASES (1000 CFS)
0.00
0.08
0.16
0.24
0.32
0.40
0.48
0.56
0.64
0.72
0.80
WATER YEAR 2017

Shoshone Project and Buffalo Bill Unit

The primary features of the original Shoshone Project included Buffalo Bill Dam and Reservoir, Shoshone and Heart Mountain Powerplants, and the canal and lateral systems for the Willwood, Frannie, Garland, and Heart Mountain Divisions. In 1982, the Buffalo Bill Dam and Reservoir Modifications, Shoshone Project, Wyoming, was authorized as the Buffalo Bill Unit P-S MBP. The principal modifications to Buffalo Bill Dam included raising the height of the dam by 25 feet, reconstructing the Shoshone Powerplant, construction of the Buffalo Bill Powerplant, construction of the Spirit Mountain Energy Dissipation Structure, pressurizing a portion of the Shoshone Canyon Conduit, enlarging and gating the spillway, constructing a visitor's center, and constructing the North Fork, South Fork, and Diamond Creek Dikes. The North and South Fork dust abatement dikes were designed to impound water in areas of the enlarged reservoir that would be dry during periods when the reservoir elevation is low, thereby reducing the dust producing area of the reservoir. The Diamond Creek protective dike prevents the enlarged reservoir from inundating Irma Flats.

Controlled releases are made from Buffalo Bill Reservoir at four points: (1) Shoshone Canyon Conduit, (2) Shoshone Powerplant, (3) the gated spillway, and (4) two river outlets (jet-flow valve and 4X5 high-pressure gates). Water for the Willwood, Frannie, and Garland Divisions of the Shoshone Project is diverted from the Shoshone River below Buffalo Bill Reservoir. The Heart Mountain Division is irrigated by water released at the dam through a high-level outlet to the Shoshone Canyon Conduit and Heart Mountain Canal. Irrigation releases for the project land along the Shoshone River are made through the Shoshone Powerplant, the river outlets, or through the Shoshone Canyon Conduit and Buffalo Bill or Heart Mountain Powerplants. Project works presently serve about 93,000 acres in the four divisions.

Heart Mountain Powerplant, Shoshone Project, with a nameplate capability of 6,000 kilowatts (kW) and maximum discharge capacity of 360 cfs, is located at the end of the Shoshone Canyon Conduit, which obtains its water from a high-level outlet, elevation 5233.00 feet, at Buffalo Bill Dam. The powerplant is located 3.5 miles below the dam and discharges into the Shoshone River. During the summer months, the water released through the powerplant is used to satisfy a portion of the irrigation demand of lands diverting directly from the river.

Shoshone Powerplant, reconstructed as part of the Buffalo Bill Unit P-S MBP, is located on the left bank of the Shoshone River at the toe of Buffalo Bill Dam and releases water directly into the Shoshone River. After 56 years of continuous use, the Shoshone Powerplant became obsolete because of safety problems beyond economical repair. On March 21, 1980, the original plant was taken out of service. In 1992, one of the three generating units was replaced with a new unit having a nameplate capability of 3,000 kW. In accordance with the Buffalo Bill Reservoir Enlargement Winter Release Operation Agreement a flow of at least 100 cfs is released to the Shoshone River at the base of the dam. This is normally achieved using the Shoshone Powerplant. A maximum release of approximately 200 cfs can be made through the Shoshone Powerplant.

Buffalo Bill Powerplant, Buffalo Bill Unit P-S MBP, with a nameplate capability of 18,000 kW, is located about one mile downstream of Buffalo Bill Dam on the right bank of the Shoshone River. Water for generation at this powerplant is supplied through a portion of the Shoshone Canyon

Conduit, which was pressurized as part of the Buffalo Bill modification. The maximum discharge capacity of the three units at the Buffalo Bill Powerplant is 930 cfs. The powerplant first generated power on July 15, 1992.

Spirit Mountain Powerplant, Buffalo Bill Unit P-S MBP, with a nameplate capability of 4,500 kW and discharge capacity of 560 cfs, is a newly constructed energy dissipater powerplant located about one mile downstream of Buffalo Bill Dam on the right side of the Shoshone River. Water released through the Shoshone Canyon Conduit for Heart Mountain Canal or Heart Mountain Powerplant must be routed through the Spirit Mountain Powerplant or through associated sleeve valves to dissipate energy in the transition from the pressurized portion of the Shoshone Canyon Conduit to the free flow portion of the conduit. The discharge from the powerplant must be carried away from the plant by use of the free-flow conduit and operation of the powerplant depends on the availability of the conduit to carry discharged water.

Buffalo Bill Dam and Reservoir, located on the Shoshone River above Cody, Wyoming, is a multipurpose facility that provides water for domestic, irrigation, municipal, fish and wildlife, power, and recreational use. It also provides a small amount of incidental flood control, although no storage space is specifically reserved for this purpose. The total storage capacity of the reservoir is 646,565 AF at elevation 5393.50 feet, the top of the active conservation pool.

Buffalo Bill storage carried over into WY 2017 amounted to 421,289 AF, which is 94 percent of the thirty-year average. Operations to evacuate storage and deliver irrigation supply were maintained through the end of October. October inflows amounted to 211 percent of average, and reservoir storage increased to approximately 441,300 AF, which is 103 percent of average.

Inflows continued to be high through November and December, amounting to 190 percent and 117 percent of average respectively. November's end of month storage was 470,100 AF, which is 109 percent of average. The winter flow rate, as determined by the criteria outlined in the agreement, was set on November 1, 2016. Operations to maintain the designated winter flow rate of 200 cfs continued through March 1, 2017. December's end of month content was approximately 475,900 AF, which is 111 percent of average.

Beginning on January 1 of each year, Reclamation and other agencies prepare inflow forecasts for the upcoming runoff season. On January 1, 2017 the snowpack in the Buffalo Bill watershed, as calculated from a composite of SNOTEL sites within the basin, had built up to be 123 percent of the median. After analysis of the snowpack and reviewing the output from the forecasting models, the WYAO issued a forecast for an April-July runoff volume of 780,000 AF, which would be 115 percent of the average.

During the month of January, high inflows continued with 122 percent of average coming into the reservoir. Operators in the control center maintained the winter flow rate of 200 cfs below the dam. January's end of month content was approximately 481,400 AF, which is 113 percent of average.

On February 1, the snowpack above Boysen Reservoir amounted to 122 percent of median, which was a slight decrease from the previous month. After analysis of the data, and model runs, the

resource division in Mills, Wyoming forecasted an April-July runoff volume of 900,000 AF, which is 133 percent of the thirty-year average.

During February, several strong storm systems brought wet and heavy snow throughout the watershed. The resulting low-level snowmelt caused inflows during the month of February to be 173 percent of average. The end of month reservoir content was approximately 483,200 AF, which is 114 percent of average.

On March 1, 2017, the WYAO again prepared a runoff forecast for the basin. The watershed snowpack had significantly increased to 188 percent of the median. Consequently, the April-July inflow forecast issued by the WYAO increased to 1,100,000 AF, which is 162 percent of the average.

During March, above average temperatures and springs storms continued to drive a well above average trend for inflows. During March, the computed reservoir inflow amounted to 339 percent of average. Releases from the reservoir increased on March 1, 2017 to counteract the high inflows. A bypass release was initiated on March 9, 2017. Reservoir discharge during March amounted to 461 percent of average. March's end of month reservoir content was approximately 457,100 AF, which is 109 percent of average and just over 26,000 AF lower than February's end of month content.

On April 1, 2017, the watershed's SWE showed a slight decrease in magnitude from the previous month. The basins computed SWE was 147 percent of the median. The WYAO prepared their monthly forecast and determined the previous month's forecast of 1,100,000 AF would be carried forward. This amount would be 162 percent of the average.

During April, the basin's SWE set a record high for the month on April 29, 2017 with a value of 25.52 inches of SWE. Inflows continued to increase as warmer weather melted the low-level snow. For the month, inflows were 215 percent of average. Releases from the reservoir were increased to 4,000 cfs on April 3, 2017 to complete a sediment flushing flow that was coordinated with the Wyoming Game and Fish. The flushing flow was completed on April 14, 2017, and releases were set to 3,000 cfs at the river gauge. Total releases during this month amounted to 338 percent of average. The reservoir's end of month content was approximately 357,400 AF, which is 89 percent of average.

A powerful storm system passed through the region in late April and into early May. Large amounts of snowfall accumulated in the mountain ranges. Reclamation issued an increased April-July inflow volume forecast to 1,250,000 AF, which is 185 percent of average. The WYAO forecast agreed with forecasts issued by several other agencies including the NRCS and CORPS.

During May, the trend of well above average inflows continued due to the above average temperatures and rain on snow events during the month. Inflows for the month were 180 percent of average. Releases at the beginning of the month were approximately 4,000 cfs and increased to 6,000 cfs by the end of the month. Release totals were 271 percent of average. May's end of month content was approximately 331,900 AF, which is 74 percent of average and nearly half the normal capacity of the reservoir.

During June, the reservoir experienced very high levels of inflow. Inflows at the beginning of the month were near 10,000 cfs and stayed above those levels until June 10, 2017. The peak inflow for WY 2017 was recorded on the tenth with a flow rate of 13,810 cfs. After the initial inflow surge, which lasted through June 10, 2017, the reservoir had increased to a content of 456,559 AF, which is approximately 71 percent of the normal capacity for the reservoir. With the uncertainty of the future, reservoir operators chose to lower the releases to make sure the reservoir would fill. Releases were decreased on June 6, 2017, with additional decreases on the June13, 14, and 17, 2017. On June 15, 2017, the computed inflow was 5,500 cfs. Inflows jumped to 12,743 cfs on June 17, 2017, 10,359 cfs on June 20, 2017, 11,744 cfs on June 21, 2017, and 11,921 cfs on June 22, 2017. During this period, the reservoir was observed gaining two feet of pool elevation in a day. Releases were increased on June 22, 23, 28, and 29, 2017 to counteract the surge of inflows. During the month, the pool elevation increased by over forty feet. The end of month content was 624,484 AF, which is 109 percent of average and approximately 22,000 AF below the reservoir's normal capacity. June's inflows were 191 percent of average and releases were 158 percent of average.

Warm and drier climate trends were observed during July 2017, and hydrologic conditions were less extreme than those in June. During the month, observed precipitation at the sites used by Reclamation to determine watershed precipitation amounted to only 69 percent of average. Temperatures were well above average.

During July, inflows began the month with computed flow rates of 6,000-8,000 cfs. Inflows gradually declined for the remainder of the month as the snowpack melted out of the high elevations. By the end of July, the inflows had dropped below 2,000 cfs. The release rate to the river below the dam coming into the month had been increased to 6,500 cfs, which represents the peak release to river for WY 2017. At the end of the month, the river flow rate below the dam was down to 1,400 cfs. The annual peak pool elevation of 5,391.79 feet was observed on July 30, 2017, which is 1.7 feet below the normal full elevation. Reservoir operators typically target a max pool elevation of 5,391.5 around July 31 to reserve room in the reservoir for a late season runoff event. The July inflow volume was 177 percent of average and releases were 165 percent of average.

The computed inflow volume for the April-July period totaled 1,262,044 AF, which is 186 percent of average. The 2017 runoff exceeded the previous record set in 2011 by approximately 32,000 AF.

Inflow into Buffalo Bill Reservoir during WY 2017 was 1,595,018 AF, which is also a new record and 148 percent of the thirty-year average. The September 30, 2017 storage was 528,150 AF, which is 118 percent of the average. During WY 2017, the powerplants associated with Buffalo Bill Reservoir had a gross generation of approximately 148,433 MWh with a value estimated to be $6,104,654. The estimated lost revenue of the bypass release is $6,052,288.

Important Events - 2017

October 20, 2016: End of 2016 irrigation diversions by the Shoshone Projects.

November 1, 2016: Releases to the Shoshone River reduced to the winter flow rate of 200 cfs.

March 21, 2017: Buffalo Bill Reservoir Public Information meeting was held in Powell to discuss WY 2016 operation and expected 2017 operation.

April 20, 2017: Irrigation diversions by the Shoshone Project were initiated for the 2017 irrigation season.

July 30, 2017: Buffalo Bill Reservoir reached a peak pool elevation for WY 2017 of 5391.79 feet.

Additional hydrologic and statistical information pertaining to the operations of Buffalo Bill Reservoir during WY 2017 can be found in Table WYT10 and Figure WYG5.

TABLE WYT10
HYDROLOGIC DATA FOR WY 2017
BUFFALO BILL RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	5259.60	41,748	41,748
TOP OF ACTIVE CONSERVATION	5393.50	646,565	604,817

STORAGE-ELEVATION DATA	ELEVATION (FEET)	STORAGE (AF)	DATE
BEGINNING OF YEAR	5363.24	421,289	OCT 01, 2016
END OF YEAR	5378.23	528,150	SEP 30, 2017
ANNUAL LOW	5348.33	327,501	MAY 29, 2017
HISTORIC LOW*		19,080	JAN 31, 1941
ANNUAL HIGH	5391.79	632,790	JUL 30, 2017
HISTORIC HIGH	5393.51	646,647	JUL 30, 1996

* Prior to 1952 daily records are not available. End-of-month data was used to determine the historic low.

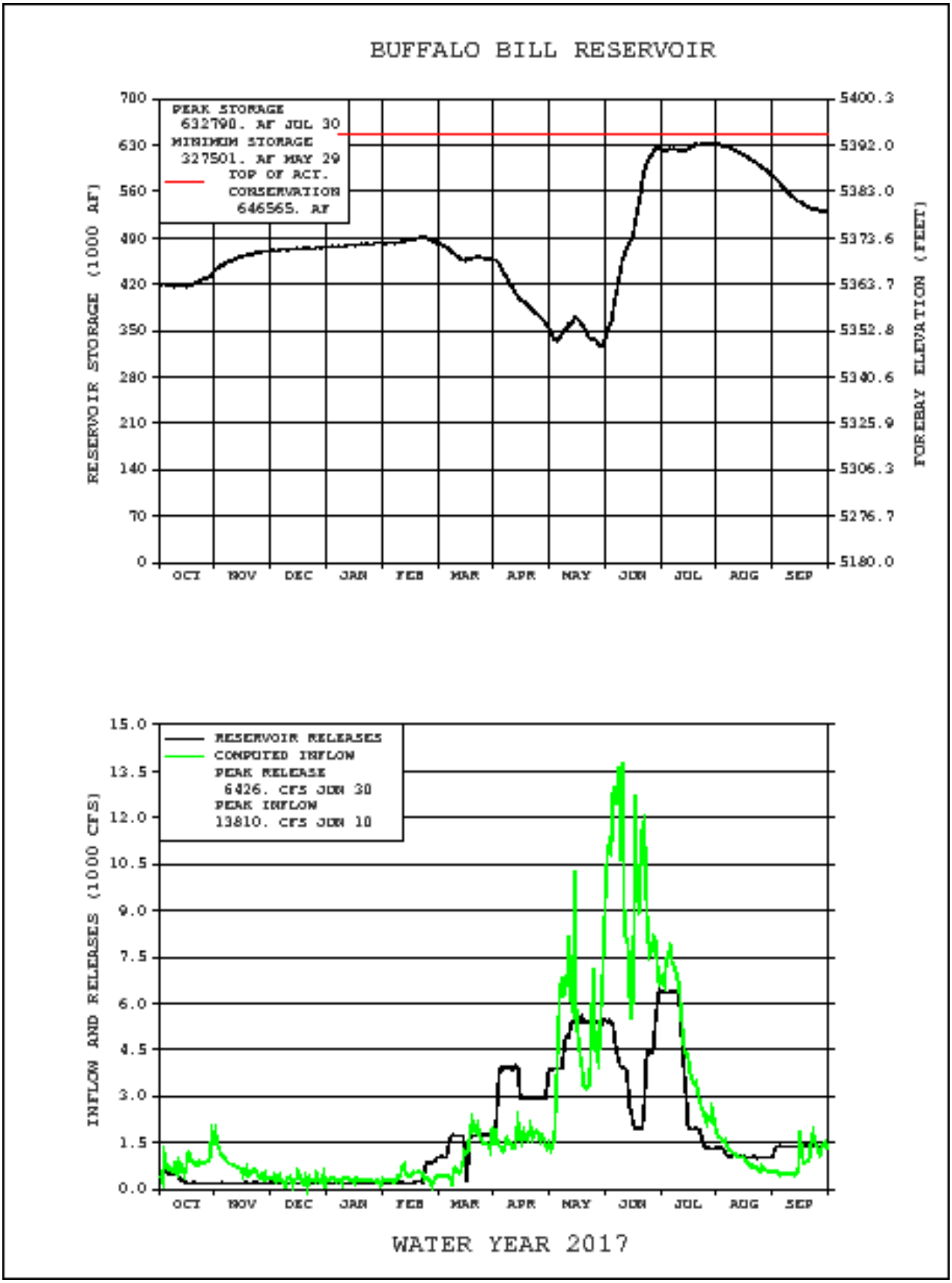
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW*	DATE
ANNUAL TOTAL (AF)	1,596,018	OCT 16-SEP 17	1,489,156	OCT 16-SEP 17
DAILY PEAK (cfs)	13,810	JUN 10, 2017	7,276	JUL 7, 2017
DAILY MINIMUM (cfs)	22*	DEC 20, 2016	180	NOV 14, 2016
PEAK SPILLWAY FLOW (cfs)				
TOTAL SPILLWAY FLOW (AF)				

*High winds in the area can result in a false forebay reading.

MONTH	INFLOW		OUTFLOW		CONTENT	
	KAF	% of Avg*	KAF	% of Avg*	KAF	% of Avg*
OCTOBER	52.9	211	32.9	86	441.3	103
NOVEMBER	40.5	190	11.7	67	470.1	109
DECEMBER	18.3	117	12.6	76	475.9	111
JANUARY	17.9	122	12.4	80	481.4	113
FEBRUARY	22.1	173	20.3	135	483.2	114
MARCH	66.0	339	92.2	461	457.1	109
APRIL	95.8	215	195.5	338	357.4	89
MAY	306.2	180	331.7	271	331.9	74
JUNE	576.4	191	283.8	158	624.5	109
JULY	283.6	177	275.7	165	632.4	109
AUGUST	61.2	146	109.7	98	583.8	114
SEPTEMBER	55.0	233	110.7	131	528.2	118
April - July	1,262	186%				
Water Year Summary	1,596.0	187%	1,489.2	206%		

* Average for inflow and outflow is the 1987-2016 period. Because of the enlargement of Buffalo Bill Reservoir in 1992, the period of record on which average content is based spans 1993-2016.

FIGURE WYG5


BUFFALO BILL RESERVOIR
PEAK STORAGE
632790. AF JUL 30
MINIMUM STORAGE
327501. AF MAY 29
TOP OF ACT.
CONSERVATION
646565. AF
RESERVOIR STORAGE (1000 AF)
FOREBAY ELEVATION (FEET)
700
630
560
490
420
350
280
210
140
70
0
5400.3
5392.0
5383.0
5373.6
5363.7
5352.8
5340.6
5325.9
5306.3
5276.7
5180.0
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
RESERVOIR RELEASES
COMPUTED INFLOW
PEAK RELEASE
6426. CFS JUN 30
PEAK INFLOW
13810. CFS JUN 10
INFLOW AND RELEASES (1000 CFS)
15.0
13.5
12.0
10.5
9.0
7.5
6.0
4.5
3.0
1.5
0.0
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
WATER YEAR 2017

SUMMARY OF RESERVOIR OPERATIONS FOR BENEFIT OF FISH AND WILDLIFE, ENVIRONMENT, AND RECREATION

Bull Lake Reservoir

During the past several years, Midvale and Reclamation have entered into an annual agreement whereby Reclamation could store Boysen water in Bull Lake under any combination of four conditions set forth in the agreement. The agreement was approved for 2017 and the non-irrigation season releases were maintained above the required minimum flow rate of 20 cfs. As outlined in the agreement, a steady 20 cfs of the reservoir releases were accounted for as Boysen water being released from Bull Lake. During the typical runoff period of April-July, the inflows to Bull Lake were the highest on record and the reservoir filled in July.

Boysen Reservoir

Boysen Reservoir storage at the beginning of WY 2017 was 624,893 AF, which is approximately 84 percent of normal reservoir capacity. In the fall of 2016, releases were made to provide irrigation supply and to manage the reservoir. In early October, the winter releases were projected to be approximately 820 cfs. However, abnormally high inflow conditions during November gave reservoir operators reason to increase the releases to approximately 925 cfs. The higher winter release of 925 cfs was held through the end of February. At the request of the Wyoming Game and Fish Department, a one-day flushing flow was completed in the spring of 2017. Flushing flows remove fine sediments from the streambed gravels, which improves the spawning habitat for trout. On March 28, 2017 flows were ramped up to 5,000 cfs from 2,000 cfs for the flushing flow, and then returned to a flow rate of 3,000 cfs.

Buffalo Bill Reservoir

Following the 2016 irrigation season, the release from Buffalo Bill Reservoir was set to a non-irrigation season flow rate of approximately 200 cfs. The non-irrigation season releases are determined by the criteria outlined in the agreement. The criteria include the previous year's annual inflow, end of year reservoir content, and state account ownership. Based on those conditions, a winter release of 100 cfs, 150 cfs, 200 cfs, or 350 cfs will be provided below Buffalo Bill Powerplant. The agreement serves to insure a minimum release of 100 cfs will be maintained below the dam always.

Reclamation continues to support the WGF Reservoir Research Branch in its efforts to assess fish population and species distribution in the enlarged reservoir using hydro-acoustic technology and by providing WGF river access and an aluminum tube for planting fish in the Shoshone River off the deck of Buffalo Bill Powerplant.

At Buffalo Bill Reservoir, as the reservoir is drawn down, the lakebed is exposed to wind erosion, which creates dust in the reservoir area and in the town of Cody, Wyoming. As a part of the enlargement of Buffalo Bill Reservoir, dust abatement dikes were built on the upper ends of the North and South Fork arms of the reservoir to hold water in areas that would become dry as the reservoir level decreased, thus reducing the area of dry lake bed. The top of the North Fork Dike

is approximately 5,370 feet. When the reservoir pool elevation drops below 5,370 feet, the North Fork Dike helps to minimize the amount of lakebed exposure. The number of stop logs at the outlet control structure on the South Fork Dike are used to maintain a nearly static water level above the dike of approximately 5393.23 feet at the end of WY 2017. The stop logs provide a larger impoundment behind the dike, which benefits waterfowl habitat and fishery conditions.

The Diamond Creek Dike was constructed to prevent Diamond Creek and the Irma Flats area from being inundated by the enlarged reservoir. Inflows from the Diamond Creek drainage enter Diamond Creek Reservoir that lies at the base of the dike. This water is then pumped into Buffalo Bill Reservoir to maintain the elevation of Diamond Creek Reservoir between a maximum of 5340.40 feet and a minimum of 5339.50 feet. The normal water surface elevation is typically 5340.00 feet.

Reservoir levels during all of WY 2017 were adequate for recreational activities on Buffalo Bill Reservoir.

SUMMARY

OF OPERATIONS

FOR WATER YEAR 2017

FOR RESERVOIRS

(Angostura, Belle Fourche, Deerfield, Edward Arthur (E.A.) Patterson,
Lake Tschida, Jamestown, Keyhole, Pactola, and Shadehill)

UNDER THE RESPONSIBILITY

OF THE

DAKOTAS AREA OFFICE

WEATHER SUMMARY FOR NORTH AND SOUTH DAKOTA
WY 2017

October precipitation was below average at Dickinson and Jamestown Reservoirs; much below average at Heart Butte Reservoir; very much below average at Angostura, Belle Fourche, Keyhole, and Shadehill Reservoirs; above average at Deerfield Reservoir, very much above average at Pactola Reservoir.

November precipitation was very much above average at Jamestown Reservoir; below average at Dickinson and Heart Butte Reservoirs; very much below average at Angostura, Belle Fourche, and Keyhole Reservoirs; much above average at Deerfield and Pactola Reservoirs, and very much above average at Shadehill Reservoir.

December precipitation was very much above average at Heart Butte and Jamestown Reservoirs; below average at Dickinson Reservoir; very much below average at Angostura, Belle Fourche, Keyhole, and Shadehill Reservoirs; average at Pactola; and very much above average at Deerfield Reservoir.

January precipitation was average at Heart Butte Reservoir; much below average at Jamestown Reservoir; very much below average at Dickinson Reservoir; very much below average at Angostura Belle Fourche Keyhole, and Shadehill Reservoirs; average at Pactola Reservoir; very much above average at Deerfield Reservoir.

February precipitation was average at Heart Butte Reservoir; below average at Dickinson Reservoir; much below average at Jamestown Reservoir; very much below average at Angostura, Belle Fourche, Keyhole, and Shadehill Reservoirs; average at Pactola Reservoir; very much above average at Deerfield Reservoir.

March precipitation was average at Heart Butte Reservoir; much below average at Dickinson Reservoir; very much below average at Jamestown Reservoir; very much below average at Angostura, Belle Fourche, Keyhole, and Shadehill Reservoirs; much above average at Deerfield and Pactola Reservoirs.

April precipitation was above average at Jamestown Reservoir; average at Heart Butte Reservoir; very much below average at Dickinson Reservoir; very much below average at Angostura, Belle Fourche, Keyhole, and Shadehill Reservoirs; average at Deerfield and Pactola Reservoirs.

May precipitation was below average at Dickinson Reservoir; very much below average at Heart Butte and Jamestown Reservoirs; very much below average at Angostura, Keyhole, and Shadehill Reservoirs; below average at Deerfield and Pactola Reservoirs; above average at Belle Fourche Reservoir.

June precipitation was below average at Jamestown Reservoir; very much below average at Dickinson and Heart Butte Reservoirs; very much below average at Shadehill Reservoir; much below average at Angostura, Deerfield, and Pactola Reservoirs; much above average at Belle Fourche Reservoir; very much above average at Keyhole Reservoir.

July precipitation was average at Dickinson Reservoir; much below average at Heart Butte Reservoir; very much below average at Jamestown Reservoir; very much below average at Shadehill Reservoir; much below average at Deerfield Reservoir; below average at Angostura, Belle Fourche, Pactola Reservoirs; much above average at Keyhole Reservoir.

August precipitation was very much above average at Heart Butte and Jamestown Reservoirs; much above average at Dickinson Reservoir; below average at Belle Fourche, Deerfield, and Pactola Reservoirs; average at Angostura Reservoir; very much above average at Keyhole and Shadehill Reservoirs.

September precipitation was very much above average at Dickinson Reservoir; much above average at Jamestown Reservoir; average at Heart Butte Reservoir; very much below average at Shadehill Reservoir; much below average at Deerfield Reservoir; average at Angostura, Belle Fourche, and Pactola Reservoirs; very much above average at Keyhole Reservoir.

Total annual precipitation for Reclamation facilities in North Dakota, South Dakota, and northeastern Wyoming are shown on Table DKT1.

TABLE DKT1
Total Annual Precipitation for Reclamation Reservoirs
in North Dakota, South Dakota, and Northeastern Wyoming in Inches

Reservoir	2017 Total	Average Total	Percent
Angostura 1/	15.71	17.67	89
Belle Fourche 2/	18.15	15.86	114
Deerfield 3/	19.21	13.99	137
Keyhole 4/	20.16	19.20	105
Pactola	17.13	20.58	83
Shadehill 5/	14.42	17.86	81
Dickinson	11.52	15.77	73
Heart Butte	12.25	16.27	75
Jamestown	15.64	18.77	83

1/ Angostura Reservoir's annual precipitation data is from the Hot Springs, SD, climate station.
2/ Belle Fourche Reservoir's annual precipitation data is from the Newell, SD climate station.
3/ Deerfield reservoir's annual and average precipitation data is from the Deerfield, Dam flip bucket rain gauge recorded by Hydromet.
4/ Keyhole Reservoir's annual precipitation data is from the Sundance, WY climate station.
5/ Shadehill Reservoir's annual precipitation data is from the Lemmon, SD climate station.

TABLE DKT2
Comparison of End-of-Water-Year Storage Content for Reservoirs
in North Dakota, South Dakota, and Northeastern Wyoming
in AF

Reservoir	Storage 2016	Storage 2017	Change in Storage
Angostura	89,106	83,475	-5,631
Belle Fourche	63,841	58,373	-5,468
Deerfield	14,874	15,474	600
Keyhole	145,950	122,129	-23,821
Pactola	52,455	51,288	-1,167
Shadehill	83,946	85,760	1,814
Dickinson	4,775	5,898	1,123
Heart Butte	54,167	51,387	-2,780
Jamestown	29,520	29,408	-112

Table DKT2 displays the changes in storage content between September 30, 2016, and September 30, 2017, at reservoirs in North and South Dakota and eastern Wyoming.

FLOOD BENEFITS

Reservoirs in North and South Dakota and Northeastern Wyoming

Several Reclamation reservoirs in northeastern Wyoming, South Dakota, and North Dakota provided flood relief during WY 2017. They are: E.A. Patterson on the Heart River near Dickinson, North Dakota; Heart Butte on the Heart River near Glen Ullin, North Dakota; Jamestown on the James River near Jamestown, North Dakota; Shadehill on the Grand River near Lemmon, South Dakota; Angostura on the Cheyenne River near Hot Springs, South Dakota; Pactola on Rapid Creek near Rapid City, South Dakota; Keyhole on the Belle Fourche River near Moorcroft, Wyoming.

The information on the distribution of flood damages prevented is provided by the CORPS. The distributions of flood damages prevented for each reservoir are as follows:

FLOOD DAMAGE PREVENTED IN 2017
ACCUMULATED TOTAL 1950-2017

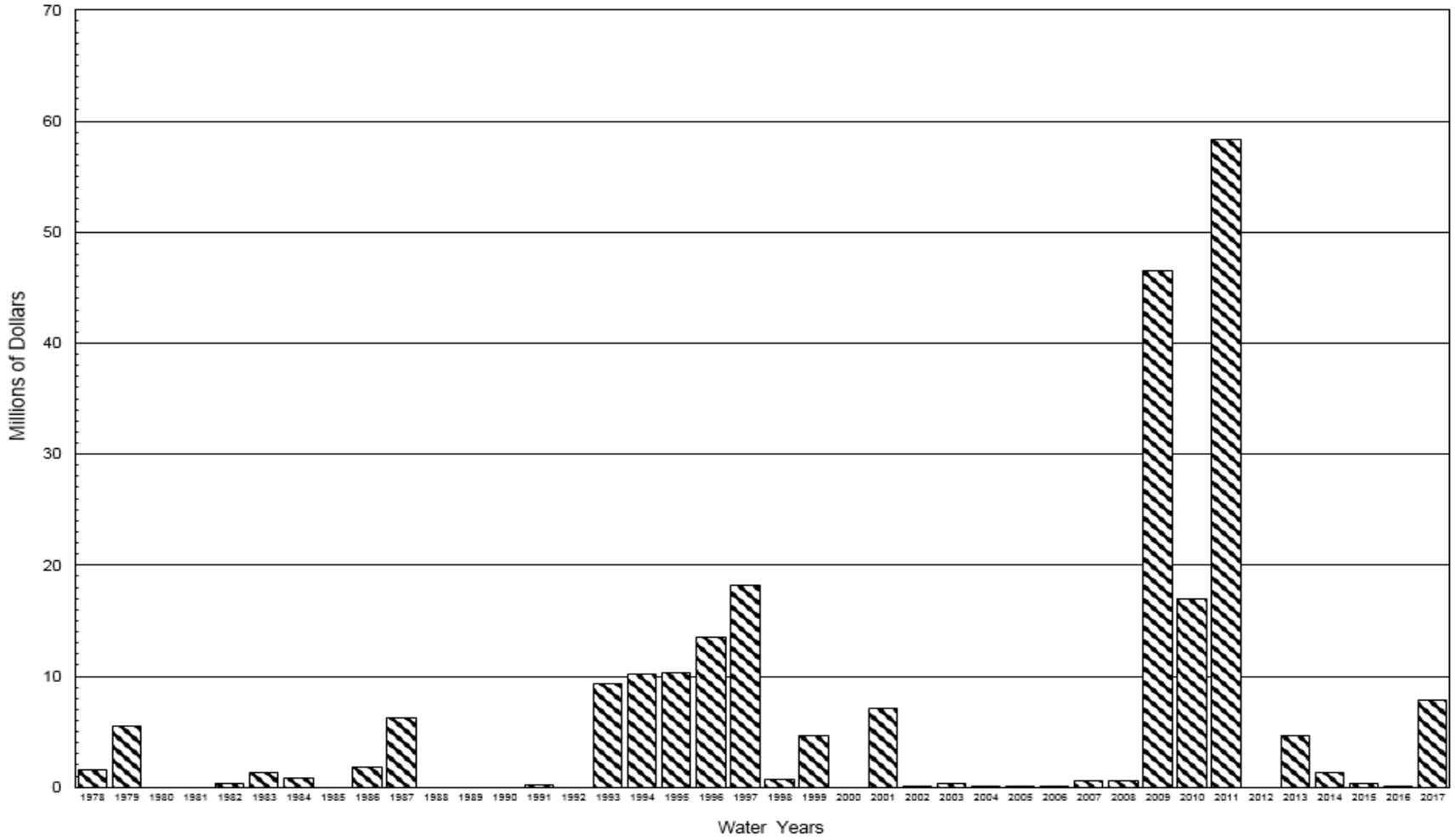
	Local	Main-Stem	2017 Total	Previous Accumulations	1950-2017 Accum Totals
Heart Butte	$0	$0	$0	$15,570,700	$15,570,700
Shadehill	$0	$0	$0	$12,240,500	$12,250,500
Angostura	$0	$0	$0	$22,800	$22,800
Pactola	$0	$0	$0	$3,719,800	$3,719,800
Keyhole	$0	$0	$0	$4,257,800	$4,257,800
Jamestown	$7,793,600	$0	$7,793,600	$208,052,100	$215,845,700
Total	$7,793,600	$0	$7,793,600	$244,049,300	$251,842,900

Flood damages prevented by Dakotas Area Office reservoirs between Garrison and Gavins Point Dams are shown on Figure DKG1

FIGURE DKG1

FLOOD DAMAGES PREVENTED

By Dakota Area Projects Between Garrison and Gavins Point Dams



UNIT OPERATIONAL SUMMARIES FOR WY 2017

Dickinson Reservoir

Background

Dickinson Dam and E.A. Patterson Lake (Dickinson Reservoir) is located on the Heart River one mile west of Dickinson, North Dakota. The reservoir has a dead capacity of 356 AF, an inactive capacity of 100 AF and an active conservation capacity of 8,156 AF (for a total storage capacity of 8,612 AF at the top of conservation elevation 2420.00 feet). Reservoir water is used for irrigating approximately 230 acres along the Heart River downstream of the dam and for municipal use by the Dickinson Parks and Recreation District.

WY 2017 Operations Summary

Dickinson Reservoir started WY 2017 at elevation 2416.13 feet and storage of 4,775 AF, which is 3.87 feet, and 3,837 AF below the top of the conservation pool (elevation 2420.00 feet and storage 8,612 AF). The reservoir peaked at elevation 2420.57 feet on March 19, 2017 with 5,944 AF of storage. The minimum reservoir elevation was 2416.14 feet with storage of 4,783 AF which occurred on October 1, 2016. The reservoir elevation on September 30, 2017 was 2417.43 feet with storage of 5,898 AF, which is 2.57 feet, and 2,714 AF below the top of conservation pool.

The maximum instantaneous discharge of 198 cfs occurred on March 20, 2017. Reservoir net inflows for WY 2017 were the nineteenth lowest on record for the dam and totaled 5,066 AF, 25 percent of average. The maximum 24 hour computed inflow occurred on February 26, 2017 with 446 cfs. Precipitation totaled 11.52 inches, which is 73 percent of average. The water released for downstream irrigation was 642 AF.

An Emergency Management/Security (EMS) orientation was conducted on February 9, 2017. An Annual Site Inspection (ASI) was conducted on August 10, 2017 by personnel from the DKAO. The ASI report was signed on September 29, 2017.

On February 24, 2017, E.A. Paterson Reservoir (Dickinson Dam) went into Internal Alert with an elevation over 2420.00 feet and remained there until March 19, 2017 when the elevation went above 2420.50 feet and into Response Level 1. The reservoir remained in Response Level 1 until March 21, 2017 when the elevation dropped below 2420.50 feet and into Internal Alert. The reservoir remained in Internal Alert until April 16, 2017 when the elevation dropped below 2420.00 feet and normal operating conditions resumed. On April 20, 2017, the reservoir went back into Internal Alert with an elevation over 2420.00 feet and remained there until May 5, 2017 when the elevation dropped below 2420.00 feet and normal operating conditions resumed.

Monthly Statistics for WY 2017

Record and near record monthly inflows in 66 years of record keeping were recorded in the following months: November had its thirteenth highest inflow, January and July had their fifteenth lowest inflow, February had its sixth highest inflow, April had its fourteenth lowest inflow, May had its sixth lowest inflow, June had its second lowest inflow.

Record or near record monthly end of month content in 65 years of record keeping were recorded in the following months: February had its eighth highest storage. Statistical information on Dickinson Reservoir and its operations can be found on Table DKT3 and Figure DKG2.

TABLE DKT3
HYDROLOGIC DATA FOR WY 2017
DICKINSON RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE	2,405.00	456	456
TOP OF ACTIVE CONSERVATION	2,420.00	8,612	8,156
TOP OF JOINT USE			
TOP OF EXCLUSIVE FLOOD CONTROL			

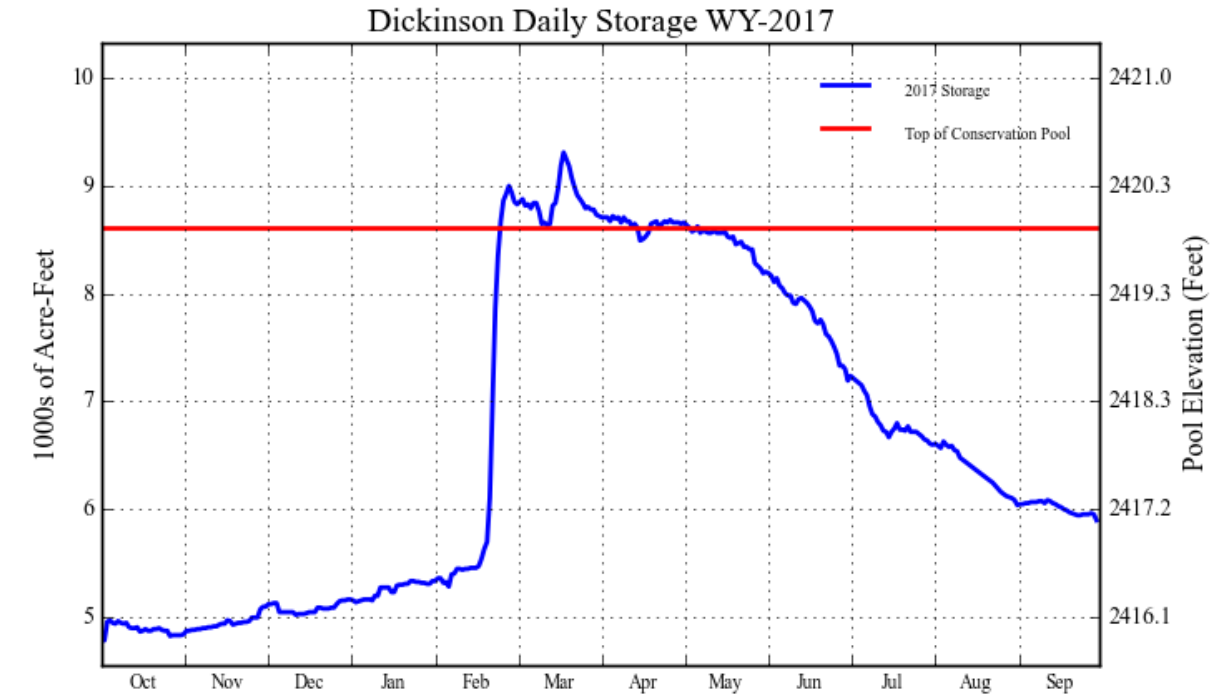
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	2,416.14	4783	OCT 01, 2016
END OF YEAR	2,417.43	5,898	SEP 30, 2017
ANNUAL LOW	2,416.14	4,783	OCT 01, 2016
ANNUAL HIGH	2,420.57	9,310	MAR 19, 2017
HISTORIC HIGH	2,422.19	***9,348	MAR 21, 1997

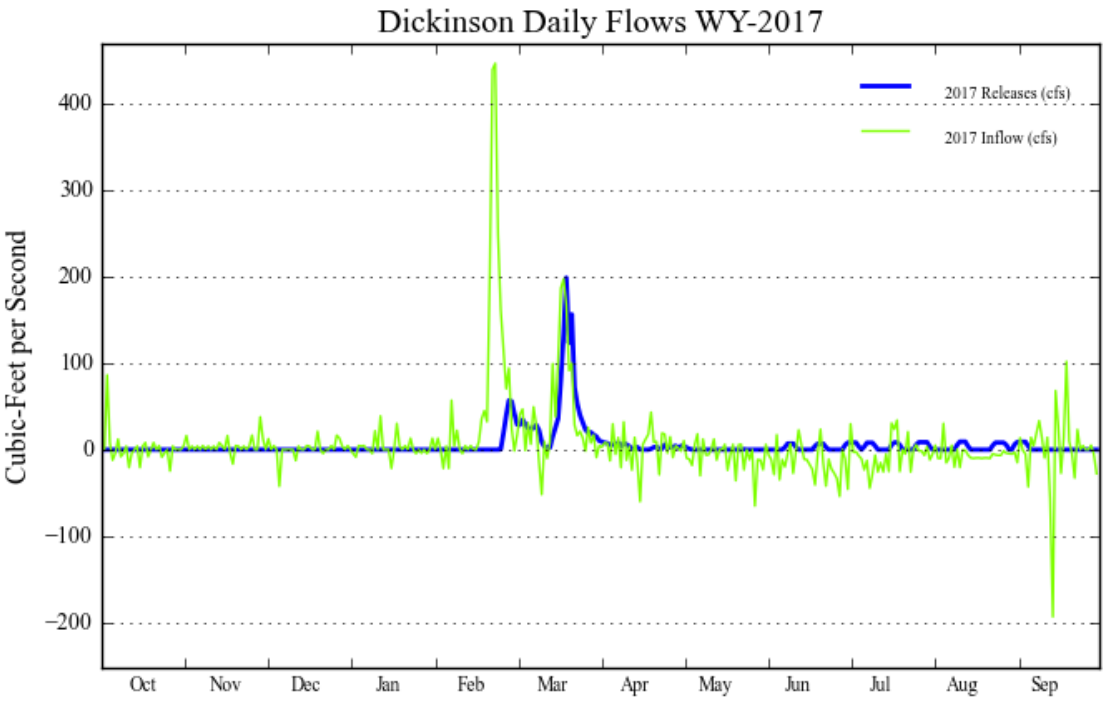
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	5,066	OCT 16-SEP 17	3,943	OCT 16-SEP 17
DAILY PEAK (CFS)*	446	FEB 22, 2017	199	MAR 20, 2017
DAILY MINIMUM (CFS)**	0	**	0	**

MONTH	INFLOW		OUTFLOW		CONTENT	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	65	10	0	NA	4,840	88
NOVEMBER	255	154	0	NA	5,095	94
DECEMBER	68	51	0	NA	5,163	95
JANUARY	171	59	0	NA	5,334	96
FEBRUARY	3,944	376	340	34	8,938	153
MARCH	2,502	37	2,708	55	8,732	125
APRIL	158	3	230	6	8,660	121
MAY	-466	NA	25	1	8,189	115
JUNE	-770	NA	119	7	7,300	103
JULY	-417	NA	275	22	6,608	101
AUGUST	-354	NA	169	14	6,085	100
SEPTEMBER	-108	163	79	12	5,898	103
ANNUAL	5,066	25	3,943	21		
APRIL-JULY	-1,495	NA				

* 24 hour daily inflow and 15 minute instantaneous discharge
** Frequently observed during fall and winter months
*** Due to new area-capacity table, the capacity that corresponds to the new historic high elevation is less than a previous historic high capacity amount (11,520 AF @ Elevation 2421.08 on June 9, 1982)

Figure DKG2
Dickinson Reservoir





Heart Butte Reservoir

Background

Heart Butte Dam and Lake Tschida (Heart Butte Reservoir) is located on the Heart River 15 miles south of Glen Ullin, North Dakota. The reservoir has a dead storage capacity of 5,227 AF, an active conservation capacity of 61,915 AF (for a total storage capacity of 67,142 AF at the top of active conservation elevation 2064.50 feet), and an exclusive flood control space of 147,027 AF. Flood control storage is located above the crest of an ungated morning glory inlet spillway. Heart Butte Reservoir is used for flood control and the authorized irrigation of up to 13,100 acres of which about 7,320 acres are now being irrigated.

WY 2017 Operations Summary

Heart Butte Reservoir started WY 2017 at elevation 2060.34 feet and storage of 54,167 AF, which is 4.16 feet, and 12,975 AF below the top of conservation pool (elevation 2064.50 feet and storage 67,142 AF). The reservoir peaked at elevation 2066.06 feet on March 25, 2017 with 72,393 AF of storage. The minimum reservoir elevation of 2059.17 feet and storage of 50,792 AF occurred on September 13, 2017. The reservoir elevation on September 30, 2017 was 2059.38 feet with storage of 51,387 AF, which is 5.12 feet and 15,755 AF below the top of conservation pool.

A maximum discharge of 514 cfs occurred on March 25, 2017. Reservoir net inflows were the twenty-second lowest on record for the dam and totaled 36,008 AF, 41 percent of average. The maximum 24 hour computed inflow occurred on March 22, 2017 with 808 cfs. Precipitation totaled 12.25 inches, which is 75 percent of average. The water released for downstream irrigation was 11,507 AF.

An EMS orientation was conducted on February 8, 2017. On March 9, 2017, Lake Tschida Reservoir (Heart Butte Dam) went into Internal Alert with an elevation over 2064.50 feet and remained there until April 13, 2017 when the elevation dropped below 2064.50 feet and normal operating conditions resumed. An ASI was conducted on August 9, 2017 by personnel from DKAO. The ASI report was signed on September 29, 2017.

Monthly Statistics for WY 2017

Record and near record monthly inflows in 68 years of record keeping were recorded in the following months: October and February had their thirteenth highest inflow, December had its fifteenth highest inflow, January had its sixth highest inflow, May had its eighth lowest inflow, June had its third lowest inflow, and July had its sixth lowest inflow.

Record or near record monthly end of month content in 68 years of record keeping were recorded in the following months: May had its thirteenth lowest storage, June and July had their eighth lowest storage, August and September had their ninth lowest storage. Statistical information on Heart Butte Reservoir and its operations can be found on Table DKT4 and Figure DKG3.

TABLE DKT4
HYDROLOGIC DATA FOR WY 2017
HEART BUTTE RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	2,030.00	5,227	5,227
TOP OF ACTIVE CONSERVATION	2,064.50	67,142	61,915
TOP OF JOINT USE			
TOP OF EXCLUSIVE FLOOD CONTROL	2,094.50	214,169	147,027

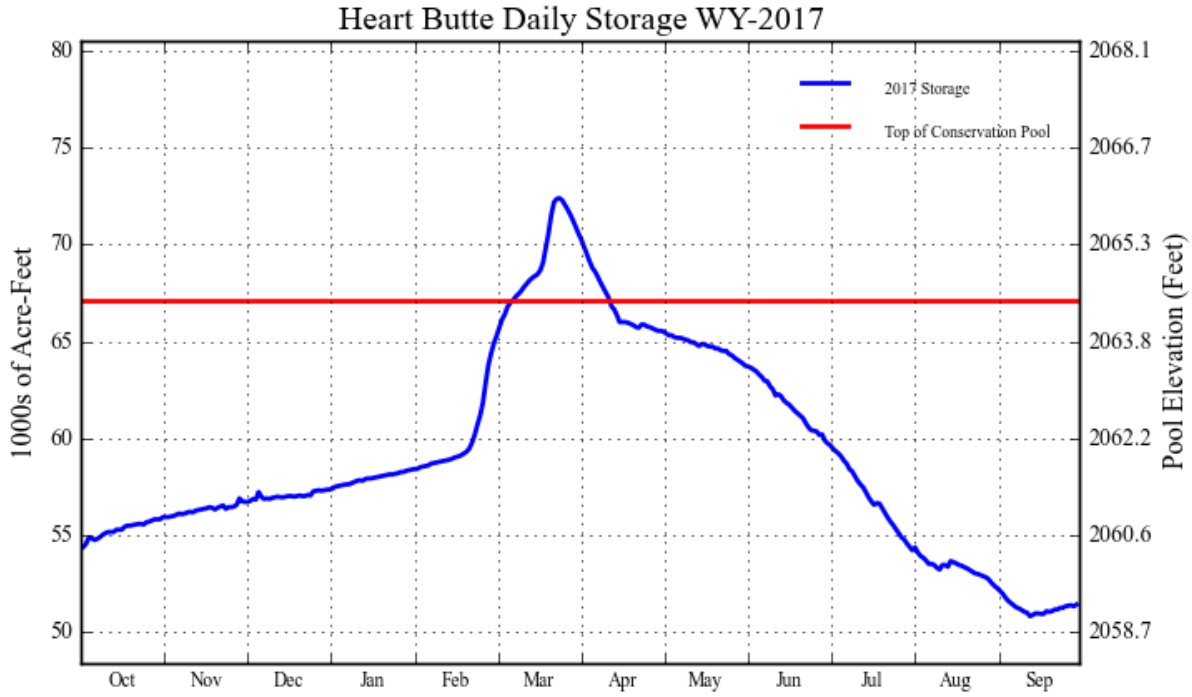
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	2,062.38	54,284	OCT 01, 2016
END OF YEAR	2,059.38	51,387	SEP 30, 2017
ANNUAL LOW	2,059.17	50,792	SEP 13, 2017
ANNUAL HIGH	2,066.06	72,393	MAR 25, 2017
HISTORIC HIGH	2,086.23	173,203	APR 09, 1952

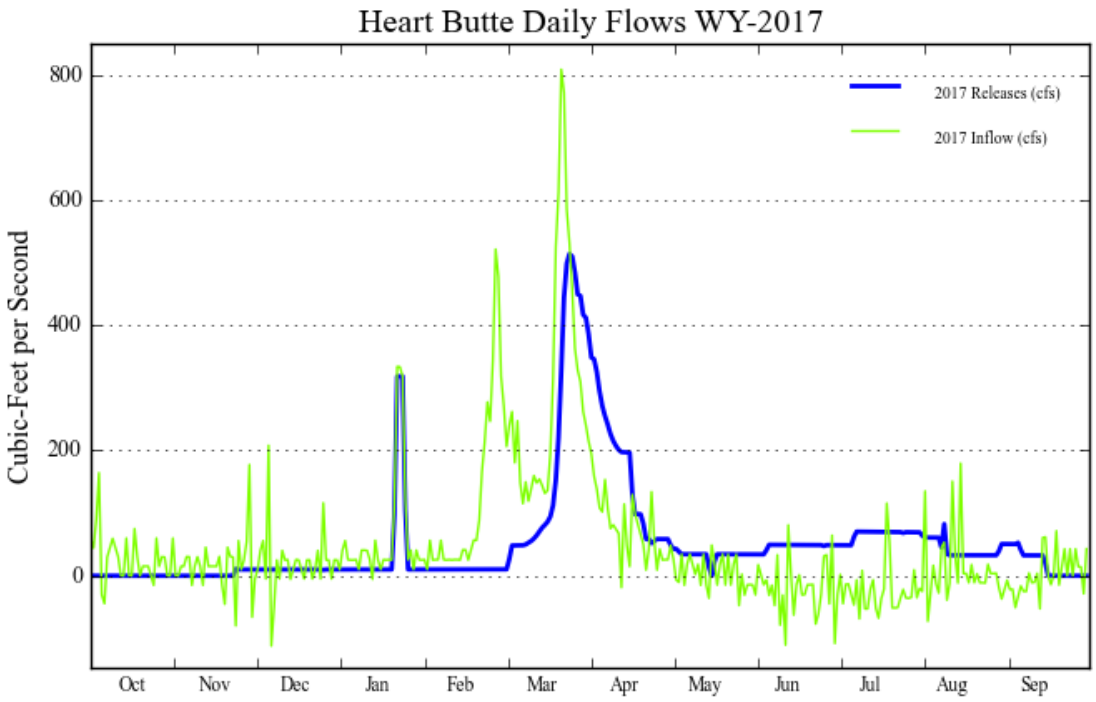
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	36,008	OCT 16-SEP 17	24,713	OCT 16-SEP 17
DAILY PEAK (CFS)	808	MAR 22, 2017	514	MAR 25, 2017
DAILY MINIMUM (CFS)	0	*	0	*

MONTH	INFLOW		OUTFLOW		CONTENT	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	1,748	118	0	NA	55,915	96
NOVEMBER	941	74	160	16	56,696	98
DECEMBER	1,247	138	613	58	57,330	99
JANUARY	3,880	339	2,813	295	58,397	101
FEBRUARY	6,533	179	561	23	64,369	109
MARCH	18,362	65	11,840	65	70,891	102
APRIL	4,820	20	10,175	49	65,536	94
MAY	364	4	2,046	28	63,854	92
JUNE	-1,190	NA	2,788	31	59,876	86
JULY	-1,478	NA	4,026	65	54,372	82
AUGUST	614	34	2,625	41	52,361	84
SEPTEMBER	167	33	1,141	42	51,387	86
ANNUAL	36,008	41	38,788	50		
APRIL-JULY	2,516	5				

* Frequently observed during fall and winter months

Figure DKG3
Heart Butte Reservoir





Jamestown Reservoir

Background

Jamestown Reservoir is located on the James River just above the city of Jamestown, North Dakota. The reservoir has a dead capacity of 292 AF, an active conservation capacity of 23,934 AF (for a total top of active conservation capacity of 24,226 AF at elevation 1428.00 feet), a joint-use capacity of 6,262 AF, and an exclusive flood control space of 190,502 AF. Exclusive flood control storage is located below the crest of an ungated morning glory inlet spillway and flood control releases are controlled by two gated outlets. The joint-use space is available for flood control at the beginning of spring runoff and is used for conservation purposes during the summer months.

WY 2017 Operations Summary

Jamestown Reservoir started WY 2017 at elevation 1430.58 feet and storage of 29,520 AF, which is 2.58 feet, and 5,294 AF above the top of the conservation pool (elevation 1428.00 feet and storage 24,226 AF). Jamestown Reservoir peaked at elevation 1439.15 on April 20, 2017 with 65,425 AF of storage. The minimum elevation was 1429.25 feet and storage of 26,664 AF occurred on December 19, 2017. The elevation on September 30, 2017 was 1430.53 with storage of 29,408 AF, which is 2.53 feet, and 5,182 AF above the top of active conservation pool.

The maximum instantaneous discharge of 667 cfs occurred on May 18, 2017. Reservoir net inflows were the thirteenth highest inflows on record for the dam and totaled 88,156 AF, 154 percent of average. The maximum 24 hour computed inflow occurred on April 9, 2017 with 2,294 cfs. Precipitation for WY 2017 totaled 15.64 inches at 83 percent of average. No water was released specifically for downstream irrigation.

An EMS orientation was conducted on February 7, 2017. On March 19, 2017, Jamestown Reservoir (Jamestown Dam) went into Internal Alert with a reservoir elevation over 1431.00 feet and remained there until June 5, 2017 when the reservoir dropped below elevation 1431.00 feet and normal operating conditions resumed. On July 9, 2017, the reservoir went back into Internal Alert with an elevation over 1431.00 feet and remained there until August 4, 2017 when the reservoir dropped below elevation 1431.00 feet and normal operating conditions resumed.

An ASI was conducted on August 8, 2017 by personnel from DKAO. The ASI report was signed on September 29, 2017.

Monthly Statistics for WY 2017

Record and near record monthly inflows in 63 years of record keeping were recorded in the following months: November and January had their ninth highest inflow, December had its tenth highest inflow, February had its second highest inflow, March had its thirteenth highest inflow, and April had its eleventh highest inflow.

Record and near record monthly end of month content in 63 years of record keeping were recorded in the following months: February had its twelfth highest storage, March had its eleventh highest storage, and April had its fifteenth highest storage. Statistical information on Jamestown Reservoir and its operations can be found on Table DKT5 and Figure DKG4.

TABLE DKT5
HYDROLOGIC DATA FOR WY 2017
JAMESTOWN RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	1,400.00	292	292
TOP OF ACTIVE CONSERVATION	1,428.00	24,226	23,934
TOP OF JOINT USE	1,431.00	30,488	6,262
TOP OF EXCLUSIVE FLOOD CONTROL	1,454.00	220,990	190,502

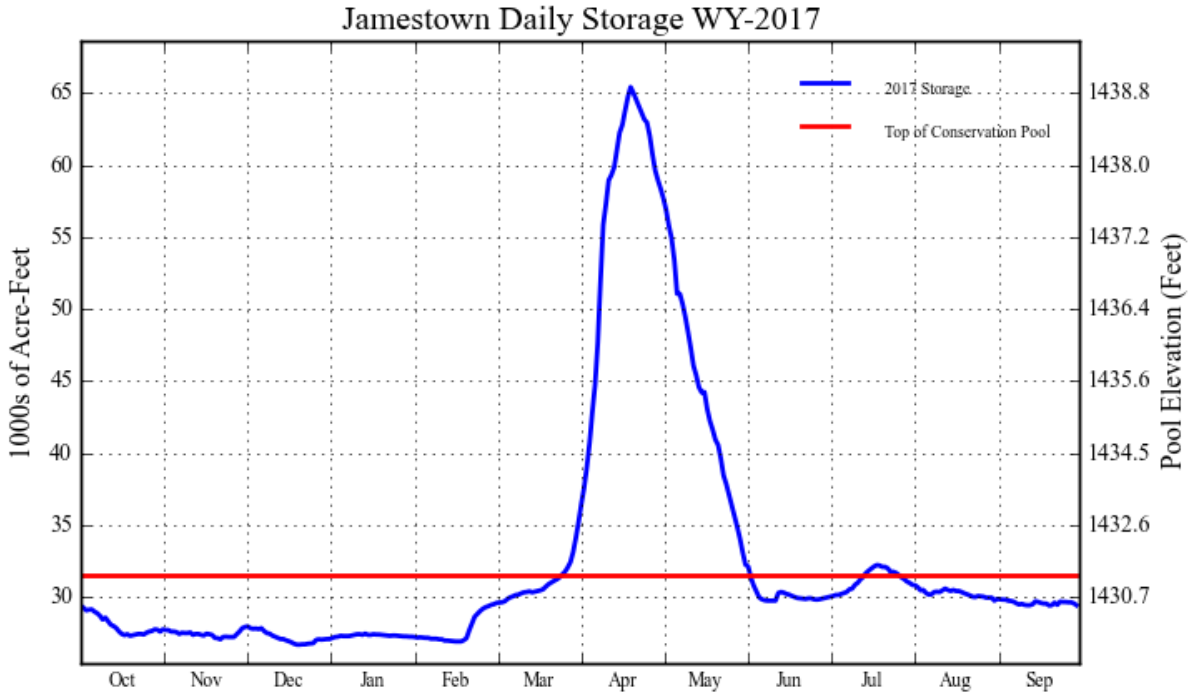
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	1,430.51	29,362	OCT 01, 2016
END OF YEAR	1,430.53	29,408	SEP 30, 2017
ANNUAL LOW	1,429.25	26,664	DEC 19, 2016
ANNUAL HIGH	1,439.15	65,425	APR 20, 2017
HISTORIC HIGH	1,454.10	222,318	APR 26, 2009

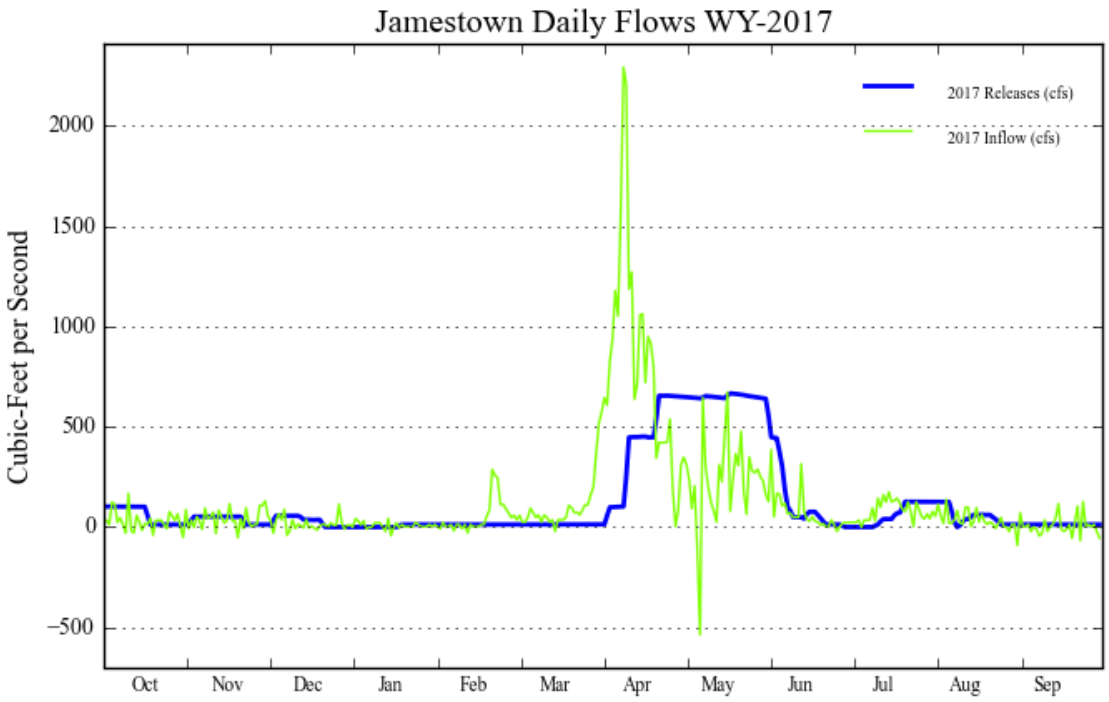
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	88,156	OCT 16-SEP 17	88,268	OCT 16-SEP 17
DAILY PEAK (CFS)	2,294	APR 09, 2017	667	MAY 18, 2017
DAILY MINIMUM (CFS)	0	*	0	*

MONTH	INFLOW		OUTFLOW		CONTENT	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	1,904	163	3,701	60	27,723	109
NOVEMBER	2,425	249	2,255	86	27,893	111
DECEMBER	895	214	1,734	255	27,054	108
JANUARY	511	308	366	133	27,199	109
FEBRUARY	2,942	1,191	711	293	29,430	117
MARCH	5,484	85	813	62	34,101	110
APRIL	48,352	197	23,502	129	58,951	127
MAY	14,139	149	40,017	148	33,073	80
JUNE	4,173	102	7,338	42	29,908	85
JULY	4,814	116	3,762	32	30,960	95
AUGUST	2,056	50	3,291	37	29,725	94
SEPTEMBER	461	34	778	8	29,408	105
ANNUAL	88,156	154	88,268	85		
APRIL-JULY	71,478	169				

* Frequently observed during fall and winter months.

Figure DKG4
Jamestown Reservoir





Deerfield Reservoir

Background

Deerfield Reservoir is located on Castle Creek, a tributary of Rapid Creek above Rapid City, South Dakota. Deerfield Reservoir in conjunction with Pactola Reservoir furnish a supplemental irrigation supply to about 8,900 acres in the Rapid Valley Water Conservancy District (District) and furnish replacement water for a portion of the water used from Rapid Creek by Rapid City. A contract is in place between the United States, Rapid City and the District for the storage space at Deerfield Reservoir. The majority of prior rights to the flows of Rapid Creek during the irrigation season is held by individuals and ditch companies in the District.

In 1985, Deerfield Dam was modified to accommodate a larger flood as determined from the results of the probable maximum flood analysis. The modifications consisted of raising the crest of the dam 38 feet, excavating an unlined auxiliary spillway, removing and filling in the old spillway, and extending the existing emergency gate passageway to the new control house at the higher crest elevation. The reservoir has a total capacity of 15,654 AF with an additional 26,657 AF of surcharge capacity.

During the winter of 1995-1996 the hollow jet valves were removed to allow the installation of the jet flow valves as part of the outlet works modification contract. The work was done to improve fish habitat in 1.5 miles of the creek immediately downstream of the dam. The stream improvement project was a cooperative effort accomplished by the city of Rapid City, the District, Black Hills Fly Fishers, Reclamation, US Forest Service, and South Dakota Game Fish and Parks. The project modified the outlet works of Deerfield Dam by installing jet flow gates to allow greater minimum winter releases than the 6-in bypass is capable of providing.

WY 2017 Operations Summary

Deerfield Reservoir started WY 2017 at elevation 5906.11 feet and storage of 14,874 AF, which is 1.89 feet and 780 AF below the top of the conservation pool elevation of 5,908.0 feet. Precipitation for 2017 was 137 percent of average. Inflows for WY 2017 totaled 9,622 AF (95 percent of the average). The peak inflows occurred in April, totaling 1,054 AF for the month. The peak elevation was 5,907.55 feet, storage of 15,474 AF, and occurred on September 30, 2017. The minimum elevation was 5,906.12 feet, storage of 14,878 AF, and occurred on October 1, 2016. Water year 2017 ended at elevation 5907.55 feet and storage of 15,474 AF, which is 0.45 feet and 180 AF below the top of the conservation pool. Deerfield Reservoir ended WY 2017 with 15,323 AF in active storage.

The District ordered 1,827 AF of water from storage for irrigation. Rapid City released 1,215 AF of water from storage for the municipal water supply in WY 2017. Although irrigation water for the District is held in Deerfield Dam, Deerfield and Pactola Dams are operated as a single unit and water is released directly from Pactola when irrigators call for water.

An EMS orientation was held for Deerfield and Pactola March 27, 2017. The ASI of Deerfield Dam was conducted July 5, 2017. There are no incomplete SOD Recommendations.

Monthly Statistics for WY 2017

Record monthly inflows were recorded in the following months: Inflows: No records were set in WY 2017. Record monthly end of month content were recorded in the following months: End of Month Storage: September was third highest, August was fifth highest. Additional statistical information on Deerfield Reservoir and its operations during WY 2017 can be found on Table DKT6 and Figure DKG5.

TABLE DKT6
HYDROLOGIC DATA FOR WY 2017
DEERFIELD RESERVOIR

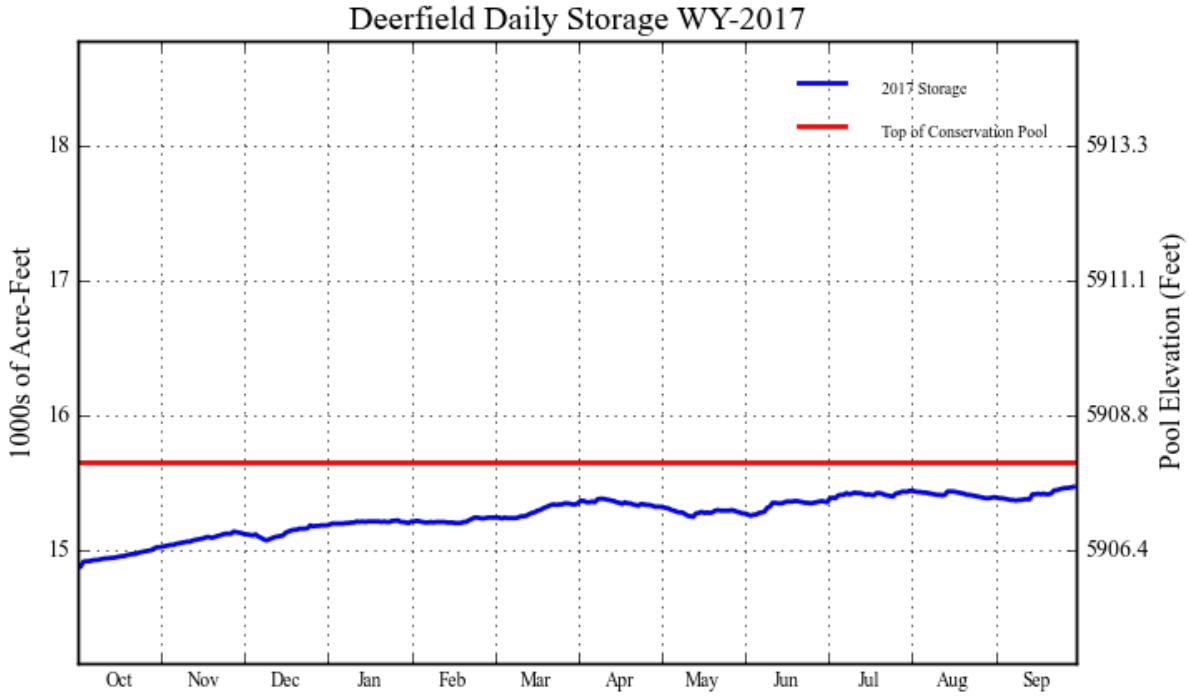
RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	5,839.00	151	151
TOP OF ACTIVE CONSERVATION	5,908.00	15,654	15,503
TOP OF JOINT USE			
TOP OF EXCLUSIVE FLOOD CONTROL			
STORAGE-ELEVATION DATA	**ELEVATION (FT)**	**STORAGE (AF)**	**DATE**
BEGINNING OF YEAR	5,906.11	14,874	OCT 1, 2016
END OF YEAR	5,907.55	15,474	SEP 30, 2017
ANNUAL LOW	5,906.12	14,878	OCT 01, 2016
ANNUAL HIGH	5,907.55	15,474	SEP 30, 2017
HISTORIC HIGH	5,909.05	16,157	FEB 25, 1985

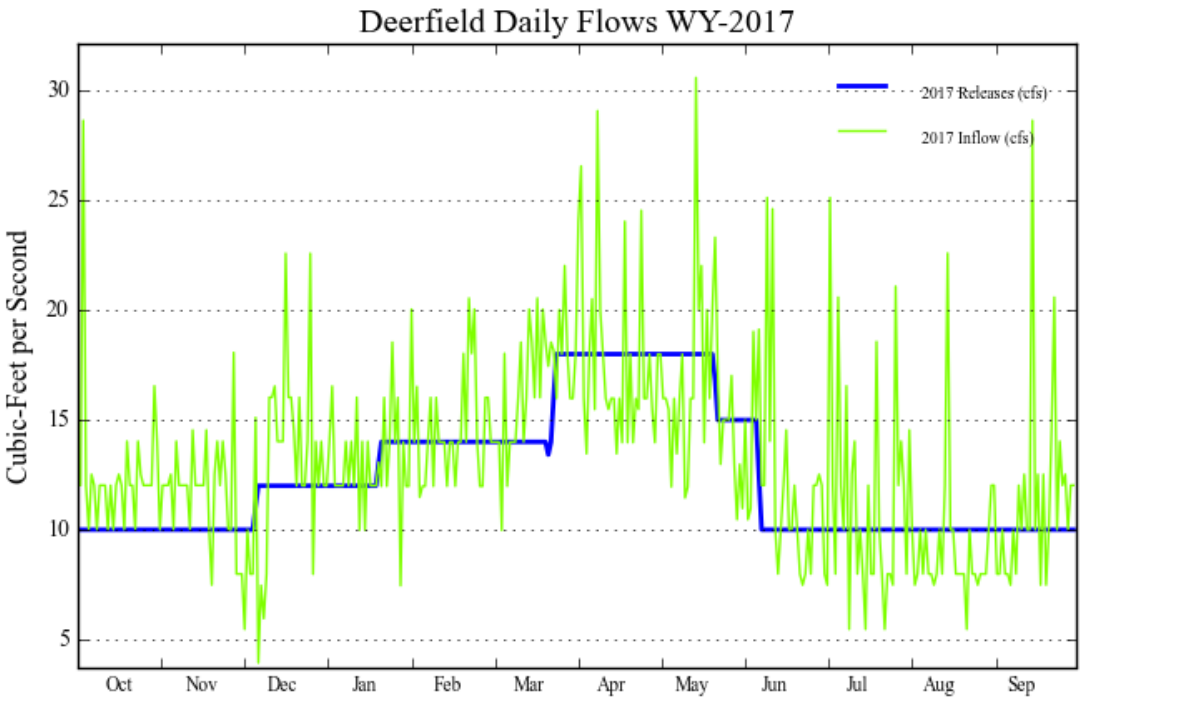
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	9,622	OCT 01-SEP 30	9,022	OCT 01-SEP 30
PEAK DAILY (CFS)	30.60	MAY 15, 2017	18	MAR-APR-MAY, 2017
MINIMUM DAILY (CFS)	3.93	DEC 06, 2017	10	OCT-NOV-DEC-JUN-JUL-AUG-SEP, 2016-2017

MONTH	INFLOW		OUTFLOW		EOM CONTENT**	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	768	113	615	81	15,027	118
NOVEMBER	699	114	595	144	15,131	117
DECEMBER	778	121	720	190	15,189	115
JANUARY	817	128	788	210	15,218	113
FEBRUARY	807	137	778	208	15,247	112
MARCH	1,016	115	919	148	15,344	110
APRIL	1,054	88	1,071	104	15,327	109
MAY	1,009	71	1,051	79	15,285	108
JUNE	744	60	660	52	15,369	109
JULY	682	78	615	55	15,436	112
AUGUST	573	82	615	52	15,394	115
SEPTEMBER	675	109	595	52	15,474	121
ANNUAL	12,009	95	11,960	90	15,287	113
APRIL-JULY	3,807	74	3,490	71	15,354	109

* Frequently observed during fall and winter months
** EOM Content – End of Month Content

Figure DKG5
Deerfield Reservoir





Pactola Reservoir

Background

Pactola Reservoir, located on Rapid Creek above Rapid City, South Dakota, acts in conjunction with Deerfield Reservoir to furnish a supplemental irrigation supply to about 8,900 acres in the District, replacement water for Rapid City, and a supply of domestic water for private water systems both above and below the city. The reservoir is also operated to provide flood control. It has a conservation capacity of 55,972 AF (54,955 AF active) and 43,057 AF of exclusive flood control space. The flood control space is all below the ungated spillway crest, and releases in this pool are controlled by the river outlet works. Rapid City has contracts for Pactola and Deerfield Reservoir water. The Rapid Valley Sanitation District and Hisega Meadows Water Inc. also have contracts for water service from Pactola Reservoir. Operation of the two reservoirs is integrated to maintain as much water as possible in the upstream facility, Deerfield Reservoir, and at the same time maintain a uniform outflow from Deerfield to maximize fishery benefits in the stream between the reservoirs. Since no inflow forecasts are available, the reservoir is normally operated as full as possible. Two SNOTEL (North Rapid Creek and Blind Park) sites were installed in the Pactola and Deerfield Drainage Basin in May of 1990.

As part of the Safety of Dams Program, a study was made in the early 1980s to determine the adequacy of Pactola Dam, Spillway, and Reservoir to safely pass the new Inflow Design Flood (IDF) determined based on present day hydrologic technology. The studies showed that the facility was not able to safely handle the new IDF. Modification work was completed in 1987 and provided sufficient surcharge storage and spillway capacity to pass the IDF. Modification work consisted of raising the crest of the dam 15 feet, widening the existing rock-cut spillway chute and stilling basin from 240 feet to 425 feet, relocating Highway 385 to the new dam crest, extending the existing gate access shaft to the higher crest elevation, and reconstructing a new two-level gate control house at the higher crest elevation.

Reclamation and Rapid City signed a new long-term storage contract on July 31, 2007. The contract provides storage space of 49,000 AF for Rapid City and 6,000 AF for Reclamation.

WY 2017 Operations Summary

Pactola Reservoir started WY 2017 at elevation 4,576.01 feet and storage of 52,455 AF, which is 4.19 feet and 3,517 AF below the top of the conservation pool. Precipitation was 83 percent of average. Inflows totaled 28,817 AF (77 percent of average). Peak inflows occurred in May, totaling 3,605 AF for the month. The peak elevation was 4,580.27 feet, storage of 56,035 AF, and occurred on June 12, 2017. The minimum elevation was 4,574.57 feet, storage of 51,288 AF, and occurred on September 29, 2017. Water year 2017 ended at elevation 4,574.57 feet and storage of 51,288 AF, which is 5.63 feet and 4,684 AF below the top of the conservation pool. Pactola Reservoir ended WY 2017 with 50,271 AF in active storage.

The District ordered 1,827 AF of water from storage for irrigation. Rapid City released 1,215 AF of water from storage for the municipal water supply in WY 2017. Although irrigation water for the District is held in Deerfield Dam, Deerfield and Pactola Dams are operated as a single unit and water is released directly from Pactola when irrigators call for water. An EMS orientation was held for Deerfield and Pactola March 29, 2017. The ASI of Pactola Dam was conducted April 4, 2017. There are no incomplete SOD Recommendations.

Monthly Statistics for WY 2017

Record monthly inflows were recorded in the following months: Inflows: No inflow records were set in WY 2017. Record end of month reservoir content were recorded in the following months: End of Month Storage: No records were set in WY 2017. Additional statistical information on Pactola Reservoir and its operations during WY 2017 can be found on Table DKT7 and Figure DKG6.

Table DKT7
Hydrologic Data for WY 2017
Pactola Reservoir

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	4,456.10	1,017	1,017
TOP OF ACTIVE CONSERVATION	4,580.20	55,972	54,955
TOP OF JOINT USE			
TOP OF EXCLUSIVE FLOOD CONTROL	4,621.50	99,029	43,057

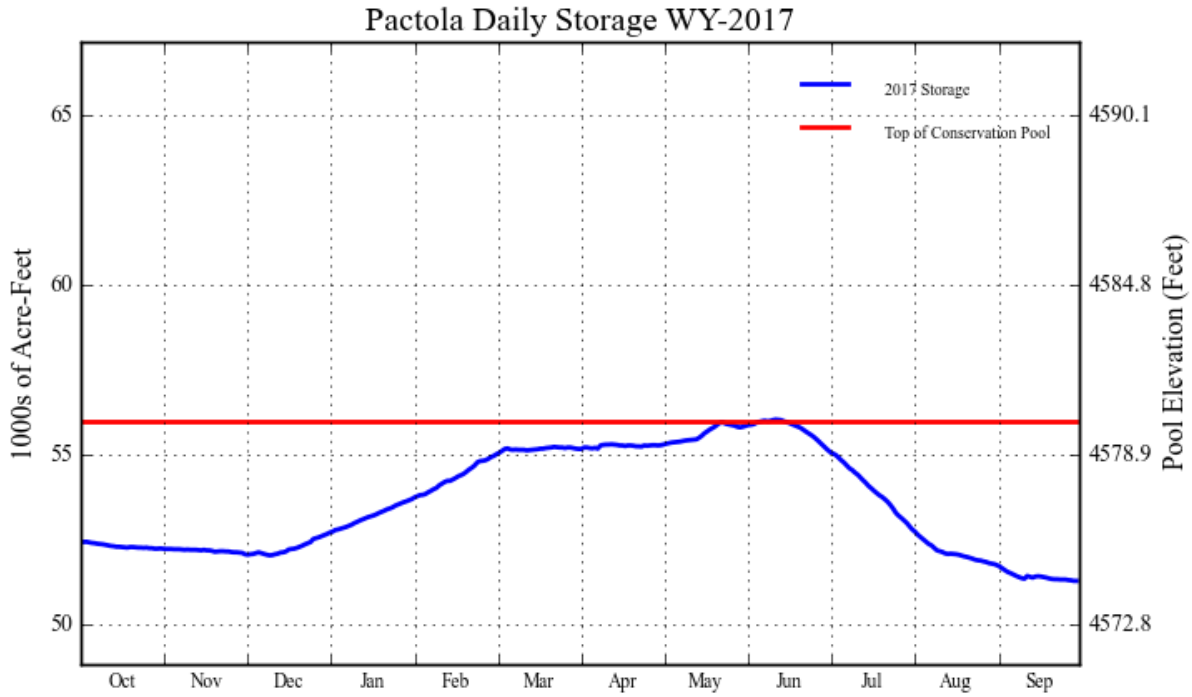
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	4,576.01	52,455	OCT 01, 2016
END OF YEAR	4,574.57	51,288	SEP 30, 2017
ANNUAL LOW	4,574.57	51,288	OCT 15, 2015
ANNUAL HIGH	4,580.27	56,035	JUN 12, 2017
HISTORIC HIGH	4,589.43	64,246	JUN 29, 2015

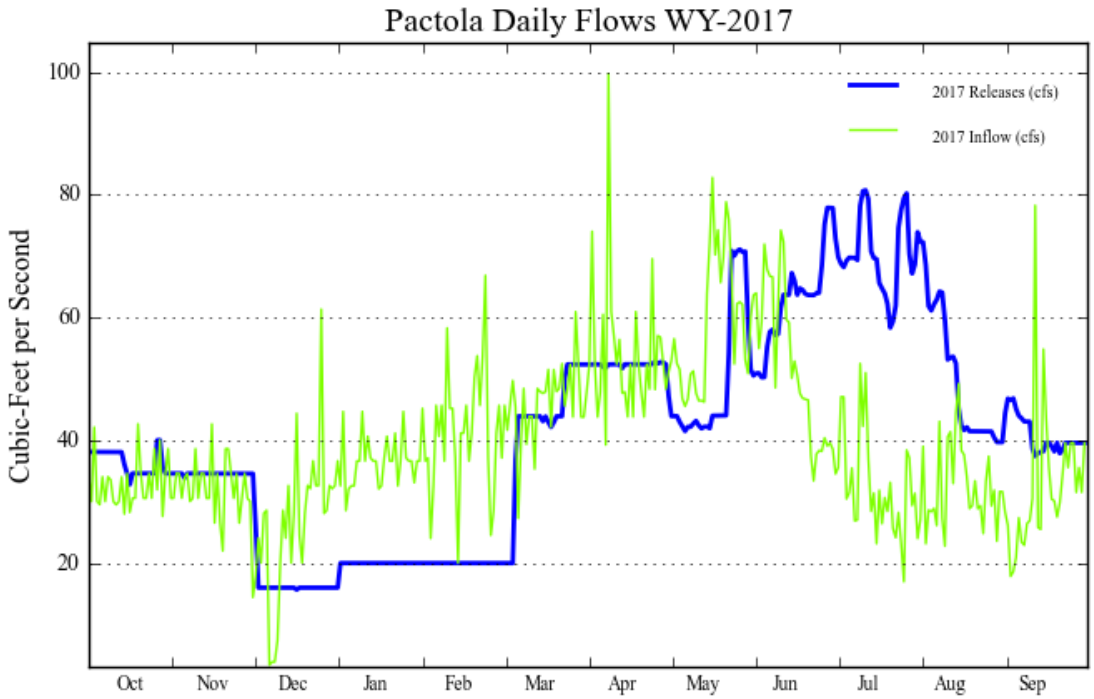
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	28,817	OCT 01-SEP 30	29,984	OCT 01-SEP 30
DAILY PEAK (CFS)	99.77	APR 09, 2017	80.78	JUL 12, 2017
DAILY MINIMUM (CFS)	3.40	DEC 06, 2016	15.67	DEC 16, 2016

MONTH	INFLOW		OUTFLOW		EOM CONTENT*	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	2,021	91	2,241	125	52,235	116
NOVEMBER	1,894	115	2,057	140	52,072	115
DECEMBER	1,640	117	1,003	67	52,709	116
JANUARY	2,265	155	1,230	86	53,744	119
FEBRUARY	2,298	158	1,111	86	54,931	121
MARCH	2,817	113	2,570	142	55,178	120
APRIL	3,211	76	3,117	110	55,272	116
MAY	3,605	53	3,057	56	55,820	115
JUNE	3,125	44	3,725	59	55,220	112
JULY	2,004	51	4,334	79	52,890	111
AUGUST	1,997	72	3,107	75	51,780	114
SEPTEMBER	1,940	87	2,432	86	51,288	114
ANNUAL	28,817	77	29,984	82	53,595	116
APRIL-JULY	11,945	54	14,233	70	54,801	113

* EOM Content – End of Month Content

Figure DKG6
Pactola Reservoir





Angostura Reservoir

Background

Angostura Reservoir P-S MBP, located on the Cheyenne River above Hot Springs, South Dakota, was built to service about 12,200 acres in the Angostura Unit P-S MBP and for power generation. It has a total capacity of 123,048 AF with an additional surcharge capacity of 57,308 AF. Its principle use is for irrigation of the Angostura Unit, which diverts its water from a high-level outlet at the dam. In the early years, water surplus to irrigation needs was released to the river through a small power plant with a nameplate capacity of 1,200 kilowatts. Because of the low runoff, and because actual irrigation diversions were higher than previously anticipated, it was concluded that continued operation of the power plant was economically infeasible. Except for a few operations of less than 24 hours each, the plant was last operated in February 1959. In 1966, the plant was officially closed, and the equipment was declared surplus in March 1968. Disposal of this equipment was completed in 1971. Releases for irrigation are made through the canal outlet works into the Angostura Main Canal having a design capacity of 290 cfs. Releases to the Cheyenne River are only made when the reservoir is assured of filling.

A sedimentation survey of Angostura Reservoir was conducted in 2004 and a new area and capacity table was published in August of 2005. The previous survey was done in 1979. Angostura Reservoir accumulated 7,716 AF of sediment since the last survey. Since construction in 1949, Angostura has accumulated 36,867 AF of sediment. The sedimentation rate from 1949-2004 has averaged 670 AF per year. The new area and capacity tables were first used in WY 2006.

WY 2017 Operations Summary

Angostura Reservoir started WY 2017 at elevation 3,179.02 feet and with a storage of 89,106 AF, which is 8.18 feet and 33,942 AF below the top of the conservation pool. Precipitation for was 89 percent of average. Inflows totaled 36,309 AF (45 percent of the average). Peak inflows occurred in February totaling 6,221 AF for the month. The peak elevation was 3,185.89 feet, storage of 117,103 AF, and occurred on May 28, 2017. The minimum elevation was 3,177.35 feet, storage of 83,089 AF, and occurred on September 22, 2017. Water year 2017 ended at elevation 3,177.46 feet and storage of 83,475 AF, which is 9.74 feet and 39,573 AF below the top of the conservation pool. Angostura Reservoir ended WY 2017 with 41,270 AF in active storage.

The Angostura Irrigation District had a full water allotment for its irrigators. Releases for irrigation began May 22, 2017 and reached a peak of 251 cfs on July 20, 2017. The irrigation release was terminated on September 22, 2017. Total irrigation releases were 40,300.26 AF.

An EMS orientation was held on March 28, 2017. The ASI report for Angostura Dam was completed on June 14, 2017. There are no incomplete SOD Recommendations.

Monthly Statistics for WY 2017

Record monthly inflows were recorded in the following months: Inflows: no inflow records achieved in WY 2017. Record end of month reservoir content were recorded in the following months: End of Month Storage: no storage records achieved in WY 2017. Additional statistical information on Angostura Reservoir and its operations during WY 2017 can be found on Table DKT8 and Figure DKG7.

Table DKT8
Hydrologic Data for WY 2017
Angostura Reservoir

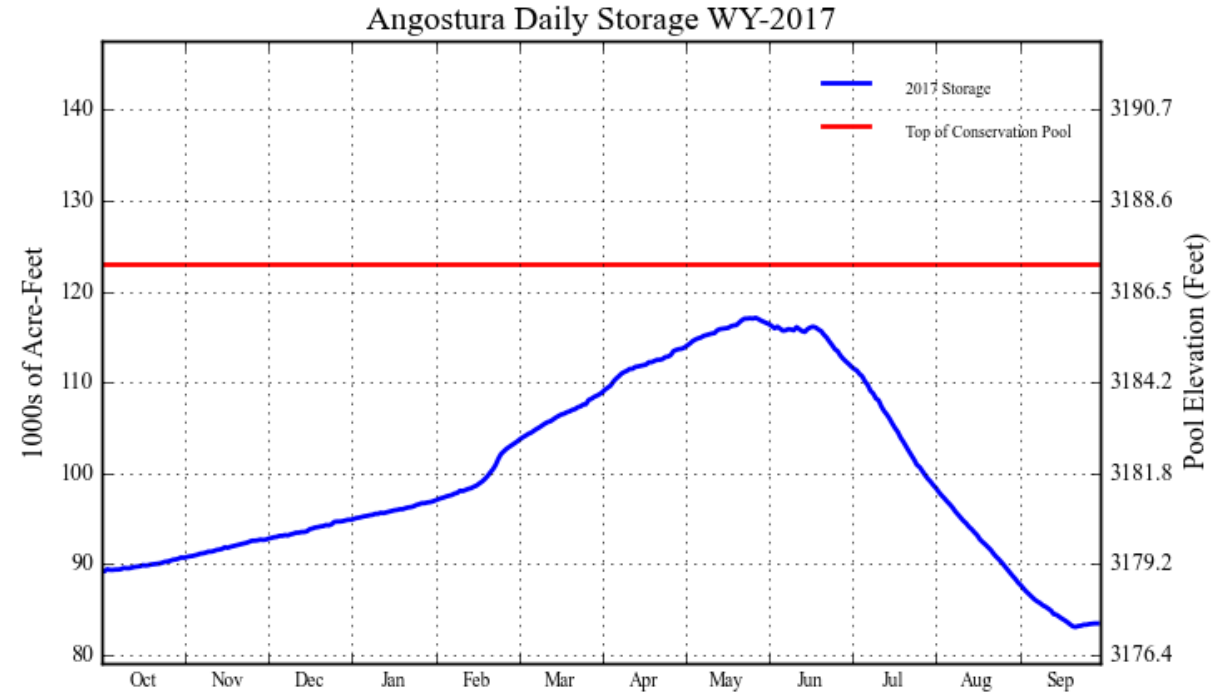
RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	3,163.00	42,205	42,205
TOP OF ACTIVE CONSERVATION	3,187.20	123,048	80,843
TOP OF JOINT USE			
TOP OF EXCLUSIVE FLOOD CONTROL			
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	3,179.02	89,106	OCT 01, 2016
END OF YEAR	3,177.46	83,475	SEP 30, 2017
ANNUAL LOW	3,177.35	83,089	SEP 16, 2016
ANNUAL HIGH	3,185.89	117,103	MAY 22, 2016
HISTORIC HIGH	3,189.37	**152,228	MAY 20, 1978

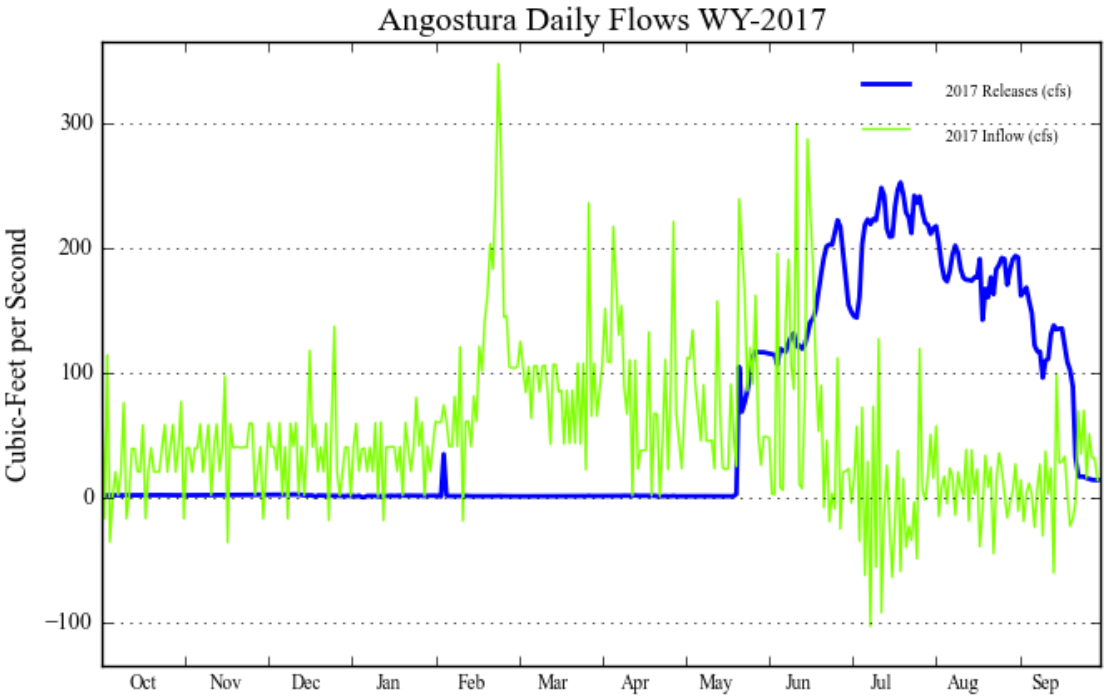
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	36,309	OCT 01-SEP 30	41,940	OCT 01-SEP 30
DAILY PEAK (CFS)	347.58	FEB 23, 2017	252.44	JUL 20, 2017
DAILY MINIMUM (CFS)	-103.22	JUL 09, 2017	0.22	OCT 21, 2015

MONTH	INFLOW		OUTFLOW		EOM CONTENT***	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	1,709	169	112	6	90,703	93
NOVEMBER	2,114	131	118	85	92,699	94
DECEMBER	2,292	239	110	413	94,881	95
JANUARY	2,218	169	78	391	97,021	96
FEBRUARY	6,221	123	130	222	103,112	98
MARCH	5,484	45	67	50	108,529	97
APRIL	5,201	97	74	148	113,656	98
MAY	5,054	50	2,053	58	116,657	97
JUNE	4,609	6	8,961	53	112,305	94
JULY	-24	8	13,206	72	99,075	89
AUGUST	541	24	11,247	70	88,369	87
SEPTEMBER	890	120	5,784	56	83,475	86
ANNUAL	36,309	45	41,940	53	100,040	94
APRIL-JULY	14,840	29	24,294	46	110,423	95

** Due to new area-capacity table, the capacity that corresponds to the new historic high elevation is less than a previous high capacity amount (169,020 AF @ Elevation 3189.0 on June 18, 1962)
*** EOM Content – End of Month Content

Figure DKG7
Angostura Reservoir





Keyhole Reservoir

Background

Keyhole Reservoir P-S MBP located on the Belle Fourche River below Moorcroft, Wyoming, has a conservation capacity of 188,671 AF (182,079 AF active) and 140,463 AF of exclusive flood control space. It was constructed to furnish a supplemental irrigation supply to 57,000 acres in the Belle Fourche Project and for flood control. Keyhole Reservoir is subject to the Belle Fourche River Compact, and the inflows and storage in the reservoir are allocated 10 percent to Wyoming users and 90 percent to South Dakota users, subject to prior rights. On January 3, 1963, the Belle Fourche Irrigation District (BFID) executed a long-term contract for the use of 7.7 percent of active storage space in the reservoir. This space will be used to store water belonging to the irrigation district under its prior water right along with the District's pro rata share of storable inflows to Keyhole Reservoir. On January 1, 1985, the Crook County Irrigation District's contract for 18,080 AF of space in Keyhole Reservoir became effective. The allocated space is used by each organization to store its pro rata share of inflows to Keyhole Reservoir. The flood control space at Keyhole Reservoir is all located above an ungated spillway. The spillway capacity is 11,000 cfs at maximum water surface elevation. The downstream safe channel capacity is 3,000 cfs. Formulas for forecasting inflows have not been developed. Research by the Soil Conservation Service during water years 1992 through 1994 show that inflow forecasting to Keyhole Reservoir is not reliable since there is no consistent snow pack and precipitation is highly cyclical. No further efforts to develop forecast models are planned.

A sedimentation survey of Keyhole Reservoir was conducted in 2003 and a new area and capacity table was published in July of 2005. The previous survey was done in 1978. Keyhole Reservoir accumulated 5,082 AF of sediment since the previous survey. Since construction in 1952, Keyhole has accumulated 12,495 AF of sediment. The sedimentation rate from 1952-2003 has averaged 240 AF per year. The new area and capacity tables were first used in WY 2006.

WY 2017 Operations Summary

Keyhole Reservoir started WY 2017 at elevation 4,094.32 feet and storage of 145,950 AF, which is 4.98 feet and 42,721 AF below the top of the conservation pool. Precipitation was 105 percent of average. Inflows totaled negative 1,875 AF (negative 12 percent of average), because of evaporation and seepage. Peak inflows occurred in July, totaling 3,565 AF for the month. The peak elevation was 4,094.89 feet, storage of 150,417 AF, and occurred on May 5, 2017. The minimum elevation was 4,091.00 feet, storage of 122,129 AF, and occurred on September 30, 2017. Water year 2017 ended at elevation 4,091.00 feet and storage of 122,129 AF, which is 8.30 feet and 66,542 AF below the top of the conservation pool. Keyhole Reservoir ended WY 2017 with 115,537 AF in active storage.

The BFID ordered 18,309 AF and the Crook County Irrigation District (CCID) ordered 2,459 AF for WY 2017.

An EMS orientation was held March 7, 2017. The ASI of Keyhole was conducted on May 10, 2017. There are no incomplete SOD recommendations.

Monthly Statistics for WY 2017

Record monthly inflows were recorded in the following months: Inflows: fifth lowest on record. Record end of month reservoir content were recorded in the following months: End of Month Storage: July fourth highest on record. Additional statistical information on Keyhole Reservoir and its operations during WY 2017 can be found on Table DKT9 and Figure DKG8.

Table DKT9
Hydrologic Data for WY 2017
Keyhole Reservoir

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	4,051.00	6,592	6,592
TOP OF ACTIVE CONSERVATION	4,099.30	188,671	182,079
TOP OF JOINT USE			
TOP OF EXCLUSIVE FLOOD CONTROL	4,111.50	329,134	140,463

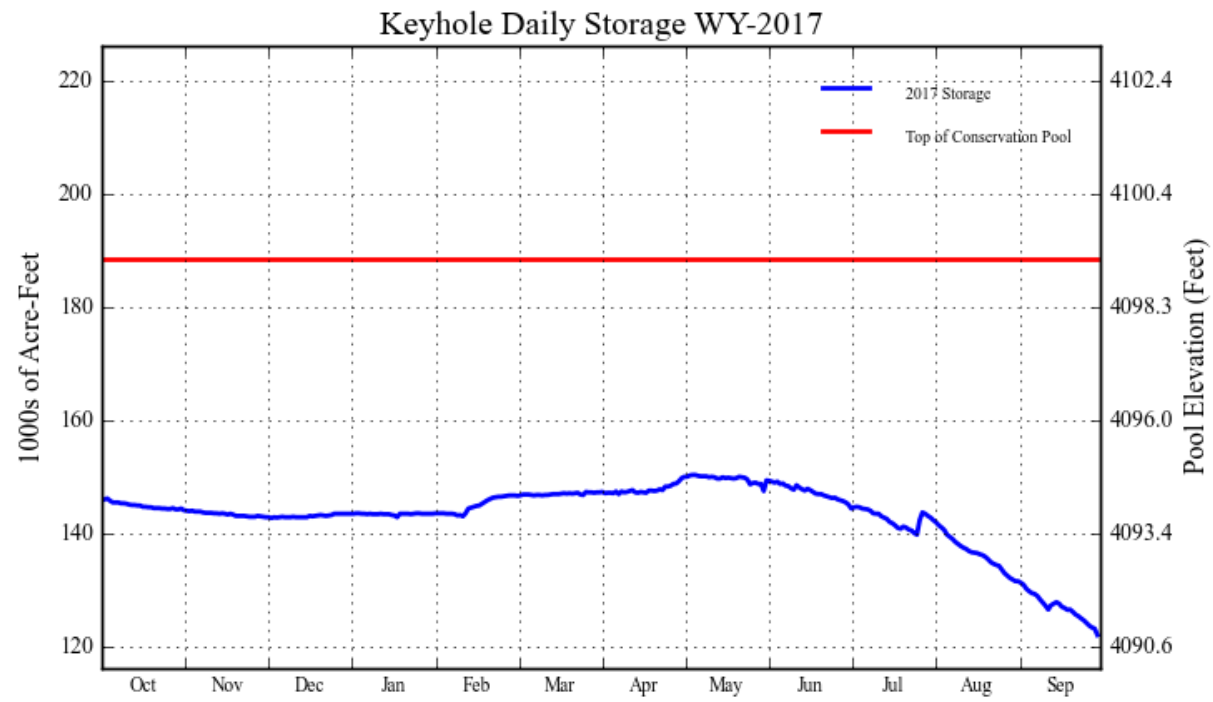
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	4,094.32	145,950	OCT 01, 2016
END OF YEAR	4,091.00	122,129	SEP 30, 2017
ANNUAL LOW	4,091.00	122,129	SEP 30, 2017
ANNUAL HIGH	4,094.89	150,417	MAY 05, 2017
HISTORIC HIGH	4,100.38	210,222	MAY 21, 1978

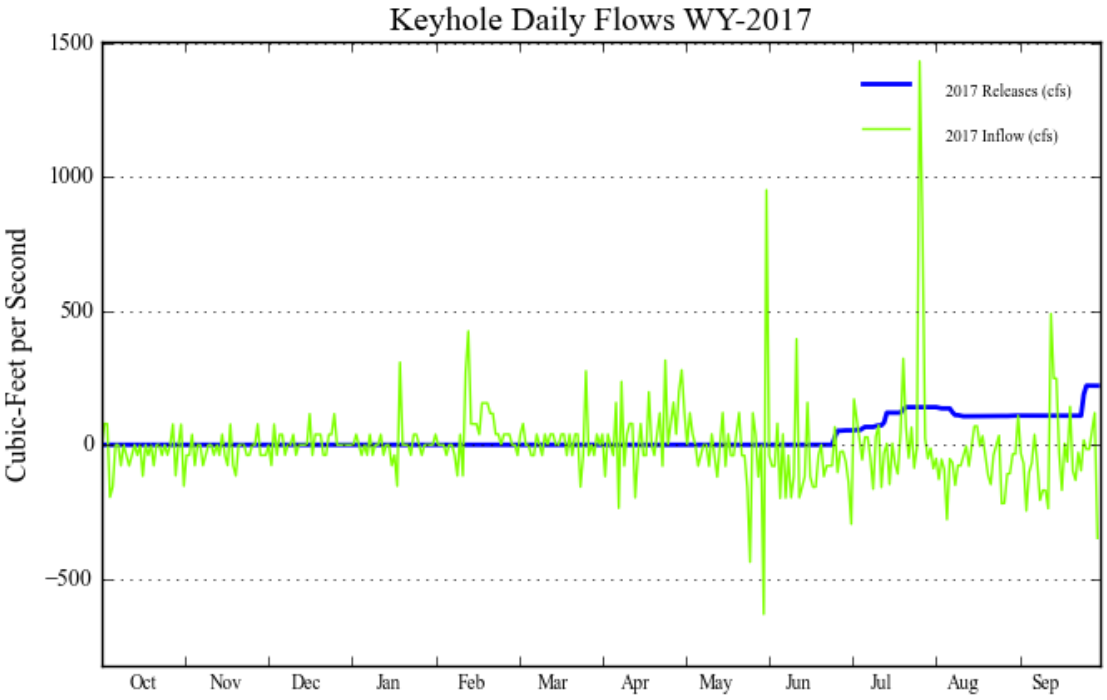
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	-1,875	OCT 01-SEP 30	8503	OCT 01-SEP 30
DAILY PEAK (CFS)	1,430.82	JUL 27, 2017	220.65	SEP 26, 2017
DAILY MINIMUM (CFS)	-631.72	MAY 31, 2017	0	JUN 01, 2017

MONTH	INFLOW		OUTFLOW		EOM CONTENT**	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	-1,771	392	0	0	144,179	153
NOVEMBER	-1,223	345	0	0	142,956	152
DECEMBER	1,050	226	0	0	143,566	153
JANUARY	77	115	0	0	143,643	152
FEBRUARY	3,160	49	0	0	146,803	151
MARCH	546	3	0	0	147,349	143
APRIL	1,962	25	0	0	149,311	144
MAY	-1,727	-51	0	0	147,584	138
JUNE	-1,544	-106	477	93	145,563	135
JULY	-3,565	406	6,248	144	142,880	138
AUGUST	-4,184	213	7,053	29	131,643	135
SEPTEMBER	-1,786	59	7,728	0	122,129	121
ANNUAL	-1,875	-12	21,506	157	142,301	143
APRIL-JULY	2,256	23	6,725	82	146,335	139

* Frequently observed during fall and winter months
** EOM Content – End of Month Content

Figure DKG8
Keyhole Reservoir





Shadehill Reservoir

Background

Shadehill Reservoir, a feature of the Shadehill Unit P-S MBP, is located on the Grand River near Shadehill, South Dakota, and was constructed for irrigation of 9,700 acres, recreation, flood control, and fish and wildlife purposes. The reservoir has a dead and conservation capacity totaling 120,172 AF with an additional exclusive flood control capacity of 230,004 AF and a surcharge capacity of 119,560 AF. Flood control space is all located above the crest of an un-gated glory-hole spillway. Because of the questionable quality of water, it was decided to postpone construction of distribution works for irrigation.

After further study, it was concluded that water from Shadehill Reservoir can be used for sustained irrigation if certain limitations of soils, leaching water, soil amendments, and drainage are met. A definite plan report covering 6,700 acres which meets these limitations has been completed, approved by the Commissioner, and released for distribution. On December 17, 1963, landowners within the area voted 24 to 21 against formation of an irrigation district. Further action on development of the area was deferred until the attitude of the landowners was more favorable. Pending more extensive irrigation development, an additional 51,500 AF of space between elevations 2260 and 2272 feet was allocated to flood control. Allocations and evacuation of this space was made possible by modification of the outlet works in 1969 to permit a discharge of 600 cfs to the river. In June of 1975, the West River Conservancy Sub-District was formed combining all but one of the old individual contracts for water supply from the reservoir into one. Acreage contracted for by the District was 5,000 acres; however, only 3,064 acres were developed. On March 18, 1986, the contract between Reclamation and the West River Conservancy Sub-District was assigned to the Shadehill Water User District, an organization, which succeeded the Sub-District under South Dakota law. This contract has expired and presently conservation releases are meeting irrigation demands. Should irrigation releases be required a temporary water service contract will need to be executed with the Shadehill Water User District.

Because certain release criteria reduced the effectiveness of flood control operations in the zone between elevation 2260 and 2272 feet, and because the CORPS has constructed Bowman Haley Reservoir upstream from Shadehill Reservoir with 53,800 AF of flood control space, CORPS requested that the interim flood control agreement be terminated and that responsibility for the operations of Shadehill Reservoir when the pool is between elevations 2260 and 2272 feet revert to Reclamation. By a revised field working agreement dated May 15, 1972, it was agreed that the space between elevation 2260 and 2272 feet (51,500 AF) be reallocated to conservation use. However, space below elevation 2272 feet will continue to be evacuated before the start of the spring runoff, but to a lesser extent than in the past.

WY 2017 Operations Summary

Shadehill Reservoir started WY 2017 at elevation 2,263.90 feet and with a storage of 83,946 AF, which is 8.10 feet and 36,226 AF below the top of the conservation pool. Precipitation was 81 percent of average. Inflows totaled 12,524 AF (17 percent of average). Peak inflows occurred in March totaling 7,515 AF for the month. The peak elevation was 2,266.31 feet, storage of 93,793 AF, and occurred on May 1, 2017. The minimum elevation for WY 2017 was 2,262.54 feet

storage of 78,779 AF and occurred on February 11, 2017. Water year 2017 ended at elevation 2,264.36 feet and storage of 85,760 AF, which is 7.64 feet and 34,412 AF below the top of the conservation pool. Shadehill Reservoir ended with 41,891 AF in active storage. All irrigation demands were met from river maintenance releases. There were no storage releases for irrigation needed during WY 2017.

An Emergency Action Plan Orientation Meeting was conducted on March 8, 2017. A Periodic Facility Review (PFR) for Shadehill Dam was conducted on August 6, 2017. There are no incomplete SOD Recommendations.

The Shadehill Dam Service Spillway Stilling Basin Concrete Repairs Contract, No. R17PS00430, was awarded to Lillard and Clark Construction Company, Inc. for $616,000.00. The contractor demolished, cleaned, placed new rebar and a new silica fume concrete floor in the Shadehill Dam Spillway Stilling Basin. The last concrete pour was conducted October 6, 2017. The contract final inspection of the stilling basin floor and dentate construction was completed on October 23, 2017.

Monthly Statistics for WY 2017

Record monthly inflows were recorded in the following months: Inflows: June was second lowest, and December was fifth lowest on record. Record end of month reservoir content were recorded in the following months: End of Month Storage: no storage records were achieved in WY 2017. Additional statistical information on Shadehill Reservoir and its operations during WY 2017 can be found on Table DKT10 and Figure DKG9.

TABLE DKT10
HYDROLOGIC DATA FOR WY 2017
SHADEHILL RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	2,250.80	43,869	43,869
TOP OF ACTIVE CONSERVATION	2,272.00	120,172	76,303
TOP OF JOINT USE			
TOP OF EXCLUSIVE FLOOD CONTROL	2,302.00	350,176	230,004

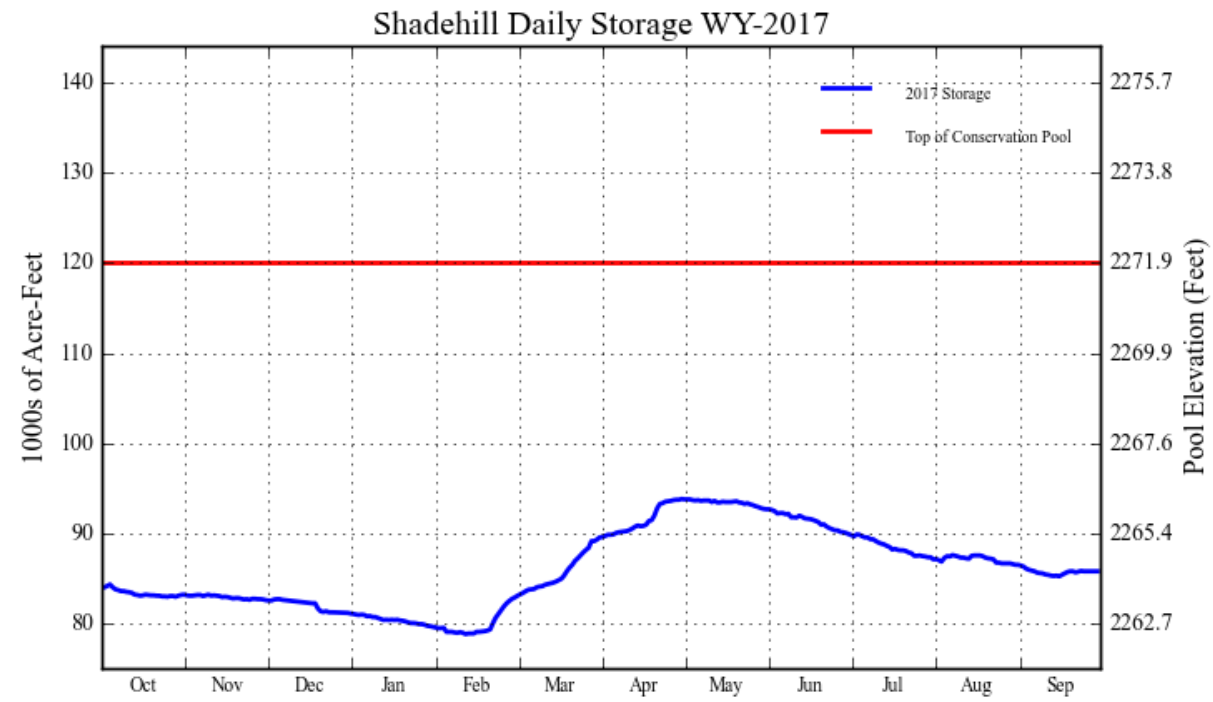
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE (end-of-day)
BEGINNING OF YEAR	2,263.90	83,946	OCT 01, 2016
END OF YEAR	2,264.36	85,760	SEP 30, 2017
ANNUAL LOW	2,262.54	78,779	FEB 11, 2017
ANNUAL HIGH	2,266.31	93,793	MAY 01, 2017
HISTORIC HIGH	2,297.90	318,438	APR 10, 1952

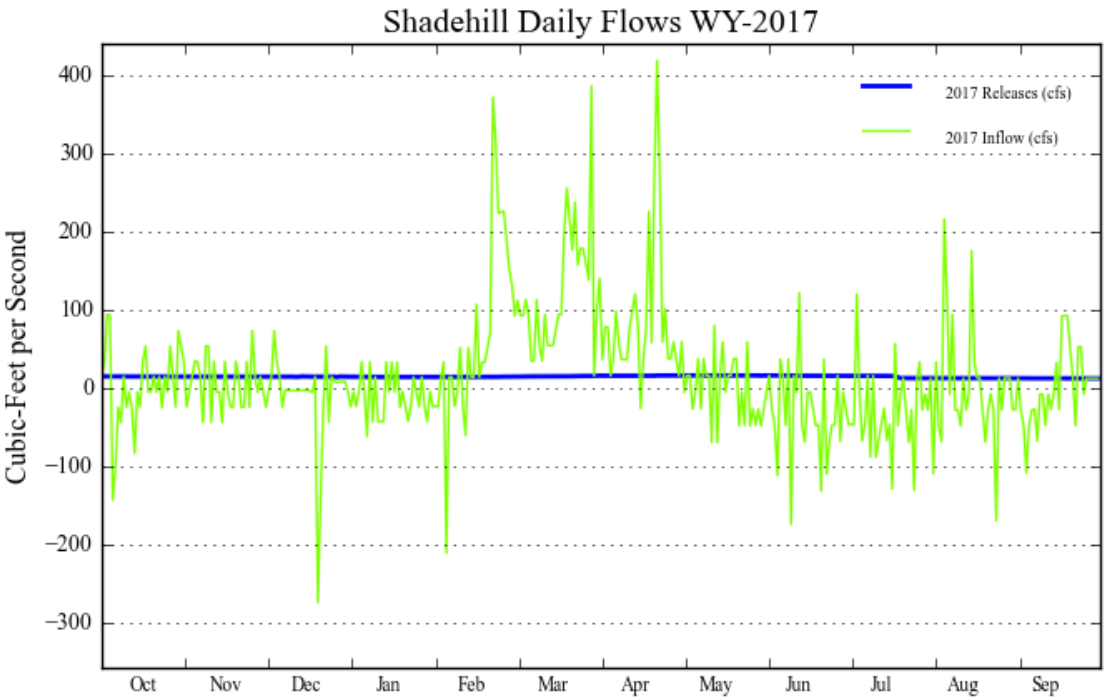
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	12,524	OCT 01-SEP 30	10,740	OCT 01-SEP 30
DAILY PEAK (CFS)	419.17	ARP 22, 2017	16.53	MAY 07, 2017
DAILY MINIMUM (CFS)	-274.09	DEC 19, 2016	12.67	SEP 30, 2017

MONTH	INFLOW		OUTFLOW		EOM CONTENT**	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	147	34	925	24	83,168	76
NOVEMBER	268	6	885	27	82,551	77
DECEMBER	-610	160	910	36	81,061	77
JANUARY	-651	51	889	27	79,521	76
FEBRUARY	3,987	136	803	38	82,705	78
MARCH	7,515	8	942	9	89,278	75
APRIL	5,390	12	960	6	93,708	77
MAY	-8	5	1,008	10	92,692	76
JUNE	-1,714	-25	959	11	90,019	73
JULY	-1,792	-45	905	16	87,322	72
AUGUST	-45	-62	799	19	86,478	74
SEPTEMBER	37	-1558	755	21	85,760	76
ANNUAL	12,524	17	10,740	14	86,189	76
APRIL-JULY	1,876	4	3,832	9	90,935	75

* Frequently observed during fall and winter months
** EOM Content – End of Month Content

Figure DKG9
Shadehill Reservoir





Belle Fourche Reservoir

Background

Belle Fourche Reservoir, located near Belle Fourche, South Dakota, is formed by Belle Fourche Dam on Owl Creek, a tributary of the Belle Fourche River. It has a total capacity of 172,873 AF (169,790 AF active). The reservoir is filled by diverting water from the Belle Fourche River through the inlet canal, which has a capacity of 1,300 cfs. The reservoir is used for irrigation of 57,000 acres in the Belle Fourche Project, which also receives a supplemental supply from Keyhole Reservoir. From November 1965 to May 1977, the active capacity of the reservoir was temporarily limited to 160,300 AF at elevation 2981.8 feet until the damaged spillway was replaced.

When the Belle Fourche Reservoir storage right is satisfied by the reservoir filling, the South Dakota Department of Environment and Natural Resources provide guidelines for complying with water rights on the Belle Fourche River. The District is required to continue to bypass 5 cfs for domestic use prior to diverting the Johnson Lateral water right for up to 40 cfs. If flows into the diversion dam are greater than 45 cfs, the District is required to bypass up to 60 cfs for downstream irrigation rights. Any flows more than these amounts can be diverted into the reservoir and stored. If all these rights are not needed, the District can divert flows into the reservoir.

A sedimentation survey of Belle Fourche Reservoir was conducted in 2006 and a new area and capacity table was published in April 2007. The previous survey was done in 1949. Belle Fourche Reservoir accumulated 19,204 AF of sediment since the 1949 survey and 36,364 AF since the original survey in 1910. The sedimentation rate from 1910 to 2006 averages 375 AF per year. The new area and capacity tables were first used in WY 2008.

WY 2017 Operations Summary

Belle Fourche Reservoir started WY 2017 at elevation 2,957.68 feet and storage of 63,841 AF, which is 17.32 feet and 109,032 AF below the top of the conservation pool. Precipitation was 114 percent of average. Inflows totaled 105,998 AF, which was 92 percent of average. Peak inflows occurred in April, totaling 18,954 AF for the month. The peak elevation was 2,972.26 feet, storage of 151,509 AF, and occurred on May 7, 2017. The minimum elevation was 2,956.37 feet, storage of 58,030 AF, and occurred on September 23, 2017. Water year 2017 ended at elevation 2,956.45 feet and storage of 58,373 AF, which is 18.55 feet and 114,500 AF below the top of the conservation pool. Belle Fourche Reservoir ended WY 2017 with 55,290 AF in active storage.

The BFID had a full water allotment of 24 inches for its irrigators. The North and South Canal were turned on May 9, 2017. Releases reached a peak of 278 cfs on July 24 for South Canal and a peak of 383 cfs on July 2, 2017 for North Canal. The North and South Canal were shut off September 21, 2017. Total irrigation releases for WY 2017 were over 120,000 AF.

An EMS orientation was conducted March 14, 2017. The PFR of Belle Fourche was conducted on May 3, 2017. There are no incomplete SOD recommendations. Inlet Canal was not shut down in 2017.

Inclinometer readings were taken twice this year at high and low reservoir elevation as required by the periodic monitoring schedule.

The Belle Fourche Reservoir Road Maintenance Contract, No. R17PX00359, was awarded to Bachman LLC for $45,958.50. The contractor bladed the Belle Fourche Reservoir roads on three separate dates during the 2017 recreation season. The contract was completed on November 1, 2017.

The rip rap procurement for Gaden's Point, No. R17PC00024, was awarded to Western Construction Inc. for $325,146.50. Western Construction delivered approximately 17,000 tons of riprap. Delivery was complete October 12, 2017. Western Construction, Inc. worked with Lawson Environmental to deliver rock directly to the site where needed assisting the construction.

The construction of the shoreline protection at Gaden's Point, No. R17PC00070, was awarded to Lawson Environmental Services, LLC for $194,672.00. Lawson Environmental constructed riprap revetment along the north shoreline of Gaden's Point to protect the neck and access to this point from further erosion. Approximately 11,000 tons of rock were placed to protect this reach. On site work of the shoreline protection was completed on October 6, 2017.

Monthly Statistics for WY 2017

Record monthly inflows were recorded in the following months: Inflows: no inflow records achieved in WY 2017. Record end of month reservoir content were recorded in the following months: End of Month Storage: no storage records were achieved in WY 2017. Additional statistical information on Belle Fourche Reservoir and its operations during WY 2017 can be found on Table DKT11 and Figure DKG10.

Table DKT11
Hydrologic Data for WY 2017
Belle Fourche Reservoir

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	2,927.00	3,083	3,083
TOP OF ACTIVE CONSERVATION	2,975.00	172,873	169,790
TOP OF JOINT USE			
TOP OF EXCLUSIVE FLOOD CONTROL			

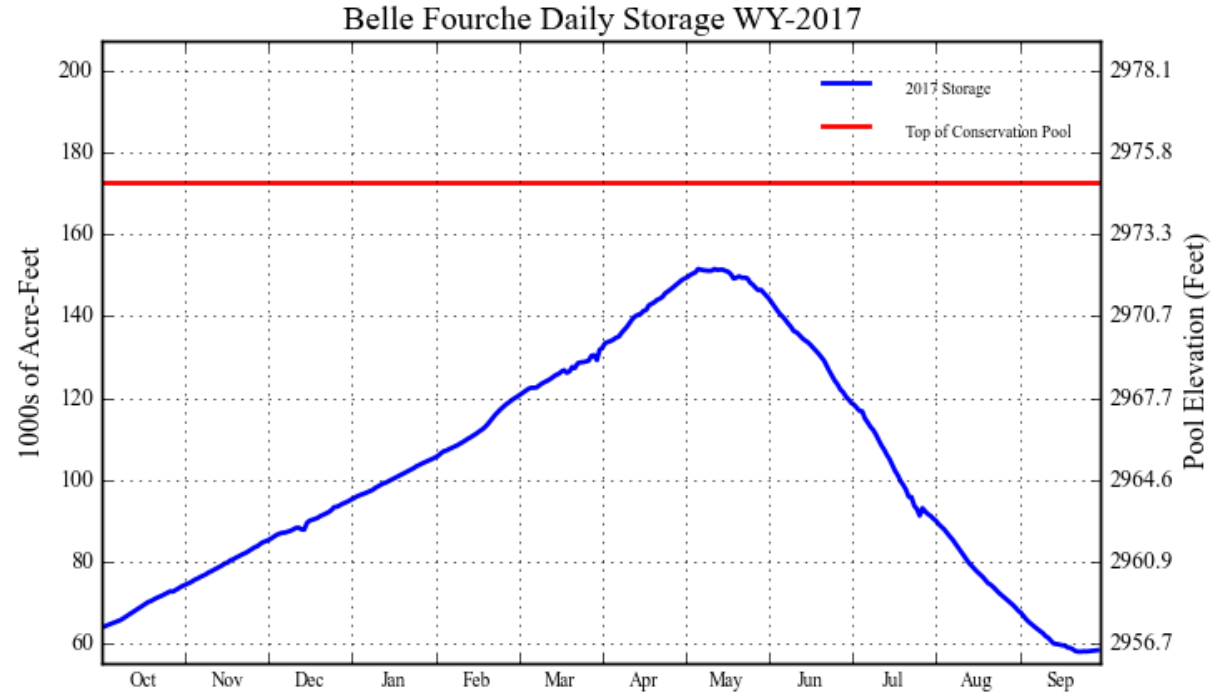
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE (end-of-day)
BEGINNING OF YEAR	2,957.68	63,841	OCT 01, 2016
END OF YEAR	2,956.45	58,373	SEP 30, 2017
ANNUAL LOW	2,956.37	58,030	SEP 23, 2017
ANNUAL HIGH	2,972.26	151,509	MAY 07, 2017
HISTORIC HIGH	2,975.92	196,792	MAY 30, 1996

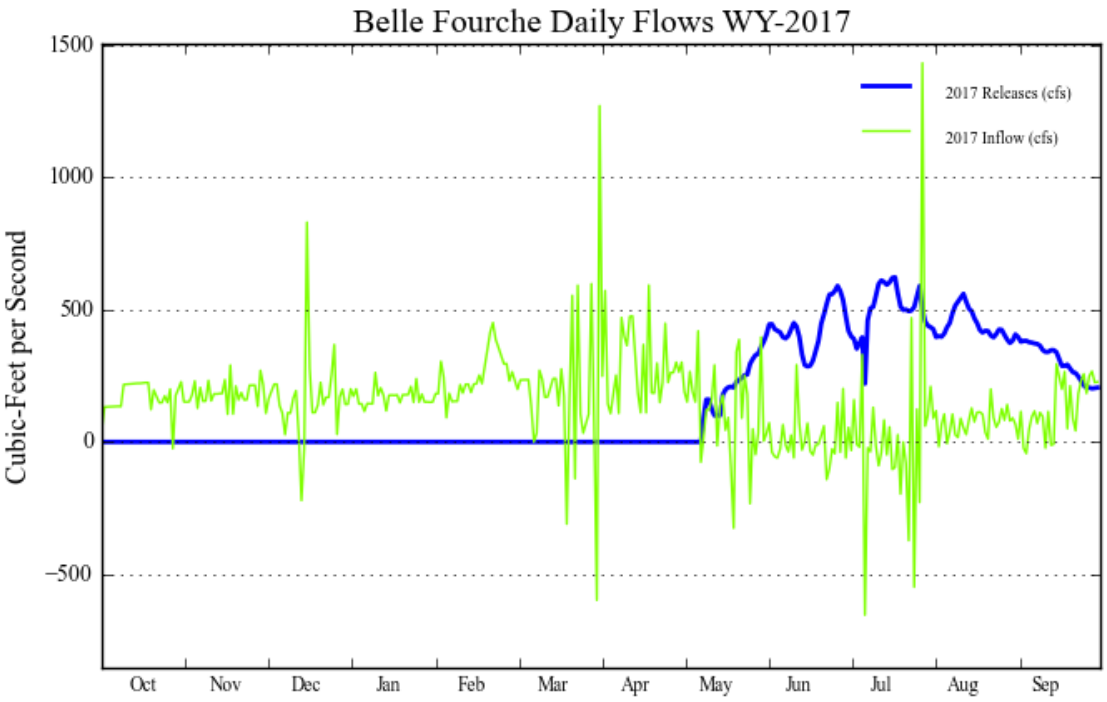
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	105,998	OCT 01-SEP 30	111,466	OCT 01-SEP 30
DAILY PEAK (CFS)	1,430.91	JUL 28, 2016	622.03	JUL 18, 2017
DAILY MINIMUM (CFS)	-653.59	JUL 07, 2016	0	MAY 08, 2017

MONTH	INFLOW		OUTFLOW		EOM CONTENT**	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	10,365	98	0	0	74,206	99
NOVEMBER	10,806	110	0	0	85,012	101
DECEMBER	10,111	112	0	0	95,123	102
JANUARY	10,406	115	0	0	105,529	104
FEBRUARY	13,995	145	0	0	119,524	107
MARCH	9,726	62	1	0	129,249	102
APRIL	18,954	138	0	4	148,203	106
MAY	7,478	51	10,011	107	145,670	99
JUNE	452	4	25,744	197	120,378	85
JULY	1,273	34	30,460	91	91,191	84
AUGUST	4,727	185	27,107	83	68,811	90
SEPTEMBER	7,705	157	18,143	69	58,373	91
ANNUAL	71,577	62	111,466	97	103,439	98
APRIL-JULY	22,430	51	66,215	108	126,361	94

* Frequently observed during fall and winter months
** EOM Content – End of Month Content

Figure DKG10
Belle Fourche Reservoir





CORPS OF ENGINEERS

MAIN STEM RESERVOIRS

AND

ENERGY GENERATION

DATA

CORPS MAIN STEM RESERVOIRS

The Missouri River main stem reservoir system, consisting of six reservoirs located in Montana, North Dakota, South Dakota, and Nebraska, provides for the following beneficial uses: flood control, irrigation, navigation, power, municipal and industrial water supply, water quality control, fish and wildlife, and recreation. Based on information from the CORPS' 2017-18 AOP, the capacity and storage allocations of the main stem system were updated to current values and are shown in upstream to downstream order as follows:

Reservoir Storage Allocation (1,000 AF)

Dam	Permanent	Carryover Multiple Use	Flood Control and Multiple Use	Exclusive Flood Control	Storage
Fort Peck, MT	4,088	10,700	2,704	971	18,463
Garrison, ND	4,794	12,951	4,211	1,495	23,451
Oahe, SD	5,315	13,353	3,208	1,107	22,983
Big Bend, SD	1,631	0	118	61	1,810
Fort Randall, SD	1,469	1,532	1,306	986	5,293
Gavins Point, NE	295	0	79	54	428
Totals	17,592	38,536	11,626	4,674	72,428

Each main stem facility serves a powerplant. The number of generating units and total nameplate capabilities are shown below:

Powerplant	Units	Capacity (Kilowatts)
Fort Peck, MT	5	185,250
Garrison, ND	5	583,300
Oahe, SD	7	786,030
Big Bend, SD	8	494,320
Fort Randall, SD	8	320,000
Gavins Point, NE	3	132,300
Totals	36	2,501,200

Main stem system releases are regulated to support the multiple use purposes of the reservoirs. The navigation season on the Missouri River below the dams is from late March to late November. Releases from the system for navigation are higher during late summer and fall lowering the system storage. During that time, much of the system's hydropower is generated from the lower most projects. During closure of the navigation season, higher releases are made, and more power is generated from the upstream Fort Peck and Garrison Reservoirs. This offsets the reduced release and generation from the downstream projects during winter closure of the river for navigation. The desired annual target system storage level is 56.1 million AF on the first of March.

Operation of the Missouri River main stem reservoir system provides the following nine beneficial uses: flood control, irrigation, navigation, power, municipal and industrial water supply, water quality control, fish and wildlife, and recreation. Table CET1 presents the regulation benefit for most of those uses as recorded in 2016-2017, 2015-2016, and the average. Benefits are defined as the tons of produce shipped, dollars of damages prevented, kilowatt hours of electricity produced, and reservoir elevation and river stages maintained. For the shipping information, estimates also were provided this year which included the sand, gravel, and waterway material shipped. Table CET1 shows damages prevented at September 2017 price levels.

Table CET1:
Main Stem Reservoir System
Comparison of Present and Past Benefits

Use of Regulated Water	Period of Use or Season	Totals	Totals	Long-Term
Navigation[1]	Apr. - Dec.[2]	0.634 million tons (2017)	0.559 million tons (2016)	1.65 million Tons[3]
Flood Damages Prevented	Oct. – Sept.	$244.0 million (2017)	$ 680.0 million (2016)	$ 62.5 billion[4]
Energy	Aug. - Jul.	8.6 billion KWH (Aug. 16-July 17)	7.7 billion KWH (Aug. 15-July 16)	9.3 billion KWH[5]

[1]If sand, gravel, and waterway material are included:
4.918 million tons (2017)
4.656 million tons (2016)
6.61 million tons (1967-2017 average)
[2]End of navigation season extended 0 days in 2016 and 10 days in 2017
[3]1967-2017 average. Peak tonnage shipped in 1977 (3.336 million tons)
[4]Total damages prevented (1938-2017)
[5]1968-2017 Average

A detailed description of the main stem system operations is presented in annual operating reports prepared by and available for distribution from the U.S. Missouri River Basin Water Management Division, U.S. Army Corps of Engineers, Northwestern Division, Omaha, Nebraska.

ENERGY GENERATION

There are 14 Federal powerplants located in the Upper Missouri River Basin that are currently operating. Eight of the power plants are owned and operated by Reclamation and have a total capacity of 348,100 kilowatts. The other six are owned and operated by the CORPS and have a total capacity of 2,501,200. Energy generated by the 14 power plants is marketed by the Department of Energy.

Total generation in the combined system in WY 2017 was 10,653.142 million kilowatt hours, 1,836.173 million kilowatt hours less than in WY 2016. A summary of the past 10 years of energy generation within the Upper Missouri River Basin is shown below.

USBR and CORPS Energy Generation
(Million Kilowatt Hours)

Year	USBR	USACE	TOTAL
2017	1,560.628	9,092.514	10,653.142
2016	1,164.801	7,652.158	8,816.969
2015	1,316.344	9,323.682	10,340.026
2014	1,559.297	8,729.714	10,289.011
2013	840.209	8,183.967	9,024.176
2012	1,141.904	10,779.032	11,920.936
2011	1,674.806	11,267.588	12,942.390
2010	1,430.618	7,422.355	8,852.974
2009	1,481.641	6,273.697	7,755.338
2008	1,182.399	4,775.900	5,958.299

A comparison of 2016 and 2017 generation and other data from Missouri Basin Region powerplants is shown on Table CET2. Tables CET3, CET4, and CET5 show the monthly generation, power releases, and total downstream releases, respectively, for all Federal plants in the Missouri Basin Region. The annual energy generation for each of the last several years for all Reclamation, CORPS, and combined plants is shown graphically on Figures CEG1, CEG3, and CEG5, respectively, Monthly generation for each month during the past several years is shown graphically on Figures CEG2, CEG4, and CEG6.

For a more detailed account of powerplants operation at Reclamation facilities during the year, refer to the 2017 operation summaries. Information on the CORPS' powerplants operations can be obtained from the annual operating reports prepared by and available for distribution from the Missouri River Basin Water Management Division, U.S. Army Corps of Engineers, Northwestern Division, Omaha, Nebraska.

TABLE CET2

ANNUAL ENERGY PRODUCTION DATA
WATER YEAR 2017

BUREAU PLANTS	INSTALLED CAPACITY (KW)	MILLION KILOWATT-HOURS GENERATED 2016	MILLION KILOWATT-HOURS GENERATED 2017	WATER USED FOR GENERATION IN 2017 1,000 AF	WATER USED FOR GENERATION IN 2017 PERCENT OF TOTAL RELEASE	WATER USED FOR GENERATION IN 2017 KW-HOURS PER AF	RIVER RELEASE 1,000 AF	TOTAL RELEASE 1,000 AF
Canyon Ferry	50,000	305.357	336.681	2,782.041	79.77	121.02	3,384.7	3,487.8
Pilot Butte[1]	1,600	0.000	0.000	0.000	0.00	N/A	159.6	159.6
Boysen	15,000	67.344	85.315	1,128.997	53.12	75.57	2,125.5	2,125.5
Buffalo Bill Reservoir Units								
Shoshone	3,000	17.029	18.731	110.086	7.39	170.15	See below for	total.
Buffalo Bill	18,000	56.814	90.413	376.585	25.29	240.09	See below for	total.
Heart Mountain	6,000	18.330	22.634	106.130	7.13	213.27	See below for	total.
Spirit Mountain [2]	4,500	17.389	15.360	150.253	10.09	102.23	See below for	total.
Total for Buffalo Bill Reservoir[3]	31,500	109.562	147.138	743.054	49.90	198.02	1,270.2	1,489.2
Yellowtail	250,000	682.538	991.494	2,612.873	59.27	379.46	4,360.5	4,408.4
Subtotal	**348,100**	**1,164.801**	**1,560.628**	**7,266.966**	**62.27**	**214.76**	**11,300.5**	**11,670.4**
CORPS PLANTS								
Fort Peck	185,250	785.498	816.111	5,125.00	100.00	159.24	5,125.0	5,125.0
Garrison	583,300	1,913.684	2,527.377	16,213.00	100.00	155.89	16,213.0	16,213.0
Oahe	786,030	2,051.136	2,481.144	16,324.00	100.00	151.99	16,324.0	16,324.0
Big Bend	494,320	746.601	908.475	14,982.00	100.00	60.64	14,982.0	14,982.0
Fort Randall	320,000	1,460.986	1,584.231	15,482.00	92.75	102.33	16,693.0	16,693.0
Gavins Point	132,300	694.263	775.176	17,399.00	95.66	44.55	18,189.0	18,189.0
Subtotal	**2,501,200**	**7,652.168**	**9,092.514**	**85,525.00**	**97.71**	**106.31**	**87,526.0**	**87,526.0**
TOTAL MISSOURI BASIN	**2,849,300**	**8,816.969**	**10,653.142**	**92,791.97**	**93.54**	**114.81**	**98,826.5**	**99,196.4**

[1] River Release and Total Release at Pilot Butte Reservoir is computed inflow to Pilot Butte Reservoir due to the location of the powerplant at inlet of supply canal.

[2] Spirit Mountain Powerplant is used to dissipate energy in the transition from the pressurized portion of the Shoshone Canyon Conduit to the free flow section of the conduit. Water used for generation at Spirit Mountain Powerplant is then routed to Heart Mountain Canal or used for generation at Heart Mountain Powerplant.

[3] This represents the total for the four separate powerplants at Buffalo Bill Dam.

TABLE CET3
MONTHLY ENERGY GENERATION (MILLION KILOWATT-HOURS)
WATER YEAR 2017

	BUREAU OF RECLAMATION PLANTS								
				BUFFALO BILL PLANTS					
MONTH	CANYON FERRY	PILOT BUTTE	BOYSEN	HEART MOUNTAIN	SPIRIT MOUNTAIN	BUFFALO BILL	SHOSHONE	YELLOWTAIL	TOTAL
October	23.922	0.000	3.361	1.083	1.233	0.119	1.505	59.988	**91.211**
November	24.604	0.000	4.715	0.000	0.000	0.000	1.550	53.889	**84.758**
December	26.351	0.000	5.588	0.000	0.000	0.399	1.551	59.648	**93.537**
January	25.269	0.000	5.384	0.000	0.000	0.536	1.542	58.448	**91.179**
February	21.679	0.000	4.856	0.000	0.000	3.783	1.012	69.384	**100.714**
March	26.039	0.000	9.903	1.234	0.095	12.418	1.621	108.456	**159.766**
April	31.135	0.000	6.696	3.523	0.555	12.993	1.521	102.384	**158.807**
May	38.528	0.000	9.458	3.658	1.884	13.060	1.398	105.689	**173.675**
June	37.055	0.000	8.245	3.086	2.329	12.293	1.467	100.236	**164.711**
July	30.081	0.000	10.443	3.039	3.244	13.402	1.888	103.401	**165.498**
August	26.943	0.000	10.978	3.600	3.297	8.245	1.921	91.923	**146.907**
September	25.075	0.000	5.688	3.411	2.723	13.165	1.755	78.048	**129.865**
TOTAL	**336.681**	**0.000**	**85.315**	**22.634**	**15.360**	**90.413**	**18.731**	**991.494**	**1,560.628**

	CORPS OF ENGINEERS PLANTS							MISSOURI BASIN
MONTH	FORT PECK	GARRISON	OAHE	BIG BEND	FORT RANDALL	GAVINS POINT	TOTAL	TOTAL
October	46.742	122.740	115.203	41.595	128.585	62.814	**517.679**	**608.890**
November	45.011	119.484	143.905	54.357	112.973	62.896	**538.626**	**623.384**
December	66.877	148.504	170.219	64.448	92.426	52.342	**594.816**	**688.353**
January	68.115	149.612	172.807	64.986	89.072	49.409	**594.001**	**685.180**
February	43.396	112.342	137.634	56.294	67.729	44.318	**461.713**	**562.427**
March	42.726	134.199	177.342	68.603	108.366	50.397	**581.633**	**741.399**
April	56.857	247.465	234.990	82.906	125.545	71.227	**818.990**	**977.797**
May	85.417	306.181	225.805	81.948	123.375	74.893	**897.619**	**1,071.294**
June	94.018	321.187	283.259	103.593	168.149	83.120	**1,053.326**	**1,218.037**
July	97.818	327.434	309.495	107.480	191.976	83.624	**1,117.827**	**1,283.325**
August	97.142	318.045	278.572	100.734	191.424	75.440	**1,061.357**	**1,208.264**
September	71.992	220.184	231.913	81.531	184.611	64.696	**854.927**	**984.792**
TOTAL	**816.111**	**2,527.377**	**2,481.144**	**908.475**	**1,584.231**	**775.176**	**9,092.514**	**10,653.142**

TABLE CET4

WATER USED FOR POWER GENERATION (1,000 ACRE-FEET)
WATER YEAR 2017

MONTH	CANYON FERRY	BOYSEN	PILOT BUTTE	BUFFALO BILL RESERVOIR UNITS				YELLOWTAIL	FORT PECK	GARRISON	OAHE	BIG BEND	FORT RANDALL	GAVINS POINT
				SHOSHONE	BUFF. BILL	HEART MTN.	SPIRIT MTN.[1]							
October	200.789	50.477	0.000	10.557	1.580	5.023	12.546	152.137	286.000	799.000	779.000	677.000	1,258.000	1,355.000
November	206.100	51.175	0.000	11.011	0.000	0.000	0.000	148.233	292.000	778.000	914.000	872.000	1,212.000	1,361.000
December	225.165	56.426	0.000	10.328	1.769	0.000	0.000	156.475	398.000	965.000	1,128.000	1,041.000	1,004.000	1,107.000
January	217.267	56.300	0.000	10.268	1.937	0.000	0.000	163.457	415.000	979.000	1,151.000	1,043.000	917.000	1,053.000
February	183.552	50.305	0.000	5.731	12.359	0.000	0.000	188.658	276.000	732.000	914.000	909.000	646.000	945.000
March	221.296	116.834	0.000	8.891	49.649	5.472	0.000	274.078	291.000	860.000	1,169.000	1,120.000	1,020.000	1,109.000
April	259.308	94.377	0.000	8.073	51.839	15.857	4.982	265.855	376.000	1,590.000	1,551.000	1,381.000	1,193.000	1,629.000
May	316.270	176.620	0.000	7.421	56.345	17.006	20.179	276.661	534.000	1,976.000	1,484.000	1,381.000	1,157.000	1,714.000
June	288.089	128.293	0.000	8.274	53.296	15.666	24.317	269.242	586.000	2,045.000	1,874.000	1,716.000	1,638.000	1,964.000
July	236.143	141.177	0.000	10.021	51.930	14.843	30.677	271.843	607.000	2,061.000	2,041.000	1,794.000	1,842.000	1,952.000
August	219.041	135.209	0.000	10.196	39.293	16.538	31.071	246.840	620.000	2,027.000	1,827.000	1,704.000	1,809.000	1,758.000
September	209.022	71.805	0.000	9.315	56.589	15.725	26.480	199.395	444.000	1,401.000	1,492.000	1,344.000	1,786.000	1,452.000
TOTAL	**2,782.041**	**1,128.997**	**0.000**	**110.086**	**376.585**	**106.130**	**150.253**	**2,612.873**	**5,125.000**	**16,213.000**	**16,324.000**	**14,982.000**	**15,482.000**	**17,399.000**

[1] Spirit Mountain Powerplant is used to dissipate energy in the transition from the pressurized portion of the Shoshone Canyon Conduit to the free flow section of the conduit. Water used for generation at Spirit Mountain Powerplant is then routed to Heart Mountain Canal or used for generation at Heart Mountain Powerplant.

TABLE CET5

TOTAL RELEASE (1,000 ACRE-FEET)
WATER YEAR 2017

MONTH	CANYON FERRY	BOYSEN	PILOT BUTTE	BUFFALO BILL	BULL LAKE	ANCHOR	YELLOWTAIL	FORT PECK	GARRISON	OAHE	BIG BEND	FORT RANDALL	GAVINS POINT
October	203.835	50.477	0.000	32.944	26.162	0.090	152.137	286.000	799.000	779.000	677.000	1,258.000	1,355.000
November	206.191	51.175	0.000	11.650	1.479	0.000	148.233	292.000	778.000	914.000	872.000	1,212.000	1,375.000
December	262.221	56.426	0.000	12.603	1.606	0.000	156.475	398.000	965.000	1,128.000	1,041.000	1,004.000	1,107.000
January	217.267	56.300	0.000	12.388	1.681	0.000	163.457	415.000	979.000	1,151.000	1,043.000	917.000	1,053.000
February	183.552	50.305	0.000	20.257	1.485	0.000	188.658	276.000	732.000	914.000	909.000	646.000	945.000
March	227.810	127.845	0.000	92.159	1.634	0.045	456.159	291.000	860.000	1,169.000	1,120.000	1,121.000	1,262.000
April	335.338	285.855	2.222	195.521	1.814	0.144	625.139	376.000	1,590.000	1,551.000	1,381.000	1,547.000	1,698.000
May	541.115	351.780	15.885	331.704	21.517	3.181	820.075	534.000	1,976.000	1,484.000	1,381.000	1,552.000	1,726.000
June	520.338	485.488	35.940	283.821	85.305	15.571	657.318	586.000	2,045.000	1,874.000	1,716.000	1,946.000	1,965.000
July	292.159	400.071	41.604	275.701	60.274	5.484	574.939	607.000	2,061.000	2,041.000	1,794.000	1,895.000	1,952.000
August	261.783	138.018	33.379	109.738	37.653	4.317	258.792	620.000	2,027.000	1,827.000	1,704.000	1,809.000	1,906.000
September	236.143	71.805	30.569	110.670	39.372	2.042	207.004	444.000	1,401.000	1,492.000	1,344.000	1,786.000	1,845.000
TOTAL	**3,487.750**	**2,125.545**	**159.599**	**1,489.156**	**279.982**	**30.873**	**4,408.385**	**5,125.000**	**16,213.000**	**16,324.000**	**14,982.000**	**16,693.000**	**18,189.000**

TABLE CET6

TOTAL RESERVOIR STORAGE CONTENTS (1,000 ACRE-FEET)
WATER YEARS 2016 AND 2017

BUREAU RESERVOIRS	TOP OF CONSERVATION CAPACITY [3]	DEAD AND INACTIVE CAPACITY	TOTAL STORAGE SEPTEMBER 30		END OF SEPTEMBER PERCENT OF AVERAGE	
			2016	2017	2016	2017
Clark Canyon	174.4	1.1	52.0	99.1	58%	105%
Canyon Ferry	1,891.9	396.0	1,485.4	1,544.7	92%	95%
Helena Valley	10.5	4.6	9.1	9.0	115%	120%
Gibson	96.5	0.0	5.5	5.6	23%	24%
Willow Creek	31.8	1.0	16.8	17.3	87%	86%
Pishkun	46.7	16.0	20.1	19.7	67%	61%
Lake Elwell	925.6	554.3	755.3	814.9	103%	103%
Sherburne	66.1	1.9	23.6	11.1	95%	66%
Fresno	92.9	0.4	57.6	43.0	129%	93%
Nelson	79.0	18.1	26.1	50.7	117%	89%
Bull Lake	152.5	0.7	38.3	120.5	84%	159%
Pilot Butte	33.7	3.8	7.4	18.0	85%	100%
Boysen	741.6	219.2	624.9	717.0	105%	120%
Anchor[1]	17.2	0.1	0.5	1.2	141%	358%
Buffalo Bill[2]	646.6	41.7	421.3	528.2	97%	119%
Bighorn Lake	1,020.6	469.9	942.4	1,014.6	102%	107%
E. A. Patterson	8.6	0.5	4.8	5.9	65%	95%
Lake Tschida	67.1	5.2	54.2	51.4	106%	90%
Jamestown Reservoir	31.5	0.8	29.5	29.4	103%	102%
Shadehill Reservoir	120.2	43.9	83.9	85.8	107%	81%
Angostura Reservoir	123.0	42.2	89.1	83.5	119%	98%
Deerfield Reservoir	15.7	0.2	14.9	15.5	111%	116%
Pactola Reservoir	56.0	1.0	52.5	51.3	110%	111%
Keyhole Reservoir	188.7	6.6	146.0	122.1	190%	138%
Belle Fourche Reservoir	172.9	3.1	63.8	58.4	151%	79%
Subtotal	**6,811.2**	**1,832.3**	**5,024.9**	**5,517.7**		
CORPS RESERVOIRS						
Fort Peck	17,578.0	4,073.0	14,659.0	15,377.0		
Garrison	22,332.0	4,980.0	18,040.0	19,029.0		
Oahe	22,035.0	5,373.0	19,428.0	19,568.0		
Big Bend	1,738.0	1,621.0	1,650.0	1,660.0		
Fort Randall	4,433.0	1,517.0	3,276.0	3,257.0		
Gavins Point	393.0	307.0	355.0	362.0		
Subtotal	**68,509.0**	**17,871.0**	**57,408.0**	**59,253.0**		
TOTAL UPPER MISSOURI BASIN	**75,320.2**	**19,703.3**	**62,432.9**	**64,770.7**		

[1] Percent of average content of Anchor Reservoir is based on an 22-year average, 1991-2012.

[2] Percent of average content of Buffalo Bill Reservoir is based on an 20-year average, 1993-2012; to reflect the operation of the reservoir since 1992 when the dam was raised and the capacity of the reservoir was increased to 646,565 acre-feet.

[3] Includes joint-use space.

TABLE CET7
WATER YEAR 2017
End-of-Month Reservoir Contents
(1,000 Acre-Feet)

RECLAMATION RESERVOIRS	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
CLARK CANYON RESERVOIR	65.4	78.1	87.9	97.1	107.1	127.0	138.8	143.3	142.3	117.9	101.2	99.1
% of Average	63.2%	69.7%	74.6%	79.0%	84.0%	93.6%	97.3%	103.8%	108.3%	106.6%	107.8%	105.2%
CANYON FERRY RESERVOIR	1,492.4	1,531.1	1,449.9	1,418.5	1,464.0	1,561.5	1,567.4	1,673.5	1,891.6	1,795.2	1,632.4	1,544.7
% of Average	91.3%	92.6%	90.5%	92.4%	98.4%	106.8%	105.6%	101.8%	102.2%	100.5%	97.5%	95.3%
HELENA VALLEY RESERVOIR	8.6	8.2	8.0	7.7	7.5	7.3	10.2	9.5	9.7	8.0	9.6	9.0
% of Average	123.9%	122.3%	123.3%	126.3%	130.6%	128.2%	110.1%	103.9%	108.7%	107.0%	118.6%	119.8%
GIBSON RESERVOIR	12.6	23.3	29.1	31.8	36.6	40.4	46.0	90.6	94.0	39.6	5.5	5.6
% of Average	43.2%	70.1%	79.8%	79.8%	84.7%	84.4%	73.4%	100.8%	104.2%	77.1%	20.4%	23.7%
WILLOW CREEK	21.8	27.4	27.6	27.7	28.3	29.2	29.5	30.9	31.5	20.2	15.5	17.3
% of Average	0.1%	127.4%	126.1%	124.6%	124.8%	124.1%	116.2%	108.7%	108.0%	83.6%	75.9%	85.9%
PISHKUN RESERVOIR	20.2	20.2	20.3	20.5	20.5	20.8	28.7	45.6	38.6	40.0	27.2	19.7
% of Average	0.1%	58.8%	59.7%	60.9%	60.8%	60.9%	71.9%	99.3%	92.2%	107.9%	75.9%	60.8%
LAKE ELWELL (TIBER DAM)	763.1	766.6	748.4	733.1	750.4	825.3	863.8	907.3	914.0	879.5	841.5	814.9
% of Average	100.3%	102.1%	101.5%	101.5%	104.9%	114.7%	117.1%	111.0%	104.1%	102.6%	102.3%	102.8%
SHERBURNE LAKE	42.3	46.3	47.8	48.6	52.0	57.4	49.7	52.8	65.2	53.1	23.3	11.1
% of Average	212.1%	184.5%	171.4%	157.3%	157.2%	199.7%	244.5%	153.8%	115.8%	108.4%	83.0%	65.6%
FRESNO RESERVOIR	59.7	59.7	56.7	53.2	64.4	86.3	87.9	81.3	61.5	20.1	24.5	43.0
% of Average	131.7%	132.0%	129.9%	125.9%	147.5%	145.8%	116.1%	112.1%	81.1%	34.5%	53.8%	92.9%
NELSON RESERVOIR	29.4	28.8	28.2	28.0	27.8	42.4	64.4	72.3	59.2	41.9	47.8	50.7
% of Average	49.9%	49.9%	50.4%	51.5%	52.3%	77.7%	104.9%	119.0%	97.4%	76.0%	87.8%	89.0%
BULL LAKE	29.7	37.4	40.6	43.3	46.7	52.4	60.9	85.6	128.0	149.0	141.9	120.5
% of Average	39.7%	49.5%	53.4%	56.9%	61.5%	68.8%	80.3%	96.3%	101.6%	115.6%	137.6%	159.0%
PILOT BUTTE RESERVOIR	29.8	29.5	29.4	29.4	29.4	29.5	29.7	28.9	28.6	28.3	25.8	18.0
% of Average	112.0%	106.6%	106.0%	105.5%	105.0%	100.2%	97.0%	107.6%	96.0%	111.3%	121.0%	99.6%
BOYSEN RESERVOIR	648.2	661.0	644.7	630.7	660.3	618.3	465.0	483.4	816.9	731.1	692.9	717.0
% of Average	108.8%	112.0%	112.6%	113.3%	120.8%	114.6%	88.4%	88.0%	124.5%	112.6%	112.2%	119.6%
ANCHOR RESERVOIR	0.97	0.88	0.65	0.48	0.64	0.88	1.43	4.77	7.05	6.29	2.32	1.17
% of Average[1]	340.1%	358.2%	275.4%	206.9%	245.1%	240.5%	286.4%	311.6%	207.8%	287.6%	390.4%	357.9%
BUFFALO BILL RESERVOIR	441.3	470.1	475.9	481.4	483.2	457.1	357.4	331.9	624.5	632.4	583.8	528.2
% of Average[2]	104.4%	110.3%	112.1%	113.9%	115.5%	110.4%	90.6%	75.8%	110.0%	109.9%	114.9%	118.6%
BIGHORN LAKE	992.9	984.6	937.3	894.4	918.7	769.2	747.5	740.4	1,003.5	1,044.9	1,002.5	1,014.6
% of Average	103.3%	105.2%	105.5%	106.3%	113.0%	95.8%	94.7%	85.7%	100.5%	106.3%	106.2%	106.8%
E. A. PATTERSON LAKE	4.8	5.1	5.2	5.3	8.9	8.7	8.7	8.2	7.3	6.6	6.1	5.9
% of Average	81.0%	86.3%	87.9%	90.0%	138.5%	111.4%	109.5%	105.3%	95.3%	92.7%	92.0%	94.7%
LAKE TSCHIDA	55.9	56.7	57.3	58.4	64.4	70.9	65.5	63.9	59.9	54.4	52.4	51.4
% of Average	97.8%	98.6%	99.8%	101.7%	107.8%	104.4%	99.5%	97.6%	91.6%	87.8%	89.9%	90.5%
JAMESTOWN RESERVOIR	27.7	27.9	27.1	27.2	29.4	34.1	59.0	33.1	29.9	31.0	29.7	29.4
% of Average	103.1%	105.5%	101.8%	101.8%	109.0%	93.6%	103.9%	72.8%	80.3%	91.1%	91.0%	102.4%
SHADEHILL RESERVOIR	83.2	82.6	81.1	79.5	82.7	89.3	93.7	92.7	90.0	87.3	86.5	85.8
% of Average	81.1%	81.5%	81.1%	80.6%	81.9%	77.5%	80.1%	79.2%	77.7%	76.6%	78.9%	81.3%
ANGOSTURA RESERVOIR	90.7	92.7	94.9	97.0	103.1	108.5	113.7	116.7	112.3	99.1	88.4	83.5
% of Average	104.9%	106.0%	106.4%	106.3%	107.7%	106.0%	107.5%	106.6%	103.3%	100.1%	99.5%	98.3%
DEERFIELD RESERVOIR	15.0	15.1	15.2	15.2	15.2	15.3	15.3	15.3	15.4	15.4	15.4	15.5
% of Average	112.2%	111.9%	110.5%	109.1%	108.0%	107.2%	106.6%	105.6%	106.7%	109.3%	112.9%	115.9%
PACTOLA RESERVOIR	52.2	52.1	52.7	53.7	54.9	55.2	55.3	55.8	55.2	52.9	51.8	51.3
% of Average	112.1%	111.2%	113.2%	115.5%	117.8%	116.5%	113.6%	111.8%	109.5%	108.7%	110.1%	110.5%
KEYHOLE RESERVOIR	144.2	143.0	143.6	143.6	146.8	147.3	149.3	147.6	145.6	142.9	131.6	122.1
% of Average	163.2%	162.4%	162.8%	161.9%	160.8%	151.1%	151.0%	145.2%	143.4%	148.9%	145.2%	137.8%
BELLE FOURCHE RESERVOIR	74.2	85.0	95.1	105.5	119.5	129.2	148.2	145.7	120.4	91.2	68.8	58.4
% of Average	90.1%	92.1%	94.0%	95.5%	100.1%	96.8%	102.5%	93.8%	80.6%	77.2%	80.1%	78.9%
CORPS RESERVOIRS	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
FORT PECK RESERVOIR	14,954.0	14,989.0	14,828.0	14,764.0	14,983.0	15,252.0	15,482.0	15,882.0	16,134.0	15,869.0	15,529.0	15,377.0
GARRISON RESERVOIR	18,217.0	18,341.0	17,934.0	17,760.0	17,997.0	18,999.0	19,023.0	19,545.0	20,675.0	20,576.0	19,610.0	19,029.0
OAHE RESERVOIR	19,323.0	19,146.0	18,962.0	18,800.0	18,816.0	18,753.0	18,931.0	19,406.0	19,562.0	19,503.0	19,697.0	19,568.0
BIG BEND RESERVOIR	1,680.0	1,676.0	1,670.0	1,677.0	1,675.0	1,631.0	1,671.0	1,644.0	1,630.0	1,666.0	1,636.0	1,660.0
FORT RANDALL RESERVOIR	2,621.0	2,264.0	2,382.0	2,708.0	3,272.0	3,409.0	3,490.0	3,505.0	3,442.0	3,494.0	3,590.0	3,257.0
GAVINS POINT RESERVOIR	385.0	374.0	372.0	370.0	338.0	340.0	330.0	316.0	335.0	335.0	348.0	362.0

[1] Percent of average content of Anchor Reservoir is based on a 22-year average, 1991-2012; this is due to the availability of data for Anchor Reservoir.

[2] Percent of average content of Buffalo Bill Reservoir is based on an 20-year average, 1993-2012; to reflect the operation of the reservoir since 1992 when the dam was raised and the capacity of the reservoir was increased to 646,565 acre-feet.

TABLE CET8
WATER YEAR 2017
Monthly Inflow Amounts
(1,000 Acre-Feet)

RECLAMATION RESERVOIRS	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
CLARK CANYON RESERVOIR	16.2	15.2	12.4	11.7	12.4	22.5	14.4	18.1	25.6	17.3	11.7	17.6	195.2
% of Average	77.3%	75.8%	74.2%	82.5%	98.1%	137.7%	84.4%	85.5%	80.9%	66.9%	62.0%	98.1%	83.6%
CANYON FERRY RESERVOIR	210.8	244.9	181.1	185.9	229.0	325.3	341.3	647.2	738.4	195.8	99.0	148.4	3,547.0
% of Average	82.8%	92.4%	83.3%	87.1%	110.8%	128.5%	111.5%	129.9%	107.6%	66.6%	64.5%	81.2%	100.5%
HELENA VALLEY RESERVOIR	-0.4	-0.4	-0.2	-0.3	-0.2	-0.2	5.8	12.3	14.9	18.4	20.3	14.1	84.1
% of Average	N/A	N/A	N/A	N/A	N/A	N/A	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%
GIBSON RESERVOIR	19.1	22.3	12.7	9.9	11.4	35.3	67.7	191.4	160.9	35.7	17.5	11.4	595.3
% of Average	118.1%	134.6%	93.5%	81.9%	105.5%	242.0%	161.3%	130.2%	106.4%	63.5%	73.3%	66.0%	114.2%
WILLOW CREEK	4.9	5.7	0.2	0.1	0.6	0.9	0.3	1.5	1.2	-1.5	0.2	1.8	15.8
% of Average	0.6%	0.7%	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	N/A	N/A	0.4%	0.1%
PISHKUN RESERVOIR	0.2	-0.1	0.2	0.2	0.0	0.3	6.2	42.7	79.1	83.5	47.1	-1.1	258.3
% of Average	0.0%	N/A	N/A	N/A	N/A	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	N/A	0.1%
LAKE ELWELL (TIBER DAM)	38.2	33.0	12.1	15.3	45.9	109.5	79.1	153.2	122.7	15.1	0.8	3.8	628.7
% of Average	227.8%	154.6%	70.9%	96.1%	211.3%	283.7%	150.2%	123.6%	91.4%	36.0%	6.2%	33.2%	123.7%
SHERBURNE LAKE	18.7	11.7	1.8	0.8	3.5	8.9	9.8	38.5	40.7	12.7	5.1	3.6	155.7
% of Average	286.5%	168.7%	52.1%	26.6%	149.9%	253.3%	89.7%	125.0%	110.0%	68.2%	57.6%	59.3%	112.9%
FRESNO RESERVOIR	5.2	2.8	0.0	-0.7	14.0	39.0	17.0	30.2	30.8	26.8	31.3	23.5	219.8
% of Average	73.5%	126.0%	N/A	N/A	360.7%	163.9%	57.1%	70.3%	62.9%	79.0%	104.1%	113.7%	89.7%
NELSON RESERVOIR	3.2	-0.6	-0.6	-0.2	-0.2	14.6	22.0	16.7	9.3	8.0	15.2	2.9	90.4
% of Average	0.1%	N/A	N/A	N/A	N/A	1.0%	0.3%	0.2%	0.1%	0.2%	0.2%	0.0%	0.2%
BULL LAKE	17.6	9.2	4.8	4.4	5.0	7.3	10.3	46.3	125.6	81.2	30.5	18.0	360.1
% of Average	313.2%	291.7%	194.8%	204.4%	310.3%	400.7%	275.1%	165.5%	203.9%	175.6%	146.3%	190.3%	192.9%
PILOT BUTTE RESERVOIR[1]	22.4	-0.2	-0.1	0.0	0.0	0.2	2.4	15.1	35.6	41.3	30.9	22.7	170.2
% of Average	200.0%	N/A	N/A	N/A	N/A	10.6%	34.7%	64.1%	95.6%	100.2%	95.3%	96.9%	95.1%
BOYSEN RESERVOIR	75.5	64.0	40.1	42.4	79.9	85.1	132.8	370.2	819.0	314.3	99.8	96.0	2,219.0
% of Average	128.0%	130.5%	106.4%	115.5%	213.8%	163.7%	271.5%	308.6%	319.8%	240.0%	174.6%	183.7%	236.8%
ANCHOR RESERVOIR	0.51	-0.08	-0.23	-0.17	0.16	0.28	0.70	6.52	17.86	4.72	0.35	0.89	31.50
% of Average[2]	0.1%	N/A	N/A	N/A	0.1%	0.1%	0.1%	0.2%	0.3%	0.2%	0.2%	0.2%	0.2%
BUFFALO BILL RESERVOIR	52.9	40.5	18.3	17.9	22.1	66.0	95.8	306.2	576.4	283.6	61.2	55.0	1,596.0
% of Average	205.6%	189.4%	117.2%	122.5%	169.5%	348.8%	234.0%	193.0%	191.5%	176.8%	136.3%	221.6%	190.0%
BIGHORN LAKE	202.6	139.9	109.2	120.5	212.9	306.7	603.4	813.0	920.4	616.3	216.4	219.0	4,480.5
% of Average	120.7%	108.4%	99.8%	109.2%	190.4%	207.7%	424.6%	319.0%	225.4%	242.5%	143.1%	132.2%	208.1%
E. A. PATTERSON LAKE	0.1	0.3	0.1	0.2	3.9	2.5	0.2	-0.4	-0.8	-0.4	-0.4	-0.1	5.1
% of Average	16.0%	111.8%	45.0%	76.0%	236.9%	37.9%	4.7%	N/A	N/A	N/A	N/A	N/A	29.5%
LAKE TSCHIDA	1.7	0.9	1.2	3.9	6.5	18.4	4.8	0.4	-1.2	-1.5	0.6	0.2	36.0
% of Average	117.1%	62.7%	129.9%	459.7%	135.3%	62.6%	28.6%	6.6%	N/A	N/A	45.7%	63.1%	48.8%
JAMESTOWN RESERVOIR	1.9	2.4	0.9	0.5	2.9	5.5	48.4	14.1	4.2	4.8	2.1	0.5	88.2
% of Average	118.0%	186.8%	144.5%	181.7%	689.0%	50.6%	133.1%	153.1%	93.1%	86.8%	41.9%	22.9%	113.6%
SHADEHILL RESERVOIR	0.1	0.3	-0.6	-0.7	4.0	7.5	5.4	0.0	-1.7	-1.8	0.0	0.0	12.5
% of Average	14.0%	23.1%	N/A	N/A	91.3%	29.5%	28.9%	N/A	N/A	N/A	N/A	N/A	16.5%
ANGOSTURA RESERVOIR	1.7	2.1	2.3	2.2	6.2	5.5	5.2	5.1	4.6	0.0	0.5	0.9	36.3
% of Average	70.9%	66.7%	115.4%	97.4%	122.8%	48.2%	61.7%	37.9%	29.7%	N/A	32.3%	83.6%	52.2%
DEERFIELD RESERVOIR	0.8	0.7	0.8	0.8	0.8	1.0	1.1	1.0	0.7	0.7	0.6	0.7	9.6
% of Average	100.5%	102.2%	111.6%	119.7%	130.1%	102.2%	79.5%	65.3%	53.3%	68.5%	70.8%	94.9%	85.7%
PACTOLA RESERVOIR	2.0	1.9	1.6	2.3	2.3	2.8	3.2	3.6	3.1	2.0	2.0	1.9	28.8
% of Average	93.6%	101.8%	108.9%	144.0%	147.6%	100.8%	70.5%	52.2%	46.3%	53.0%	68.6%	90.7%	74.9%
KEYHOLE RESERVOIR	-1.8	-1.2	0.6	0.1	3.2	0.5	2.0	-1.7	-1.5	3.6	-4.2	-1.8	-2.3
% of Average	N/A	N/A	321.1%	15.6%	121.8%	8.7%	91.4%	N/A	N/A	N/A	N/A	N/A	-17.4%
BELLE FOURCHE RESERVOIR	10.4	10.8	10.1	10.4	14.0	9.7	19.0	7.5	0.5	1.3	4.7	7.7	106.0
% of Average	90.0%	109.3%	113.1%	112.9%	156.0%	68.5%	161.9%	44.2%	4.4%	26.1%	218.2%	161.6%	93.4%

[1] Negative values are the result of calculated inflow based on reservoir release and change in reservoir content.

[2] Percent of average inflow for Anchor Reservoir is based on a 22-year average, 1991-2012, this is due to the availability of data for Anchor Reservoir.