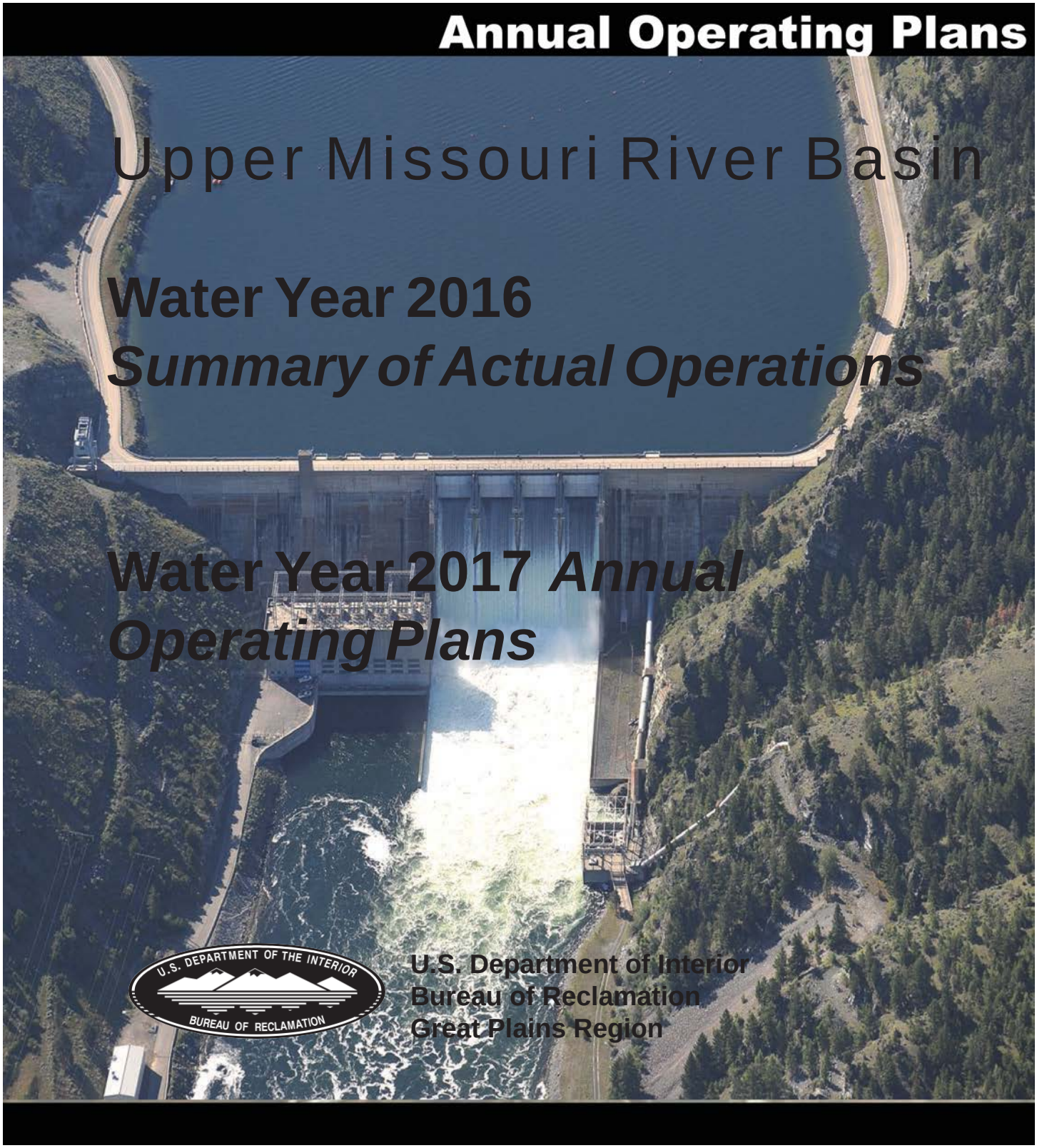
RECLAMATION

Managing Water in the West

Annual Operating Plans



Upper Missouri River Basin

Water Year 2016
Summary of Actual Operations

Water Year 2017 *Annual Operating Plans*

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

TABLE OF CONTENTS
SUMMARIES OF OPERATION FOR WATER YEAR 2016 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 steamflow conditions in the Upper Missouri River Basin during water year (WY) 2016, which are principal factors governing the pattern of reservoir operations. This report also describes operations during WY 2016 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.

This report includes operating plans to show estimated ranges of operation for WY 2017, with a graphical presentation on a monthly basis. The operating plans for the reservoirs are presented only to show possible operations under a wide range of inflows, most of which cannot be reliably forecasted at the time operating plans are prepared; therefore, plans are at best only probabilities. The plans are updated monthly and as the season progresses more reliable estimates of inflow become available.

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) plants are discussed, and the energy generated in 2016 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 2016

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

WATER YEAR 2016 SUMMARY
HYDROLOGIC CONDITIONS AND FLOOD CONTROL

End of Water Year 2015 Conditions

Water year 2015 ended with varying storage levels. Gibson Reservoir was at 28 percent of average while Bighorn Lake was 110 percent of average. Reclamation reservoir with the most carryover storage was Bighorn Lake at 95 percent of full capacity.

Temperatures were generally above normal, with variable precipitation throughout Montana and Wyoming during September 2015. By the end of WY 2015 the mountain precipitation was slightly below average for all basins. Valley precipitation varied: Gallatin Basin had a low of 77 percent of average while the Madison Basin was at a high of 115 percent of average.

October through December

Temperatures in October 2015 were above normal, with variable precipitation across Montana. There were a few record high temperatures set during the month. Due to higher temperatures, little to no snowfall accumulated by the end of October. Heavy precipitation fell in central Montana, however, the state soil moisture values remained below average.

November 2015 brought above normal temperatures in the east and below normal temperatures in southwestern Montana. Across much of the state, variable amounts of precipitation caused soil moisture to rebound to normal to above normal conditions. Valley precipitation ranged from 95 percent of average in the Sun River Basin to 301 percent of average in the Marias Basin. Mountain precipitation ranged from 86 percent of average above Bighorn Lake to 134 percent of average above Clark Canyon Reservoir.

Above normal temperatures dominated during the first half of December 2015. This produced windy conditions east of the continental divide. A large storm brought rain to much of western Montana on December 7, 2015 with 4 inches of precipitation at Flattop Mountain. Another winter storm passed through the state on December 13, 2015 which produced 3 to 6 inches of snow at low elevations. Snowfall and low temperatures characterized the remainder of the month. West Yellowstone reached negative 27 degrees Fahrenheit on December 26, 2015.

Mountain precipitation from October through December 2015 ranged from 78 percent of average above Tiber Reservoir to 112 percent of average above Clark Canyon Reservoir. Valley precipitation ranged from 95 percent of average in the Sun-Teton River Basin to 166 percent of average in the Madison Basin. By the end of December, reservoir storages ranged from 48 percent of average at Gibson Reservoir to 142 percent of average at Fresno.

Monthly valley and mountain precipitation data per basin during WY 2016 can be found in Tables MTT1A and MTT1B, and Figures MTT1A-1 and MTT1B-1, respectively.

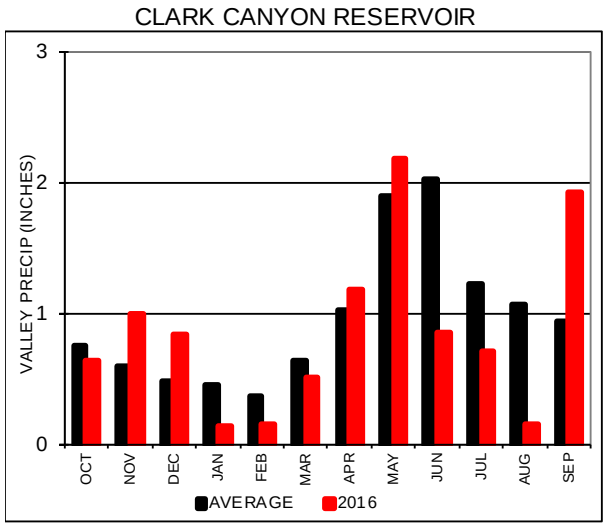
TABLE MTT1A
PRECIPITATION IN INCHES AND PERCENT OF AVERAGE
2016 VALLEY PRECIPITATION

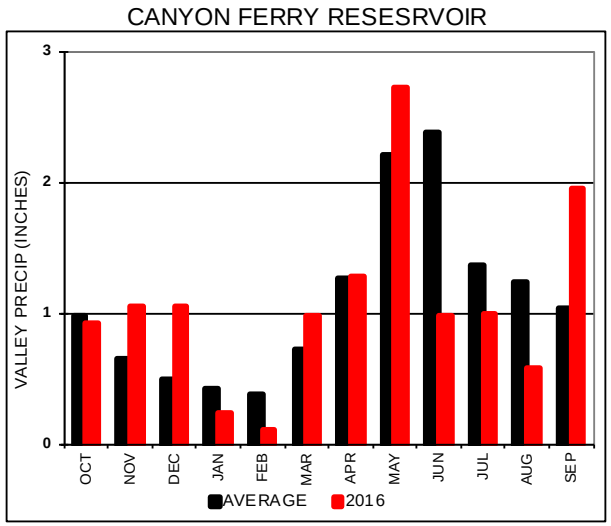
BASIN	OCT		NOV		DEC		JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP	
	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%
Beaverhead																								
Monthly Average Precip	0.75		0.60		0.48		0.46		0.37		0.64		1.03		1.89		2.02		1.22		1.06		0.94	
Monthly Precip and % of Average	0.64	85	1.00	166	0.83	175	0.13	29	0.16	42	0.51	80	1.18	115	2.18	115	0.86	42	0.71	58	0.15	14	1.93	206
Year-to-Date Precip and % of Average	0.64	85	1.64	121	2.47	135	2.60	114	2.75	104	3.26	99	4.44	103	6.62	107	7.47	91	8.18	87	8.32	79	10.25	90
Jefferson																								
Monthly Average Precip	0.83		0.63		0.52		0.41		0.33		0.58		1.07		1.92		2.07		1.36		1.15		0.95	
Monthly Precip and % of Average	0.69	83	0.89	141	0.90	175	0.20	48	0.13	38	0.36	61	1.31	122	2.07	108	0.88	43	0.80	59	0.27	23	1.73	181
Year-to-Date Precip and % of Average	0.69	83	1.58	108	2.48	126	2.68	112	2.81	103	3.16	96	4.47	102	6.54	104	7.42	89	8.23	85	8.50	78	10.22	86
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	1.09	86	1.46	207	1.64	298	0.22	46	0.12	24	1.96	216	1.19	73	3.42	135	1.03	38	0.96	70	0.41	30	2.45	217
Year-to-Date Precip and % of Average	1.09	86	2.55	129	4.19	166	4.41	147	4.53	130	6.48	148	7.67	127	11.09	130	12.11	107	13.07	103	13.48	96	15.93	105
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	1.72	125	1.50	167	1.09	202	0.34	62	0.14	26	1.31	127	1.34	75	2.71	96	0.77	28	1.21	86	0.87	72	2.40	190
Year-to-Date Precip and % of Average	1.72	125	3.22	141	4.31	153	4.65	138	4.79	123	6.10	123	7.44	111	10.15	107	10.92	89	12.13	88	13.00	87	15.40	95
Missouri Above Toston																								
Monthly Precip Average	0.98		0.65		0.50		0.42		0.39		0.72		1.27		2.20		2.38		1.37		1.23		1.03	
Monthly Precip and % of Average	0.93	95	1.05	163	1.04	209	0.23	55	0.11	30	0.97	135	1.28	101	2.72	123	0.98	41	0.99	72	0.59	48	1.95	189
Year-to-Date Precip and % of Average	0.93	95	1.98	122	3.03	142	3.26	128	3.37	115	4.35	119	5.62	114	8.34	117	9.32	98	10.31	95	10.89	90	12.84	98
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	0.85	74	1.11	95	1.16	121	0.97	96	0.58	64	0.91	81	1.21	83	2.87	125	0.89	31	0.59	46	1.15	80	2.16	146
Year-to-Date Precip and % of Average	0.85	74	1.97	84	3.13	95	4.10	95	4.68	90	5.59	88	6.79	87	9.67	96	10.55	82	11.15	79	12.30	79	14.45	85
Marias																								
Monthly Average Precip	0.59		0.41		0.40		0.33		0.30		0.63		1.01		1.91		2.47		1.36		1.18		1.19	
Monthly Precip and % of Average	0.61	103	1.23	301	0.32	80	0.37	115	0.09	31	0.42	67	2.28	224	2.14	112	1.42	57	1.69	124	1.67	142	1.46	123
Year-to-Date Precip and % of Average	0.61	103	1.84	185	2.16	155	2.53	147	2.63	130	3.05	115	5.33	145	7.47	134	8.89	110	10.57	112	12.24	116	13.70	116
Milk																								
Monthly Average Precip	0.69		0.37		0.31		0.29		0.24		0.42		0.93		2.26		2.63		1.49		1.35		1.09	
Monthly Precip and % of Average	1.26	182	0.54	146	0.33	107	0.19	66	0.10	43	0.29	69	3.22	345	3.92	173	2.21	84	2.35	158	0.80	60	2.21	203
Year-to-Date Precip and % of Average	1.26	182	1.80	170	2.13	156	2.32	140	2.42	128	2.72	117	5.93	183	9.85	179	12.06	148	14.42	150	15.22	139	17.43	144
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	1.23	78	2.94	117	2.81	138	0.55	26	0.82	46	2.29	118	1.20	71	3.78	144	0.83	25	1.24	64	1.34	101	2.91	154
Year-to-Date Precip and % of Average	1.23	78	4.17	102	6.98	114	7.53	91	8.35	83	10.64	89	11.83	87	15.61	96	16.44	84	17.67	82	19.01	83	21.91	89
Bighorn Above Yellowtail																								
Monthly Average Precip	0.89		0.50		0.37		0.31		0.35		0.57		1.11		1.76		1.38		0.89		0.59		1.02	
Monthly Precip and % of Average	0.90	101	0.79	157	0.30	80	0.20	66	0.15	43	1.47	258	2.51	227	2.05	116	0.34	25	0.36	40	0.49	83	2.56	251
Year-to-Date Precip and % of Average	0.90	101	1.69	121	1.99	113	2.19	106	2.34	97	3.81	127	6.32	154	8.37	143	8.71	120	9.07	112	9.56	110	12.12	124

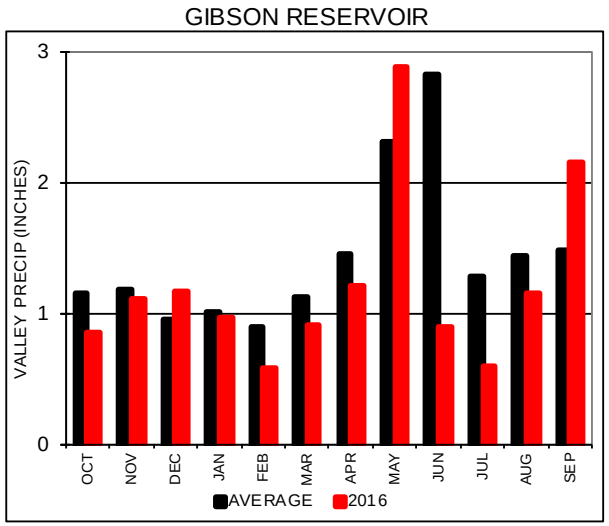
A composite of the following National Weather Service stations was used to determine monthly valley precipitation and percent of average for the drainage basins:

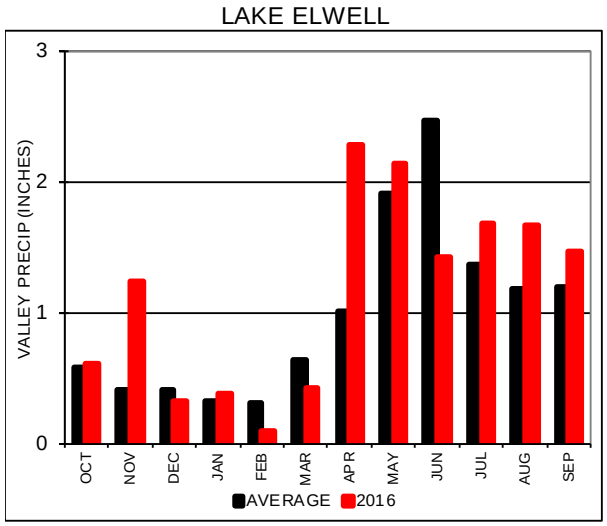
Beaverhead.....Wisdom and Dillon
Jefferson.....Wisdom, Dillon, Virginia City, and Boulder
Madison.....Ennis, and Norris Madison
Gallatin.....Bozeman
Missouri Above Toston.....Townsend, Wisdom, Dillon, Virginia City, Boulder, Ennis, Norris Madison, and Bozeman
Sun-Teton.....Summit, Choteau, Fairfield,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

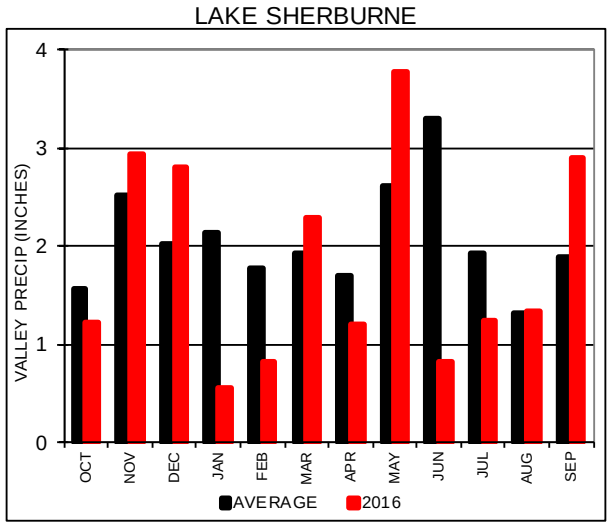
FIGURE MTT1A-1
PRECIPITATION IN INCHES AND PERCENT OF AVERAGE
2016 VALLEY PRECIPITATION











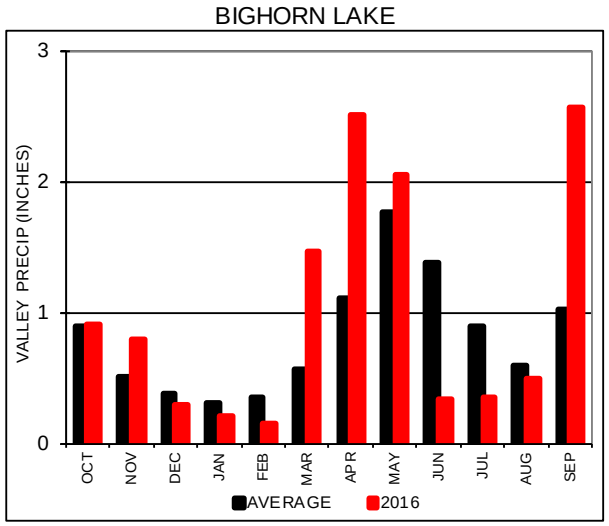


TABLE MTT1B
PRECIPITATION IN INCHES AND PERCENT OF AVERAGE
2016 MOUNTAIN PRECIPITATION

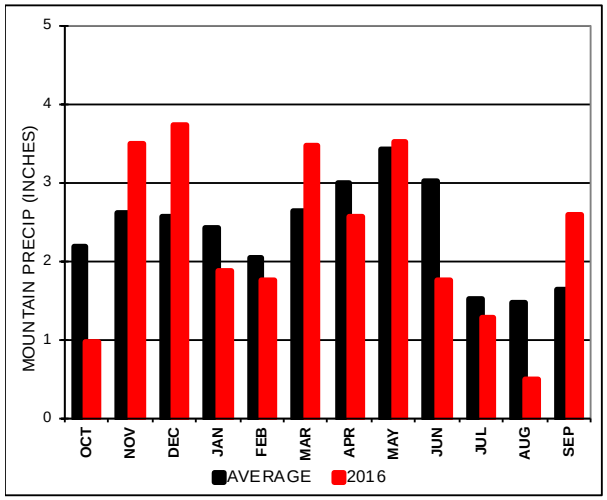
BASIN	OCT		NOV		DEC		JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP	
	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%	IN.	%
Lima Reservoir																								
Monthly Average Precip	2.05		2.43		2.80		2.52		2.14		2.57		2.57		3.05		2.81		1.61		1.36		1.50	
Monthly Precip and % of Average	1.08	53	2.90	120	3.72	133	2.26	90	1.30	61	3.22	125	2.00	78	3.66	120	1.40	50	1.06	66	0.20	15	2.24	149
Year-to-Date Precip and % of Average	1.08	53	3.98	89	7.70	106	9.96	102	11.26	94	14.48	100	16.48	96	20.14	100	21.54	94	22.60	92	22.80	88	25.04	91
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	0.97	45	3.50	134	3.73	146	1.87	77	1.76	86	3.46	131	2.56	86	3.51	103	1.74	58	1.29	85	0.49	33	2.59	157
Year-to-Date Precip and % of Average	0.97	45	4.47	93	8.20	112	10.07	103	11.83	100	15.29	106	17.84	102	21.36	103	23.10	97	24.39	96	24.87	93	27.46	96
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	1.04	48	3.21	122	3.93	149	1.96	78	1.79	85	3.16	120	2.61	87	3.42	101	1.79	60	1.38	88	0.60	39	2.52	151
Year-to-Date Precip and % of Average	1.04	48	4.24	89	8.18	110	10.13	102	11.92	99	15.08	103	17.69	100	21.11	100	22.90	95	24.28	95	24.88	92	27.39	95
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	1.50	52	3.95	103	5.75	137	3.10	79	2.16	66	5.25	140	2.95	77	3.54	88	1.31	41	1.54	86	0.36	22	2.96	162
Year-to-Date Precip and % of Average	1.50	52	5.45	81	11.20	103	14.30	96	16.46	91	21.71	99	24.66	96	28.20	95	29.51	90	31.05	89	31.41	86	34.38	90
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	2.63	86	3.63	106	4.20	122	2.83	87	2.07	70	5.40	138	4.37	95	4.67	94	1.87	45	1.43	65	0.83	42	2.37	110
Year-to-Date Precip and % of Average	2.63	86	6.27	96	10.47	105	13.30	101	15.37	95	20.77	103	25.13	102	29.80	101	31.67	94	33.10	92	33.93	89	36.30	91
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	1.40	58	3.46	114	4.63	147	2.46	82	1.98	79	3.94	130	2.90	87	3.57	97	1.61	52	1.43	87	0.57	36	2.50	145
Year-to-Date Precip and % of Average	1.40	58	4.87	89	9.50	110	11.96	103	13.94	99	17.88	104	20.77	101	24.34	101	25.95	95	27.38	95	27.95	92	30.46	94
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	1.08	43	3.60	115	2.68	89	0.75	27	1.68	69	1.70	63	2.45	89	4.53	124	1.65	45	1.80	101	1.80	87	3.10	143
Year-to-Date Precip and % of Average	1.08	43	4.68	83	7.35	85	8.10	71	9.78	70	11.48	69	13.93	72	18.45	80	20.10	75	21.90	77	23.70	78	26.80	82
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		2.55	
Monthly Precip and % of Average	1.26	40	3.94	93	3.78	93	1.72	42	2.52	77	2.80	77	2.88	84	4.48	108	2.24	56	1.78	94	1.92	91	3.18	125
Year-to-Date Precip and % of Average	1.26	40	5.20	71	8.98	78	10.70	69	13.22	70	16.02	71	18.90	73	23.38	78	25.62	75	27.40	76	29.32	77	32.50	80
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	1.85	38	9.65	128	9.65	141	4.75	64	4.70	92	9.10	170	1.90	42	5.85	125	3.05	60	1.55	63	3.10	158	5.20	161
Year-to-Date Precip and % of Average	1.85	38	11.50	93	21.15	110	25.90	97	30.60	96	39.70	107	41.60	100	47.45	103	50.50	98	52.05	97	55.15	99	60.35	102
Bighorn Lake																								
Monthly Average Precip	2.41		2.35		2.17		2.13		1.85		2.63		3.12		3.58		2.83		1.81		1.34		2.15	
Monthly Precip and % of Average	1.47	61	2.01	86	1.98	91	1.26	59	1.96	106	3.34	127	3.59	115	3.17	89	1.40	49	1.06	59	1.08	81	3.43	160
Year-to-Date Precip and % of Average	1.47	61	3.48	73	5.47	79	6.72	74	8.68	80	12.02	89	15.61	94	18.78	93	20.18	87	21.24	85	22.32	85	25.75	91

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:

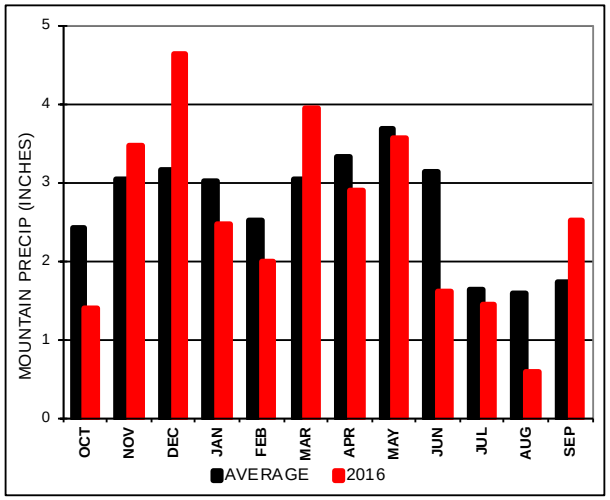
- Lima Reservoir.....Crab Creek, Island Park, Tepee Creek, Divide, and Lakeview Ridge
- Clark Canyon Reservoir.....Beagle Springs, Darkhorse Lake, Lemhi Ridge, Tepee Creek, Divide, Bloody Dick, and Lakeview Ridge
- Jefferson Drainage.....Beagle Springs, Clover Meadow, Darkhorse Lake, Mule Creek, Lemhi 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
2016 MOUNTAIN PRECIPITATION

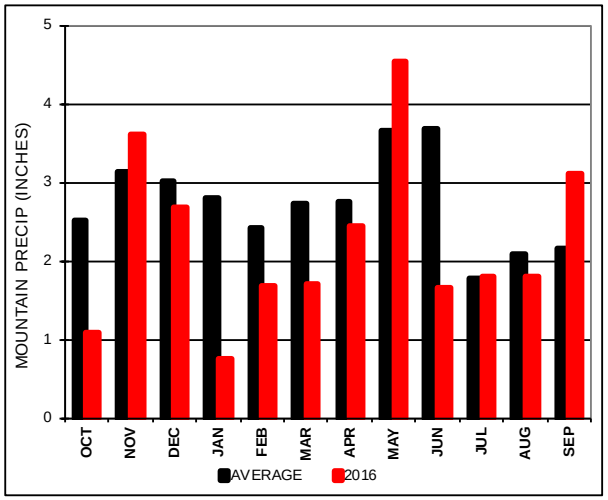
CLARK CANYON RESERVOIR



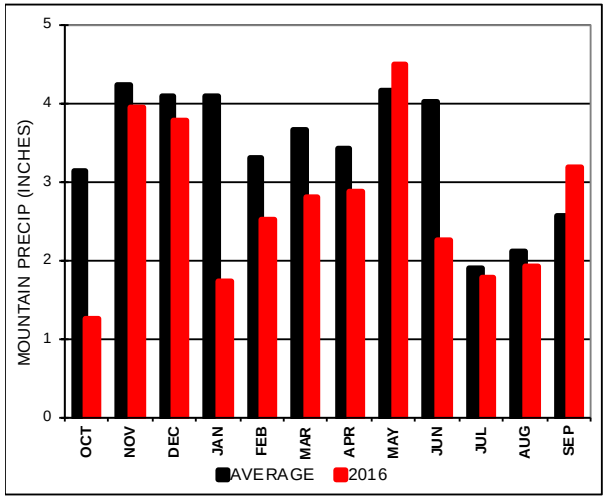
CANYON FERRY RESESRVOIR



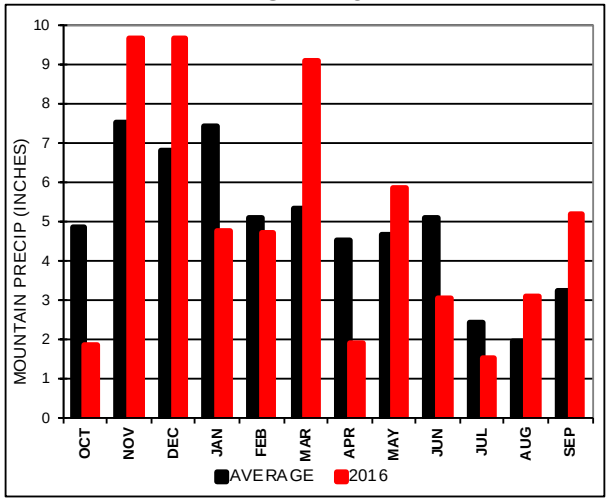
GIBSON RESERVOIR



LAKE ELWELL



LAKE SHERBURNE



BIGHORN LAKE

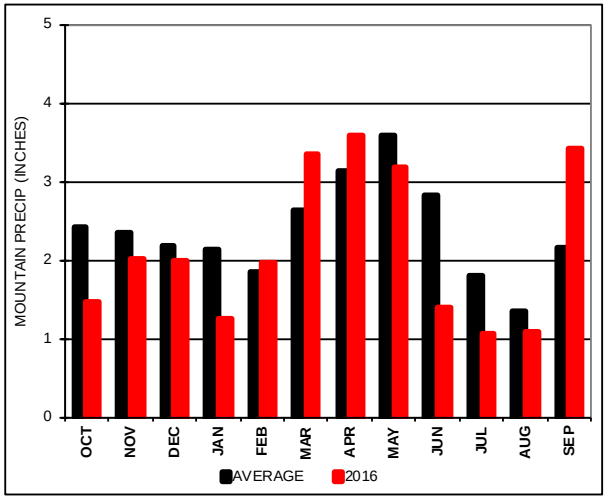


TABLE MTT2
2016 MOUNTAIN SNOW WATER CONTENT
AS A PERCENT OF MEDIAN

DRAINAGE BASIN	JAN 1	FEB 1	MAR 1	APR 1	MAY 1
Beaverhead	117	112	106	112	83
Jefferson	120	112	107	111	82
Madison	100	95	89	100	80
Gallatin	99	97	91	98	87
Missouri Headwaters above Toston	118	112	103	103	69
Sun	83	68	68	64	31
Marias	79	60	61	67	38
Milk River	65	52	48	2	0
St. Mary	87	79	73	82	65
Wind	76	72	82	106	117
Shoshone	97	89	93	95	82
Bighorn (Boysen-Bighorn)	76	73	82	91	95

TABLE MTT3
2016 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	69.8	92	64.5	85	60.0	79	72.2	95	37.0	60	26.3	56	49.2	65	68
Canyon Ferry	1,647.1	97	1,514.3	89	1,350.1	80	1,551.2	91	1,097.0	79	550.0	60	1,340.9	79	86
Gibson	334.9	82	282.5	69	275.3	68	257.5	63	184.0	51	103.5	49	264.8	65	103
Tiber	302.6	82	241.1	65	241.1	65	222.8	60	135.9	43	67.8	36	203.5	55	91
Sherburne	90.1	90	87.8	88	82.5	83	89.0	89	68.5	77	38.8	67	83.7	84	94
Fresno	67.7	72	64.5	69	51.8	55	40.1	54	26.3	45	24.3	60	27.5	29	53
Yellowtail	711.3	64	596.2	54	625.7	56	873.0	78	933.0	97	551.5	80	1,031.8	93	118

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

January through March

Temperatures in January 2016 were slightly below normal in the southwest valleys and a small portion of north central Montana, and generally above normal throughout the rest of the state. Precipitation was mostly above normal, with areas of below normal in north central and southeast Montana.

The Natural Resource Conservancy Service (NRCS) reports mountain snowpack or snow water equivalent (SWE) data for SNOTEL sites throughout Montana and Wyoming. On January 1, 2016 mountain SWE ranged from 65 percent of median in the Milk River to 120 percent of median in the Jefferson Basin, see Table MTT2. January 1 SNOTEL and snow course data for Montana and Wyoming are shown in Figure 1. Starting in January, Reclamation forecasts April-July runoff volumes for Reclamation reservoirs east of the Continental Divide. Water supply forecasts prepared on January 1, 2016 varied from 64 percent of average at Bighorn Lake to 97 percent of average at Canyon Ferry Reservoir, see Table MTT3.

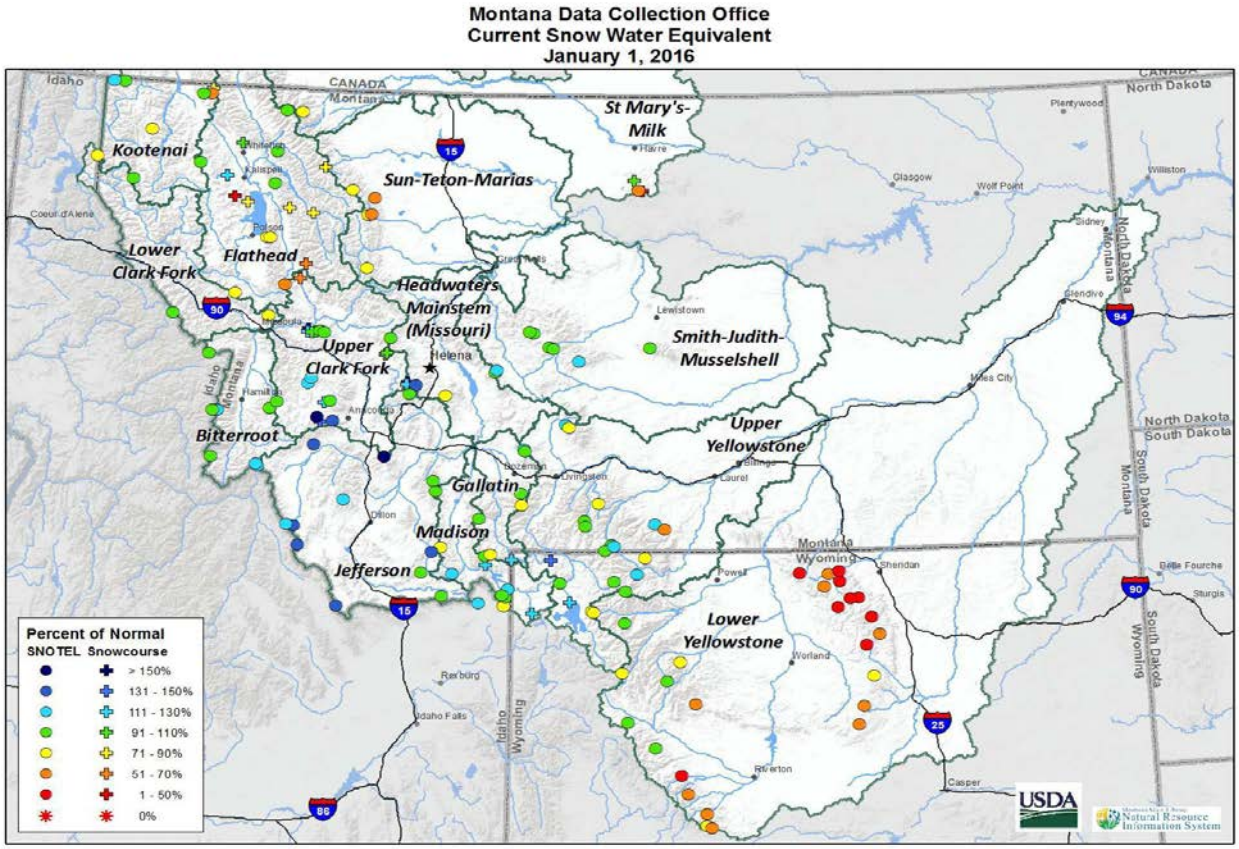


Figure 1. January 1, 2016 Snow Water Equivalent, Percent of Normal (NRCS).

An El Niño weather pattern influenced Montana for the month of February 2016. This brought warm and dry air to the state. Temperatures were near normal in the southwest valleys and above normal elsewhere. There were periods of below normal temperatures for the first few days of the month but for the most part, the month averaged above normal. Winds across the state were well above average. By the end of February 2016, the year to date mountain precipitation ranged from 70 percent of average in the Marias and Sun River drainages to 100 percent of average above Clark Canyon Reservoir.

Lower than expected precipitation during February caused the April-July water supply forecast to remain the same or decrease for March 1, 2016. Forecasts ranged from 55 percent of average at Fresno Reservoir to 83 percent of average at Lake Sherburne.

Although El Niño's influence gradually weakened in March, temperatures continued to be above normal as shown in Figure 2. A record high temperature was set at Glasgow on March 6, 2016. The second half of the month brought variable conditions. Much of central Montana experienced the coolest temperatures in over two months. Rapid warming brought a record high temperature to Bozeman on March 21 and 23, 2016, and a storm system produced the first significant precipitation of the month to southern Montana. The storm system also impacted the northern Rocky Mountain Front, with 10 inches of snow falling at Many Glacier. The Bighorn Basin in northern Wyoming received significant quantities of snow. Precipitation departures from normal throughout Montana and northern Wyoming are shown in Figure 3.

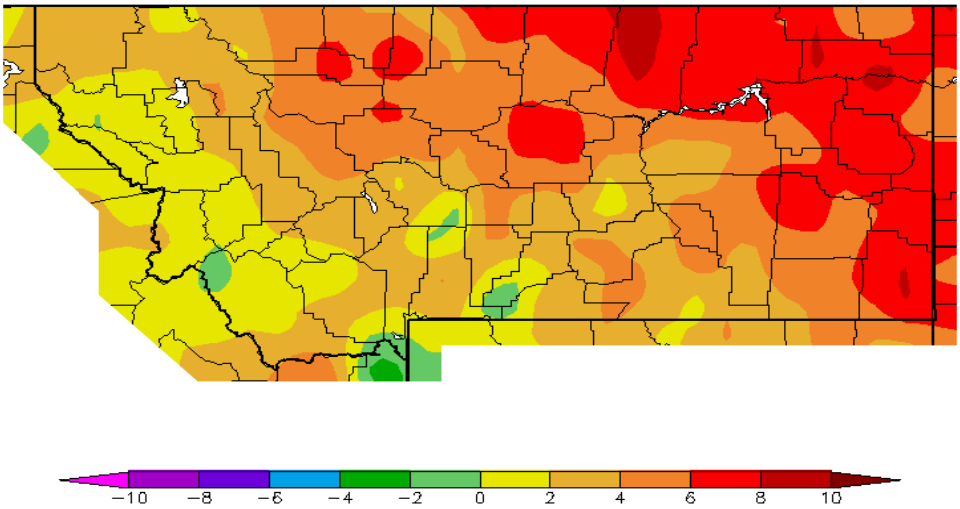


Figure 2. March 2016 temperature departures from normal (°F) (Western Region Climate Center).

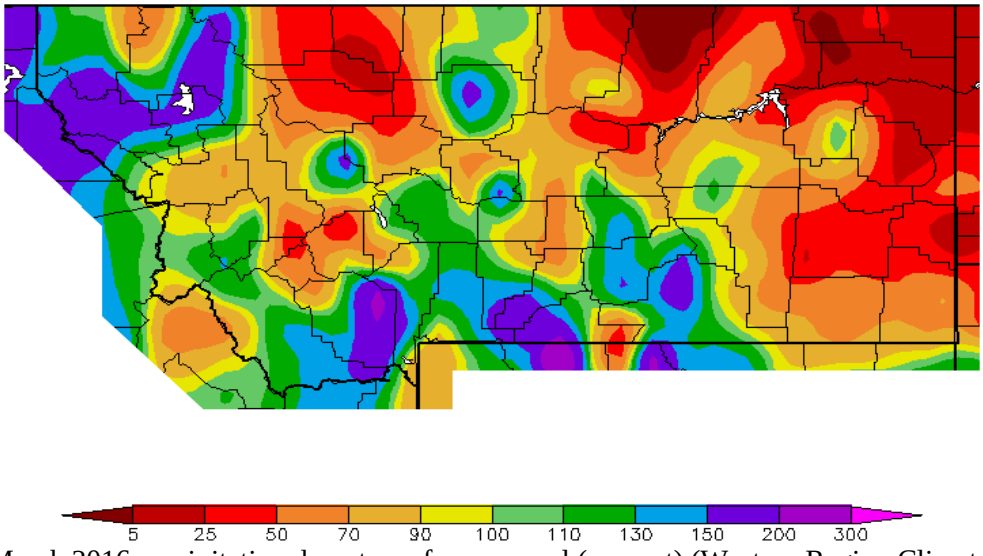


Figure 3. March 2016 precipitation departures from normal (percent) (Western Region Climate Center).

April through June

The NRCS map in Figure 4 shows April 1 SWE varied across Montana and northern Wyoming. The resulting April-July forecasted runoff volumes ranged from 60 percent of average into Tiber Reservoir to 95 percent of average into Clark Canyon Lake. With a range of forecasted runoff volumes, some of Reclamation's reservoirs were not anticipated to fill unless more precipitation fell in the coming months. All of Reclamation's reservoirs reached their peak snowpack for the year by April 1, Figure MTG1.

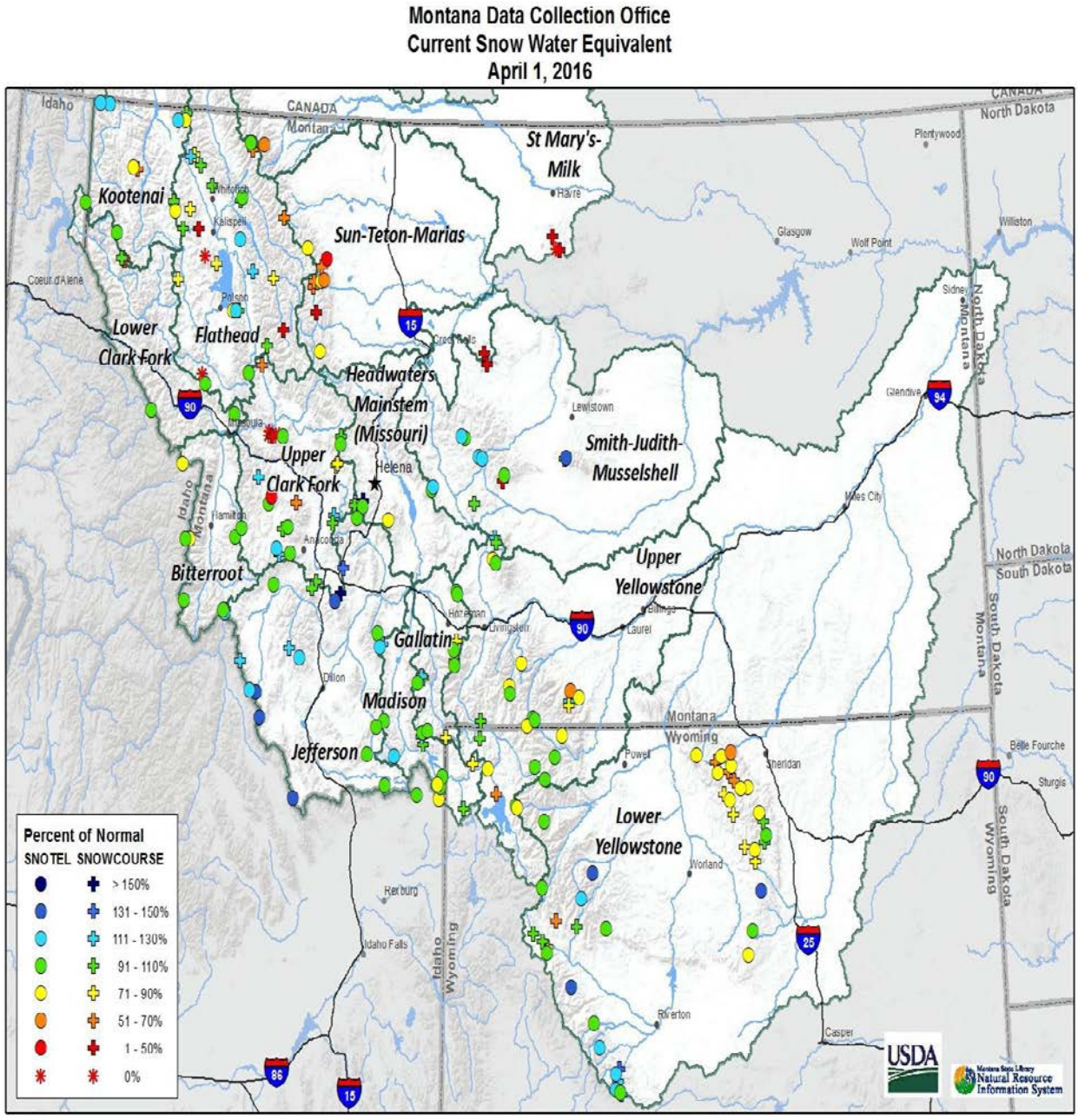
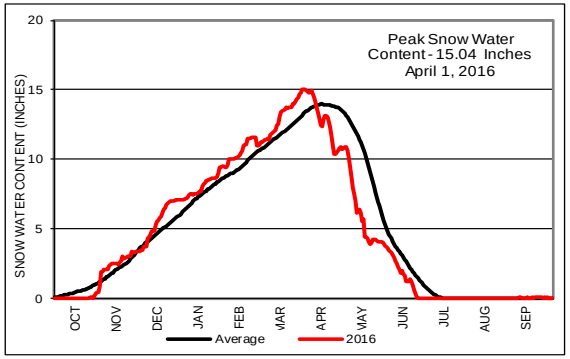


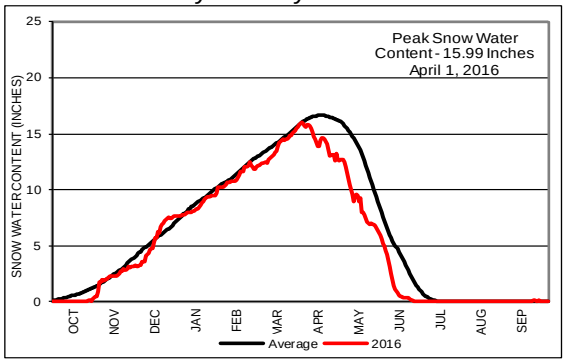
Figure 4. April 1, 2016 Snow Water Equivalent, Percent of Normal (NRCS).

Figure MTG1
WATER YEAR 2016
S N O W W A T E R C O N T E N T

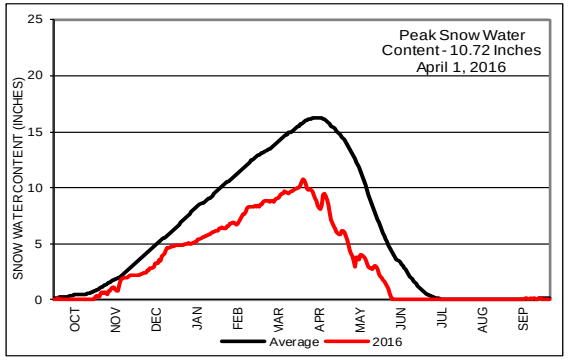
Clark Canyon Reservoir



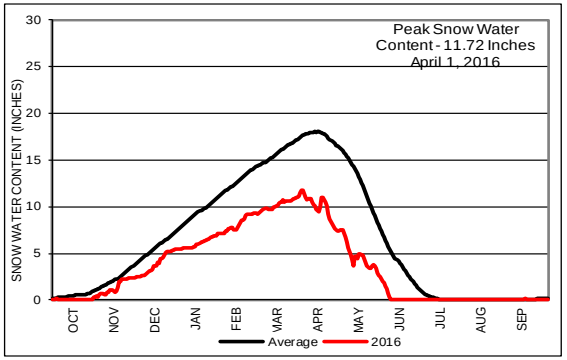
Canyon Ferry Reservoir



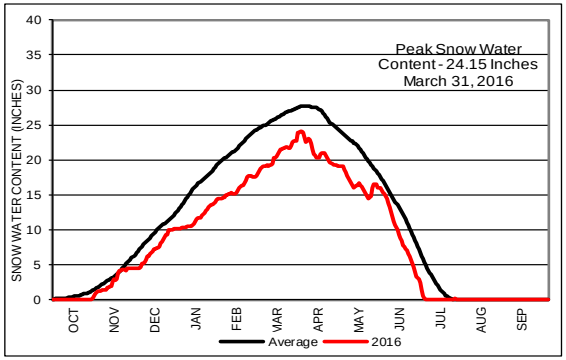
Gibson Reservoir



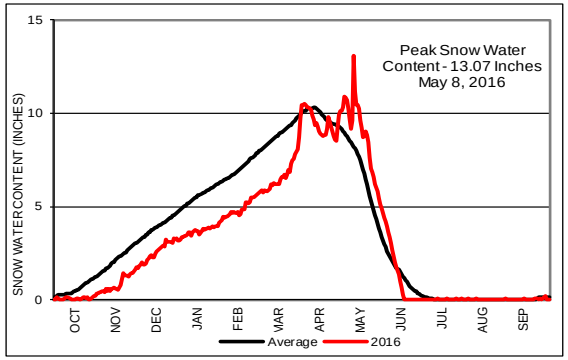
Lake Elwell



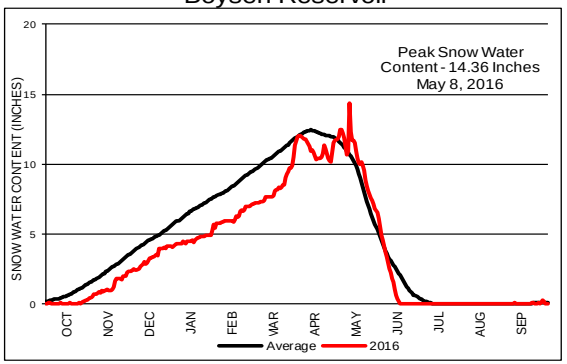
Lake Sherburne



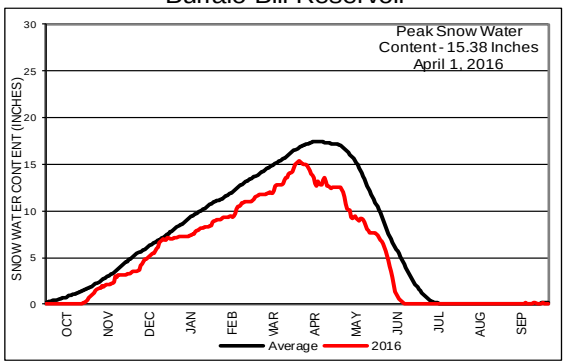
Bull Lake Reservoir



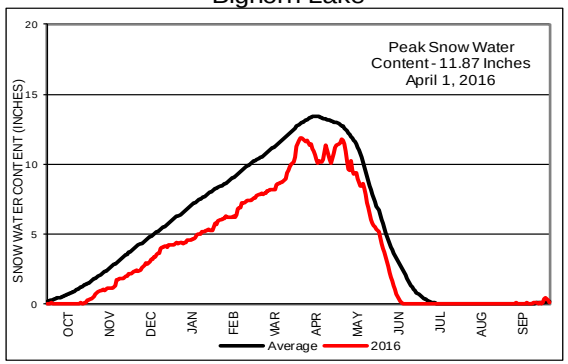
Boysen Reservoir



Buffalo Bill Reservoir



Bighorn Lake



The dry warm conditions that started in March 2016 continued through early April 2016. A cold front passing through Montana produced thunderstorms across much of southwest Montana on April 4, 2016. The system produced the coolest temperatures of the month, along with heavy precipitation. Cooler conditions on April 15 and 16, 2016 accompanied heavy snow in the Rocky Mountains. Nearly 20 inches of snow fell at Mt Lockhart (Teton Basin). Nearly 7 inches of snow fell at Great Falls, MT. Meanwhile rain amounts over 2 inches fell within the Milk River Basin (Kremlin to Hinsdale, MT). The Bighorn Basin continued to receive above normal precipitation, 115 percent of mountain precipitation and 227 percent of average valley precipitation. Warmer conditions returned by the end of April.

During the month of April 2016 above average temperatures caused substantial snowmelt. SNOTEL sites and snow courses set new records for monthly melt. Snowpack percentages were reduced from near normal in most basins on April 1, 2016 to below normal on May 1, 2016. Peak SWE occurred during the first week of April in many river basins, and peaks were near, or slightly below average. Since both peak SWE and melt were ahead of normal, runoff into the river systems was earlier than average.

Warm dry conditions prevailed in early May 2016. A large storm system moved across the state mid-month and brought heavy rain, including heavy snow to higher elevations of central Montana. Montana and northern Wyoming experienced below normal temperatures and areas of heavy precipitation throughout the last 10 days of May 2016. The heavy rain recharged the soil moisture to above normal conditions over most areas. Valley precipitation ranged from 173 percent of average along the Milk River to 96 percent of average in the Gallatin basin. These storms brought the valley precipitation averages to normal or above normal in all basins for WY 2016.

The month of June 2016 was warm across Montana and northern Wyoming, ranging from 2 to 6 degrees above normal. The area received much below average valley precipitation, ranging from 25 percent of average in the St. Mary's and Bighorn Basin to 57 percent of average in the Sun River Basin. The exception was the Milk River Basin, which received 84 percent of average precipitation, see Figure 5. For the month of June reservoir inflows ranged from 33 percent of average at Tiber Reservoir to 97 percent of average at Yellowtail Dam.

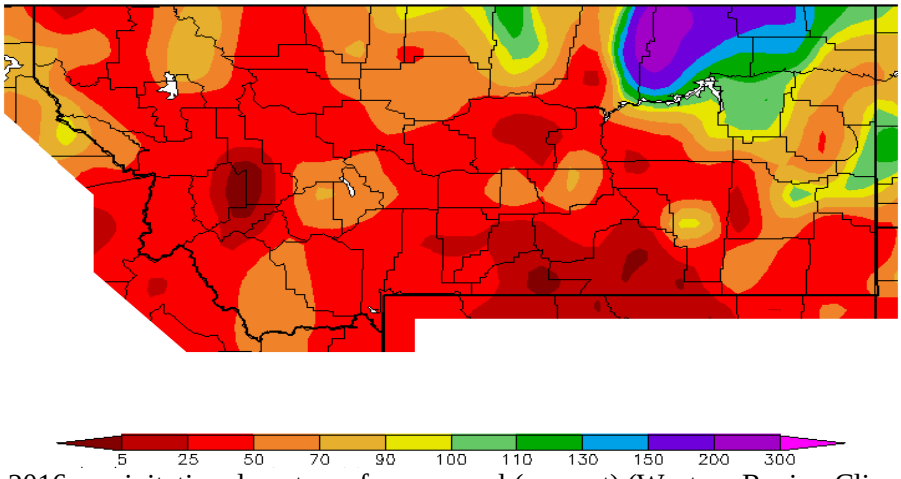


Figure 5. June 2016 precipitation departures from normal (percent) (Western Region Climate Center).

July through September

July 2016 temperatures were below normal throughout Montana and near normal in northern Wyoming. Storms produced varied results, one storm generated a tornado near Dillon, Montana, see Figure 6. Precipitation was mixed with below normal conditions in the Upper Missouri, Sun River, St. Mary, and Bighorn Basins. The Marias and Milk River Basins experienced above normal precipitation. By the end of July the actual April-July runoff volumes ranged from 55 percent of average into Tiber Reservoir to 93 percent of average into Yellowtail, reference Table MTT3.

Figure 6. Tornado near Dillon, MT (Beaverhead Basin) on July 10, 2016

August 2016 temperatures were near to below normal throughout Montana and northern Wyoming. Precipitation varied with above normal amounts in the southeast corner with up to 2 inches of rain. Twenty-five percent of normal precipitation fell in the Upper Missouri Basin. Mid-month, three separate hail storms hit areas of Cut Bank (1 inch diameter), Great Falls (2 inch diameter) and Townsend, MT (0.5 inch diameter).

Temperatures were generally below normal by several degrees, with above average precipitation throughout Montana and northern Wyoming during September 2016. Even with the late season precipitation, by the end of the WY 2016, most of western Montana remained in a drought status, see Figure 7. Total WY 2016 mountain precipitation was average to slightly below average for all basins (80-102 percent of average). Valley precipitation ranged from 85 percent of low in the Sun River Basin, to 144 percent in the Madison Basin.

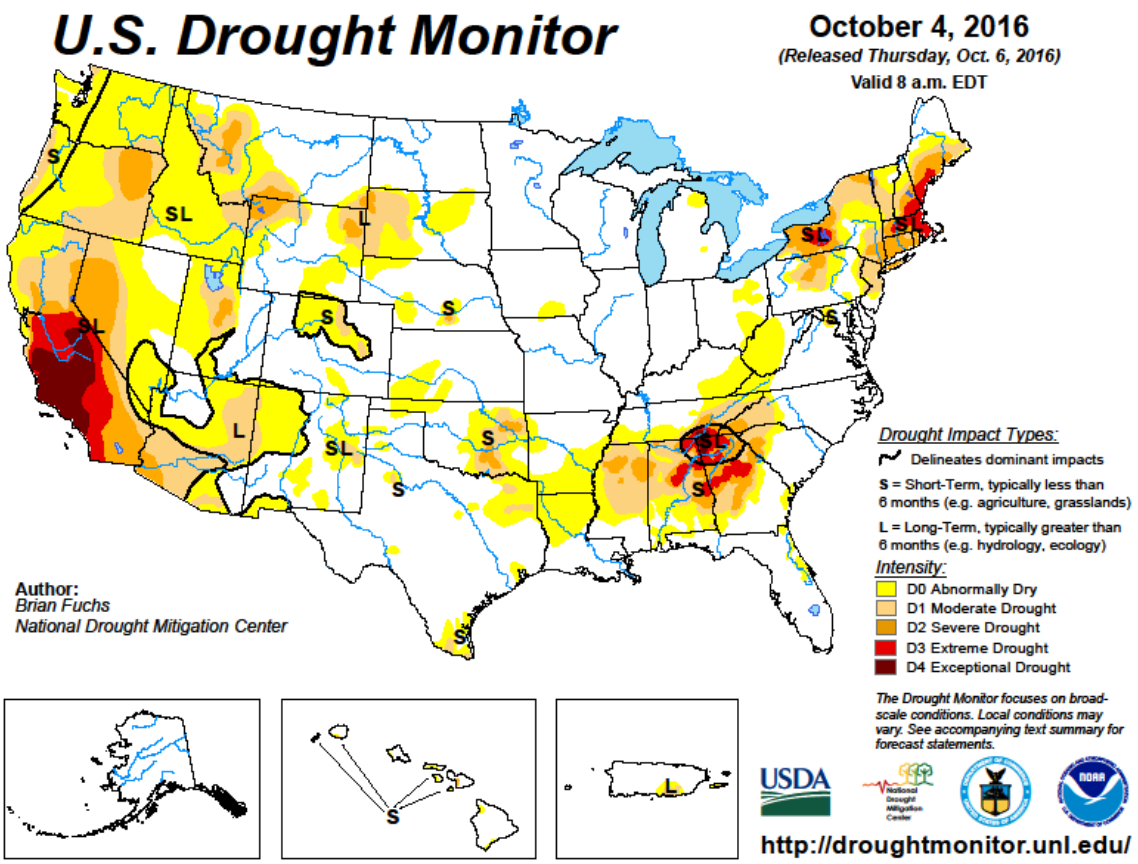


Figure 7. U.S. Drought Monitor Map, October 4, 2016, produced by the National Drought Mitigation Center, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration

Water Year 2016 Summary

Reservoir storage levels ended WY 2016 with varied storage levels. Gibson Reservoir was at 30 percent of average while Lake Sherburne was 147 percent of average. The reservoir with the most carryover storage was Tiber Dam at 82 percent of full capacity.

Reservoir inflows for WY 2016 ranged from 57 percent of average at Tiber Dam to 96 percent of average at Bighorn Lake. Even though the spring and summer produced little precipitation, fishery flows and recreational lake elevations remained desirable.

The Corps reported the operations of Reclamation projects under the authority of the MTAO east of the Continental Divide prevented approximately $1,218,900 in total flood damages during WY 2016. The damages prevented were credited to the operations of Canyon Ferry, Tiber, Fresno, and Yellowtail Dam. Total flood damages prevented by MTAO's facilities since 1950 is approximately $551,114,900.

FLOOD BENEFITS

The Corps evaluated reservoir regulation data pertaining to MTAO's reservoirs and indicated the following four reservoirs provided flood relief during WY 2016: Canyon Ferry Reservoir on the Missouri River near Helena; Lake Elwell on the Marias River near Chester; Fresno Reservoir on the Milk River near Havre; and Bighorn Lake on the Bighorn River near Fort Smith. The most notable examples of peak flows regulated by Reclamation reservoirs during the spring runoff are as follows:

Reservoir	Peak Inflow (cfs)	River Discharge (cfs)	Date
Canyon Ferry	12,449	5,271	05/23/16
Lake Elwell	1,961	519	04/26/16
Fresno	1,193	122	04/16/16
Bighorn Lake	10,839	6,947	06/12/16

The Corps estimated the operations of MTAO's reservoirs during WY 2016 reduced flood damages by $1,218,900. Benefits were derived by reducing local damages and 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 MTAO's reservoirs, refer to the individual "Summary of Operations for 2016" for each reservoir within this report. Figure MTG2 shows the annual flood damages prevented by MTAO reservoirs since 1950.

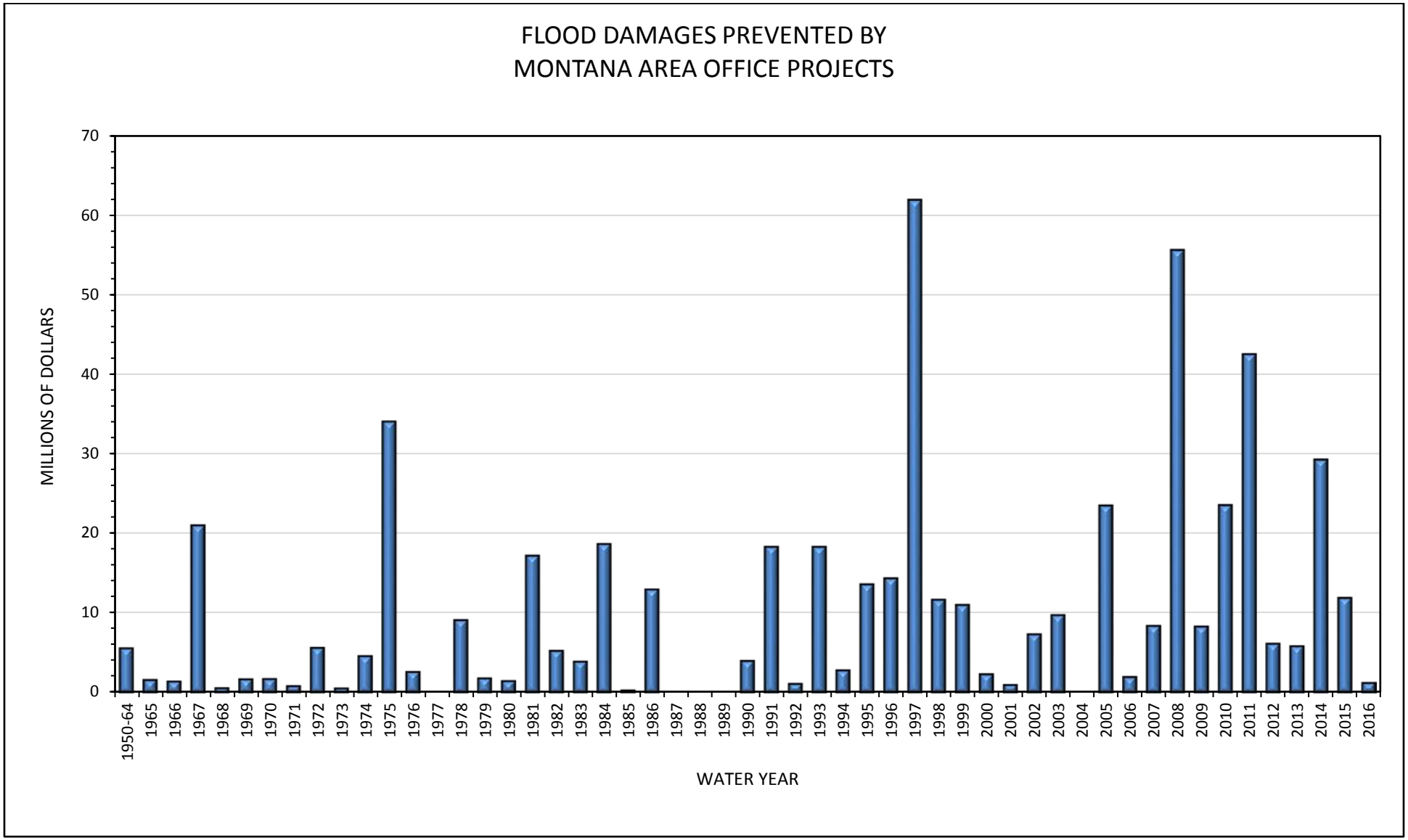
TABLE MTT4
FLOOD DAMAGES PREVENTED
(THOUSANDS OF DOLLARS)

Reservoir	Local	Main Stem	2016 Total	Prev. Accum.	1950-2016 Accum. Total
Clark Canyon	$ 0.0	$ 0.0	$ 0.0	$ 16,127.7	$ 16,127.7
Canyon Ferry	192.1	513.3	705.4	237,859.5	238,564.9
Gibson[1]	0.0	0.0	0.0	3,085.6	3,085.6
Lake Elwell	0.0	290.9	290.9	96,355.2	96,646.1
Lake Sherburne[2]	0.0	0.0	0.0	10,412.0	10,412.0
Fresno	19.7	0.0	19.7	15,500.9	15,520.6
Bighorn Lake	0.0	202.9	202.9	170,555.1	170,758.0
Total	$ 211.8	$ 1,007.1	$ 1,218.9	$549,896.0	$551,114.9

[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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40
50
60
70
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1965
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2016
WATER YEAR

UNIT OPERATIONAL SUMMARIES FOR WATER YEAR 2016

Clark Canyon Reservoir

Clark Canyon Reservoir, a Pick-Sloan Missouri River Basin Program (P-S MBP) project is located on the Beaverhead River approximately 20 miles upstream from Dillon, Montana. It has a total capacity of 257,152 acre-feet (AF) (255,643 AF active). The reservoir is the storage facility for the East Bench Unit providing a full 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, Reclamation surveyed Clark Canyon Reservoir to develop a topographic map and compute area-capacity tables. The data was used to calculate reservoir capacity lost due to sediment accumulation since dam closure in August 1964. The 2000 survey determined that Clark Canyon Reservoir has a storage capacity of 174,367 AF and a surface area of 5,151 acres at a reservoir elevation of 5546.10 feet. Since closure in 1964, the reservoir has accumulated a sediment volume of 4,106 AF below an elevation of 5546.10 feet. This volume 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.

The storage content at the start of WY 2016 was 55,034 AF (73 percent of average) at an elevation of 5515.90 feet. Warm temperatures and below average precipitation started WY 2016. Cooler temperatures brought 6.5 inches of snow to Dillon, Montana in November 2016. Temperatures averaged 4 to 6 degrees below normal and up to 300 percent above normal precipitation. Cooler temperatures and above average precipitation continued and by the end of December 2016, valley precipitation had reached 53 percent of average while mountain precipitation was 112 percent of average.

On January 1, 2016 the measured snowpack in the Beaverhead River Basin was 117 percent of median. January temperatures were average to below average. Snow accumulation remained steady, resulting in the February 1, 2016 snowpack being measured at 112 percent of median. February brought warmer than average temperatures (6 to 9 degrees above average) with much below average mountain and valley precipitation (5 to 25 percent of average). By the end of February the mountain and valley precipitation declined slightly to 100 and 41 percent of average, respectively.

On March 1, 2016 the snowpack had decreased to 106 percent of median. Based on snowpack and basin conditions, the runoff projection for the April-July period was 60,000 AF, or 79 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 8, 2016 to discuss the water supply outlook for the 2016 irrigation season. The forecast projected below average storage levels, therefore the Joint Board tentatively set allotments at the first reduced tier (Clark Canyon Water Supply Company (CCWSC) 3.25 AF/acre, East Bench Irrigation District (EBID) 2.25 AF/acre) with the option of raising the reduced allotments if basin conditions improved.

The remainder of March 2016 continued to be warmer than normal. Above average precipitation fell in southwestern Montana, further increasing the SWE. Mountain precipitation was 131 percent of average while valley precipitation was 80 percent of average. Inflow into Clark Canyon Reservoir for October 2015 through March 2016 was 70,280 AF, or 78 percent of the 30 year average. Due to the below average inflows, the reservoir elevation at the end of March was recorded at 5533.35 feet, approximately 12.8 feet below full pool.

On April 1, 2016 the mountain snowpack was 112 percent of median with a SWE of 15.04 inches. Valley precipitation was slightly above average while mountain precipitation was 86 percent of average. The snowpack declined throughout the month as temperatures averaged 2 to 6 degrees Fahrenheit above normal. Warmer conditions triggered snowmelt runoff but the total inflow remained steady at 11,300 AF, or 80 percent of average.

Releases from Clark Canyon Reservoir increased on May 1, 2016 in preparation for the start of the 2016 irrigation season. The mountain snowpack declined to 83 percent of median. The water supply forecast prepared on May 1, 2016 predicted the May through July runoff into Clark Canyon Reservoir would be 60 percent of average, totaling approximately 37,000 AF. The Joint Board kept the set allotments at the first reduced tier (CCWSC 3.25 AF/acre, EBID 2.25 AF/acre). The option of raising the allotments in June 2016 could still occur if conditions improved.

The mountain snowpack melted quickly during May 2016. May also brought much needed moisture to the valley. Precipitation within the Red Rocks and Beaverhead Basin ranged from 90 to 110 percent of average. By the end of May the total inflow to Clark Canyon Reservoir was 12,600 AF, which was 85 percent of the 30 year average. With the increased precipitation, the EBID reduced releases out of Clark Canyon Reservoir to conserve storage. The precipitation also recharged the soil moisture, delayed the melting of the remaining 4 inches of SWE, and improved inflows into Clark Canyon Reservoir. By the end of May 2016 Clark Canyon Reservoir elevation was near the 30 year average of 5535.19 feet.

The June to July 2016 monthly operating plan was revised for total inflow of 26,300 AF. The revised forecast prompted the Joint Board to hold a meeting on June 7, 2016. With Reclamation in agreement, the Joint Board increased their allotments between the first tier reduction and full allotments (CCWSC 3.75 AF/acre, EBID 2.90 AF/acre).

Warm temperatures returned during the month of June 2016, up to 4 degrees Fahrenheit above average, and very dry conditions, 25 to 70 percent of normal precipitation. What typically is one of the wetter months of the year, was now the driest. Inflows during June were the second lowest for WY 2016 at 10,500 AF or 41 percent of average. July 2016 brought cooler temperatures, however, below average precipitation continued to prevail. By the end of July 2016 the reservoir was at an elevation of 5521.30 feet or 70,356 AF, 79 percent of average.

Snowmelt runoff during April-July was below normal at 64 percent of the 30 year average, totaling an inflow of 49,228 AF. Daily inflows into Clark Canyon Reservoir averaged 190 cubic feet per second (cfs) during April, 204 cfs during May, 176 cfs during June and 241 cfs during July. These resulted in respective monthly total inflow of 11,296 AF, 12,559 AF, 10,523 AF and 14,850 AF. The peak inflow for WY 2016 occurred on May 21, at 386 cfs.

Releases during the April-July time period averaged 32 cfs during April, 229 cfs during May, 563 cfs during June, and 706 cfs during July 2016. Storage reached the peak for WY 2016 of 123,940 AF at an elevation of 5535.65 feet on May 3, 2016. On July 8, 2016 the peak release from Clark Canyon Reservoir was 815 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 in WY 2016 and spilled slightly over the spillway crest. The reservoir peaked at 78,496 AF at an elevation of 6581.83 feet on May 30, 2016. On August 24, 2016 all irrigation releases out of Lima Reservoir were discontinued for the year, with the exception of senior water right holders, with storage at an elevation of 6564.80 (45 percent full). The drainage area above Lima Reservoir accounts for about 25 percent of the total drainage area above Clark Canyon Reservoir.

Temperatures remained below normal during August 2016 and precipitation ranged from 5 to 50 percent of average throughout the basin. Three months of continual dry conditions caused the elevation at Clark Canyon Reservoir to draft to 5515.68 feet or 31 percent of full pool by August 31, 2016. September 2016 brought much needed precipitation as several thunderstorms produced up to 206 percent of normal precipitation in the Beaverhead Basin.

On September 6, 2016 the Joint Board held a meeting to discuss winter releases, winter guidelines, fishery concerns, and basin conditions. Reclamation provided reservoir operation plans with minimum, maximum, and most probable inflows with a 50 cfs winter release. The Joint Board settled on winter flows at 47 cfs with a reduction to 42 cfs to store water for a 2017 spring flushing flow. Montana Fish, Wildlife and Parks participated in the discussions and was in agreement with the Joint Board.

In response, Reclamation's letter dated September 22, 2016 stated that under Article 6.g and Exhibit D of Reclamation's Contract Nos. 069F670010 and 069F6700009 with the EBID and CCWSC includes provisions 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, provided the minimum release from Clark Canyon Reservoir is not less than 25 cfs. In accordance with these contracts, Reclamation concurred that a reduction in winter flows from 47 cfs to 42 cfs for the purpose of storing water for a spring 2017 flushing flow was acceptable, provided all parties are in mutual agreement. The reduction will result in approximately 2,100 AF of banked water.

A memorandum of understanding would be created to identify and determine the specific requirements of the flushing flow. Therefore, the winter release from Clark Canyon Reservoir was set at 42 cfs on October 6, 2015.

The majority of the storage water released from Clark Canyon Reservoir during WY 2016 was released May 1, 2016 through September 30, 2016 to meet downstream irrigation demands. Beginning May 1, 2016 storage declined from 123,675 AF at an elevation of 5535.59 feet to 52,040 AF at an elevation of 5514.72 feet on September 30, 2016. Due to slightly reduced

allotments, the EBID water users received approximately 62,151 AF at the point of diversion, leaving 3,963 AF of their allotment in the reservoir and CCWSC used approximately 82,463 AF, leaving 13,057 AF of their allotment in the reservoir. The total May through September irrigation deliveries recorded by the river commissioner for the "non-signer" users on the Beaverhead River was approximately 43,039 AF on 7,370 acres.

The total inflow to Clark Canyon Reservoir during WY 2016 was 73 percent of the 30 year average, totaling approximately 142,859 AF. The total annual release to the Beaverhead River from Clark Canyon Reservoir was 145,853 AF. By the end of September the total cumulative valley precipitation for WY 2016 was 90 percent of average, while the total cumulative mountain precipitation was 91 percent of average.

The Corps determined that during WY 2016, Clark Canyon Reservoir did not prevent any local or main stem flood damages. Since construction of the Clark Canyon Dam in 1964, Clark Canyon Reservoir has reduced flood damages by a total of $16,127,700.

Important Events – Water Year 2016

October 1, 2015: Clark Canyon Reservoir enters WY 2016 with 55,034 AF of storage at an elevation of 5515.90 feet. Following the 2015 irrigation season, releases from Clark Canyon Reservoir to the Beaverhead River were reduced to approximately 30 cfs for a winter release.

May 1, 2016: This marked the beginning of when releases from Clark Canyon Reservoir were increased to meet irrigation demands.

May 3, 2016: Clark Canyon Reservoir reached peak storage content of 123,940 AF at an elevation of 5535.65 feet, which was approximately 10.5 feet below full pool.

May 21, 2016: Inflows into Clark Canyon Reservoir peaked at 386 cfs.

July 8, 2016: Releases from Clark Canyon Reservoir reached a peak of 815 cfs to meet downstream water demands from the Beaverhead River.

September 30, 2016: Clark Canyon Reservoir ended WY 2016 with 52,040 AF of storage at an elevation of 5514.72 feet.

Additional hydrologic and statistical information pertaining to the operation of Clark Canyon Reservoir during WY 2016 can be found in Table MTT5 and Figure MTG3.

TABLE MTT5
HYDROLOGIC DATA FOR WY 2016
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	5,470.60	1,061	1,061
TOP OF ACTIVE CONSERVATION	5,535.70	124,160	123,099
TOP OF JOINT USE	5,546.10	174,367	50,207
TOP OF EXCLUSIVE FLOOD CONTROL	5,560.40	253,442	79,075

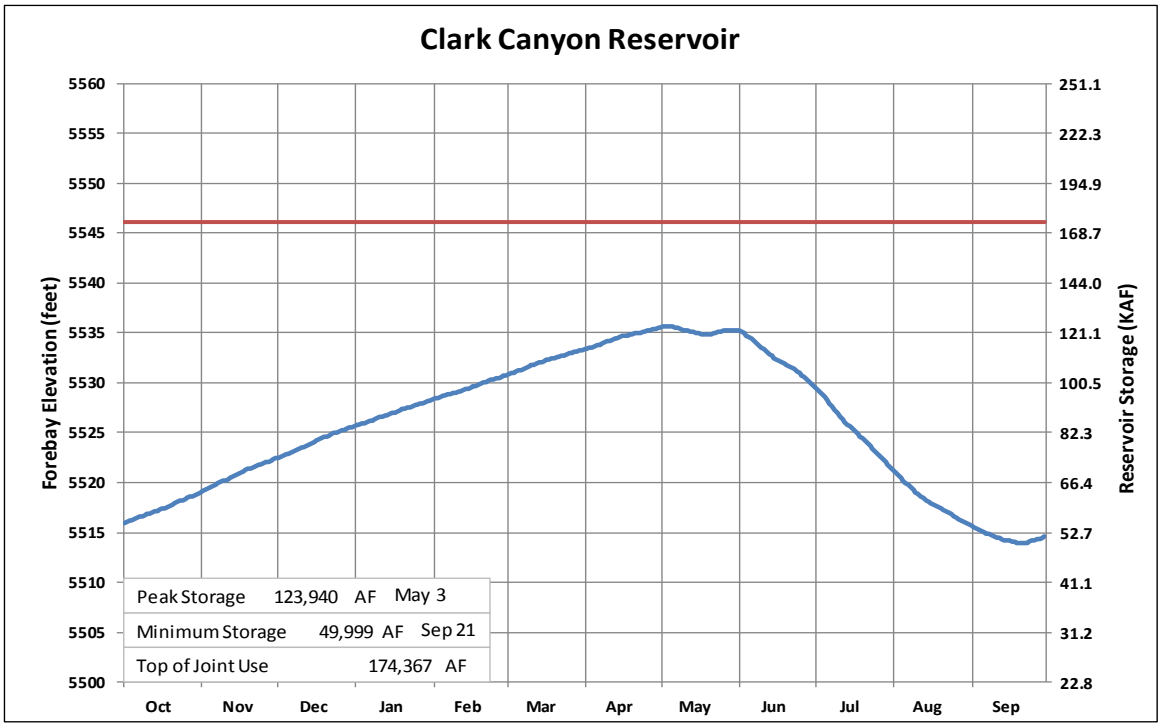
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	5,515.90	55,034	OCT 01, 2015
END OF YEAR	5,514.72	52,040	SEP 30, 2016
ANNUAL LOW	5,513.89	49,999	SEP 21, 2016
ANNUAL HIGH	5,535.65	123,940	MAY 03, 2016
HISTORIC HIGH	5,564.70	283,073	JUN 25, 1984

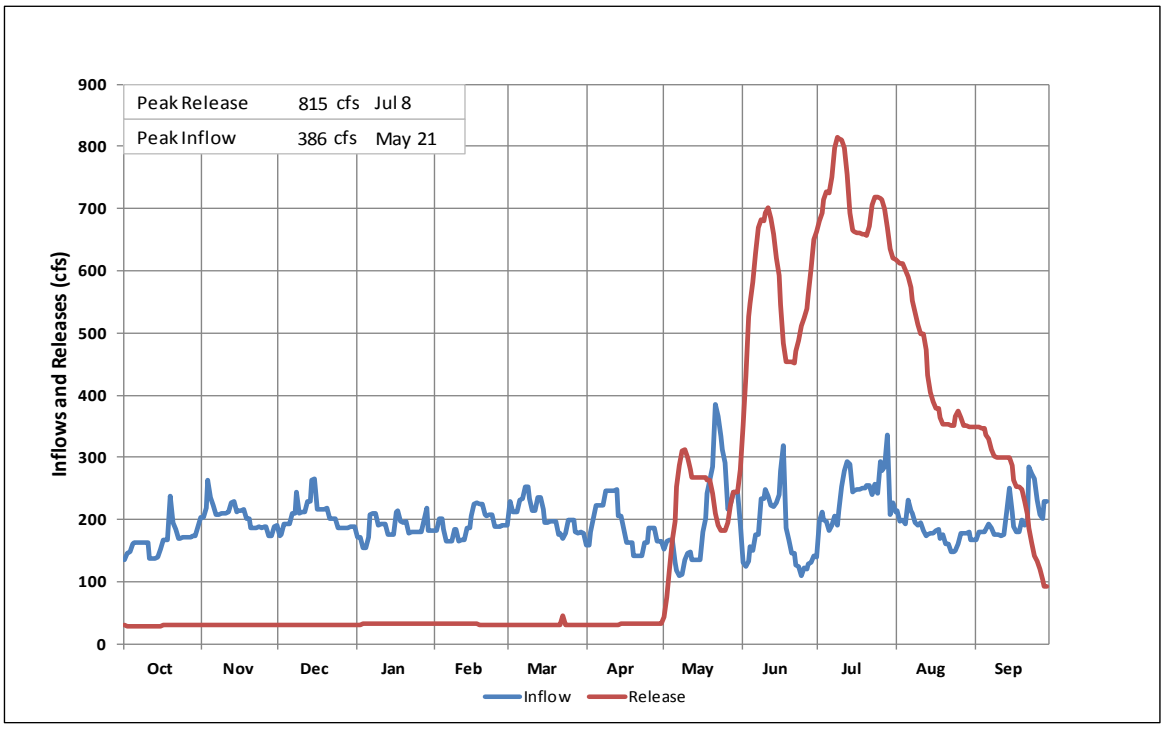
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	142,859	OCT 15-SEP 16	145,853	OCT 15-SEP 16
DAILY PEAK (CFS)	386	MAY 21, 2016	815	JUL 08, 2016
DAILY MINIMUM (CFS)	109	JUN 24, 2016	30	OCT 02, 2015
DAILY FLOW AT BARRETTS (CFS)			890	JUL 11, 2016
PEAK SPILL (CFS)			0	NONE
TOTAL SPILL (AF)			0	NONE

MONTH	INFLOW		OUTFLOW*		CONTENT	
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG
OCTOBER	10.2	59	1.8	14	63.4	74
NOVEMBER	12.2	69	1.8	15	73.9	77
DECEMBER	12.7	84	1.9	16	84.6	82
JANUARY	11.5	88	2.0	20	94.2	85
FEBRUARY	11.1	94	1.8	20	103.4	88
MARCH	12.6	84	2.0	20	114.1	91
APRIL	11.3	80	1.9	16	123.5	94
MAY	12.6	85	14.1	52	121.9	99
JUNE	10.5	41	33.5	88	98.9	88
JULY	14.9	69	43.4	96	70.4	79
AUGUST	11.2	74	27.0	72	54.5	75
SEPTEMBER	12.1	80	14.5	72	52.0	70
ANNUAL	142.9	73	145.9	59		
APRIL-JULY	49.2	47				

* Average for the 1965-2016 period.

FIGURE MTG3





Water Year 2016

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 three 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 are 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. 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, a hydrographic and a topographic survey were conducted resulting in a new 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 a reservoir elevation of 3800.00 feet. Since closure in 1953, the reservoir has accumulated a sediment volume of 59,746 AF below the reservoir elevation of 3800.00 feet. This volume represents a 2.91 percent loss in capacity and an average annual loss of 1,345.6 AF. The revised area-capacity table was put into effect on October1, 1998, reflecting the new storage levels.

Canyon Ferry Lake started WY 2016 with a storage content of 1,486,015 AF at an elevation of 3784.32 feet (95 percent of average), with inflows averaging near 2,200 cfs (77 percent of average) with releases near 3,400 cfs below Holter Dam. Temperatures were slightly above average with above average precipitation falling in the Upper Missouri River Bain.

October 2015 prevailed with warm temperatures, 6 to 8 degrees Fahrenheit above normal, with slightly below normal precipitation patterns. Inflows averaged 2,830 cfs and by the end of October the SWE was only 26 percent of average. A swing in conditions occurred during November 2015 resulting in 6 to 8 degrees Fahrenheit below normal temperatures. Precipitation quantities increased, delivering much needed moisture; 200 to 300 percent of average. By the end of November the SWE reached 80 percent of average and inflows increased to 3,350 cfs. The climatic conditions of December 2015 were near normal temperatures with continued above average precipitation. By the end of December, the valley precipitation had a year to date percent of average of 126 in the Jefferson Basin, 166 in the Madison Basin, and 153 in the Gallatin Basin. On December 31, 2015 the storage content of Canyon Ferry Reservoir was at 1,479,045 AF at an elevation of 3784.09 feet with inflows near 2,540 cfs.

On January 1, 2016 the SWE in the Missouri River Basin was at 118 percent of median. Snow accumulated at near average rates throughout the month, while normal too slightly below normal temperatures prevailed for the majority of the time. On February 1, 2016 the mountain snowpack SWE was 112 percent of median. February brought warmer temperatures and below average

mountain precipitation, 85 percent in the Jefferson Basin, 66 percent in the Madison Basin, and 70 percent in the Gallatin Basin.

On March 1, 2016 the mountain SWE in the Missouri River Basin was 103 percent of median. The forecasted April-July inflow volume was 80 percent of the 30 year average. As the month progressed, the snowpack continued to accumulate and releases from Canyon Ferry Reservoir to the Missouri River were maintained at 3,600 cfs. The storage content in Canyon Ferry Lake reached a near low for WY 2016 at 1,472,996 AF, at an elevation of 3783.89 feet. By the end of the month, the snowpack reached 15.9 inches of SWE or 100 percent of average for the Upper Missouri Basin. The mountain and valley precipitation was 130 and 135 percent of average.

On April 1, 2016 the mountain SWE was 112 percent of median, while Reclamation's April-July forecasted inflow volume increased to 91 percent of average (1,551.2 KAF). Releases were increased 200 cfs to meet target reservoir elevations. Diversions for the Helena Valley Irrigation District (HVID) to the Helena Valley Reservoir began on April 4, 2016. Temperatures during April were slightly above normal with normal precipitation. The basin snowpack SWE peaked on April 1, 2016 at 15.99 inches. The snowpack starting melting with the basin SWE ending the month at 12.73 inches, or 79 percent of average.

May 2016 was cooler than expected and produced near average precipitation in most locations within the Upper Missouri River Basin. Spring rains coupled with snowmelt runoff caused inflows to increase from 4,570 cfs on May 5, 2106 to a peak of 12,450 cfs on May 23, 2016. Reclamation monitored inflows as the storage content in the reservoir filled. Canyon Ferry Reservoir reached elevation 3794.0 feet, approximately three feet from the top of conservation pool. Releases to the Missouri River were increased to 6,600 cfs.

June 2016 brought warmer temperatures, causing the remaining high elevation snow to melt. Inflows increased to 9,240 cfs on June 10, 2016 with a reservoir elevation of 3795.7 feet. Releases were reduced to fill the remaining reservoir capacity. By June 22, 2016 the reservoir reached a peak elevation of 3797.12 feet. By June 30, 2016 inflows had declined to 2,220 cfs (30 percent of average) while flows on the Missouri River below Holter Dam were being maintained near 4,100 cfs. The valley received 41 percent of average and the mountains received 60 percent of average precipitation for the month of June.

July 2016 exhibited slightly below normal temperatures and much below average precipitation, 25 percent of normal precipitation occurred in the Jefferson Basin. Inflows into Canyon Ferry Reservoir continued to decline, despite mid-month thunderstorms. By the end of July inflows were near 1,500 cfs, 60 percent of the 30 year average, while 4,100 cfs was maintained to the Missouri River below Holter Dam. The April-July runoff into Canyon Ferry Lake during WY 2016 was 79 percent of average, totaling approximately 1,340,500 AF.

August 2016 exhibited slightly below normal temperatures and little to no precipitation. Drought conditions were prevalent in Jefferson, Gallatin, and Madison Basins, see Figure 8. Canyon Ferry Reservoir drafted below the 30 year average and releases to the Missouri River below Holter Dam were reduced to 3,900 cfs on August 10, 2016. Inflows during the month averaged 57 percent and by the end of the month, the releases to the river were reduced to maintain 3,800 cfs below Holter Dam.

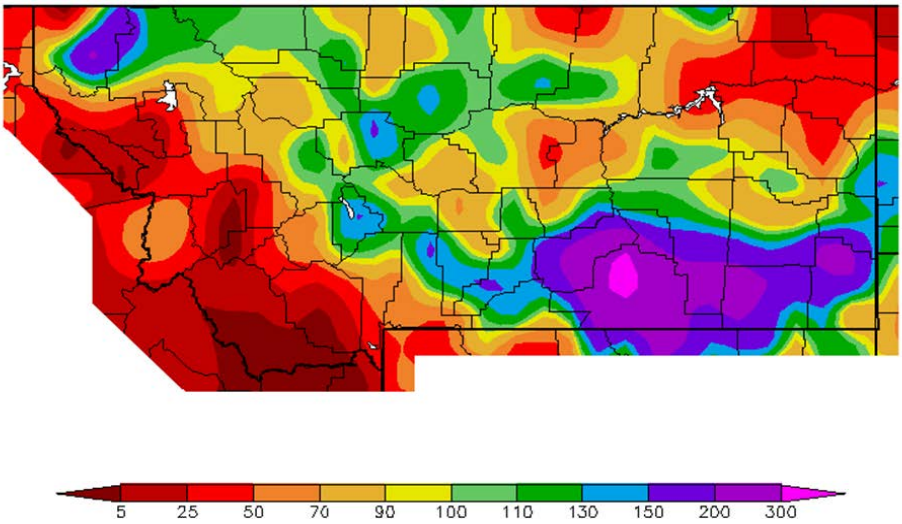


Figure 8. August 2016 precipitation departures from normal (percent) (Western Region Climate Center).

September 2016 forecasts projected below average inflows. To conserve storage, releases were reduced to maintain 3,700 cfs below Holter Dam. Temperatures in September were cooler with heavy precipitation, up to 200 percent of average. Inflows remained near 72 percent of average and the reservoir was still drafting. The HVID discontinued diversions on October 3, 2016.

By the end of WY 2016, Canyon Ferry Lake had a storage content of 1,485,407 AF at an elevation of 3784.30 feet (95 percent of average), with inflows averaging near 2,640 cfs and releases maintained near 3,500 cfs below Holter Dam. The annual inflow to Canyon Ferry Lake was 82 percent of average, totaling 2,731,576 AF.

During WY 2016, Canyon Ferry powerplant generated 305,357,000 kilowatt-hours, 81 percent of the long-term average dating back to 1967. The powerplant used 2,512,691 AF, or 92 percent of the total water released from the dam. The other eight percent was released to meet irrigation needs for HVID (202,877 AF), 16,617 AF spilled through the river outlet gates and zero AF spilled through the spillway gates.

The Corps estimated that during WY 2016, Canyon Ferry Dam prevented $192,100 in local flood damages and also prevented $513,300 in flood damages downstream on the Missouri River below Fort Peck Reservoir. Since construction of the Canyon Ferry Dam in 1954, Canyon Ferry Reservoir has reduced flood damages by a total of $238,564,900.

Important Events -Water Year 2016

October 19-29, 2015: Canyon Ferry personnel conducted annual maintenance on Unit 1. Turbine releases were restricted and limited to a two-unit capacity. All releases were made through the power plant, and averaged 3,135 cfs.

November 2-12, 2015: Canyon Ferry personnel conducted annual maintenance on Unit 3. Turbine releases were restricted and limited to a two-unit capacity. All releases were made through the power plant, and averaged 3,130 cfs.

January 4-28, 2016: Canyon Ferry personnel conducted annual maintenance on Unit 1. Turbine releases were restricted and limited to a 2 unit capacity. All releases were made through the power plant, and averaged 3,130 cfs.

January 8, 2016: January runoff forecasts indicated releases out of Canyon Ferry Reservoir needed to be increased to meet target reservoir elevations by early spring. (≈3,300 cfs through the powerplant).

January 27, 2016: Preliminary February runoff forecasts indicated releases out of Canyon Ferry Reservoir needed to be increased to meet targeted reservoir elevations by early spring. (≈3,600 cfs through the powerplant).

February 1-19, 2016: Canyon Ferry personnel conducted annual maintenance on Unit 2. Turbine releases were restricted and limited to a 2-unit capacity. All releases were made through the power plant, and averaged 3,600 cfs.

February 29 - March 31, 2016: Canyon Ferry personnel conducted annual maintenance on Unit 3. Turbine releases were restricted and limited to a 2-unit capacity. All releases were made through the power plant, and averaged 3,600 cfs.

March 1, 2016: NRCS reported snowpack at 103 percent of median.

April 1, 2016: NRCS reported snowpack at 103 percent of median.

April 4, 2016: HVID started pumping water to the Helena Valley. In response, the total release out of Canyon Ferry Lake was increased to 3,750 cfs (≈ 3,440 cfs through the powerplant, 0 cfs through the river outlet gates, and 310 cfs for the Helena Valley Pump (HVP)).

April 5 & 6, 2016: The spillway and river outlet works gate were under clearance for inspection purposes and temporary operations occurred to test the gates.

April 8, 2016: The snowpack was 100 percent of average and the April 1 runoff forecast indicated flows needed to be increased. (≈ 3,590 cfs through the powerplant, 0 cfs through the river outlet gates, and 410 cfs for the HVP).

April 14, 2016: HVID decreased diversions to Helena Valley Reservoir. (≈ 3,690 cfs through the powerplant, 0 cfs through the river outlet gates, and 230 cfs for the HVP).

April 21, 2016: Canyon Ferry Reservoir releases were increased to safely store anticipated spring runoff. Total release out of Canyon Ferry Reservoir was increased to 4,000 cfs. (≈ 3,780 cfs through the powerplant, 0 cfs through the river outlet gates, and 220 cfs for the HVP).

May 1, 2015: NRCS reported snowpack at 69 percent of median.

May 3, 2016: HVID increased diversions to Helena Valley Reservoir. (≈ 3,780 cfs through the powerplant, and 460 cfs for the HVP).

May 5, 2016: HVID increased diversions to Helena Valley Reservoir. (≈ 3,780 cfs through the powerplant, and 550 cfs for the HVP).

May 9, 2016: HVID increased diversions to Helena Valley Reservoir. (≈ 3,690 cfs through the powerplant, and 680 cfs for the HVP).

May 17, 2016: Canyon Ferry Reservoir releases were increased to safely store anticipated spring runoff. Total release was increased to 4,930 cfs. (≈ 4,270 cfs through the powerplant, 0 cfs through the river outlet gates, and 660 cfs for the HVP).

May 23, 2016: Inflow into Canyon Ferry Reservoir peaked at 12,448 cfs. Canyon Ferry personnel conducted maintenance on Unit 3. Turbine releases were restricted and limited to a 2-unit capacity. Total release out of Canyon Ferry Lake was 5,430 cfs. (≈ 3,500 cfs through the powerplant, 1,270 cfs through the river outlet gates, and 660 cfs for the HVP).

May 24, 2016: Canyon Ferry Reservoir releases were increased to safely store anticipated spring runoff. Total release was increased to 5,930 cfs. (≈ 5,270 cfs through the powerplant, 0 cfs through the river outlet gates, and 660 cfs for the HVP).

May 25, 2016: To control the rate of fill, releases were increased to 6,430 cfs. (≈ 5,270 cfs through the powerplant, 500 cfs through the river outlet gates, and 660 cfs for the HVP).

May 26, 2016: HVID decreased diversions to Helena Valley Reservoir. To control the rate of fill, releases were increased to 6,840 cfs. (≈ 5,270 cfs through the powerplant, 1,070 cfs through the river outlet gates, and 500 cfs for the HVP).

May 31, 2016: Snowmelt runoff inflows into Canyon Ferry Reservoir were decreasing. To ensure filling the reservoir to the top of the joint use pool, releases were decreased. The total release was decreased to 6,240 cfs. (≈ 5,270 cfs through the powerplant, 470 cfs through the river outlet gates, and 500 cfs for the HVP).

June 1, 2016: Canyon Ferry personnel conducted maintenance on Unit 2. Turbine releases were restricted and limited to a 2-unit capacity. (≈ 3,430 cfs through the powerplant, 2,300 cfs through the river outlet gates, and 530 cfs for the HVP).

June 2, 2016: Inflows continued to decrease. The total release was decreased to 5,610 cfs. HVID requested an increase. (≈ 4,960 cfs through the powerplant, 0 cfs through the river outlet gates, and 650 cfs for the HVP).

June 4, 2016: Inflows continued to decrease. To ensure filling the reservoir to the top of the joint use pool, releases were also decreased. The total release decreased to 5,110 cfs. (≈ 4,460 cfs through the powerplant, 0 cfs through the river outlet gates, and 650 cfs for the HVP).

June 7, 2016: HVID increased diversions to Helena Valley Reservoir. (≈ 4,380 cfs through the powerplant, 0 cfs through the river outlet gates, and 795 cfs for the HVP).

June 9, 2016: Releases were decreased 4,875 cfs to fill the reservoir to the top of the joint use pool. (≈ 4,160 cfs through the powerplant, 0 cfs through the river outlet gates, and 715 cfs for the HVP).

June 15, 2016: High elevation snow in the Upper Missouri Basin has melted out. Flows on the Missouri River below Holter Dam were maintained at or above 4,100 cfs. The total release out of Canyon Ferry Reservoir was decreased to 4,485 cfs. (≈ 3,760 cfs through the powerplant, 0 cfs through the river outlet gates, and 725 cfs for the HVP).

June 20, 2016: Canyon Ferry Reservoir was nearing the top of the joint use pool and inflows were declining. Flows on the Missouri River below Holter Dam were maintained at or above 4,100 cfs. The total release was decreased to 4,185 cfs. (≈ 3,460 cfs through the powerplant, 0 cfs through the river outlet gates, and 725 cfs for the HVP).

June 29, 2016: Flows on the Missouri River below Holter Dam were maintained near 4,100 cfs. The total release was decreased to 4,090 cfs. (≈ 3,360 cfs through the powerplant, 0 cfs through the river outlet gates, and 730 cfs for the HVP).

July 28, 2016: Canyon Ferry personnel conducted maintenance on the generators. Turbine releases were restricted and limited to a 2-unit capacity. (≈ 3,345 cfs through the powerplant, 0 cfs through the river outlet gates, and 745 cfs for the HVP).

August 10, 2016: Inflows into Canyon Ferry Reservoir were 50 percent of average. To balance the water supply, flows on the Missouri River below Holter Dam were maintained near 3,900 cfs. Canyon Ferry personnel conducted maintenance on the generators. The total release was decreased to 3,890 cfs. (≈ 3,135 cfs through the powerplant, 0 cfs through the river outlet gates, and 755 cfs for the HVP).

August 10-12, 2016: Canyon Ferry personnel conducted maintenance on Unit 2. Turbine releases were restricted and limited to a 2-unit capacity. (≈ 3,135 cfs through the powerplant, 0 cfs through the river outlet gates, and 755 cfs for the HVP).

August 11, 2016: HVID requested a decrease in diversions to the Helena Valley Reservoir. Flows on the Missouri River below Holter Dam were be maintained near 3,900 cfs. (≈ 3,175 cfs through the powerplant, 0 cfs through the river outlet gates, and 650 cfs for the HVP).

August 23, 2016: HVID requested a decrease in diversions to the Helena Valley Reservoir. Flows on the Missouri River below Holter Dam were maintained near 3,900 cfs. (≈ 3,270 cfs through the powerplant, 0 cfs through the river outlet gates, and 450 cfs for the HVP).

August 27, 2016: Inflows ranged from 40 to 50 percent of average. To conserve water supply, flows on the Missouri River below Holter Dam were maintained near 3,800 cfs. (≈ 3,140 cfs through the powerplant, 0 cfs through the river outlet gates, and 460 cfs for the HVP).

September 21-28, 2016: Canyon Ferry personnel requested an outage on Unit 1 for maintenance purposes. Generation was limited and restricted to a 2-unit load during this time frame. Flows on the Missouri River below Holter Dam were maintained near 3,700 cfs. (≈ 3,165 cfs through the powerplant, 0 cfs through the river outlet gates, and 435 cfs for the HVP).

September 26, 2016: HVID requested a decrease in diversions to the Helena Valley Reservoir. In addition, inflow projections indicated a need for decreased releases. Flows on the Missouri River below Holter Dam were be maintained near 3,600 cfs. (≈ 3,045 cfs through the powerplant, 0 cfs through the river outlet gates, and 425 cfs for the HVP).

September 28 - October 6, 2016: Canyon Ferry personnel conducted maintenance on Unit 3. (≈ 3,165 cfs through the powerplant, 0 cfs through the river outlet gates, and 285 cfs for the HVP).

October 3, 2016: HVID discontinued all diversions to Helena Valley Reservoir. Flows below Holter Dam were maintained near 3,500 cfs. (≈ 3,300 cfs through the powerplant, 0 cfs through the river outlet gates, and 0 cfs for the HVP).

Additional statistical information of Canyon Ferry Reservoir and its operations during WY 2016 can be found on Table MTT6 and Figure MTG4.

TABLE MTT6
HYDROLOGIC DATA FOR WY 2016
CANYON FERRY RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	3,728.00	396,031	396,031
TOP OF ACTIVE CONSERVATION	3,770.00	1,097,599	701,568
TOP OF JOINT USE	3,797.00	1,891,888	794,289
TOP OF EXCLUSIVE FLOOD CONTROL	3,800.00	1,992,977	101,089

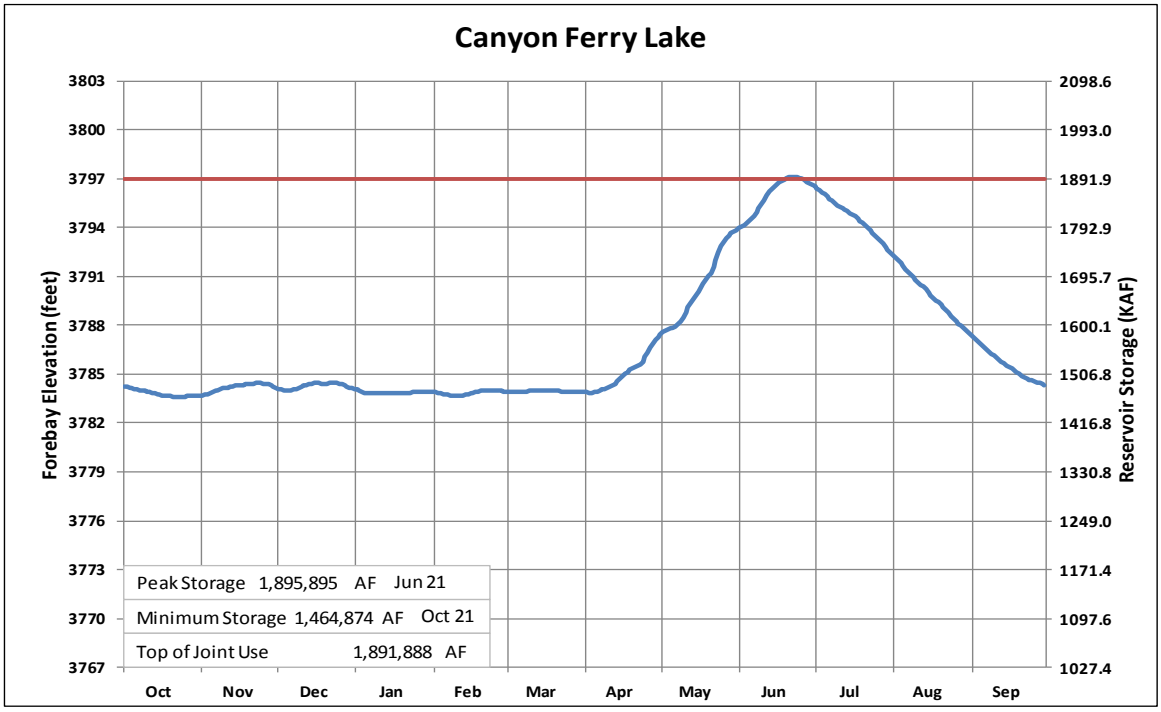
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	3,794.32	1,486,015	OCT 01, 2015
END OF YEAR	3,784.30	1,485,407	SEP 30, 2016
ANNUAL LOW	3,783.62	1,464,874	OCT 21, 2015
ANNUAL HIGH	3,797.12	1,895,895	JUN 21, 2016
HISTORIC HIGH	3,800.00	2,050,900	JUN 23, 1964

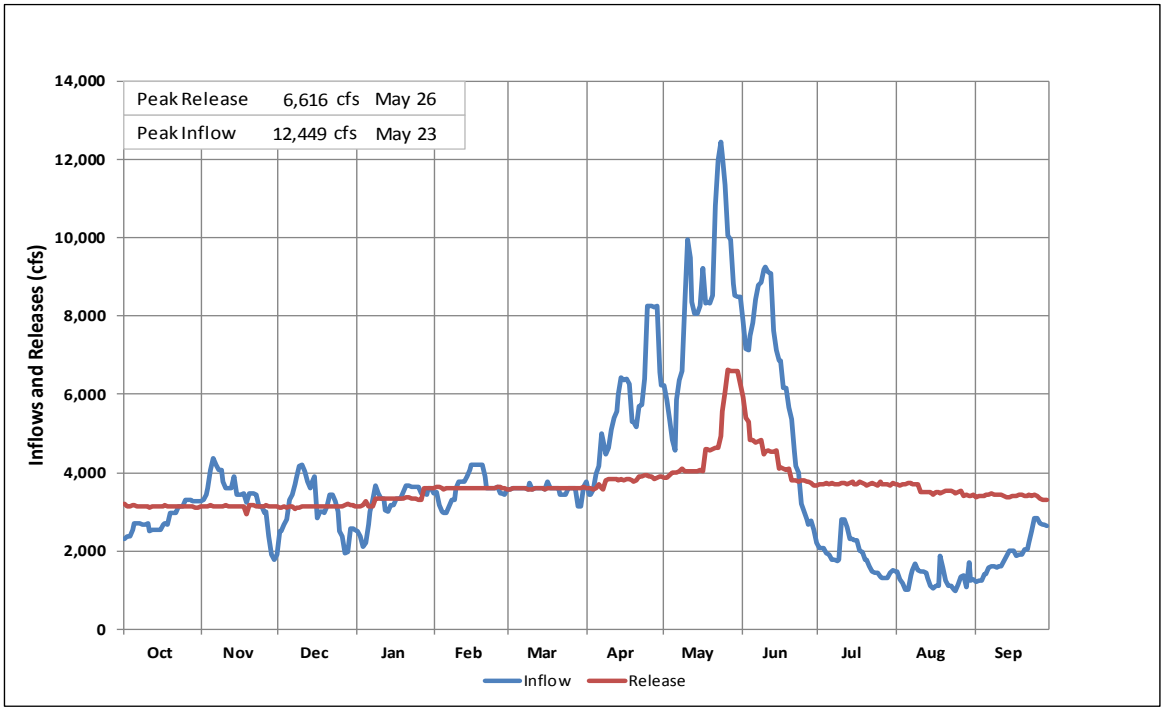
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	2,731,575	OCT 15-SEP 16	2,631,025	OCT 15-SEP 16
DAILY PEAK (CFS)	12,449	MAY 23, 2016	6,616	MAY 26, 2016
DAILY MINIMUM (CFS)	968	AUG 24, 2016	2,935	NOV 18, 2015
PEAK SPILL (CFS)			1,197	MAY 30, 2016
TOTAL SPILL (AF)			16.6	11/18/15, 05/23-06/02/16

MONTH	INFLOW		OUTFLOW*				CONTENT	
	KAF	% OF AVG	PUMPED TO HELENA VALLEY (KAF)	% OF AVG	RIVER KAF	% OF AVG	KAF	% OF AVG
OCTOBER	174.1	74	0.1	11	193.1	76	1,467.0	93
NOVEMBER	199.7	82	0.0	---	186.7	70	1,480.0	93
DECEMBER	192.0	92	0.0	---	192.9	67	1,479.0	96
JANUARY	200.0	96	0.0	---	205.4	71	1,473.6	99
FEBRUARY	208.5	105	0.0	---	200.2	77	1,474.8	102
MARCH	219.4	88	0.0	---	221.2	75	1,473.0	104
APRIL	342.2	115	7.3	117	225.7	75	1,582.2	110
MAY	519.5	109	17.9	124	292.5	81	1,791.2	113
JUNE	364.6	56	22.2	131	257.5	55	1,876.2	104
JULY	114.5	42	23.8	127	228.5	64	1,738.2	100
AUGUST	79.4	57	19.2	110	218.2	88	1,580.6	97
SEPTEMBER	117.6	72	10.7	119	202.1	88	1,485.4	95
ANNUAL	2,731.6	82	101.2	120	2,631.0	72		
APRIL-JULY	1,340.9	79						

* Average for the 1955-2016 period.

FIGURE MTG4





Water Year 2016

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 2016, storage in Helena Valley Reservoir was 8,618 AF at an elevation of 3816.30 feet. The reservoir reached a low for the year, 6,527 AF at an elevation of 3811.17 feet on April 2, 2106. New operating criteria goals were to fill Helena Valley Reservoir by May 1, 2016 and maintain it nearly full through June 2016. In response, diversions to the Helena Valley Unit from Canyon Ferry Reservoir were started on April 4, 2016. Storage in Helena Valley Reservoir steadily increased to a peak for the year of 10,291 AF at an elevation of 3819.76 feet on April 18, 2016. Helena Valley Reservoir ended WY 2016 with a storage content of 9,080 AF at an elevation of 3817.30 feet. During WY 2016, 101,072 AF of water was pumped to Helena Valley Reservoir from Canyon Ferry Reservoir. HVID released 80,670 AF for irrigation. All irrigation deliveries were discontinued for the 2016 season on October 3.

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 2016
HELENA VALLEY RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
Top of Inactive Storage	3,805.00	4,554	4,554
Top of Active Conservation Storage	3,820.07	10,451	5,897
STORAGE ELEVATION DATA	ELEVATION (FEET)	STORAGE (AF)	DATE
Beginning of Year	3,816.30	8,618	10/01/15
End of Year	3,817.30	9,080	09/30/16
Annual Low	3,811.17	6,527	04/03/16
Annual High	3,819.76	10,291	04/18/16
Historic High	3,820.60	10,738	6/02/75
INFLOW-OUTFLOW DATA			ANNUAL
Pumped from Canyon Ferry to Helena Valley Unit			101,072 AC-FT
Inflow to Helena Valley Reservoir			83,503 AC-FT
Released from reservoir for irrigation			80,670 AC-FT
Delivered to the City of Helena for municipal use			1,891 AC-FT

MONTH	RESERVOIR		
	FOREBAY ELEVATION (FEET)	STORAGE CONTENT (KAF)	PUMPED TO HELENA VALLEY (KAF)
OCTOBER	3,815.53	8.3	0.1
NOVEMBER	3,814.72	7.9	0
DECEMBER	3,814.10	7.7	0
JANUARY	3,813.45	7.4	0
FEBRUARY	3,812.69	7.1	0
MARCH	3,811.32	6.6	0
APRIL	3,818.96	9.9	7.3
MAY	3,818.79	9.8	17.9
JUNE	3,819.37	10.1	22.2
JULY	3,817.20	9.0	23.8
AUGUST	3,818.13	9.5	19.2
SEPTEMBER	3,817.30	9.1	10.7
ANNUAL			101.2

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 reenter 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 new hydrographic and topographic survey was conducted to measure reservoir volume, resulting in an updated area-capacity table and curve. The previous survey, completed in 1996, measured the reservoir volume after major forest fires in 1988.

The 2009 survey data yielded a capacity increase of 2,211 AF at an elevation of 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 an elevation of 4724.0 feet (top of active conservation). Since closure in 1929 the reservoir accumulated 6,172 AF of sediment below the reservoir elevation of 4724.0 feet. The revised area-capacity table was placed into effect January 1, 2013.

The spillway crest is at an elevation of 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 an elevation of 4724.0 feet (98,688 AF).

Gibson Reservoir began WY 2016 with a storage content of 5,395 AF at an elevation of 4609.85 feet, which is the minimum reservoir elevation before sediment is sluiced through the river outlet works. At the conclusion of the 2015 irrigation season, fall releases from Gibson Reservoir were diverted to Willow Creek Reservoir bringing the reservoir storage to desired winter carry-over levels, and preventing the need to move water after snow settles in the canals. Once all diversions to Willow Creek Reservoir were discontinued for the year, winter releases to the Sun River were reduced and maintained between 75 to 100 cfs.

Precipitation during the start of WY 2016 was slow. Valley and mountain precipitation in the Sun River Basin was much below average until November 2015 when a storm brought the average up to slightly below normal conditions (85 percent). This trend continued into December 2015 resulting in a cumulative valley precipitation for October 2015 through December 2015 at 95 percent of average while the cumulative mountain precipitation remained near 85 percent of average.

On January 1, 2016 the mountain SWE in the Sun River Basin was at 83 percent of median. January and February 2016 temperatures were above normal and the precipitation amounts varied. Valley precipitation was near normal for both months, however mountain precipitation declined, with January 2016 yielding only 27 percent of average. The March 1, 2016 mountain SWE was at 68 percent of median.

Temperatures during March 2016 were 2 to 4 degrees Fahrenheit above average and precipitation ranged from 50 to 70 percent of average in the Sun and Teton Basins. Inflows during March 2016 remained steady at 200 cfs with Gibson Reservoir ending the month at an elevation of 4665.30 feet, 58.7 feet from full pool.

The April 1, 2016 SWE was at 64 percent of median, and the forecasted April-July runoff volume into Gibson Reservoir was at 257,500 AF, 63 percent of average, which was modeled as enough volume to refill all the reservoirs (Gibson, Willow Creek, and Pishkun). However late season inflows did not keep up with full irrigation demands. On April 12, 2016 Reclamation and the Greenfield Irrigation District Board discussed the April-July water supply forecast, and set reduced allotments for the upcoming irrigation season.

Inflows into Gibson Reservoir slowly increased from 200 cfs to 2,300 cfs as temperatures increased throughout April. Greenfield Irrigation District began refilling Pishkun Reservoir through the Pishkun Supply Canal on April 11, 2016. By April 30, 2016 the storage level of Gibson Reservoir was at an elevation of 4706.32 feet, 17.7 feet below the top of the conservation pool. The SWE at the end of April was near 6.1 inches. At this time, the peak inflow was anticipated to be less than 3,000 cfs, therefore all spillway gates were closed to fill the remaining pool. Releases to the Sun River averaged 115 cfs for the month.

The temperatures in May 2016 were slightly below normal and slightly above average precipitation fell in the valley and mountain areas (125 and 124 percent, respectively). The melt continued at a steady rate and storage in Gibson Reservoir continued to increase. Greenfield Irrigation District and Reclamation continued to monitor inflows, releases, and the remaining snowpack. Releases to the Sun River over the Sun River Diversion Dam during May increased from 200 cfs to approximately 1,000 cfs to control the rate of fill in Gibson Reservoir. Peak inflow of 2,767 cfs occurred on May 9, 2016. By the end of May, the reservoir reached the top of conservation pool with 1.6 inch of SWE remaining in the mountains.

For the remainder of the runoff season, releases were adjusted to meet irrigation demands while keeping the reservoir full. Inflows during June 2016 remained steady, near 2,000 cfs until June 9, 2016, then decreased to 600 cfs by the end of the month (35 percent of average). Temperatures were above normal and little to no moisture fell within the basin. Valley and mountain precipitation was 31 and 45 percent of average, respectively.

Warm temperatures and lower than normal precipitation fell in July 2016. Irrigation demands far exceeded inflows into Gibson Reservoir. Below average snowpack and warm temperatures generated an actual April-July runoff total of 264,800 AF, 65 percent of average. Inflows during April, May, June, and July were 153, 66, 46, and 43 percent of average, respectively.

Temperatures during August were slightly below normal, however, much needed precipitation fell in the basin. Valley and mountain precipitation was 80 and 87 percent of average, respectively. Irrigation deliveries through the Pishkun Supply Canal were discontinued on August 2, 2016 due to the much below average inflow. 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 content of 4,955 AF on August 30, 2016.

September 2016 temperatures were normal with up to 150 percent above average precipitation. August through September inflow to Gibson Reservoir totaled 22,260 AF, 57 percent of average. Gibson Reservoir ended with a content of 5,459 AF of storage at an elevation of 4610.06 feet on September 30, 2016. This was 30 percent of average and 5 percent of normal full. Annual inflow to Gibson Reservoir for WY 2016 was 346,643 AF, 66 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 2016 Gibson Reservoir did not contribute to the reduction of flood damages locally or downstream on the Missouri River below Fort Peck Reservoir. 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 the Sun River below Gibson Reservoir, and serves the 81,000 acre Greenfields Division. The total capacity is 46,670 AF at an elevation of 4370.0 feet.

In 2002, Reclamation surveyed Pishkun Reservoir to develop a topographic map and compute area-capacity tables. Data was used to calculate reservoir capacity 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 a reservoir elevation of 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 storage content at the beginning of WY 2016 was 21,587 AF at an elevation of 4349.08 feet. Storage during the fall and winter was maintained at 21,587 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 11, 2016. On May 2, 2016 irrigation releases from Pishkun Reservoir began. On May 22, 2016 the storage reached the top of active conservation pool at an elevation of 4370.0 feet.

Once irrigation releases began, storage fluctuated with variations in inflow and irrigation demands. On June 7, 2016 a maximum release of 1,720 cfs and the maximum inflow of 1,367 cfs were recorded. All diversions from the Sun River into Pishkun Reservoir were discontinued on August 2, 2016, two months earlier than normal.

All irrigation releases out of Pishkun Reservoir were discontinued on August 11, 2016 for lack of water supply and dry conditions.

Greenfields Irrigation District delivered a reduced allotment (1.5 AF per acre) to its water users in 2016 due to the limited water supply. Approximately 223,000 AF of water was released from Pishkun Reservoir from May 2 through August 11, 2016 to help meet irrigation demands on the Sun River Project. The reservoir storage was 20,074 AF at an elevation of 4347.28 feet, 70 percent of average and 43 percent of full capacity at the end of WY 2016.

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 an elevation of 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 a topographic map and compute area-capacity tables. Data were used to calculate reservoir capacity since dam closure in 1911. The survey determined that Willow Creek Reservoir has a storage capacity of 34,819 AF and a surface area of 1,509 acres at an elevation of 4144.00 feet. Since closure in 1911, the reservoir had an estimated volume change of 431 AF below an elevation of 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 2016 was 17,663 AF at an elevation of 4131.28 feet. Since storage in Willow Creek Reservoir was lower than average, diversions continued until December 2, 2015. Diversions throughout the fall and early winter gained approximately 10,300 AF of storage or 7.7 feet in reservoir elevation.

Willow Creek Reservoir continued to receive diverted water through the Willow Creek feeder canal from April 19 through May 21, 2016. The reservoir reached a peak storage content of 31,891 AF at an elevation of 4142.03 feet on May 22, 2016. This storage level was 114 percent of average and 100 percent of full capacity. The peak inflow for the year was 109 cfs on June 20, 2016. To meet irrigation demands within the Sun River Irrigation Project releases were made from Willow Creek Reservoir from June 20 through August 10, 2016 totaling 15,500 AF.

To refill Willow Creek Reservoir, diversions from the Sun River were initiated on September 8, 2016 at a rate of approximately 50-75 cfs. The reservoir ended WY 2016 with a storage content of 16,829 AF at an elevation of 4130.52 feet. This was 85 percent of average and 53 percent of normal full capacity. Fall and winter diversions continued into Willow Creek Reservoir in an 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 – Water Year 2016

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

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

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

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

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

May 23, 2016: Storage in Pishkun Reservoir reached peak content for the year of 46,938 AF at an elevation of 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 an elevation of 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 2016
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	4,557.50	0	0
TOP OF ACTIVE CONSERVATION	4,724.00	98,687	98,687

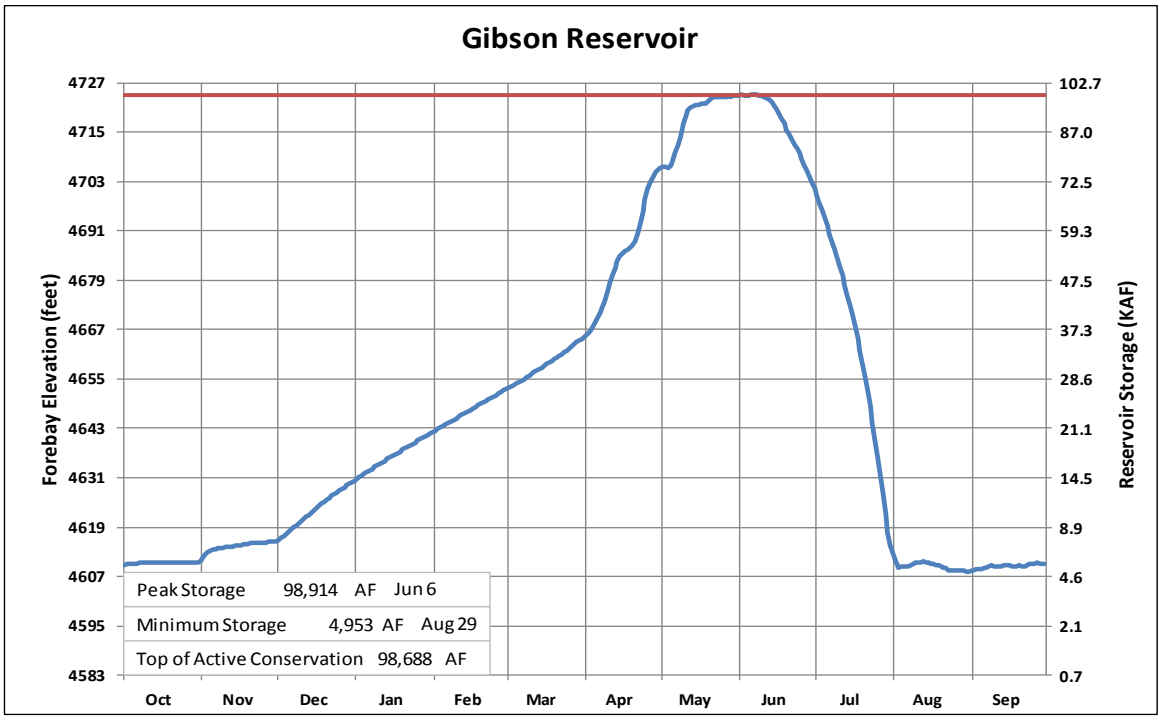
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	4,609.77	5,371	OCT 01, 2015
END OF YEAR	4,610.06	5,459	SEP 30, 2016
ANNUAL LOW	4,608.29	4,953	AUG 29, 2016
ANNUAL HIGH	4,724.17	98,914	JUN 06, 2016
HISTORIC HIGH	4,732.23	116,400	JUN 08, 1964

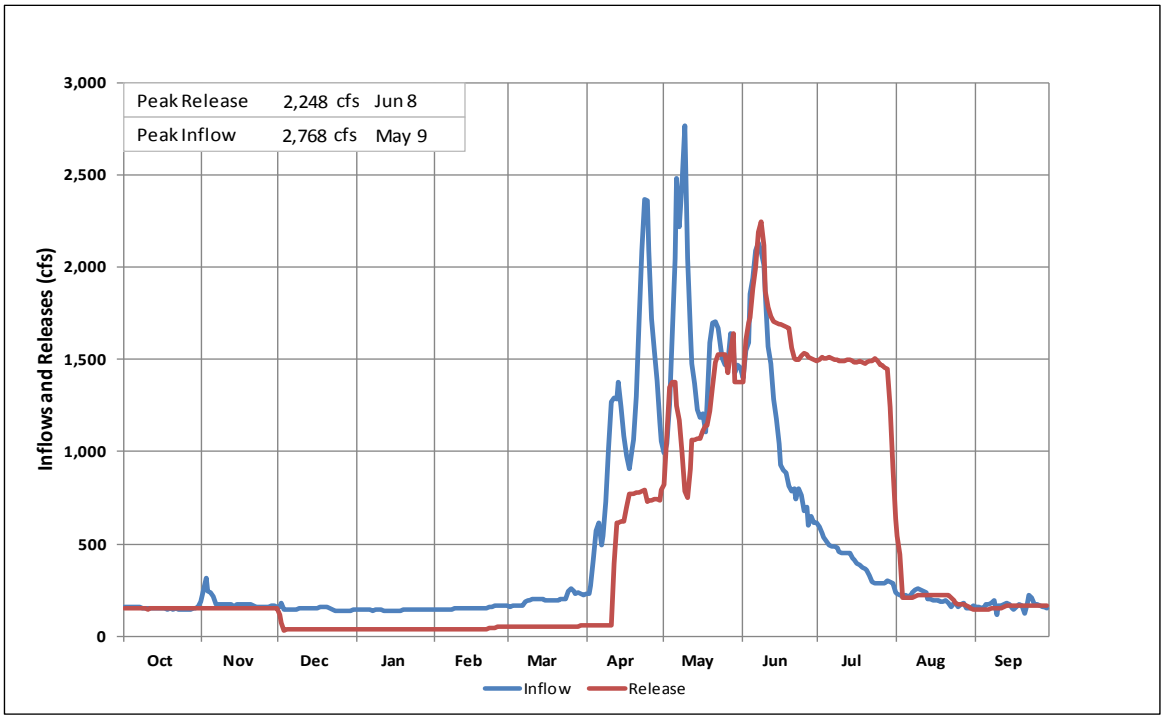
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	346,643	OCT 15-SEP 16	108,801	OCT 15-SEP 16
DAILY PEAK (CFS)	2,768	MAY 09, 2016	1,138	MAY 28, 2016
DAILY MINIMUM (CFS)	115	SEP 09, 2016	69	NOV 13, 2015

MONTH	INFLOW		OUTFLOW*				CONTENT	
	KAF	% OF AVG	TOTAL CANAL KAF	% OF AVG	RIVER KAF	% OF AVG	KAF	% OF AVG
OCTOBER	9.5	62	6.6	180	4.8	50	5.7	24
NOVEMBER	10.8	67	6.3	400	5.0	46	7.5	28
DECEMBER	9.2	70	0.0	---	5.5	50	14.2	48
JANUARY	8.8	77	0.0	---	5.6	57	20.6	64
FEBRUARY	8.9	86	0.0	---	5.9	72	27.0	77
MARCH	12.4	81	0.0	---	5.0	51	36.0	88
APRIL	69.8	153	21.3	230	7.0	32	76.3	133
MAY	98.5	66	46.8	116	27.1	28	98.6	109
JUNE	72.0	46	80.5	140	18.6	14	70.1	78
JULY	24.5	43	81.8	111	6.3	24	6.3	13
AUGUST	12.3	53	2.0	5	11.2	86	5.0	24
SEPTEMBER	9.9	62	2.9	24	6.4	64	5.5	30
ANNUAL	346.6	66	248.3	104	108.8	30		
APRIL-JULY	264.8	65						

* Average for the 1931-2016 period.

FIGURE MTG5





Water Year 2016

TABLE MTT8-B
HYDROLOGIC DATA FOR WY 2016
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	4,342.00	16,008	16,008
TOP OF ACTIVE CONSERVATION	4,370.00	46,694	30,686

STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	4,349.08	21,587	OCT 01, 2015
END OF YEAR	4,347.28	20,074	SEP 30, 2016
ANNUAL LOW	4,346.87	19,739	AUG 11, 2016
ANNUAL HIGH	4,370.16	46,938	MAY 23, 2016
HISTORIC HIGH	4,371.40	48,950	JUL 04, 1953

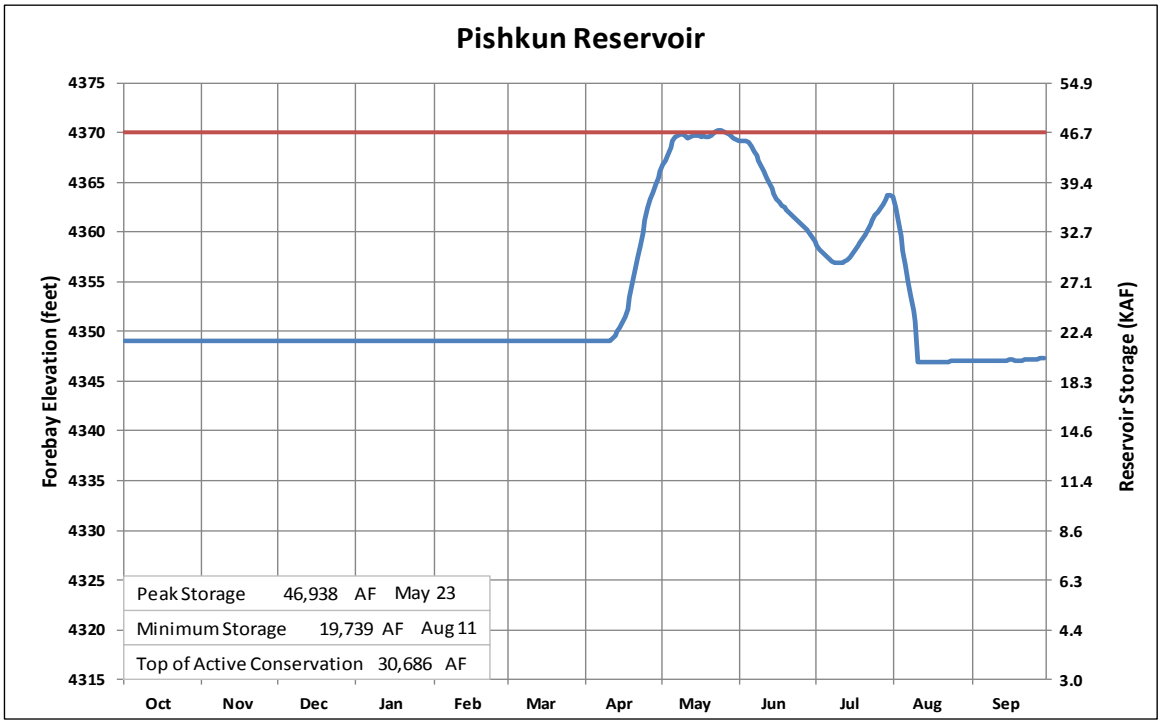
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	221,092	OCT 15-SEP 16	222,605	OCT 15-SEP 16
DAILY PEAK (CFS)	1,368	JUN 07, 2016	1,723	JUN 07, 2016
DAILY MINIMUM (CFS)	0	*	0	*

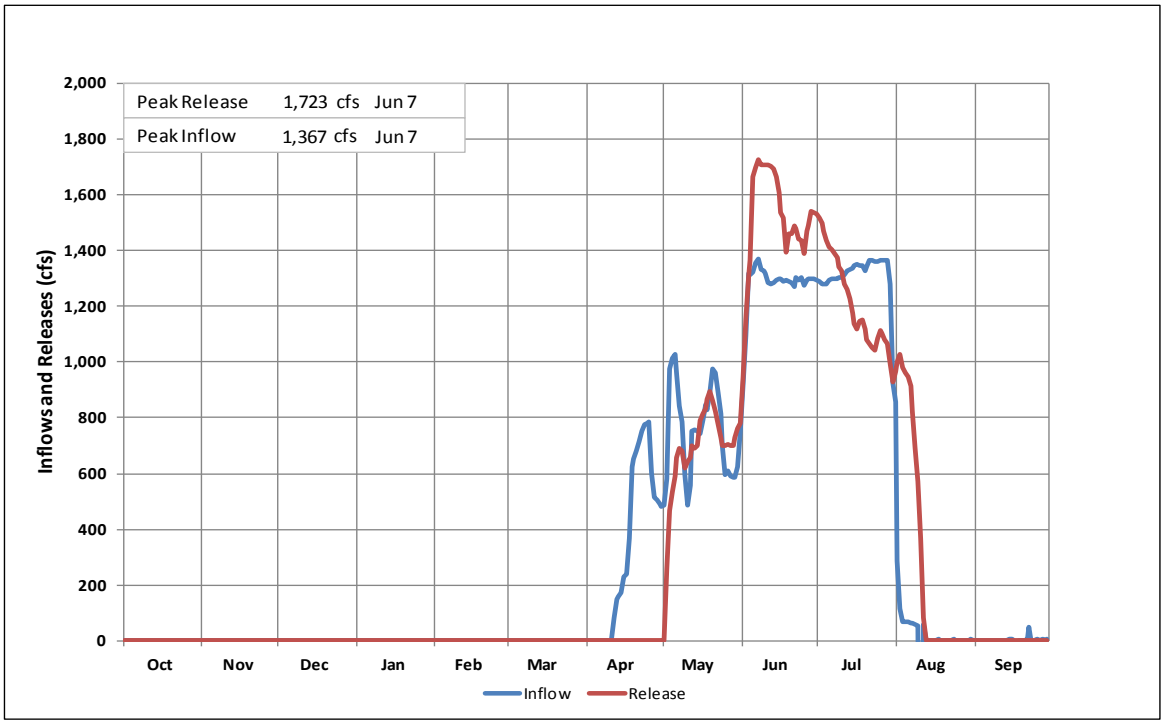
* During nonirrigation season

MONTH	INFLOW*		OUTFLOW*		CONTENT	
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG
OCTOBER	0.0	---	0.0	---	21.6	72
NOVEMBER	0.0	---	0.0	---	21.6	69
DECEMBER	0.0	---	0.0	---	21.6	70
JANUARY	0.0	---	0.0	---	21.6	70
FEBRUARY	0.0	---	0.0	---	21.6	71
MARCH	0.0	---	0.0	---	21.6	67
APRIL	19.3	264	0.0	---	40.9	105
MAY	46.3	125	41.7	135	45.5	99
JUNE	76.3	130	90.2	145	31.5	78
JULY	79.8	112	74.0	98	37.3	102
AUGUST	-0.8	---	16.6	38	19.9	58
SEPTEMBER	0.2	1	0.0	---	20.1	70
ANNUAL	221.1	96	222.6	97		
APRIL-JULY	221.3	127				

* Average for the 1947-2016 period.

FIGURE MTG6





Water Year 2016

TABLE MTT8-C
HYDROLOGIC DATA FOR WY 2016
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	4,085.28	1	1
TOP OF ACTIVE CONSERVATION	4,142.00	31,848	31,847

STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	4,131.16	17,529	OCT 01, 2015
END OF YEAR	4,130.52	16,829	SEP 30, 2016
ANNUAL LOW	4,129.22	15,468	SEP 10, 2016
ANNUAL HIGH	4,142.03	31,891	MAY 27, 2016
HISTORIC HIGH	4,144.00	35,300	JUN 22, 1975

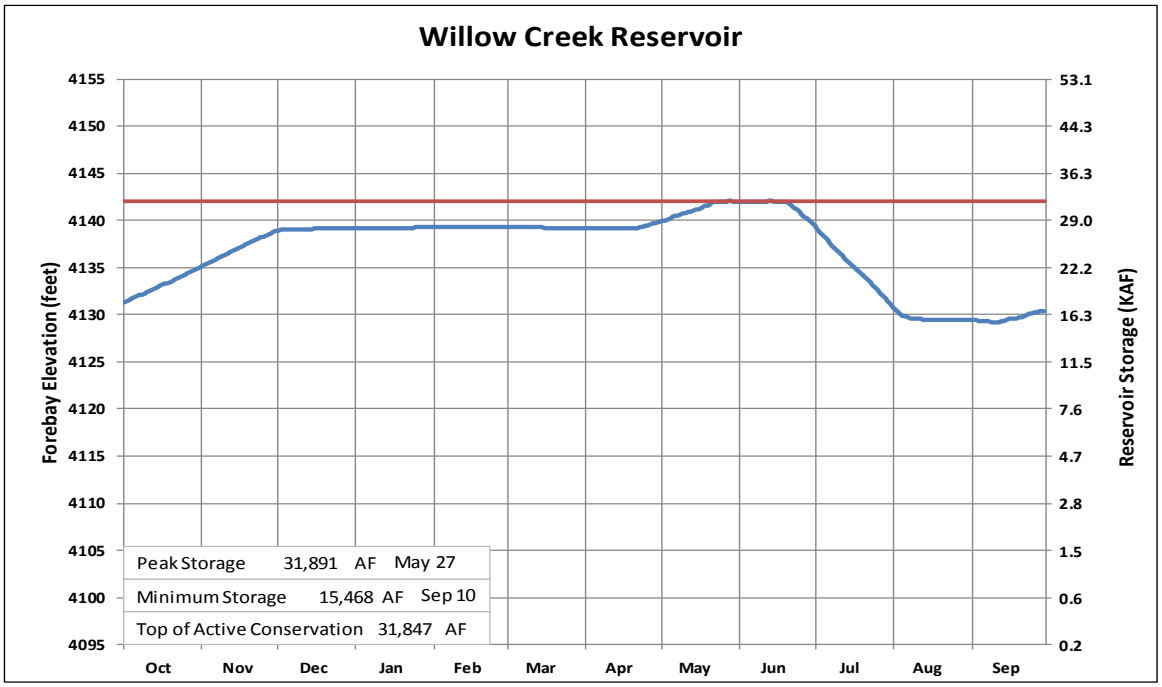
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	14,825	OCT 15-SEP 16	15,524	OCT 15-SEP 16
DAILY PEAK (CFS)	110	MAY 20, 2016	197	JUL 07, 2016
DAILY MINIMUM (CFS)	0	*	0	*

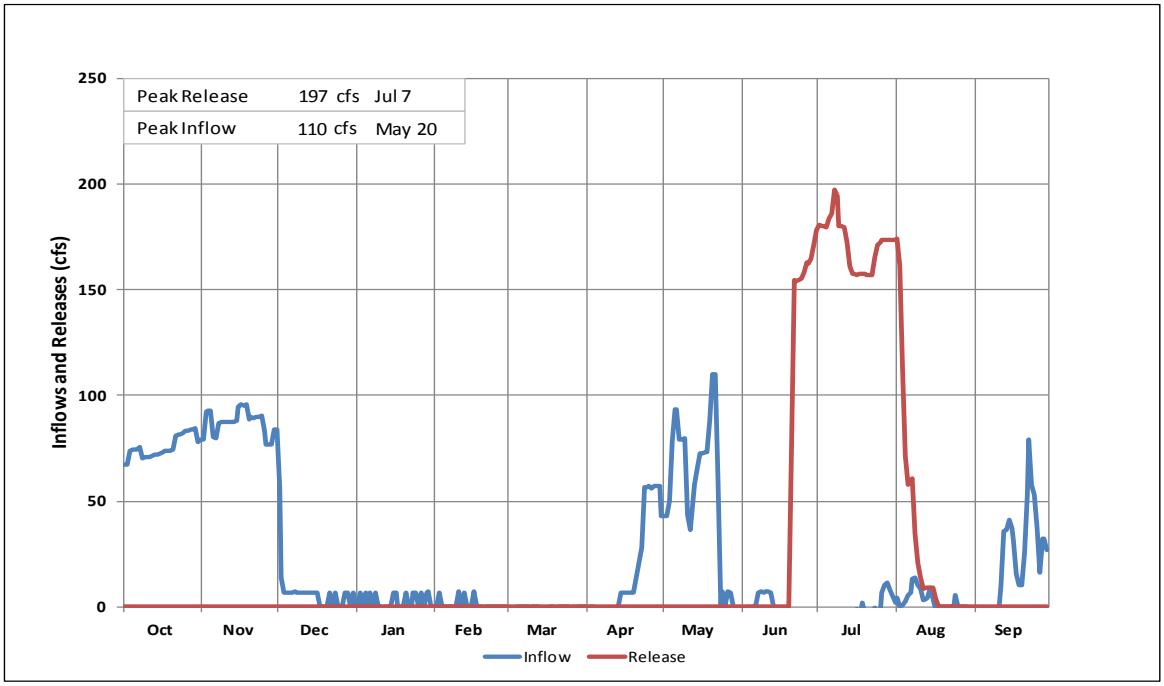
* During nonirrigation season

MONTH	INFLOW*		OUTFLOW*		CONTENT	
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG
OCTOBER	4.7	498	0.0	---	22.2	106
NOVEMBER	5.2	570	0.0	---	27.4	124
DECEMBER	0.4	91	0.0	---	27.8	122
JANUARY	0.2	42	0.0	---	27.9	121
FEBRUARY	0.1	12	0.0	---	28.0	119
MARCH	-0.2	---	0.0	---	27.8	116
APRIL	1.0	50	0.0	---	28.8	111
MAY	3.1	80	0.0	---	31.8	112
JUNE	-0.4	---	3.4	109	28.1	98
JULY	-0.4	---	10.6	195	17.2	74
AUGUST	0.1	---	1.6	45	15.7	79
SEPTEMBER	1.1	259	0.0	---	16.8	85
ANNUAL	14.8	106	15.5	111		
APRIL-JULY	3.3	33				

* Average for the 1952-2016 period.

FIGURE MTG7





Water Year 2016

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. Settlement increased following the flood of 1964 and the heavy runoff of 1965. It 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 was 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 were lifted and normal operations were restored at Lake Elwell.

The irrigation distribution works have not yet been constructed, so 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, Lake Elwell was surveyed to develop a topographic map and compute area-capacity tables. Data were used to calculate reservoir capacity since dam closure in October 1957. Lake Elwell has a storage capacity of 925,649 AF and a surface area of 18,275 acres at a reservoir elevation of 2993.00 feet. Since closure, 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 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 incorporated the addition of a 7.5 megawatt powerplant, privately 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 the WY 2015, normal operations of Lake Elwell drafted storage to 819,442 AF at an elevation of 2986.80 feet. This was 104 percent of normal.

October through December 2015 valley precipitation fluctuated between below and above average. Mountain precipitation and snowpack was consistently below average during this same period. Valley and mountain precipitation was 155 percent and78 percent of average, respectively. Inflow

totaled 58,259 AF, 62 percent of average. Releases were maintained at 500 cfs, and by the end of December 2015, Lake Elwell storage was 762,355 AF, 103 percent of average.

On January 1, 2016 the mountain snowpack in the Marias River Basin above Lake Elwell was at 74 percent of average, and the water supply forecast, indicated the April-July runoff into Lake Elwell would be 302,600 AF, 82 percent of average. Valley and mountain precipitation was at 115 percent 42 percent of average. On February 1, 2016 the snowpack was 64 percent of average, and the water supply forecast indicated the April-July runoff would be about 241,100 AF, 65 percent of average.

On March 1, 2016 the snowpack was 65 percent of average, and the water supply forecast indicated the April-July runoff would be 241,100 AF, 65 percent of average. Conditions were dry in February and March 2016. Releases were kept at 500 cfs due to low inflows and the poor water supply outlook.

On April 1, 2016 the mountain snowpack peaked two weeks earlier than normal at 65 percent of average. The water supply forecast prepared in April 2016 indicated the April-July runoff was expected to be 60 percent of average, totaling 222,800 AF. The lowest storage content for the year occurred on April 5, 2016 at 725,817 AF, at an elevation of 2980.43 feet. Inflow peaked at an average of 1,961 cfs on April 26, 2016. On April 13, 2016 forecasts and planned operations of Tiber Dam were presented at the Marias River Water Management Committee's annual meeting.

April 2016 precipitation was above average in the valley and below average in the mountains. On May 1, 2016 the mountain snowpack decreased to 47 percent of average, and the water supply forecast indicated May to July 2016 runoff would be 135,000 AF, 43 percent of average. Lake Elwell was forecasted to come up short of filling by 6.3 feet but the water level would stay high enough for lake recreation needs throughout the summer if the releases from Tiber Dam were kept at 500 cfs.

Precipitation in May 2016 was 112 and 108 percent of average in the valley and mountains, respectively. Monthly precipitation for June 2016 were lower at 57 and 56 percent of average for the valley and mountains, respectively. Storage peaked on June 19, 2016 at 833,482 AF, at an elevation of 2987.68 feet. Releases were kept at 500 cfs throughout the months of May and June. July through September 2016 precipitation in the valley and mountains were 129 and 105 percent of average with inflow at 26 percent of average.

Total annual valley and mountain precipitation were 116 and 80 percent of average, respectively. Inflow during August and September 2016 totaled 1,700 AF and 7,500 AF, respectively, which was 12 and 65 percent of average. Releases to the Marias River were kept at 500 cfs for WY 2016.

The April-July runoff into Lake Elwell during WY 2016 was 55 percent of average, totaling 203,510 AF. This was 10,114 AF more than the April-July inflow received in 2015. WY 2016 was the eighth lowest April-July inflow on record. April was the only month during WY 2016 that inflow was above average, at 111 percent of average. The total annual inflow was 57 percent of average, totaling 307,700 AF. This was 131,600 AF less than the annual inflow received in WY 2015. By the end of WY 2016, Lake Elwell storage was 755,270 AF at an elevation of

2982.51 feet. This was 92 percent of normal and 64,172 AF or 4.29 feet lower than reported on September 30, 2015.

The Corps determined that during WY 2016, Lake Elwell did not prevent any local flood damages but prevented $290,900 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 $96,646,100.

Important Events – Water Year 2016

October 9, 2015: An efficiency test was conducted on the powerplant turbine. Releases were briefly increased to 550 and 600 cfs for the test and returned to 500 cfs.

January 1, 2016: Mountain snowpack in the watershed above Lake Elwell was about 74 percent of average. The April-July runoff into Lake Elwell was forecasted for 302,600 AF, 82 percent of average.

February 1, 2016: Snowpack in the watershed above Lake Elwell was about 64 percent of average. The February water supply forecast indicates the April-July runoff into Lake Elwell would be 241,100 AF which was 65 percent of average.

March 1, 2016: Snowpack in the Marias River Basin upstream of Lake Elwell was about 65 percent of average. The March water supply forecast indicates the April-July runoff into Lake Elwell would be 241,100 AF which is 65 percent of average.

April 1, 2016: Snowpack in the watershed above Lake Elwell was 66 percent of average. Water supply forecast indicated the April-July runoff into Lake Elwell would be 222,800 AF or 60 percent of average.

April 5, 2016: Storage was drafted to a water year low of 725,817 AF, at an elevation of 2980.43 feet.

April 26, 2016: WY 2016 inflow peaked at 1,961 cfs.

May 1, 2016: Snowpack in the watershed above Lake Elwell was 47 percent of average. The May 1, 2016 water supply forecast indicates the May through July runoff into Lake Elwell would be 135,000 AF which is 43 percent of average.

June 1, 2016: Snowpack conditions in the watershed above Lake Elwell was 27 percent of average. The June 1, 2016 water supply forecast indicates the June to July runoff into Lake Elwell would be 67,800 AF which is 36 percent of average.

June 16, 2016: Storage peaked for WY 2016 at 833,482 AF, an elevation of 2987.68 feet.

Additional hydrologic and statistical information pertaining to the operation of Lake Elwell during WY 2016 can be found in Table MTT9 and Figure MTG8.

TABLE MTT9
HYDROLOGIC DATA FOR WY 2016
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	2,966.40	554,330	554,330
TOP OF ACTIVE CONSERVATION	2,976.00	667,213	112,883
TOP OF JOINT USE	2,993.00	925,649	258,436
TOP OF EXCLUSIVE FLOOD CONTROL	3,012.50	1,328,723	403,074

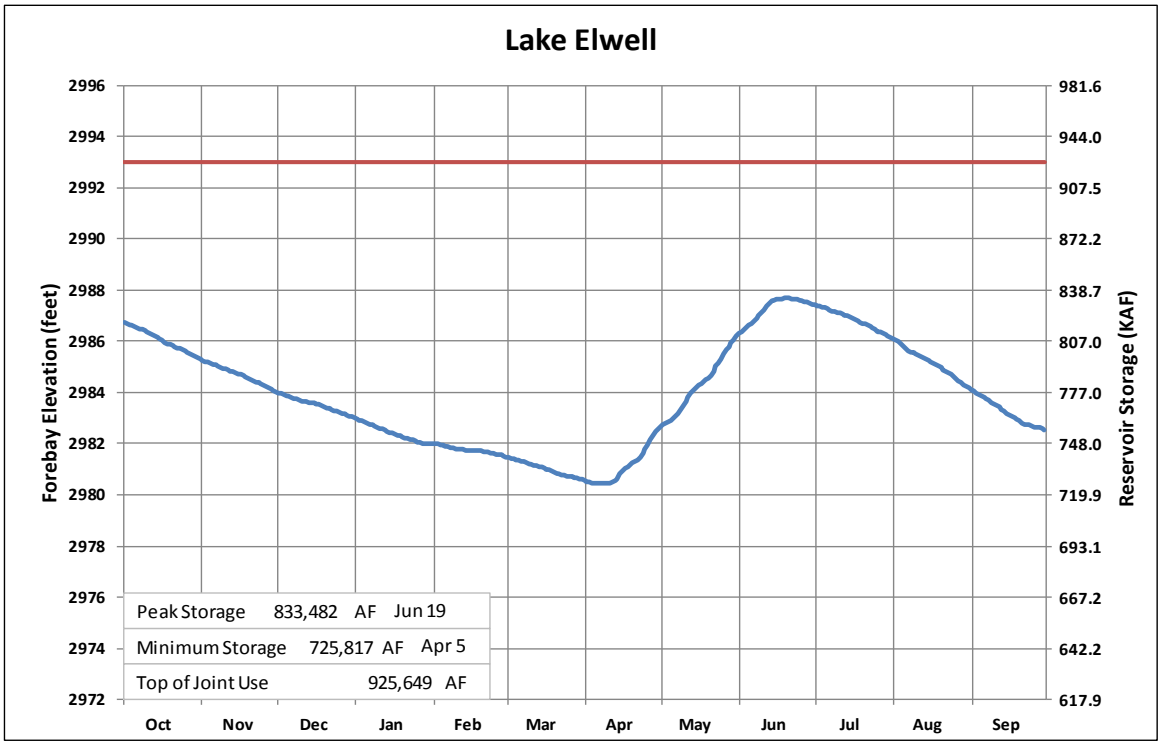
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	2,986.80	819,442	OCT 01, 2015
END OF YEAR	2,982.51	755,270	SEP 30, 2016
ANNUAL LOW	2,980.43	725,817	APR 05, 2016
ANNUAL HIGH	2,987.67	833,482	JUN 10, 2016
HISTORIC HIGH	3,011.42	1,303,858	JUL 19, 2011

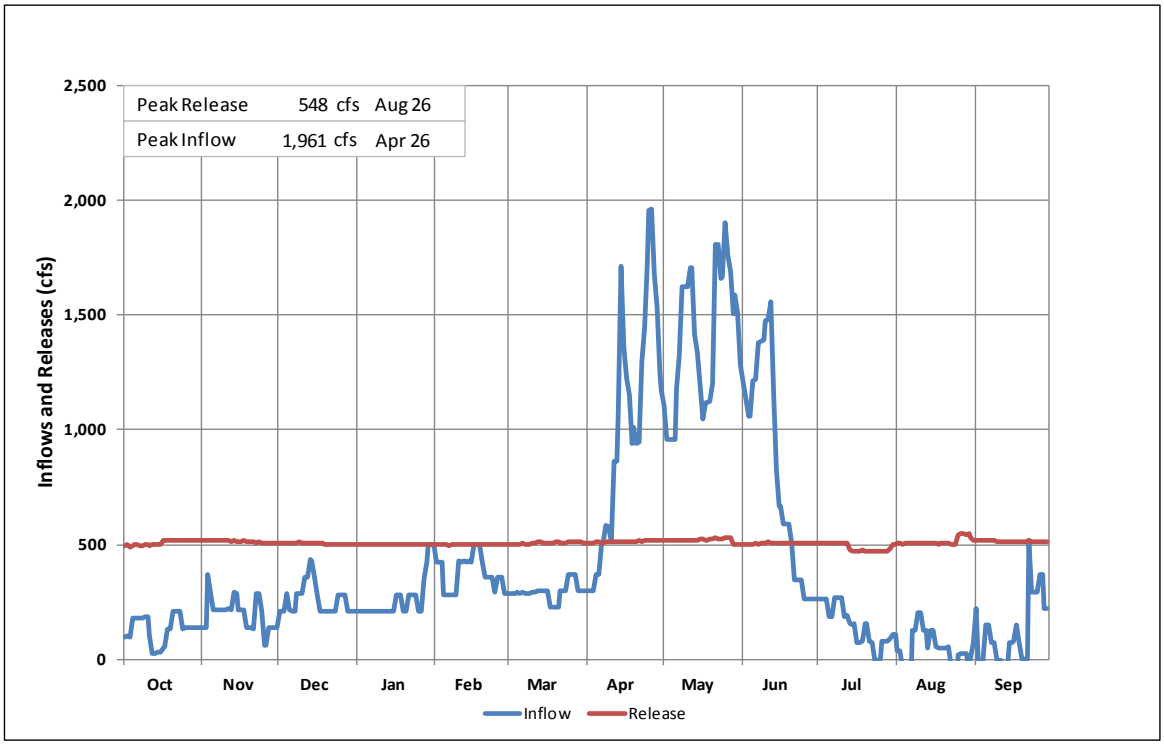
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	304,737	OCT 15-SEP16	368,909	OCT 15-SEP 16
DAILY PEAK (CFS)	1,961	APR 26, 2016	548	AUG 26, 2016
DAILY MINIMUM (CFS)	-247	AUG 24, 2016	472	JUL 22, 2016
PEAK SPILL (CFS)			0	-
TOTAL SPILL (AF)			0	-

MONTH	INFLOW		OUTFLOW*		CONTENT	
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG
OCTOBER	8.2	47	31.3	69	796.3	104
NOVEMBER	11.7	52	30.6	86	777.4	103
DECEMBER	16.1	87	31.1	109	762.4	103
JANUARY	16.4	97	30.8	115	748.0	104
FEBRUARY	21.5	96	27.8	108	740.7	104
MARCH	18.2	43	31.3	89	727.6	101
APRIL	60.4	111	30.6	70	757.4	103
MAY	86.1	69	32.0	50	811.6	100
JUNE	47.8	33	30.2	33	829.3	94
JULY	9.1	20	30.0	41	808.4	94
AUGUST	1.7	12	31.6	54	778.5	95
SEPTEMBER	7.5	65	30.7	60	755.3	96
ANNUAL	304.7	52	368.9	64		
APRIL-JULY	203.5	55				

* Average for the 1957-2016 period.

FIGURE MTG8





Water Year 2016

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 located 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 an elevation of 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 an elevation of 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 a topographic map and compute area-capacity tables. The data was used to calculate reservoir capacity since dam closure in 1919. The survey data determined a storage capacity of 66,147 AF and a surface area of 1,719 acres at a reservoir elevation of 4788.0 feet. Since dam closure in 1919, the volume change at reservoir elevation 4788.0 feet was estimated to be 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, 2015, was 16,195 AF, at an elevation of 4749.28 feet, which is 103 percent of average. Precipitation in October 2015 was below average and above average in November and December 2015. Cumulative mountain precipitation was 110 percent of average. October through December 2015 inflows were 98 percent of average. Storage in Lake Sherburne at the end of December 2015 was 33,487 AF at an elevation of 4765.71 feet, 120 percent of average.

Even though precipitation was above average for October through December, on January 1, 2016 the mountain snowpack in the St. Mary Basin was only 80 percent of average. The April-July runoff forecast for January 1, 2016 was 90,100 AF, 90 percent of average.

Precipitation in the mountains was much below average during January 2016 and as a result, the February 1, 2016 mountain snowpack for the St. Mary Basin dropped to 73 percent of average. February precipitation was also below average but SWE increased to 75 percent of average by March 1, 2016. The April-July runoff forecast for March 1, 2016 was 82,500 AF, 83 percent of average.

March precipitation was 170 and 118 percent of average in the mountains and valley, respectively. Total inflow during January through March 2016 was approximately 10,556 AF, 115 percent of average. Releases from Lake Sherburne were initiated on March 21, 2016 and diversions to the St. Mary Canal started on March 22, 2016. Diversions to the St. Mary Canal were increased to 500 cfs by April 7, 2016. The decision to start moving water to the Milk River Basin in March was based on storage levels in Fresno Reservoir and below average runoff in the Milk River Basin.

Mountain snowpack peaked at 87 percent of average on April 1, 2016, and the runoff forecast for April-July was 89,000 AF, 89 percent of average. Based on the April 1, 2016 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 34,826 AF, 147 percent of average. This occurred on April 20, 2016 when inflows from snowmelt runoff started to exceed the 500 cfs release. Sherburne releases were varied to control the rate of fill with the plan to fill the reservoir to normal full pool by end of June. Releases were also varied based on the international water accounting. By May 1, 2016 releases were reduced to 150 cfs to store the snowmelt runoff while canal diversions remained at 500 cfs. A deficit of St. Mary water occurred in April under the Letter of Intent as part of the international water accounting procedures. The deficit would have to be repaid after September 1, 2016. Once Fresno Reservoir filled to normal full pool, St. Mary Canal diversions were reduced to 190 cfs until to June 7, 2016 when irrigation demands started picking up in the Milk River Basin.

Precipitation during April was below average, above average in May, and below average in June and July 2016. Inflow was above average in April but below average in May, June, and July 2016. Inflow peaked at 848 cfs on June 8, 2016. Lake Sherburne storage peaked on June 14, 2016 at 63,910 AF, at an elevation of 4786.69 feet, 1.31 feet below the top of normal full capacity. The snowmelt runoff was over by July 6, 2016. The actual April-July runoff was 84 percent of average, totaling 83,739 AF.

Precipitation was above average in August, and September 2016. The cumulative precipitation was 102 and 89 percent of average for mountain and valley areas, respectively. Inflows during August were 77 percent of average and 133 percent of average in September. Inflow for WY 2016 totaled 126,000 AF, 89 percent of average. This was approximately 5,277 AF more than the inflow experienced during WY 2015. On September 30, 2016 the storage content in Lake Sherburne was 23,589 AF at an elevation of 4756.84 feet, 147 percent of average.

According to preliminary data, diversions from the St. Mary River to the Milk River totaled 150,873 AF, 100 percent of average. The long-term average annual diversion is 150,500 AF. The largest annual diversion recorded was 277,500 AF during 1989. Releases from Lake Sherburne were discontinued on September 21, 2016 and canal diversions from the St. Mary River to the Milk River were discontinued on September 11, 2016. The release from Lake Sherburne continued longer than the St. Mary Canal diversion to balance water delivery deficits on the St. Mary and Milk Rivers.

During the 2016 irrigation season two conference calls were conducted with the International Joint Commission Field Representatives to discuss accumulated deficits by the United States and

Alberta, Canada on the St. Mary and Milk Rivers, respectively. One was conducted in July 2016 and the second one was conducted in September 2016.

During WY 2016, 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 2016 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 loss of 1,134 AF from the previous survey. Reclamation started using the revised 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.

In WY 2015, storage in Fresno Reservoir drafted to an end of year storage of 59,816 AF, at an elevation of 2567.54. This storage content was 145 percent of average and 65 percent of normal full capacity.

Valley precipitation for October, November and December 2015 was above average. Precipitation from October through December was 156 percent of average. Reservoir inflow was 47 percent of average from October through December. Although inflow was below average, due to above average carryover, end of December storage was 56,554 AF at an elevation of 2566.61 feet, 141 percent of average.

By January 1, 2016 the mountain snowpack in the Milk River Basin was 62 percent of average. The mountain snowpack was 91 percent of average on February 1, 2016 and March 1, 2016. Spring runoff season generally occurs during March through June 2016. The peak snowpack and most reliable water supply runoff forecast for the Milk River Basin is March 1, 2016.

The March 1, 2016 forecast for natural runoff above Fresno Reservoir for March through September 2016 was 52,300 AF, 65 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 an elevation of 2575.0 feet by the end of May. By the end of March 2016, snowmelt runoff in the Milk River Basin was over.

In preparation for the upcoming irrigation season, releases were ramped up to 200 cfs from March 23 to March 25, 2016. This was done to flush the Milk River to assist districts with preparation of their diversion works.

On April 6, 2016 the Milk River Joint Board of Control (MRJBC) set the initial irrigation allotment for the 2016 irrigation season at 1.0 AF/acre based on water supply information provided by Reclamation. This allotment was less than 50 percent of a full allotment. The Nelson Reservoir Safety of Dams project and the Dodson South Canal headworks replacement project both had large impacts on operations and management of the water in WY 2016. Nelson Reservoir needed to be down to an elevation of 2205.0 feet by August 25, 2016 and Malta Irrigation District started the headworks replacement project on August 10, 2016.

Water from the St. Mary Basin through the St. Mary Canal reached Fresno Reservoir on April 4, 2016. Fresno releases for irrigation were started on April 7, 2016 and were increased to 450 cfs by April 9, 2016. Rain started falling in the Milk River Basin shortly after start of releases. On April 13, 2016 releases were decreased and by April 25, 2016 releases were back to 45 cfs due to lack of irrigation demand. One to two inches of rain fell over most of the Milk River Basin April 13 through April 16, 2016 with additional precipitation towards the end of April. Inflow into Fresno Reservoir peaked on April 16, 2016 at a daily average of 1,193 cfs. The inflow was a combination of rainfall and water transferred through the St. Mary Canal. Precipitation was 345 percent of average in April.

Fresno inflow for April was slightly above average. On May 6, 2016 Fresno Reservoir filled to normal full pool 91,746 AF, at an elevation of 2575.0 feet. Fresno Reservoir filled from natural spring runoff, water from the St. Mary River Basin, and carryover storage. Fresno Reservoir stayed above 2575.0 feet from May 6 through June 12, 2016.

Above average precipitation continued into May 2016 with 4 to 5 inches falling over most of the Milk River Basin. May precipitation was 173 percent of average. Fresno Reservoir inflow during May was below average but due to lack of irrigation demand remained full. Fresno release increased to greater than 600 cfs as releases over the spillway and storage continued to increase. Storage peaked for WY 2016 at, 96,069 AF, at an elevation of 2575.82 feet on May 15, 2016.

On June 9, 2016 irrigation demands became greater than the spillway release out of Fresno Reservoir. June precipitation was 84 percent of average and St. Mary Canal diversions were less than average. Inflow into Fresno Reservoir was 34 percent of average. Precipitation in April and May 2016 led to the MRJBC increasing the annual allotment to 2.0 AF/acre and setting September 15, 2016 as the end of the irrigation season. Inflows remained below average for the remainder of WY 2016. Precipitation varied for the remainder of WY 2016 with some months above average and some below average.

The actual March through September 2016 inflow for Fresno Reservoir, excluding St. Mary Canal water was approximately 26,873 AF, 33 percent of median, based on the United States Geological Survey computation for natural flow at the Milk River at Eastern Crossing gaging station.

The cumulative valley precipitation through the end of September 2016 was 144 percent of average. Total inflow into Fresno Reservoir for WY 2016 was 170,000 AF, 67 percent of average. Diversions from the St. Mary River Basin to the Milk River Basin accounted for about 80 percent of the inflow to Fresno Reservoir during 2016. After the irrigation season, releases from Fresno Reservoir were reduced to a winter release rate of 45 cfs on September 20, 2016. Storage in Fresno

Reservoir at the end of the WY 2016 was 57,556 AF, at an elevation of 2566.90 feet, 138 percent of average and 63 percent of normal full capacity.

The Corps determined that during WY 2016, Fresno Reservoir prevented $19,700 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 $15,520,600.

Additional hydrologic and statistical information pertaining to the operation of Fresno Reservoir during 2016 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. Nelson Reservoir also 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 sedimentation was 446 AF. The new revised elevation-area capacity data was implemented on October 1, 2001. Nelson Reservoir has a revised total capacity of 78,950 AF and an active capacity of 60,810 AF.

Storage on September 30, 2015 was 66,467 AF at an elevation of 2218.56 feet, 121 percent of average and 84 percent of normal full capacity. Once the diversions ceased, storage decreased due to seepage from October 2015 through March 9, 2016.

Diversions through the Dodson South Canal reached Nelson Reservoir on March 10, 2016. Releases for irrigation demands started on May 7, 2016. Irrigation demand remained low due to above average precipitation throughout April and May. Starting March 10, 2016 storage steadily increased until the reservoir reached near full pool in mid-May. Storage in Nelson Reservoir peaked at 77,317 AF, at an elevation of 2221.22 feet on May 22, 2016 which was approximately 0.28 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. The low storage content for WY 2016 was 26,115 AF at an elevation of 2204.48 feet on September 30, 2016 following the drawdown for the Safety of Dams modification.

Since much of the irrigation demand from Malta Irrigation District is early, releases are generally discontinued in mid to late June. Releases were reduced to the Nelson South Canal from June 11 through June 20, 2016. Once releases resumed, they were ramped up to approximately 540 cfs to start the drawdown of Nelson Reservoir for the Safety of Dams modification around the outlet works. Releases were reduced June 30 through July 5, 2016 for demossing then ramped back up to 600 cfs. Nelson Reservoir was lowered to an elevation of 2505.0 feet.

Diversions to Dodson South Canal were stopped on August 10, 2016 for Malta Irrigation District's Dodson South Canal headworks replacement project. Inflows into Nelson Reservoir stopped about a week later once Dodson South Canal storage was drained. Total net inflow to Nelson Reservoir during WY 2016 was 35,400 AF.

Releases were discontinued out of the North and South Canals on August 25, 2016 as the Safety of Dams project began. Storage on September 30, 2016 was 26,115 AF at an elevation of

2204.48 feet, 46 percent of average and 33 percent of normal full capacity. The refilling of Nelson Reservoir will likely not start until spring 2017.

Additional hydrologic and statistical information pertaining to the operation of Nelson Reservoir during 2016 can be found in Table MTT10-C and Figure MTG11.

Important Events – Water Year 2016

March 1, 2016: Milk River runoff forecast indicated March through September runoff to be 84 percent of average.

March 7, 2016: Diversion to Dodson South Canal begins to move water to Nelson Reservoir.

March 21, 2016: Lake Sherburne releases begin to move water to the Milk River Basin.

March 22, 2016: Diversion to St. Mary Canal begin to move water to the Milk River Basin.

April 1, 2016: Lake Sherburne runoff forecast indicated April-July runoff to be 89 percent of average.

April 6, 2016: MRJBC set the irrigation allotment to 1.0 AF per acre.

April 7, 2016: Fresno Reservoir releases were increased for the first time this year to meet irrigation demand.

April 16, 2016: Inflow to Fresno Reservoir peaked at 1,193 cfs.

May 1, 2016: Lake Sherburne runoff forecast indicated April-July runoff to be 77 percent of average.

May 6, 2016: Fresno Reservoir filled and began spilling water over the ungated spillway.

May 7, 2016: Releases were initiated from Nelson Reservoir for irrigation demands and to manage storage.

May 15, 2016: Storage in Fresno Reservoir reached a peak content for the year of 96,069 AF, at an elevation of 2575.82 feet, 0.82 feet above normal full pool.

May 22, 2016: Storage in Nelson Reservoir reached a peak content for the year of 77,317 AF, at an elevation of 2221.22 feet, 0.28 feet below normal full pool.

June 8, 2016: Inflow to Lake Sherburne peaked at 848 cfs.

June 14, 2016: Storage in Lake Sherburne reached a peak content for the year, 63,910 AF, at an elevation of 4786.69 feet, 1.31 feet below normal full pool.

July 12, 2016: A conference call was held with the IJC Field Representatives to discuss St. Mary and Milk River apportionments.

September 8, 2016: A conference call was held with the IJC Field Representatives to discuss St. Mary and Milk River apportionments.

August 25, 2016: Releases from Nelson Reservoir were discontinued.

September 10, 2016: St. Mary Canal diversions were discontinued.

September 21, 2016: Lake Sherburne releases were discontinued.

September 20, 2016: Releases from Fresno Reservoir are set at approximately 45 cfs for the duration of the winter.

TABLE MTT10-A
HYDROLOGIC DATA FOR WY 2016
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	4,729.30	1,899	1,899
TOP OF ACTIVE CONSERVATION	4,788.00	66,147	64,248

STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	4,749.28	16,195	OCT 01, 2015
END OF YEAR	4,756.84	23,589	SEP 30, 2016
ANNUAL LOW	4,749.28	16,195	OCT 01, 2016
ANNUAL HIGH	4,786.69	63,910	JUN 14, 2016
HISTORIC HIGH	4,788.30	68,371	JUN 30, 1986

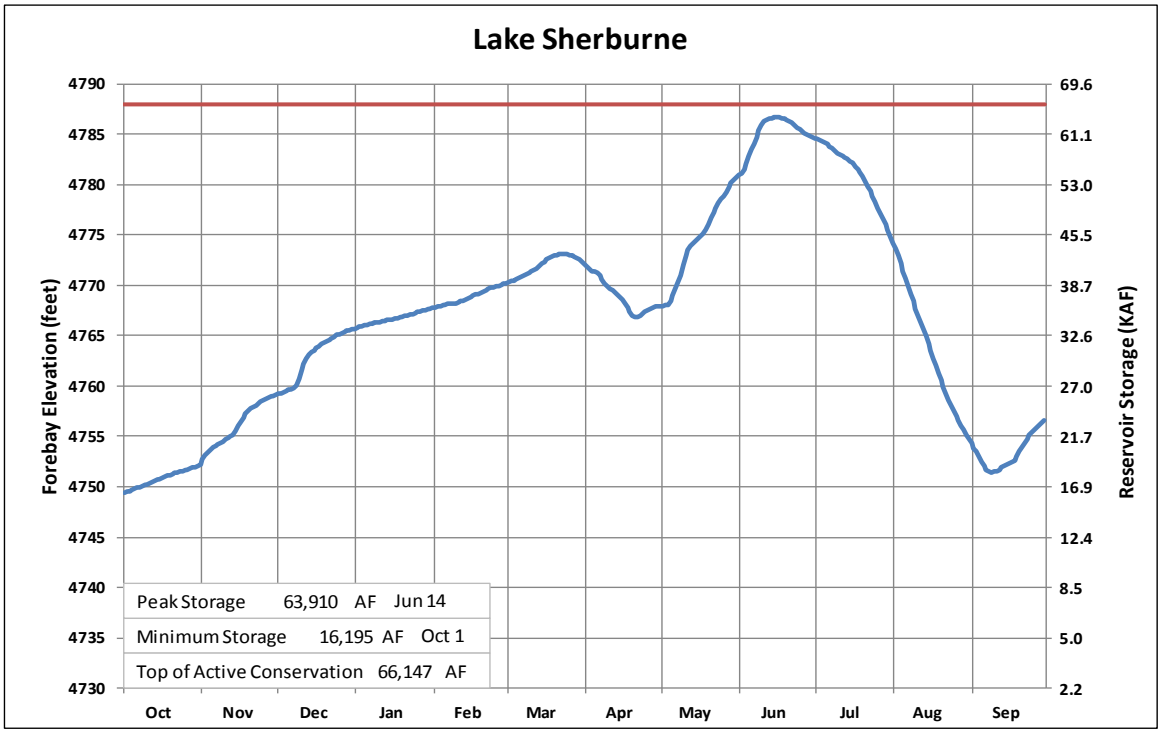
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	126,019	OCT 15-SEP 16	118,625	OCT 15-SEP 16
DAILY PEAK (CFS)	848	JUN 08, 2016	608	AUG 05, 2016
DAILY MINIMUM (CFS)	25	FEB 06, 2016	0	*

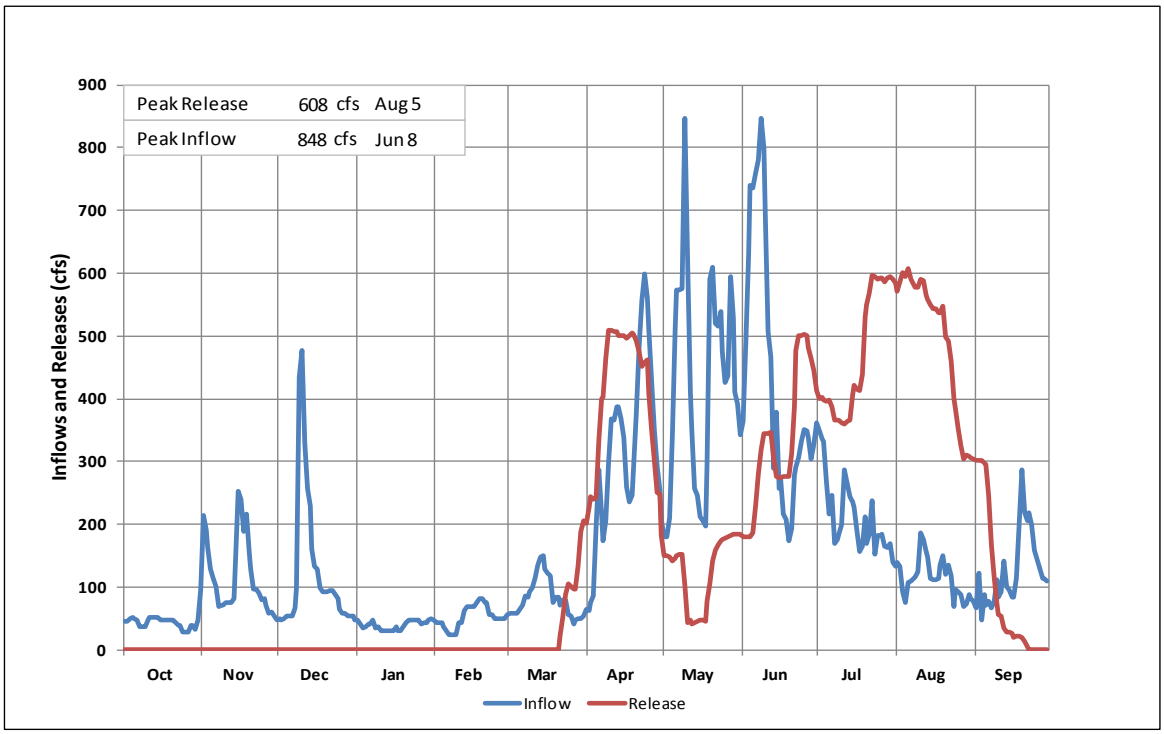
* During non-irrigation season

MONTH	INFLOW		OUTFLOW*		CONTENT	
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG
OCTOBER	2.8	41	0.0	---	19.0	98
NOVEMBER	7.0	95	0.0	---	26.0	104
DECEMBER	7.5	213	0.0	---	33.5	120
JANUARY	2.5	88	0.0	---	36.0	118
FEBRUARY	3.0	127	0.0	---	39.0	119
MARCH	5.0	126	2.6	56	41.5	137
APRIL	18.8	172	24.2	160	36.1	165
MAY	26.1	85	7.8	38	54.4	153
JUNE	25.9	67	20.0	102	60.3	107
JULY	13.0	67	28.9	112	44.4	90
AUGUST	7.0	77	30.4	93	21.0	76
SEPTEMBER	7.4	133	4.8	27	23.6	147
ANNUAL	126.0	89	118.6	84		
APRIL-JULY	83.7	84				

* Average for the 1955-2016 period.

FIGURE MTG9





Water Year 2016

TABLE MTT10-B
HYDROLOGIC DATA FOR WY 2016
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	2,530.00	158	158
TOP OF ACTIVE CONSERVATION	2,567.00	57,905	57,747
TOP OF JOINT USE	2,575.00	91,746	33,841

STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	2,567.54	59,816	OCT 01, 2015
END OF YEAR	2,566.90	57,556	SEP 30, 2016
ANNUAL LOW	2,566.07	54,721	JAN 28, 2016
ANNUAL HIGH	2,575.82	96,069	MAY 15, 2016
HISTORIC HIGH	2,579.35	154,023	APR 03, 1952

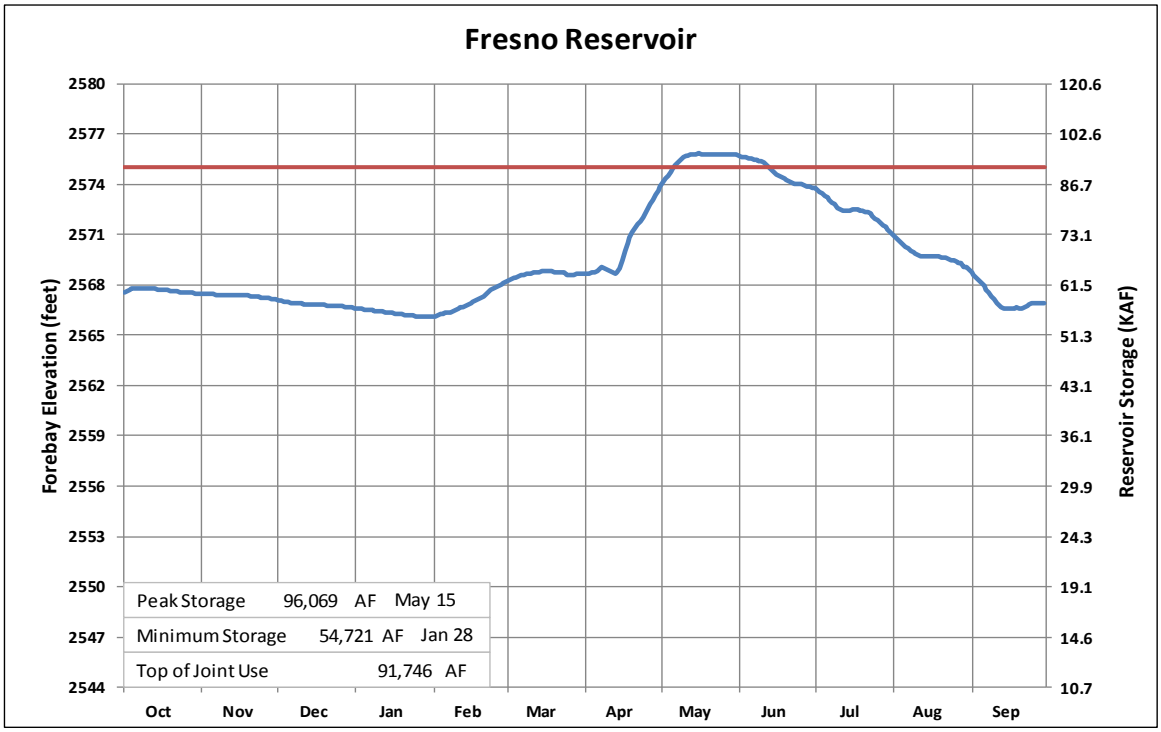
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	170,036	OCT 15-SEP 16	172,296	OCT 15-SEP 16
DAILY PEAK (CFS)	1,193	APR 16, 2016	783	JUL 30, 2016
DAILY MINIMUM (CFS)	0	*	46	OCT 18, 2016

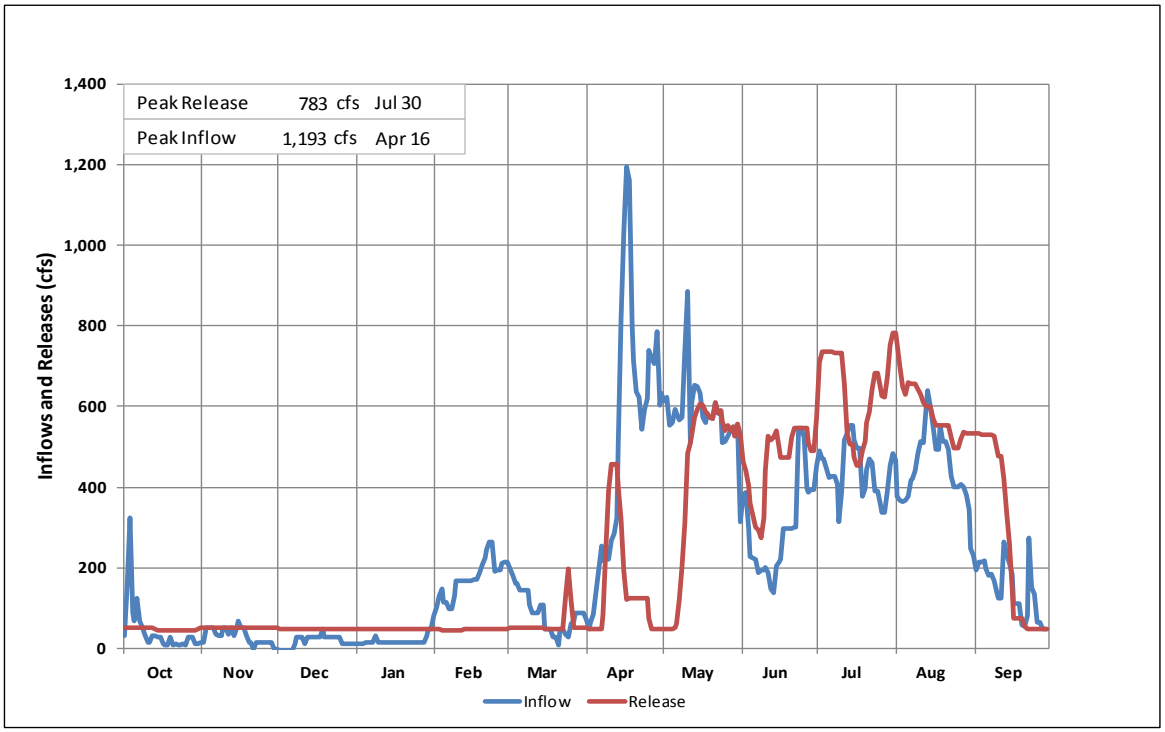
* During non-irrigation season

MONTH	INFLOW		OUTFLOW*		CONTENT	
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG
OCTOBER	2.6	34	2.9	41	59.5	142
NOVEMBER	1.8	70	3.0	94	58.3	140
DECEMBER	1.1	75	2.9	105	56.6	141
JANUARY	1.2	81	3.0	111	54.8	142
FEBRUARY	10.0	213	2.6	104	62.1	157
MARCH	5.5	22	3.6	52	64.0	121
APRIL	31.3	104	9.3	47	85.9	127
MAY	35.8	82	26.4	55	95.3	145
JUNE	17.9	34	27.8	56	85.5	123
JULY	27.1	83	39.5	72	73.1	141
AUGUST	27.2	90	36.0	80	64.4	160
SEPTEMBER	8.4	38	15.2	70	57.6	137
ANNUAL	170.0	67	172.3	65		
APRIL-JULY	112.1	70				

* Average for the 1949-2016 period.

FIGURE MTG10





Water Year 2016

TABLE MTT10-C
HYDROLOGIC DATA FOR WY 2016
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	2,200.00	18,140	18,140
TOP OF ACTIVE CONSERVATION	2,221.60	78,950	60,810

STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	2,218.56	66,467	OCT 01, 2015
END OF YEAR	2,204.48	26,115	SEP 30, 2016
ANNUAL LOW	2,204.48	26,115	SEP 30, 2016
ANNUAL HIGH	2,221.22	77,317	MAY 22, 2016
HISTORIC HIGH	2,221.68	79,297	JUN 01, 2007

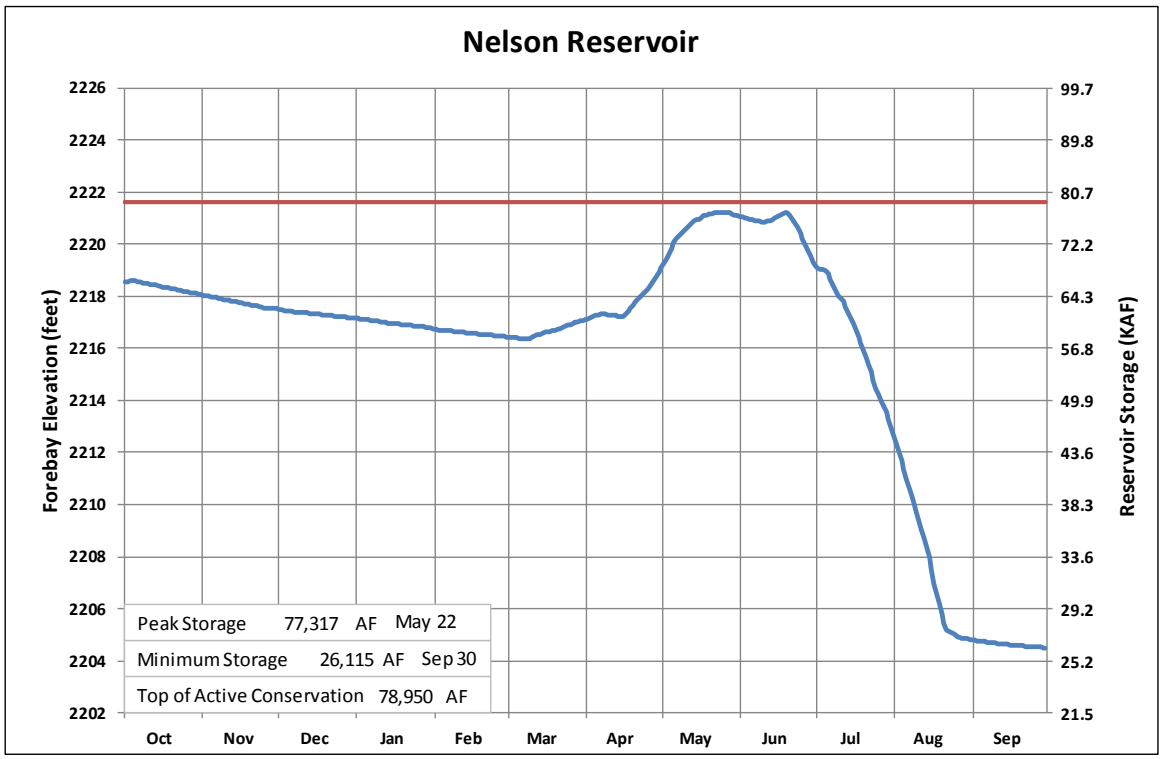
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	35,408	OCT 15-SEP 16	75,760	OCT 15-SEP 16
DAILY PEAK (CFS)	450	MAY 04, 2016	614	JUL 22, 2016
DAILY MINIMUM (CFS)	0	*	0	*

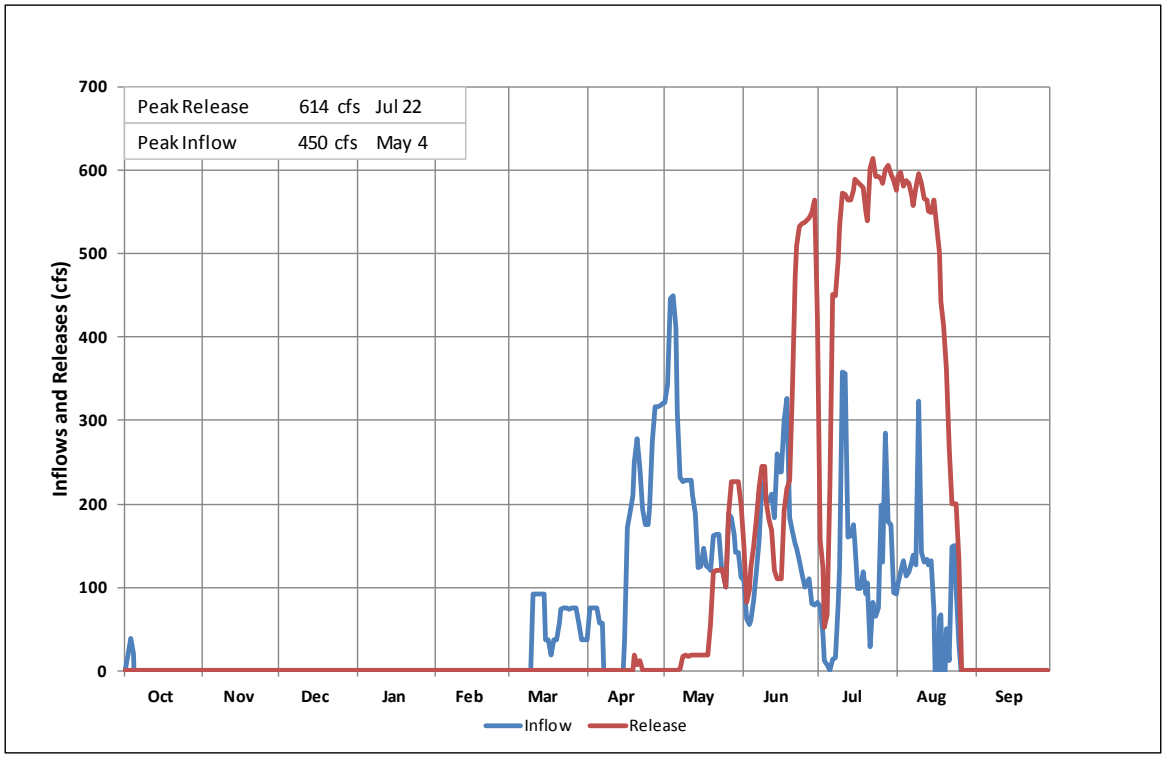
* During nonirrigation season

MONTH	INFLOW*		OUTFLOW*		CONTENT	
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG
OCTOBER	-2.0	---	0.0	---	64.5	114
NOVEMBER	-2.1	---	0.0	---	62.4	113
DECEMBER	-1.3	---	0.0	---	61.1	115
JANUARY	-1.5	---	0.0	---	59.6	115
FEBRUARY	-1.1	---	0.0	---	58.5	115
MARCH	2.4	149	0.0	---	60.8	112
APRIL	7.7	102	0.1	12	68.5	108
MAY	12.6	178	4.5	58	76.6	125
JUNE	9.3	116	17.2	218	68.7	112
JULY	7.3	139	30.4	277	45.5	84
AUGUST	4.8	63	23.5	276	26.8	50
SEPTEMBER	-0.7	---	0.0	---	25.9	46
ANNUAL	35.4	84	75,760	180		
APRIL-JULY	36.9	132				

* Average for the 1947-2016 period.

FIGURE MTG11





Water Year 2016

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 (kW). The water is managed to support multiple beneficial uses. Reclamation has a storage allocation agreement with the Northern Cheyenne Indian Tribe (NCIT) for 30,000 AF and the Crow Tribe (CT) for up to 300,000 AF of water. Reclamation has an industrial water service contract with Pennsylvania Power and Light, Montana for 6,000 AF. No additional water can be contracted out of Yellowtail Dam following 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 hydrographic and a topographic survey were conducted and a new elevation-area capacity table and curve was developed. The 2007 survey determined Bighorn Lake has a storage capacity of 1,278,896 AF and a surface area of 17,279 acres at an elevation of 3657.0 feet (the top of the spillway gates). Since closure of the dam in November 1965, Bighorn Reservoir accumulated a sediment volume of 103,415 AF below an elevation of 3657.0 feet. The volume represents a 7.5 percent sediment accumilation and an average annual accumilation of 2,480 AF from November 1965 through July 2007. The revised area-capacity table was put into effect on January 1, 2011 reflecting the new storage levels.

After a peak content of 1,129,858 AF on June 20, 2016 storage in Bighorn Lake declined and ended the year with a content of 969,502 AF at an elevation of 3635.71 feet, 111 percent of average. Releases to the Bighorn River were maintained at 2,500 cfs through the end of WY 2015.

At the end of WY 2015, storage in Boysen and Buffalo Bill Reservoirs, located on the Wind and Shoshone Rivers, was at 109 and 96 percent of average, respectively. The WYAO established the winter release out of Boysen Reservoir at 925 cfs in early October 2015 with plans for a flushing flow in March 2016 at the request of Wyoming Game and Fish (WGF). The winter release rate from Buffalo Bill Reservoir was set to 200 cfs in late October 2015.

October through December 2015 valley and mountain precipitation was a mix of above and below average conditions. Cumulative precipitation was 113 and 79 percent of average, respectively. Temperatures were well above average in October, near average in November, and slightly above average in December in the Bighorn River Basin. Inflow into Bighorn Lake was below average in October but stayed above average in November and December. The October through December inflow was 97 percent of average. Gains over the three month period were 89 percent of average.

On November 1, 2015 total storage in Bighorn Lake was 951,353 AF at an elevation of 3634.05feet, 107 percent of average. On November 5, 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 9, 2016 releases to Bighorn River was reduced to 2,450 cfs, 99 percent of average. Forecasted gains, planned winter

releases out of Boysen and Buffalo Bill Reservoirs, and an end of March 2016 elevation target of 3617.0 feet are used to calculate the fall/winter release.

On January 1, 2016 the mountain snowpack was 70 percent of average. October 2015 was very warm and snowpack did not start accumulating until late October. Inflows in November and December were higher than what was forecasted. Storage in Bighorn Lake on January 1 2016 was higher than projected at 901,311 AF at an elevation of 3628.89 feet. The higher gains were likely due to the warmer than average temperatures in December 2015. Releases to the Bighorn River were increased by 50 cfs to 2,500 cfs on January 6, 2016 to continue drafting storage towards an end of March elevation of 3617.0 feet.

During January and February 2016 snow fell in the mountains at a rate that kept the accumulated snowpack well below average. On March 1, 2016 the mountain snowpack was 75 percent of average. Valley precipitation was 66 and 43 percent of average in January and February 2016. Inflow into Bighorn Lake was 116 percent of average for January and February. Much above average temperatures in January and February kept gains above what was forecasted, and on March 1, 2016 the April-July runoff was forecasted to be 625,700 AF, 56 percent of average. Storage in Bighorn Lake was 854,115 AF, at an elevation of 3623.26 feet, 111 percent of average. Storage was 5.1 feet or 37,900 AF higher than what was forecasted on November 1, 2015.

Under the operating criteria, on March 1, 2016 the end of month target changed from March 31, 2016 to April 30, 2016. The end of April target is based on April-July runoff forecast and the operating rule curves. Based on the inflow forecast, operations were below the minimum required amount of runoff to fill Bighorn Lake to normal full pool, 3640.0 feet, therefore operating rule curves did not apply on March 1, 2016. Releases were reduced by 250 cfs to 2,250 cfs on March 10, 2016 to balance projected Bighorn Lake elevations and river releases. Even though storage on March 1, 2016 was higher than what was projected in November 2015, Bighorn Lake was projected to be 4.6 feet short of filling.

March 2016 temperatures were much above average. The first half of March was drier than average and inflows were approximately 72 percent of average. Releases to the Bighorn River were reduced to 2,000 cfs on March 22, 2016. The latter part of March was much wetter than average with mountain and valley precipitation at 258 and 127 percent of average respectively.

On March 29, 2016 a flush of the Bighorn Canal was started when diversions to the Bighorn Canal were ramped up to 200 cfs. This was conducted to flush the irrigation system. Diversions were ramped back down to 50 cfs following the flush on April 7, 2016. This was one of the earliest starts on the Bighorn Canal. Throughout the remainder of the year diversion to the Bighorn Canal was adjusted as needed to meet irrigation demands.

The storage content in Bighorn Lake on April 1, 2016 was 854,115 AF at an elevation of 3620.24 feet. The mountain snowpack increased to 91 percent of average with increased precipitation in the later part of March. The April 1, 2016 forecasted April-July runoff was 873,000 AF, 78 percent of average. The forecast showed that the reservoir was expected to fill with river releases being equal to or greater than 2,500 cfs. The river release was increased to 2,250 cfs on April 7, 2016 and to 2,500 cfs on April 14, 2016 following careful consideration of water supply conditions and forecasted inflow. Precipitation in April was at 115 percent of average

in the mountains and 227 percent of average in the valley. Temperature in April continued to be warmer than average. SWE above Yellowtail Dam peaked two weeks earlier than normal, on April 1, 2016 at 88 percent of average.

By May 1, 2016 storage decreased to 808,675 AF at an elevation of 3617.11 feet. Mountain snowpack SWE on May 1, 2016 was 92 percent of average and the May through July runoff was forecasted to be 933,100 AF, 97 percent of average. Based on the forecast, releases to the Bighorn River were increased to 3,000 cfs on May 5, 2016. A weather system during early May produced heavy rain and snow mainly above Boysen Dam. More than 5 inches of rain fell over a large part of the basin above Boysen Dam. For the basin as a whole, mountain and valley precipitation was 89 and 116 percent of average, respectively. May temperatures were near average. Several release increases were made from Boysen Dam to pass the additional precipitation and snowmelt runoff while smaller and less frequent increases were made from Buffalo Bill Reservoir. Releases from Yellowtail Dam were increased several times. The river release was eventually increased to 7,000 cfs on May 21, 2016 to control the rate of fill. May inflow into Bighorn Lake was 358,300 AF, 131 percent of average.

On June 1, 2016 storage in Bighorn Lake was 865,236 AF, at an elevation of 3624.65 feet, 106 percent of average. Snowpack was 69 percent of average. The June 1, 2016 forecast for June through July runoff was 608,000 AF, 88 percent of average. To control the rate of fill and after careful consideration of forecasted snowmelt runoff, river releases were decreased to 6,500 cfs on June 9, 2016. The daily average inflow into Bighorn Lake peaked at 10,839 cfs on June 12, 2016. After the peak runoff, inflows quickly dropped off. From June 14 through June 25, 2016 releases to the Bighorn River were staged down to follow inflows and conserve storage. On June 24, 2016 releases were decreased to 2,500 cfs. Storage peaked in Bighorn Lake on July 1, 2016 at 960,852 AF, at an elevation of 3634.93 feet or 5.07 feet from normal full pool. June precipitation was 25 percent of average in the valley and 49 percent of average in the mountains while temperatures were well above average. Operations through snowmelt runoff were closely coordinated between the MTAO, WYAO, Corps, and Montana Fish, Wildlife and Parks.

On July 1, 2016 storage in Bighorn Lake was 960,852 AF at an elevation of 3634.93 feet, 104 percent of average. July was a hot dry month. Following careful consideration of water supply conditions, releases to the Bighorn River were decreased to 2,250 cfs on July 5, 2016. Inflows into Bighorn Lake during July were 128,700 AF, 50 percent of average.

Inflows continued to stay below average through August 2016. The river release was kept at 2,250 cfs throughout August and September. Several shift changes to the river gage were required to keep up with the algae growth. Valley and mountain precipitation in August were 83 and 81 percent of average, respectively.

Valley and mountain precipitation in September 2016 were well above average at 251 and 160 percent, respectively. Storage in Bighorn Lake ended WY 2016 with a content of 942,447 AF at an elevation of 3633.20 feet. This was 107 percent of average and 27,055 AF, 2.51 feet lower than at the end of WY 2015. Winter release was set to 2,510 cfs in November following procedures outlined in the operating criteria. Releases were increased in November to 2,610 cfs to help manage a higher winter release rate from Boysen Reservoir.

Inflows into Bighorn Lake during April-July were 93 percent of average, totaling 1,031,800 AF. This was 510,972 AF lower than the April-July inflow which occurred in 2015. The annual runoff into Bighorn Lake during WY 2016 totaled 2,072,384 AF, 96 percent of average.

The total annual release to the Bighorn River during WY 2016 was 2,034,460 AF or 95 percent of average. This was 686,909 AF less than the annual release to the Bighorn River in WY 2015.

The water levels of Bighorn Lake during WY 2016 allowed for full service recreation at all marinas for most of the recreation season, from Memorial Day through Labor Day.

Total generation produced at Yellowtail Powerplant during WY 2016 was 794,362 megawatt-hours, 90 percent of average. This was 111,824 megawatt-hours less than what was generated in WY 2015. Approximately 94 percent of all water released from Yellowtail Dam during WY 2016 was released through the powerplant, 1,975,429 AF. The remainder, 124,008 AF, was released either through the evacuation outlet gates or the spillway gates.

The Corps estimated that during WY 2016, Bighorn Lake prevented no local flood damages and $202,916 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 $170,758,000.

Important Events - Water Year 2016

All of WY 2016: Yellowtail Powerplant was limited to three units for the major rewind project except for the burn-in period for Unit 3. All four units were available during the burn-in period before Unit 1 was taken offline for unit rewind.

October 7, 2015: A black start test of the Yellowtail Powerplant was conducted. All four units of the Yellowtail Powerplant were offline for approximately 4 hours. The Yellowtail Powerplant is restarted in black start using the standby generator.

October 7, 2015: The Bighorn Canal was shut down for the 2015 irrigation season.

November 5, 2015: 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 9, 2015: Based on the operating criteria, Reclamation set the fall and winter release rate to the Bighorn River at 2,450 cfs. (2,450 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

November 16-17, 2015: Relay and double testing and transformer maintenance was conducted. The powerplant was limited to two units during the upgrade.

January 1, 2016: Snowpack was 70 percent of average. The first April-July runoff forecast for 2016 for Bighorn Lake inflow was 711,300 AF, 64 percent of average.

January 6, 2016: Inflows during November and December were higher than forecasted. Releases to the Bighorn River were increased to 2,500 cfs to continue drafting Bighorn Lake to 3617 feet by end of March. (2,500 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

January 19-21, 2016: Unit 4 of the Yellowtail Powerplant was unavailable for installation of removable bus links.

February 1, 2016: Snowpack was 70 percent of average. The April-July snowmelt runoff forecast was 596,200 AF, 54 percent of average.

February 8-19, 2016: Unit 2 of the Yellowtail Powerplant was unavailable for scheduled electrical and mechanical maintenance.

February 22-March 1, 2016: Unit 2 of the Yellowtail Powerplant was unavailable for scheduled electrical and mechanical maintenance.

February 29-March 3, 2016: Unit 1 of the Yellowtail Powerplant was unavailable for instrumentation installation and testing.

March 1, 2016: Snowpack was 75 percent of average. The April-July snowmelt runoff forecast was 625,700 AF, 56 percent of average.

March 8, 2016: Unit 3 and 4 of the Yellowtail Powerplant were unavailable during switchyard breaker work.

March 10, 2016: Applying the March 1, 2016 inflow forecast and end of April storage target, the release was decreased to 2,250 cfs. (2,250 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

March 14, 2016: Unit 1 of the Yellowtail Powerplant was taken out of service for unit rewind which was expected to last one year.

March 22, 2016: To meet reservoir storage targets, Bighorn River releases were decreased to 2,000 cfs. (2,000 cfs to the Bighorn River and 0 cfs to the Bighorn Canal)

March 29-April 7, 2016: Diversions to the Bighorn Canal were ramped up to 200 cfs to flush the irrigation system and were ramped back down to 50 cfs following the flush. (2,000 cfs to the Bighorn River and 200 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.

April 1, 2016: Snowpack was 91 percent of average. The April-July snowmelt runoff forecast was 873,000 AF, 78 percent of average.

April 4-8, 2016: Unit 2 of the Yellowtail Powerplant was unavailable during transformer maintenance.

April 7, 2016: Based on the April 1, 2016 inflow forecast and storage targets, releases to the Bighorn River were increased to 2,250 cfs. (2,250 cfs to the Bighorn River and 50 cfs to the Bighorn Canal)

April 14, 2016: Based on water supply conditions, releases to the Bighorn River were increased to 2,500 cfs. (2,500 cfs to the Bighorn River and 50 cfs to the Bighorn Canal)

April 25-May 6, 2016: Semi-annual maintenance of the Yellowtail Afterbay Dam sluicegates required the Yellowtail Afterbay Reservoir be maintained above an elevation of 3183.0 feet to maintain river flows through the radial gates.

May 1, 2016: Snowpack was 92 percent of average. The May through July snowmelt runoff forecast was 933,100 AF, 97 percent of average.

May 4, 2016: Based on water supply conditions, releases to the Bighorn River were increased to 2,750 cfs. (2,750 cfs to the Bighorn River and 150 cfs to the Bighorn Canal)

May 5, 2016: After carefully considering water supply conditions and the May 1, 2016 inflow forecast, releases to the Bighorn River were increased to 3,000 cfs. (3,000 cfs to the Bighorn River and 150 cfs to the Bighorn Canal)

May 10-11, 2016: Unit 3 of the Yellowtail Powerplant was unavailable during unit testing associated with the unit rewind.

May 10-11, 2016: Based on water supply conditions and inflow forecast, releases to the Bighorn River were increased to 4,000 cfs. Most of the additional water supply was the result of precipitation that fell upstream of Boysen Dam. (4,000 cfs to the Bighorn River and 125 cfs to the Bighorn Canal)

May 16-21, 2016: Based on water supply conditions and inflow forecast, releases to the Bighorn River were increased several times. Releases were eventually increased to 7,000 cfs. This required a bypass of the Yellowtail Powerplant and the river outlet works were initially used then the bypass went through the spillway. (7,000 cfs to the Bighorn River and 125 cfs to the Bighorn Canal)

June 1, 2016: NRCS reported mountain snowpack SWE at 69 percent of average. The June through July runoff forecast for Bighorn Lake inflow was 608,000 AF, 88 percent of average.

June 9, 2016: After careful consideration of water supply conditions and the June 1, 2016 inflow forecast, releases to the Bighorn River were decreased to 6,500 cfs. (6,500 cfs to the Bighorn River and 525 cfs to the Bighorn Canal)

June 14-25, 2016: After careful consideration of water supply conditions and declining inflow, releases to the Bighorn River were decreased over several days to 2,500 cfs to conserve storage. (2,500 cfs to the Bighorn River and 525 cfs to the Bighorn Canal)

July 5, 2016: In response to the current water supply conditions, releases to the Bighorn River were decreased to 2,250 cfs as part of a river gage shift change. (2,250 cfs to the Bighorn River and 450 cfs to the Bighorn Canal)

July 6-12, 2016: Diversion to the Bighorn Canal was decreased and maintained at 200 cfs to allow for chemical treatment of heavy algae growth. Diversion to the Bighorn Canal was ramped back up to 500 cfs following the chemical treatment. (2,250 cfs to the Bighorn River and 500 cfs to the Bighorn Canal)

August 22-31, 2016: 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.

September 12-13, 2016: 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 22, 2016: The Bighorn Canal was shut down for the irrigation season.

Additional hydrologic and statistical information pertaining to the operations of Bighorn Lake during 2016 can be found on Table MTT11 and MTG12.

For more detailed information on the operations of Boysen and Buffalo Bill Reservoirs during 2016, refer to the section relating to Boysen Reservoir and Powerplant and Shoshone Project under the responsibility of the WYAO.

TABLE MTT11
HYDROLOGIC DATA FORWY 2016
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	3,547.00	469,910	469,910
TOP OF ACTIVE CONSERVATION	3,614.00	788,208	318,298
TOP OF JOINT USE	3,640.00	1,020,573	232,365
TOP OF EXCLUSIVE FLOOD CONTROL	3,657.00	1,278,896	258,323

STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	3,635.71	969,502	OCT 01, 2015
END OF YEAR	3,633.20	942,447	SEP 30, 2016
ANNUAL LOW	3,616.45	804,189	MAY 07, 2016
ANNUAL HIGH	3,635.71	969,502	OCT 09, 2015
HISTORIC HIGH	3,656.43	1,365,198	JUL 06, 1967

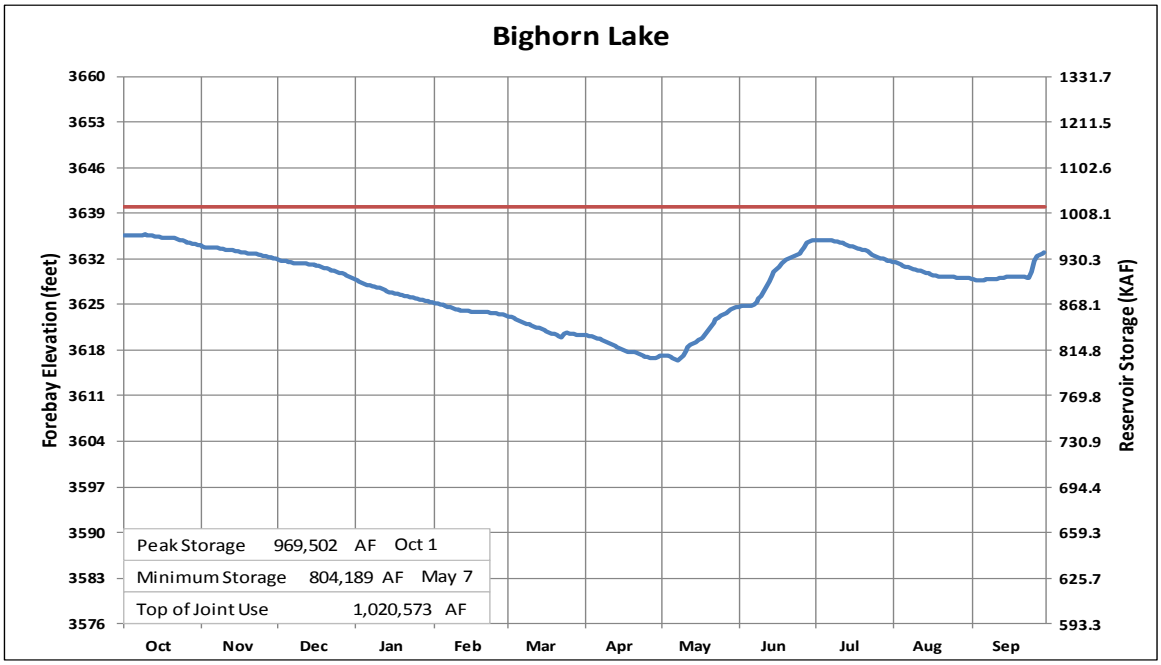
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW*	DATE
ANNUAL TOTAL (AF)	2,072,382	OCT 15-SEP 16	2,034,459	OCT 15-SEP 16
DAILY PEAK (CFS)	10,839	JUN 12, 2016	7,031	JUN 01, 2016
DAILY MINIMUM (CFS)	1,487	MAR 22, 2016	1,989	MAR 31, 2016
PEAK SPILL (CFS)			2,575	JUN 08, 2016
TOTAL SPILL (KAF)			124.0	05/18/2016-06/18/2016

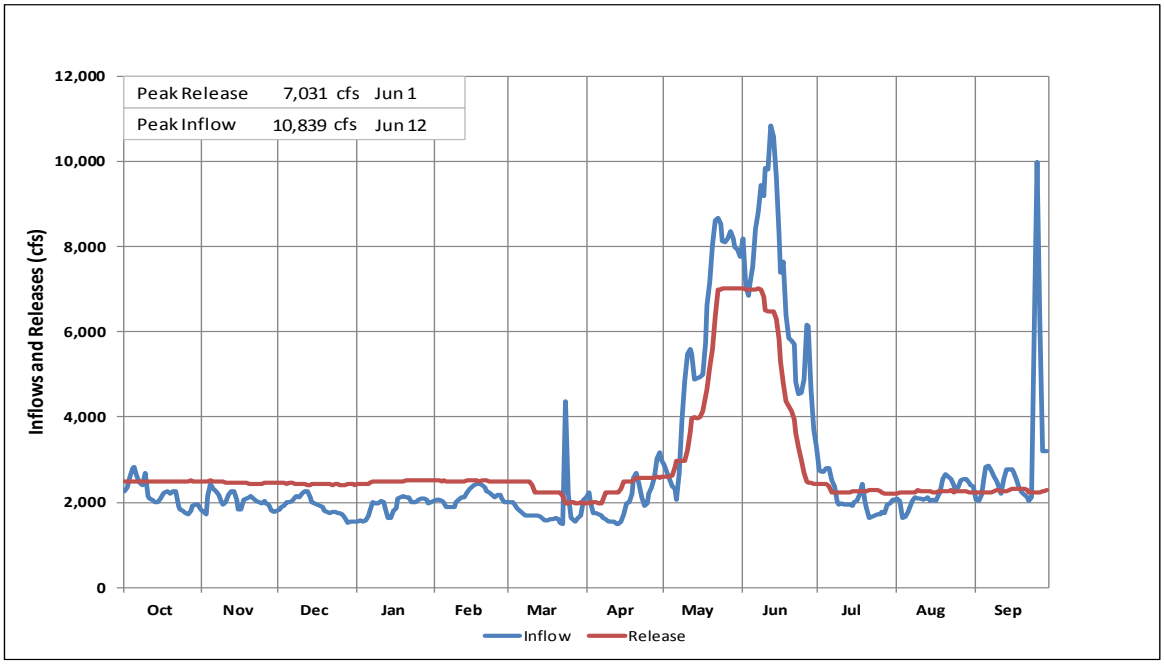
*Discharge to the Bighorn River

MONTH	INFLOW		OUTFLOW*				CONTENT	
	KAF	% OF AVG	CANAL KAF	% OF AVG	RIVER KAF	% OF AVG	KAF	% OF AVG
OCTOBER	133.5	84	206	71	153.3	90	951.4	107
NOVEMBER	121.1	102	0.0	---	146.5	85	930.1	107
DECEMBER	116.1	114	0.0	---	149.2	84	901.3	108
JANUARY	118.1	115	0.0	---	153.3	87	870.5	110
FEBRUARY	123.5	117	0.0	---	143.9	90	854.1	111
MARCH	111.5	77	1.0	4301	137.9	76	831.0	109
APRIL	122.0	81	8.6	814	139.9	77	808.7	108
MAY	358.3	131	11.4	100	294.6	149	865.2	106
JUNE	422.8	97	28.6	134	302.8	104	960.9	104
JULY	128.7	50	28.2	102	139.8	51	925.9	102
AUGUST	135.9	91	26.0	98	138.4	50	901.7	103
SEPTEMBER	180.9	111	9.6	53	134.9	89	942.4	107
ANNUAL	2,072.4	96	116.0	105	2,034.5	88		
APRIL-JULY	1,031.8	93						

* Average for the 1967-2016 period.

FIGURE MTG12





Water Year 2016

SUMMARY

OF OPERATIONS

FOR WATER YEAR 2016

FOR BIGHORN BASIN RESERVOIRS

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

UNDER THE RESPONSIBILITY

OF THE

WYOMING AREA OFFICE

CLIMATE SUMMARY

The following is a climate summary of conditions observed within the Bighorn Drainage Basin (BHDB) and Wind River Drainage Basin (WRDB) during WY 2016. October 2015 temperatures in the BHDB averaged 49 degrees Fahrenheit. In addition to above average temperatures, BHDB received 101 percent of average precipitation. Cody and the Powell Field Station recorded monthly precipitation at 209 percent and 157 percent of average. Precipitation totals were 73 percent of average within WRDB associated with Anchor, Bull Lake, and Boysen Reservoirs. For both basins, October 2015 was the second warmest month on record.

Temperatures in November 2015 were an average of 29 degrees Fahrenheit. Precipitation in the BHDB was 111 percent above average, 1.05 inches. Temperatures in November for WRDB were normal, but had significant increases in precipitation. Precipitation in theWRDB was 121 percent of average, 0.96 inches. Snowfall in Lander and Riverton were 140 percent and 241 percent of average, respectively.

December 2015 brought warmer temperatures in the BHDB with averages of 1.5 degrees Fahrenheit warmer than average. December temperatures ranked as the fifty-sixth warmest on record. Precipitation was 95 percent of average with notable variance occurring between weather stations. Worland Airport recorded 122 percent and Cody recorded 152 percent of average. Greybull recorded only 4 percent of average. The Thermopolis Weather Station recorded significant snowfall, 13 inches of snow, which amounts to 259 percent of the historical average. WRDB experienced normal temperatures during December 2015. Monthly precipitation in WRDB was below average at 82 percent. Totals within the basin for WY 2016 remained well above the average values.

BHDB began January 2016 with well above average temperatures, ranking as the fourteenth warmest on record. In addition to above average temperatures, the basin experienced well below average precipitation and ranked as the nineteenth driest January on record. Worland received 13 percent of its average precipitation. Cody and Thermopolis snowfall accumulations were 21 percent and 27 percent of average. Buffalo Bill Reservoir's SWE at the end of January was 81 percent of average. Boysen's SWE was at 75 percent. WRDB experienced similar conditions with temperatures averaging 4 degrees Fahrenheit higher than normal and ranking as the thirtieth warmest on record. WRDB's combined average precipitation totals were 65 percent of average. Conditions within the basins resulted in below average water supply forecasts by Reclamation.

High temperatures persisted through February 2016 with BHDB experiencing temperatures 9 degrees Fahrenheit above average and ranked as the fourth warmest February on record. Precipitation at Greybull, Worland, Cody, Powell and Thermopolis were zero, zero, 9, zero, and 56 percent, respectively. Thermopolis received 109 percent of average snowfall. Buffalo Bill and Boysen ended with 82.5 percent and 75 percent of average SWE. WRDB experienced nearly 8 degrees Fahrenheit above average temperatures during the month, which was the fifth warmest on record. Precipitation was well below average at 79 percent of average.

In March 2016, conditions in both basins changed dramatically. BHDB temperatures were still well above average, ranking as the eleventh warmest which resulted in significant rainfall

precipitation. The basin was 154 percent of average and ranked as the nineteenth wettest March on record. Worland was above 200 percent of average with Thermopolis at nearly 300 percent of average. WRDB weather stations also recorded above average temperatures and precipitation. March 2016 ranked as the fifteenth warmest and fourth wettest on record. WRDB averages for precipitation were 110 percent above average. Lander recorded over 380 percent of average with Riverton receiving 482 percent of average. Dubois and Riverton received 15 inches and 22 inches of snowfall respectively. Snowfall at these locations was 245 percent and 375 percent of average.

The weather pattern from March continued into April 2016. Conditions within BHDB were 4 degrees Fahrenheit above average and precipitation was 139 percent of average. Cody and Thermopolis again experienced precipitation above 200 percent of average. WRDB experienced average temperatures of 42 degrees Fahrenheit. Precipitation in the WRDB was 162 percent of average resulting in being the tenth wettest April on record. Riverton precipitation totals were 390 percent of average with snowfall totals amounting to 148 percent of average. WY 2016 was significantly altered by the amounts of rain and snow that occurred during the March-April period and water supply forecast increased by 100s of thousand AF.

May 2016 climate conditions were more moderate within the BHDB. Temperatures averaged within 0.3 degrees Fahrenheit of expected, and precipitation within the basin averaged 93 percent of expected. The Powell Field Stations recorded precipitation at 101 percent of average. Temperatures in the WRDB were below expected values by 0.8 degrees Fahrenheit and precipitation was 148 percent of historical averages. All weather stations within the WRDB experienced above 150 percent of average precipitation. Lander received 229 percent of its historical average. No recordable snowfall occurred in the WRDB during May. WRDB's March to May climate conditions significantly altered and enhanced water supply in WY 2016. Boysen Reservoir forecast for April-July runoff began March 2016 at 350,000 AF. By the end of May, the forecast was for 750,000 AF. The actual Boysen Reservoir April-July runoff amounted to 752,700 AF, which is 215 percent of the March 1, 2016 forecast.

June-August 2016 in the BHDB saw a significant climate shift. This shift was towards expected temperatures with well below average precipitation. The BHDB average precipitation for June-August was 30, 51, and 77 percent of average, respectively. June 2016 ranked as the third warmest and eighth driest of the BHDB's 122-year historical record. The warm temperatures resulted in extremely high inflows for Buffalo Bill Reservoir with daily average peaks over 10,000 cfs. The WRDB also saw a shift towards warm and dry conditions during this period. June was the second warmest on record. July 2016 in the WRDB ranked as the second driest on record. Precipitation in the WRDB during the June-August time period amounted to 30, 25, and 90 percent of average.

The last month of WY 2016 for the BHDB and WRDB's again saw a shift in climate conditions. During September 2016, the BHDB averaged an accumulated precipitation of 210 percent of average. Greybull accumulated nearly 315 percent of average with Worland, Cody, Powell, and Thermopolis each above 200 percent of their respective average preceipitation. The WRDB also experienced well above average precipitation. The basin averaged 203 percent of expected totals for the month, which was the ninth wettest on record.

The BHDB and WRDB WY 2016 was a year of weather fluctuation. Temperatures in BHDB were above average for every month of WY 2016. Precipitation was below average in December 2015, January, February, May, June, July, and August 2016. October, November 2015, March, April, and September 2016 recorded well above averages for precipitation. The end of year averages for each month was 3.5 degrees Fahrenheit above this century's average and ranked WY 2016 as the fourth warmest on record. Monthly precipitation averages were 99 percent of the cumulative historical averages for WY 2016. The WRDB average monthly temperatures were 2.9 degrees Fahrenheit above average and ranked as the sixth warmest on record. WY 2016 ranked as the ninth wettest on record and respective monthly amounts were 114 percent of yearly precipitation.

The 2016 mountain snow water content for the BHDB is shown in Table WYT1. The 2016 water supply forecasts are contained in Table WYT2 and the WY 2016 precipitation in inches and the percent of average is shown in Table WYT3.

Table WYT1
2016 Mountain Snow Water Content

DRAINAGE BAISN	1-Jan-16		1-Feb-16		1-Mar-16		1-Apr-16		1-May-16	
	INCHES	%	INCHES	%	INCHES	%	INCHES	%	INCHES	%
BULL LAKE	3.15	66	4.25	67	5.83	73	10.43	104	10.88	120
BOYSEN	4.07	72	5.45	71	7.25	76	12.05	101	12.46	107
BUFFALO BILL	7.00	88	8.92	81	11.44	84	15.38	92	12.52	73

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……Cold Springs, Elkhart Park, Hobbs Park, and St. Lawrence Alt;

Boysen……Burroughs Creek, Cold Springs, Deer Park, Hobbs Park, Little Warm, St. Lawrence Alt, South Pass, Togwotee Pass, and Townsend Creek;

Buffalo Bill Blackwater, Evening Star, Kirwin, Marqutte, Sylvan Lake, Sylvan Road, and Younts Peak

Table WYT2
2016 Water Supply Forecasts of April-July Snowmelt Runoff

	JAN 1		FEB 1		MAR 1		APR 1		MAY 1		JUN 1		ACTUAL	APR-JULY	% OF APRIL
	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG	KAF	% OF AVG	FORECAST RECEIVED
BULL LAKE	110	80	110	80	110	80	135	98	140	101	160	117	144.6	137	107
BOYSEN	350	64	350	64	350	64	550	100	700	128	750	141	752.7	105	137
BUFFALO BILL	620	90	570	83	600	87	620	90	620	90	650	96	592.1	86	96

Averages are based on the 1985-2015 period

FLOOD BENEFITS

Flood Damage Prevented in the Wind/Bighorn and Shoshone River Systems[1]					
Reservoir	**Local**	**Main Stem**	**2016 Total**	**Previous Accumulation[3]**	**1950 - 2016 Accumulation Total**
Bull Lake[2]	$ 102,500	$ 0	$ 102,500	$ 3,479,800	$ 3,582,300
Boysen	$ 273,700	$ 519,900	$ 793,600	$122,024,100[4]	$122,818,000
Buffalo Bill[2]	$ 443,800	$ 0	$ 443,800	$ 31,659,100	$32,102,900

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 - 2016.

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.

TABLE WYT3
WY 2016 PRECIPITATION IN INCHES AND PRECENT OF AVERAGE

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.	%
VALLEY PRECIPITATION [1]																								
BUFFALO BILL																								
MONTHLY PRECIP AND % OF AVERAGE	1.01	88	1.35	120	1.54	149	0.90	81	0.75	83	0.45	38	0.89	62	3.69	176	1.52	73	0.97	71	1.49	129	1.05	84
YEAR-TO-DATE PRECIP AND % OF AVERAGE	1.01	88	2.36	104	3.90	117	4.80	108	5.55	104	6.00	92	6.89	86	10.58	105	12.10	100	13.07	97	14.56	99	15.61	98
BOYSEN																								
MONTHLY PRECIP AND % OF AVERAGE	0.27	29	0.56	130	0.81	272	0.07	28	1.05	289	0.34	61	1.25	109	4.85	251	1.17	99	1.02	125	0.50	93	0.10	10
YEAR-TO-DATE PRECIP AND % OF AVERAGE	0.27	29	0.83	62	1.64	100	1.71	90	2.76	123	3.10	110	4.35	110	9.20	156	10.37	147	11.39	145	11.89	141	11.99	127
BULL LAKE																								
MONTHLY PRECIP AND % OF AVERAGE	0.27	35	0.73	188	0.69	303	0.06	33	0.92	301	0.28	67	1.09	101	4.81	254	1.51	126	1.37	151	0.72	115	0.11	11
YEAR-TO-DATE PRECIP AND % OF AVERAGE	0.27	35	1.00	85	1.69	120	1.75	110	2.67	141	2.95	127	4.04	119	8.85	168	10.36	160	11.73	159	12.45	155	12.56	139
MOUNTAIN PRECIPITATION [2]																								
BUFFALO BILL																								
MONTHLY PRECIP AND % OF AVERAGE	1.50	63	4.20	114	3.50	113	2.90	97	2.30	92	1.40	50	2.60	76	4.90	129	2.10	70	2.50	114	1.30	81	1.40	64
YEAR-TO-DATE PRECIP AND % OF AVERAGE	1.50	63	5.70	93	9.20	100	12.10	99	14.40	98	15.80	90	18.40	88	23.30	94	25.40	92	27.90	93	29.20	93	30.60	91
BOYSEN																								
MONTHLY PRECIP AND % OF AVERAGE	1.20	57	3.20	107	2.60	104	1.50	60	2.00	91	1.30	45	2.90	83	5.90	174	1.50	63	2.40	141	0.80	57	1.10	55
YEAR-TO-DATE PRECIP AND % OF AVERAGE	1.20	57	4.40	86	7.00	92	8.50	84	10.50	85	11.80	78	14.70	79	20.60	93	22.10	90	24.50	94	25.30	92	26.40	89
BULL LAKE																								
MONTHLY PRECIP AND % OF AVERAGE	1.20	60	2.10	95	2.10	124	0.80	50	1.20	75	0.70	29	3.00	94	5.80	171	1.50	65	2.30	153	1.00	71	0.90	47
YEAR-TO-DATE PRECIP AND % OF AVERAGE	1.20	60	3.30	79	5.40	92	6.20	83	7.40	81	8.10	70	11.10	76	16.90	93	18.40	90	20.70	95	21.70	93	22.60	90

[1] A composite of the following National Weather Service stations was used to determine monthly valley precipitation and percent of average for the drainage basins:
Bull Lake.....Burris, Diversion Dam, and Dubois;
Boysen.....Boysen Dam, Burris, Diversion Dam, Dubois, Lander, and Riverton;
Buffalo Bill.....Buffalo Bill Dam, Lake Yellowstone, and Tower Falls

[2] 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:
Bull Lake.....Cold Springs, Elkhart Park, Hobbs Park, and St. Lawrence Alt;
Boysen.....Burroughs Creek, Cold Springs, Deer Park, Hobbs Park, Little Warm, St. Lawrence Alt, South Pass, Togwotee Pass, and Townsend Creek;
Buffalo Bill.....Blackwater, Evening Star, Kirwin, Marquette, Sylvan Lake, Sylvan Road, and Younts Peak

Averages for Valley Precipitation are based on the 1986-2015 period
Averages for Mountain Precipitation are based on the 1981-2010 period

Riverton Unit

Facilities in the Riverton Unit P-S MBP are Bull Lake Reservoir, Wind River Diversion Dam, Wyoming Canal, Pilot Butte Powerplant, Pilot Butte Reservoir, and Pilot Butte Canal. The facilities provide water for irrigation of about 73,000 acres on the Midvale Irrigation District (Midvale). The water supply comes from the natural flow of the Wind River and from water stored in Bull Lake and Pilot Butte Reservoirs.

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.

At the start of WY 2016, Bull Lake held 63,684 AF at an elevation of 5772.68 feet. This was 84 percent of average and 42 percent of capacity. Diversions into the Wyoming Canal were discontinued on September 25, 2016 marking the end of the 2016 irrigation season on the Riverton Unit. Releases from Bull Lake were reduced to 29 cfs after September 25, 2016.

October 2015 inflows were 129 percent of average, and with above average reservoir storage. Bull Lake releases averaged 25 cfs during the month and storage was 38,288 AF, with water surface elevation of 5760.80 feet. November and December 2015 inflows were below average and releases continued at 25 cfs to maintain a stable reservoir. At the end of December, storage was 71,226 AF, which was 93 percent of average.

On January 1, 2016, snowpack in the basin above Bull Lake was 78 percent of average. Water supply forecasts of the April-July snowmelt runoff were prepared beginning in January and contined monthly through June 2016. The January forecast indicated the April-July snowmelt runoff would be approximately 110,000 AF, which was 80 percent of average. Inflow was 88 percent of average and the release from the dam of about 25 cfs closely matched the inflow. Precipitation in the Wind River valley was 117 percent of average and the mountains above Bull Lake received below average snowfall, with snowpack falling to 74 percent of average. The February 1, 2016 snowmelt runoff forecast remained at 110,000 AF. Inflow into the reservoir remained below average ending the month with 71,107 AF. February precipitation was well below average in the Wind River valley, and the mountains above Bull Lake remained below average, with the snowpack at 83 percent of average at the end of February. The March 1, 2016 snowmelt runoff forecast remained at 110,000 AF.

March 2016 had near average inflows and releases. Bull Lake Reservoir reached 71,346 AF on March 31, 2016. The snowpack reached 11.63 inches by the end of March. On April 1, 2016, the snowpack was 98 percent of average, a 15 percent increase from March 1, 2016. The April forecast increased to 135,000 AF, which was 98 percent of average. Midvale began diverting water into the Wyoming Canal on April 7, 2016 to flush the canal system and finish filling Pilot Butte. Inflow was 178 percent of average and increased from snowmelt runoff. On April 30, 2016, Bull Lake held 77,099 AF at an elevation of 5778.29 feet. The snowpack on May 1, 2016 was 106 percent of average and the May forecast increased to 140,000 AF.

By June 1, 2016, the snowpack had climbed to 275 percent of average, and with improving conditions in the basin, the June forecast increased to 160,000 AF, which was 117 percent of average. Inflows peaked above 2,900 cfs on June 10, 2016 and remained above 1,000 cfs until June 23, 2016. On June 8, 2016 releases from the dam were increased to slow the rate of fill, but by June 22, 2016, Bull Lake was less than a foot from the top of active conservation and releases were set to match the inflow to prevent the lake from rising further. Releases in excess of 1,000 cfs were made from June 11 through June 15, 2016, with the maximum daily release of 1,557 cfs occurring on June 11, 2016. The maximum inflow for WY 2016 of 2,979 cfs occurred on June 10, 2016. Bull Lake reached its maximum content of 149,974 AF at an elevation of 5804.21 feet on June 22, 2016 and releases were adjusted as necessary to hold the reservoir level near 150,000 AF for as long as possible. June inflow was 134 percent of average and storage in Bull Lake at the end of June 2016 was 149,911 AF, which was 117 percent of average.

During July 2016, Bull Lake inflows were 47 percent of average, and flow in the Wind River was adequate to meet much of Midvale's irrigation demand. This allowed Midvale to keep Bull Lake within one foot of full until July 9, 2016. In early July, outflows began to outpace inflows and on July 4, 2016, Bull Lake Reservoir peaked with a storage content equaling 150,037 AF. By July 31, 2016, the reservoir content had been reduced by 31,905 AF and equaled 118,132 AF of total storage. July 2016 releases were 107 percent of average and totaled 53,083 AF.

Diversions into the Wyoming Canal increased through the first half of August 2016, peaking at 1,232 cfs on August 7, 2016. Irrigation demands remained for the first two weeks of September 2016 and releases from Bull Lake averaged 932 cfs for that portion of the month. On September 17, 2016, the releases were reduced to 25 cfs. Bull Lake's end of month storage was 38,288 AF at an elevation of 5760.80 feet, which was 50 percent of average.

April-July 2016 inflows totaled 144,604 AF and were 105 percent of average. Total inflow to Bull Lake for WY 2016 was 176,028 AF, which was 96 percent of average. The flow of the Wind River above the mouth of Bull Lake Creek during the April-July period was estimated to be 322,700 AF, 81 percent of average. The total diversion into the Wyoming Canal for the April-September 2016 period was 288,100 AF, 88 percent of average.

Additional hydrologic and statistical information pertaining to Bull Lake operations during WY 2016 can be found in Table WYT4 and Figure WYG1.

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 are for inactive and dead storage and 29,918 AF for active conservation storage. Pilot Butte Dam and the Wyoming Canal are operated by Midvale under contract with Reclamation.

Pilot Butte Reservoir began WY 2016 with a total storage content of approximately 15,392 AF at an elevation of 5436.10 feet. The 2016 irrigation season on the Riverton Unit ended on September 25, 2016 and diversion into the Wyoming Canal and releases from Pilot Canal ended at that time. At the end of the season, Pilot Butte storage was 15,728 AF. This was near the normal end of October content so no additional diversions into Pilot Butte occurred following the

irrigation season. By the end of March 2016, the storage content of Pilot Butte Reservoir was 27,391 AF. Diversion into Wyoming Canal resumed on April 9, 2016 to fill Pilot Butte and storage increased to 30,263 AF at the end of April. Storage in Pilot Butte peaked at 30,522 AF at an elevation of 5456.35 feet on July 8, 2016 and remained stable through the end of July. Natural flow in the Wind River was adequate to meet irrigation demands through the month of June and well into July 2016, and Pilot Butte content was held around 30,000 AF through July 7, 2016. As the summer progressed and river flows declined, Pilot Butte storage was needed and the reservoir was drawn down to 16,660 AF on July 31, 2016. Storage use continued during August and September 2016, with the reservoir content falling to 10,155 AF at the end of August. On September 30, 2016, Pilot Butte content was 7,396 AF, which is 43 percent of average. The end of September elevation at Pilot Butte was 5420.69 feet.

Pilot Butte Powerplant was unavailable for service during WY 2016 and did not generate any electricity. In June of 2009, both units at Pilot Butte Powerplant were placed in "Mothballed" status and a determination of whether the units will be returned to service is pending.

Additional hydrologic and statistical information pertaining to Pilot Butte Reservoir during WY 2016 can be found in Table WYT5 and Figure WYG2.

TABLE WYT4
HYDROLOGIC DATA FOR WY 2016
BULL LAKE RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	5,739.00	722	722
TOP OF ACTIVE CONSERVATION	5,805.00	152,459	151,737

STORAGE-ELEVATION DATA	ELEVATION (FEET)	STORAGE (AF)	DATE
BEGINNING OF YEAR	5,772.68	63,684	OCT 01, 2015
END OF YEAR	5,760.80	38,288	SEP 30, 2016
ANNUAL LOW	5,759.36	35,485	SEP 16, 2016
HISTORIC LOW*	5,743.03	6,228	MAR 31, 1950
ANNUAL HIGH	5,804.23	150,037	JUL 03, 2016
HISTORIC HIGH	5,805.70	154,677	AUG 10, 1965

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

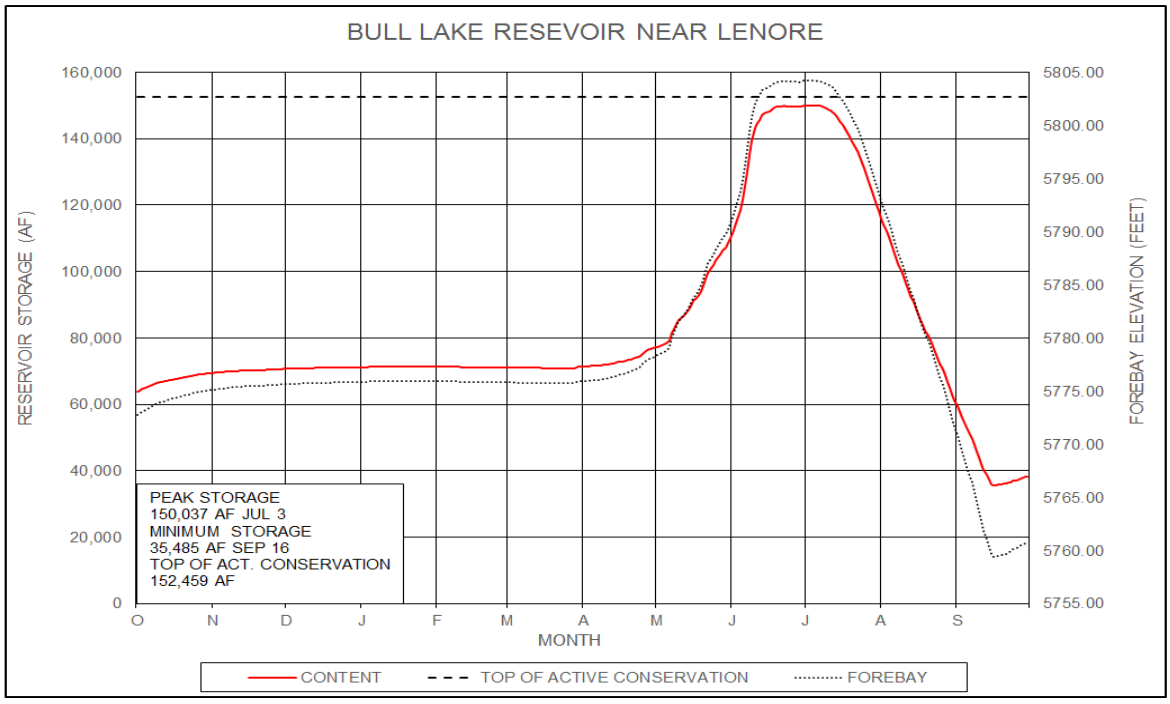
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	176,029	OCT 15-SEP 16	201,425	OCT 15-SEP 16
DAILY PEAK (cfs)	2,979	JUN 10, 2016	1,558	JUN 11, 2016
DAILY MINIMUM (cfs)	1	FEB 14, 2016	22	SEP 27, 2016
PEAK SPILLWAY FLOW (cfs)			0	
TOTAL SPILLWAY FLOW (AF)			0	

	INFLOW		OUTFLOW		CONTENT	
MONTH	KAF	% of Avg*	KAF	% of Avg*	KAF	% of Avg*
OCTOBER	7.2	129	1.6	28	69.4	92
NOVEMBER	2.8	90	1.5	63	70.7	93
DECEMBER	2.1	88	1.6	84	71.2	93
JANUARY	1.7	81	1.6	80	71.3	93
FEBRUARY	1.2	75	1.5	94	71.1	92
MARCH	1.8	95	1.6	89	71.3	93
APRIL	7.3	178	1.5	41	77.1	100
MAY	34.7	123	1.8	13	110.0	120
JUNE	81.3	134	41.4	168	149.9	117
JULY	21.3	47	53.1	124	118.1	90
AUGUST	8.9	45	65.8	139	61.3	60
SEPTEMBER	5.7	59	28.7	80	38.3	50
ANNUAL	176.0	96	201.7	110		

- JULY INFLOW (AF)	
ACTUAL	AVERAGE
144,573	138,200

* Average for the 1986-2015 period

FIGURE WYG1


BULL LAKE RESEVOIR NEAR LENORE
RESERVOIR STORAGE (AF)
FOREBAY ELEVATION (FEET)
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
5805.00
5800.00
5795.00
5790.00
5785.00
5780.00
5775.00
5770.00
5765.00
5760.00
5755.00
PEAK STORAGE
150,037 AF JUL 3
MINIMUM STORAGE
35,485 AF SEP 16
TOP OF ACT. CONSERVATION
152,459 AF
O N D J F M A M J J A S
MONTH
CONTENT
TOP OF ACTIVE CONSERVATION
FOREBAY

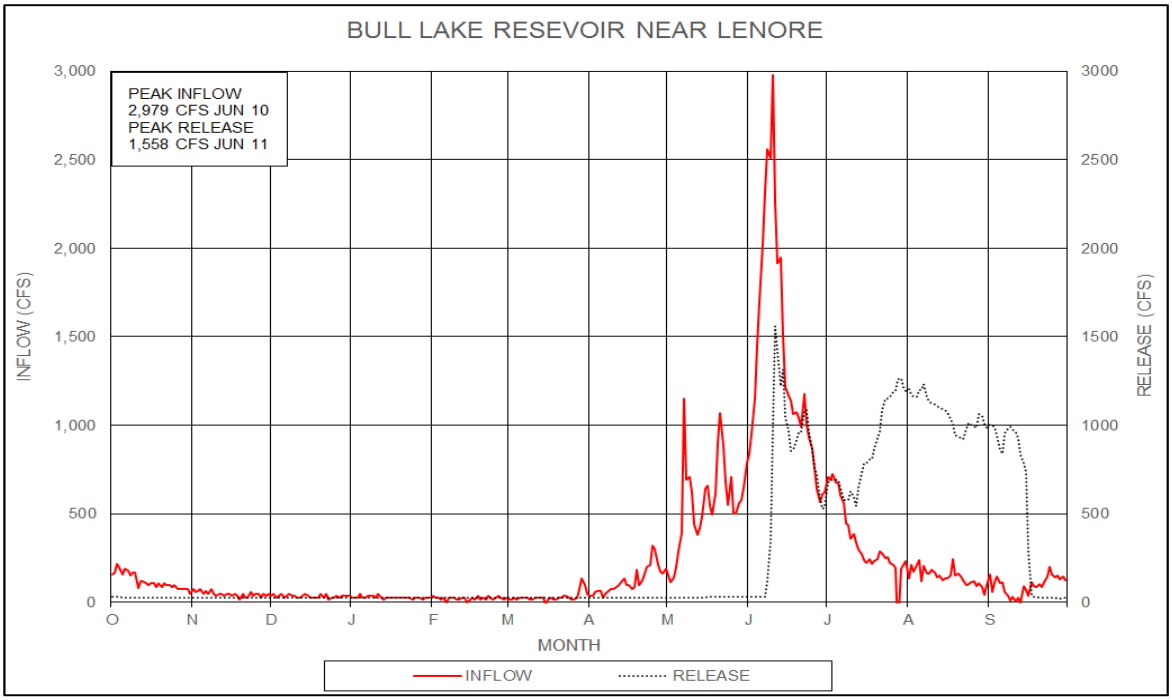

BULL LAKE RESEVOIR NEAR LENORE
INFLOW (CFS)
RELEASE (CFS)
3,000
2,500
2,000
1,500
1,000
500
0
3000
2500
2000
1500
1000
500
0
PEAK INFLOW
2,979 CFS JUN 10
PEAK RELEASE
1,558 CFS JUN 11
O N D J F M A M J J A S
MONTH
INFLOW
RELEASE

TABLE WYT5
HYDROLOGIC DATA FOR WY 2016
PILOT BUTTE RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	5,410.00	3,803	3,803
TOP OF ACTIVE CONSERVATION	5,460.00	33,721	29,918

STORAGE-ELEVATION DATA	ELEVATION (FEET)	STORAGE (AF)	DATE
BEGINNING OF YEAR	5,436.10	15,392	OCT 01, 2015
END OF YEAR	5,420.69	7,396	SEP 30, 2016
ANNUAL LOW	5,419.71	7,006	SEP 15, 2016
HISTORIC LOW	5,409.80	3,748	DEC 01, 2007
ANNUAL HIGH	5,456.37	30,384	MAY 07, 2016
HISTORIC HIGH	5,460.60	37,465	APR 20, 1988

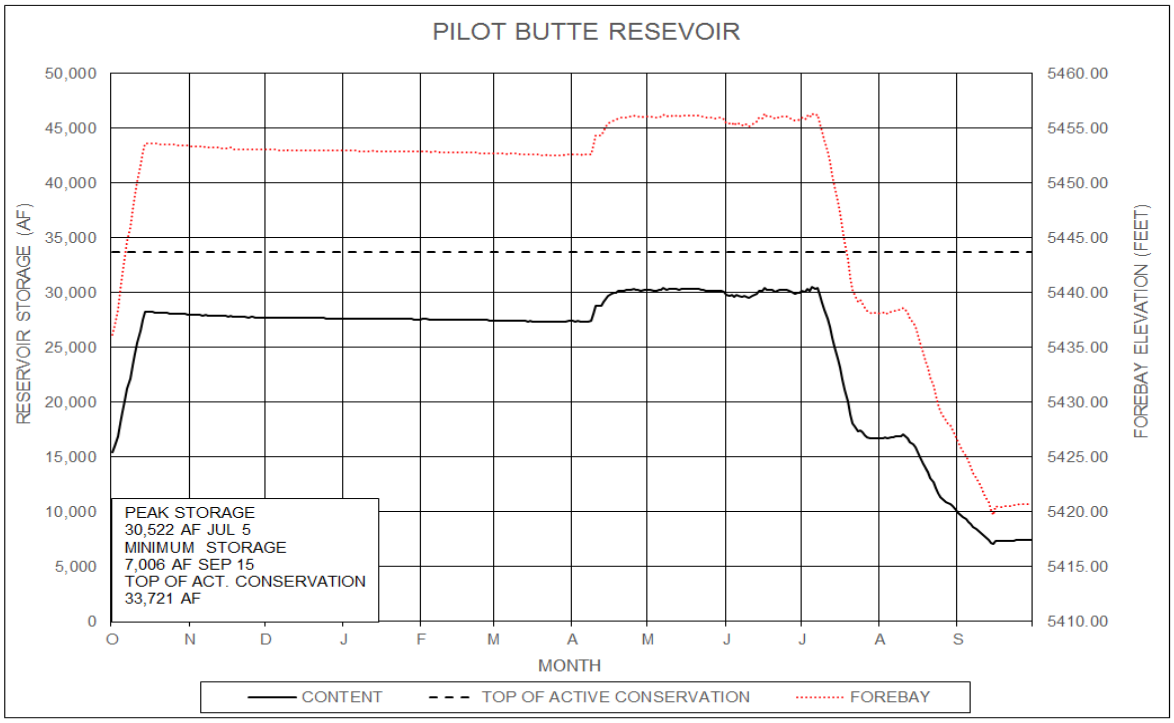
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	134,258	OCT 15-SEP 16	142,254	OCT 15-SEP 16
DAILY PEAK (cfs)	839	JUL 05, 2016	739	JUL 21, 2016
DAILY MINIMUM (cfs)	0	WINTER MONTHS	0	WINTER MONTHS
PEAK SPILLWAY FLOW (cfs)			0	
TOTAL SPILLWAY FLOW (AF)			0	

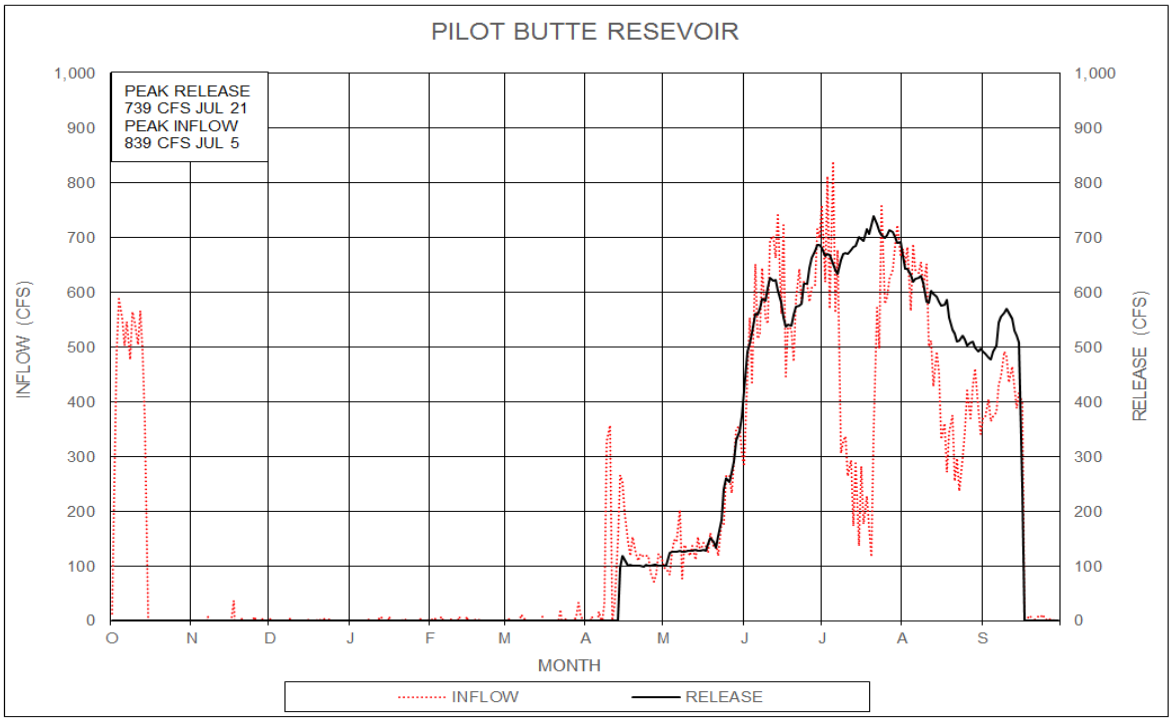
	INFLOW*		OUTFLOW		CONTENT	
MONTH	KAF	% of Avg**	KAF	% of Avg**	KAF	% of Avg**
OCTOBER	12.6	102	0.0	N/A	28.0	103
NOVEMBER	-0.3	N/A	0.0	N/A	27.7	98
DECEMBER	-0.1	N/A	0.0	N/A	27.6	97
JANUARY	-0.1	N/A	0.0	N/A	27.6	97
FEBRUARY	-0.1	N/A	0.0	N/A	27.4	95
MARCH	-0.1	N/A	0.0	N/A	27.4	94
APRIL	6.3	95	3.5	59	30.3	101
MAY	10.5	45	10.7	40	30.0	115
JUNE	34.7	97	34.7	106	30.0	101
JULY	29.0	74	42.4	97	16.7	68
AUGUST	28.5	89	35.0	96	10.2	50
SEPTEMBER	13.3	58	16.0	61	7.4	43
ANNUAL	134.3	77	149.5	86		

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

** Average for the 1986-2015 period.

FIGURE WYG2


PILOT BUTTE RESEVOIR
RESERVOIR STORAGE (AF)
FOREBAY ELEVATION (FEET)
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
5460.00
5455.00
5450.00
5445.00
5440.00
5435.00
5430.00
5425.00
5420.00
5415.00
5410.00
PEAK STORAGE
30,522 AF JUL 5
MINIMUM STORAGE
7,006 AF SEP 15
TOP OF ACT. CONSERVATION
33,721 AF
O N D J F M A M J J A S
MONTH
CONTENT
TOP OF ACTIVE CONSERVATION
FOREBAY


PILOT BUTTE RESEVOIR
INFLOW (CFS)
RELEASE (CFS)
1,000
900
800
700
600
500
400
300
200
100
0
PEAK RELEASE
739 CFS JUL 21
PEAK INFLOW
839 CFS JUL 5
O N D J F M A M J J A S
MONTH
INFLOW
RELEASE

Boysen Reservoir and Powerplant

Boysen Reservoir P-S MBP is located on the Wind River above Thermopolis, Wyoming. The dam and reservoir offer 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 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 is allocated for joint-use flood control storage. All of the joint-use space is located between an elevation of 4717.00 and 4725.00 feet, which is the top of the spillway gates when closed. The exclusive flood control space is located between an elevation of 4725.00 and 4732.20 feet. When the reservoir rises above an elevation of 4724.50 feet, the spillway gates need 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.

Irrigation water is provided from the reservoir for several units, both upstream and downstream. Water is furnished downstream for 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 a number of 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 with temporary water service contracts.

Boysen Reservoir started WY 2016 with 629,518 AF, which was 109 percent of the thirty-year average. The reservoir elevation of 4718.92 feet was 6.08 feet below the top of the joint-use pool. On October 2, 2015, releases from the dam were reduced to 825 cfs. Winter releases were maintained at 825 cfs during October 2, 2015-March 1, 2016, with additional water stored to provide fish and game flushing flows occurring in March. October inflows were 74 percent of average, and reservoir storage increased to 619,458 AF at the end of the month. Inflow percentages of average during November and December 2015 were 89 and 103 percent, respectively. November and December releases exceeded inflow, and end-of-year storage content decreased to 601,455 AF at an elevation of 4717.25 feet. Boysen Reservoir's end-of-year storage content was 106 percent of average.

Forecasts of April-July 2016 snowmelt runoff were prepared beginning in January and continuing monthly through June 2016. On January 1, 2016, the snowpack in the mountains above Boysen Reservoir was 72 percent of average, and the forecast indicated approximately 350,000 AF (64 percent of average) would enter Boysen Reservoir during the April-July snowmelt runoff period. January inflow was near average, and precipitation was 109 percent of average at lower elevations and 102 percent of average in the mountains. The snowpack percent of average decreased slightly to 71 percent of average on February 1, 2016, and the forecast remained at 350,000 AF. February precipitation in the Wind River valley was only 51 percent of average, but snowfall in the mountains was 102 percent of average. Reservoir inflows continued to be above average for February, but remained outpaced by releases. The end-of-month content decreased to 581,139 AF at an elevation of 4715.99 feet. The snowpack increased to 75 percent of average on March 1, 2016, and the forecast of April-July runoff remained at 350,000 AF.

The winter SWE peaked the first week of April and again during the first week of May 2016. Releases from Boysen were 600 cfs on March 21, 2016 when the outflow was increased to provide a flushing flow for the WGF Department. Flushing flows simulate high runoff events that occurred in the river prior to flows being controlled by the dam. The rapidly increasing flows flush the fine sediment from the spawning gravels in the river, improving the spawning habitat for trout. On March 21, 2016, releases from Boysen Dam increased from 825 cfs to 5,000 cfs over several hours. The 5,000 cfs release was maintained for 10 hours and then was gradually reduced to 600 cfs where it remained through the end of the month. During the flushing flow, approximately 6,693 AF were released above the 600 cfs winter release. The inflow was greater than outflow during March, and content in the reservoir increased by about 4,924 AF to 586,063 AF by the end of the month. The end of March water surface elevation was 4716.30 feet. On April 1, 2016, the snowpack in the Boysen watershed was 118 percent of average. This was a significant increase from March 1, 2016 and the April 1, 2016 snowmelt runoff forecast was increased to 550,000 AF, which was 100 percent of average.

Moderate precipitation fell on the irrigated lands below Boysen Reservoir during the first half of April 2016, and the 725 cfs release from the dam was adequate to meet the early season needs of the irrigators. Releases were closely monitored as the irrigation demand began to increase. By the end of April, releases of 1,000 cfs were needed. On May 1, 2016, the snowpack was 93 percent of average and the forecast of April-July runoff increased to 700,000 AF. Actual October 1, 2015-April 30, 2016 inflows averaged 102 percent of each month's respective thirty-year average. On April 30, 2016, Boysen Reservoir content was 612,060 AF at an elevation of 4717.89 feet with end-of-month storage content at 114 percent of average.

The May 1, 2016 forecast called for 128 percent of average runoff, and increasing irrigation demand required releases from Boysen Reservoir to be increased. The May 1, 2016 releases of 1,000 cfs were increased to 4,611 cfs on May 17, 2016. Releases continued to increase and peaked at 5,996 cfs on May 30, 2016. For the purpose of optimization (demand, inflow, spill, and power), the power turbine discharges of 918 cfs on May 1, 2016 were increased to 2,634 cfs on May 30, 2016. Cumulative releases for the month were 243,954 AF, with a turbine release of 918 cfs and 119,797 AF spillway release. Daily inflows peaked above 10,300 cfs on May 9, 2016 but quickly moderated resulting in average daily inflows of 4,409 cfs. Cumulative inflows of 271,151 AF were 231 percent of average. May 2016 precipitation in the Boysen watershed was 159 percent of average with end-of-month storage content of 641,319 AF.

Climate conditions during June 2016 were warm and dry. SWE began the month at 101 percent but decreased to zero percent of average on June 20, 2016. Inflows began the month at 4,760 cfs and increased to a peak of 12,110 cfs on June 12, 2016. During June 13-30, 2016, inflows decreased from 12,110 cfs to 1,370 cfs respectively. Cumulative monthly inflows totaled 363,380 AF. Preparation for high inflows allowed early June releases from Boysen Reservoir to remain relatively consistent. Releases from Boysen Reservoir during June 1-19, 2016 ranged between 5,008-6,026 cfs. From July 20-30, 2016, releases were decreased from 4,590 to 1,955 cfs. The 155,127 AF of turbine discharge, and 118,260 AF spillway achieved cumulative monthly releases of 278,859 AF, and 5,472 regulating outlet discharge (June 10-13, 2016). June releases from Boysen Reservoir, combined with gains below the dam, resulted in maximum downstream flows of 10,587 cfs entering Bighorn Lake. June 2016 Bighorn Lake inflows compared favorably

to 2015 peak inflows of 19,000 cfs. Boysen Reservoir storage content peaked June 23-24, 2016 at 734,955 AF at a forebay elevation of 4724.66 feet. On June 30, 2016, the reservoir content was 725,840 AF at an elevation of 4724.19 feet with end-of-month content at 113 percent of average.

For the month of July 2016, low precipitation fell in the Boysen Watershed and monthly precipitation was 42 percent of the thirty-year average. Inflows receded at a rapid rate with the peak inflow of 1,914 cfs on July 2, 2016 and a minimum inflow of 90 cfs on July 24, 2016. Average daily inflows for the month equaled 783 cfs. Lack of precipitation continued a high demand for irrigation water, which decreased as crops matured. Boysen Reservoir releases began July 2016 at 2,000 cfs. However, from July 6 through July 31, 2016 flows fluctuated between 1,300 cfs and 1,500 cfs relative to demand. Releases for the remainder of the irrigation season were maintained slightly above what was needed to fill irrigation demands. July's end-of-month content was 676,236 AF with a forebay elevation of 4721.55 feet, 107 percent of average.

Actual inflow for the April-July period totaled 752,681 AF, which was 137 percent of average. Inflow to Boysen Reservoir during WY 2016 was 1,073,749 AF, 118 percent of average. The reservoir forebay ended WY 2016 at 4718.65 feet with storage content of 624,893 AF, 108 percent of average. The peak inflow for the year of 12,110 cfs occurred on June 12, 2016 and the maximum outflow of 6,031 cfs occurred on June 11, 2016. During WY 2016, Boysen Powerplant generated 67,344,000 kilo-watt hours (kWh) of electricity, 104 percent of average and 1,936,000 kWh more than was generated in 2015. Of the 1,083,859 AF released from Boysen Reservoir in WY 2016, 832,102 AF was discharged through the powerplant, and 251,757 AF bypassed the powerplant. WY 2016 spillway discharge was 61 percent of WY 2015.

Important Events – WY 2016

October 4, 2015: Release for the winter was set at 825 cfs.

March 21, 2016: Boysen Reservoir spring water information meeting was held in Worland to discuss the water supply and proposed operation of Boysen Reservoir in 2016.

March 21 – March 22, 2016: Flushing flows below Boysen Dam.

April 4, 2016: Release through the Boysen spillway was initiated.

June 24, 2016: Boysen Reservoir level reached its peak forebay elevation of 4724.66 feet.

June 29, 2016: Boysen Reservoir's spillway discharge releases were discontinued.

June 23-24, 2016: Boysen Reservoir's storage content peaked at 734,955 AF.

Additional hydrologic and statistical information pertaining to the operation of Boysen Reservoir can be found in Table WYT6 and Figure WYG3.

TABLE WYT6
HYDROLOGIC DATA FOR WY 2016
BOYSEN RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	4,685.00	219,181	219,181
TOP OF ACTIVE CONSERVATION	4,717.00	597,365	378,184
TOP OF JOINT USE	4,725.00	741,594	144,229
TOP OF EXCLUSIVE FLOOD CONTROL	4,732.20	892,226	150,632
STORAGE-ELEVATION DATA	**ELEVATION (FEET)**	**STORAGE (AF)**	**DATE**
BEGINNING OF YEAR	4,719.01	631,064	OCT 01, 2015
END OF YEAR	4,718.65	624,893	SEP 30, 2016
ANNUAL LOW	4,715.89	579,556	FEB 17, 2016
HISTORIC LOW ELEVATION *	4,684.18		MAR 18, 1956
HISTORIC LOW CONTENT *		235,737	SEP 24, 2002
ANNUAL HIGH	4,724.66	734,955	JUNE 23, 2016
HISTORIC HIGH	4,730.83	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)	1,073,749	OCT 15-SEP 16	1,083,859*	OCT 15-SEP 16
DAILY PEAK (cfs)	12,110	JUN 12, 2016	6031.43	JUN 11, 2016
DAILY MINIMUM (cfs)	-350.17	Aug 3, 2016	586.97	MAR 6, 2016
PEAK SPILLWAY FLOW (cfs)			7,358	MAY 19, 2016
TOTAL SPILLWAY FLOW (AF)			251,757	MAR 21-JUN 29

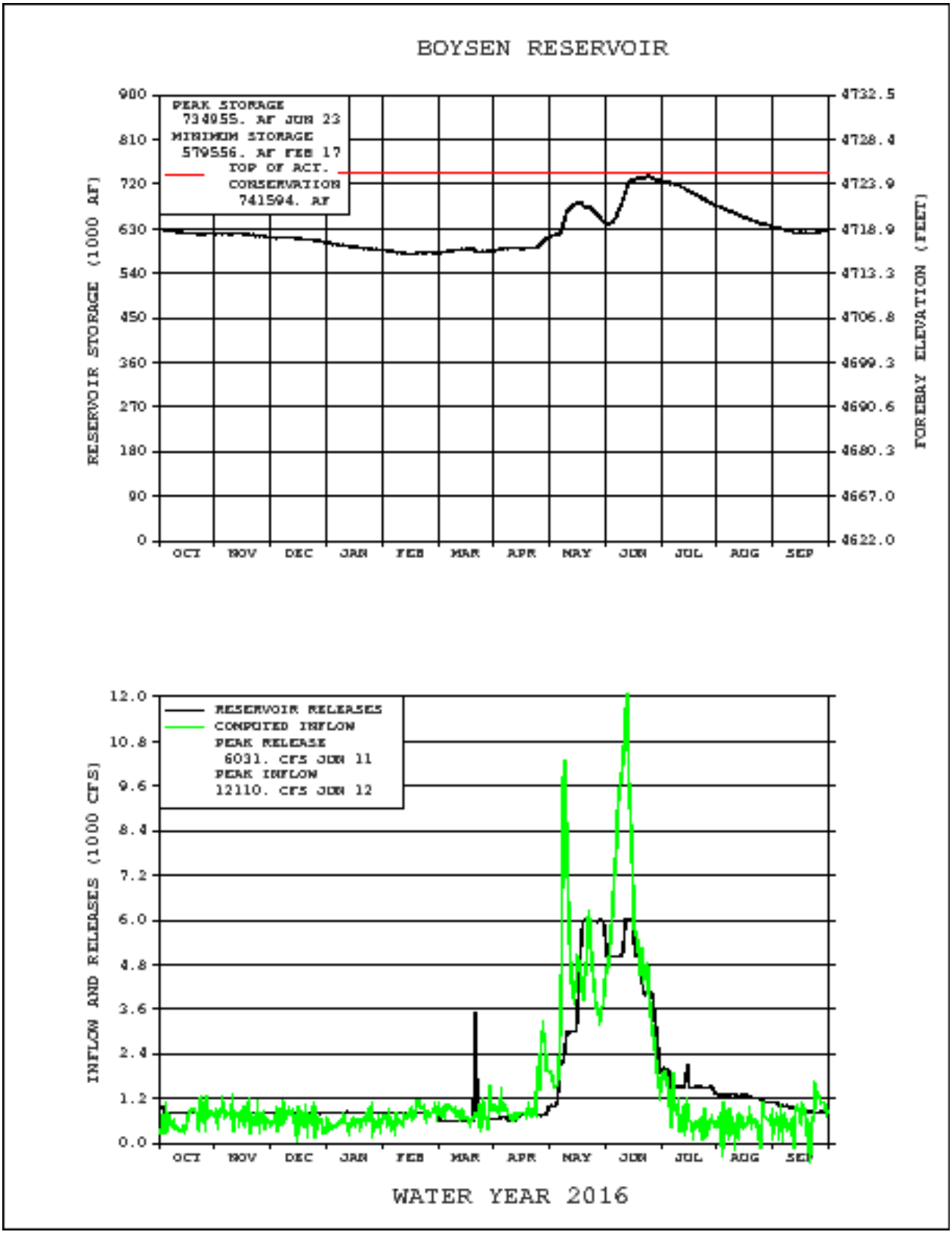
* Of the 1,083,749 AF released from Boysen Reservoir, 251,757 AF bypassed the powerplant.

	INFLOW		OUTFLOW		CONTENT	
MONTH	KAF	% of Avg*	KAF	% of Avg*	KAF	% of Avg*
OCTOBER	39.673	74	51.280	100	619.458	107
NOVEMBER	42.050	89	48.615	106	612.893	106
DECEMBER	38.566	103	50.004	104	601.455	106
JANUARY	34.395	94	50.107	106	585.743	105
FEBRUARY	42.485	115	47.089	111	581.139	105
MARCH	49.411	95	44.487	82	586.063	107
APRIL	69.994	143	42.571	68	612.060	114
MAY	271.151	231	243.954	240	641.319	116
JUNE	363.380	143	278.859	173	725.840	113
JULY	48.156	37	97.760	70	676.236	107
AUGUST	32.951	66	75.703	89	633.484	106
SEPTEMBER	41.536	89	53.430	76	624.893	108
ANNUAL	1,073.749	118	1,083,859	120		

APRIL - JULY INFLOW (AF)	
ACTUAL	AVERAGE
752,681	548,300

* Average for the 1985-2015 period

FIGURE WYG3


BOYSEN RESERVOIR
PEAK STORAGE
734955. AF JUN 23
MINIMUM STORAGE
579556. AF FEB 17
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
6031. CFS JUN 11
PEAK INFLOW
12110. CFS JUN 12
INFLOW AND RELEASES (1000 CFS)
12.0
10.8
9.6
8.4
7.2
6.0
4.8
3.6
2.4
1.2
0.0
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP
WATER YEAR 2016

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. It was constructed to furnish a 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 not to exceed elevation 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.

Storage in Anchor Reservoir at the beginning of WY 2016 was 461 AF at an elevation of 6361.23 feet. The reservoir level rose to 506 AF by the end of October 2015 and then fell to 467 AF at the end of November 2015. From December 2015 through March 2016, the reservoir content remained stable. Releases for irrigation began on April 14, 2016 and the reservoir level slowly fell until April 24, 2016 when snowmelt runoff began to enter the reservoir. Storage at the end of April was 788 AF. Inflows were greater than releases during May 2016 and the reservoir content increased to 4,264 AF on May 31, 2016. May-June runoff continued to fill the reservoir with the inflow peaking at 525 cfs on May 11, 2016. As the reservoir level approached an elevation of 6400.00 feet, releases were increased to slow the rate of fill. With releases increased to over 145 cfs on June 12, 2016, the reservoir forebay elevation remained over 6,400.00 feet from June 2- July 4, 2016. Storage in the Anchor Reservoir peaked on June 11, 2016 at 6,877 AF at an elevation of 6411.25 feet. From that point on, Anchor Reservoir storage was required to meet irrigation demands and the reservoir level steadily dropped to 6403.32 feet and 5,128 AF at the end of the month. August 2016 releases averaged 9 cfs and reservoir storage was reduced to 439 AF at the end of August. The reservoir level increased during September 2016 and was at an elevation of 6363.33 feet, 548 AF at 109 percent of average.

Hydrologic and statistical data pertaining to Anchor Reservoir operations during WY 2016 can be found in Table WYT7 and Figure WYG4. The negative inflows displayed in Figure WYG4 are the result of calculated inflow based on reservoir release and change in reservoir content. During some periods, evaporation and seepage from the reservoir could exceed inflow.

TABLE WYT7
HYDROLOGIC DATA FOR WY 2016
ANCHOR RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	6,343.75	68	68
TOP OF ACTIVE CONSERVATION*	6,441.00	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	6,361.23	461	OCT 01,2015
END OF YEAR	6,363.29	548	SEP 30, 2016
ANNUAL LOW	6,360.10	418	NOV 06, 2016
HISTORIC LOW			
ANNUAL HIGH	6,411.25	7,631	JUN 11, 2016
HISTORIC HIGH	6,418.52	9,252	JUL 03, 1967

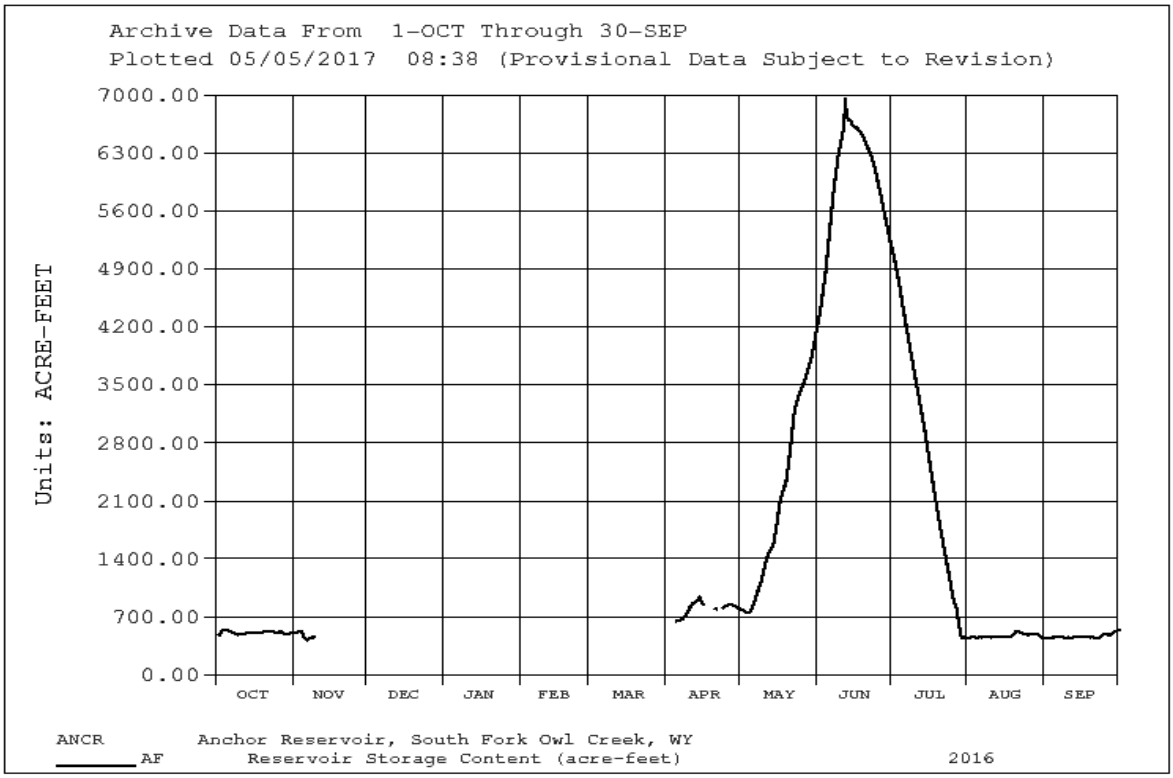
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW *	DATE
ANNUAL TOTAL (AF)	11,305	OCT 15-SEP 16	15,831	OCT 15-SEP 16
DAILY PEAK (cfs)	526	MAY 11, 2016	186	JUN 14, 2015
DAILY MINIMUM (cfs)	0	WINTER MONTHS	0	WINTER MONTHS
PEAK SPILLWAY FLOW (cfs)			0	
TOTAL SPILLWAY FLOW (AF)			0	

* 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. In 2015, water flowed over the notch in the dike from June 12 to June 14 and July 6 to July 8.

	INFLOW		OUTFLOW*		CONTENT	
MONTH	KAF	% of Avg*	KAF	% of Avg*	KAF	% of Avg*
OCTOBER	0.503	91	0.456	7	0.506	158
NOVEMBER	0.006	2.4	0	0	0	0
DECEMBER	0	-	0	0	0	0
JANUARY	0	-	0	0	0	0
FEBRUARY	0	-	0	0	0	0
MARCH	0	-	0	0	0	0
APRIL	0.223	38	0.452	89	0.788	161
MAY	4.551	128	0.946	37	4.264	287
JUNE	5.091	77	4.227	90	5.128	151
JULY	-0.172	-8	4.511	141	0.445	20
AUGUST	0.551	221	0.558	30	0.439	75
SEPTEMBER	0.553	103	0.443	58	0.548	161
ANNUAL	11.305	75	11.593	78		

* Average is for the 1991-2015 period. This period was used because of the availability of data at Anchor Reservoir.

FIGURE WYG4


Archive Data From 1-OCT Through 30-SEP
Plotted 05/05/2017 08:38 (Provisional Data Subject to Revision)
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7000.00
6300.00
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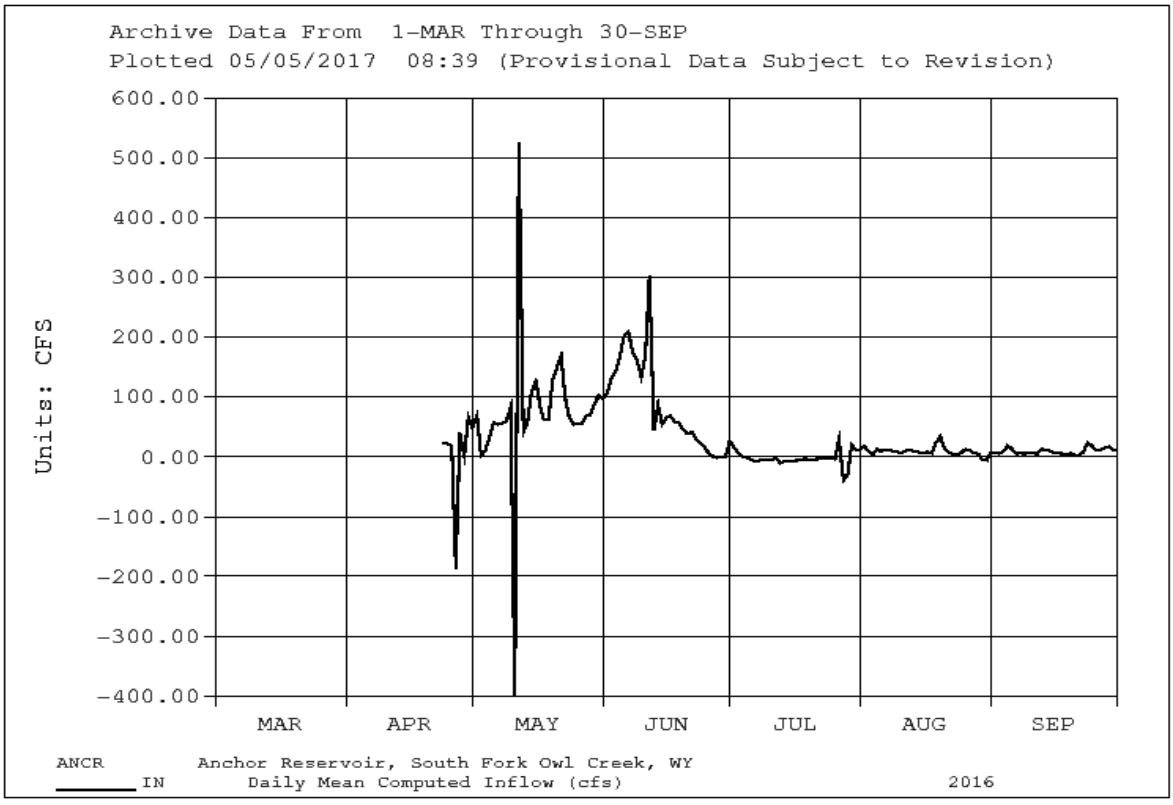
3500.00
2800.00
2100.00
1400.00
700.00
0.00
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
ANCR
AF
Anchor Reservoir, South Fork Owl Creek, WY
Reservoir Storage Content (acre-feet)
2016


Archive Data From 1-MAR Through 30-SEP
Plotted 05/05/2017 08:39 (Provisional Data Subject to Revision)
Units: CFS
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500.00
400.00
300.00
200.00
100.00
0.00
-100.00
-200.00
-300.00
-400.00
MAR
APR
MAY
JUN
JUL
AUG
SEP
ANCR
IN
Anchor Reservoir, South Fork Owl Creek, WY
Daily Mean Computed Inflow (cfs)
2016

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

Heart Mountain Powerplant, with a nameplate capability of 6,000 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

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 (Agreement), a flow of at least 100 cfs is released to the Shoshone River at the base of the dam at all times through the Shoshone Powerplant. A maximum release of approximately 200 cfs can be made through the Shoshone Powerplant.

Buffalo Bill 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

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 is 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

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 reserved for this purpose. The total storage capacity of the reservoir is 646,565 AF at an elevation of 5393.50 feet, the top of the active conservation pool.

Storage in Buffalo Bill Reservoir at the beginning of WY 2016 was 430,804 AF at an elevation of 5364.67 feet, which is 96 percent of average. Irrigation releases continued until October 13, 2015. Inflows during October 2015 were 115 percent of average. Reservoir content allowed releases to be adjusted and maintained at seasonal winter water agreements of approximately 250 cfs (Cody gage) for November 2015. On November 30, 2015, the reservoir level was 5363.56 feet and storage content totaled 423,415 AF. Actual November inflows were 4 percent above average and 154 percent of the releases with the objective of approaching but staying below 5,370 feet, forebay elevation. The forebay elevation stays below 5,370 feet during the winter months to minimize the problems associated with ice jams in the South Fork of the Shoshone River during the winter season. December 2015 inflows were 104 percent of average and the reservoir contained 424,743 AF at an elevation of 5363.76 feet on December 31, 2015. Buffalo Bill Reservoir end of year content was 39,510 AF less than the previous year.

Forecasts of the April-July snowmelt runoff are made each month beginning in January and continuing through June 2016 for Buffalo Bill Reservoir. Accumulated precipitation totals on January 1, 2016 indicated 620,000 AF of inflow could be expected to flow into Buffalo Bill Reservoir during the April-July period, which was 90 percent of the thirty-year average. January's

SWE increased throughout the month, and run off resulted in 116 percent of average inflow totals. Releases averaged 217 cfs. End-of-month reservoir content reached 426,588 AF with a forebay elevation of 5364.04 feet.

A February 1, 2016 SWE estimate of 85 percent of average made it necessary to reduce the April to July run off expectations to 570,000 AF. The moderate winter weather continued within the Buffalo Bill watershed with 73 percent of average precipitation. Inflow averaged 252 cfs and releases averaged 217 cfs. Inflow to outflow ratios adjusted the February end-of-month content to 428,065 AF, with a forebay of 5364.27 feet.

Precipitation totals for February were above average. On March 1, 2016, the April-July forecast increased to 600,000 AF. March inflow was 88 percent the average, and at the end of March storage in Buffalo Bill was 432,718 AF at an elevation of 5364.96 feet. The SWE gained 8 percent during March, and stood at 92 percent of average on April 1, 2016. Because of the increased snowpack, the April 1, 2016 forecast of April-July runoff was increased to 620,000 AF, which was 90 percent of average.

The 217 cfs winter release to the Shoshone River was maintained until April 15, 2016 when higher releases were required to meet the demand of Shoshone Project irrigators. Heart Mountain Canal deliveries began on April 20, 2016. April inflow was 154 percent of average and the reservoir rose to 449,340 AF by the end of the month. With the May 1, 2016 snowpack at 73 percent of average and falling, the forecast for April-July inflow was maintained at 620,000 AF. This forecast was 90 percent of average.

Balanced reservoir releases and inflows resulted in Buffalo Bill Reservoir storage content of 509,069 AF on May 31, 2016. Warmer temperatures during the last week of the month resulted in additional inflow to the reservoir from snowmelt runoff as well. On May 25, 2016, releases increased over the 2,000 cfs threshold. May inflows averaged 2,839 cfs and peaked at 4,444 cfs.

Inflows peaked at 8,251 cfs on June 9, 2016 and decreased to a flow of 2,602 cfs on June 30, 2016. For the month, computed inflows averaged 4,739 cfs and totaled 281,983 AF. Reservoir releases on June 1, 2016 were 2,681 cfs. During the month, demand and storage content resulted in peak releases of 4,246 cfs occurring on July 25, 2016. For the month, releases averaged 2,792 cfs with a total discharge of 166,142 AF, with no spillway discharge for WY 2016. On June 18, 2016, releases decreased from the dam as inflows declined. At the end of June, the reservoir level was at an elevation of 5390.80 feet and the end of month content of 624,910 AF was 109 percent of average, and inflow of 281,983 AF was 91 percent of average.

Buffalo Bill Reservoir inflow fell off sharply during July 2016 with a beginning inflow of 2,565 cfs on July 1, 2016 to under 1,000 cfs on July 12, 2016. Releases averaging 1,974 cfs were adequate to meet the needs of irrigators diverting water from the Shoshone River and Heart Mountain Canal. The average daily inflow was about 887 cfs less than the outflow during July and storage in the reservoir fell through the month. At the end of July, the reservoir held 570,366 AF at an elevation of 5383.83 feet, 99 percent of the average end of July content, while inflows were 41 percent of average.

Releases during August and September 2016 were near normal but inflows were 57 and 82 percent of average, respectively. At the end of WY 2016, storage in Buffalo Bill Reservoir totaled 421,289 AF at an elevation of 5363.24 feet, which was 94 percent of average. Reservoir storage was heavily relied upon to meet irrigation demands during July, August, and September and without the significant inflow, which occurred in April 2016, carryover storage in Buffalo Bill Reservoir would have been substantially lower. The total inflow during the April-July runoff period was 592,128 AF, which was 86 percent of average. The total WY 2016 inflow of 753,121 AF was 87 percent of average.

Total energy generated at all powerplants that directly receive water out of Buffalo Bill Reservoir totaled 124,023,000 kWh in 2016. Of this total amount, Heart Mountain Powerplant generated 18,330,000 kWh, Buffalo Bill Powerplant generated 56,814,000 kWh, Shoshone Powerplant generated 17,029,000 kWh and Spirit Mountain Powerplant generated 17,389,000 kWh. The powerplants used 628,819 AF to generate this amount of energy and 83 percent of the total water released from Buffalo Bill Reservoir during WY 2016 was used for generation. About 249,167 AF released from Buffalo Bill Reservoir went to the Heart Mountain Canal for irrigation purposes.

Important Events - 2016

October 19, 2015: Irrigation diversions from the Shoshone River were discontinued for the 2015 irrigation season.

October 19, 2015: Irrigation diversions to the Heart Mountain Canal were discontinued for the 2015 irrigation season.

October 20, 2015: Releases to the Shoshone River were reduced to the winter release of 200 cfs.

March 21, 2016: Buffalo Bill Reservoir Public Information meeting was held in Powell to discuss WY 2015 operation and expected 2016 operation.

April 15, 2016: Irrigation diversions from the Shoshone River by Shoshone Project irrigation districts were initiated for the 2015 irrigation season.

April 15, 2016: Irrigation releases to the Heart Mountain Canal were initiated for the 2016 irrigation season.

June 24, 2016: Buffalo Bill Reservoir reached a maximum elevation for WY 2016 of 5391.59 feet

April 8, 2016: The control of the release from Buffalo Bill Dam was turned over to the Shoshone Irrigation District and releases were adjusted as necessary to meet irrigation demands.

Additional hydrologic and statistical information pertaining to the operations of Buffalo Bill Reservoir during WY 2016 can be found in Table WYT8 and Figure WYG5.

TABLE WYT8
HYDROLOGIC DATA FOR WY 2016
BUFFALO BILL RESERVOIR

RESERVOIR ALLOCATIONS	ELEVATION (FEET)	TOTAL RESERVOIR STORAGE (AF)	STORAGE ALLOCATION (AF)
TOP OF INACTIVE AND DEAD	5,259.60	41,748	41,748
TOP OF ACTIVE CONSERVATION	5,393.50	646,565	604,817
STORAGE-ELEVATION DATA	**ELEVATION (FEET)**	**STORAGE (AF)**	**DATE**
BEGINNING OF YEAR	5,364.67	430,804	OCT 01,2015
END OF YEAR	5,363.24	421,289	SEP 30, 2016
ANNUAL LOW	5,363.24	421,289	SEP 30, 2016
HISTORIC LOW*		19,080	JAN 31, 1941
ANNUAL HIGH	5,391.80	631,266	JUN 24, 2016
HISTORIC HIGH	5,393.51	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)	753,121	OCT 15-SEP 16	755,854	OCT 15-SEP 16
DAILY PEAK (cfs)	8,251	JUN 11, 2016	4,245	JUN 25, 2016
DAILY MINIMUM (cfs)	41	DEC 28, 2015	175	MAR 27, 2016
PEAK SPILLWAY FLOW (cfs)				
TOTAL SPILLWAY FLOW (AF)				

*Daily peak and minimum are releases to the river

	INFLOW		OUTFLOW		CONTENT	
MONTH	KAF	% of Avg*	KAF	% of Avg*	KAF	% of Avg*
OCTOBER	28.894	115	43.567	117	415.675	97
NOVEMBER	22.178	104	12.173	72	423.415	98
DECEMBER	16.255	104	13.143	80	424.743	99
JANUARY	16.988	116	13.360	86	426.065	100
FEBRUARY	14.475	112	12.504	83	428.065	101
MARCH	17.928	89	13.275	66	432.718	103
APRIL	68.673	154	52.051	89	449.340	112
MAY	174.592	103	114.863	93	509.069	114
JUNE	281.983	91	166.142	90	624.910	109
JULY	66.880	41	121.424	71	570.366	99
AUGUST	24.457	57	113.801	101	481.022	94
SEPTEMBER	19.818	82	79.551	94	421.289	94
ANNUAL	753.120	87	755.854	88		

APRIL - JULY INFLOW (AF)	
ACTUAL	AVERAGE
592,100	686,300

the 1985-2015 period. Because of the enlargement of Buffalo

* Average for inflow and outflow is the 1985-2015 period. Because of the enlargement of Buffalo Bill Reservoir in 1992, the period of record on which average content is based is 1993-2015.

FIGURE WYG5

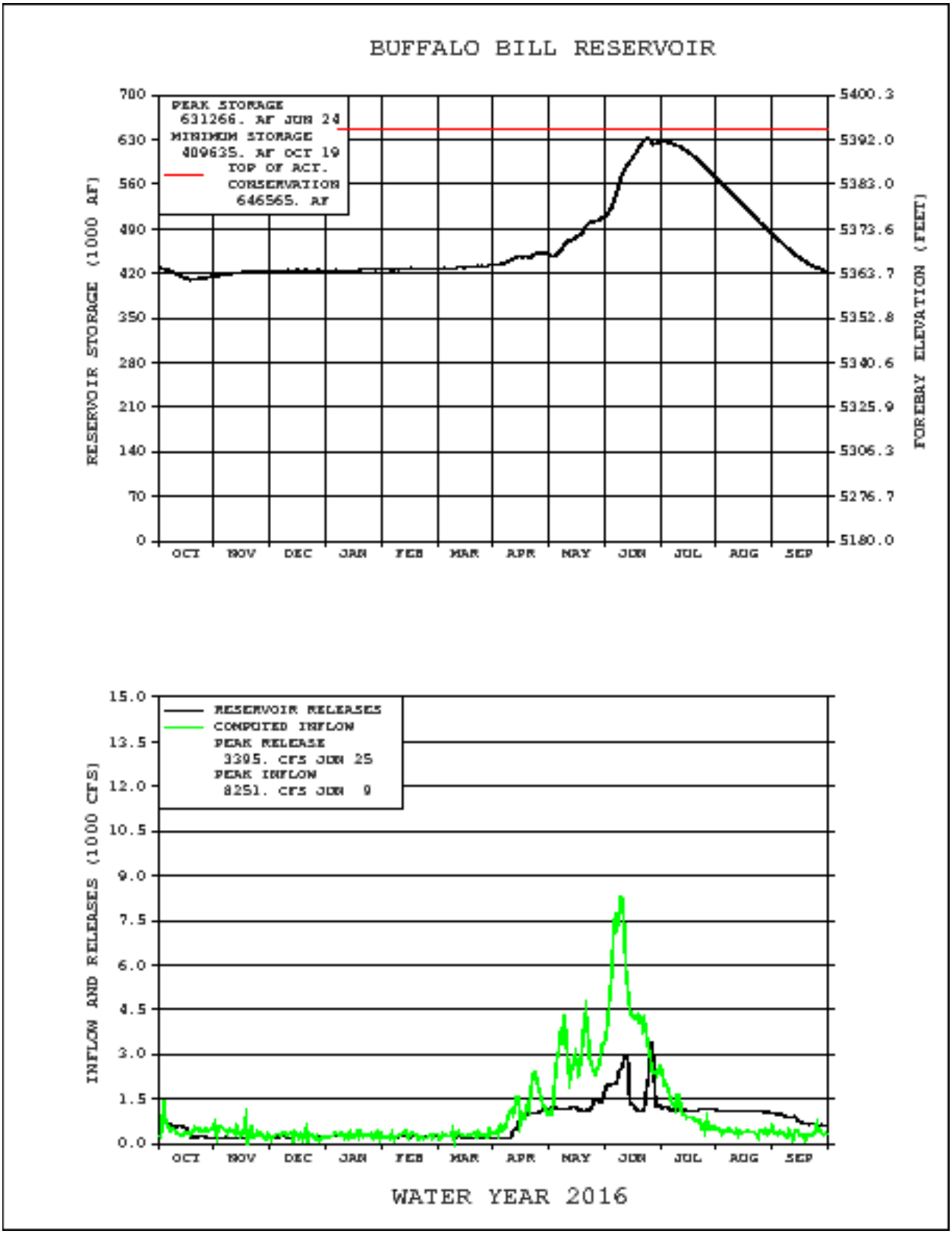

BUFFALO BILL RESERVOIR
PEAK STORAGE
631266. AF JUN 24
MINIMUM STORAGE
409635. AF OCT 19
TOP OF ACT.
CONSERVATION
646565. AF
RESERVOIR STORAGE (1000 AF)
FOREBAY ELEVATION (FEET)
700
630
560
490
420
350
280
210
140
70
0
5400.3
5392.0
5383.0
5373.6
5363.7
5352.8
5340.6
5325.9
5306.3
5276.7
5180.0
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
RESERVOIR RELEASES
COMPUTED INFLOW
PEAK RELEASE
3395. CFS JUN 25
PEAK INFLOW
8251. CFS JUN 9
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
WATER YEAR 2016

Table WYT13
WY 2016 SCHEDULED OUTAGES FOR WYOMING POWERPLANTS

Facilities	Description of Work	Scheduled Dates
BOYSEN		
Unit 1	Annual Maintenance	10/21/15 - 12/12/15
Unit 1	Penstock Inspection	04/04/16 - 04/07/16
Unit 2	Annual Maintenance	01/11/16 - 03/10/16
Unit 2	Penstock Inspection	04/04/16 - 04/07/16
BUFFALO BILL		
Buffalo Bill Powerplant		
Unit 1	Annual Maintenance	11/09/15 - 12/10/15
Unit 2	Annual Maintenance	12/14/15 - 01/07/16
Unit 3	Annual Maintenance	01/11/16 - 01/28/16
Shoshone Powerplant		
Unit 3	Annual Maintenance	02/08/16 - 02/25/16
Heart Mountain Powerplant		
Unit 1	Annual Maintenance	03/07/16 - 03/24/16
Spirit Mountain Powerplant		
Unit 1	Annual Maintenance	10/19/15 - 10/29/15

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. A similar agreement was approved for 2016. The Boysen water stored in Bull Lake allows Bull Lake to be maintained at a higher content and provides a flow of 20 to 25 cfs in Bull Lake Creek below the dam as the Boysen water is released from Bull Lake through the winter months. On October 1, 2015, Bull Lake Reservoir held 63,938 AF with 2,078 AF belonging to Boysen. Inflow to Bull Lake was well above average during the winter and spring of WY 2016. Releases were maintained at about 25 cfs through the winter to maintain the level of Bull Lake. Of the water released from Bull Lake during the non-irrigation season, 20 cfs of the release was considered Boysen storage water. Inflow from snowmelt runoff began in late April and during the April-July period the inflow to Bull Lake was 121 percent of average. The reservoir reached a maximum elevation for the year of 5,804 feet on June 3, 2016. At the end of WY 2016, the content of Bull Lake was 38,288 AF.

Boysen Reservoir

Boysen Reservoir storage at the beginning of WY 2016 was 110 percent of average and 73 percent of capacity. Following the 2015 irrigation season, the release from Boysen Dam was set at approximately 825 cfs. To guarantee a spring flushing flow, the WGF Department agreed to a reduced winter release of 825 cfs. The release from the dam was set at 825 cfs on October 24, 2015 where it remained through the winter months. At the request of the WGF Department, a flushing flow release was made beginning on March 21, 2016. Flushing flows are designed to simulate high runoff events that occurred in the river prior to flows being controlled by the dam. The rapidly increasing flows flush the fine sediment from the spawning gravels in the river, improving the spawning habitat for trout. On March 24, 2016, the release from Boysen Dam was increased from 589 cfs to 3,500 cfs. This was followed by an increase from 3,000 cfs to 5,000 cfs when personnel were available at the dam to open the spillway gates. The 5,000 cfs release was maintained for ten hours and then gradually decreased to an average of 650 cfs. During the flushing flow, approximately 7,906 AF was released above the 589 cfs release on March 20.

Buffalo Bill Reservoir

Following the 2015 irrigation season the release from Buffalo Bill Reservoir was set to approximately 200 cfs, based on winter release criteria contained in the Agreement. A winter release of 100 cfs, 150 cfs, 200 cfs, or 350 cfs will be provided below Buffalo Bill Powerplant based on the total inflow to Buffalo Bill Reservoir during the previous water year and the amount of storage in the reservoir and in the State account on the last day of September. A minimum release of 100 cfs will be maintained in the river below the dam at all times.

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 Department 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. On September 30, 2016, when the water surface elevation of Buffalo Bill Reservoir was at its low for the year of 5,363.40 feet, the water surface elevation of the pool behind the North Fork Dike was approximately 5,365.00 feet and the water surface elevation of the pool behind the South Fork Dike was 5,393.18 feet. At the minimum reported elevation of Buffalo Bill Reservoir, 198 more acres of land would have been exposed without the ability to store water behind the South Fork Dike.

The number of stoplogs at the outlet control structure on the South Fork Dike has been set to maintain the static water level of the pond behind the dike at approximately 5393.23 feet at the end of WY 2016. The increased elevation provides a larger impoundment behind the dike, benefiting waterfowl as well as the fishery.

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 with the normal water surface elevation being 5340.00 feet.

Reservoir levels during WY 2016 were adequate for recreational activities on Buffalo Bill Reservoir.

SUMMARY

OF OPERATIONS

FOR WATER YEAR 2016

FOR RESERVOIRS

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

UNDER THE RESPONSIBILITY

OF THE

DAKOTAS AREA OFFICE

WEATHER SUMMARY FOR WATER YEAR 2016

October 2015 precipitation was much above average at Heart Butte, Angostura and Belle Fourche Reservoirs; average at Dickinson, Deerfield, Keyhole and Shadehill Reservoirs; much below average at Pactola Reservoir; and very much below average at Jamestown Reservoir.

November 2015 precipitation was very much above average at Angostura and Jamestown Reservoirs; average at Deerfield Reservoir; much below average at Belle Fourche, Deerfield and Pactola Reservoirs; and very much below average at Shadehill, Dickinson and Heart Butte Reservoirs.

December 2015 precipitation was very much above average at Angostura, Deerfield and Shadehill Reservoirs; much above average at Belle Fourche and Keyhole Reservoirs; above average at Heart Butte Reservoir; average at Dickinson and Pactola Reservoirs; and very much below average at Jamestown Reservoir.

January 2016 precipitation was average at Deerfield Reservoir; much below average at Belle Fourche, Dickinson and Keyhole Reservoirs; very much below average at Angostura, Pactola, Shadehill, Heart Butte and Jamestown Reservoirs.

February 2016 precipitation was very much above average at Deerfield Reservoir; above average at Keyhole and Pactola Reservoirs; above average at Heart Butte Reservoir; below average at Belle Fourche and Dickinson Reservoirs; and very much below average at Angostura and Jamestown Reservoirs.

March 2016 precipitation was very much above average at Keyhole Reservoir; much above average at Deerfield Reservoir; average at Angostura and Pactola Reservoirs; below average at Belle Fourche Reservoir; much below average at Jamestown and Shadehill Reservoirs; very much below average at Dickinson and Heart Butte Reservoirs.

April 2016 precipitation was very much above average at Belle Fourche, Shadehill, Dickinson, Heart Butte and Jamestown Reservoirs; average at Angostura and Deerfield Reservoirs; below average at Keyhole Reservoir; much below average at Pactola Reservoir.

May 2016 precipitation was average at Jamestown Reservoir; below average at Angostura and Deerfield Reservoirs; much below average at Dickinson, Heart Butte, Keyhole and Shadehilll Reservoirs; very much below average at Belle Fourche and Pactola Reservoirs.

June 2016 precipitation was below average at Angostura, Belle Fourche, Dickinson and Heart Butte Reservoirs; much below average at Deerfield and Pactola Reservoirs; very much below average at Keyhole, Shadehill and Heart Butte Reservoir.

July 2016 precipitation was very much above average at Heart Butte and Jamestown Reservoirs; much above average at Dickinson Reservoir; was above average at Angostura, Keyhole, Pactola and Shadehill Reservoir; average at Belle Fourche Reservoir; much below average at Deerfield Reservoir.

August 2016 precipitation was very much above average at Jamestown and Shadehill Reservoirs; above average at Pactola Reservoir; average at Heart Butte, Belle Fourche, Deerfield and Keyhole Reservoirs; below at Angostura Reservoir; and much below average at Dickinson Reservoir.

September 2016 precipitation was very much above average at Belle Fourche, Dickinson, Heart Butte and Jamestown Reservoirs much above average at Angostura and Keyhole Reservoir; above average at Pactola Reservoir; below average at Deerfield Reservoir; much below average at Shadehill 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	2016 Total	Average Total	Percent
Angostura 1/	17.09	17.67	97
Belle Fourche 2/	14.56	15.86	92
Deerfield 3/	11.59	13.99	83
Keyhole 4/	15.87	19.20	83
Pactola	15.62	20.58	77
Shadehill 5/	17.55	17.86	98
Dickinson	16.70	15.77	106
Heart Butte	15.91	16.27	98
Jamestown	24.43	18.77	130

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	2016 Total	Average Total	Percent
Angostura	100,959	89,106	-11,853
Belle Fourche	112,086	63,841	-48,254
Deerfield	14,825	14,874	49
Keyhole	168,256	145,950	-22,306
Pactola	50,952	52,455	1,503
Shadehill	112,506	83,946	-28,560
Dickinson	4,040	4,775	735
Heart Butte	60,156	54,167	-5,989
Jamestown	29,589	29,520	-69

Table DKT2 displays the changes in storage content between September 30, 2015, and September 30, 2016, 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 2016. 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 2016
Accumulated Total 1950-2016

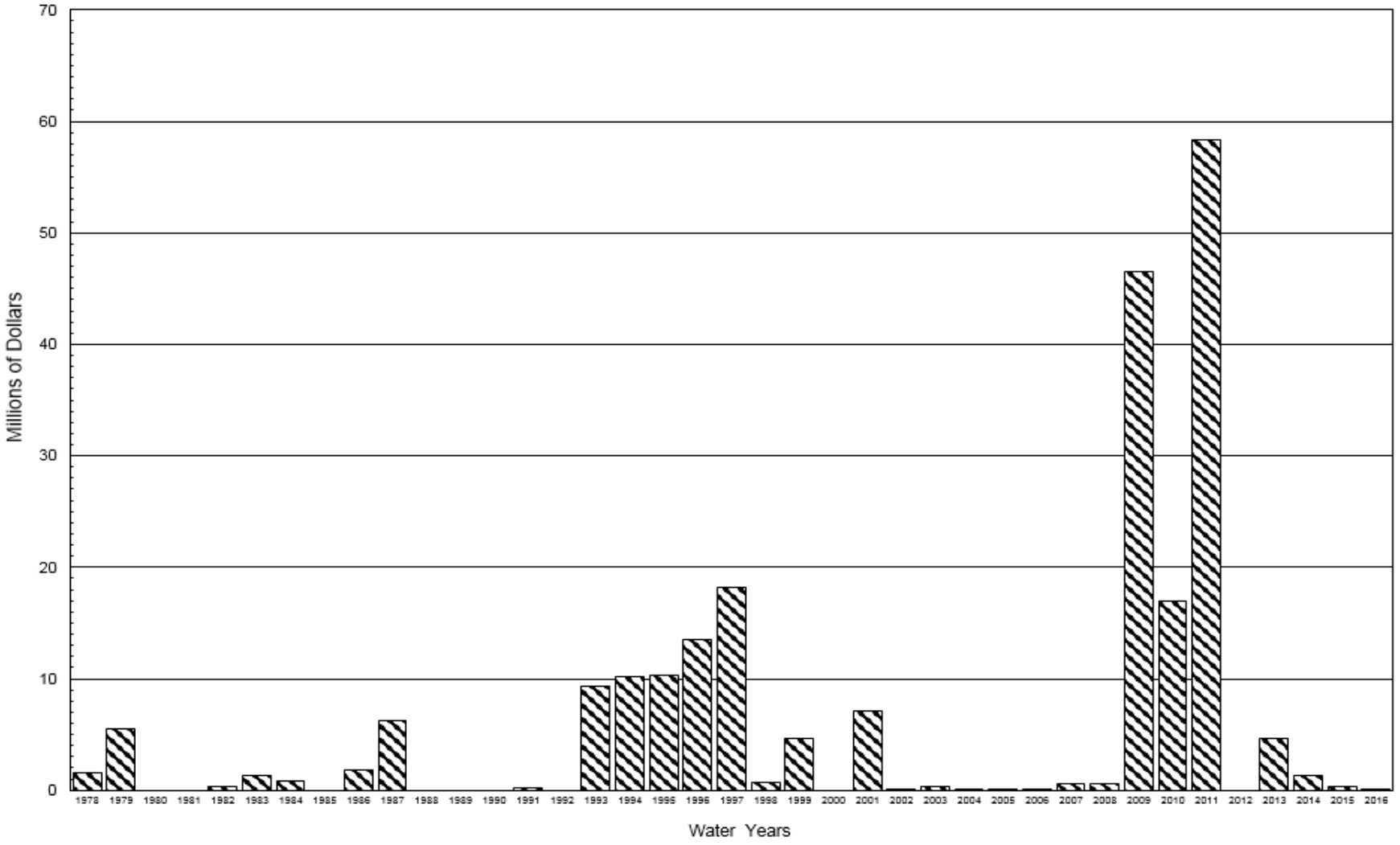
	Local	Main-Stem	2016 Total	Previous Accumulations	1950-2016 Accum Totals
Heart Butte	$0	$0	$0	$15,570,700	$15,570,700
Shadehill	$0	$10,000	$10,000	$12,240,500	$12,250,500
Angostura	$0	$0	$0	$22,800	$22,800
Pactola	$0	$2,800	$2,800	$3,717,000	$3,719,800
Keyhole	$0	$0	$0	$4,257,800	$4,257,800
Jamestown	$0	$0	$0	$208,052,100	$208,052,100
Total	$0	$12,800	$12,800	$244,036,500	$244,049,300

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 2016

Dickinson Reservoir

Background

Dickinson Dam and Edward Arthur 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). Dickinson 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 2016 Operations Summary

Dickinson Reservoir started WY 2016 at an elevation of 2415.16 feet and a storage of 4,040 AF, which is 4.84 feet, and 4,572 AF below the top of conservation pool (elevation 2420.00 feet and storage 8,612 AF). Dickinson Reservoir peaked at an elevation of 2417.48 feet on May 4, 2016 with 5,944 AF of storage. The minimum reservoir elevation for WY 2016 was 2415.09 feet with a storage of 3,991 AF on October 2, 2015. The reservoir elevation on September 30, 2016 was 2416.13 feet with storage of 4,775 AF, which is 3.87 feet, and 3,837 AF below the top of conservation pool.

The maximum instantaneous discharge of 6 cfs occurred on July 22, 2016. Reservoir net inflows for WY 2016 were the tenth lowest on record for the dam and totaled 995 AF, 5 percent of average. The maximum 24 hour computed inflow occurred on July 9, 2016 with 141 cfs. Precipitation for WY 2016 totaled 16.70 inches, which is 106 percent of average. A total of 81 AF of water was released specifically for downstream irrigation. An Emergency Management Security orientation was conducted on February 25, 2016.

Dickinson Dam entered FY 2016 under an Internal Alert (IA) for sedimentation transport from the toe drain because of two dead beavers and it was decided that the dam would remain in IA until the reservoir fills again and the dam has the opportunity to observe the seepage discharge under full reservoir head. On May 26, 2016 the IA was canceled and the dam returned to normal operations. The toe drain and weir box are being monitored under regular instrumentation schedule. An Annual Site Inspection (ASI) was conducted on August 11, 2016 by personnel from the DKAO, and the report was signed on September 13, 2016.

Monthly Statistics for WY 2016

Record and near record monthly inflows in 65 years of record keeping were recorded in the following months: November 2015 had its fifteenth lowest inflow, December 2015 had its ninth highest inflow, January 2016 had its eighth highest inflow, March and June 2016 had its seventh lowest inflow, and September 2016 had its thirteenth highest inflow.

Record or near record monthly end of month content in 65 years of record keeping were recorded in the following months: October 2015, June and August 2016 had its tenth lowest storage, November 2015, April and May 2016 had its twelfth lowest storage, December 2015 had its fifteenth lowest storage, July 2016 had its eleventh lowest storage.

Additional statistical information on Dickinson Reservoir and its operations during 2016 can be found on Table DKT3 and Figure DKG2.

TABLE DKT3
HYDROLOGIC DATA FOR WY 2016
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			

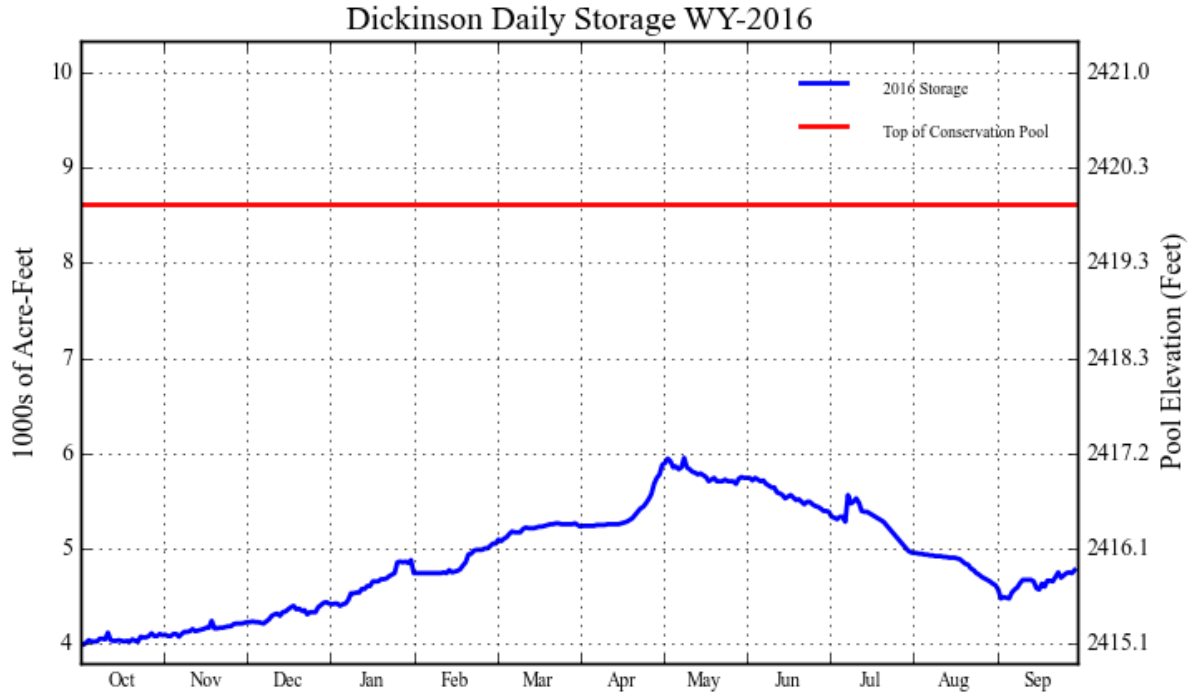
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	2,415.16	4,040	OCT 01, 2015
END OF YEAR	2,416.13	4,775	SEP 30, 2016
ANNUAL LOW	2,415.09	3,991	OCT 02, 2015
ANNUAL HIGH	2,417.48	5,952	MAY 04, 2016
HISTORIC HIGH	2,422.19	***9,348	MAR 21, 1997

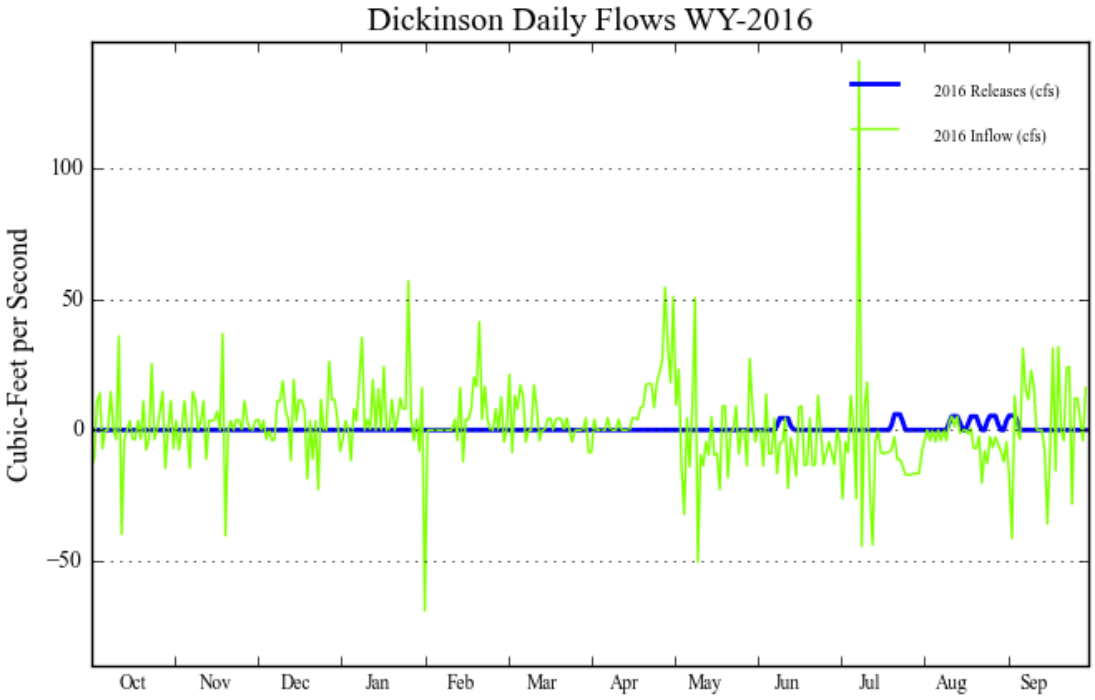
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	995	OCT 15-SEP 16	260	OCT 15-SEP 16
DAILY PEAK (CFS)*	141	JUL 09, 2016	6	JUL 22, 2016
DAILY MINIMUM (CFS)**	0	**	0	**

MONTH	INFLOW		OUTFLOW		CONTENT	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	51	8	0	NA	4,091	74
NOVEMBER	130	78	0	NA	4,221	77
DECEMBER	202	153	0	NA	4,423	81
JANUARY	320	111	0	NA	4,743	88
FEBRUARY	319	30	0	NA	5,062	86
MARCH	203	3	0	NA	5,265	75
APRIL	477	10	0	NA	5,742	80
MAY	9	NA	0	NA	5,751	81
JUNE	-313	NA	43	2	5,395	76
JULY	-370	NA	46	3	4,979	76
AUGUST	-222	NA	125	12	4,632	76
SEPTEMBER	189	163	46	8	4,775	83
ANNUAL	995	5	260	1		
APRIL-JULY	-197	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 primarily 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 2016 Operations Summary

Heart Butte Reservoir started WY 2016 at an elevation of 2062.32 feet and storage of 60,156 AF, which is 2.18 feet, and 6,986 AF below the top of conservation pool (elevation 2064.50 feet and storage 67,142 AF). Heart Butte Reservoir peaked at an elevation of 2064.18 feet on May 11, 2016 with 66,090 AF of storage. The minimum reservoir elevation for WY 2016 occurred on September 22, 2016 with 2060.16 feet and a storage of 53,638 AF. Heart Butte Reservoir elevation on September 30, 2016 was 2060.34 feet with a storage of 54,167 AF, which is 4.16 feet and 12,975 AF below the top of conservation pool.

A maximum discharge of 129 cfs occurred on October 28, 2015. Reservoir net inflows for WY 2016 were the twelfth lowest on record for the dam and totaled 18,724 AF, 21 percent of average. The maximum 24 hour computed inflow occurred on October 11, 2015 with 302 cfs. Precipitation for WY 2016 totaled 15.91 inches, which is 98 percent of average. A total of 7,311 AF was released specifically for downstream irrigation. An Emergency Management Security orientation was conducted on February 24, 2016. Heart Butte Reservoir remained in normal operation for the entire water year, and the dam completed an Issue Evaluation Risk Analysis in August 2016. An ASI was conducted on August 10, 2016 by personnel from the DKAO, and the report was signed on September 13, 2016.

Monthly Statistics for WY 2016

Record and near record monthly inflows in 67 years of record keeping were recorded in the following months: October 2015 had its thirteenth highest inflow, November 2015 had its fourteenth highest inflow, December 2015 had its eighth highest inflow, June 2016 had its sixth lowest inflows, and September 2016 had its fourteenth highest storage.

Record and near record monthly end of month content in 67 years of record keeping were recorded in the following months: March and May 2016 had its fifteenth lowest storage, June and August 2016 had its eleventh lowest storage, July and September 2016 had its twelfth lowest storage.

Additional statistical information on Heart Butte Reservoir and its operations during 2016 can be found on Table DKT4 and Figure DKG3.

TABLE DKT4
HYDROLOGIC DATA FOR WY 2016
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

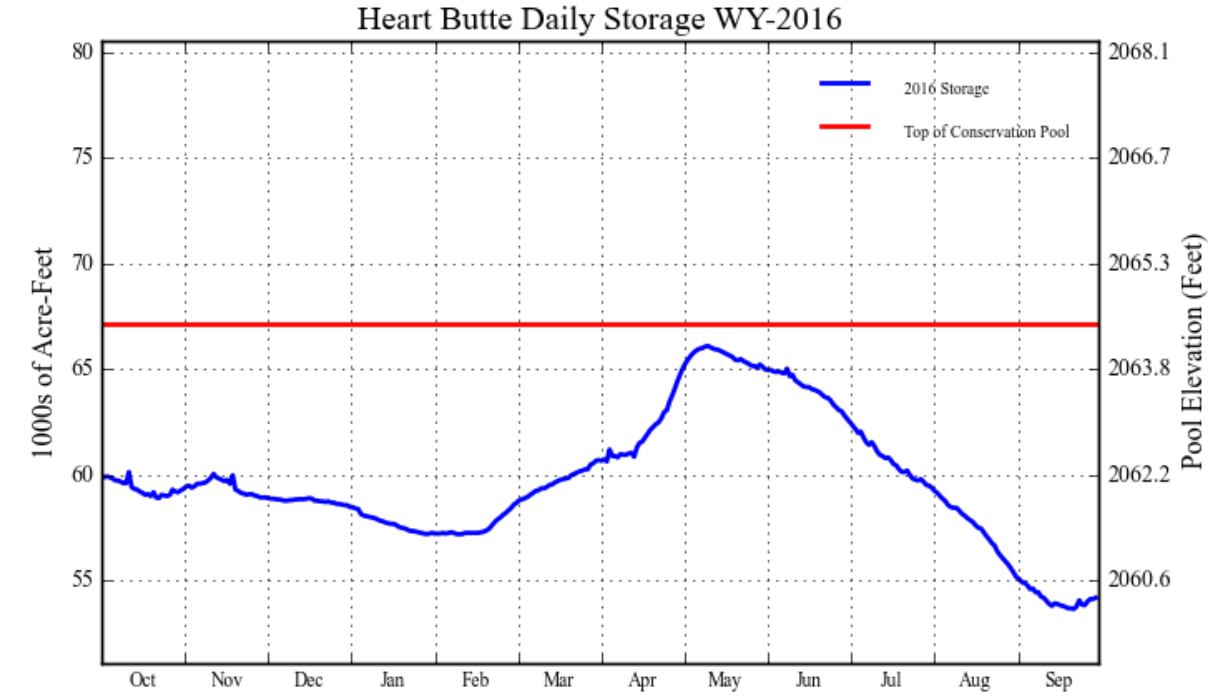
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	2,062.32	60,156	OCT 01, 2015
END OF YEAR	2,060.34	54,167	SEP 30, 2016
ANNUAL LOW	2,060.16	53,638	SEP 22, 2016
ANNUAL HIGH	2,064.18	66,090	MAY 11, 2016
HISTORIC HIGH	2,086.23	173,203	APR 09, 1952

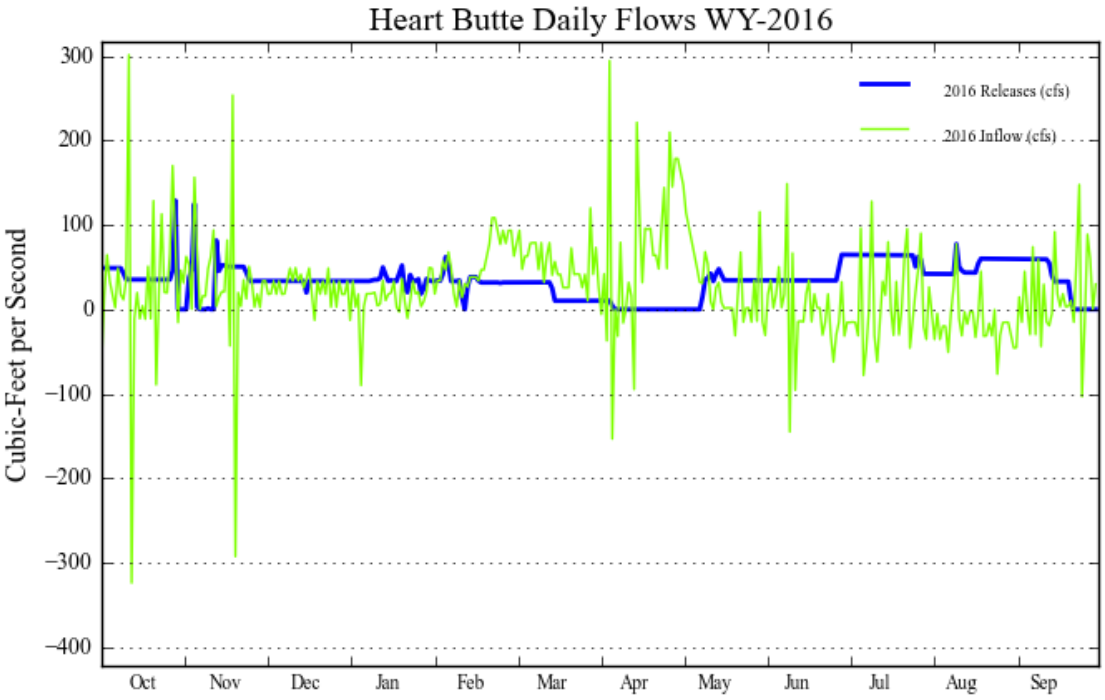
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	18,724	OCT 15-SEP 16	24,713	OCT 15-SEP 16
DAILY PEAK (CFS)	302	OCT 11, 2015	129	OCT 28, 2015
DAILY MINIMUM (CFS)	0	*	0	*

MONTH	INFLOW		OUTFLOW		CONTENT	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	1,559	105	2,396	105	59,319	102
NOVEMBER	1,738	137	2,139	148	58,918	101
DECEMBER	1,574	176	2,034	157	58,485	101
JANUARY	864	75	2,112	186	57,210	99
FEBRUARY	3,214	88	1,905	88	58,519	99
MARCH	3,391	12	1,256	7	60,654	87
APRIL	3,921	16	109	0	64,466	92
MAY	2,251	22	1,604	14	65,113	94
JUNE	-125	NA	2,189	22	62,799	90
JULY	456	11	3,781	48	59,474	90
AUGUST	-950	NA	3,175	56	55,349	89
SEPTEMBER	830	167	2,012	69	54,167	90
ANNUAL	18,724	21	24,713	28		
APRIL-JULY	6,803	8				

* 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 an elevation of 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 2016 Operations Summary

Jamestown Reservoir started WY 2016 at an elevation of 1430.61 feet and a storage of 29,589 AF, which is 2.61 feet, and 5,363 AF above the top of conservation pool (elevation 1428.00 feet and storage of 24,226 AF). Jamestown Reservoir peaked at an elevation of 1432.01 feet on September 7, 2016 with 32,947 AF of storage. The minimum reservoir elevation for WY 2016 of 1429.56 feet and storage of 27,303 AF occurred on February 3, 2016. The reservoir elevation on September 30, 2016 was 1430.58 feet with storage of 29,520 AF, which is 2.58 feet, and 5,294 AF above the top of active conservation pool.

The maximum instantaneous discharge of 122 cfs occurred on September 15, 2016. Jamestown Reservoir net inflows for WY 2016 were the twenty sixth lowest inflows on record for the dam and totaled 10,913 AF, 19 percent of average. The maximum 24 hour computed inflow occurred on September 4, 2016 with 566 cfs. Precipitation for WY 2016 totaled 24.43 inches at 130 percent of average. No water was released specifically for downstream irrigation. An Emergency Management Security orientation was conducted on February 23, 2016.

On April 25, 2016 Jamestown Reservoir went into IA with a reservoir elevation over 1431.00 feet and remained there until May 8, 2016 when the reservoir elevation dropped below elevation 1431.00 feet and normal operating conditions resumed. On May 12, 2016 the reservoir went back into IA with a reservoir elevation over 1431.00 feet and remained there until May 14, 2016 when the reservoir elevation dropped below elevation 1431.00 feet and normal operating conditions resumed. On May 22, 2016 the reservoir went back into IA with a reservoir elevation over 1431.00 feet and remained there until June 27, 2016 when the reservoir elevation dropped below elevation 1431.00 feet and normal operating conditions resumed. On July 11, 2016 the reservoir went back into IA with a reservoir elevation over 1431.00 feet and remained there until September 21, 2016 when the reservoir elevation dropped below elevation 1431.00 feet and normal operating conditions resumed. An ASI was conducted on August 9, 2016 by personnel from the DKAO. The ASI report was signed on September 15, 2016.

Monthly Statistics for WY 2016

Record and near record monthly inflows in 62 years of record keeping were recorded in the following months: December had its twelfth highest inflow, February had its thirteenth highest inflow, June had its tenth lowest inflow, and September had its fourteenth highest inflow.

Record and near record monthly end of month content in 62 years of record keeping were recorded in the following months: There were none in the top or bottom 15 storages. Additional statistical information on Jamestown Reservoir and its operations during 2016 can be found on Table DKT5 and Figure DKG4.

TABLE DKT5
HYDROLOGIC DATA FOR WY 2016
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

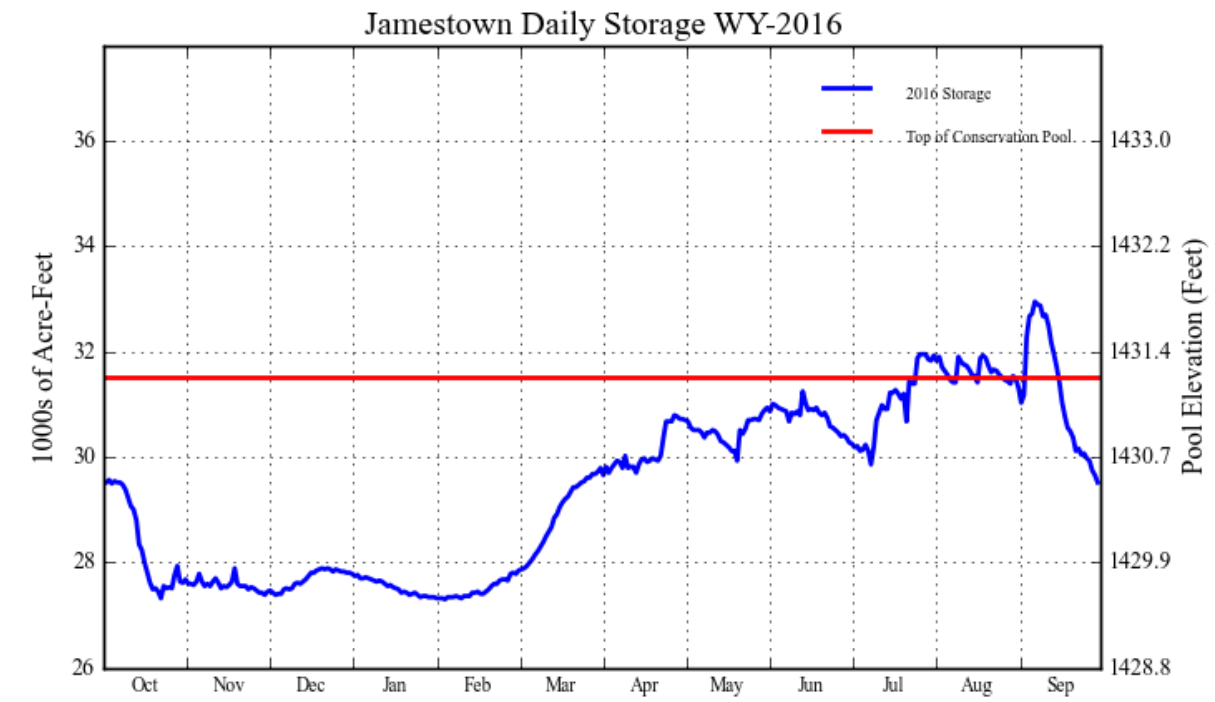
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	1,430.61	29,589	OCT 01, 2015
END OF YEAR	1,430.58	29,520	SEP 30, 2016
ANNUAL LOW	1,429.56	27,303	FEB 03, 2016
ANNUAL HIGH	1,432.01	32,947	SEPT 07, 2016
HISTORIC HIGH	1,454.10	222,318	APR 26, 2009

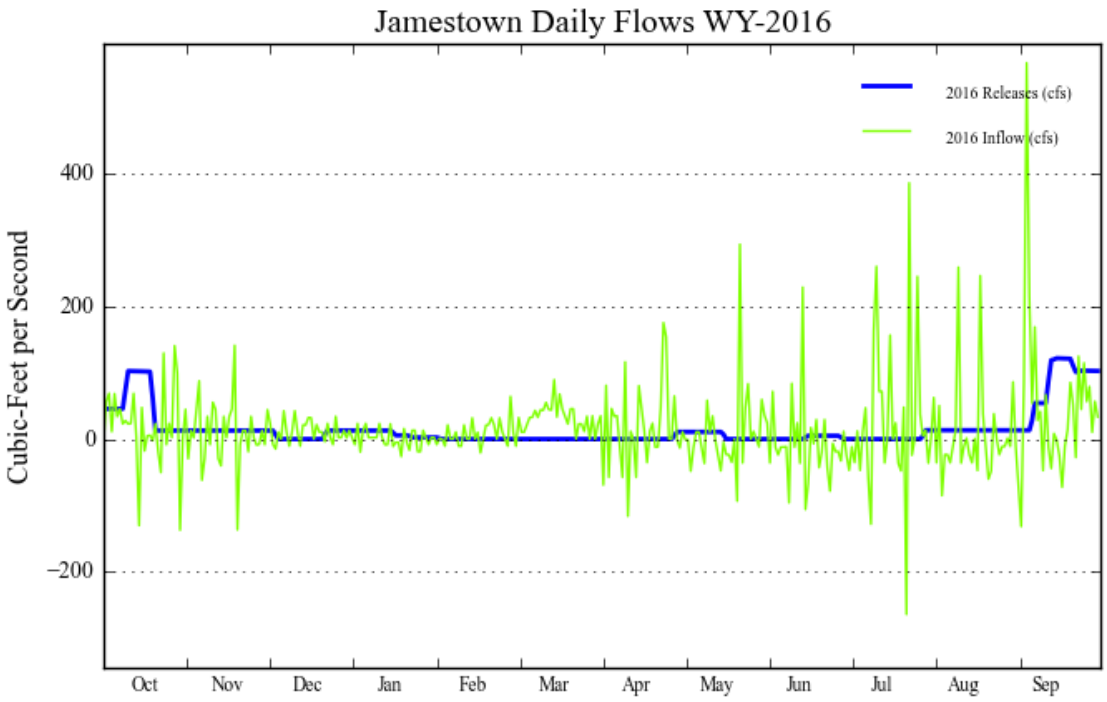
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	10,913	OCT 15-SEP 16	10,982	OCT 15-SEP 16
DAILY PEAK (CFS)	566	SEPT 04, 2016	122	SEPT 15, 2016
DAILY MINIMUM (CFS)	0	*	0	*

MONTH	INFLOW		OUTFLOW		CONTENT	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	1,205	103	3,313	94	27,681	108
NOVEMBER	530	54	762	56	27,449	108
DECEMBER	670	161	332	88	27,787	109
JANUARY	25	15	488	344	27,324	109
FEBRUARY	486	200	2	2	27,808	109
MARCH	1,917	29	0	NA	29,725	91
APRIL	1,051	4	53	1	30,723	60
MAY	501	5	335	2	30,889	74
JUNE	-386	NA	129	1	30,371	86
JULY	1,547	37	89	1	31,829	92
AUGUST	480	11	821	16	31,488	92
SEPTEMBER	2,891	219	4,859	98	29,520	106
ANNUAL	10,913	19	10,982	19		
APRIL-JULY	2,710	6				

* 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 (Rapid Valley Project) and Pactola Reservoir (Rapid Valley Unit P-SMBP), 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, South Dakota 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. These 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. Deerfield Reservoir has a total capacity of 15,655 AF with an additional 26,655 AF of surcharge capacity.

During the winter of 1995 and 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 inch bypass is capable of providing.

WY 2016 Operations Summary

Deerfield Reservoir started WY 2016 at an elevation of 5905.99 feet and a storage of 14,825 AF, which is 2.01 feet and 829 AF below the top of conservation pool (elevation of 5,908.0 feet). Precipitation for 2015 was 83 percent of average. Inflows for WY 2016 totaled 12,009 AF (119 percent of the average). The peak inflows occurred in March 2016, totaling 1,287 AF. The peak reservoir elevation for WY 2016 occurred on September 30, 2016 with 5,906.11 feet, and storage of 14,874 AF. The minimum elevation for WY 2016 occurred on March 4, 2016 with 5,904.65 feet, and storage of 14,279 AF. WY 2016 ended at an elevation of 5906.11 feet and storage of 14,874 AF, which is 1.89 feet and 780 AF below the top of the conservation pool. Deerfield Reservoir ended WY 2016 with 14,723 AF in active storage.

In 2016 the District ordered 770 AF of water from storage for irrigation from Deerfield Reservoir. Rapid City released 620.1 AF of water from storage for the municipal water supply from Pactola Reservoir. An Emergency Management Security Orientation Exercise (EMSOE) was held for Deerfield and Pactola March 29, 2016. The ASI of Deerfield was conducted May 24, 2016. There are no incomplete Safety of Dams (SOD) Recommendations.

Monthly Statistics for WY 2016

Record monthly inflows were recorded in the following months: December 2015, January 2016, and September 2016 were fifth highest, February 2016 was fourth highest. Record monthly end of month content were recorded in the following months: No records were set in WY2016.

Additional statistical information on Deerfield Reservoir and its operations during WY 2016 can be found on Table DKT6 and Figure DKG5.

TABLE DKT6
HYDROLOGIC DATA FOR WY 2016
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	15,655	15,504
TOP OF JOINT USE			
TOP OF EXCLUSIVE FLOOD CONTROL			

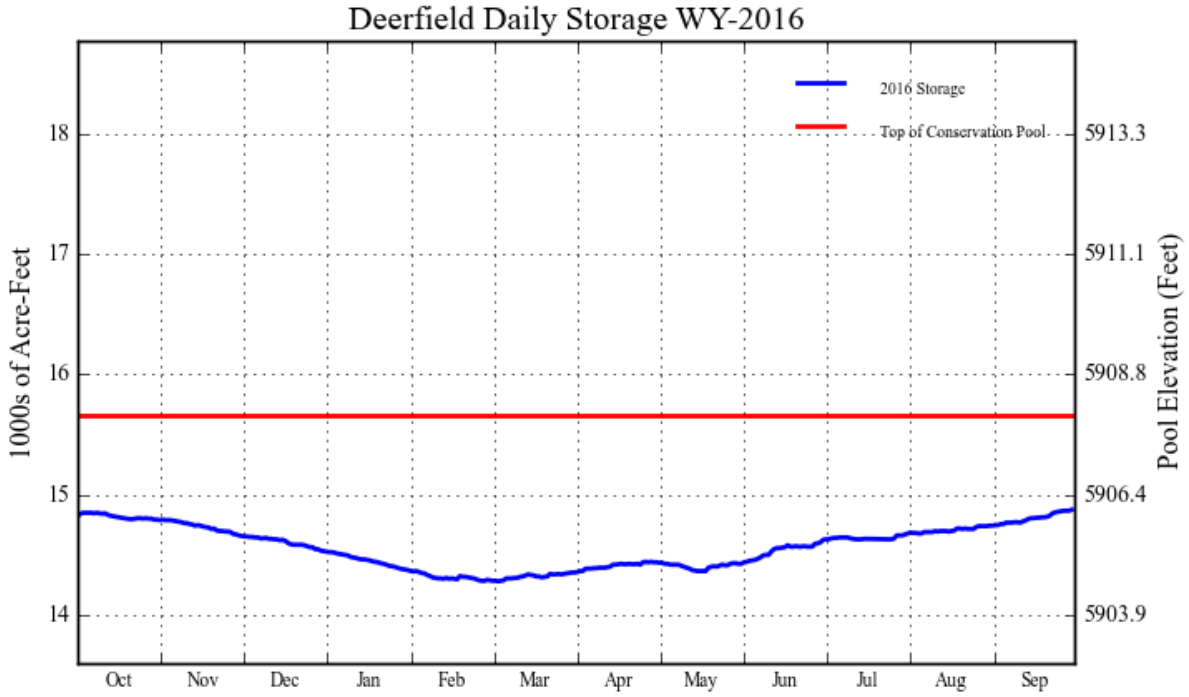
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	5,905.99	14,825	OCT 01, 2015
END OF YEAR	5,906.11	14,874	SEP 30, 2016
ANNUAL LOW	5,904.65	14,279	MAR 04, 2016
ANNUAL HIGH	5,906.11	14,874	SEP 30, 2016
HISTORIC HIGH	5,909.05	16,157	FEB 25, 1985

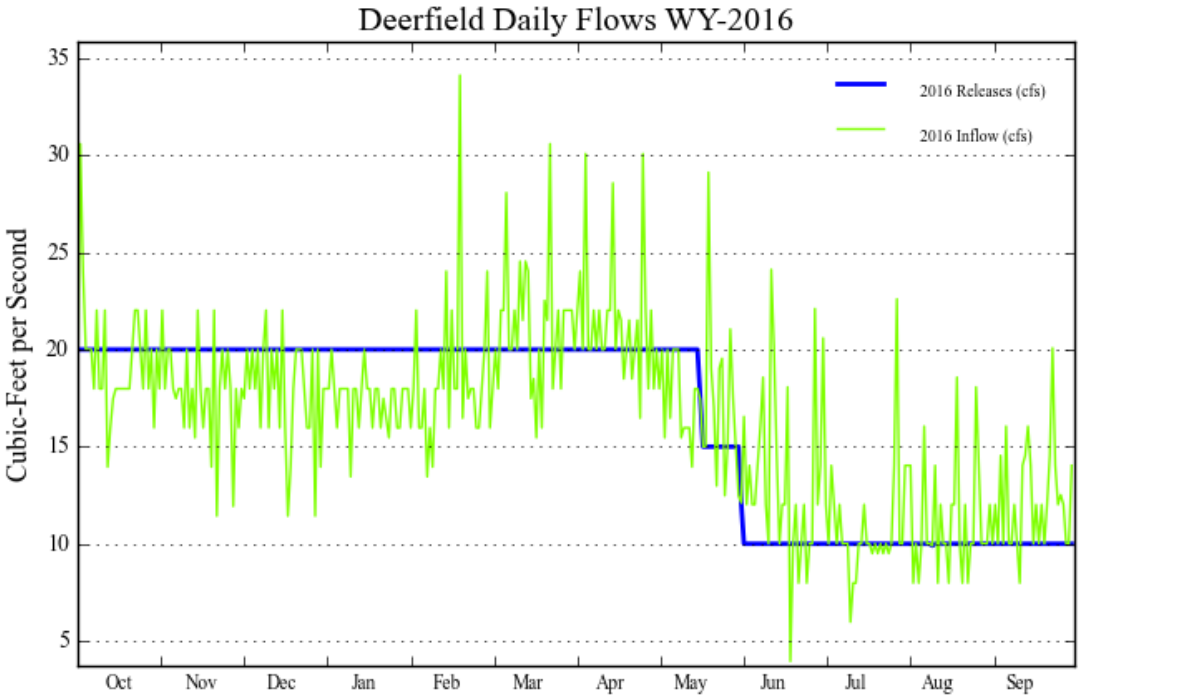
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	12,009	OCT 01-SEP 30	11,960	OCT 01-SEP 30
PEAK DAILY (CFS)	34	FEB 18, 2016	20	OCT 01, 2015
MINIMUM DAILY (CFS)	4	JUN 19, 2016	10	AUG 10, 2016

MONTH	INFLOW		OUTFLOW		EOM CONTENT**	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	1,193	178	1,230	161	14,788	117
NOVEMBER	1,059	175	1,190	290	14,657	114
DECEMBER	1,099	174	1,230	330	14,526	111
JANUARY	1,068	170	1,230	334	14,364	107
FEBRUARY	1,081	186	1,150	313	14,295	105
MARCH	1,287	147	1,230	199	14,352	103
APRIL	1,275	107	1,190	115	14,437	103
MAY	1,073	76	1,086	81	14,424	102
JUNE	778	62	599	47	14,603	109
JULY	681	77	615	55	14,669	106
AUGUST	688	99	615	52	14,742	112
SEPTEMBER	727	118	595	52	14,874	116
ANNUAL	12,009	119	11,960	119	14,561	108
APRIL-JULY	3,807	80	3,490	73	14,533	104

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

Figure DKG5
Deerfield Reservoir





Pactola Reservoir

Background

Pactola Reservoir, Rapid Valley Unit P-S MBP, located on Rapid Creek above Rapid City, South Dakota, acts in conjunction with Rapid Valley Project, 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 Deerfield Reservoir, and at the same time maintain a uniform outflow from Deerfield Reservoir 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. North Rapid Creek and Blind Park snowtel sites were installed in the Pactola and Deerfield drainage basin in May of 1990.

As part of the Safety Examination of Existing Structures 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 on the basis of 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.

A new long term storage contract was signed on July 31, 2007 between Reclamation and Rapid City. The contract provides storage space of 49,000 AF for the city and 6,000 AF was retained by Reclamation.

WY 2016 Operations Summary

Pactola Reservoir started WY 2016 at an elevation of 4,574.15 feet and storage of 50,952 AF, which is 6.05 feet and 5,020 AF below the top of conservation pool (elevation of 4,580.20 feet). Precipitation for WY 2016 was 77 percent of average. Inflows for WY 2016 totaled 35,946 AF (96 percent of average). Peak inflows occurred in October 2015, totaling 4,510 AF for the month. The peak reservoir elevation for WY 2016 occurred on May 30, 2016 with 4,580.22 feet, and storage of 55,993 AF. The minimum elevation for WY 2016 occurred on October 15, 2015 with 4,572.33 feet, and storage of 49,516 AF. WY 2016 ended at an 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. Pactola Reservoir ended WY 2016 with 51,438 AF in active storage. In WY 2016 the District ordered 770 AF of water from storage for irrigation from Deerfield Reservoir. Rapid City released 620.1 AF of water from storage for the municipal water supply from Pactola Reservoir.

An EMSOE was held for Deerfield and Pactola March 29, 2016. The ASI of Pactola was conducted May 26, 2016. There are no incomplete SOD Recommendations.

Monthly Statistics for WY 2016

Record monthly inflows were recorded in the following months: October 2015 and January 2016 were fourth highest, November 2015, and February 2016 were fifth highest. Record end of month reservoir content were recorded in the following months: No records were set in WY2016. Additional statistical information on Pactola Reservoir and its operations during WY 2016 can be found on Table DKT7 and Figure DKG6

TABLE DKT7
HYDROLOGIC DATA FOR WY 2016
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

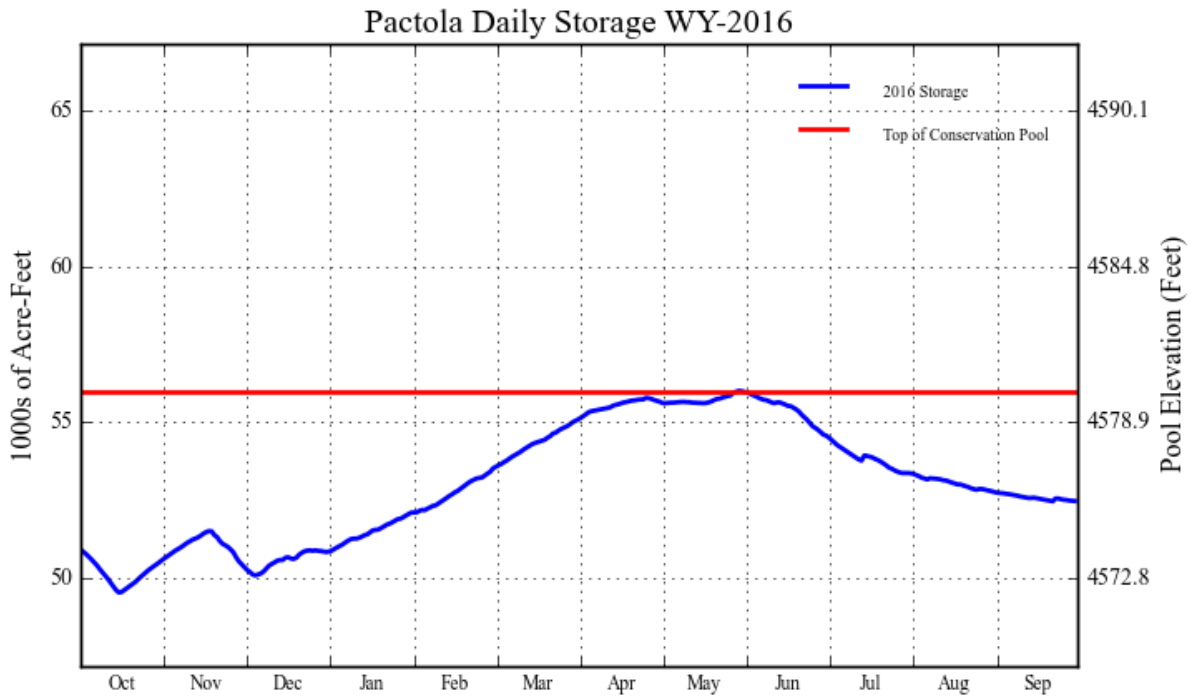
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	4,574.15	50,952	OCT 01, 2015
END OF YEAR	4,576.01	52,455	SEP 30, 2016
ANNUAL LOW	4,572.33	49,516	OCT 15, 2015
ANNUAL HIGH	4,580.22	55,993	MAY 30, 2016
HISTORIC HIGH	4,589.43	64,246	JUN 29, 2015

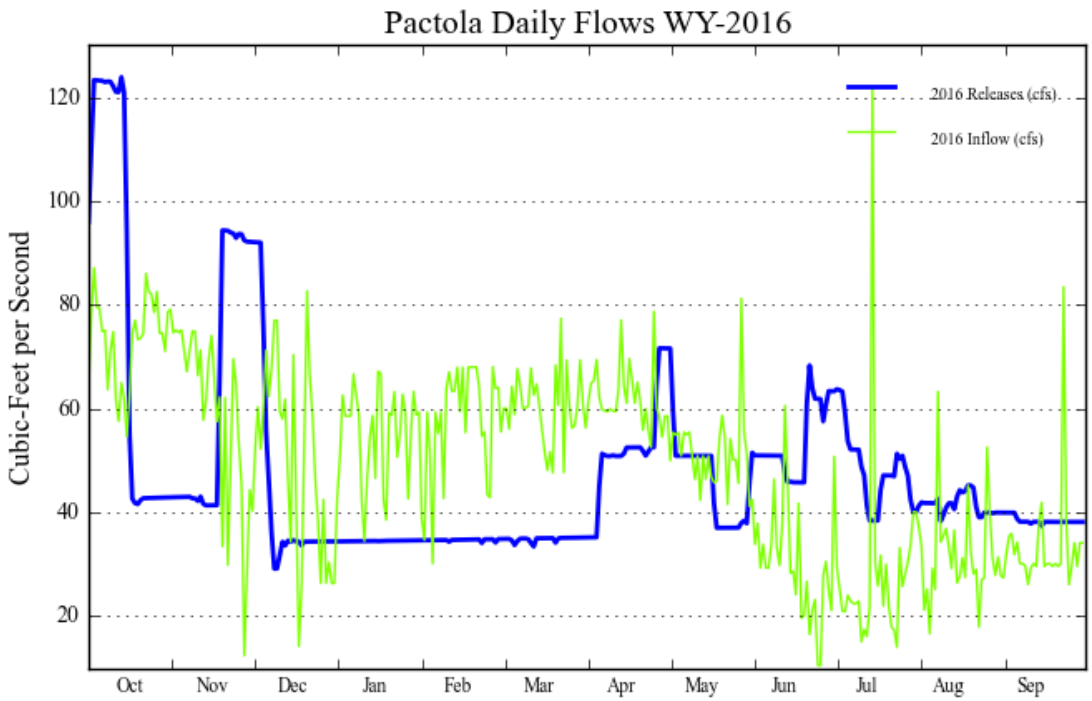
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	35,946	OCT 01-SEP 30	34,443	OCT 01-SEP 30
DAILY PEAK (CFS)	122	JUL 15, 2016	124	OCT 13, 2016
DAILY MINIMUM (CFS)	10	JUN 26, 2016	29	DEC 08, 2015

MONTH	INFLOW		OUTFLOW		EOM CONTENT*	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	4,510	208	4,892	274	50,570	112
NOVEMBER	3,526	218	3,780	259	50,316	111
DECEMBER	3,095	225	2,579	170	50,832	113
JANUARY	3,375	237	2,119	148	52,088	115
FEBRUARY	3,365	236	1,992	154	53,461	118
MARCH	3,703	150	2,139	119	55,025	120
APRIL	3,691	88	3,042	107	55,674	118
MAY	3,186	46	2,876	52	55,984	115
JUNE	1,781	25	3,181	50	54,584	111
JULY	1,776	45	3,007	54	53,353	112
AUGUST	1,956	70	2,550	62	52,759	116
SEPTEMBER	1,982	88	2,286	81	52,455	117
ANNUAL	35,946	96	34,443	94	53,092	115
APRIL-JULY	10,434	47	12,106	60	54,889	114

* 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, and was built to service about 12,200 acres in the Angostura Unit P-S MBP, and for power generation. The reservoir 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 kW. Because of the low runoff, and actual irrigation diversions were higher than 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. 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.

Reclamation's Sedimentation and River Hydraulics Group of the Technical Service Center in Denver conducted a sedimentation survey of Angostura Reservoir in 2004 and provided a survey report and new area-capacity tables in August of 2005. Angostura Reservoir accumulated 7,716 AF since the last survey in 1979. Since construction in 1949, Angostura has accumulated 36,867 AF of sediment. The rate from 1949 to 2004 has averaged 670 AF per year. The new area-capacity tables were first used in WY 2006.

WY 2016 Operations Summary

Angostura Reservoir started WY 2016 at an elevation of 3,182.09 feet and a storage of 100,959 AF, which is 5.11 feet and 22,089 AF below the top of the conservation pool. Precipitation for WY 2016 was 97 percent of average. Inflows for WY 2016 totaled 45,082 AF (56 percent of the average). Peak inflows occurred in April totaling 7,277 AF for the month. The peak reservoir elevation for WY 2016 occurred on May 22, 2016 with 3186.76 feet and storage of 121,029 AF. The minimum elevation for WY 2016 occurred on September 16, 2016 with 3,178.81 feet and storage of 88,333 AF. WY 2016 ended at an elevation of 3179.02 feet and storage of 89,106 AF, which is 8.18 feet and 33,942 AF below the top of the conservation pool. Angostura Reservoir ended WY 2016 with 46,901 AF in active storage.

The Angostura Irrigation District had a full water allotment for its irrigators. Releases for irrigation began May 24, 2016 and reached a peak of 257 cfs on June 26, 2016. The irrigation release was terminated on September 25, 2016 with a total irrigation release of 35,156 AF. Angostura Reservoir went into IA status on April 29, 2016 after reaching a reservoir elevation 3186.0 feet and stayed in IA until June 9, 2016. The river outlet gate was operated to drop the reservoir pool down to 3186.0, and then set to match inflows and/or allow the reservoir to slowly fill. An EMSOE was held on March 22, 2016. The Annual Examination (AE) report for Angostura Dam was completed on August 2, 2016. There are no incomplete SOD recommendations.

Monthly Statistics for WY 2016

Record monthly inflows were recorded in the following months: November 2015 fourth highest, December 2015 and June 2016 second highest, January and July 2016 fifth highest. Record end of month reservoir content were recorded in the following months: no storage records achieved in WY 2016.

Additional statistical information on Angostura Reservoir and its operations during WY 2016 can be found on Table DKT8 and Figure

DKG7.TABLE DKT8
HYDROLOGIC DATA FOR WY 2016
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			

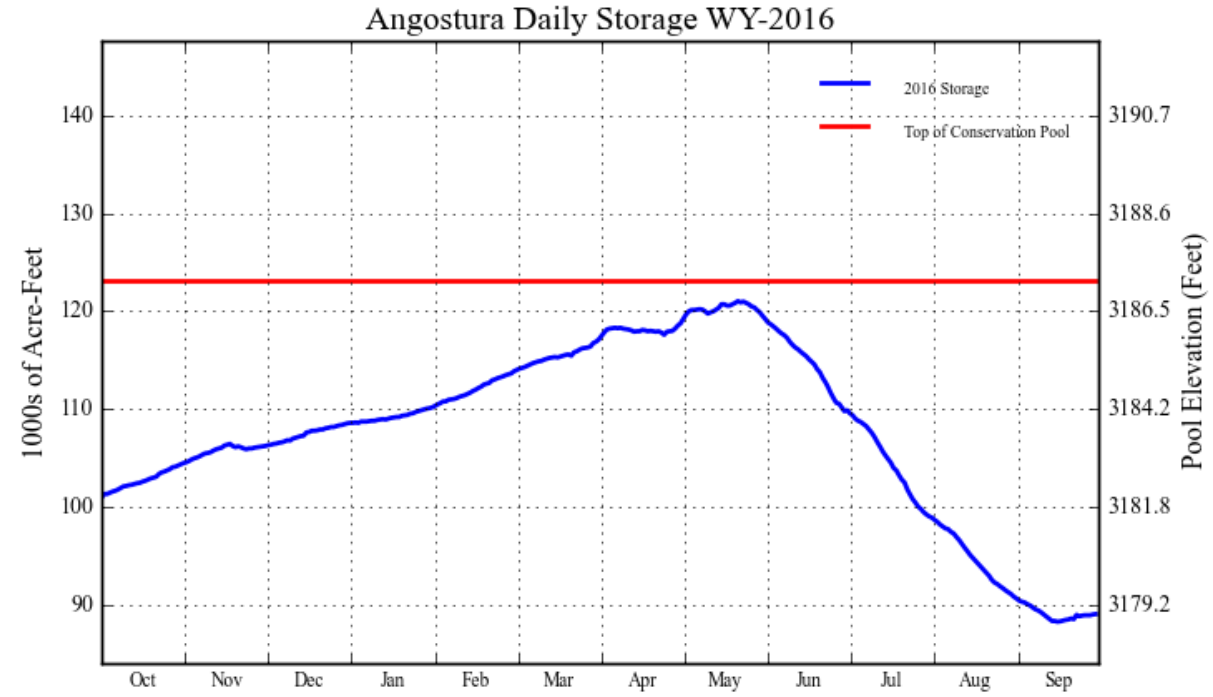
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE
BEGINNING OF YEAR	3,182.09	100,959	OCT 01, 2015
END OF YEAR	3,179.02	89,106	SEP 30, 2016
ANNUAL LOW	3,178.81	88,333	SEP 16, 2016
ANNUAL HIGH	3,186.76	121,029	MAY 22, 2016
HISTORIC HIGH	3,189.37	**152,228	MAY 20, 1978

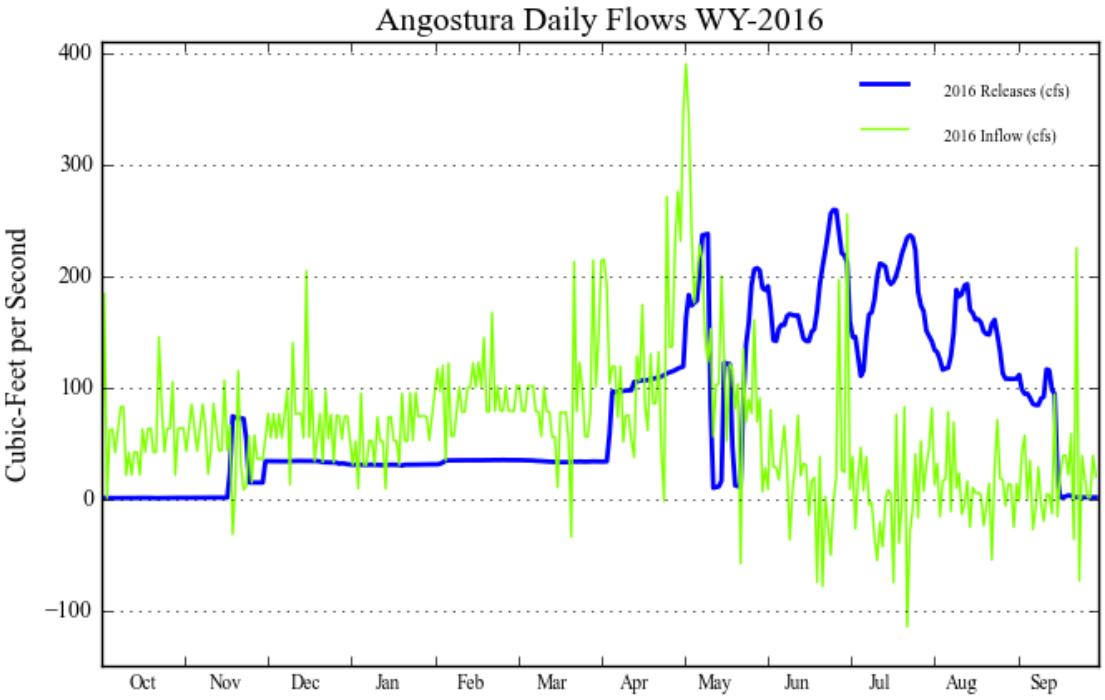
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	45,082	OCT 01-SEP 30	56,936	OCT 01-SEP 30
DAILY PEAK (CFS)	390	MAY 03, 2016	259	JUN 26, 2016
DAILY MINIMUM (CFS)	-114	July 23, 2016	1	OCT 21, 2015

MONTH	INFLOW		OUTFLOW		EOM CONTENT***	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	3,623	169	72	6	104,510	107
NOVEMBER	2,916	131	1,171	85	106,255	108
DECEMBER	4,422	239	2,063	413	108,614	109
JANUARY	3,608	169	1,901	391	110,321	109
FEBRUARY	5,460	123	1,994	222	113,787	108
MARCH	5,182	45	2,089	50	116,880	104
APRIL	7,277	97	5,620	148	118,537	102
MAY	8,912	50	7,919	58	119530	99
JUNE	1,169	6	10,893	53	109,806	92
JULY	564	8	11,295	72	99,075	89
AUGUST	744	24	8,929	70	90,890	90
SEPTEMBER	1,205	120	2,989	56	89,106	92
ANNUAL	45,082	56	56,935	71	107,276	101
APRIL-JULY	17,922	34	17,622	78	116,188	99

** 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 furnishes a supplemental irrigation supply to 57,000 acres in the Belle Fourche Project and 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 BFID under its prior water right along with BFID's pro rata share of storable inflows to Keyhole Reservoir. On January 1, 1985, the Crook County Irrigation District's (CCID) 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 WYs 1992 to 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.

Reclamation's Sedimentation and River Hydraulics Group of the Technical Service Center in Denver conducted a sedimentation survey of Keyhole Reservoir in 2003 and provided a survey report and new area-capacity tables in July of 2005. Keyhole Reservoir accumulated 5,082 AF of sediment since the previous survey in 1978. Since construction in 1952, Keyhole has accumulated 12,495 AF of sediment. The sedimentation rate from 1952 to 2003 has averaged 240 AF per year. The new area-capacity tables were first used in WY 2006.

WY 2016 Operations Summary

Keyhole Reservoir started WY 2016 at an elevation of 4,097.04 feet and storage of 168,256 AF, which is 2.26 feet and 20,415 AF below the top of the conservation pool. Precipitation for WY 2016 was 83 percent of average. Inflows for WY 2016 totaled -13,803 AF (-84 percent of average). Peak inflows occurred in February 2016, totaling 1,379 AF for the month. The peak reservoir elevation for WY 2016 was 4,097.15 feet, storage of 169,209 AF, and occurred on April 23, 2016. The minimum elevation for WY 2016 was 4,094.21 feet, storage of 145,100 AF, and occurred on September 22, 2016. WY 2016 ended at an elevation of 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. Keyhole Reservoir ended WY 2016 with 139,358 AF in active storage. BFID ordered 744 AF and CCID ordered 216 AF for WY 2016. An EMSOE was held March 16, 2016. The Comprehensive Review of Keyhole was conducted on June 15, 2016. There are no incomplete SOD recommendations.

Monthly Statistics for WY 2016

Record inflows were recorded in the following months: Lowest for March 2016, third lowest for May 2016, and second lowest for June 2016. Record end of month reservoir content were recorded in the following months: fifth highest for October, November, and December 2015.

Additional statistical information on Keyhole Reservoir and its operations during WY 2016 can be found on Table DKT9 and Figure DKG8.

TABLE DKT9
HYDROLOGIC DATA FOR WY 2016
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

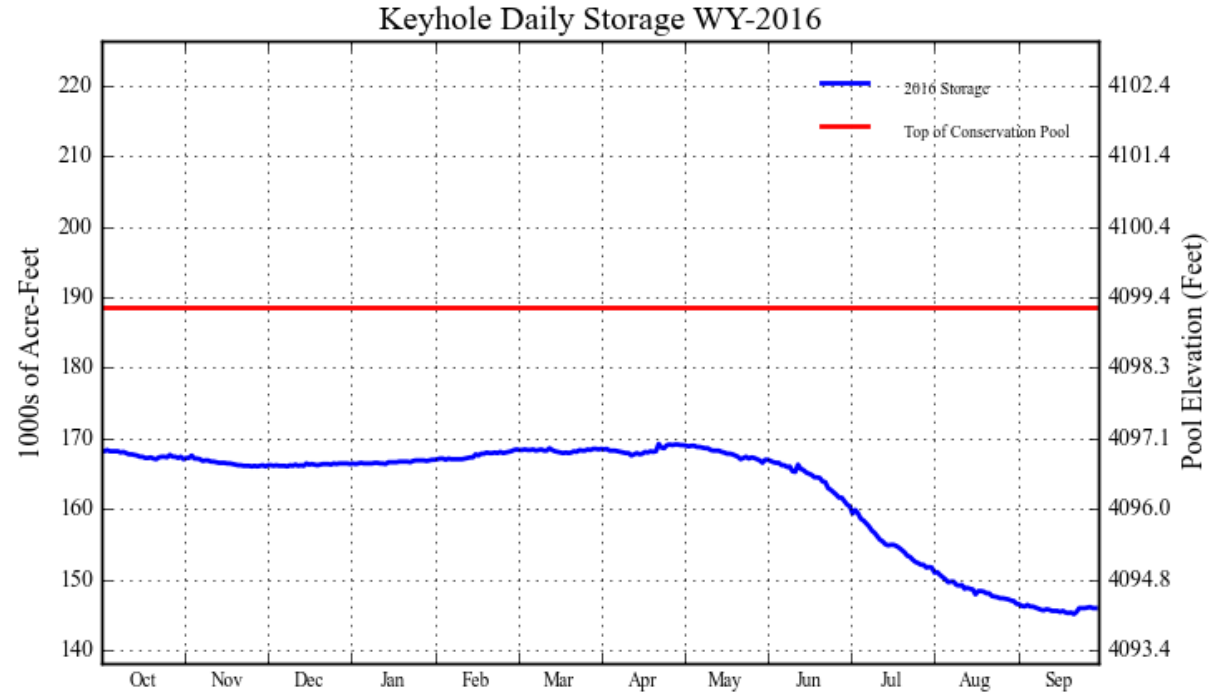
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE (end-of-day)
BEGINNING OF YEAR	4,097.04	168,256	OCT 01, 2015
END OF YEAR	4,094.32	145,950	SEP 30, 2016
ANNUAL LOW	4,094.21	145,100	SEP 22, 2016
ANNUAL HIGH	4,097.15	169,209	APR 23, 2016
HISTORIC HIGH	4,100.38	210,222	MAY 21, 1978

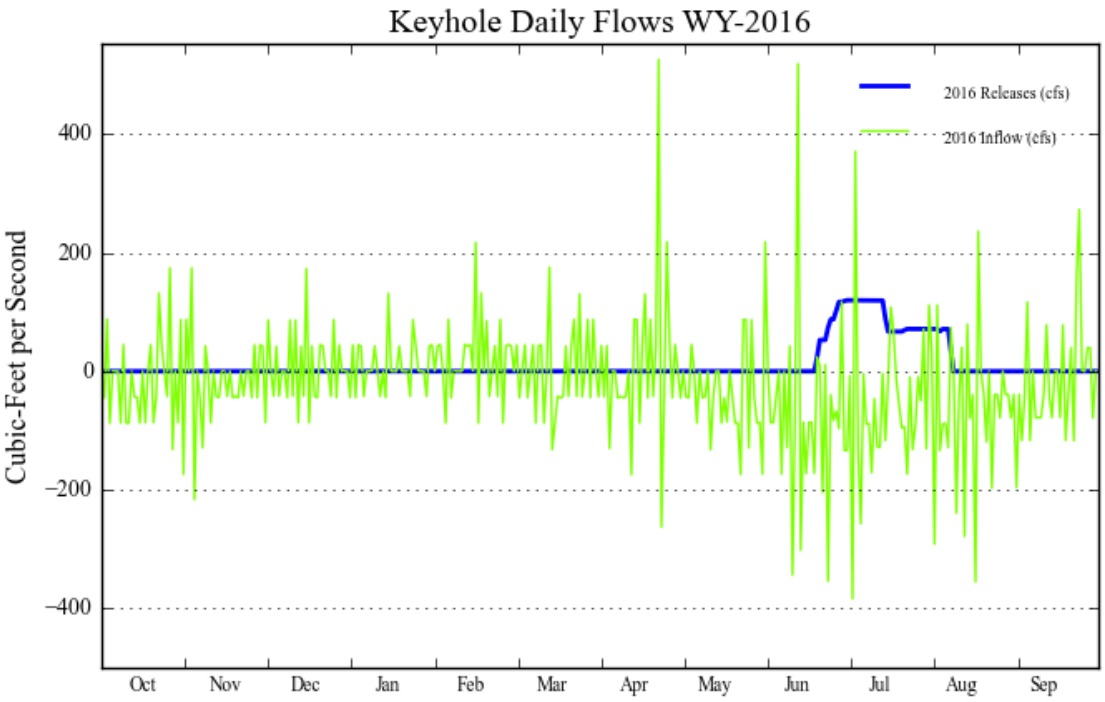
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	-13,803	OCT 01-SEP 30	8503	OCT 01-SEP 30
DAILY PEAK (CFS)	525	APR 23, 2016	120	JUL 01, 2016
DAILY MINIMUM (CFS)	-384	JUL 03, 2016	0	OCT 01, 2015

MONTH	INFLOW		OUTFLOW		EOM CONTENT**	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	-1,210	-392	0	0	167,046	179
NOVEMBER	-1,031	-345	0	0	166,015	178
DECEMBER	343	226	0	0	166,358	178
JANUARY	604	115	0	0	166,962	178
FEBRUARY	1,379	49	0	0	168,341	175
MARCH	173	3	0	0	168,514	164
APRIL	610	25	0	0	169,124	165
MAY	-2,594	-51	0	0	166,530	157
JUNE	-3,670	-106	1,756	93	161,104	150
JULY	-3,631	-406	5,700	144	151,773	148
AUGUST	-3,767	-213	1,047	29	146,959	151
SEPTEMBER	-1,009	-59	0	0	145,950	154
ANNUAL	-13,803	-84	8,503	63	162,056	164
APRIL-JULY	-9,285	-92	7,456	91	162,133	155

* 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, flood control, recreation, 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 ungated 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 feet 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 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 an elevation of 2260 feet and 2272 feet, and because the Corps has constructed Bowman Haley Reservoir upstream from Shadehill Reservoir with 53,800 AF of flood control space, the 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 feet 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 2016 Operations Summary

Shadehill Reservoir started WY 2016 at an elevation of 2,270.44 feet and storage of 112,506 AF, which is 1.56 feet and 7,666 AF below the top of the conservation pool. Precipitation for WY 2016 was 98 percent of average. Inflows for WY 2016 totaled 6,235 AF (8 percent of the average). Peak inflows occurred in February 2016 totaling 4,514 AF for the month. On October 1, 2015 the

peak reservoir elevation was 2,270.40 feet, storage of 112,314 AF. The minimum elevation was 2,263.64 feet, storage of 82,936 AF, and occurred on September 23, 2016. WY 2016 ended at an elevation of 2,263.90 feet and storage of 83,946 AF, which is 8.10 feet and 36,226 AF below the top of the conservation pool. Shadehill Reservoir ended WY 2016 with 40,077 AF in active storage. All irrigation demands were met from river maintenance releases. There were no storage releases for irrigation needed during WY 2016. An Emergency Action Plan Orientation Meeting was conducted on March 10, 2016. The AE for Shadehill Dam was conducted on July 20, 2016. There are no incomplete SOD Recommendations.

Monthly Statistics for WY 2016

Record monthly inflows were recorded in the following months: lowest for June 2016. Record end of month reservoir content were recorded in the following months: no storage records were achieved in WY 2016. Additional statistical information on Shadehill Reservoir and its operations during WY 2016 can be found on Table DKT10 and Figure DKG9.

TABLE DKT10
HYDROLOGIC DATA FOR WY 2016
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

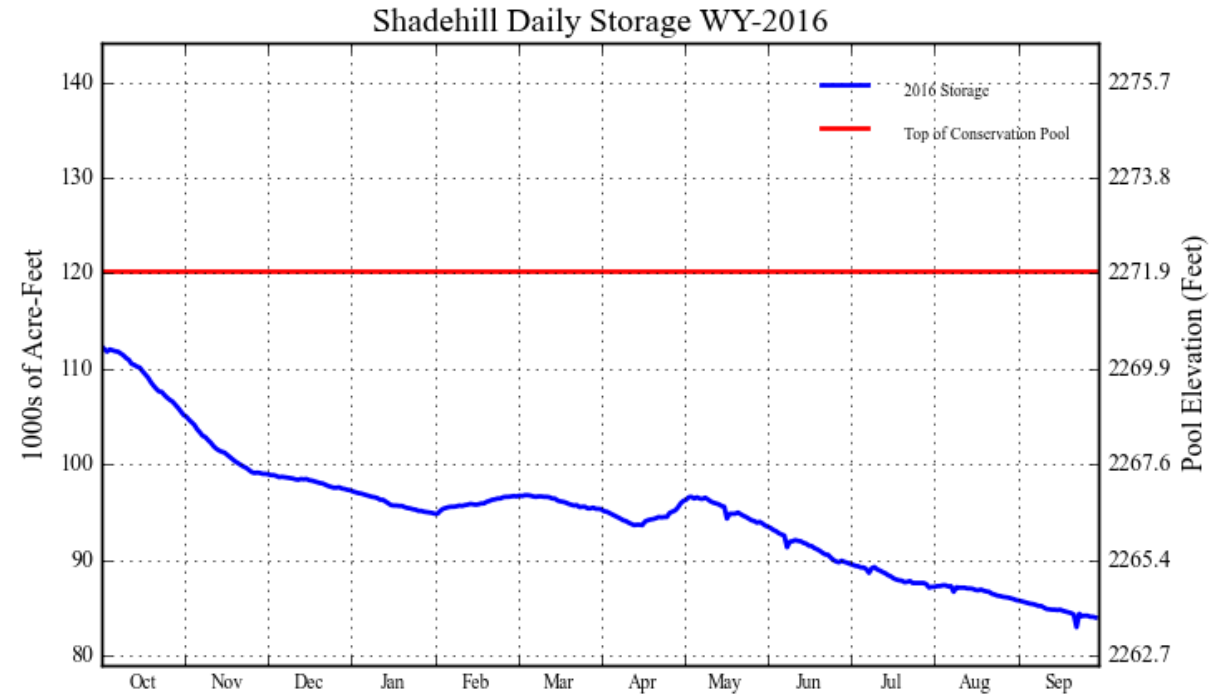
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE (end-of-day)
BEGINNING OF YEAR	2,270.44	112,506	OCT 01, 2015
END OF YEAR	2,263.90	112,506	SEP 30, 2016
ANNUAL LOW	2,263.64	100,324	SEP 23, 2016
ANNUAL HIGH	2,270.40	119,721	OCT 01, 2015
HISTORIC HIGH	2,297.90	318,438	APR 10, 1952

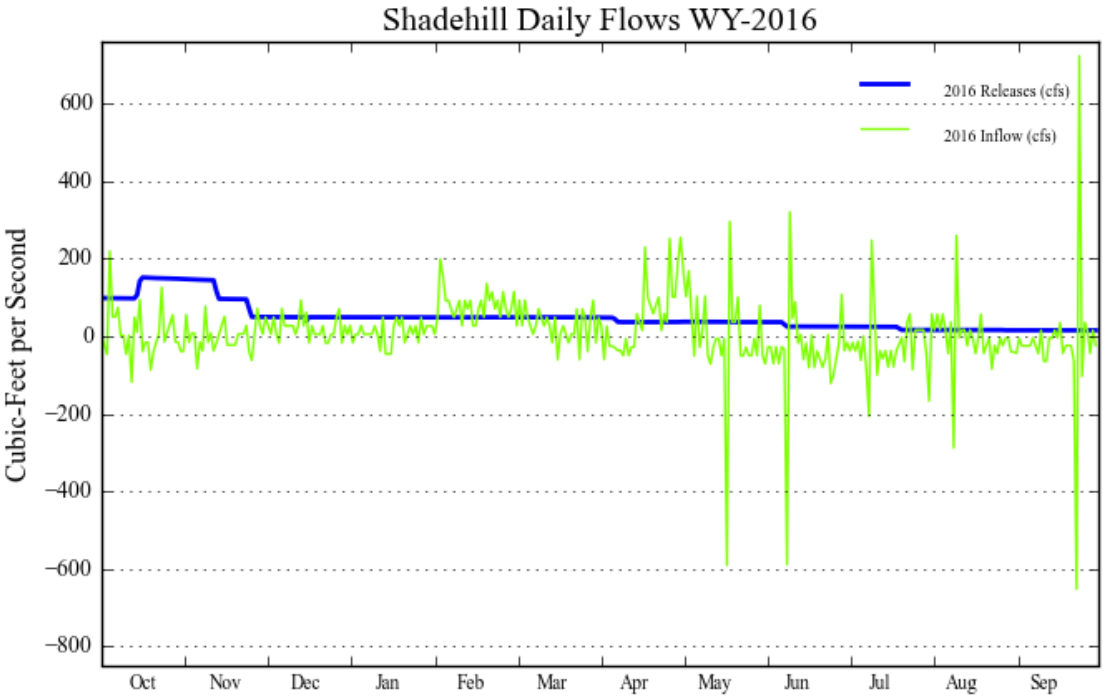
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	6,237	OCT 01-SEP	35,162	OCT 01-SEP 30
DAILY PEAK (CFS)	722	30	151	OCT 16, 2015
DAILY MINIMUM (CFS)	-652	SEP 24, 2016	15	SEP 24, 2016
		SEP 23, 2016		

MONTH	INFLOW		OUTFLOW		EOM CONTENT**	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	423	34	7,762	195	105,167	96
NOVEMBER	58	6	6,231	185	98,994	92
DECEMBER	1,283	160	2,994	118	97,283	92
JANUARY	513	51	2,978	123	94,818	91
FEBRUARY	4,514	136	2,790	129	96,542	92
MARCH	1,780	8	2,990	28	95,332	80
APRIL	2,441	12	2,331	13	95,462	79
MAY	587	5	2,256	22	93,793	77
JUNE	-2,380	-25	1,641	19	89,772	73
JULY	-1,683	-45	1,315	24	87,080	72
AUGUST	-273	-62	989	23	85,878	73
SEPTEMBER	-1,028	-1558	904	25	83,946	74
ANNUAL	6,235	8	35,161	47	93,672	82
APRIL-JULY	-1,035	-2	7,523	18	91,527	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 an elevation of 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 in excess of these amounts can be diverted into the reservoir and stored. If all of these rights are not needed, the District can divert flows into the reservoir.

Reclamation's Sedimentation and River Hydraulics Group, of the Technical Service Center in Denver, conducted a sedimentation survey of Belle Fourche Reservoir in 2006 and provided a survey report and new area-capacity tables 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-capacity tables were first used in WY 2008.

WY 2016 Operations Summary

Belle Fourche Reservoir started WY 2016 at an elevation of 2,966.60 feet and storage of 112,086 AF, which is 8.4 feet and 60,787 AF below the top of the conservation pool. Precipitation for WY 2016 was 92 percent of average. Inflows for WY 2016 totaled 71,577 AF, which was 62 percent of average. Peak inflows occurred in April 2016, totaling 14,545 AF for the month. The peak reservoir elevation for WY 2016 was 2,974.33 feet, storage of 167,527 AF, and occurred on May 9, 2016. The minimum elevation for WY 2016 was 2,957.05 feet, storage of 61,001 AF, and occurred on September 19, 2016. Belle Fourche Reservoir ended WY 2016 at an elevation of 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. Belle Fourche Reservoir ended WY 2016 with 60,758 AF in active storage.

The BFID had a water allotment of 21 inches for its irrigators. The North and South Canals were turned on May 19, 2016. Releases reached a peak of 278 cfs on July 24, 2016 for South Canal and a peak of 383 cfs on July 2, 2016 for North Canal. The North and South Canal was shut off September 21, 2016. Irrigation releases for WY 2016 were North Canal 39,811 AF, South Canal 26,108 AF, and Inlet Canal-Johnson Lateral 3,791 AF for a total of 69,711 AF. An EMSOE was conducted March 12, 2016.

Belle Fourche Reservoir went into IA status on April 29, 2016 after reaching an elevation of 2974.0 feet (top of active conservation elevation 2975.0 feet). The reservoir reached normal operating conditions on May 31, 2016 and was removed from IA status. The AE for Belle Fourche Reservoir was conducted on June 22, 2016. There are no incomplete SOD recommendations. Inlet Canal was shut down from the end of November 2015 to the beginning of March 2016. 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. R16PX00564, was awarded to J W Services LLC for $23,880.75. The contractor bladed the Belle Fourche Reservoir roads on two separate dates during the 2016 recreation season. The contract was completed on September 22, 2016.

Monthly Statistics for WY 2016

Record monthly inflows were recorded in the following months: lowest for February2016. Record end of month reservoir content were recorded in the following months: fifth highest for December 2015.

Additional statistical information on Belle Fourche Reservoir and its operations during WY 2016 can be found on Tabl 2016e DKT11 and Figure DKG10.

TABLE DKT11
HYDROLOGIC DATA FOR WY 2016
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			

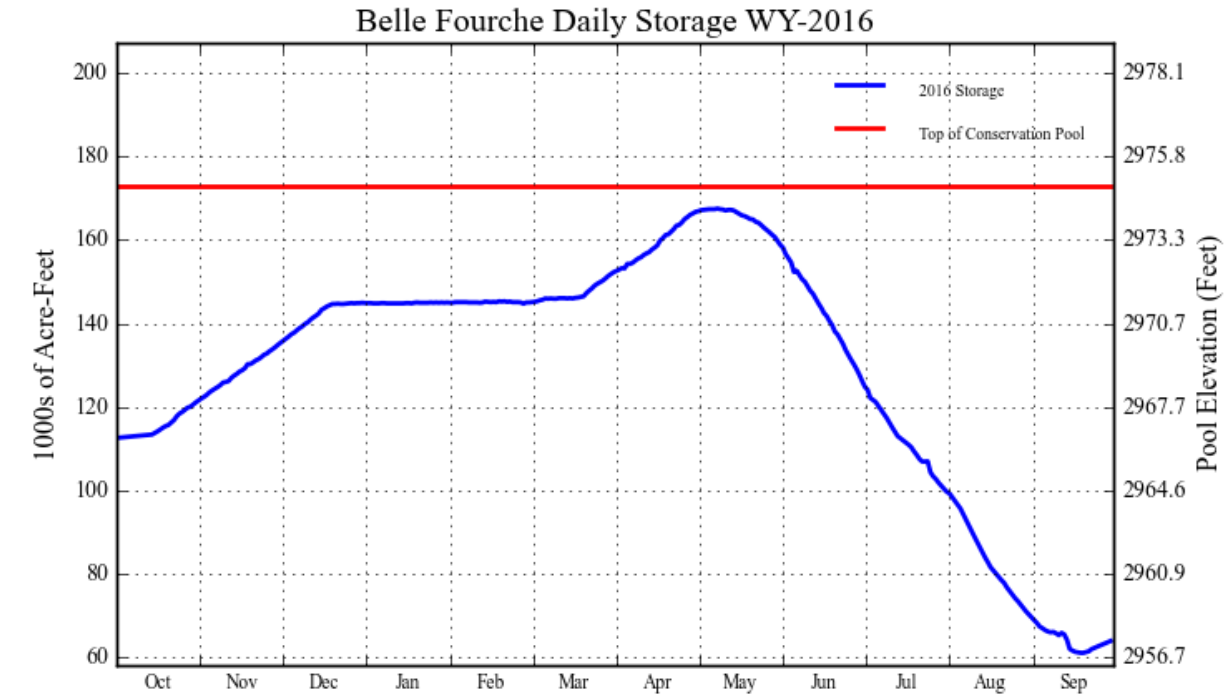
STORAGE-ELEVATION DATA	ELEVATION (FT)	STORAGE (AF)	DATE (end-of-day)
BEGINNING OF YEAR	2,966.60	112,086	OCT 01, 2015
END OF YEAR	2,957.68	63,841	SEP 30, 2016
ANNUAL LOW	2,957.05	61,001	SEP 19, 2016
ANNUAL HIGH	2,974.33	167,527	MAY 09, 2016
HISTORIC HIGH	2,975.92	196,792	MAY 30, 1996

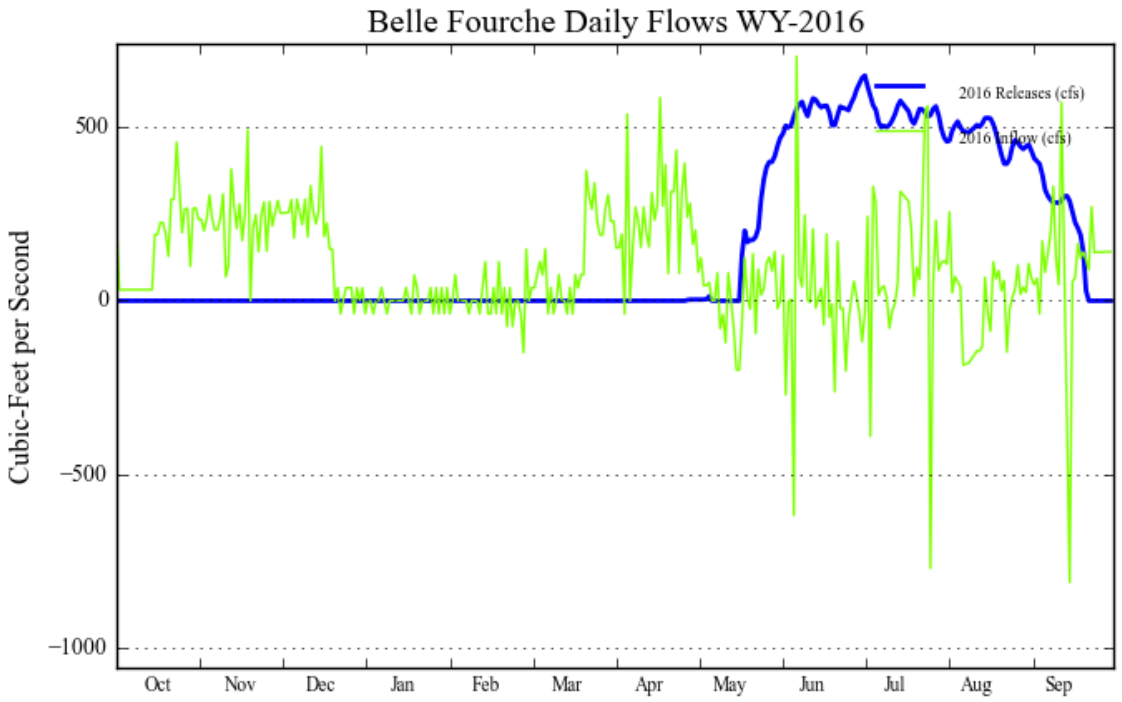
INFLOW-OUTFLOW DATA	INFLOW	DATE	OUTFLOW	DATE
ANNUAL TOTAL (AF)	67,038	OCT 01-SEP 30	114,932	OCT 01-SEP 30
DAILY PEAK (CFS)	704	JUN 07, 2016	649	JUL 02, 2016
DAILY MINIMUM (CFS)	-811	SEP 15, 2016	0	OCT 01, 2015

MONTH	INFLOW		OUTFLOW		EOM CONTENT**	
	AF	% OF AVG	AF	% OF AVG	AF	% OF AVG
OCTOBER	9,419	89	0	0	121,505	162
NOVEMBER	13,813	142	0	0	135,318	161
DECEMBER	9,539	106	0	0	144,856	156
JANUARY	73	1	0	0	144,929	142
FEBRUARY	74	1	0	0	145,003	130
MARCH	6,808	43	0	0	151,811	120
APRIL	14,545	106	17	4	166,339	119
MAY	1,298	9	7,865	107	159,772	109
JUNE	461	4	32,574	197	127,659	90
JULY	6,126	165	33,479	91	100,306	92
AUGUST	-578	-22	29,118	83	70,259	91
SEPTEMBER	9,999	204	11,878	69	63,841	99
ANNUAL	71,577	62	114,931	100	127,633	121
APRIL-JULY	22,430	51	73,935	121	138,519	103

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

Figure DKG10
Belle Fourche Reservoir





OPERATING PLANS
FOR

WATER YEAR 2017

FOR RESERVOIRS

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

UNDER THE RESPONSIBILITY

OF THE

MONTANA AREA OFFICE

OPERATING PLANS FOR WATER YEAR 2017

Clark Canyon Reservoir

Three operating plans were prepared for WY 2017 to show the operations of Clark Canyon Reservoir which could occur under various runoff conditions. These operations for the three runoff conditions are shown in Table MTT12A-C and Figure MTG13. These plans are presented only to show the probable limits of operations; therefore, unpredictable conditions may cause the actual operations to vary widely from the plans presented. Flood control operations will be coordinated with the Corps as specified by the Flood Control Regulations. The Corps will issue instructions on release rates when storage rises into or above the joint use space reserved for flood control.

The objectives of operations of Clark Canyon Reservoir are to meet all conservation commitments, to provide flood control in cooperation with the Corps, and meet fish, wildlife, and recreational needs. The reservoir is generally operated under the following criteria and limitations.

(1) During the fall and winter, releases are adjusted to allow storage to reach no higher than 154,195 AF at an elevation of 5542.10 by March 1.

(2) From inflow forecasts prepared during January through the end of the spring runoff season, considering current and anticipated snowpack, releases are adjusted to allow storage to fill to 174,367 AF at an elevation of 5546.10 feet during late May or early June.

(3) During May - September, reservoir releases are adjusted to meet downstream irrigation demands or to control storage in the flood pool if storage increases above the top of the joint use pool. If the Corps requests replacement storage, the reservoir is allowed to fill as high as 230,822 AF at an elevation of 5556.50 feet.

(4) Whenever an adequate water supply is available, releases from Clark Canyon Dam will be maintained at rates to sustain flows in the Beaverhead River below Clark Canyon Dam between 100-200 cfs. During below normal runoff years, it may be necessary to reduce the releases to as low as 25 cfs in the Beaverhead River below Clark Canyon Dam, the absolute minimum flow required to protect the river fishery.

(5) Whenever possible, stable flows are maintained during October through the spring to enhance the fish spawning conditions. Large fluctuations in winter releases will be avoided whenever possible to prevent flooding from occurring as a result of ice jams.

Storage in Lima Reservoir, a private facility located upstream of Clark Canyon Reservoir, ended WY 2016 at an elevation of 6565.50 feet or 19,800 AF, 66 percent of the 30 year average.

Depending on snowpack and storage conditions, Lima Reservoir may store much of the early season runoff during 2017 from the Red Rock River drainage.

The East Bench Unit Joint Board and Reclamation, with input from other interested parties, agreed to a winter release rate of 42 cfs with 5 cfs, or approximately 2,100 AF, being stored for a potential

spring 2017 flushing flow on the Beaverhead River. The total annual inflow to Clark Canyon Reservoir during WY 2016 was approximately 142,900 AF, 73 percent of the 30 year average. Storage on September 30, 2016, was 52,040 AF at an elevation of 5514.72 feet, 70 percent of the 30 year average.

Clark Canyon Reservoir is anticipated to fill during WY 2016 under the maximum probable runoff condition with full allotments and is expected to fill by late May. The reservoir water level under the most probable runoff condition, with full allotments, is anticipated to peak in early April, approximately 10.9 feet below the top of the joint-use pool. The reservoir water level under the minimum probable runoff condition, with full allotments, is expected to peak in early April, approximately 16.2 feet below the top of the joint-use pool.

Under the most, minimum, and maximum plans, the fall/winter release was set at 42 cfs as noted above. Irrigation shortages are expected to occur under the minimum plan and likely to occur under the most probable plan. The most probable inflows were estimated near the 25 percentile inflows or inflows that are historically exceeded 75 percent of the time. The minimum probable inflows were estimated near the 10 percentile inflow or inflows that are historically exceeded 90 percent of the time. The maximum probable inflows were estimated near the 30 to 50 percentile inflows or inflows that are historically exceeded 50 to 70 percent of the time.

TABLE MTT12
Clark Canyon Reservoir Operating Plan
Based on October 1, 2016 Inflow Estimates

2017 Minimum Probable **Plan with Full Irrigation Allotments**

Clark Canyon Reservoir		Initial Cont Elev	52.0 kaf 5514.70 ft			Maximum Cont Elev	310.1 kaf 5569.57 ft			Minimum Cont Elev	10.0 kaf 5489.22 ft		
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Monthly Inflow	kaf	10.0	10.2	9.6	9.6	8.4	10.0	7.9	6.3	9.6	10.6	8.0	8.1	108.3
River Release	kaf	2.6	2.5	2.6	2.6	2.3	2.6	2.5	20.9	34.9	44.5	24.2	8.1	150.3
River Release	cfs	42	42	42	42	41	42	42	340	587	724	394	136	
Excess Release	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gordon Spring Gain	kaf	1.5	1.5	1.5	1.5	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	17.9
End-Month Elevation	ft	5517.54	5520.23	5522.50	5524.63	5526.40	5528.44	5529.86	5525.89	5517.79	5502.14	5489.22	5489.22	
End-Month Content	kaf	59.4	67.1	74.1	81.1	87.2	94.6	100.0	85.4	60.1	26.2	10.0	10.0	
Net Change Content	kaf	7.4	7.7	7.0	7.0	6.1	7.4	5.4	-14.6	-25.3	-33.9	-16.2	0.0	-42.0
Diversions	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
East Bench Demand	kaf	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.80	9.40	11.88	7.23	4.37	38.68
East Bench Req Rels	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	17.1	21.6	13.1	7.9	70.2
CCWSCO Tot Demand	kaf	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.60	25.27	31.92	19.44	11.75	103.98
CCWSCO Deliv	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8	15.9	20.1	12.2	7.4	65.4
Non-proj Demand	kaf	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.33	5.39	6.81	4.15	2.51	22.19

2017 Most Probable **Plan with Full Irrigation Allotments**

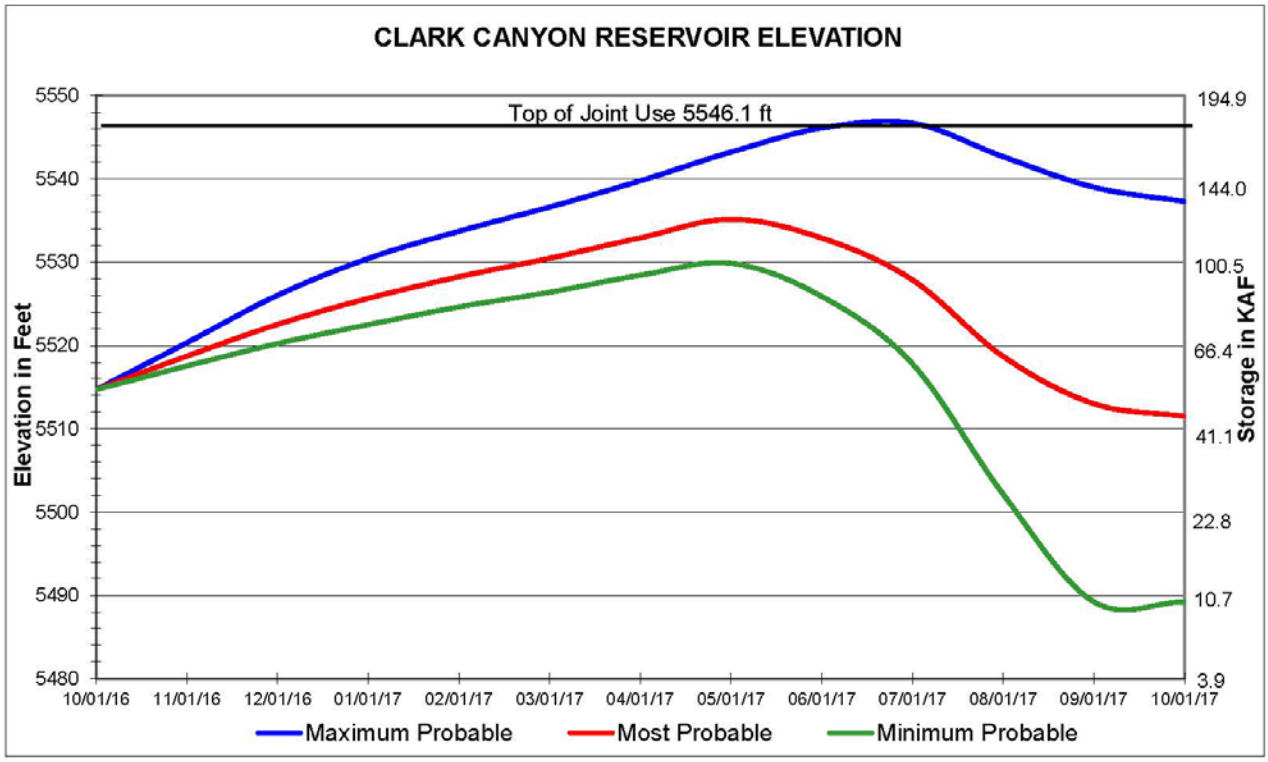
Clark Canyon Reservoir		Initial Cont Elev	52.0 kaf 5514.70 ft			Maximum Cont Elev	310.1 kaf 5569.57 ft			Minimum Cont Elev	10.0 kaf 5489.22 ft		
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Monthly Inflow	kaf	13.3	14.0	13.0	11.9	10.8	12.5	12.0	11.3	15.2	14.6	11.7	11.9	152.2
River Release	kaf	2.6	2.5	2.6	2.6	2.3	2.6	2.5	20.9	34.9	44.5	26.4	15.4	159.8
River Release	cfs	42	42	42	42	41	42	42	340	587	724	429	259	
Excess Release	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gordon Spring Gain	kaf	1.5	1.5	1.5	1.5	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	17.9
End-Month Elevation	ft	5518.72	5522.53	5525.66	5528.25	5530.48	5532.93	5535.16	5532.90	5527.87	5518.68	5513.01	5511.50	
End-Month Content	kaf	62.7	74.2	84.6	93.9	102.4	112.3	121.8	112.2	92.5	62.6	47.9	44.4	
Net Change Content	kaf	10.7	11.5	10.4	9.3	8.5	9.9	9.5	-9.6	-19.7	-29.9	-14.7	-3.5	-7.6
Diversions	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
East Bench Demand	kaf	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.80	9.40	11.88	7.23	4.37	38.68
East Bench Req Rels	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	17.1	21.6	13.1	7.9	70.2
CCWSCO Tot Demand	kaf	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.60	25.27	31.92	19.44	11.75	103.98
CCWSCO Deliv	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8	15.9	20.1	12.2	7.4	65.4
Non-proj Demand	kaf	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.33	5.39	6.81	4.15	2.51	22.19

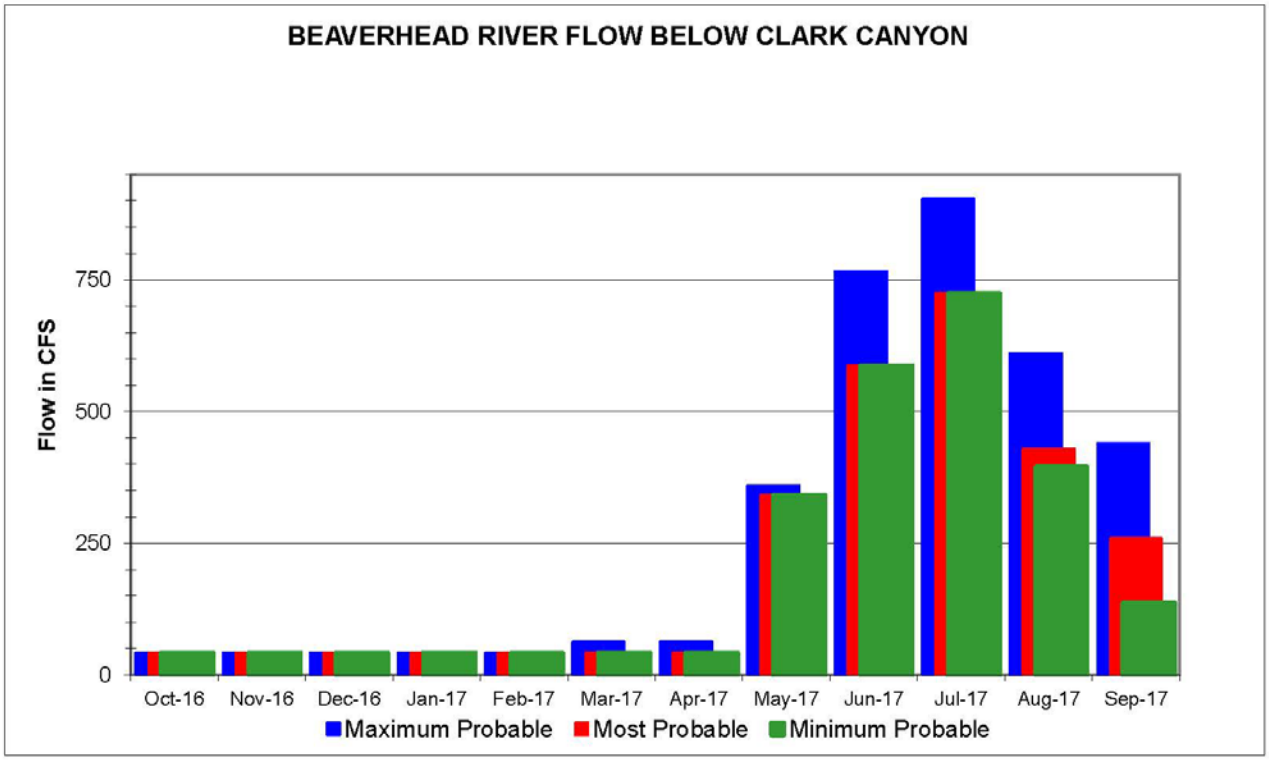
2017 Maximum Probable **Plan with Full Irrigation Allotments**

Clark Canyon Reservoir		Initial Cont Elev	52.0 kaf 5514.70 ft			Maximum Cont Elev	310.1 kaf 5569.57 ft			Minimum Cont Elev	10.0 kaf 5489.22 ft		
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Monthly Inflow	kaf	18.0	21.0	19.0	15.9	15.0	18.4	20.6	36.7	48.6	35.2	19.7	18.2	286.3
River Release	kaf	2.6	2.5	2.6	2.6	2.3	3.8	3.7	22.1	45.6	55.6	37.5	26.1	207.0
River Release	cfs	42	42	42	42	41	62	62	359	766	904	610	439	
Excess Release	kaf	0.0	0.0	0.0	0.0	0.0	1.2	1.2	1.2	10.7	11.1	11.1	10.7	47.2
Gordon Spring Gain	kaf	1.5	1.5	1.5	1.5	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	17.9
End-Month Elevation	ft	5520.33	5526.03	5530.45	5533.72	5536.63	5539.78	5543.23	5546.11	5546.69	5542.67	5539.00	5537.29	
End-Month Content	kaf	67.4	85.9	102.3	115.6	128.3	142.9	159.8	174.4	177.4	157.0	139.2	131.3	
Net Change Content	kaf	15.4	18.5	16.4	13.3	12.7	14.6	16.9	14.6	3.0	-20.4	-17.8	-7.9	79.3
Diversions	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
East Bench Demand	kaf	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.80	9.40	11.88	7.23	4.37	38.68
East Bench Req Rels	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	17.1	21.6	13.1	7.9	70.2
CCWSCO Tot Demand	kaf	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.60	25.27	31.92	19.44	11.75	103.98
CCWSCO Deliv	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8	15.9	20.1	12.2	7.4	65.4
Non-proj Demand	kaf	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.33	5.39	6.81	4.15	2.51	22.1

FIGURE MTG13

CLARK CANYON RESERVOIR





WATER YEAR 2017

Canyon Ferry Lake and Powerplant

Three operating plans were prepared for 2017 to demonstrate the operations of Canyon Ferry Lake which could occur under various runoff conditions. These operations for the three runoff conditions are shown in Tables MTT13A-C and Figure MTG14. These plans are presented only to show the probable limits of operations; therefore, actual conditions and operations could vary widely from the plans to comply with the authorized project purposes and the current general operating criteria established for Canyon Ferry Dam and Lake.

Power operations will be closely coordinated with Northwestern Energy as part of the formal Agreement to Coordinate Hydroelectric Power Operations, dated March 1972. Flood control operations will be coordinated with the Corps as specified by the Flood Control Regulations Report, dated March 1972. The Corps will issue instructions on release rates when storage rises into or above the joint use space reserved for flood control. Both of these documents are on file and available for review at MTAO.

The objectives of operations at Canyon Ferry are to meet all conservation commitments, to provide flood control in cooperation with the Corps, and to coordinate all operations with Northwestern Energy to achieve optimum benefits from the water resource. Except for special operations, the reservoir is generally operated under the following criteria and limitations:

(1) The top 3 feet between elevations 3797.0 feet (1,891,888 AF) and 3800.0 feet (1,992,977 AF) are used exclusively for downstream flood control and when storage rises into this pool, operation of the reservoir is directed by the Corps. This storage is generally evacuated as fast as downstream conditions permit.

(2) When storage has peaked, usually in June or July, power releases are adjusted so that the pool will be drawn to near elevation 3780-3782 feet (1,358,973-1,416,767 AF) by the beginning of the following April. Each month inflows are reevaluated and releases are adjusted accordingly. Releases to meet this schedule are limited to powerplant capacity. Water is generally not spilled to provide this drawdown.

(3) In accordance with operating procedures outlined in the license for the Madison-Missouri Hydro-electric Project, FERC Project No. 2188, most of the water stored in Hebgen Reservoir will be uniformly released from Hebgen during October through March. Releases during October and November may cause storage in Canyon Ferry Lake to rise slightly during these months. However, Northwestern Energy will try to limit the Hebgen Reservoir drawdown during these months in an effort to maintain Canyon Ferry Lake below an elevation of 3794.0 feet (1,792,884 AF) after the first of December. Storage below elevation 3794.0 feet (1,792,884 AF) prior to winter freeze-up is desired to reduce the potential for ice jam problems to occur at the head end of the lake.

(4) Beginning near the first of January and at least monthly thereafter through June, forecasts are made of the estimated spring runoff, considering existing and anticipated snowpack and precipitation data. When these forecasts become available, operational changes may be required. Releases are based on the most probable spring inflow forecast to allow the reservoir to fill to the top of the joint-use pool at an elevation of 3797.0 feet (1,891,888 AF) near the end of June. On

occasion, high spring runoff may result in the reservoir filling above the top of the joint-use pool to the top of the exclusive flood pool at an elevation of 3800.0 feet (1,992,997 AF).

(5) If spilling is required, it is made only to the extent current inflow and the reservoir content indicates additional spills are required. Attempts are made to limit river releases to 15,000 cfs or to full downstream channel capacity as long as space is available in the channel downstream of Canyon Ferry Dam.

(6) Canyon Ferry releases may draw the pool as low as an elevation of 3770 feet (1,097,599 AF). In a series of dry years, the pool may be drawn as low as an elevation of 3728 feet (396,031 AF) to meet firm power generation requirements and satisfy Northwestern Energy prior water rights. If storage is drawn below an elevation of 3728 feet (396,031 AF), the powerplant efficiency is affected. If emergency maintenance is required on the dam or powerplant, the reservoir may be required to be drawn lower than an elevation of 3728 feet (396,031 AF).

(7) Whenever adequate water supply is available, releases from Canyon Ferry Dam to the Missouri River will be made to meet the minimum desired flow of 4,100 cfs below Holter Dam, to minimize impacts to downstream river fisheries and recreation activities. During below normal runoff years, it may be necessary to reduce the releases to less than 4,100 cfs but no lower than 2,800 cfs to fulfill contractual obligations with Northwestern Energy.

Reservoir storage content at the end of WY 2016 was 1,485,407 AF at an elevation of 3784.3 feet, 95 percent of the 30 year average. September 2016 inflows were 72 percent of the 30 year average, while the monthly average release to the river was 3,575 cfs.

The most probable October and December inflows were estimated near the 12 percentile, inflows that historically have been exceeded 88 percent of the time. The January through April inflows were estimated near the 30 percentile, 70 percent exceedence. The May through September inflows were estimated near the 50 percentile, 50 percent exceedence.

Under the minimum probable, October through February inflows were estimated using the average of the record low inflows. The minimum probable March through September inflows were estimated at 10 percentile, 90 percent exceedence.

Under the maximum probable, October through February inflows were estimated between the 30 and 50 percentile, 50 to 70 percent exceedence. The maximum probable March through September inflows were estimated near the 75 percentile, 25 percent exeedence.

Based on the storage level on October 1, 2016, Canyon Ferry Reservoir would be expected to fill to the top of the joint-use pool at an elevation of 3797 feet by the end of June under the most probable and maximum probable runoff scenarios. However, under the minimum probable runoff scenario, releases from Canyon Ferry Reservoir to the Missouri River downstream of Holter Dam would have to be decreased and maintained near 3,200 cfs throughout the year to conserve storage and allow Canyon Ferry Reservoir to fill near an elevation of 3791.8 feet, about 5 feet below the top of the joint-use pool. Under the most probable runoff condition, releases to the Missouri River downstream of Holter Dam are started at 3,500 cfs in October and may increase to 3,700 cfs by

November. The flow of 4,100 cfs or greater are planned to be maintained from April throughout the remainder of the water year.

The average power generation produced at Canyon Ferry Powerplant during 1967-2016 is 378.5 million kilowatt-hours. Under the most probable runoff conditions, power generation produced at Canyon Ferry Powerplant during 2017 would be about 355.8 million kilowatt-hours. Under the minimum probable runoff condition, power generation would be about 251.5 million kilowatt-hours. Under the maximum probable runoff condition, power generation would be about 422.3 million kilowatt-hours.

TABLE MTT13A
Canyon Ferry Lake Monthly Operations
Based on October 1, 2016 Inflow Estimates
2017 Minimum Probable Plan

Canyon Ferry Reservoir		Initial Cont Elev	1485.4 kaf 3784.30 ft				Maximum Cont Elev	1993.0 kaf 3800.00 ft			Minimum Cont Elev	445.5 kaf 3732.31 ft	
2016		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Reservoir Inflow	kaf	163.8	190.0	170.0	165.0	169.0	203.0	234.0	295.0	348.0	139.7	91.0	125.0	2293.5
HV Canal Diversions	kaf	0.0	0.0	0.0	0.0	0.0	0.0	5.0	12.0	16.0	17.0	16.0	12.0	78.0
HV Pump Turbines	kaf	0.0	0.0	0.0	0.0	0.0	0.0	6.5	14.9	18.3	19.0	18.9	15.2	92.8
Turbine Release	kaf	191.3	184.3	189.1	192.2	169.4	186.3	175.0	180.3	162.4	171.2	173.9	171.0	2146.4
Turbine Release	cfs	3111	3097	3075	3126	3050	3030	2941	2932	2729	2784	2828	2874	
Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
River Release	kaf	191.3	184.3	189.1	192.2	169.4	186.3	181.5	195.2	180.7	190.2	192.8	186.2	2239.2
River Release	cfs	3111	3097	3075	3126	3050	3030	3050	3175	3037	3093	3136	3129	
Min Release	cfs	3111	3097	3075	3126	3050	3030	3050	3175	3037	3093	3136	3129	
Total Dam Release	kaf	191.3	184.3	189.1	192.2	169.4	186.3	186.5	207.2	196.7	207.2	208.8	198.2	2317.2
Total Dam Release	cfs	3111	3097	3075	3126	3050	3030	3134	3370	3306	3370	3396	3331	
End-Month Content	kaf	1457.9	1463.6	1444.5	1417.3	1416.9	1433.6	1481.1	1568.9	1720.2	1652.7	1534.9	1461.7	
End-Month Elevation	ft	3783.4	3783.6	3782.9	3782.0	3782.0	3782.6	3784.2	3787.0	3791.8	3789.7	3785.9	3783.5	
Net Change	kaf	-27.5	5.7	-19.1	-27.2	-0.4	16.7	47.5	87.8	151.3	-67.5	-117.8	-73.2	-23.7

Canyon Ferry Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Turbine Release	cfs	3111	3097	3075	3126	3050	3030	2941	2932	2729	2784	2828	2874	
Tailwater Elev	ft	3650.8	3650.7	3650.7	3650.8	3650.7	3650.7	3650.7	3650.8	3650.7	3650.7	3650.8	3650.8	
Average Head	ft	133.0	132.8	132.6	131.7	131.3	131.6	132.7	134.8	138.7	140.0	137.0	133.9	
Average Power	mw	30.3	30.1	29.8	30.2	29.3	29.1	28.2	28.4	26.6	27.5	27.5	27.6	
Average Kwh/Af		118	118	117	117	116	116	116	117	118	120	118	116	117
Generation	gwh	22.543	21.672	22.171	22.469	19.690	21.650	20.304	21.130	19.152	20.460	20.460	19.872	251.573
End-Month Power Cap	mw	57	57	57	56	56	57	57	57	57	57	57	57	

Hauser	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Missouri Gain	kaf	4.0	4.8	7.1	4.5	7.2	8.6	7.8	0.4	1.9	1.9	0.9	1.8	50.9
End-Month Content	kaf	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	
Release	kaf	195.3	189.1	196.2	196.7	176.6	194.9	189.3	195.6	182.6	192.1	193.7	188.0	2290.1
Release	cfs	3176	3178	3191	3199	3180	3170	3181	3181	3069	3124	3150	3159	
Turbine Release	cfs	3176	3178	3191	3199	3180	3170	3181	3181	3069	3124	3150	3159	
Turbine Bypass	cfs	0	0	0	0	0	0	0	0	0	0	0	0	
Generation	gwh	8.223	7.963	8.262	8.283	7.437	8.208	7.970	8.236	7.690	8.088	8.156	7.915	96.431

Holter	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Missouri Gain	kaf	1.5	1.3	0.6	0.1	1.1	1.9	1.1	1.2	7.8	4.7	3.1	2.4	26.8
End-Month Content	kaf	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	
Release	kaf	196.8	190.4	196.8	196.8	177.7	196.8	190.4	196.8	190.4	196.8	196.8	190.4	2316.9
Release	cfs	3201	3200	3201	3201	3200	3201	3200	3201	3200	3201	3201	3200	
Min Release	cfs	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	
Turbine Release	cfs	3201	3200	3201	3201	3200	3201	3200	3201	3200	3201	3201	3200	
Turbine Bypass	cfs	0	0	0	0	0	0	0	0	0	0	0	0	
Generation	gwh	16.766	16.220	16.766	16.766	15.139	16.766	16.220	16.766	16.220	16.766	16.766	16.220	197.381

TABLE MTT13B
Canyon Ferry Lake Monthly Operations
Based on October 1, 2016 Inflow Estimates
2017 Most Probable Plan

Canyon Ferry Reservoir		Initial Cont Elev	1485.4 kaf 3784.30 ft			Maximum Cont Elev	1993.0 kaf 3800.00 ft			Minimum Cont Elev	445.5 kaf 3732.31 ft		
2016		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Reservoir Inflow	kaf	197.0	213.0	192.0	189.0	185.0	224.0	279.0	543.0	762.0	287.0	147.0	201.0	3419.0
HV Canal Diversions	kaf	0.0	0.0	0.0	0.0	0.0	0.0	11.0	18.4	17.0	18.4	18.4	12.0	95.2
HV Pump Turbines	kaf	0.0	0.0	0.0	0.0	0.0	0.0	14.5	22.5	18.2	18.4	19.1	13.0	105.7
Turbine Release	kaf	204.0	210.4	217.6	216.9	194.0	216.3	218.2	337.0	308.8	268.9	225.3	221.7	2839.1
Turbine Release	cfs	3318	3536	3539	3528	3493	3518	3667	5481	5189	4373	3664	3726	
Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	149.7	0.0	0.0	0.0	152.7
River Release	kaf	204.0	210.4	217.6	216.9	194.0	216.3	232.7	362.5	476.7	287.3	244.4	234.7	3097.5
River Release	cfs	3318	3536	3539	3528	3493	3518	3911	5895	8011	4672	3975	3944	
Min Release	cfs	3318	3536	3539	3528	3493	3518	3911	3959	3707	3981	3975	3944	
Total Dam Release	kaf	204.0	210.4	217.6	216.9	194.0	216.3	243.7	380.9	493.7	305.7	262.8	246.7	3192.7
Total Dam Release	cfs	3318	3536	3539	3528	3493	3518	4096	6195	8297	4972	4274	4146	
End-Month Content	kaf	1478.4	1481.0	1455.4	1427.5	1418.5	1426.2	1461.5	1623.6	1891.9	1873.2	1757.4	1711.7	
End-Month Elevation	ft	3784.1	3784.2	3783.3	3782.4	3782.1	3782.3	3783.5	3788.7	3797.0	3796.4	3792.9	3791.5	
Net Change	kaf	-7.0	2.6	-25.6	-27.9	-9.0	7.7	35.3	162.1	268.3	-18.7	-115.8	-45.7	226.3

Canyon Ferry Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Turbine Release	cfs	3318	3536	3539	3528	3493	3518	3667	5481	5189	4373	3664	3726	
Tailwater Elev	ft	3650.8	3650.8	3650.8	3650.8	3650.8	3650.8	3650.8	3651.1	3651.3	3650.9	3650.8	3650.8	
Average Head	ft	133.4	133.3	132.9	132.0	131.4	131.4	132.1	135.1	141.6	145.8	143.9	141.4	
Average Power	mw	32.9	35.6	35.5	35.2	34.6	34.9	36.8	56.7	56.7	48.9	39.5	39.7	
Average Kwh/Af		120	122	121	121	120	120	121	125	132	135	130	129	125
Generation	gwh	24.478	25.632	26.412	26.189	23.251	25.966	26.496	42.185	40.824	36.382	29.388	28.584	355.787
End-Month Power Cap	mw	57	57	57	56	56	56	57	57	57	57	57	57	

Hauser	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Missouri Gain	kaf	9.1	8.4	8.8	9.0	9.3	10.2	9.0	5.4	13.1	1.3	3.3	5.2	92.1
End-Month Content	kaf	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	
Release	kaf	213.1	218.8	226.4	225.9	203.3	226.5	241.7	367.9	489.8	288.6	247.7	239.9	3189.6
Release	cfs	3466	3677	3682	3674	3661	3684	4062	5983	8231	4694	4028	4032	
Turbine Release	cfs	3466	3677	3682	3674	3661	3684	4062	4740	4740	4694	4028	4032	
Turbine Bypass	cfs	0	0	0	0	0	0	0	1243	3491	0	0	0	
Generation	gwh	8.974	9.213	9.533	9.512	8.561	9.538	10.178	12.272	11.877	12.153	10.429	10.103	122.343

Holter	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Missouri Gain	kaf	2.1	1.4	1.1	1.6	2.2	1.0	2.3	3.3	10.3	6.0	4.4	4.1	39.8
End-Month Content	kaf	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	
Release	kaf	215.2	220.2	227.5	227.5	205.5	227.5	244.0	371.2	500.1	294.6	252.1	244.0	3229.4
Release	cfs	3500	3701	3700	3700	3700	3700	4101	6037	8404	4791	4100	4101	
Min Release	cfs	3500	3700	3700	3700	3700	3700	4100	4100	4100	4100	4100	4100	
Turbine Release	cfs	3500	3701	3700	3700	3700	3700	4101	6037	7100	4791	4100	4101	
Turbine Bypass	cfs	0	0	0	0	0	0	0	0	1304	0	0	0	
Generation	gwh	18.332	18.760	19.380	19.380	17.504	19.380	20.787	31.620	35.988	25.094	21.475	20.787	268.487

TABLE MTT13C
Canyon Ferry Lake Monthly Operations
Based on October 1, 2016 Inflow Estimates
2017 Maximum Probable Plan

Canyon Ferry Reservoir — Initial Cont 1485.4 kaf — Maximum Cont 1993.0 kaf — Minimum Cont 445.5 kaf
Elev 3784.30 ft — Elev 3800.00 ft — Elev 3732.31 ft

2016		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Reservoir Inflow	kaf	230.3	248.0	243.0	206.0	211.0	289.0	389.0	694.0	959.0	433.0	206.0	245.0	4353.3
HV Canal Diversions	kaf	0.0	0.0	0.0	0.0	0.0	0.0	11.0	18.4	17.0	18.4	18.4	12.0	95.2
HV Pump Turbines	kaf	0.0	0.0	0.0	0.0	0.0	0.0	14.9	23.4	18.4	18.3	18.8	12.8	106.6
Turbine Release	kaf	198.5	232.7	240.7	283.8	256.4	283.8	336.5	343.7	311.3	310.3	275.1	258.1	3330.9
Turbine Release	cfs	3228	3911	3915	4616	4617	4616	5655	5589	5231	5046	4474	4338	
Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	48.4	117.0	306.9	86.0	0.0	0.0	558.3
River Release	kaf	198.5	232.7	240.7	283.8	256.4	283.8	399.8	484.1	636.6	414.6	293.9	270.9	3995.8
River Release	cfs	3228	3911	3915	4616	4617	4616	6719	7873	10698	6743	4780	4553	
Min Release	cfs	3228	3911	3915	3915	3833	3825	3850	3711	3284	3731	3807	3838	
Total Dam Release	kaf	198.5	232.7	240.7	283.8	256.4	283.8	410.8	502.5	653.6	433.0	312.3	282.9	4091.0
Total Dam Release	cfs	3228	3911	3915	4616	4617	4616	6904	8172	10984	7042	5079	4754	
End-Month Content	kaf	1517.2	1532.5	1534.8	1457.0	1411.6	1416.8	1395.0	1586.5	1891.9	1891.9	1785.6	1747.7	
End-Month Elevation	ft	3785.3	3785.8	3785.9	3783.4	3781.8	3782.0	3781.3	3787.6	3797.0	3797.0	3793.8	3792.6	
Net Change	kaf	31.8	15.3	2.3	-77.8	-45.4	5.2	-21.8	191.5	305.4	0.0	-106.3	-37.9	262.3

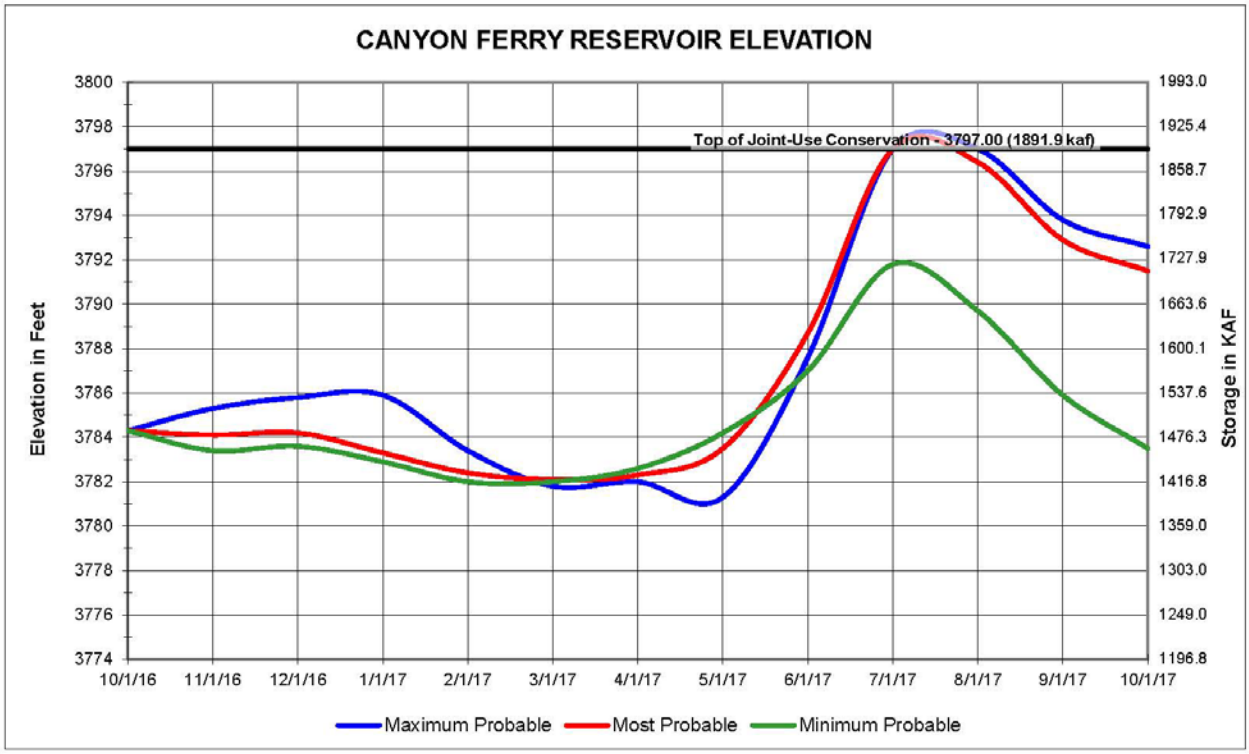
Canyon Ferry Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Turbine Release	cfs	3228	3911	3915	4616	4617	4616	5655	5589	5231	5046	4474	4338	
Tailwater Elev	ft	3650.8	3650.8	3650.8	3650.9	3650.9	3650.9	3651.2	3651.3	3651.8	3651.2	3650.9	3650.9	
Average Head	ft	134.0	134.8	135.1	133.7	131.7	131.0	130.4	133.2	140.5	145.8	144.5	142.3	
Average Power	mw	32.0	40.4	40.5	48.0	47.3	47.1	55.9	56.7	56.7	56.7	49.8	47.5	
Average Kwh/Af		120	125	125	126	124	123	120	123	131	136	135	133	127
Generation	gwh	23.808	29.088	30.132	35.712	31.786	35.042	40.248	42.185	40.824	42.185	37.051	34.200	422.261
End-Month Power Cap	mw	57	57	57	57	56	56	56	57	57	57	57	57	

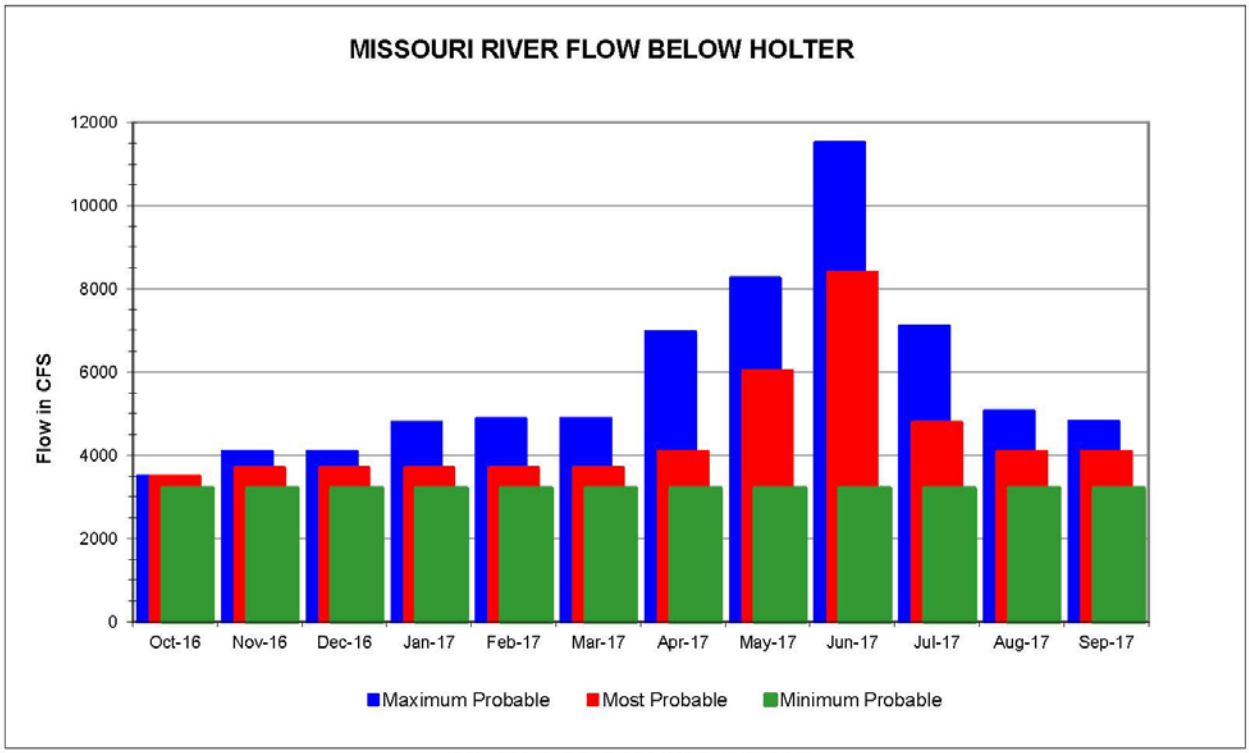
Hauser	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Missouri Gain	kaf	13.0	9.3	9.4	8.9	11.9	13.3	11.8	17.2	34.1	13.3	10.8	10.0	163.0
End-Month Content	kaf	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	64.2	
Release	kaf	211.5	242.0	250.1	292.7	268.3	297.1	411.6	501.3	670.7	427.9	304.7	280.9	4158.8
Release	cfs	3440	4067	4067	4760	4831	4832	6917	8153	11271	6959	4955	4721	
Turbine Release	cfs	3440	4067	4067	4740	4740	4740	4740	4740	4740	4740	4740	4721	
Turbine Bypass	cfs	0	0	0	20	91	92	2177	3413	6531	2219	215	0	
Generation	gwh	8.907	10.190	10.530	12.272	11.085	12.272	11.877	12.272	11.877	12.272	12.272	11.829	137.655

Holter	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Missouri Gain	kaf	3.7	2.0	2.0	2.5	2.9	3.6	3.1	6.7	14.5	9.4	7.2	5.6	63.2
End-Month Content	kaf	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	
Release	kaf	215.2	244.0	252.1	295.2	271.2	300.7	414.7	508.0	685.2	437.3	311.9	286.5	4222.0
Release	cfs	3500	4101	4100	4801	4883	4890	6969	8262	11515	7112	5073	4815	
Min Release	cfs	3500	4100	4100	4100	4100	4100	4100	4100	4100	4100	4100	4100	
Turbine Release	cfs	3500	4101	4100	4801	4883	4890	6969	7100	7100	7100	5073	4815	
Turbine Bypass	cfs	0	0	0	0	0	0	0	1162	4415	12	0	0	
Generation	gwh	18.332	20.787	21.475	25.146	23.101	25.613	35.324	37.188	35.988	37.188	26.571	24.406	331.119

FIGURE MTG14

CANYON FERRY RESERVOIR





WATER YEAR 2017

Gibson Reservoir

Three operating plans were prepared for 2017 to show the operations of Gibson Reservoir which could occur under various conditions. These plans are shown in Table MTT14A-C and Figure MTG15. The plans are presented only to show the probable limits of operations; therefore, actual operations may vary widely from these plans.

The primary objective of operations at Gibson Reservoir is to provide irrigation water to the Sun River Project. Gibson Reservoir is operated under the following criteria and limitations:

(1) Beginning near the first of January and at least monthly thereafter through June, forecasts are made of the estimated spring inflow from existing and anticipated snowpack and precipitation. When these forecasts become available, the Facility Operation and Maintenance Division provides assistance to Greenfields Irrigation District to prevent storage content in Gibson Reservoir from exceeding an elevation of 4724.0 feet until the peak of the spring runoff has passed.

(2) The spillway crest elevation is 4712.0 feet (83,248 AF). The spillway gates will remain open until after the peak inflow has occurred. The remaining 12 feet of storage shall be filled with recession inflows. This will normally occur during mid to late June or early July.

(3) Once Gibson Reservoir has filled or reached its maximum level during spring runoff (normally late June), releases are set to maintain the reservoir at or below an elevation of 4724.0 feet.

(4) After the spring runoff is over, releases during the remainder of the irrigation season from July through mid-October are adjusted as necessary to meet the irrigation demands of the Sun River Project.

(5) When irrigation demands on the Sun River Project place heavy demands on storage in Gibson Reservoir, the reservoir should not be drafted lower than an elevation of 4609.0 feet (5,148 AF) to prevent sediment from being flushed through the reservoir protecting the water quality of the Sun River downstream of the dam.

(6) During the non-irrigation season, Gibson Reservoir should be maintained below an elevation of 4712.0 feet (83,248 AF) to provide incidental flood control. During most years, Gibson Reservoir is generally maintained below an elevation of 4700.9 feet (70,000 AF). When normal or above normal inflow is forecast, the end-of-April target storage content is 55,000 AF. When below normal inflow is forecast, the end-of-April target storage content can be increased but set no higher than 70,000 AF.

(7) Whenever an adequate water supply is available, releases from Gibson Reservoir will be maintained at rates to sustain flows in the Sun River below Sun River Diversion Dam at 100 cfs or higher and in the river below the Fort Shaw Diversion Dam at 50 cfs or higher. This is normally required to achieve the desired end-of-April content and minimize impacts to downstream river fisheries and recreation activities. During below normal runoff years, it may be necessary to

reduce the releases to as low as 50 cfs in the Sun River below the Sun River Diversion Dam, the absolute minimum flow required to protect the river fishery.

(8) Releases during July-September are made as necessary to meet irrigation requirements.

During September the average inflow was approximately 175 cfs. Gibson Reservoir ended WY 2016 with a content of 5,371 AF of storage at an elevation of 4609.77 feet on September 30, 2016. This was 28 percent of average and 5 percent of normal full. The total inflow for Gibson Reservoir during WY 2016 was approximately 431,600 AF, 81 percent of the 30 year average.

The most probable October through March inflows to Gibson Reservoir were estimated based upon record low inflows. The October inflows start at 63 percent of the 30 year average and gradually trend towards 85 percent of average by May. The April and September inflows were estimated at the 85 percent of the 30 year average, or flows near the 25 to 30 percentile.

The minimum probable October through March inflows to Gibson Reservoir were estimated to be near the record low. The April through September flows are estimated to be near the 10 to 15 percentile flows, 85 to 90 percent exceedence.

The maximum probable October through February inflows to Gibson Reservoir were estimated near the 30 to 35 percentiles, 65 to 70 percent exeedence. The March inflow was estimated at the 30 year average with a gradual increase to 120 percent of average by May. The remainder of 2017 is estimated at 120 percent of the 30 year average inflow.

Gibson Reservoir is expected to fill to the top of the conservation pool at an elevation of 4724.0 feet (98,688 AF) under the most and maximum probable runoff scenarios. The storage content of Gibson Reservoir on September 30, 2016 was sufficient to maintain a winter release of approximately 75 to 100 cfs over the Sun River Diversion Dam. These flow rates vary with runoff and snowpack conditions.

TABLE MTT14A
Gibson Reservoir Monthly Operations
Based on October 1, 2016 Inflow Estimates
2017 Minimum Probable Plan

Gibson Reservoir		Initial Cont Elev	5.5 kaf 4610.19 ft			Maximum Cont Elev	98.7 kaf 4724.01 ft			Minimum Cont Elev	5.0 kaf 4608.47 ft		
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Monthly Inflow	kaf	9.0	9.2	8.3	8.7	8.2	9.5	30.0	98.0	89.0	34.0	16.0	11.0	330.9
Spillway Rels	cfs	0	0	0	0	0	0	0	0	0	0	0	0	
Total Release	kaf	9.2	7.8	3.1	3.0	2.8	2.5	31.3	60.4	83.2	101.1	16.0	11.0	331.4
Total Release	cfs	150	131	50	49	50	41	526	982	1398	1644	260	185	
End-Month Content	kaf	5.3	6.7	11.9	17.6	23.0	30.0	28.7	66.3	72.1	5.0	5.0	5.0	
End-Month Elevation	ft	4609.53	4613.63	4625.74	4636.80	4646.15	4656.99	4655.08	4697.54	4702.69	4608.47	4608.47	4608.47	
End-Month Area	acre	294.5	377.3	477.9	549.3	605.7	688.5	672.9	1100.5	1151.5	271.7	271.7	271.7	
Net Change Content	kaf	-0.2	1.4	5.2	5.7	5.4	7.0	-1.3	37.6	5.8	-67.1	0.0	0.0	-0.5

Sun River Div Dam	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Gain Below Gibson	cfs	20	20	24	26	25	34	57	184	215	78	29	22	
Rels to WFC	cfs	75	76	0	0	0	0	76	65	0	0	0	0	
Rels to PSC	cfs	0	0	0	0	0	0	457	1051	1333	1173	239	156	
Total Diversion	kaf	4.6	4.5	0.0	0.0	0.0	0.0	31.7	68.6	79.3	72.1	14.7	9.3	284.8
Total Diversion	cfs	75	76	0	0	0	0	533	1116	1333	1173	239	156	
Flow Over Div Dam	kaf	5.8	4.5	4.6	4.6	4.2	4.6	3.0	3.1	16.7	33.8	3.1	3.0	91.0
Flow Over Div Dam	cfs	94	76	75	75	76	75	50	50	281	550	50	50	

Willow Crk Operations		Initial Cont Elev	16.8 kaf 4130.49 ft			Maximum Cont Elev	31.9 kaf 4142.04 ft			Minimum Cont Elev	0.1 kaf 4093.42 ft		
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Native Inflow	kaf	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2
Total Inflow	kaf	3.9	3.8	0.0	0.0	0.0	0.1	3.9	3.4	0.0	0.0	0.0	0.0	15.1
WCR Dam Rels	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	25.2	2.0	28.1
End-Month Content	kaf	20.7	24.5	24.5	24.5	24.5	24.6	28.5	31.9	31.9	31.0	5.8	3.8	
End-Month Elevation	ft	4133.85	4136.76	4136.76	4136.76	4136.76	4136.84	4139.67	4142.04	4142.04	4141.42	4117.07	4112.89	
Net Change Content	kaf	3.9	3.8	0.0	0.0	0.0	0.1	3.9	3.4	0.0	-0.9	-25.2	-2.0	-13.0

Pishkun Operations		Initial Cont Elev	20.1 kaf 4347.31 ft			Maximum Cont Elev	46.8 kaf 4370.07 ft			Minimum Cont Elev	16.0 kaf 4341.99 ft		
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Rels to PSC	kaf	0.0	0.0	0.0	0.0	0.0	0.0	27.2	64.6	79.3	72.1	14.7	9.3	267.2
Total Inflow	kaf	0.0	0.0	0.0	0.0	0.0	0.0	23.1	51.7	65.0	61.3	12.5	7.9	221.5
PSH Dam Rels	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.0	65.0	85.0	19.5	7.9	224.4
End-Month Content	kaf	20.1	19.9	19.7	19.5	19.3	19.1	42.0	46.7	46.7	23.0	16.0	16.0	
End-Month Elevation	ft	4347.31	4347.07	4346.82	4346.58	4346.33	4346.08	4366.83	4370.00	4370.00	4350.69	4341.99	4341.99	
Net Change Content	kaf	0.0	-0.2	-0.2	-0.2	-0.2	-0.2	22.9	4.7	0.0	-23.7	-7.0	0.0	-4.1

Greenfields Irrig	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
GID Demand	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.0	65.0	85.0	48.0	18.0	263.0
GID Delivery	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.0	65.0	85.0	19.5	7.9	224.4

River Blw Div Dam	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Flow Over Div Dam	cfs	94	76	75	75	76	75	50	50	281	550	50	50	
PSC Return Flow	cfs	0	0	0	0	0	0	55	168	192	174	36	24	
WCR Dam Rels	cfs	0	0	0	0	0	0	0	0	0	15	410	34	
Sr Demand Above	kaf	1.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	12.9	13.3	13.3	2.0	50.2
Sr Demand Below	kaf	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	10.6	18.0	14.1	2.0	46.6
Flow @ Ft.Shaw Div	cfs	76	84	88	89	92	99	155	190	185	236	207	50	
Ft Shaw Demand	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.7	7.9	8.0	11.4	9.6	0.0	37.6
Ft Shaw Tot Deliv	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.7	7.9	8.0	11.4	9.6	0.0	37.6
Flow blw Ft. Shaw	cfs	76	84	88	89	92	99	143	62	50	50	50	50	

TABLE MTT14B
Gibson Reservoir Monthly Operations
Based on October 1, 2016 Inflow Estimates
2017 Most Probable Plan

Gibson Reservoir		Initial Cont	5.5 kaf	Maximum Cont	98.7 kaf	Minimum Cont	5.0 kaf						
		Elev	4610.19 ft	Elev	4724.01 ft	Elev	4608.47 ft						
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Monthly Inflow	kaf	10.2	10.7	9.2	9.5	8.5	11.9	45.0	149.0	155.0	57.0	24.0	16.0	506.0
Spillway Rels	cfs	0	0	0	0	0	0	0	0	0	0	0	0	
Total Release	kaf	8.0	7.8	3.1	3.0	2.8	2.5	25.4	108.2	155.0	113.2	61.5	16.0	506.5
Total Release	cfs	130	131	50	49	50	41	427	1760	2605	1841	1000	269	
End-Month Content	kaf	7.7	10.6	16.7	23.2	28.9	38.3	57.9	98.7	98.7	42.5	5.0	5.0	
End-Month Elevation	ft	4616.19	4622.95	4635.15	4646.48	4655.38	4668.29	4689.64	4724.01	4724.01	4673.43	4608.47	4608.47	
End-Month Area	acre	403.7	454.4	539.5	607.8	675.3	785.9	1030.7	1334.0	1334.0	851.3	271.7	271.7	
Net Change Content	kaf	2.2	2.9	6.1	6.5	5.7	9.4	19.6	40.8	0.0	-56.2	-37.5	0.0	-0.5

Sun River Div Dam	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Gain Below Gibson	cfs	20	20	24	26	25	34	57	184	215	78	29	22	
Rels to WFC	cfs	75	76	0	0	0	0	50	75	20	0	0	0	
Rels to PSC	cfs	0	0	0	0	0	0	358	1153	1333	1360	597	215	
Total Diversion	kaf	4.6	4.5	0.0	0.0	0.0	0.0	24.3	75.5	80.5	83.6	36.7	12.8	322.5
Total Diversion	cfs	75	76	0	0	0	0	408	1228	1353	1360	597	215	
Flow Over Div Dam	kaf	4.6	4.5	4.6	4.6	4.2	4.6	4.5	44.0	87.3	34.4	26.6	4.5	228.4
Flow Over Div Dam	cfs	75	76	75	75	76	75	76	716	1467	559	433	76	

Willow Crk Operations		Initial Cont	16.8 kaf	Maximum Cont	31.9 kaf	Minimum Cont	0.1 kaf						
		Elev	4130.49 ft	Elev	4142.04 ft	Elev	4093.42 ft						
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Native Inflow	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Inflow	kaf	3.9	3.8	0.0	0.0	0.0	0.0	2.5	3.9	1.0	0.0	0.0	0.0	15.1
WCR Dam Rels	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	12.5	20.4
End-Month Content	kaf	20.7	24.5	24.5	24.5	24.5	24.5	27.0	30.9	31.9	31.9	24.0	11.5	
End-Month Elevation	ft	4133.85	4136.76	4136.76	4136.76	4136.76	4136.76	4138.59	4141.35	4142.04	4142.04	4136.39	4125.03	
Net Change Content	kaf	3.9	3.8	0.0	0.0	0.0	0.0	2.5	3.9	1.0	0.0	-7.9	-12.5	-5.3

Pishkun Operations		Initial Cont	20.1 kaf	Maximum Cont	46.8 kaf	Minimum Cont	16.0 kaf						
		Elev	4347.31 ft	Elev	4370.07 ft	Elev	4341.99 ft						
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Rels to PSC	kaf	0.0	0.0	0.0	0.0	0.0	0.0	21.3	70.9	79.3	83.6	36.7	12.8	304.6
Total Inflow	kaf	0.0	0.0	0.0	0.0	0.0	0.0	18.1	56.7	65.0	71.1	31.2	10.9	253.0
PSH Dam Rels	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.0	65.0	85.0	48.0	10.9	255.9
End-Month Content	kaf	20.1	19.9	19.7	19.5	19.3	19.1	37.0	46.7	46.7	32.8	16.0	16.0	
End-Month Elevation	ft	4347.31	4347.07	4346.82	4346.58	4346.33	4346.08	4363.28	4370.00	4370.00	4360.05	4341.99	4341.99	
Net Change Content	kaf	0.0	-0.2	-0.2	-0.2	-0.2	-0.2	17.9	9.7	0.0	-13.9	-16.8	0.0	-4.1

Greenfields Irrig	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
GID Demand	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.0	65.0	85.0	48.0	18.0	263.0
GID Delivery	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.0	65.0	85.0	48.0	10.9	255.9

River Blw Div Dam	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Flow Over Div Dam	cfs	75	76	75	75	76	75	76	716	1467	559	433	76	
PSC Return Flow	cfs	0	0	0	0	0	0	44	185	217	203	89	32	
WCR Dam Rels	cfs	0	0	0	0	0	0	0	0	0	0	128	210	
Sr Demand Above	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	12.9	13.3	13.3	2.0	49.2
Sr Demand Below	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	10.6	18.0	14.1	5.0	48.6
Flow @ Ft.Shaw Div	cfs	89	84	88	89	92	99	168	873	1397	260	231	210	
Ft Shaw Demand	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.7	7.9	8.0	11.4	9.6	8.0	45.6
Ft Shaw Tot Deliv	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.7	7.9	8.0	11.4	9.6	8.0	45.6
Flow blw Ft. Shaw	cfs	89	84	88	89	92	99	156	745	1262	75	75	76	

TABLE MTT14C
Gibson Reservoir Monthly Operations
Based on October 1, 2016 Inflow Estimates
2017 Maximum Probable Plan

Gibson Reservoir		Initial Cont	5.5 kaf		Maximum Cont	98.7 kaf		Minimum Cont	5.0 kaf				
		Elev	4610.19 ft		Elev	4724.01 ft		Elev	4608.47 ft				
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Monthly Inflow	kaf	15.3	14.0	12.2	12.8	11.9	15.8	50.0	203.0	258.0	88.0	32.0	22.0	735.0
Spillway Rels	cfs	0	0	0	0	0	0	0	0	0	0	0	0	
Total Release	kaf	9.1	7.8	7.8	7.9	7.1	7.8	36.3	158.0	258.0	117.2	96.5	22.0	735.5
Total Release	cfs	148	131	127	128	128	127	610	2570	4336	1906	1569	370	
End-Month Content	kaf	11.7	17.9	22.3	27.2	32.0	40.0	53.7	98.7	98.7	69.5	5.0	5.0	
End-Month Elevation	ft	4625.32	4637.34	4644.98	4652.82	4659.85	4670.42	4685.49	4724.01	4724.01	4700.41	4608.47	4608.47	
End-Month Area	acre	474.9	552.6	598.4	654.7	710.7	810.7	993.5	1334.0	1334.0	1128.5	271.7	271.7	
Net Change Content	kaf	6.2	6.2	4.4	4.9	4.8	8.0	13.7	45.0	0.0	-29.2	-64.5	0.0	-0.5

Sun River Div Dam	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Gain Below Gibson	cfs	20	20	24	26	25	34	57	184	215	78	29	22	
Rels to WFC	cfs	75	76	0	0	0	0	76	65	0	0	0	0	
Rels to PSC	cfs	0	0	0	0	0	0	417	1091	1333	1400	1077	103	
Total Diversion	kaf	4.6	4.5	0.0	0.0	0.0	0.0	29.3	71.1	79.3	86.1	66.2	6.1	347.2
Total Diversion	cfs	75	76	0	0	0	0	492	1156	1333	1400	1077	103	
Flow Over Div Dam	kaf	5.7	4.5	9.3	9.5	8.5	9.9	10.4	98.2	191.5	35.9	32.1	17.2	432.7
Flow Over Div Dam	cfs	93	76	151	155	153	161	175	1597	3218	584	522	289	

Willow Crk Operations		Initial Cont	16.8 kaf		Maximum Cont	31.9 kaf		Minimum Cont	0.1 kaf				
		Elev	4130.49 ft		Elev	4142.04 ft		Elev	4093.42 ft				
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Native Inflow	kaf	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2
Total Inflow	kaf	3.9	3.8	0.0	0.0	0.0	0.1	3.9	3.4	0.0	0.0	0.0	0.0	15.1
WCR Dam Rels	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9
End-Month Content	kaf	20.7	24.5	24.5	24.5	24.5	24.6	28.5	31.9	31.9	31.9	31.9	31.0	
End-Month Elevation	ft	4133.85	4136.76	4136.76	4136.76	4136.76	4136.84	4139.67	4142.04	4142.04	4142.04	4142.04	4141.42	
Net Change Content	kaf	3.9	3.8	0.0	0.0	0.0	0.1	3.9	3.4	0.0	0.0	0.0	-0.9	14.2

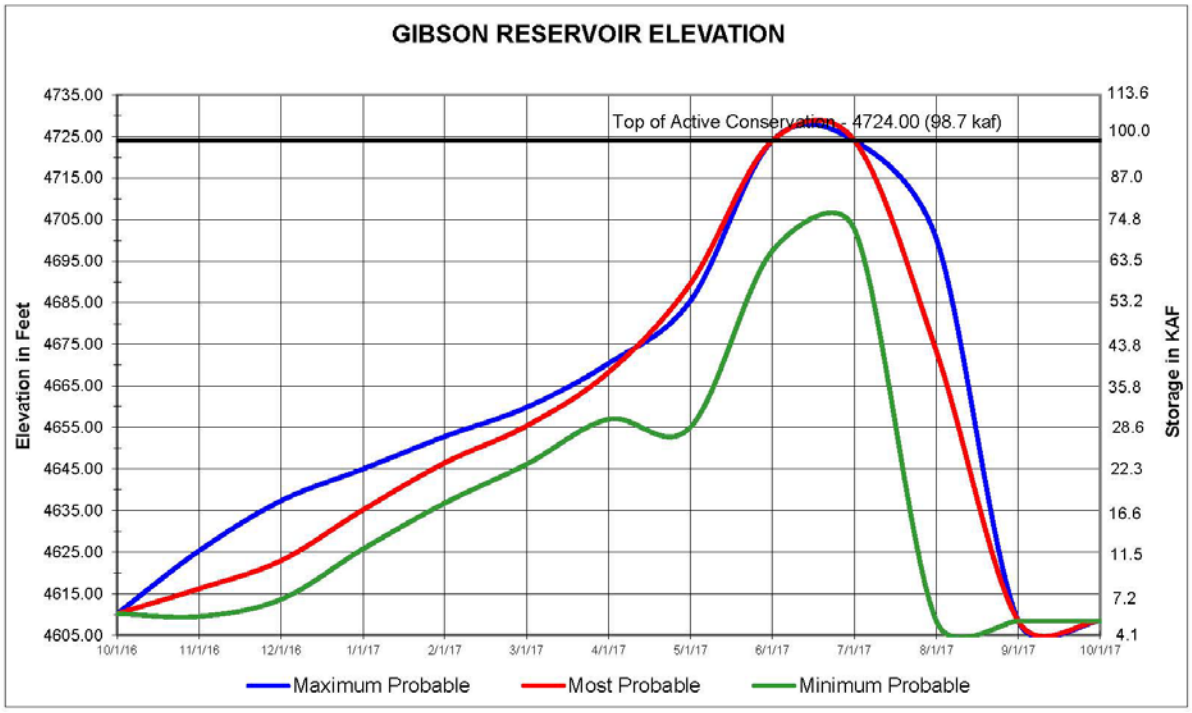
Pishkun Operations		Initial Cont	20.1 kaf		Maximum Cont	46.8 kaf		Minimum Cont	16.0 kaf				
		Elev	4347.31 ft		Elev	4370.07 ft		Elev	4341.99 ft				
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Rels to PSC	kaf	0.0	0.0	0.0	0.0	0.0	0.0	24.8	67.1	79.3	86.1	66.2	6.1	329.6
Total Inflow	kaf	0.0	0.0	0.0	0.0	0.0	0.0	21.1	53.7	65.0	73.2	56.3	5.2	274.5
PSH Dam Rels	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.0	65.0	85.0	48.0	18.0	263.0
End-Month Content	kaf	20.1	19.9	19.7	19.5	19.3	19.1	40.0	46.7	46.7	34.9	43.2	30.4	
End-Month Elevation	ft	4347.31	4347.07	4346.82	4346.58	4346.33	4346.08	4365.44	4370.00	4370.00	4361.71	4367.66	4358.03	
Net Change Content	kaf	0.0	-0.2	-0.2	-0.2	-0.2	-0.2	20.9	6.7	0.0	-11.8	8.3	-12.8	10.3

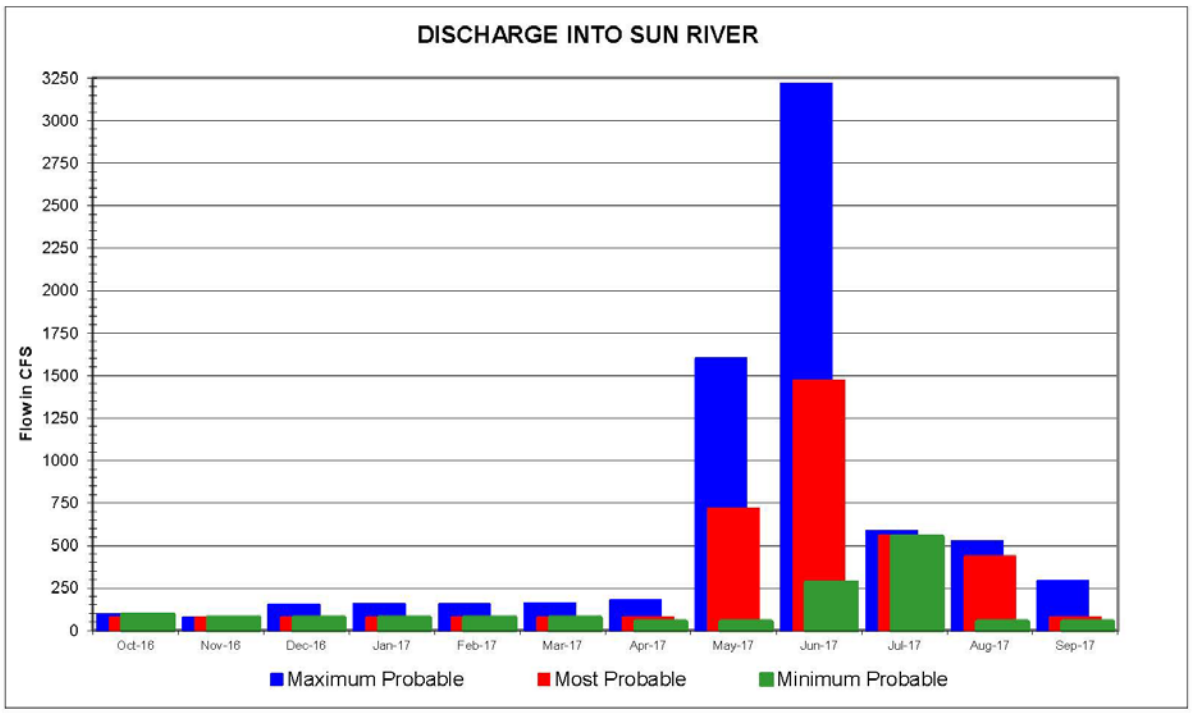
Greenfields Irrig	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
GID Demand	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.0	65.0	85.0	48.0	18.0	263.0
GID Delivery	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.0	65.0	85.0	48.0	18.0	263.0

River Blw Div Dam	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Flow Over Div Dam	cfs	93	76	151	155	153	161	175	1597	3218	584	522	289	
PSC Return Flow	cfs	0	0	0	0	0	0	50	174	192	179	143	13	
WCR Dam Rels	cfs	0	0	0	0	0	0	0	0	0	0	0	15	
Sr Demand Above	kaf	1.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	12.9	13.3	13.3	2.0	50.2
Sr Demand Below	kaf	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	10.6	18.0	14.1	5.0	49.6
Flow @ Ft.Shaw Div	cfs	75	84	164	169	169	185	274	1743	3122	260	231	210	
Ft Shaw Demand	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.7	7.9	8.0	11.4	9.6	8.0	45.6
Ft Shaw Tot Deliv	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.7	7.9	8.0	11.4	9.6	8.0	45.6
Flow blw Ft. Shaw	cfs	75	84	164	169	169	185	262	1615	2988	75	75	75	

FIGURE MTG15

GIBSON RESERVOIR





WATER YEAR 2017

Lake Elwell (Tiber Dam)

Three operating plans were prepared for 2017 to show the operations of Lake Elwell which could occur under various runoff conditions. These operations for the three runoff conditions are shown in Table MTT15 and Figure MTG16. These plans are presented only to show the probable limits of operations; therefore, actual conditions and operations could vary widely from the plans.

In 2002, Reclamation surveyed Lake Elwell to develop a topographic map and compute area-capacity tables. The data were used to calculate reservoir capacity lost 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 a reservoir elevation of 2993.00 feet. Since closure, Lake Elwell 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.

The objectives of operations at Lake Elwell are to provide flood control in cooperation with the Corps, to provide fish and wildlife enhancement to the area, and supply water for irrigation and municipal uses. The reservoir is operated under the following criteria and limitations:

(1) Whenever an adequate water supply is available, Tiber Dam and Reservoir is operated to maintain a minimum flow of 500 cfs or more in the Marias River immediately below Tiber Dam to provide a healthy river fishery. When an adequate water supply is not available to maintain a release of 500 cfs, releases will be reduced to 380 cfs during the irrigation season and to 320 cfs during the non-irrigation season. During periods of extreme extended drought it may be necessary to reduce releases to as low as 250 cfs outside the irrigation season.

(2) During unusually low runoff years, maintaining the desired or minimum flow levels may result in failure to fill the reservoir.

(3) In accordance with monthly seasonal water supply forecasts prepared during January through June, releases are adjusted to allow storage to fill to an elevation of 2993 feet (925,649 AF) (top of joint-use pool) by the end of June.

(4) To minimize lowland flooding, maximum releases are currently maintained below 5,500 cfs. The maximum safe channel capacity of the Marias River is currently established as 10,000 cfs.

(5) After storage has peaked, usually in June, releases are adjusted to evacuate storage to an elevation between 2976-2980 feet (667,213-719,885 AF) by the first of March. This elevation is determined by the monthly water supply forecasts and provides adequate space to control the next season's snowmelt runoff.

(6) Maintain Tiber Reservoir at or above an elevation of 2982 feet (747,953 AF) between Memorial Day Weekend in late May and Labor Day Weekend in early September, to protect flat water recreation interests.

(7) From October to early November, set a release that can be reasonably maintained through the fall and winter. A stable flow or one that is gradually increased during the winter is needed to protect the spawning habitat for brown trout. This flow rate should be low enough to minimize the possibility that flows may need to be reduced as a result of below normal winter mountain snowpack and runoff projections.

(8) If conditions allow, attempt to maintain stable releases to Marias River during April 1 through May 15 to protect goose nesting.

(9) If conditions allow, avoid dropping the reservoir level during April and May, to protect fish spawning in the reservoir.

(10) In close coordination with Montana Fish, Wildlife and Parks, whenever an adequate water supply is available and conditions allow, releases will be scheduled to simulate a natural spring runoff hydrograph which normally occurs in late May or early June.

(11) All flood control operations are closely coordinated with the Corps. If the Corps advises that replacement storage is desirable during the maximum probable runoff, releases during the spring runoff period from March through June will be maintained at about 500 cfs, allowing storage to exceed an elevation of 2993 feet (925,649 AF), the top of the joint use pool.

(12) March to June releases are based on forecasted inflows with the objective of filling Lake Elwell to an elevation of 2993 feet (925,649 AF) by the end of June. However, in some years, March to June releases may be based on filling the reservoir to an elevation of as high as 3008 feet (1,227,174 AF) by the end of June, to provide replacement storage and assist the Corps with the operations of their main stem reservoir system.

(13) Whenever possible, attempts are made to maintain water temperatures in the Marias River between 55 degrees Fahrenheit and 60 degrees Fahrenheit during June 1 through September 15.

(14) To prevent ice jam flooding from occurring, the maximum desired winter release is maintained no higher than 700 cfs.

(15) Under normal operations, river releases of up to about 700 cfs will generally be released through the 7.5 MW FERC powerplant. If releases greater than 700 cfs are required, flows in excess of the powerplant capacity will be released through a combination of the river outlet works regulating gate, through the auxiliary outlet works or through the spillway gates.

Precipitation for the remainder of WY 2016, July through September, was 129 percent of average in the valley and 105 percent of average in the mountains. However, inflow during August and September 2016 totaled 1,700 and 7,500 AF, respectively, which was only 12 and 65 percent of average. Releases from Lake Elwell to the Marias River were kept at 500 cfs for WY 2016. By the end of WY 2016, Lake Elwell storage was 755,270 AF at an elevation of 2982.51 feet.

With the low inflows experienced in August and September 2016, the most probable October through January inflows to Lake Elwell were gradually increased from 19 percentile inflows to

30 percentile inflows, 70 percent exeedence. February through September inflows were estimated at 50 percentile inflows, 50 percent exeedence.

Minimum probable October inflows to Lake Elwell were estimated to be less than 10 percentile inflows, 90 percent exeedence. The minimum probable inflows to Lake Elwell for November through September were estimated to equal 10 percentile inflows, 90 percent exeedence.

The maximum probable October inflows to Lake Elwell were estimated to equal 40 percentile inflows, 60 percent exeedence. November and December inflows were estimated as 50 percentile inflows. January through March inflows were estimated as 75 percentile inflows. April through September inflows to Lake Elwell were estimated as 90 percentile inflows, 10 percent exeedence.

Water levels are expected to peak in late June or early July at approximately 8.2 feet below the top of the joint use pool under the minimum probable runoff condition. Under the most and maximum probable runoff conditions, the water level in Lake Elwell is expected to peak in late June or early July at or near the top of the joint use pool. A minimum river release of 500 cfs would be maintained through the summer months under all three runoff conditions.

TABLE MTT15
Tiber Reservoir Operating Plan
Based on October 1, 2016 Inflow Estimates

2017 Minimum Probable

Tiber Reservoir Elev 2982.51 ft		Initial Cont	755.3 kaf		Maximum Cont Elev	1356.5 kaf 3013.69 ft		Minimum Cont Elev	260.7 kaf 2932.27 ft				
2016		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Monthly Inflow	kaf	5.3	9.3	9.3	11.1	13.4	21.5	34.8	78.3	68.6	18.6	4.9	4.9	280.0
Evaporation	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dam Release	kaf	30.7	20.8	21.5	21.5	19.4	21.5	22.6	30.7	29.8	30.7	30.7	29.8	309.7
Dam Release	cfs	499	350	350	350	349	350	380	499	501	499	499	501	
End-Month Content	kaf	729.9	718.4	706.2	695.8	689.8	689.8	702.0	749.6	788.4	776.3	750.5	725.6	
End-Month Elevation	ft	2980.72	2979.89	2978.99	2978.21	2977.75	2977.75	2978.68	2982.12	2984.77	2983.95	2982.18	2980.41	
Net Change Content	kaf	-25.4	-11.5	-12.2	-10.4	-6.0	0.0	12.2	47.6	38.8	-12.1	-25.8	-24.9	-29.7

2017 Most Probable

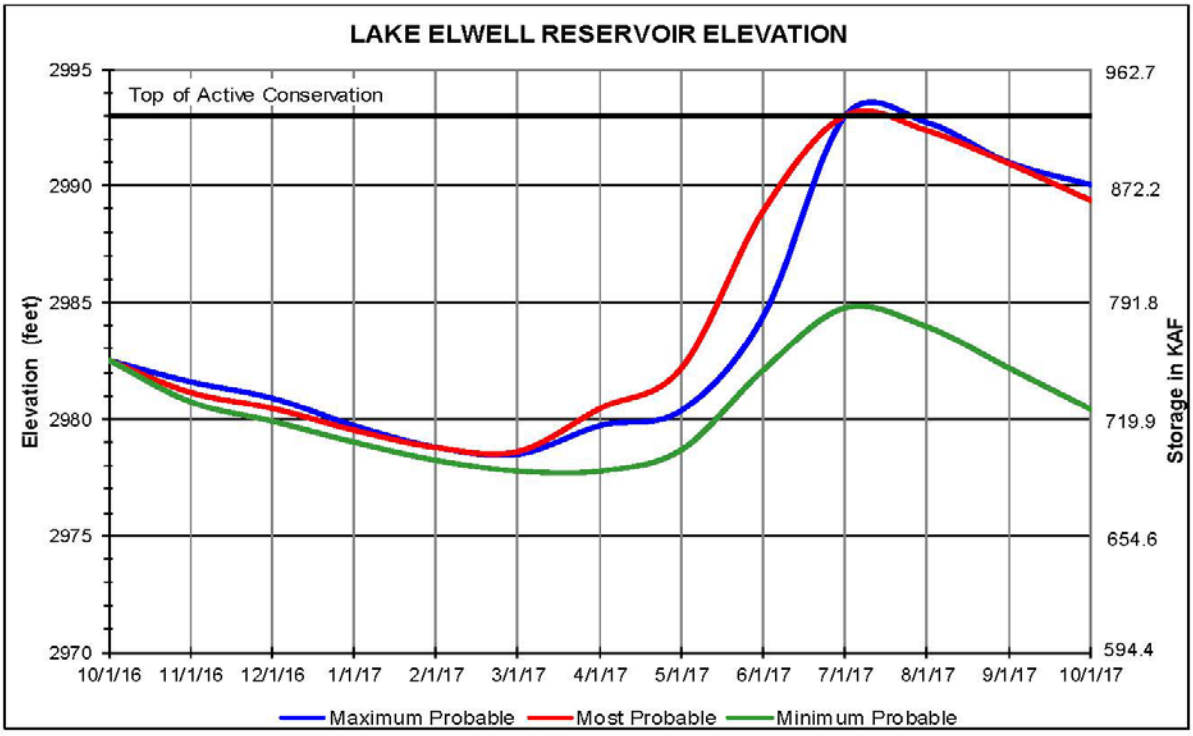
Tiber Reservoir Elev 2982.51 ft		Initial Cont	755.3 kaf		Maximum Cont Elev	1356.5 kaf 3013.69 ft		Minimum Cont Elev	260.7 kaf 2932.27 ft				
2016		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Monthly Inflow	kaf	11.2	14.2	11.8	14.7	20.1	49.5	60.3	163.5	142.7	49.7	17.5	14.3	569.5
Evaporation	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dam Release	kaf	30.7	23.8	24.6	24.6	22.2	24.6	35.7	60.1	71.4	61.5	43.0	41.1	463.3
Dam Release	cfs	499	400	400	400	400	400	600	977	1200	1000	699	691	
End-Month Content	kaf	735.8	726.2	713.4	703.5	701.4	726.3	750.9	854.3	925.6	913.8	888.3	861.5	
End-Month Elevation	ft	2981.14	2980.46	2979.52	2978.79	2978.63	2980.46	2982.21	2988.95	2993.00	2992.35	2990.93	2989.37	
Net Change Content	kaf	-19.5	-9.6	-12.8	-9.9	-2.1	24.9	24.6	103.4	71.3	-11.8	-25.5	-26.8	106.2

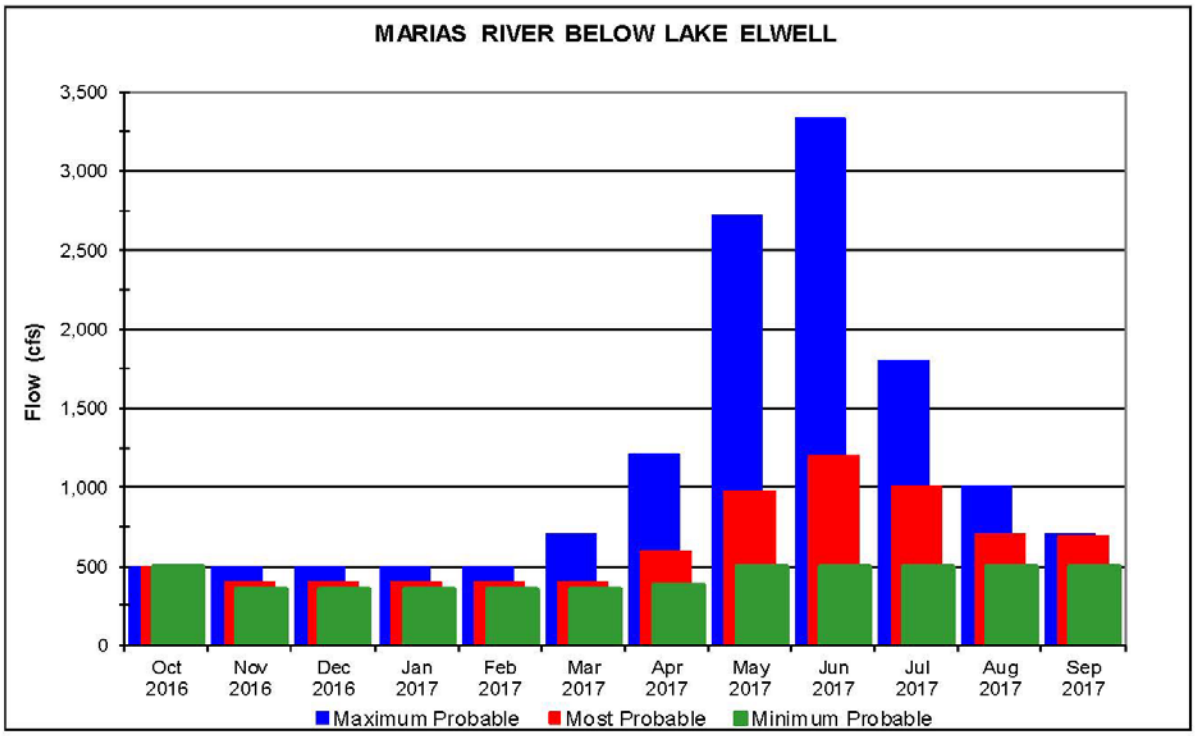
2017 Maximum Probable

Tiber Reservoir Elev 2982.51 ft		Initial Cont	755.3 kaf		Maximum Cont Elev	1356.5 kaf 3013.69 ft		Minimum Cont Elev	260.7 kaf 2932.27 ft				
2016		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Monthly Inflow	kaf	17.6	20.0	14.3	18.4	23.9	59.4	81.1	225.1	340.0	105.2	30.9	25.0	960.9
Evaporation	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dam Release	kaf	30.7	29.8	30.7	30.7	27.8	43.0	72.0	166.9	197.9	110.7	61.5	41.7	843.4
Dam Release	cfs	499	501	499	499	501	699	1210	2714	3326	1800	1000	701	
End-Month Content	kaf	742.2	732.4	716.0	703.7	699.8	716.2	725.3	783.5	925.6	920.1	889.5	872.8	
End-Month Elevation	ft	2981.60	2980.90	2979.72	2978.80	2978.51	2979.73	2980.39	2984.44	2993.00	2992.70	2990.99	2990.04	
Net Change Content	kaf	-13.1	-9.8	-16.4	-12.3	-3.9	16.4	9.1	58.2	142.1	-5.5	-30.6	-16.7	117.5

FIGURE MTG16

LAKE ELWELL





WATER YEAR 2017

Milk River Project

The 120,000-acre Milk River Project is served by three reservoirs: Sherburne, Fresno, and Nelson. All are single-purpose irrigation structures except Fresno Reservoir, which has some joint-use flood control space and furnishes a small amount of municipal water to Havre, Chinook, and Harlem, Montana, and to the Hill County Water District.

Three operating plans were prepared for 2017 to demonstrate the operations which could occur under various runoff conditions. These plans were prepared to show the probable limits of operations, therefore, actual conditions and operations could vary widely from the plans.

Lake Sherburne

The division of the waters of the St. Mary River, including Lake Sherburne inflow, is carried out in accordance with the Order of the International Joint Commission dated October 4, 1921. There are no agreements for reservoir releases specifically for fish, wildlife, recreation purposes, or minimum release requirements. All stored water is required for irrigation use, and other uses are incidental. Lake Sherburne lands are administered for recreation and wildlife habitat by the National Park Service in accordance with the management plan for Glacier National Park. Lake Sherburne is operated under the following criteria:

(1) Near the end of the spring runoff, the discharge should be regulated based on snow measurements and inflow forecasts to insure filling the reservoir to an elevation of 4788.00 feet. The final reservoir filling up to an elevation of 4788.00 feet should be delayed until near the end of the spring runoff. During this final phase, care should be taken to avoid use of the outlet works overflow crest because of less desirable hydraulic flow conditions which develop in the conduit. When the water surface reaches an elevation of 4788.00 feet, the outlet gates must be opened to the extent necessary to maintain this elevation. If reservoir inflows continue to increase, the outlet gates must be fully opened and maintained in the full open position until the water surface recedes to an elevation of 4788.00 feet.

(2) Every effort must be made to prevent the reservoir from spilling while assuring a full reservoir. During all stages, except the final stage of the spring runoff, the outlet gates should be adjusted to maintain the water surface no higher than an elevation of 4788.00 feet. The outlet gates should be fully opened during the spring runoff when the water surface rises to or above an elevation of 4788.00 feet and fully open at any time the water surface is above an elevation of 4788.00 feet.

The cumulative precipitation for WY 2016 was 102 and 89 percent of average for mountain and valley areas, respectively. Inflow totaled 126,000 AF, 89 percent of average. The storage content in Lake Sherburne was 23,589 AF at an elevation of 4756.84 feet, 147 percent of average on September 30, 2016.

The most probable plan October through December inflows varied from 20 to 30 percentile. January through September inflows were estimated at 50 percentile inflows or inflows that are exceeded 50 percent of the time.

Minimum probable October through December inflows to Lake Sherburne were estimated as less than 10 percentile inflows, 90 percent exeedence. Minimum probable January through September inflows to Lake Sherburne were estimated as 10 percentile inflows, 90 percent exeedence.

Maximum probable October through December inflows to Lake Sherburne were estimated as 50 to 60 percentile inflows. January through September inflows were estimated as 90 percentile inflows, 10 percent exeedence.

Fresno Reservoir

Fresno Reservoir storage is primarily for irrigation and municipal water supply. However, the operation of the joint use storage space does provide both conservation use and limited flood control benefits. There is no exclusive flood control space, but some flood benefits are obtained by maintaining the water level below an elevation of 2567.0 feet by March 1, prior to spring runoff, providing 33,841 AF of space for storage of spring runoff.

Winter releases will be chosen to provide approximately 33,800 AF of space before spring runoff begins, however no less than 25 cfs to the Milk River as measured at the highway bridge at Havre. An anticipated release of approximately 45 cfs will be made from Fresno Reservoir during October through February to meet contractual amounts required for the maintenance of suitable water quality for municipal use for the cities of Havre, Chinook, and Harlem, Montana. After spring runoff begins, releases will be made only to meet conservation requirements until it becomes obvious that the reservoir will fill and spill. At that time, releases will be gradually increased so that spill will be minimized when the pool rises above the spillway crest.

The only planned summer releases will be those for irrigation and municipal uses. Municipal requirements are established by contract and scheduled in advance by the municipal water contractors.

Inflows into Fresno Reservoir included runoff above Fresno Reservoir and diversions through the St Mary Canal. The runoff portion of the inflow is called the natural inflow.

The cumulative valley precipitation in the Milk River Basin through the end of September 2016 was 144 percent of average. Total inflow into Fresno Reservoir for WY 2016 was 170,000 AF, 67 percent of average. Diversions from the St. Mary River Basin to the Milk River Basin accounted for about 80 percent of the inflow to Fresno Reservoir during WY 2016. After irrigation was done for the year, releases from Fresno Reservoir were reduced to the winter release rate of 45 cfs on September 20, 2016. Storage in Fresno Reservoir at the end of September 2016 was at 57,556 AF at an elevation of 2566.90 feet, 138 percent of average and 63 percent of normal full capacity.

The most probable plan used 25 percentile natural inflows or natural inflows, 75 percent exeedence flows for October through December. January through September inflows were estimated as 50 percentile inflows, 50 percent exeedence.

The minimum probable natural inflows during October through September to Fresno Reservoir were estimated as 10 percentile inflows, 90 percent exeedence.

The maximum probable natural inflows during October through December to Fresno Reservoir were estimated as approximately 40 percentile inflows, 60 percent exeedence. January through September natural inflows were estimated at 90 percentile inflows, 10 percent exeedence.

Nelson Reservoir

Storage on September 30, 2016 was 26,115 AF at an elevation of 2204.48 feet, 46 percent of average and 33 percent of normal full capacity due to the Safety of Dams project started in August 2016. Malta Irrigation District tries to fill Nelson Reservoir in the spring, prior to the irrigation season, using Dodson South Canal to convey water from the Milk River to the reservoir. Under most circumstances, water is transferred from storage in Fresno Reservoir in the early spring instead of in the fall to minimize seepage losses from Nelson Reservoir during the winter. However, if water is available in Fresno Reservoir after the irrigation season, it may be transferred to Nelson Reservoir to ensure a full supply for the following irrigation season. Nelson Reservoir is operated to satisfy irrigation demands and all other uses are incidental to irrigation. In conjunction with delivering water to Nelson Reservoir, water is conveyed through the Dodson South Canal to provide the Bowdoin Wildlife Refuge adequate water for migratory birds. Bowdoin usually receives a proportional share of their full contract allotment, 3,500 AF, depending on the irrigation supply. The operation of Nelson Reservoir and delivery to Bowdoin is integrated with the operation of Fresno Reservoir and Lake Sherburne to ensure maximum beneficial use of spring runoff.

Irrigation shortages are not expected to occur under the maximum or most probable expected runoff, but could possibly occur under the minimum probable expected runoff. Lake Sherburne is expected to fill under the most and maximum probable plans. Fresno Reservoir is expected to fill under the most and maximum operating plans. Nelson is not expected to fill in 2017 because of the lower carryover. With the low carryover, water will likely need to be transferred from Fresno Reservoir to Nelson Reservoir during the spring of 2017. The operations for the three runoff conditions are shown in Table MTT16A-C and Figure MTG17-18.

TABLE MTT16A
Milk River Operating Plan
Based on October 1, 2016 Inflow Estimates
2017 Minimum Probable Plan

Sherburne Reservoir		Initial Cont		23.6 kaf		Maximum Cont		66.2 kaf		Minimum Cont		3.1 kaf	
		Elev		4756.85 ft		Elev		4788.03 ft		Elev		4731.73 ft	
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Sherburne Inflow	kaf	3.7	3.2	2.7	2.2	1.4	2.9	8.5	25.1	27.2	14.4	6.4	3.2	100.9
Sherburne Rels	kaf	0.0	0.0	0.0	0.0	0.0	4.3	39.0	22.5	15.5	30.5	6.4	3.2	121.4
Sherburne Rels	cfs	0	0	0	0	0	70	655	366	260	496	104	54	
Net Content Change	kaf	3.7	3.2	2.7	2.2	1.4	-1.4	-30.5	2.6	11.7	-16.1	0.0	0.0	-20.5
End-Month Content	kaf	27.3	30.5	33.2	35.4	36.8	35.4	4.9	7.5	19.2	3.1	3.1	3.1	
End-Month Elevation	ft	4760.30	4763.15	4765.47	4767.30	4768.45	4767.30	4734.80	4738.64	4752.48	4731.73	4731.73	4731.73	
St. Mary River	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
St Mary Runoff	kaf	9.2	5.5	5.4	4.0	4.6	4.1	7.4	68.2	81.5	42.1	21.7	15.2	268.9
Nat Flow @ Boundary	kaf	12.9	8.7	8.1	6.2	6.0	7.0	15.9	93.3	108.7	56.5	28.1	18.4	369.8
St Mary canal rels	cfs	0	0	0	0	0	99	600	550	550	555	114	101	
St Mary canal rels	kaf	0.0	0.0	0.0	0.0	0.0	6.1	35.7	33.8	32.7	34.1	7.0	6.0	155.4

Fresno Reservoir		Initial Cont		57.6 kaf		Maximum Cont		91.7 kaf		Minimum Cont		0.5 kaf	
		Elev		2566.90 ft		Elev		2575.00 ft		Elev		2531.90 ft	
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Milk River runoff	kaf	1.0	0.5	0.2	0.3	0.7	2.5	3.2	2.2	2.8	0.8	0.8	1.9	16.9
From St Mary Canal	kaf	0.0	0.0	0.0	0.0	0.0	5.5	32.1	30.4	29.4	30.7	6.3	5.4	139.8
Fresno inflow	kaf	1.0	0.5	0.2	0.3	0.7	8.0	35.3	32.6	32.2	31.5	7.1	7.3	156.7
Fresno Release	kaf	2.8	2.7	2.8	2.8	2.5	2.8	12.9	38.4	46.3	56.6	16.9	3.0	190.5
Fresno Release	cfs	46	45	46	46	45	46	217	625	778	921	275	50	
Net Content Change	kaf	-1.8	-2.2	-2.6	-2.5	-1.8	5.2	22.4	-5.8	-14.1	-25.1	-9.8	4.3	-33.8
End-Month Content	kaf	55.8	53.6	51.0	48.5	46.7	51.9	74.3	68.5	54.4	29.3	19.5	23.8	
End-Month Elev	ft	2566.39	2565.73	2564.91	2564.06	2563.45	2565.20	2571.32	2569.86	2565.97	2555.71	2550.23	2552.75	
Project Allotment	f/ac	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.50	0.60	0.15	0.00	1.50
Project Delivery	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.2	46.3	55.6	13.9	0.0	139.0
FBIIP Demand	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.0	3.0	7.0
Fresno-Dodson Gain	kaf	0.0	0.0	0.0	0.0	0.0	8.7	9.1	6.3	8.2	1.0	1.0	0.8	35.1
Bowdoin Demand	kaf	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.5	0.0	0.0	0.0	0.0	3.5
Transfer to Nelson	kaf	1.0	0.0	0.0	0.0	0.0	10.0	20.0	20.0	5.0	0.0	0.0	0.0	56.0

Nelson Reservoir		Initial Cont		26.1 kaf		Maximum Cont		79.0 kaf		Minimum Cont		18.0 kaf	
		Elev		2204.47 ft		Elev		2221.61 ft		Elev		2199.91 ft	
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Deliv to Nelson	kaf	0.9	0.0	0.0	0.0	0.0	9.0	18.0	18.0	4.5	0.0	0.0	0.0	50.4
Net Content Change	kaf	0.9	-0.9	-0.9	-0.9	-0.8	8.1	17.1	9.9	-7.4	-16.8	-4.4	-0.9	3.0
End-Month Content	kaf	27.0	26.1	25.2	24.3	23.5	31.6	48.7	58.6	51.2	34.4	30.0	29.1	
End-Month Elev	ft	2204.93	2204.47	2204.01	2203.54	2203.11	2207.12	2213.64	2216.49	2214.40	2208.36	2206.38	2205.96	
Total Release	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	10.7	15.6	3.2	0.0	36.4
Malta Delivery	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	9.2	11.0	2.8	0.0	27.6
Glasgow Delivery	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	4.7	5.6	1.4	0.0	14.0

TABLE MTT16B
Milk River Operating Plan
Based on October 1, 2016 Inflow Estimates
2017 Most Probable Plan

Sherburne Reservoir		Initial Cont	23.6 kaf		Maximum Cont	66.2 kaf		Minimum Cont	3.1 kaf				
			Elev	4756.85 ft		Elev	4788.03 ft		Elev	4731.73 ft			
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Sherburne Inflow	kaf	5.1	7.3	3.5	2.9	2.8	3.2	9.5	32.9	39.3	17.5	8.6	4.8	137.4
Sherburne Rels	kaf	0.0	0.0	0.0	0.0	0.0	2.1	10.4	12.3	39.1	17.5	35.3	34.9	151.6
Sherburne Rels	cfs	0	0	0	0	0	34	175	200	657	285	574	587	
Net Content Change	kaf	5.1	7.3	3.5	2.9	2.8	1.1	-0.9	20.6	0.2	0.0	-26.7	-30.1	-14.2
End-Month Content	kaf	28.7	36.0	39.5	42.4	45.2	46.3	45.4	66.0	66.2	66.2	39.5	9.4	
End-Month Elevation	ft	4761.56	4767.80	4770.60	4772.77	4774.77	4775.54	4774.91	4787.91	4788.03	4788.03	4770.60	4741.20	

St. Mary River	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
St Mary Runoff	kaf	13.1	5.7	6.7	7.2	6.1	8.7	24.5	95.5	135.0	80.6	32.3	17.7	433.1
Nat Flow @ Boundary	kaf	18.2	13.0	10.2	10.1	8.9	11.9	34.0	128.4	174.3	98.1	40.9	22.5	570.5
St Mary canal rels	cfs	0	0	0	0	0	99	200	550	550	600	600	600	
St Mary canal rels	kaf	0.0	0.0	0.0	0.0	0.0	6.1	11.9	33.8	32.7	36.9	36.9	35.7	194.0

Fresno Reservoir		Initial Cont	57.6 kaf		Maximum Cont	91.7 kaf		Minimum Cont	0.5 kaf				
			Elev	2566.90 ft		Elev	2575.00 ft		Elev	2531.90 ft			
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Milk River runoff	kaf	3.0	1.6	0.9	1.9	4.9	19.6	22.6	23.8	19.4	6.8	3.5	4.1	112.1
From St Mary Canal	kaf	0.0	0.0	0.0	0.0	0.0	5.5	10.7	30.4	29.4	33.2	33.2	32.1	174.5
Fresno inflow	kaf	3.0	1.6	0.9	1.9	4.9	25.1	33.3	54.2	48.8	40.0	36.7	36.2	286.6
Fresno Release	kaf	2.8	2.7	2.8	2.8	2.5	2.8	20.2	54.2	48.8	69.1	70.9	24.7	304.3
Fresno Release	cfs	46	45	46	46	45	46	339	881	820	1124	1153	415	
Net Content Change	kaf	0.2	-1.1	-1.9	-0.9	2.4	22.3	13.1	0.0	0.0	-29.1	-34.2	11.5	-17.7
End-Month Content	kaf	57.8	56.7	54.8	53.9	56.3	78.6	91.7	91.7	91.7	62.6	28.4	39.9	
End-Month Elev	ft	2566.96	2566.65	2566.09	2565.82	2566.53	2572.27	2575.00	2575.00	2575.00	2568.31	2555.25	2560.68	
Project Allotment	f/ac	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.50	0.70	0.70	0.15	2.30
Project Delivery	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.2	46.3	64.9	64.9	13.9	213.2
FBIIP Demand	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.0	3.0	7.0
Fresno-Dodson Gain	kaf	0.0	0.0	0.0	0.0	0.0	17.4	18.2	12.6	16.4	6.8	2.0	2.2	75.6
Bowdoin Demand	kaf	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.5	0.0	0.0	0.0	0.0	3.5
Transfer to Nelson	kaf	1.0	0.0	0.0	0.0	0.0	10.0	20.0	20.0	10.0	10.0	5.0	10.0	86.0

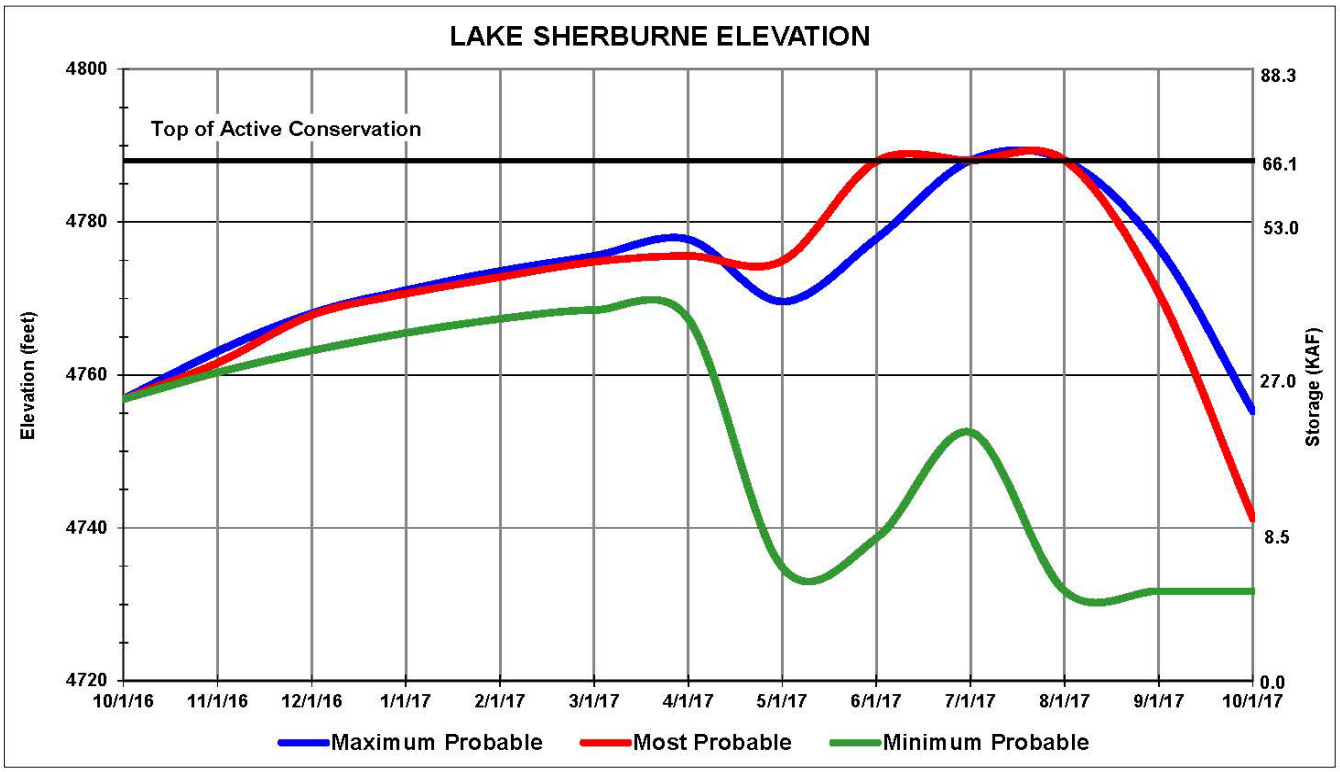
Nelson Reservoir		Initial Cont	26.1 kaf		Maximum Cont	79.0 kaf		Minimum Cont	18.0 kaf				
			Elev	2204.47 ft		Elev	2221.61 ft		Elev	2199.91 ft			
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Deliv to Nelson	kaf	0.9	0.0	0.0	0.0	0.0	9.0	18.0	18.0	9.0	9.0	4.5	9.0	77.4
Net Content Change	kaf	0.9	-0.9	-0.9	-0.9	-0.8	8.1	17.1	12.2	-1.4	-11.6	-16.1	3.9	9.6
End-Month Content	kaf	27.0	26.1	25.2	24.3	23.5	31.6	48.7	60.9	59.5	47.9	31.8	35.7	
End-Month Elev	ft	2204.93	2204.47	2204.01	2203.54	2203.11	2207.12	2213.64	2217.11	2216.73	2213.40	2207.21	2208.91	
Total Release	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	9.2	19.4	19.4	4.2	56.8
Malta Delivery	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	9.2	12.9	12.9	2.8	42.4
Glasgow Delivery	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	4.7	6.5	6.5	1.4	21.4

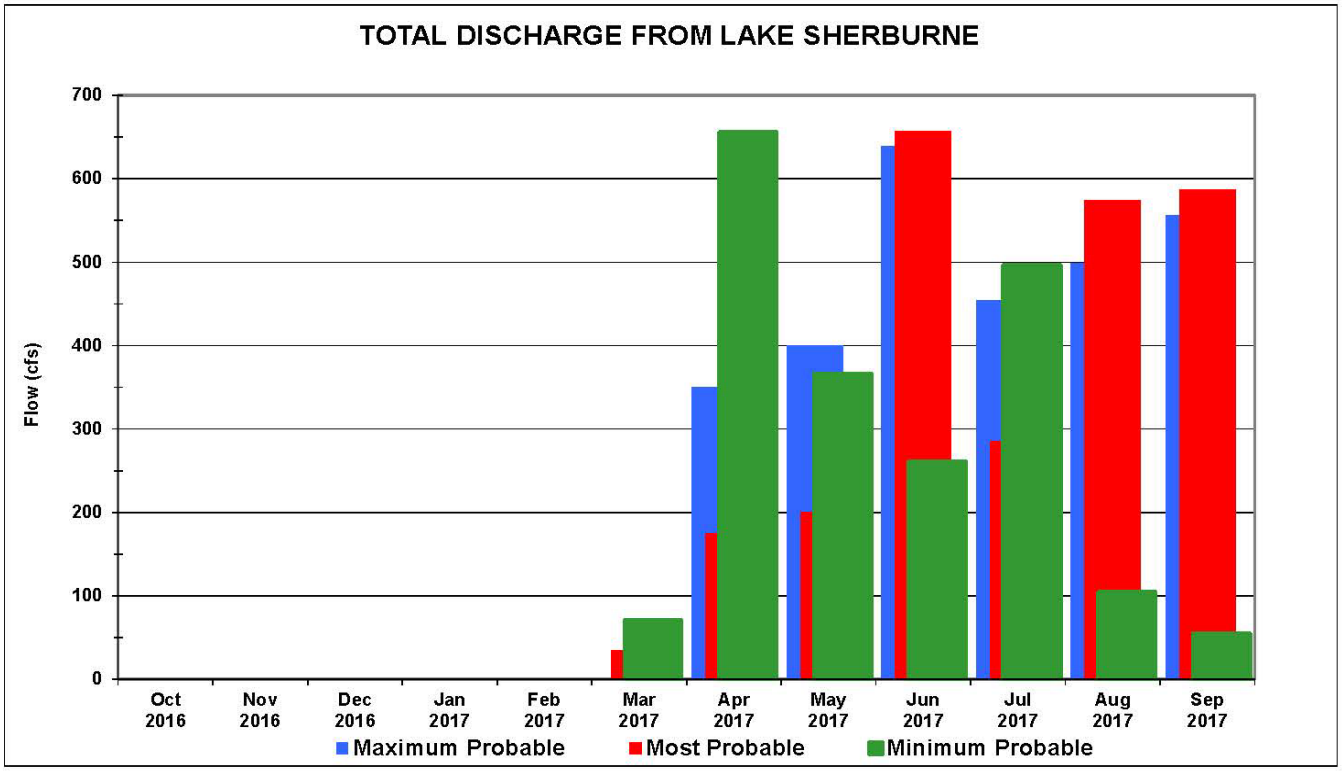
TABLE MTT16C
Milk River Operating Plan
Based on October 1, 2016 Inflow Estimates
2017 Maximum Probable Plan

Sherburne Reservoir		Initial Cont		23.6 kaf		Maximum Cont		66.2 kaf		Minimum Cont		3.1 kaf		
			Elev	4756.85 ft			Elev	4788.03 ft			Elev	4731.73 ft		
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Sherburne Inflow	kaf	6.8	5.9	3.8	3.4	2.8	3.2	9.5	36.1	54.5	27.9	12.3	7.2	173.4
Sherburne Rels	kaf	0.0	0.0	0.0	0.0	0.0	0.0	20.8	24.6	38.0	27.9	30.7	33.1	175.1
Sherburne Rels	cfs	0	0	0	0	0	0	350	400	639	454	499	556	
Net Content Change	kaf	6.8	5.9	3.8	3.4	2.8	3.2	-11.3	11.5	16.5	0.0	-18.4	-25.9	-1.7
End-Month Content	kaf	30.4	36.3	40.1	43.5	46.3	49.5	38.2	49.7	66.2	66.2	47.8	21.9	
End-Month Elevation	ft	4763.06	4768.04	4771.06	4773.57	4775.54	4777.70	4769.57	4777.83	4788.03	4788.03	4776.56	4755.20	
St. Mary River	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
St Mary Runoff	kaf	15.2	9.8	7.6	9.8	14.4	21.7	46.1	147.5	215.6	130.5	51.7	17.2	687.1
Nat Flow @ Boundary	kaf	22.0	15.7	11.4	13.2	17.2	24.9	55.6	183.6	270.1	158.4	64.0	24.4	860.5
St Mary canal rels	cfs	0	0	0	0	0	0	0	99	600	600	600	600	
St Mary canal rels	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	35.7	36.9	36.9	35.7	151.3
Fresno Reservoir		Initial Cont		57.6 kaf		Maximum Cont		91.7 kaf		Minimum Cont		0.5 kaf		
			Elev	2566.90 ft			Elev	2575.00 ft			Elev	2531.90 ft		
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Milk River runoff	kaf	5.3	2.8	1.8	1.9	4.7	41.3	41.1	40.7	16.1	18.2	7.7	6.6	188.2
From St Mary Canal	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	32.1	33.2	33.2	32.1	136.1
Fresno inflow	kaf	5.3	2.8	1.8	1.9	4.7	41.3	41.1	46.2	48.2	51.4	40.9	38.7	324.3
Fresno Release	kaf	2.8	2.7	2.8	2.8	2.5	10.1	41.1	46.2	64.9	69.1	55.3	21.5	321.8
Fresno Release	cfs	46	45	46	46	45	164	691	751	1091	1124	899	361	
Net Content Change	kaf	2.5	0.1	-1.0	-0.9	2.2	31.2	0.0	0.0	-16.7	-17.7	-14.4	17.2	2.5
End-Month Content	kaf	60.1	60.2	59.2	58.3	60.5	91.7	91.7	91.7	75.0	57.3	42.9	60.1	
End-Month Elev	ft	2567.58	2567.61	2567.34	2567.09	2567.69	2575.00	2575.00	2575.00	2571.50	2566.82	2561.93	2567.58	
Project Allotment	f/ac	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.70	0.70	0.50	0.15	2.30
Project Delivery	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.2	64.9	64.9	46.3	13.9	213.2
FBIIP Demand	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	6.0	3.0	10.0
Fresno-Dodson Gain	kaf	0.0	0.0	0.0	0.0	0.0	26.1	27.3	18.9	24.6	6.8	2.0	5.4	111.1
Bowdoin Demand	kaf	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.5	0.0	0.0	0.0	0.0	3.5
Transfer to Nelson	kaf	1.0	0.0	0.0	0.0	0.0	10.0	20.0	20.0	10.0	10.0	5.0	10.0	86.0
Nelson Reservoir		Initial Cont		26.1 kaf		Maximum Cont		79.0 kaf		Minimum Cont		18.0 kaf		
			Elev	2204.47 ft			Elev	2221.61 ft			Elev	2199.91 ft		
	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Deliv to Nelson	kaf	0.9	0.0	0.0	0.0	0.0	9.0	18.0	18.0	9.0	9.0	4.5	9.0	77.4
Net Content Change	kaf	0.9	-0.9	-0.9	-0.9	-0.8	8.1	17.1	12.2	-5.1	-11.6	-10.6	3.9	11.4
End-Month Content	kaf	27.0	26.1	25.2	24.3	23.5	31.6	48.7	60.9	55.8	44.2	33.6	37.5	
End-Month Elev	ft	2204.93	2204.47	2204.01	2203.54	2203.11	2207.12	2213.64	2217.11	2215.72	2212.20	2208.01	2209.66	
Total Release	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	12.9	19.4	13.9	4.2	55.0
Malta Delivery	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	12.9	12.9	9.2	2.8	42.4
Glasgow Delivery	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	6.5	6.5	4.7	1.4	21.4

FIGURE MTG17

LAKE SHERBURNE

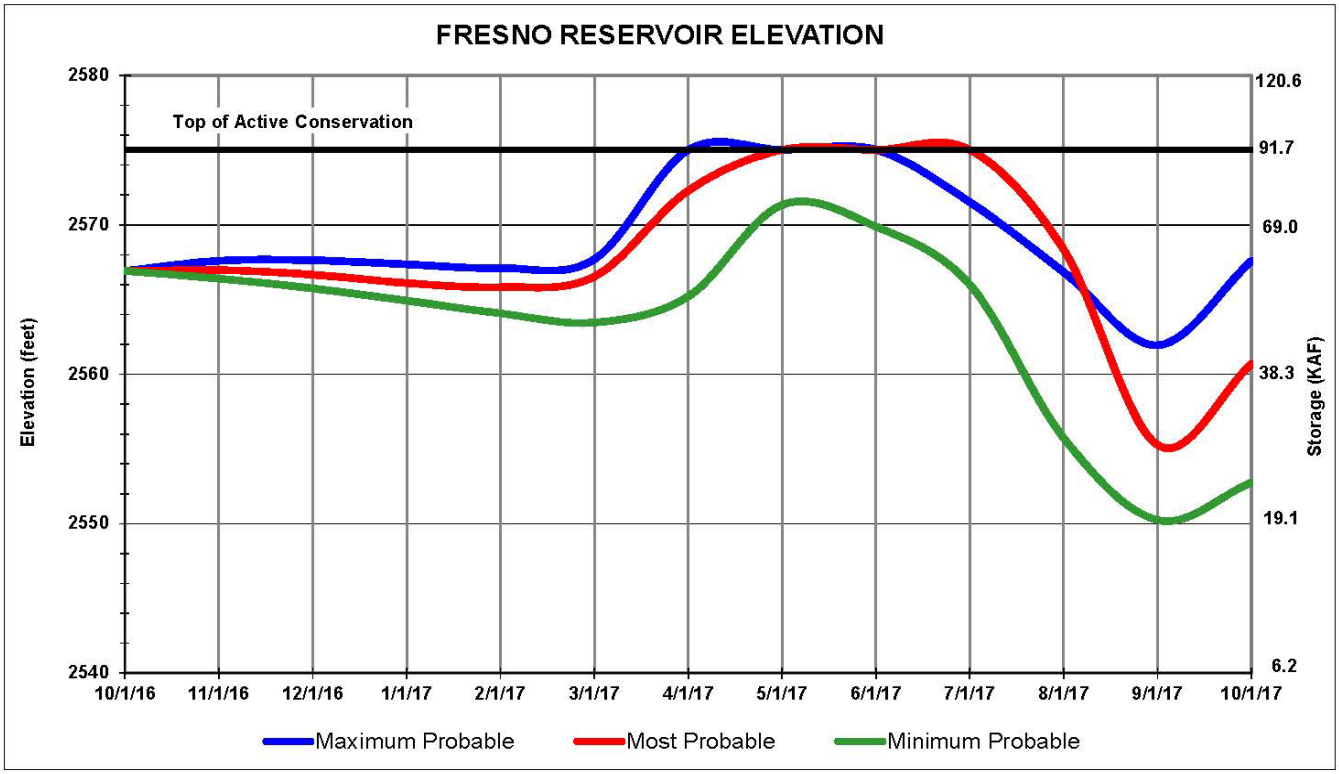


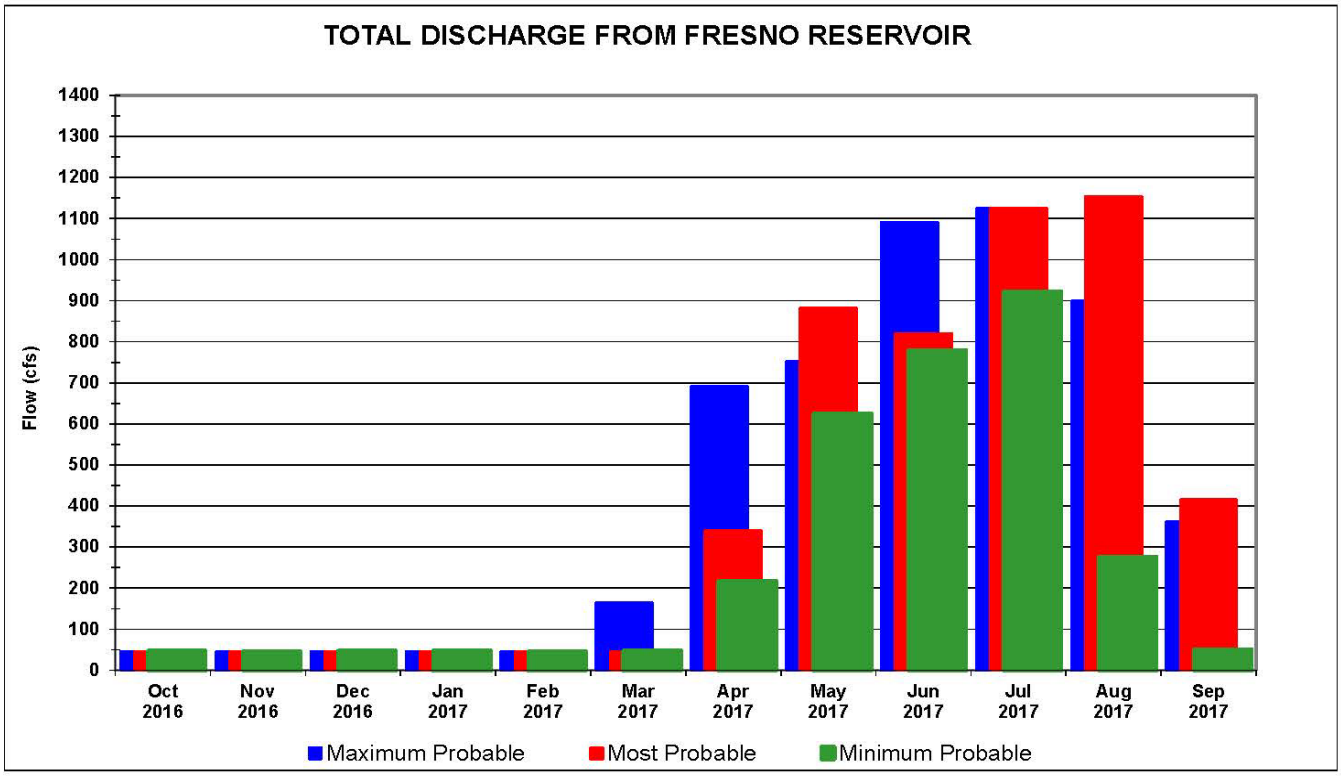


WATER YEAR 2017

FIGURE MTG18

FRESNO RESERVOIR





WATER YEAR 2017

Bighorn Lake and Yellowtail Powerplant

Three operating plans were prepared for 2017 to demonstrate the operations of Bighorn Lake which could occur under various runoff conditions. These operations for the three runoff scenarios are shown in Tables MTT17A-C and Figure MTG19. These plans were prepared only to show the probable limits of operations and therefore, actual conditions and operations could vary widely from the plans to conform to the authorized project purposes and the current general operating criteria established for Yellowtail Dam and Bighorn Lake.

There is a process for setting the November through March release in the operating criteria for the Yellowtail Unit. The winter release is set in November and depends on end of October storage, total April through October natural accretions between Boysen and Buffalo Bill Reservoirs to Yellowtail Dam, and projected releases out of Boysen and Buffalo Bill Reservoirs. Since the November monthly operating plans provide the best projected operations, they are used in this report.

In July 2007, a hydrographic and a topographic survey were conducted and a new elevation-area-capacity table and curve was developed. The 2007 survey determined that Bighorn Lake has a storage capacity of 1,278,896 AF and a surface area of 17,279 acres at a reservoir elevation of 3657.0 feet (the top of the spillway gates). Since closure of the dam in November 1965, the reservoir has accumulated a sediment volume of 103,415 AF below the reservoir elevation of 3657 feet. This volume represents a 7.48 percent reduction in capacity and an average annual deficit of 2,480 AF from November 1965 through July 2007. Sediment was deposited at the annual rate of 0.242 AF per square mile during that period. The revised area-capacity table was put into effect on January 1, 2011, reflecting the new storage levels.

The objectives of operations at Yellowtail are to meet all contractual and agreement obligations, all conservation commitments, to optimize generation, provide flood control in cooperation with the Corps, and meet fish, wildlife, and recreational needs. The reservoir is operated under the following criteria and limitations:

(1) Beginning near the first of January and at least monthly thereafter through June, forecasts are made of the estimated spring inflow from existing and anticipated snowpack and precipitation. When these forecasts become available, Yellowtail Dam and Bighorn Lake is managed and regulated to allow storage to fill to the top of the joint-use pool at an elevation of 3640 feet (1,020,573 AF) and prevent storage in Bighorn Lake from exceeding this level until the peak of the runoff has passed. If releases in excess of full powerplant capacity are required, they are made only to the extent that current inflow and reservoir content indicate that spills are required. Depending on when the spring runoff starts and the volume of water forecasted, the release of water may draw Bighorn Lake below an elevation of 3617.0 feet (807,921 AF).

(2) Once Bighorn Lake has filled or reached its maximum level during spring runoff (normally late June or early July), it is desirable to adjust the releases to maintain storage within the top 5 feet of the joint-use pool through October. Maintaining Bighorn Lake near this elevation provides suitable waterfowl habitat, enhances flat-water recreation, enhances habitat for the lake fisheries, and minimizes dust problems around the southern area of Bighorn Lake.

(3) In late fall, a uniform release from Bighorn Lake to the Bighorn River is scheduled during November through March with the objective of evacuating storage to an elevation of 3617 feet (807,921 AF) by the end of March, depending on the forecasted snowmelt runoff into Bighorn Lake. This target attempts to provide the required storage space needed to safely store the spring runoff while protecting the desired reservoir levels for summer and fall recreation activities.

(4) Releases during October and early November are generally maintained at the lowest forecasted minimum release rate to protect the brown trout spawn, if dry winter conditions require reducing releases later during the winter months.

(5) Whenever an adequate water supply is available, releases from Bighorn Lake will be maintained at rates to sustain flows in the Bighorn River at 2,500 cfs or higher. When there is not an adequate water supply available, it may be necessary to reduce releases to the Bighorn River to 2,000 cfs or the absolute minimum flow of 1,500 cfs required to protect a lower quality river fishery. These flow levels affect the river fishery as follows:

2,500 cfs - provides good spawning, rearing, and cover conditions in all major side channels.

2,000 cfs - provides adequate spawning and rearing conditions in most side channels but cover for adult fish is limited.

1,500 cfs - protects main channel habitat but not important side channels.

(6) During years of below normal runoff, efforts to protect the desired minimum river fishery flow levels may prevent Bighorn Lake from reaching the top of the joint use pool. During some critical dry years, it has been observed that river flows have even been reduced to less than 1,500 cfs to ensure the operation of the Yellowtail Powerplant and also provide desirable lake levels for the recreation season.

(7) All water released from Bighorn Lake is generally released through the Yellowtail Powerplant. Releasing any water in excess of the powerplant capacity (normally 7,500 to 8,200 cfs) is avoided, except during times of unusually large inflow or scheduled powerplant maintenance.

(8) For downstream flood control purposes, avoid making releases that would cause flows in the Bighorn River to exceed 20,000 cfs at St. Xavier and 25,000 cfs at Bighorn and 65,000 cfs in the Yellowstone River at Miles City.

(9) During April through October, water is diverted to the Bighorn Canal to meet downstream irrigation demands of the Crow Indian Irrigation Project. Diversions to the Bighorn Canal are limited to a maximum of about 550 cfs.

(10) During low flow years when the Yellowstone River flow rate at Forsyth, Montana drops below 6,000 cfs anytime between August 10 and September 15, river releases may be increased by 100 cfs to meet contractual commitments with PPL-MT concerning their operations of

Castle Rock Reservoir at Colstrip Powerplant. This release will continue for approximately 10 to 30 days.

(11) Release rates during the winter are generally not changed or fluctuated more than 100 cfs in 6 hours when the downstream river channel is ice covered.

(12) Because the inflow to Bighorn Lake is heavily dependent upon the releases from Boysen and Buffalo Bill Reservoirs, all reservoir and river operations are closely coordinated with the WYAO.

(13) In an agreement with the NCIT and pursuant to the Northern Cheyenne Indian Reserved Water Rights Settlement Act of 1992, Reclamation recognizes 30,000 AF of stored water in Bighorn Reservoir for use or disposition by NCIT. The United States shall furnish a maximum of 30,000 AF of water annually to NCIT in accordance with the limitations set forth in the Compact and the Settlement Act.

(14) In an agreement with the CT and pursuant to the CT Water Rights Settlement Act of 2010, Reclamation recognizes up to 300,000 AF of stored water in Bighorn Reservoir for use or disposition by CT. The United States shall furnish up to 300,000 AF of water annually to CT in accordance with the limitations set forth in the Streamflow and Lake Level Management Plan, Compact and the Settlement Act.

Inflows into Bighorn Lake continued to stay below average through the month of August 2016. The river release was kept at 2,250 cfs throughout the months of August and September. Several shift changes to the river gage were required to keep up with the algae growth. Valley and mountain precipitation in August were 83 and 81 percent of average.

Valley and mountain precipitation in September 2016 was well above average at 251 and 160 percent. Storage in Bighorn Lake ended the year with a content of 942,447 AF at an elevation of 3633.20 feet. This was 107 percent of average and 27,055 AF or 2.51 feet lower than at the end of WY 2015. Winter releases were set to 2,510 cfs in November following the procedures outlined in the operating criteria. Releases were later increased in November to 2,610 cfs in response to a higher winter release rate from Boysen Reservoir.

The forecasted inflows to Bighorn Lake are based upon the natural accretions between Boysen and Buffalo Bill Reservoirs to Yellowtail Dam plus the projected releases out of Boysen and Buffalo Bill Dams. The projected releases from Boysen and Buffalo Bill Dams are provided by the WYAO.

The most probable November through March accretions were forecasted as 60 percentile of historic accretions, 40 percent exeedence. The April through October accretions were estimated as 50 percentile of historic accretions, 50 percent exeedence.

The minimum probable November through March accretions were estimated to be 40,000 AF less than the most probable November through March accretions. The April through June accretions were estimated as 10 percentile historic accretions, 90 exeedence.

The maximum probable November through March accretions were estimated to be about 40,000 AF greater than the most probable November through March accretions. The April through October accretions were estimated as 90 percentile historic accretions, 10 percent exeedence.

In all three runoff conditions, the release from November through January is 2,510 cfs. The release was increased to 2,610 cfs in November after the winter release from Boysen was increased by 100 cfs. Under the most probable runoff conditions, the river release would stay at 2,610 cfs through April until increases were made during spring runoff. Storage in Bighorn Lake would be expected to fill to the top of the joint-use pool at an elevation of 3640.0 feet (1,020,573 AF) by the end of July and essentially remain near full through October. Under the minimum probable runoff scenario, the river release would start decreasing in February and continue to decrease until it is 2,000 cfs in March. Bighorn Lake would be expected to slowly fill to near elevation 3630.3 feet by the end of June. This would be about 9.7 feet below the top of the joint-use pool. Under the maximum probable runoff conditions, it is anticipated the river release would be increased starting in February and continue to increase through runoff. Storage would be expected to fill to the top of the joint use pool at an elevation of 3640.0 feet by the end of July.

The average power generation produced annually at Yellowtail Powerplant from 1987 to 2015 is 748.7 million kilowatt-hours. Under the most probable runoff conditions, power generation produced at Yellowtail Powerplant during WY 2016 is expected to be about 891.7 million kilowatt-hours, 143.0 million kilowatt-hours more than average. Under the minimum probable runoff conditions, power generation would be about 155.4 million kilowatt-hours less than average. Under the maximum probable runoff conditions, power generation would be about 453.1 million kilowatt-hours greater than average.

In all three plans, maintenance outages are scheduled as shown on Table MTT19. Only under maximum probable runoff conditions, would a spill in excess of full powerplant capacity be expected during these 2016 power outages.

TABLE MTT17A
Bighorn Lake Operating Plan
Based on November 1, 2016 Inflow Estimates
2017 Minimum Probable Plan

Bighorn Reservoir		Initial Cont Elev	992.9 kaf 3637.73 ft			Maximum Cont Elev	1278.9 kaf 3657.00 ft			Minimum Cont Elev	469.9 kaf 3547.00 ft		
	2016	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Boysen Release	kaf	49.1	50.7	50.7	45.8	57.2	49.1	72.2	71.4	73.8	73.8	53.6	50.7	698.1
Boysen Release	cfs	825	825	825	825	930	825	1174	1200	1200	1200	901	825	
Buffalo Bill Release	kaf	12.2	12.6	12.6	11.4	12.6	42.6	107.2	110.7	118.7	108.3	94.0	41.7	684.6
Buffalo Bill Release	cfs	205	205	205	205	205	716	1743	1860	1930	1761	1580	678	
Station Gain	kaf	44.2	27.1	30.8	35.1	54.0	20.3	10.0	1.3	-70.0	-52.3	-0.8	46.2	145.9
Monthly Inflow	kaf	105.5	90.4	94.1	92.3	123.8	112.0	189.4	183.4	122.5	129.8	146.8	138.6	1528.6
Monthly Inflow	cfs	1773	1470	1530	1662	2013	1882	3080	3082	1992	2111	2467	2254	
Turbine Release	kaf	145.2	150.0	150.0	121.1	118.7	116.1	130.6	137.6	146.8	145.7	132.3	121.7	1615.8
Bypass/Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Release	kaf	145.2	150.0	150.0	121.1	118.7	116.1	130.6	137.6	146.8	145.7	132.3	121.7	1615.8
Total Release	cfs	2440	2440	2440	2181	1930	1951	2124	2312	2387	2370	2223	1979	
Spring Flow	kaf	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	17.5	3.0	111.6
Afterbay Rels	kaf	149.4	154.3	154.3	125.0	123.0	120.3	134.9	141.8	151.1	150.0	136.5	126.0	1666.6
Afterbay Rels	cfs	2511	2509	2509	2251	2000	2022	2194	2383	2457	2440	2294	2049	
River Release	kaf	149.4	154.3	154.3	125.0	123.0	119.0	123.0	119.0	123.0	123.0	119.0	123.0	1555.0
River Release	cfs	2511	2509	2509	2251	2000	2000	2000	2000	2000	2000	2000	2000	
Min Release	kaf	149.4	154.3	154.3	125.0	123.0	119.0	123.0	119.0	123.0	123.0	119.0	123.0	1555.0
End-Month Content	kaf	953.2	893.6	837.7	808.9	814.0	809.9	868.7	914.5	890.2	874.3	888.8	905.7	
End-Month Elevation	ft	3634.22	3628.02	3621.13	3617.14	3617.88	3617.29	3625.07	3630.34	3627.62	3625.75	3627.46	3629.38	
Net Change Content	kaf	-39.7	-59.6	-55.9	-28.8	5.1	-4.1	58.8	45.8	-24.3	-15.9	14.5	16.9	-87.2

Yellowtail Power	2016	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Turbine Release	kaf	145.2	150.0	150.0	121.1	118.7	116.1	130.6	137.6	146.8	145.7	132.3	121.7	1615.8
Generation	gwh	55.057	56.430	55.557	42.649	41.705	40.552	47.546	51.207	54.961	54.245	48.548	44.111	592.568
End-Month Power Cap	mw	282.0	276.1	269.6	265.8	266.5	265.9	273.3	278.3	275.8	274.0	275.6	277.4	
% Max Gen		27	26	26	22	19	20	22	25	26	25	23	21	
Ave kwh/af		379	376	370	352	351	349	364	372	374	372	367	362	367
Upstream Generation	gwh	7.305	7.534	7.495	5.869	7.965	14.964	26.972	26.568	27.371	25.931	21.794	13.491	193.259
Total Generation	gwh	62.362	63.964	63.052	48.518	49.670	55.516	74.518	77.775	82.332	80.176	70.342	57.602	785.827

TABLE MTT17B
Bighorn Lake Operating Plan
Based on November 1, 2016 Inflow Estimates
2017 Most Probable Plan

Bighorn Reservoir		Initial Cont Elev	992.9 kaf 3637.73 ft			Maximum Cont Elev	1278.9 kaf 3657.00 ft			Minimum Cont Elev	469.9 kaf 3547.00 ft		
	2016	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Boysen Release	kaf	49.1	50.7	50.7	45.8	57.2	109.6	135.4	131.1	133.7	98.9	78.2	65.5	1005.9
Boysen Release	cfs	825	825	825	825	930	1842	2202	2203	2174	1608	1314	1065	
Buffalo Bill Release	kaf	12.2	12.6	12.6	11.4	12.6	79.3	110.6	143.2	180.9	132.6	96.4	46.8	851.2
Buffalo Bill Release	cfs	205	205	205	205	205	1333	1799	2407	2942	2157	1620	761	
Station Gain	kaf	52.0	33.9	38.3	44.4	62.7	39.9	62.2	119.0	-61.3	-45.3	16.4	65.2	427.4
Monthly Inflow	kaf	113.3	97.2	101.6	101.6	132.5	228.8	308.2	393.3	253.3	186.2	191.0	177.5	2284.5
Monthly Inflow	cfs	1904	1581	1652	1829	2155	3845	5012	6610	4120	3028	3210	2887	
Turbine Release	kaf	145.2	150.1	150.1	135.6	150.2	252.1	271.4	236.5	210.9	207.2	191.8	183.2	2284.3
Bypass/Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Release	kaf	145.2	150.1	150.1	135.6	150.2	252.1	271.4	236.5	210.9	207.2	191.8	183.2	2284.3
Total Release	cfs	2440	2441	2441	2442	2443	4237	4414	3975	3430	3370	3223	2979	
Spring Flow	kaf	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	17.5	3.0	111.6
Afterbay Rels	kaf	149.4	154.4	154.4	139.5	154.5	256.3	275.7	240.7	215.2	211.5	196.0	187.5	2335.1
Afterbay Rels	cfs	2511	2511	2511	2512	2513	4307	4484	4045	3500	3440	3294	3049	
River Release	kaf	149.4	154.4	154.4	139.5	154.5	255.0	263.8	217.9	187.1	184.5	178.5	184.5	2223.5
River Release	cfs	2511	2511	2511	2512	2513	4285	4290	3662	3043	3001	3000	3001	
Min Release	kaf	89.3	92.2	92.2	83.3	92.2	148.8	153.7	148.8	153.7	184.5	178.5	184.5	1601.7
End-Month Content	kaf	961.0	908.1	859.6	825.6	807.9	784.6	821.4	978.2	1020.6	999.6	998.8	993.1	
End-Month Elevation	ft	3634.94	3629.64	3623.95	3619.50	3617.00	3613.42	3618.92	3636.47	3640.00	3638.30	3638.23	3637.75	
Net Change Content	kaf	-31.9	-52.9	-48.5	-34.0	-17.7	-23.3	36.8	156.8	42.4	-21.0	-0.8	-5.7	0.2

Yellowtail Power	2016	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Turbine Release	kaf	145.2	150.1	150.1	135.6	150.2	252.1	271.4	236.5	210.9	207.2	191.8	183.2	2284.3
Generation	gwh	55.145	56.680	55.959	49.103	55.121	97.747	106.833	96.258	85.651	83.677	76.728	72.753	891.655
End-Month Power Cap	mw	282.7	277.7	272.3	268.0	265.7	262.3	267.5	284.2	287.5	285.9	285.8	285.4	
% Max Gen		27	26	26	25	26	47	50	46	40	39	37	34	
Ave kwh/af		380	378	373	362	367	388	394	407	406	404	400	397	390
Upstream Generation	gwh	7.316	7.567	7.544	5.927	8.063	27.917	32.440	33.715	35.301	32.245	26.650	17.672	242.357
Total Generation	gwh	62.461	64.247	63.503	55.030	63.184	125.664	139.273	129.973	120.952	115.922	103.378	90.425	1134.012

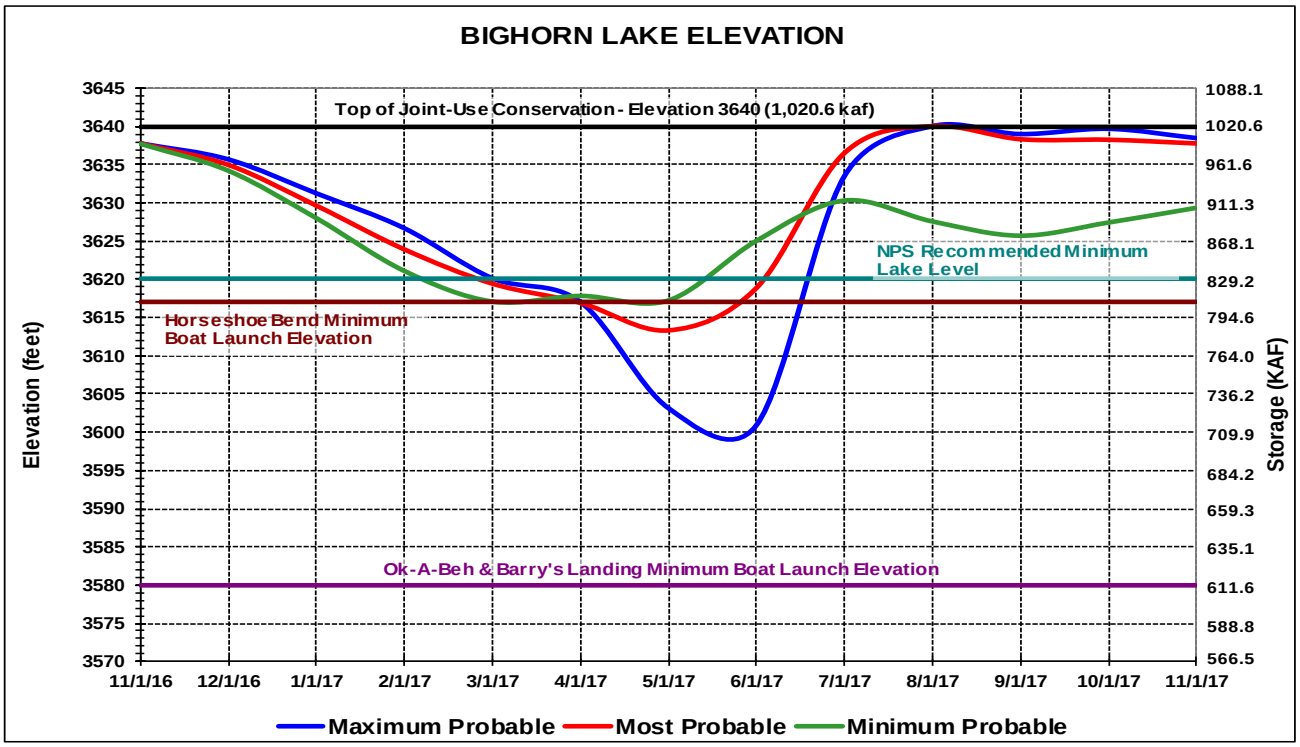
TABLE MTT17C
Bighorn Lake Operating Plan
Based on November 1, 2016 Inflow Estimates
2017 Maximum Probable Plan

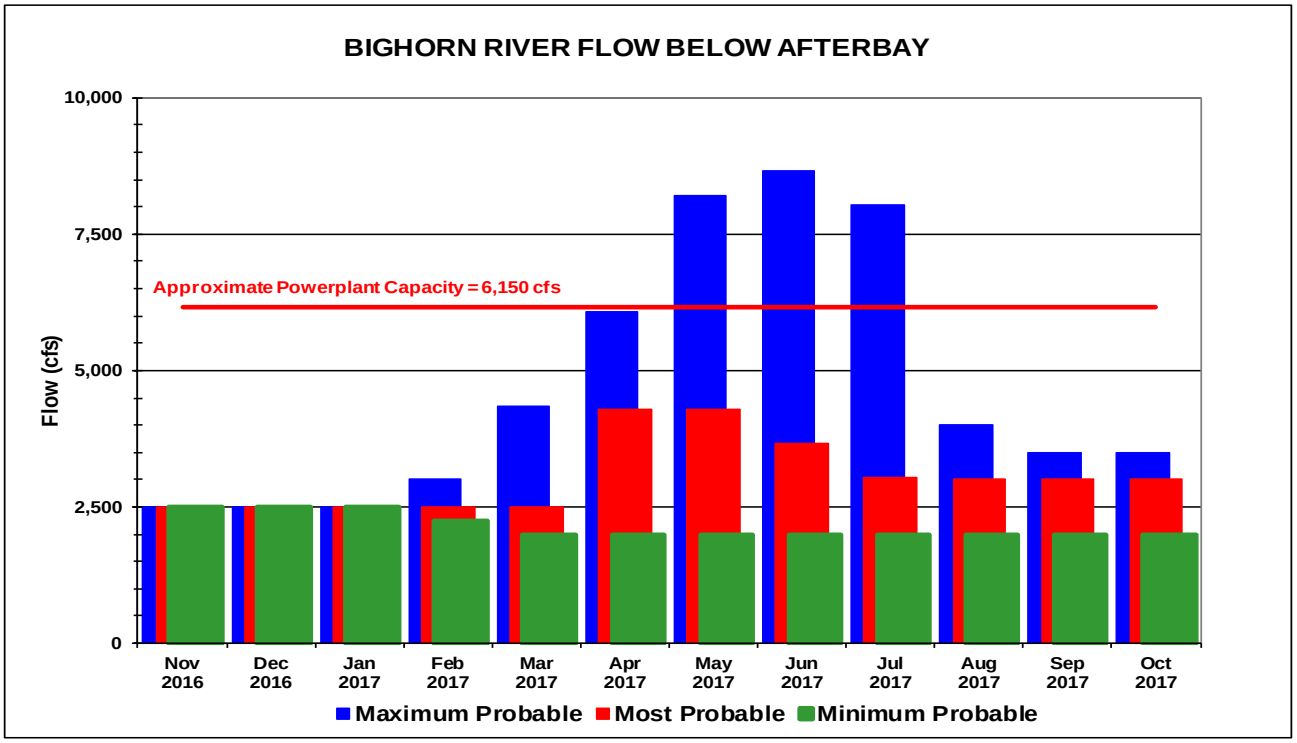
Bighorn Reservoir		Initial Cont Elev	992.9 kaf 3637.73 ft			Maximum Cont Elev	1278.9 kaf 3657.00 ft			Minimum Cont Elev	469.9 kaf 3547.00 ft		
	2016	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Boysen Release	kaf	49.1	50.7	50.7	45.8	104.5	130.9	184.5	278.3	287.5	131.1	88.4	63.3	1464.8
Boysen Release	cfs	825	825	825	825	1700	2200	3001	4677	4676	2132	1486	1029	
Buffalo Bill Release	kaf	12.2	12.6	12.6	11.4	64.4	94.7	187.3	220.2	305.4	153.5	105.1	51.5	1230.9
Buffalo Bill Release	cfs	205	205	205	205	1047	1591	3046	3701	4967	2496	1766	838	
Station Gain	kaf	59.7	40.6	45.8	53.7	71.3	51.0	128.9	266.4	0.1	-28.7	36.7	84.2	809.7
Monthly Inflow	kaf	121.0	103.9	109.1	110.9	240.2	276.6	500.7	764.9	593.0	255.9	230.2	199.0	3505.4
Monthly Inflow	cfs	2033	1690	1774	1997	3906	4648	8143	12855	9644	4162	3869	3236	
Turbine Release	kaf	145.2	150.0	150.0	162.7	262.2	358.3	368.9	357.0	368.9	268.7	221.6	213.9	3027.4
Bypass/Spill/Waste	kaf	0.0	0.0	0.0	0.0	0.0	0.0	143.7	177.4	148.3	0.0	0.0	0.0	469.4
Total Release	kaf	145.2	150.0	150.0	162.7	262.2	358.3	512.6	534.4	517.2	268.7	221.6	213.9	3496.8
Total Release	cfs	2440	2440	2440	2930	4264	6021	8337	8981	8411	4370	3724	3479	
Spring Flow	kaf	4.2	4.3	4.3	3.9	4.3	4.2	4.3	4.2	4.3	4.3	4.2	4.3	50.8
Irrigation Reqmnt	kaf	0.0	0.0	0.0	0.0	0.0	1.3	11.9	22.8	28.1	27.0	17.5	3.0	111.6
Afterbay Rels	kaf	149.4	154.3	154.3	166.6	266.5	362.5	516.9	538.6	521.5	273.0	225.8	218.2	3547.6
Afterbay Rels	cfs	2511	2509	2509	3000	4334	6092	8407	9051	8481	4440	3795	3549	
River Release	kaf	149.4	154.3	154.3	166.6	266.5	361.2	505.0	515.8	493.4	246.0	208.3	215.2	3436.0
River Release	cfs	2511	2509	2509	3000	4334	6070	8213	8668	8024	4001	3501	3500	
Min Release	kaf	149.4	154.3	154.3	166.6	266.5	89.3	92.2	89.3	92.2	246.0	208.3	215.2	1923.6
End-Month Content	kaf	968.7	922.6	881.7	829.9	807.9	726.2	714.3	944.8	1020.6	1007.8	1016.4	1001.5	
End-Month Elevation	ft	3635.64	3631.20	3626.63	3620.09	3617.00	3603.11	3600.84	3633.42	3640.00	3638.97	3639.66	3638.45	
Net Change Content	kaf	-24.2	-46.1	-40.9	-51.8	-22.0	-81.7	-11.9	230.5	75.8	-12.8	8.6	-14.9	8.6

Yellowtail Power	2016	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Turbine Release	kaf	145.2	150.0	150.0	162.7	262.2	358.3	368.9	357.0	368.9	268.7	221.6	213.9	3027.4
Generation	gwh	55.230	56.833	56.254	60.973	102.665	135.058	150.660	145.800	150.660	110.613	90.363	86.701	1201.810
End-Month Power Cap	mw	283.4	279.2	274.8	268.6	265.7	252.5	250.3	281.3	287.5	286.5	287.2	286.1	
% Max Gen		27	27	26	32	48	65	70	70	70	52	44	40	
Ave kwh/af		380	379	375	375	392	377	408	408	408	412	408	405	397
Upstream Generation	gwh	7.320	7.573	7.565	5.957	24.495	29.310	33.276	33.675	35.307	35.044	29.327	18.770	267.619
Total Generation	gwh	62.550	64.406	63.819	66.930	127.160	164.368	183.936	179.475	185.967	145.657	119.690	105.471	1469.429

FIGURE MTG19

BIGHORN LAKE





WATER YEAR 2017

ENERGY GENERATION OPERATION PLANS

Energy generation at Canyon Ferry and Yellowtail Powerplants for minimum probable, most probable, and maximum probable runoff scenarios is expected to vary between 857,000,000 and 1,596,000,000 kilowatt-hours as shown in Table MTT18.

Table MTT18

Estimated Energy Generation During Water Year 2017
(Million Kilowatt-Hours)

Plant	Minimum Probable Runoff	Most Probable Runoff	Maximum Probable Runoff
Canyon Ferry	252	356	423
Yellowtail	605	875	1,173
Total	857	1,231	1,596

Operation of powerplants and transmission facilities in the Eastern and Western Divisions will be coordinated to bring about the most efficient use of power production to realize maximum project benefits. It is also anticipated that the marketing from all Federal power systems in the Missouri and Colorado River Basins will be closely coordinated to optimize the revenues to the Federal Government.

OPERATING PLANS

FOR

WATER YEAR 2017

FOR BIGHORN BASIN RESERVOIRS

(BULL LAKE, BOYSEN BUFFALO BILL)

UNDER THE RESPONSIBILITY

OF THE

WYOMING AREA OFFICE

OPERATING PLANS FOR WY 2017

Bull Lake

Three operating plans were prepared for WY 2017 to show the operations which could occur under various runoff conditions. The operations for the three runoff conditions are shown in Table WYT10A, WYT10B, WYT10C and Figure WYG6. These plans were prepared only to show the probable limits of operations and therefore actual conditions and operations could vary widely from the most probable plan.

The primary objective of operations at Bull Lake is to provide irrigation water to Midvale. Under normal operation, the reservoir also provides small incidental flood control benefits and a water resource for fish, wildlife, and recreation. Bull Lake is operated under the following criteria and limitations:

(1) Based on forecasted inflows, March-June releases are scheduled with the objective of filling the lake to a content of 152,459 AF at an elevation of 5805.00 feet during July while eliminating or minimizing any spill.

(2) During April-October, releases must be adequate to meet the irrigation needs of Midvale and downstream irrigators with senior water rights on Bull Lake Creek.

(3) Based on the available water supply, non-irrigation season releases from Bull Lake to Bull Lake Creek are generally maintained between 20 and 45 cfs.

(4) The reservoir water surface elevation will be kept below an elevation of 5794.00 feet during the winter to prevent ice damage to the spillway gates. The gates were not designed to withstand ice pressure. To prevent damage to the concrete in the spillway inlet from ice, the reservoir is operated to have a storage level of 100,000 AF or less by November 30. The objective at the onset of winter is to be as close as possible to the 100,000 AF level (5787.13 feet) to also provide winter fish habitat.

2017 Operating Plans

Storage in Bull Lake at the end of WY 2016 was 38,288 AF at an elevation of 5760.80 feet, which is 25 percent of capacity and 51 percent of the end of September average. Projected inflows for all months of WY 2017 under most probable inflow conditions are estimated to be median flows, or flows that have historically been exceeded 50 percent of the time. The reservoir is expected to fill during July under the most probable and reasonable maximum inflow scenarios. If reasonable minimum inflows should occur during each month of WY 2017 the reservoir would reach a maximum content of approximately 87,100 AF during June and then decline as demands exceed inflow.

Reasonable minimum condition inflows are estimated to be lower decile flows for all months in WY 2017. Lower decile flows are flows that have historically been exceeded 90 percent of the time.

Under reasonable maximum inflow conditions, upper decile flows are expected for all months in WY 2017. Upper decile flows are flows that have historically been exceeded 10 percent of the time.

Under all inflow scenarios, releases in October following the end of irrigation season and continuing through the fall and winter would be held at 25 cfs with the objective of maintaining the reservoir level through the winter period.

Water diverted into the Wyoming Canal can be delivered to Midvale lands directly or routed through Pilot Butte Reservoir and delivered to district lands via the Pilot Canal. In June of 2009, both units at Pilot Butte Powerplant were placed in "Mothballed" status and are not expected to generate electricity in WY 2017.

TABLE WYT10A
RIVERTON PROJECT OPERATING PLAN
Based on October 1 Inflow Estimates

WRBAOP V2.1E 07-Feb-1995 Run: 1-Oct-2016 10:46
Based on Most Probable April-July runoff of: Bull Lake - 144 kaf / Wind River ab Bull Lake Creek - 427 kaf / Riverton – 161 kaf
This plan assumes an annual demand of 165 KAF for the North Canal and 182 KAF for the Pilot Canal

RIVERTON PROJECT OPERATING PLAN
Year Beginning Oct 2016

Bull Lake Reservoir Operations — Initial Content 38.3 Kaf — Operating Limits: Max 151.0 Kaf, 5804.54 Ft. / Min 20.0 Kaf, 5750.93 Ft.

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Reservoir Inflow	kaf	6.2	3.4	2.6	2.6	1.7	2.0	2.9	29.4	64.2	47.4	20.2	10.5	193.1
Total Dam Release	kaf	18.8	1.5	1.5	1.5	1.4	1.5	1.5	1.5	1.5	18.9	41.5	40.2	131.4
Total Dam Release	cfs	305.	25.	25.	25.	25.	25.	25.	25.	25.	308.	675.	675.	
Excess Release	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.4	10.4	0.0	27.8
End-month Content	kaf	25.7	27.6	28.7	29.8	30.1	30.5	32.0	59.8	122.5	151.0	129.7	100.0	
End-month Elevation	ft	5754.2	5755.2	5755.8	5756.3	5756.5	5756.8	5757.5	5771.0	5795.2	5804.5	5797.6	5787.1	
BLR Net Change	kaf	-12.6	1.9	1.1	1.1	0.3	0.5	1.4	27.9	62.7	28.5	-21.3	-29.7	61.7

Wind River		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Flow abv BL Creek	kaf	34.1	24.6	18.4	16.0	15.0	17.4	28.3	106.4	174.6	115.3	53.4	35.7	639.2
Crowheart Gage Flow	kaf	52.9	26.1	19.9	17.5	16.4	18.9	29.8	107.9	176.1	134.2	94.9	75.9	770.6
Flow Below Div Dam	kaf	31.7	26.1	19.9	17.5	16.4	18.9	10.4	53.2	111.4	53.3	35.2	18.3	412.4
Gain/Return Flow	kaf	0.0	0.0	0.0	0.0	0.0	0.0	4.8	7.4	7.1	7.4	6.1	5.4	38.2
Indian Irrigation	kaf	1.2	0.0	0.0	0.0	0.0	0.0	1.8	6.1	6.0	6.1	5.5	4.5	31.3
LeClair/Riverton	kaf	0.0	0.0	0.0	0.0	0.0	0.0	3.5	18.8	24.2	27.2	21.1	15.0	109.8
LeC/Riv Shortage	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Riverton Gage Flow	cfs	495.0	438.4	324.2	285.2	295.1	308.0	165.7	580.1	1485.2	445.0	239.6	70.1	

Wyoming Canal		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Total Diversion	kaf	21.2	0.0	0.0	0.0	0.0	0.0	19.4	54.7	64.7	80.9	59.7	57.6	358.2
North Canal Flow	kaf	3.4	0.0	0.0	0.0	0.0	0.0	9.8	26.4	31.2	36.5	30.9	27.0	165.2
North Canal Shortage	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Pilot Butte Reservoir Operations — Initial Content 7.4 Kaf — Operating Limits: Max 29.9 Kaf, 5459.98 Ft. / Min 10.0 Kaf, 5433.49 Ft.

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Reservoir Inflow	kaf	17.8	0.0	0.0	0.0	0.0	0.0	9.6	28.3	33.5	44.4	28.8	30.6	193.0
Power Generated	mwh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pilot Canal Release	kaf	0.0	0.0	0.0	0.0	0.0	0.0	6.7	28.0	33.1	43.9	37.4	33.3	182.4
Pilot Canal Shortage	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
End-month Content	kaf	25.0	24.8	24.7	24.6	24.5	24.3	27.0	27.0	27.0	27.0	18.0	15.0	
PBR Net Change	kaf	17.6	-0.2	-0.1	-0.1	-0.1	-0.2	2.7	0.0	0.0	0.0	-9.0	-3.0	7.6
End-month Elevation	ft	5454.3	5454.1	5454.0	5453.9	5453.8	5453.5	5456.7	5456.7	5456.7	5456.7	5445.5	5441.3	

Based on Reasonable Minimum April-July runoff of: Bull Lake - 98 kaf / Wind River ab Bull Lake Creek – 257 kaf / Riverton – 27 kaf
This plan assumes an annual demand of 159 KAF for the North Canal and 180 KAF for the Pilot Canal
RIVERTON PROJECT OPERATING PLAN

Year Beginning Oct 2016

Bull Lake Reservoir Operations — Initial Content 38.3 Kaf — Operating Limits: Max 151.5 Kaf, 5804.70 Ft. / Min 20.0 Kaf, 5750.93 Ft.

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Reservoir Inflow	kaf	4.5	2.0	1.7	1.6	1.2	1.6	3.2	26.1	40.8	27.7	15.3	7.5	133.2
Total Dam Release	kaf	17.1	1.5	1.5	1.5	1.4	1.5	1.5	3.0	4.8	51.3	48.5	17.8	151.5
Total Dam Release	cfs	278.	25.	25.	25.	25.	25.	25.	49.	81.	834.	789.	300.	
Excess Release	kaf	15.6	0.0	0.0	0.0	0.0	0.0	0.0	1.5	3.3	0.0	0.0	0.0	20.4
End-month Content	kaf	25.7	26.2	26.4	26.4	26.2	26.3	28.0	51.1	87.1	63.5	30.3	20.0	
End-month Elevation	ft	5754.1	5754.4	5754.5	5754.5	5754.4	5754.5	5755.4	5767.0	5782.3	5772.6	5756.7	5750.9	
BLR Net Change	kaf	-12.6	0.5	0.2	0.1	-0.2	0.1	1.7	23.1	36.0	-23.6	-33.2	-10.3	-18.3

Wind River		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Flow abv BL Creek	kaf	28.7	21.3	17.2	15.0	13.8	16.5	24.5	74.0	98.3	59.9	36.0	28.3	433.5
Crowheart Gage Flow	kaf	45.8	22.8	18.7	16.5	15.2	18.0	26.0	77.0	103.1	111.2	84.5	46.1	585.0
Flow Below Div Dam	kaf	21.2	22.8	18.7	16.5	15.2	18.0	6.6	22.3	38.4	30.3	24.8	18.3	253.1
Gain/Return Flow	kaf	0.0	0.0	0.0	0.0	0.0	0.0	4.8	7.4	7.1	7.4	6.1	5.4	38.2
Indian Irrigation	kaf	1.2	0.0	0.0	0.0	0.0	0.0	1.8	6.1	6.0	6.1	5.5	4.5	31.3
LeClair/Riverton	kaf	0.0	0.0	0.0	0.0	0.0	0.0	3.5	18.8	24.2	27.2	21.1	15.0	109.8
LeC/Riv Shortage	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Riverton Gage Flow	cfs	324.8	383.0	304.7	269.0	273.5	293.3	101.9	77.1	258.8	70.0	70.0	70.0	

Wyoming Canal		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Total Diversion	kaf	24.6	0.0	0.0	0.0	0.0	0.0	19.4	54.7	64.7	80.9	59.7	27.9	331.9
North Canal Flow	kaf	3.4	0.0	0.0	0.0	0.0	0.0	9.8	26.4	31.2	36.5	30.9	14.3	152.5
North Canal Shortage	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7	12.7

Pilot Butte Reservoir Operations — Initial Content 7.4 Kaf — Operating Limits: Max 29.9 Kaf, 5459.98 Ft. / Min 10.0 Kaf, 5433.49 Ft.

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Reservoir Inflow	kaf	21.2	0.0	0.0	0.0	0.0	0.0	9.6	28.3	33.5	44.4	28.8	13.6	179.4
Power Generated	mwh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pilot Canal Release	kaf	3.4	0.0	0.0	0.0	0.0	0.0	6.7	28.0	33.1	43.9	37.4	21.3	173.8
Pilot Canal Shortage	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0
End-month Content	kaf	25.0	24.8	24.7	24.6	24.5	24.3	27.0	27.0	27.0	27.0	18.0	10.0	
PBR Net Change	kaf	17.6	-0.2	-0.1	-0.1	-0.1	-0.2	2.7	0.0	0.0	0.0	-9.0	-8.0	2.6
End-month Elevation	ft	5454.3	5454.1	5454.0	5453.9	5453.8	5453.5	5456.7	5456.7	5456.7	5456.7	5445.5	5433.5	

Based on Reasonable Maximum April-July runoff of: Bull Lake - 195 kaf / Wind River ab Bull Lake Creek - 642 kaf / Riverton – 424 kaf

This plan assumes an annual demand of 165 KAF for the North Canal and 186 KAF for the Pilot Canal

RIVERTON PROJECT OPERATING PLAN
Year Beginning Oct 2016

Bull Lake Reservoir Operations — Initial Content 38.3 Kaf — Operating Limits: Max 151.0 Kaf, 5804.54 Ft. / Min 20.0 Kaf, 5750.93 Ft.

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Reservoir Inflow	kaf	5.5	3.0	2.7	2.4	1.8	2.2	4.5	28.1	86.3	75.7	32.3	12.0	256.5
Total Dam Release	kaf	18.1	5.0	5.2	3.6	1.8	2.2	4.5	5.2	5.0	48.9	48.4	46.9	194.8
Total Dam Release	cfs	294.	84.	84.	59.	32.	36.	76.	84.	84.	796.	788.	788.	
Excess Release	kaf	12.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.8	32.3	7.3	96.2
End-month Content	kaf	25.7	23.7	21.2	20.0	20.0	20.0	20.0	42.9	124.2	151.0	134.9	100.0	
End-month Elevation	ft	5754.1	5753.0	5751.6	5750.9	5750.9	5750.9	5750.9	5763.1	5795.7	5804.5	5799.3	5787.1	
BLR Net Change	kaf	-12.6	-2.0	-2.5	-1.2	0.0	0.0	0.0	22.9	81.3	26.8	-16.1	-34.9	61.7

Wind River		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Flow abv BL Creek	kaf	36.1	25.0	20.6	18.9	16.1	19.9	25.5	119.9	305.1	191.1	79.4	44.0	901.6
Crowheart Gage Flow	kaf	54.2	30.0	25.8	22.5	17.9	22.1	30.0	125.1	310.1	240.0	127.8	90.9	1096.4
Flow Below Div Dam	kaf	29.6	30.0	25.8	22.5	17.9	22.1	10.6	70.4	245.4	159.1	68.1	33.3	734.8
Gain/Return Flow	kaf	0.0	0.0	0.0	0.0	0.0	0.0	4.8	7.4	7.1	7.4	6.1	5.4	38.2
Indian Irrigation	kaf	1.2	0.0	0.0	0.0	0.0	0.0	1.8	6.1	6.0	6.1	5.5	4.5	31.3
LeClair/Riverton	kaf	0.0	0.0	0.0	0.0	0.0	0.0	3.5	18.8	24.2	27.2	21.1	15.0	109.8
LeC/Riv Shortage	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Riverton Gage Flow	cfs	461.4	504.1	419.0	366.5	322.3	359.4	169.3	858.6	3737.4	2165.7	774.9	322.0	

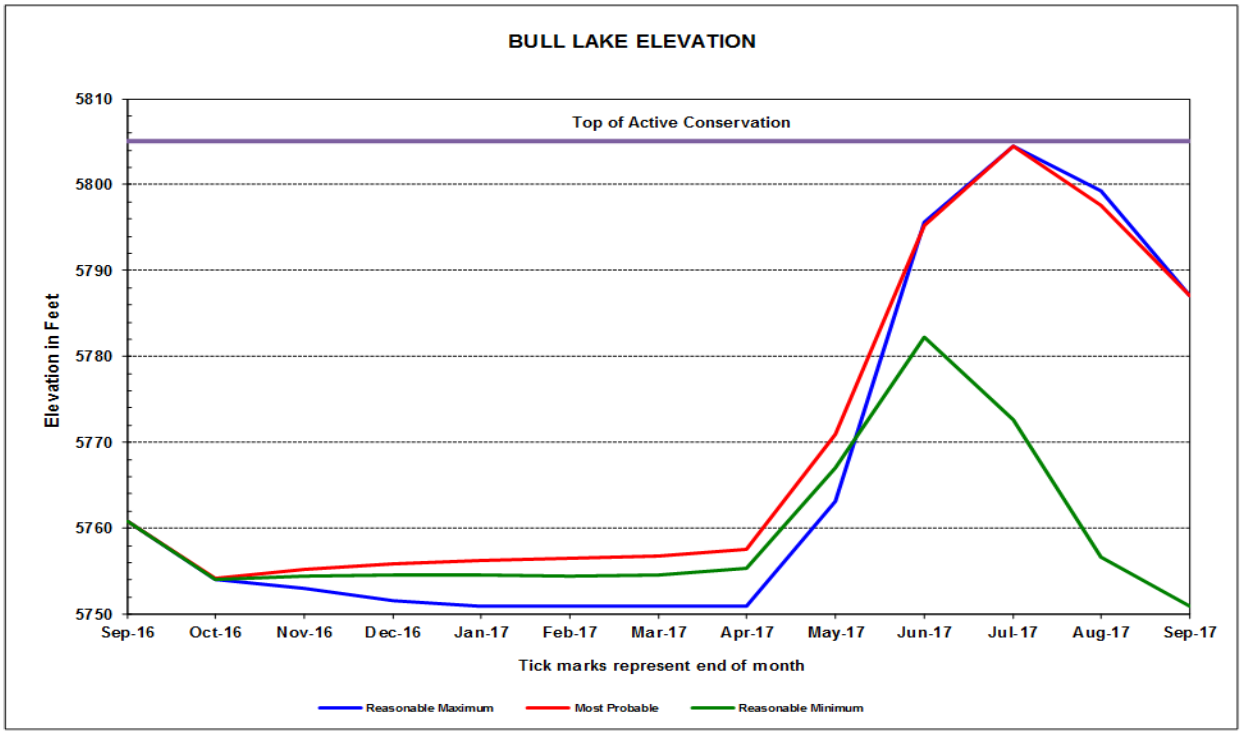
Wyoming Canal		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Total Diversion	kaf	24.6	0.0	0.0	0.0	0.0	0.0	19.4	54.7	64.7	80.9	59.7	57.6	361.6
North Canal Flow	kaf	3.4	0.0	0.0	0.0	0.0	0.0	9.8	26.4	31.2	36.5	30.9	27.0	165.2
North Canal Shortage	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

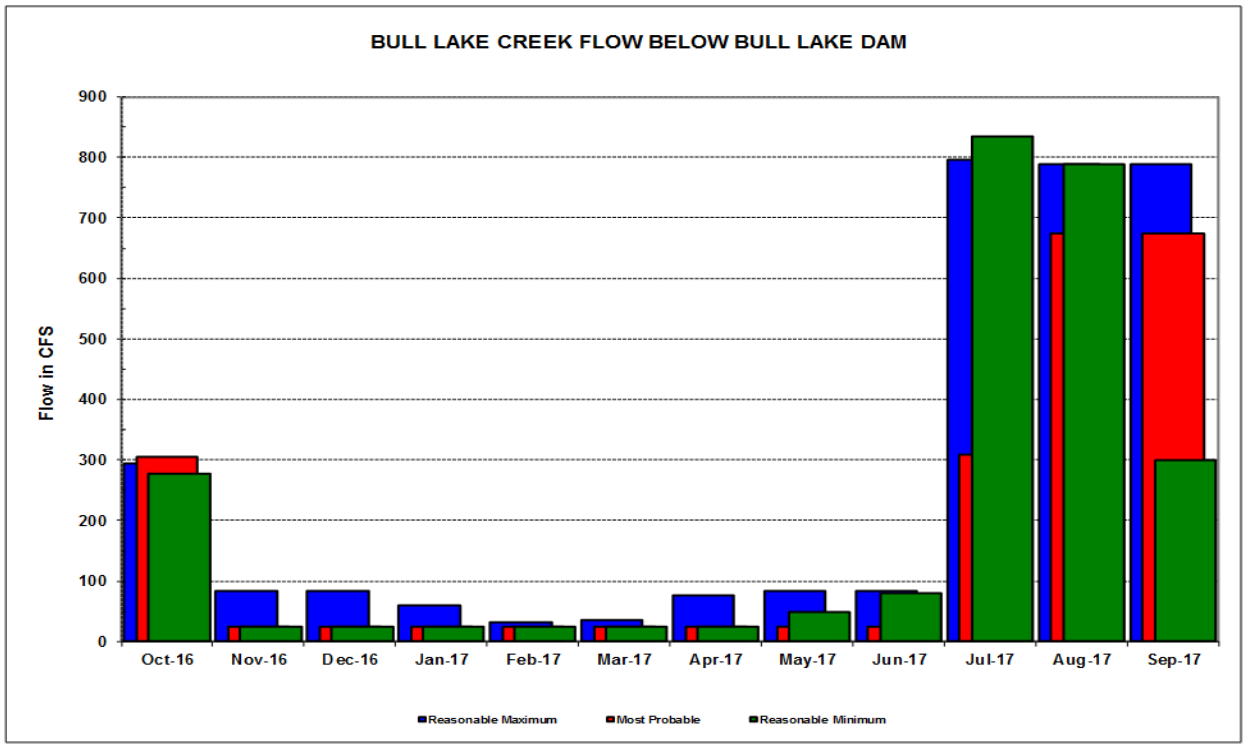
Pilot Butte Reservoir Operations — Initial Content 7.4 Kaf — Operating Limits: Max 29.9 Kaf, 5459.98 Ft. / Min 10.0 Kaf, 5433.49 Ft.

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Reservoir Inflow	kaf	21.2	0.0	0.0	0.0	0.0	0.0	9.6	28.3	33.5	44.4	28.8	30.6	196.4
Power Generated	mwh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pilot Canal Release	kaf	3.4	0.0	0.0	0.0	0.0	0.0	6.7	28.0	33.1	43.9	37.4	33.3	185.8
Pilot Canal Shortage	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
End-month Content	kaf	25.0	24.8	24.7	24.6	24.5	24.3	27.0	27.0	27.0	27.0	18.0	15.0	
PBR Net Change	kaf	17.6	-0.2	-0.1	-0.1	-0.1	-0.2	2.7	0.0	0.0	0.0	-9.0	-3.0	7.6
End-month Elevation	ft	5454.3	5454.1	5454.0	5453.9	5453.8	5453.5	5456.7	5456.7	5456.7	5456.7	5445.5	5441.3	

FIGURE WYG6

BULL LAKE RESERVOIR





Boysen Reservoir and Powerplant

Three operating plans were prepared for WY 2017 to show the operations of Boysen Reservoir that could occur under various runoff conditions. The operations for the three-runoff conditions are shown in Table WYT11 and Figure WYG7. These plans are presented only to show the probable limits of operations and therefore, actual conditions and operations could vary widely from the most probable plan.

The operating objectives at Boysen Dam and Reservoir are to provide water for irrigation, municipal and industrial use, and power generation; provide flood control in cooperation with the Corps; and enhance fish, wildlife, and recreation opportunities in both the reservoir and the Wind/Bighorn River.

Irrigation Season Release

During the irrigation season, water releases from Boysen Reservoir are made to satisfy all downstream senior water rights and storage contract commitments. Generally, demands for downstream senior water rights are met with a reservoir release between 900 and 1,200 cfs. Releases above what is required to meet irrigation demands may be made to manage reservoir levels and generate power.

Non-irrigation Season Release

During the non-irrigation season, releases are made to produce power, enhance the river and reservoir fishery, and provide storage space for the expected spring runoff or conserve storage if the reservoir is not expected to fill. Winter releases are generally in the range between 400 cfs and 1,150 cfs, depending on reservoir conditions going into the winter. The WGF Department considers 800 cfs to be the preferred fishery flow from October to February and flows below 600 cfs to be detrimental to the river fishery. A release of approximately 1,150 cfs can be made through one unit at Boysen Powerplant. By releasing less than the capacity of one powerplant unit, annual maintenance can be performed on the other unit during the winter months.

General Operating Procedures

October - February: Releases of water for power generation are scheduled to evacuate storage while assuring an adequate water supply for the upcoming irrigation season. It is desirable to maintain a uniform release during November to February to reduce the risk of ice jams, which may cause flooding or damage to bridges and other structures.

March - July: Based upon monthly water supply forecasts and as soon as river ice conditions allow, releases are scheduled to meet the irrigation demand as a minimum. Greater releases may be made if necessary to eliminate or minimize a spill, with the objective of filling the reservoir to an elevation of 4724.50 feet (731,841 AF) by the end of July. Depending on inflows, attempts will be made to provide a reservoir level of at least an elevation of 4707.00 feet from the end of May through the end of August for recreational boating access. For the spawning of rainbow trout, it is desirable to have stable or slightly rising river flows from mid-March through early June.

When conditions are suitable and without affecting power operations, attempts will be made to limit the drop in reservoir level to 2 feet or less during the reservoir fish spawn and hatch period (which begins in March and ends in May). A rising pool is desirable during this period.

August - September: As soon as storage has peaked, water releases are scheduled to meet the irrigation demand and generate power. Releases above what is needed to meet irrigation demand may be made to generate power and prevent the need to release water through the spillway gates if inflow conditions warrant.

2017 Operating Plans

At the beginning of WY 2017, storage was 624,893 AF at an elevation of 4713.67 feet. This was 115 percent of average and about 6,172 AF less than the reservoir held at the beginning of WY 2016. January through September of WY 2017 under most probable inflow conditions are estimated to be median flows, or flows, which have historically been, exceeded 50 percent of the time. A release of 825 cfs is scheduled for the months of October through March. Under most probable inflow conditions, end of month reservoir content is expected to peak in July with 732,000 AF at a reservoir elevation of 4724.50 feet. The reservoir is expected to fill if most probable or greater inflows are realized. If reasonable minimum condition inflows occurred during each month of WY 2016, the reservoir level would fall approximately 272,000 AF short of filling.

Reasonable minimum condition inflows are estimated to be lower decile flows for all months in WY 2017. Lower decile flows are flows that have historically been exceeded 90 percent of the time.

Under reasonable maximum inflow conditions, upper decile flows are expected for January through September in WY 2017. Upper decile flows are flows that have historically been exceeded 10 percent of the time.

Winter releases under minimum and maximum inflow scenarios are the same as under the most probable condition. This is because a release which meets the operating objectives under the range of inflows which could be expected to occur needs to be set prior to the time when the river might freeze. At the time the winter release is set, very limited information is available on snowpack and what inflows might be during the snowmelt runoff period. It must be assumed that releases cannot be changed significantly from mid-December through mid-March as the changes could cause flooding downstream of the reservoir if ice conditions are present on the river.

Power unit maintenance outages for the Boysen Powerplant are scheduled as shown in Table WYT13.

TABLE WYT11

BOYAOP V1.48 Run: 03-Oct-2016 14:27
Based on most probable April-July Inflow of 630 kaf

BOYSEN RESERVOIR MONTHLY OPERATIONS

Boysen Reservoir		Initial Cont Elev	624.9 kaf 4718.65 ft			Maximum Cont Elev	892.2 kaf 4732.20 ft			Minimum Cont Elev	219.2 kaf 4685.00 ft	
2016		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Monthly Inflow	kaf	60.5	51.0	39.6	36.8	38.9	50.2	52.1	162.0	282.6	133.7	65.1	55.2
Monthly Inflow	cfs	984	857	644	598	700	816	876	2635	4749	2174	1059	928
Turbine Release	kaf	50.7	49.1	50.7	50.7	45.8	57.2	80.0	140.3	132.5	132.3	98.9	78.2
Bypass/Spill	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	8.0	0.0	0.0
Total Release	kaf	50.7	49.1	50.7	50.7	45.8	57.2	80.0	140.3	135.7	140.3	98.9	78.2
Total Release	cfs	825	825	825	825	825	930	1344	2282	2281	2282	1608	1314
End-Month Content	kaf	634.7	636.6	625.5	611.6	604.7	597.7	569.8	591.5	738.4	731.8	698.0	675.0
End-Month Elevation	ft	4719.22	4719.33	4718.68	4717.86	4717.44	4717.02	4715.26	4716.64	4724.84	4724.50	4722.72	4721.48
Net Change Content	kaf	9.8	1.9	-11.1	-13.9	-6.9	-7.0	-27.9	21.7	146.9	-6.6	-33.8	-23.0
Boysen Power Plant	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Turbine Release	kaf	50.7	49.1	50.7	50.7	45.8	57.2	80.0	140.3	132.5	132.3	98.9	78.2
Turbine Release	cfs	825	825	825	825	825	930	1344	2282	2227	2152	1608	1314
Generation	gwh	4.412	4.287	4.415	4.385	3.938	4.888	6.720	11.624	11.518	11.906	8.882	6.954
Max Generation	gwh	11.904	11.520	11.904	11.904	10.752	11.904	11.520	11.904	11.520	11.904	11.904	11.520
% Max Generation	%	37	37	37	37	37	41	58	98	100	100	75	60
Ave kwh/af		87	87	87	86	86	85	84	83	87	90	90	89
End-Month Power Cap	mw	16	16	16	16	16	16	16	16	16	16	16	16

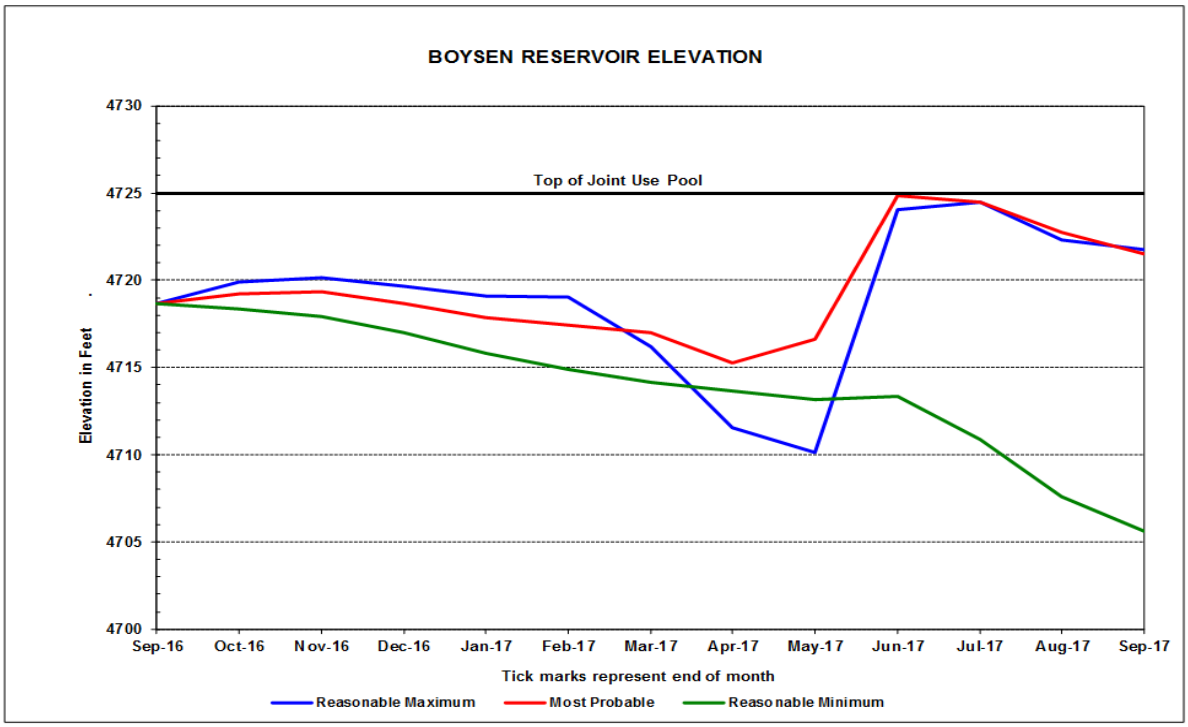
BOYAOP V1.48 Run: 03-Oct-2016 14:27
Based on reasonable minimum April-July inflow of 219 kaf
BOYSEN RESERVOIR MONTHLY OPERATIONS

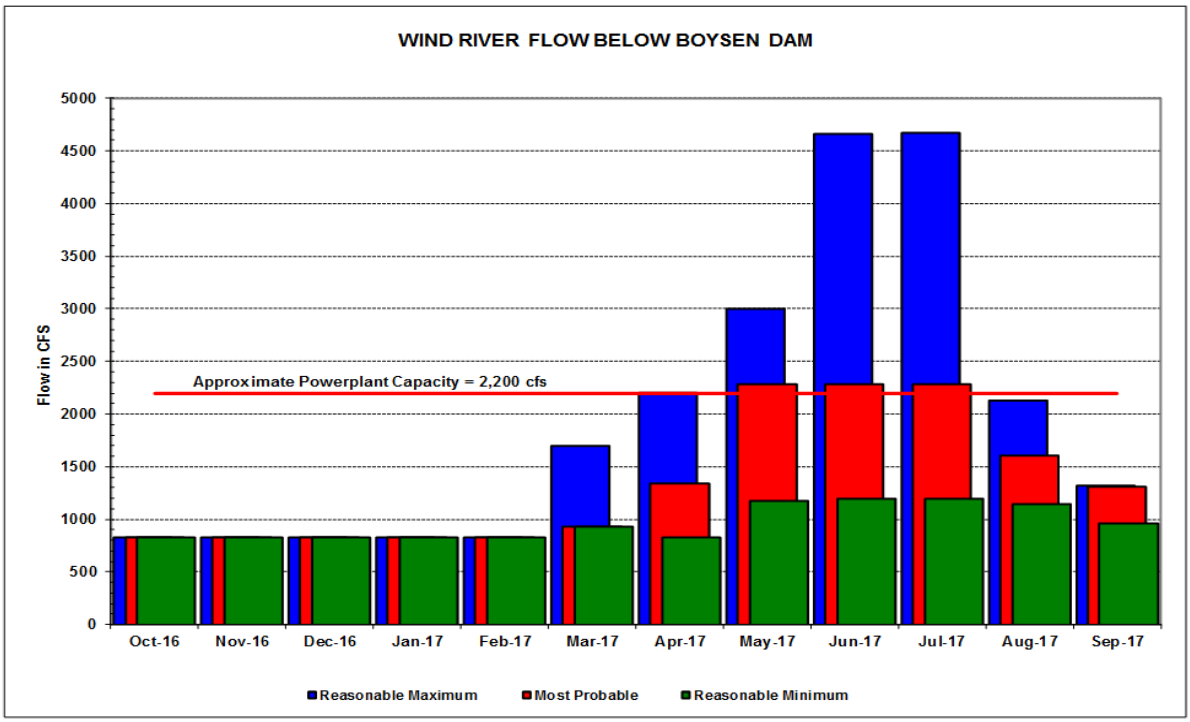
Boysen Reservoir		Initial Cont Elev	624.9 kaf 4718.65 ft			Maximum Cont Elev	892.2 kaf 4732.20 ft			Minimum Cont Elev	219.2 kaf 4685.00 ft	
2016		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Monthly Inflow	kaf	46.2	41.4	34.9	32.5	31.1	46.0	42.0	64.1	74.4	38.0	25.4	31.9
Monthly Inflow	cfs	751	696	568	529	560	748	706	1042	1250	618	413	536
Turbine Release	kaf	50.7	49.1	50.7	50.7	45.8	57.2	49.1	72.2	71.4	73.8	70.2	56.9
Bypass/Spill	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Release	kaf	50.7	49.1	50.7	50.7	45.8	57.2	49.1	72.2	71.4	73.8	70.2	56.9
Total Release	cfs	825	825	825	825	825	930	825	1174	1200	1200	1142	956
End-Month Content	kaf	620.4	612.7	596.9	578.7	564.0	552.8	545.7	537.6	540.6	504.8	460.0	435.0
End-Month Elevation	ft	4718.38	4717.93	4716.97	4715.83	4714.89	4714.15	4713.68	4713.14	4713.34	4710.87	4707.57	4705.62
Net Change Content	kaf	-4.5	-7.7	-15.8	-18.2	-14.7	-11.2	-7.1	-8.1	3.0	-35.8	-44.8	-25.0
Boysen Power Plant	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Turbine Release	kaf	50.7	49.1	50.7	50.7	45.8	57.2	49.1	72.2	71.4	73.8	70.2	56.9
Turbine Release	cfs	825	825	825	825	825	930	825	1174	1200	1200	1142	956
Generation	gwh	4.395	4.242	4.351	4.307	3.852	4.761	4.071	5.918	5.840	5.969	5.489	4.295
Max Generation	gwh	11.904	11.520	11.904	11.904	10.752	11.904	11.520	11.904	11.520	11.904	11.904	11.520
% Max Generation	%	37	37	37	36	36	40	35	50	51	50	46	37
Ave kwh/af		87	86	86	85	84	83	83	82	82	81	78	75
End-Month Power Cap	mw	16	16	16	16	16	16	16	16	16	15	14	14

BOYAOP V1.48 Run: 03-Oct-2016 14:27
Based on reasonable maximum April-July inflow of 1,028 kaf
BOYSEN RESERVOIR MONTHLY OPERATIONS

Boysen Reservoir		Initial Cont Elev	624.9 kaf 4718.65 ft			Maximum Cont Elev	892.2 kaf 4732.20 ft			Minimum Cont Elev	219.2 kaf 4685.00 ft	
2016		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Monthly Inflow	kaf	72.7	53.2	41.9	40.6	45.5	57.0	61.0	165.1	505.2	296.2	89.2	68.4
Monthly Inflow	cfs	1182	894	681	660	819	927	1025	2685	8490	4817	1451	1150
Turbine Release	kaf	50.7	49.1	50.7	50.7	45.8	104.5	130.9	139.2	138.5	135.4	131.1	78.4
Bypass/Spill	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.3	139.1	151.5	0.0	0.0
Total Release	kaf	50.7	49.1	50.7	50.7	45.8	104.5	130.9	184.5	277.6	286.9	131.1	78.4
Total Release	cfs	825	825	825	825	825	1700	2200	3001	4665	4666	2132	1318
End-Month Content	kaf	646.9	651.0	642.2	632.1	631.8	584.3	514.4	495.0	722.6	731.9	690.0	680.0
End-Month Elevation	ft	4719.92	4720.15	4719.65	4719.07	4719.05	4716.19	4711.54	4710.16	4724.02	4724.50	4722.29	4721.75
Net Change Content	kaf	22.0	4.1	-8.8	-10.1	-0.3	-47.5	-69.9	-19.4	227.6	9.3	-41.9	-10.0
Boysen Power Plant	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Turbine Release	kaf	50.7	49.1	50.7	50.7	45.8	104.5	130.9	139.2	138.5	135.4	131.1	78.4
Turbine Release	cfs	825	825	825	825	825	1700	2200	2264	2328	2202	2132	1318
Generation	gwh	4.427	4.317	4.452	4.430	3.991	8.863	10.637	10.777	11.433	11.907	11.681	6.966
Max Generation	gwh	11.904	11.520	11.904	11.904	10.752	11.904	11.520	11.904	11.520	11.904	11.904	11.520
% Max Generation	%	37	37	37	37	37	74	92	91	99	100	98	60
Ave kwh/af		87	88	88	87	87	85	81	77	83	88	89	89
End-Month Power Cap	mw	16	16	16	16	16	16	15	14	16	16	16	16

FIGURE WYG7
BOYSEN RESERVOIR





Buffalo Bill Reservoir and Powerplants

Three operating plans were prepared for WY 2017 to show the operations of Buffalo Bill Reservoir that could occur under various runoff conditions. The operations for the three-runoff conditions are shown in Table WYT12A, WYT12B, WYT12C, and Figure WYG8. These plans were prepared only to show the probable limits of operations, therefore, actual conditions and operations could vary widely from the most probable plan.

Normal Operating Procedures

At the end of the irrigation season, releases will be adjusted with the objective of filling the reservoir to an elevation of 5393.50 feet (646,565 AF) while meeting the release criteria of the Agreement. Under the Agreement, Buffalo Bill Reservoir will be operated to insure that a minimum flow of 100 cfs is provided in the river below the dam at all times. Additional winter releases beyond the 100 cfs minimum release up to a combined total of 350 cfs in the river below Buffalo Bill Powerplant will be provided based on the criteria set forth in the Agreement.

Reservoir releases to meet downstream irrigation requirements will, to the extent possible, be made through the most efficient power turbines available, after meeting winter flow requirements. A release of at least 100 cfs will be made through the Shoshone Powerplant, whenever the powerplant is available, to provide the required river flow directly below the dam. If the Shoshone Powerplant is not available, the release will be made through the jet flow valve at the Dam.

During irrigation season, releases are determined by the requirements for irrigation, and municipal and industrial demand. If snow conditions, inflow, and reservoir content indicate an assured fill of the reservoir, additional releases may be required after the start of the spring runoff to provide flood control and make optimum use of the water for power generation. An attempt is made to maintain a release of 7,000 cfs or less during the runoff season and assures that outflow is less than inflow at all times of flood rate inflow.

2017 Operating Plans

Under most probable inflow conditions, projected inflows for October, November, and December of WY 2017 have been adjusted to reflect the average trend of the last months of WY 2016 under most probable and maximum inflow conditions. Inflows for January through September of WY 2017 are estimated to be median flows, or flows that have historically been exceeded 50 percent of the time.

The reasonable minimum inflows are estimated to equal lower decile flows for all months of WY 2017. A lower decile flow is a flow that has historically been exceeded 90 percent of the time.

Upper decile flows, flows that have historically been exceeded 10 percent of the time are projected for January through September of WY 2017 under reasonable maximum conditions.

At the beginning of WY 2017, storage in Buffalo Bill Reservoir was 421,289 AF at an elevation

of 5363.24 feet. This was about 9,515 AF less water than the reservoir held at the beginning of WY 2016. Winter releases under minimum and maximum inflow scenarios are the same as under most probable conditions. Based on the criteria set forth in the Agreement the release from Buffalo Bill Dam through the winter will be 200 cfs. Ice in the Shoshone River can limit Reclamation's ability to change releases during the winter because of possible flooding due to ice jams, particularly near Lovell, Wyoming.

The Shoshone, Buffalo Bill, Heart Mountain, and Spirit Mountain Powerplants will all be available for power generation in WY 2017. Releases from Buffalo Bill Reservoir will be dependent upon the most efficient operation of all the powerplants while providing the required flow in the Shoshone River

Power unit maintenance outages for the Shoshone, Buffalo Bill. Heart Mountain and Spirit Mountain Powerplants are scheduled as shown in Table WYT13.

TABLE WYT12A
BUFFALO BILL RESERVOIR OPERATING PLAN - Based on October 1 Inflow Estimates

BBRAOP V1.04 Run: 03-Oct-2016 16:41
Based on most probable April - July inflow of 682 kaf

BUFFALO BILL RESERVOIR MONTHLY OPERATIONS

Buffalo Bill Reservoir		Initial Cont Elev	417.9 kaf 5363.36 ft			Maximum Cont Elev	643.1 kaf 5393.59 ft			Minimum Cont Elev	41.8 kaf 5259.64 ft	
2016		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Monthly Inflow	kaf	27.8	22.5	18.0	15.9	13.9	17.4	38.1	145.6	314.2	181.6	50.9	30.0
Shoshone Release	kaf	6.1	6.0	6.1	6.1	2.1	6.1	6.0	6.1	11.3	11.2	11.4	6.0
Non-Power Release	kaf	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	20.3	51.5	9.8	0.0
Total Flow Below Dam	kaf	6.1	6.0	6.1	6.1	5.6	6.1	6.0	6.1	31.6	62.7	21.2	6.0
Buffalo Bill Release	kaf	21.0	5.9	6.2	6.2	5.5	6.2	22.9	53.2	51.3	51.3	51.5	49.4
Municipal Delivery	kaf	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Heart Mtn Release	kaf	9.2	0.0	0.0	0.0	0.0	0.0	9.0	12.3	18.0	18.6	18.6	7.7
Heart Mtn Delivery	kaf	8.0	0.0	0.0	0.0	0.0	0.0	7.0	36.0	42.0	48.0	41.0	33.0
Total Outflow	kaf	44.6	12.2	12.6	12.6	11.4	12.6	45.2	107.9	143.2	180.9	132.6	96.4
Bypass/Spill	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.3	51.5	9.8	0.0
End-Month Targets	kaf	462.6	463.9						458.0	629.0	629.7	548.0	481.6
End-Month Content	kaf	401.1	411.4	416.8	420.1	422.6	427.4	420.3	458.0	629.0	629.7	548.0	481.6
Est Total Storage	kaf	404.5	414.8	420.2	423.5	426.0	430.8	423.7	461.4	632.4	633.1	551.4	485.0
End-Month Elevation	ft	5360.80	5362.37	5363.19	5363.69	5364.06	5364.78	5363.72	5369.17	5391.85	5391.93	5381.43	5372.46
Net Change Content	kaf	-16.8	10.3	5.4	3.3	2.5	4.8	-7.1	37.7	171.0	0.7	-81.7	-66.4
Flow Below BB Pwr	kaf	27.1	11.9	12.3	12.3	11.1	12.3	28.9	59.3	82.9	114.0	72.7	55.4
Flow Below BB Pwr	cfs	441	200	200	200	200	200	486	964	1393	1854	1182	931
Spring Inflow	kaf	3.7	3.6	3.7	3.7	3.3	3.7	3.6	3.7	3.6	3.7	3.7	3.6
Passing Cody Gage	kaf	40.0	15.5	16.0	16.0	14.4	16.0	41.5	75.3	104.5	136.3	95.0	66.7
Passing Cody Gage	cfs	651	260	260	260	259	260	697	1225	1756	2217	1545	1121

Shoshone Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Shoshone Release	kaf	6.1	6.0	6.1	6.1	2.1	6.1	6.0	6.1	11.3	11.2	11.4	6.0
Generation	gwh	1.087	1.067	1.090	1.093	0.377	1.098	1.079	1.108	2.163	2.232	2.238	1.138
Max Generation	gwh	2.232	2.160	2.232	2.232	0.383	2.232	2.160	2.232	2.160	2.232	2.232	2.160
% Max Generation		49	49	49	49	98	49	50	50	100	100	100	53
Ave kwh/af		178	178	179	179	180	180	180	182	191	199	196	190
End-Month Power Cap	mw	3	3	3	3	1	3	3	3	3	3	3	3

Buffalo Bill Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Buffalo Bill Release	kaf	21.0	5.9	6.2	6.2	5.5	6.2	22.9	53.2	51.3	51.3	51.5	49.4
Generation	gwh	5.550	1.581	1.668	1.671	1.485	1.677	6.084	13.129	12.968	13.382	13.400	12.828
Max Generation	gwh	13.392	12.960	13.392	13.392	12.096	13.392	12.960	13.392	12.960	13.392	13.392	12.960
% Max Generation		41	12	12	12	12	13	47	98	100	100	100	99
Ave kwh/af		264	268	269	270	270	270	266	247	253	261	260	260
End-Month Power Cap	mw	18	18	18	18	18	18	18	18	18	18	18	18

Spirit Mtn Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Spirit Mtn Release	kaf	17.2	0.0	0.0	0.0	0.0	0.0	16.0	34.4	33.3	34.4	34.4	33.3
Generation	gwh	1.642	0.000	0.000	0.000	0.000	0.000	1.554	2.746	2.882	3.277	3.233	3.102
Max Generation	gwh	1.674	0.000	0.000	0.000	0.000	0.000	1.620	3.348	3.240	3.348	3.348	3.240
% Max Generation		98	0	0	0	0	0	96	82	89	98	97	96
Ave kwh/af		95						97	80	87	95	94	93
End-Month Power Cap	mw	2	0	0	0	0	0	2	4	5	5	4	4

Heart Mtn Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Heart Mtn Release	kaf	9.2	0.0	0.0	0.0	0.0	0.0	9.0	12.3	18.0	18.6	18.6	7.7
Generation	gwh	2.202	0.000	0.000	0.000	0.000	0.000	2.154	2.944	4.309	4.453	4.453	1.843
Max Generation	gwh	2.232	0.000	0.000	0.000	0.000	0.000	2.160	4.464	4.320	4.464	4.464	4.320
% Max Generation		99	0	0	0	0	0	100	66	100	100	100	43
Ave kwh/af		239						239	239	239	239	239	239
End-Month Power Cap	mw	3	0	0	0	0	0	3	6	6	6	6	6

Total Generation	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Total Generation	gwh	10.481	2.648	2.758	2.764	1.862	2.775	10.871	19.927	22.322	23.344	23.324	18.911
End-month Power Cap	mw	26	21	21	21	19	21	26	31	32	32	31	31

BBRAOP V1.04 Run: 03-Oct-2016 16:41
Based on reasonable minimum April-July inflow of 454 kaf

BUFFALO BILL RESERVOIR MONTHLY OPERATIONS

Buffalo Bill Reservoir		Initial Cont		417.9 kaf Elev 5363.36 ft		Maximum Cont		643.1 kaf Elev 5393.59 ft		Minimum Cont		41.8 kaf Elev 5259.64 ft	
2016		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Monthly Inflow	kaf	25.2	22.2	14.4	12.8	11.7	15.8	38.7	145.3	199.1	71.4	25.3	20.5
Shoshone Release	kaf	6.1	6.0	6.1	6.1	2.1	6.1	6.0	6.1	6.0	6.2	6.2	8.5
Non-Power Release	kaf	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Flow Below Dam	kaf	6.1	6.0	6.1	6.1	5.6	6.1	6.0	6.1	6.0	6.2	6.2	8.5
Buffalo Bill Release	kaf	15.4	5.9	6.2	6.2	5.5	6.2	20.2	53.1	50.3	51.9	44.4	34.2
Municipal Delivery	kaf	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Heart Mtn Release	kaf	0.0	0.0	0.0	0.0	0.0	0.0	9.0	11.8	12.5	12.3	16.4	18.0
Heart Mtn Delivery	kaf	8.0	0.0	0.0	0.0	0.0	0.0	7.0	36.0	42.0	48.0	41.0	33.0
Total Outflow	kaf	29.8	12.2	12.6	12.6	11.4	12.6	42.5	107.3	111.1	118.7	108.3	94.0
Bypass/Spill	kaf	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
End-Month Targets	kaf		463.9					425.0	463.0	551.0	628.0		481.6
End-Month Content	kaf	413.3	423.3	425.1	425.3	425.6	428.8	425.0	463.0	551.0	503.7	420.7	347.2
Est Total Storage	kaf	416.7	426.7	428.5	428.7	429.0	432.2	428.4	466.4	554.4	507.1	424.1	350.6
End-Month Elevation	ft	5362.66	5364.17	5364.44	5364.47	5364.51	5364.99	5364.42	5369.87	5381.82	5375.49	5363.78	5352.30
Net Change Content	kaf	-4.6	10.0	1.8	0.2	0.3	3.2	-3.8	38.0	88.0	-47.3	-83.0	-73.5
Flow Below BB Pwr	kaf	21.5	11.9	12.3	12.3	11.1	12.3	26.2	59.2	56.3	58.1	50.6	42.7
Flow Below BB Pwr	cfs	350	200	200	200	200	200	440	963	946	945	823	718
Spring Inflow	kaf	3.7	3.6	3.7	3.7	3.3	3.7	3.6	3.7	3.6	3.7	3.7	3.6
Passing Cody Gage	kaf	25.2	15.5	16.0	16.0	14.4	16.0	38.8	74.7	72.4	74.1	70.7	64.3
Passing Cody Gage	cfs	410	260	260	260	259	260	652	1215	1217	1205	1150	1081

Shoshone Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Shoshone Release	kaf	6.1	6.0	6.1	6.1	2.1	6.1	6.0	6.1	6.0	6.2	6.2	8.5
Generation	gwh	1.091	1.075	1.097	1.098	0.378	1.099	1.081	1.111	1.133	1.184	1.141	1.487
Max Generation	gwh	2.232	2.160	2.232	2.232	0.383	2.232	2.160	2.232	2.160	2.232	2.232	2.160
% Max Generation		49	50	49	49	99	49	50	50	52	53	51	69
Ave kwh/af		179	179	180	180	180	180	180	182	189	191	184	175
End-Month Power Cap	mw	3	3	3	3	1	3	3	3	3	3	3	3

Buffalo Bill Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Buffalo Bill Release	kaf	15.4	5.9	6.2	6.2	5.5	6.2	20.2	53.1	50.3	51.9	44.4	34.2
Generation	gwh	4.118	1.590	1.676	1.677	1.488	1.678	5.388	13.151	12.685	13.119	11.114	8.425
Max Generation	gwh	13.392	12.960	13.392	13.392	12.096	13.392	12.960	13.392	12.960	13.392	11.383	8.424
% Max Generation		31	12	13	13	12	13	42	98	98	98	98	100
Ave kwh/af		267	269	270	270	271	271	267	248	252	253	250	246
End-Month Power Cap	mw	18	18	18	18	18	18	18	18	18	18	15	12

Spirit Mtn Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Spirit Mtn Release	kaf	8.0	0.0	0.0	0.0	0.0	0.0	16.0	34.4	33.3	34.4	34.4	33.3
Generation	gwh	0.787	0.000	0.000	0.000	0.000	0.000	1.569	2.778	2.843	2.958	2.846	2.591
Max Generation	gwh	1.674	0.000	0.000	0.000	0.000	0.000	1.620	3.348	3.240	3.348	3.348	3.240
% Max Generation		47	0	0	0	0	0	97	83	88	88	85	80
Ave kwh/af		98						98	81	85	86	83	78
End-Month Power Cap	mw	1	0	0	0	0	0	2	4	4	4	4	3

Heart Mtn Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Heart Mtn Release	kaf	0.0	0.0	0.0	0.0	0.0	0.0	9.0	11.8	12.5	12.3	16.4	18.0
Generation	gwh	0.000	0.000	0.000	0.000	0.000	0.000	2.154	2.825	2.992	2.944	3.926	4.309
Max Generation	gwh	0.893	0.000	0.000	0.000	0.000	0.000	2.160	4.464	4.320	4.464	4.464	4.320
% Max Generation		0	0	0	0	0	0	100	63	69	66	88	100
Ave kwh/af								239	239	239	239	239	239
End-Month Power Cap	mw	1	0	0	0	0	0	3	6	6	6	6	6

Total Generation	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Total Generation	gwh	5.996	2.665	2.773	2.775	1.866	2.777	10.192	19.865	19.653	20.205	19.027	16.812
End-month Power Cap	mw	23	21	21	21	19	21	26	31	31	31	28	24

BBRAOP V1.04 Run: 03-Oct-2016 16:41
Based on reasonable maximum April-July inflow of 1,015 kaf

BUFFALO BILL RESERVOIR MONTHLY OPERATIONS

Buffalo Bill Reservoir		Initial Cont		417.9 kaf Elev 5363.36 ft			Maximum Cont		643.1 kaf Elev 5393.59 ft			Minimum Cont	41.8 kaf Elev 5259.64 ft
2016		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Monthly Inflow	kaf	28.5	24.6	19.8	16.7	14.8	21.4	52.9	210.1	446.9	305.4	76.0	34.5
Shoshone Release	kaf	6.2	6.0	6.2	6.1	2.1	6.1	12.3	12.8	11.5	11.3	11.4	6.0
Non-Power Release	kaf	0.0	0.0	0.0	0.0	3.5	0.0	14.9	62.5	96.2	175.6	30.7	0.0
Total Flow Below Dam	kaf	6.2	6.0	6.2	6.1	5.6	6.1	27.2	75.3	107.7	186.9	42.1	6.0
Buffalo Bill Release	kaf	23.9	5.9	6.1	6.2	5.5	18.9	51.2	57.1	52.2	51.6	51.5	49.4
Municipal Delivery	kaf	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Heart Mtn Release	kaf	9.2	0.0	0.0	0.0	0.0	0.0	9.0	18.6	18.0	18.6	18.6	16.4
Heart Mtn Delivery	kaf	8.0	0.0	0.0	0.0	0.0	0.0	7.0	36.0	42.0	48.0	41.0	33.0
Total Outflow	kaf	47.6	12.2	12.6	12.6	11.4	25.3	94.7	187.3	220.2	305.4	153.5	105.1
Bypass/Spill	kaf	0.0	0.0	0.0	0.0	0.0	0.0	14.9	62.5	96.2	175.6	30.7	0.0
End-Month Targets	kaf		463.9				422.0	380.2	403.0	629.7	629.7		481.6
End-Month Content	kaf	398.8	411.2	418.4	422.5	425.9	422.0	380.2	403.0	629.7	629.7	552.2	481.6
Est Total Storage	kaf	402.2	414.6	421.8	425.9	429.3	425.4	383.6	406.4	633.1	633.1	555.6	485.0
End-Month Elevation	ft	5360.45	5362.34	5363.43	5364.05	5364.56	5363.97	5357.56	5361.09	5391.93	5391.93	5381.98	5372.46
Net Change Content	kaf	-19.1	12.4	7.2	4.1	3.4	-3.9	-41.8	22.8	226.7	0.0	-77.5	-70.6
Flow Below BB Pwr	kaf	30.1	11.9	12.3	12.3	11.1	25.0	78.4	132.4	159.9	238.5	93.6	55.4
Flow Below BB Pwr	cfs	490	200	200	200	200	407	1318	2153	2687	3879	1522	931
Spring Inflow	kaf	3.7	3.6	3.7	3.7	3.3	3.7	3.6	3.7	3.6	3.7	3.7	3.6
Passing Cody Gage	kaf	43.0	15.5	16.0	16.0	14.4	28.7	91.0	154.7	181.5	260.8	115.9	75.4
Passing Cody Gage	cfs	699	260	260	260	259	467	1529	2516	3050	4242	1885	1267

Shoshone Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Shoshone Release	kaf	6.2	6.0	6.2	6.1	2.1	6.1	12.3	12.8	11.5	11.3	11.4	6.0
Generation	gwh	1.104	1.066	1.109	1.095	0.378	1.097	2.167	2.229	2.155	2.238	2.234	1.139
Max Generation	gwh	2.232	2.160	2.232	2.232	0.383	2.232	2.160	2.232	2.160	2.232	2.232	2.160
% Max Generation		49	49	50	49	99	49	100	100	100	100	100	53
Ave kwh/af		178	178	179	180	180	180	176	174	187	198	196	190
End-Month Power Cap	mw	3	3	3	3	1	3	3	3	3	3	3	3

Buffalo Bill Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Buffalo Bill Release	kaf	23.9	5.9	6.1	6.2	5.5	18.9	51.2	57.1	52.2	51.6	51.5	49.4
Generation	gwh	6.296	1.580	1.641	1.673	1.487	5.078	12.959	13.393	12.953	13.391	13.397	12.657
Max Generation	gwh	13.392	12.960	13.392	13.392	12.096	13.392	12.960	13.392	12.960	13.392	13.392	12.960
% Max Generation		47	12	12	12	12	38	100	100	100	100	100	98
Ave kwh/af		263	268	269	270	270	269	253	235	248	260	260	256
End-Month Power Cap	mw	18	18	18	18	18	18	18	18	18	18	18	18

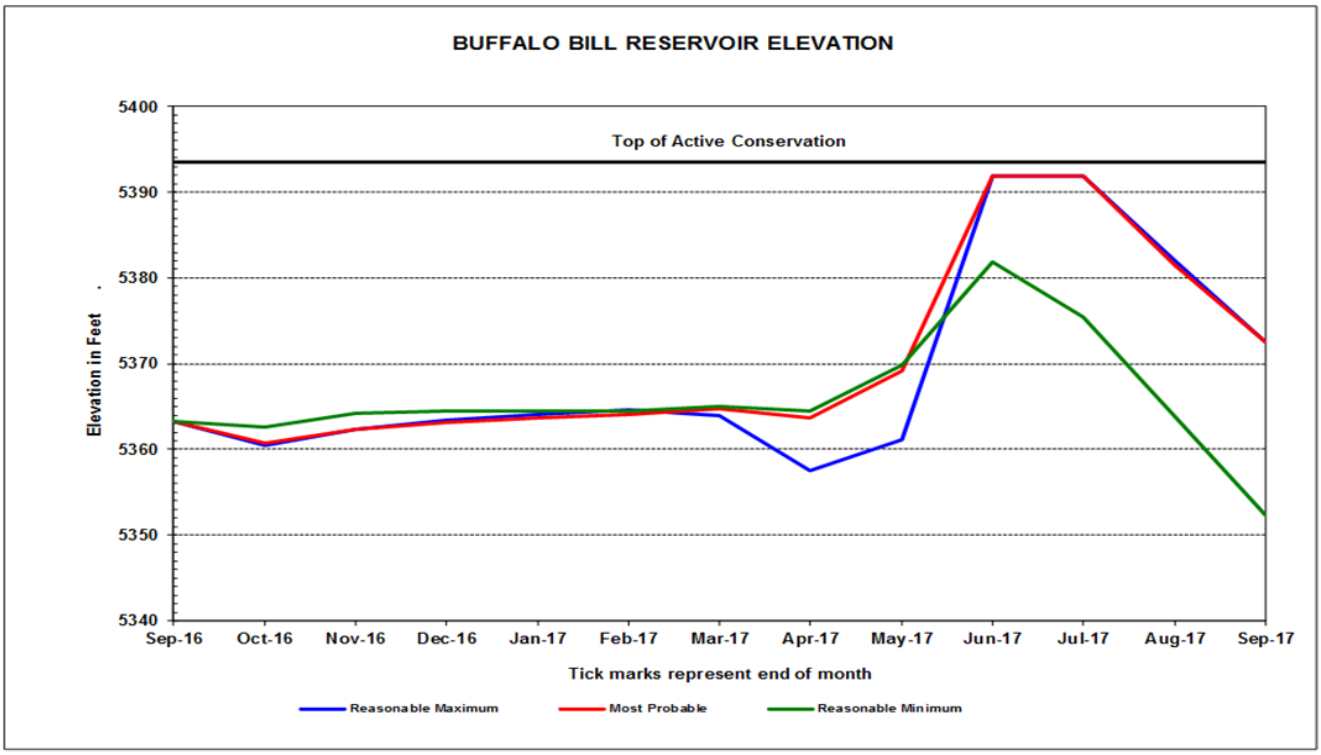
Spirit Mtn Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Spirit Mtn Release	kaf	17.2	0.0	0.0	0.0	0.0	0.0	16.0	34.4	33.3	34.4	34.4	33.3
Generation	gwh	1.631	0.000	0.000	0.000	0.000	0.000	1.389	2.353	2.755	3.273	3.242	2.981
Max Generation	gwh	1.674	0.000	0.000	0.000	0.000	0.000	1.620	3.348	3.240	3.348	3.348	3.240
% Max Generation		97	0	0	0	0	0	86	70	85	98	97	92
Ave kwh/af		95						87	68	83	95	94	90
End-Month Power Cap	mw	2	0	0	0	0	0	2	4	5	5	5	4

Heart Mtn Power	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Heart Mtn Release	kaf	9.2	0.0	0.0	0.0	0.0	0.0	9.0	18.6	18.0	18.6	18.6	16.4
Generation	gwh	2.202	0.000	0.000	0.000	0.000	0.000	2.154	4.453	4.309	4.453	4.453	3.926
Max Generation	gwh	2.232	0.000	0.000	0.000	0.000	0.000	2.160	4.464	4.320	4.464	4.464	4.320
% Max Generation		99	0	0	0	0	0	100	100	100	100	100	91
Ave kwh/af		239						239	239	239	239	239	239
End-Month Power Cap	mw	3	0	0	0	0	0	3	6	6	6	6	6

Total Generation	2016	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Total Generation	gwh	11.233	2.646	2.750	2.768	1.865	6.175	18.669	22.428	22.172	23.355	23.326	20.703
End-month Power Cap	mw	26	21	21	21	19	21	26	31	32	32	32	31

FIGURE WYG8

BUFFALO BILL RESERVOIR



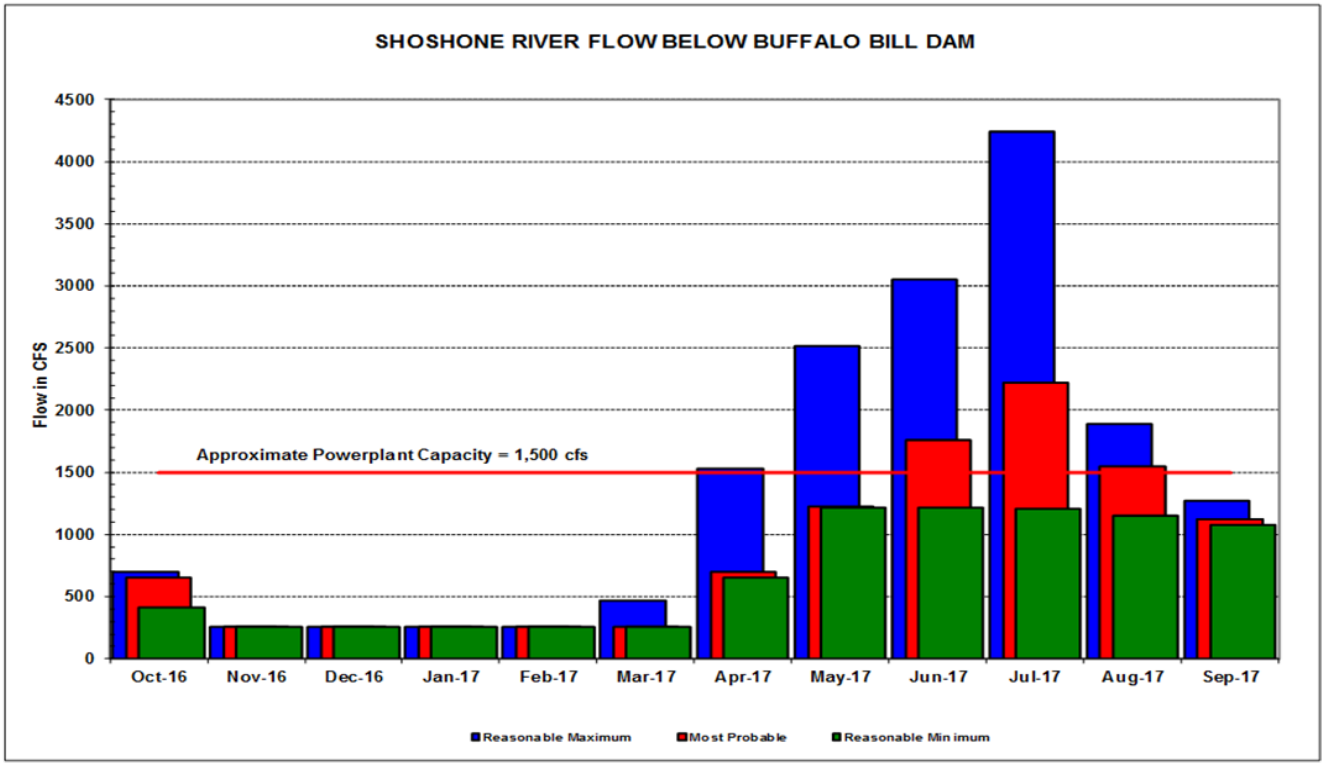


Table WYT13
WY 2017 SCHEDULED OUTAGES FOR WYOMING POWERPLANTS

Facilities	Description of Work	Scheduled Dates
BOYSEN		
Unit 1	Annual Maintenance	10/17/16 – 12/22/16
Unit 2	Annual Maintenance	01/23/17 – 03/16/17
Unit 1	Penstock Inspection	04/03/17 – 04/06/17
Unit 2	Penstock Inspection	04/03/17 – 04/06/17
BUFFALO BILL		
Buffalo Bill Powerplant		
Unit 1	Annual Maintenance	11/29/16 - 11/29/16
Unit 2	Annual Maintenance	12/12/16 - 12/22/16
Unit 3	Annual Maintenance	01/03/17 - 01/24/17
Shoshone Powerplant		
Unit 3	Annual Maintenance	02/06/17 - 02/16/17
Heart Mountain Powerplant		
Unit 1	Annual Maintenance	02/27/17 – 03/16/17
Spirit Mountain Powerplant		
Unit 1	Annual Maintenance	10/17/16 - 11/01/16

FLOOD BENEFITS

FOR

WATER YEAR 2016

FOR RESERVOIRS

(E.A. PATTERSON, HEART BUTTE, JAMESTOWN, DEERFIELD, PACTOLA, ANGOSTURA, KEYHOLE, SHADEHILL, AND BELLE FOURCHE)

UNDER THE RESPONSIBILITY

OF THE

DAKOTAS AREA OFFICE

WATER YEAR 2016 FLOOD BENEFIT REPORT

General

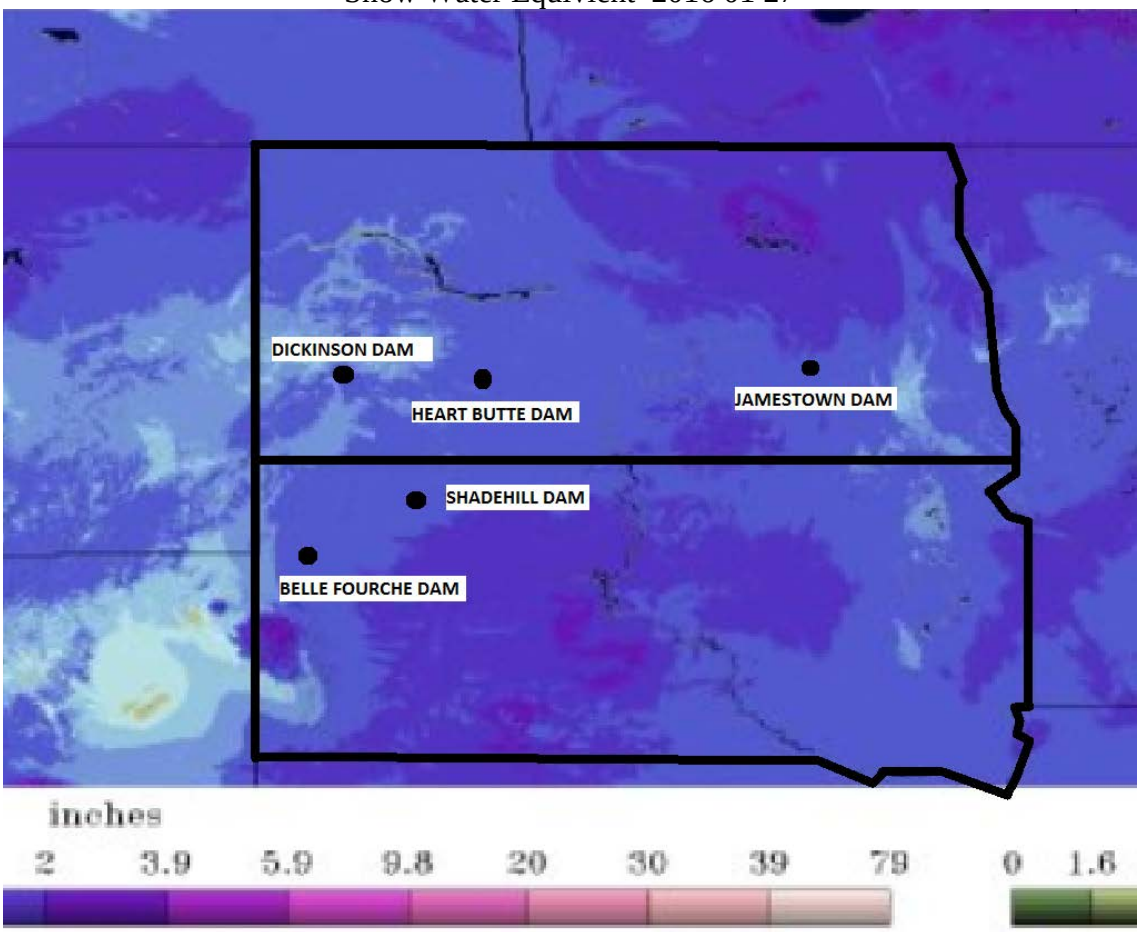
Jamestown Reservoir experienced above average precipitation, Angostura, Belle Fourche, Dickinson, Heart Butte, and Shadehill Reservoirs experienced average precipitation. Deerfield, Keyhole, and Pactola Reservoirs experienced below average precipitation.

Jamestown and Deerfield Reservoirs experienced above average runoff. Pactola Reservoir experienced average runoff. Angostura and Belle Fourche Reservoirs experienced much below average runoff. Dickinson, Heart Butte, Keyhole, and Shadehill Reservoirs experienced very much below average runoff.

Snow surveys taken by the National Weather Service to determine SWE indicated as early as January 2016 that the SWE within much of North Dakota and South Dakota was well below average. SWE for January 27, 2016 is shown below.

http://www.nohrsc.noaa.gov/snow_model/images/full/Upper_Midwest/nsm_swe/201601/nsm_swe_2016012706_Upper_Midwest.jpg

Snow Water Equivlent 2016 01 27



September 2015

Rain moved across the northern portion of North Dakota from September 4-6, 2015. Some locations recorded over four inches of rain during that three day period which pushed the monthly average rainfall to over 300 percent of normal. Although the northern portion of the state was quite wet, the rest of North Dakota recorded a very dry September 2015. Therefore, the statewide average finished near normal, even though very few locations were actually near that mark. Temperatures were consistently above average with September 2015 finishing as one of the warmest Septembers on record.

The statewide average precipitation was 1.55 inches which is below the 1981-2010 normal of 1.71 inches. September 2015 average precipitation tied for the fifty fourth wettest in the last 121 years with a maximum of 4.68 inches in 1941 and a minimum of 0.20 inches in 2012.

The US Drought Monitor (DM) on September 29, 2015 reported 20 percent of North Dakota in D0, (abnormally dry) conditions, which was confined to portions of southeastern North Dakota.

October 2015

October 2015 finished with well above average temperatures. Although there were some portions of the state with above normal precipitation, a high percent of North Dakota recorded below average precipitation. The most significant event of the month was the record high maximum temperatures that occurred on October 11, 2015. On that day many locations in southeastern North Dakota recorded maximums temperatures in the 90s. The Fargo airport recorded a high of 97 degrees which was not only a record for the day by 12 degrees, it was also a record for the highest temperature recorded during the month of October and the warmest temperature in 2015.

The state average precipitation was 1.30 inches which is below the 1981-2010 normal state average of 1.46 inches. October 2015 state average precipitation ranked the thirty seventh wettest in the past 121 years with a maximum of 4.61 inches in 1982 and a minimum of 0.09 inches in 1952.

The DM on July 28, 2015 reported 27 percent of North Dakota in abnormally dry conditions, and 10 percent in D1, (moderate drought) conditions. Those areas were confined to the eastern and southeastern portion of North Dakota.

November 2015

November 2015 started and ended warm. Temperatures ranged from 5 to 8 degrees above average across much of eastern North Dakota. Some parts of eastern and northeastern North Dakota recorded rainfall on November 6, 2015 then again on November 15 and 16, 2015 that missed much of the rest of the state. Although those locations recorded above average precipitation for the month, most other reporting sites across the state were on the dry side meaning overall the average precipitation was slightly below the 30 year normal.

The state average precipitation was 0.56 inches which is below the 1981-2010 normal of 0.68 inches. November 2015 state average precipitation ranked fifty third wettest in the past

121 years with a maximum of 2.33 inches in 2000 and a minimum of 0.03 inches in 1939. The DM on December 1, 2015 reported 34 percent of North Dakota in abnormally dry conditions and 9 percent in moderate drought conditions, which was all confined to the southern and eastern portions of the state.

The state average temperature was 32.7 degrees Fahrenheit which is above the 1981-2010 average of 27.3 degrees Fahrenheit. November 2015 state average temperature ranked the seventeenth warmest in the past 121 years with a maximum of 37.3 degrees Fahrenheit in 1999 and a minimum of 6.1 degrees Fahrenheit in 1896.

Autumn 2015 Summary

According to the National Centers for Environmental Information (NCEI), climatological autumn 2015 had a statewide average temperature of 47.5 degrees Fahrenheit. That is 4.9 degrees above the 1981-2010 average temperature 42.6 degrees Fahrenheit. That would rank the season as tied for the second warmest in the past 121 years.

The three month statewide average rainfall according to NCEI was 3.41 inches. That is 0.44 inches below the 1981-2019 average of 3.85 inches. That would rank as the fifty-fourth wettest since such records started to be calculated in 1895.

Autumn 2015 will be remembered for the persistent warmth. All three months finished well above average with September finishing as the sixth warmest, October the sixteenth warmest and November the seventeenth warmest. All areas of the state recorded above average temperatures for the season, but the highest anomalies from normal were in the east where some locations were as much 6 to 7 degrees Fahrenheit above averages.

Although all parts of the state finished above average for temperatures, precipitation amounts in more typical fashion were highly variable. Overall, the state finished a bit below average, but that was not evenly distributed across the state. The northern one-third of North Dakota recorded excess precipitation whereas the southern two-thirds were mostly in a deficit situation for the season. The drier than average autumn in combination with fairly dry conditions in July and August 2016 as well are reasons why abnormally dry or moderate drought conditions were prevalent in southern and east-central North Dakota as the winter season began.

December 2015

The mild autumn continued into December 2015 with temperatures across the state averaging from 5 to 10 degrees Fahrenheit above the 30 year average. Temperatures were consistently above average for most of the month. Although precipitation finished near average overall for the state, that precipitation, mostly in the form of snow was not evenly distributed. The central and northeastern portion of North Dakota finished with above average snowfall, whereas southeastern and western North Dakota were quite dry. What precipitation did fall occurred during two main events, one on December 1 and the other on December 15 and 16, 2015. Although it was not an exceptionally snowy month for most locations, Grand Forks was one exception as both of those storms hit the cooperative site at University of North Dakota National Weather Service.

Those two storms in combination with some minor events dropped 15.3 inches of snow during the month there which was the twelfth highest December monthly total on record for that location.

The statewide average precipitation was 0.57 inches which is near the 1981-2010 normal of 0.52 inches. December 2015 average precipitation tied for the forty-first wettest in the last 121 years with a maximum of 1.21 inches in 2008 and a minimum of 0.05 inches in 1944.

The DM on December 29, 2015 reported 39 percent of North Dakota in abnormally dry conditions and 5 percent in moderate drought conditions. Both areas were confined to the southern and southeastern portions of North Dakota.

January 2016

January 2016 was the second driest month in North Dakota with the state averaging just 0.49 inches of precipitation and most of North Dakota recorded well below average precipitation (snowfall) during the month. The one exception was associated with a narrow, yet heavy band of snow that fell just to the west and north of Fargo during the overnight hours of January 6 and 7, 2016. Harwood, North Dakota recorded over 12 inches of snow from that system.

Because of the mesoscale nature of the heavy snow most locations, 20 miles or farther away, from that band recorded little if any snowfall that night. That event was followed by a blast of arctic air that lingered for a stretch of about two weeks of well below normal temperatures including a couple of mornings with lows in the -30s near Fargo in the same area that recorded the abundant snowfall previously mentioned. Through January 25, 2016 average temperatures across the state were near or even below average, yet the last week of the month was so mild, that the month average temperature ended up finishing anywhere from 2 to 5 degrees Fahrenheit above normal.

The state average precipitation was 0.22 inches which is below the 1981-2010 normal average of 0.49 inches. January 2016 average precipitation ranked the fifteenth driest in the past 122 years with a maximum of 1.27 inches in 1916 and a minimum of 0.09 inches in 1942 and 1973.

The DM on January 26, 2016 reported 25 percent of North Dakota in abnormally dry conditions and 4 percent in moderate drought conditions. Those areas were confined to the eastern and southeastern portion of North Dakota.

February 2016

February 2016 completed winter the way it started with temperatures averaging above normal. Temperatures ranged from 5 to 8 degrees Fahrenheit above average across much of North Dakota, with the exception of a few days in the first one-half of the month. February 2016 was mostly above average with the warmest day on February 27, 2016 when the Bismarck airport sensor recorded a maximum temperature of 73 degrees Fahrenheit which was a new state record for the month. There were no widespread heavy rain or snow storms, but a narrow band of 2 to 5 inches of snow fell in northwestern North Dakota on February 14, 2016. The Cooperative Observer in Bottineau had five days with 2 inches of snow or more leading to a monthly total of 14.1 inches which is well above the average of 5.5 inches for that location.

The state average precipitation was 0.43 inches which is right at the 1981-2010 normal of 0.44 inches. February 2016 state average precipitation ranked fifty-second wettest in the past 122 years with a maximum of 1.59 inches in 1998 and a minimum of 0.07 inches in 1934.

The DM on December 1, 2015 reported 68 percent of North Dakota in abnormally dry conditions and 4 percent in moderate drought conditions which was spread over much of the state with the exception of the northeastern corner of North Dakota.

Winter 2015-16 Summary

According to the NCEI, winter of 2015-2016 had a statewide average temperature of 20.5 degrees Fahrenheit. That is 7 degrees Fahrenheit above the 1981-2010 average temperature of 13.5 degrees Fahrenheit. That would rank the season tied for the sixth warmest in the past 121 years. It was the warmest winter since the 2011-2012 season. The other winters since 1895 that were warmer are in order of warmest to coolest; 1986-1987, 1930-1931, 1991-1992, 2011-2012, 1997-1998. It should be noted with the exception of 2011-2012, the other four warmest winter seasons in North Dakota were years with an El Ninõ present in the Pacific Ocean as was the case during this past winter as well.

The three month statewide average rainfall according to NCEI was 1.22 inches. That is 0.20 inches below the 1981-2019 average of 1.42 inches. That would rank as the fiftieth driest since such records started to be calculated in 1895. The winter of 2015-2016 was perceived as a dry season but actually finished close to normal across much of the state.

March 2016

Although there were a few exceptions, most of North Dakota recorded below average precipitation during the month. March continued the trend of the past several months with precipitation amounts being recorded on the low side of normal. March 2016 was the tenth consecutive month with above average temperatures in North Dakota. For several of those months the average temperature was well above average with most of the state recording temperatures 8 to 12 degrees Fahrenheit above normal. The average temperature for the North Dakota Agricultural Weather Network (NDAWN) stations in February 2016 was 36.3 degrees Fahrenheit which is 9.6 degrees Fahrenheit above normal for those locations. Although temperatures were above average for much of the month, the highest temperature anomalies occurred from March 6 through March 16, 2016 when temperatures were 20 to 30 degrees Fahrenheit above average.

The average precipitation was 0.53 inches which is below the 1981-2010 normal of 0.83 inches. March 2016 state average precipitation tied for the forty-third driest in the last 122 years with a maximum of 2.31 inches in 1902 and a minimum of 0.11 inches in 1930.

The DM on March 29, 2016 reported 92 percent of North Dakota in abnormally dry or moderate drought, conditions. Of that 11 percent was in moderate drought conditions which was confined to the James River Valley portion of the state.

April 2016

A high percentage of the state recorded well above average rainfall during April 2016. Although there were several smaller events, most of the rain came from two systems that drop widespread moderate rain amounts, one in the middle of April and the other during the last week of the month. May 2015 was the last month with below average temperatures in North Dakota taken as a whole. Several of those months would be considered average as the positive temperature anomaly was slightly above average. April 2016 ended that streak with slightly below average temperatures.

The state average precipitation was 2.66 inches which is well above the 1981-2010 normal state average of 1.22 inches. April 2016 state average precipitation ranked the seventh wettest in the past 122 years with a maximum of 3.71 inches in 1986 and a minimum of 0.11 inches in 1987. The DM on April 26, 2016 reported 28 percent of North Dakota in abnormally dry conditions. That area was spread out in several different parts of North Dakota.

May 2016

Very little precipitation fell across North Dakota during the first half of May but the last 10 days of the month it turned quite wet for at least some parts of the state. With the lack of moisture during the first part of the month many seeds did not germinate or emerge until the rains arrived which in some ways was a blessing because of a hard freeze right before the needed rains. Even though the overall precipitation for the state was near the average, most NDAWN stations tended to finish either well above or well below normal for the month. May 2016 continued the overall trend for above normal temperatures that started last summer. The southern and western portions of North Dakota recorded temperatures near to a bit above average, whereas the northeastern portion of the state had temperatures more noticeably above the current 30 year average.

The average precipitation was 2.26 inches which is below the 1981-2010 normal of 2.53 inches. May 2016 state average precipitation ranked sixty-third driest in the past 122 years with a maximum of 5.96 inches in 1927 and a minimum of 0.23 inches in 1901. The DM on May 31, 2016 reported 13 percent of North Dakota in abnormally dry conditions. That area was split between northwestern, a small part of central and southeastern North Dakota.

June 2016

Based on the NCEI calculations, the state averaged 2.34 inches of precipitation, which is 0.29 inches below the 1981-2010 average. It was 1.05 inches drier than last year and was the driest June since 2006. The statewide average precipitation was ranked the twenty-third driest on record since 1895. As the northern parts of the state received well-above to slightly-above precipitation, the southern two-thirds of the state received below normal amounts. Some areas in the northeastern parts of the state received between 2 to 3 inches rain in the first week of June causing crops to drown. However, wide-spread precipitation helped replenish soil moisture for seed germination. In the second week, the northern locations benefited from needed moisture, but some areas had heavy rain and hail causing crop damage. The southern half of the state, by the end of the second week, showed crop stress due to dry and windy conditions.

Windy conditions caused a delayed herbicide application in these regions. The largest amount of accumulated precipitation in June was 7.14 inches, recorded in Northgate, Burke County. The least amount of accumulated precipitation in June was 0.48 inches, recorded in Pretty Rock, Grant County. The highest 24 hour rainfall was recorded in Bismarck was 2.62 inches on June 14, 2016 which was also the daily 24 hour rainfall record for Bismarck. Based on the historical records since 1890, the state average annual precipitation accumulation showed a decreasing trend by 0.02 inches per decade.

The average temperature in June was 65.9 degrees Fahrenheit, which is the twentieth warmest June on record since 1895. It was 0.8 degrees Fahrenheit warmer than last year and was the warmest June since 1997. Most of the state ranged between slightly above too much above the 1981-2010 average. There were some small pockets where the monthly average was near normal. Based on the historical records since 1890, the state average annual temperature showed an increasing trend by 0.13 degrees Fahrenheit per decade. The highest and the lowest monthly state average temperatures ranged from 74.1 degrees Fahrenheit in 1988 to 56.8 degrees Fahrenheit in 1915.

July 2016

Based on the NCEI, statewide averaged monthly accumulated precipitation was 4.38 inches, 1.73 inches greater than last year and 1.5 inches greater than the 1981-2010 average July precipitation. The statewide average precipitation was ranked the ninth wettest on record since 1895. A majority of the state received much above normal precipitation. Northeastern parts of the state received between 1.7 and 2.3 times as much rain as normally falls in these regions.

The state average temperature in July based on NCEI was 69.2 degrees Fahrenheit, which was 0.7 degrees Fahrenheit cooler than last year but 0.2 degrees Fahrenheit warmer than the 1981-2010 average. It was ranked the sixty-third warmest or sixtieth coldest July on record since 1895. For most of the state, it was either an average July or within one degree from the 1981-2010 average. Based on the historical records since 1895, the state average annual temperature showed an increasing trend of 0.03 degrees Fahrenheit per decade. The highest and the lowest monthly state July average temperatures ranged from 80.1 degrees Fahrenheit in 1936 to 61.8 degrees Fahrenheit in 1992.

Based on the DM on July 26, 2016, less than 3 percent of the state was under a drought designation (Figure 8). Out of that, only 1.2 percent was designated in the D2, (severe category), based on the index used by the DM from abnormally dry to D4 (exceptional drought). More than 90 percent of the state did not have any D designation including abnormally dry conditions.

August 2016

Based on the NCEI, statewide averaged monthly accumulated precipitation was 2.27 inches, which was 0.68 inches greater than last year, and 0.17 inches greater than the 1981-2010 average. Precipitation in August was the wettest since 2014. The statewide average precipitation was ranked the forty-fifth wettest on record since 1895. A majority of the central and eastern parts of the state received much above normal precipitation. On the contrary, northwestern parts of the state stayed dryer than normal. The largest amount of monthly accumulation was 7.45 inches and

was recorded in Oakes, Dickey County by a Coop observer. The least amount of monthly accumulation was 0.45 inches and recorded at Williston Sloulin International Airport. The greatest 24 hour rainfall was 3.89 inches and was recorded in Fullerton on August 10, 2016 by a Coop observer. Based on historical records, the state average annual precipitation accumulation showed no long-term trend since 1895. The highest and the lowest monthly state August precipitation ranged from 4.54 inches in 1900 to 0.73 inches in 1929.

The state average temperature in August based on NCEI was 67.9 degrees Fahrenheit, nearly as warm as last year, 0.4 degrees Fahrenheit warmer than the 1981-2010 average, and was the warmest August since 2015. It was ranked the fiftieth warmest August on record since 1895. As the northern parts of the state showed warmer than normal conditions, eastern parts of the state were cooler than normal and southern parts of the state were near normal. The state's highest and lowest daily temperatures ranged from 99 degrees Fahrenheit on August 1, 2016 in Watford City, McKenzie County to 58 degrees Fahrenheit on August 29, 2016 in Taylor, Stark County. Based on historical records, the state average annual temperature showed an increasing trend of 0.02 degrees Fahrenheit per decade since 1895. The highest and the lowest monthly state August average temperatures ranged from 80.1 degrees Fahrenheit in 1936 to 61.8 degrees Fahrenheit in 1992.

Based on the DM on August 30, 2016 less than 2 percent of the state was under a drought designation. Out of that, only 0.29 percent was designated in a severe category, based on the index used by the DM from abnormally dry to exceptional drought. Nearly 90 percent of the state stayed in the clear avoiding any designation including abnormally dry conditions.

Summer 2016

Using analysis from the NCEI, the average North Dakota precipitation for June 1, 2016 through August 3, 2016 was 9.28 inches, which was 1.41 inches greater than last year, and 0.91 inches greater than the 1981-2010 average. This made the August precipitation the wettest August since 2014. This would rank summer 2016 as the thirtieth wettest summer since such records began in 1895. Based on historical records, the state average summer precipitation showed an increasing trend of 0.02 inches per decade since 1895. The highest and the lowest seasonal summer average precipitation for the state ranged from the highest amount of 15.54 inches in 1993 to the lowest amount of 3.32 inches in 1929.

The average North Dakota temperature for June 1, 2016 through August 31, 2016 was 67.7 degrees Fahrenheit, which was 1.1 degrees Fahrenheit warmer than the 1981-2010 average temperature and the warmest summer since 2012. This would rank summer 2016 as the thirtieth warmest summer since such records began in 1895. Based on historical records, the state average summer temperature showed an increasing trend of 1.5 degrees Fahrenheit per decade since 1895. The highest and the lowest seasonal summer average temperatures for the state ranged from the highest amount of 72 degrees Fahrenheit in 1936 to the lowest amount of 61.2 degrees Fahrenheit in 1915.

2016 WATER YEAR PRECIPITATION (INCHES)

MONTH	DICKINSON			HEART BUTTE			JAMESTOWN		
	ACTUAL	AVE	%	ACTUAL	AVE	%	ACTUAL	AVE	%
Oct-15	1.36	1.23	111	1.78	1.13	158	0.61	1.55	39
Nov-15	0.03	0.54	6	0.03	0.72	4	1.02	0.63	162
Dec-15	0.26	0.24	108	0.33	0.44	75	0.14	0.40	35
Jan-16	0.16	0.30	53	0.11	0.49	22	0.00	0.45	0
Feb-16	0.26	0.33	79	0.33	0.41	80	0.11	0.40	28
Mar-16	0.25	0.69	36	0.33	0.86	38	0.36	0.84	43
Apr-16	2.38	1.47	162	2.93	1.49	197	2.57	1.20	214
May-16	1.37	2.32	59	1.03	2.51	41	2.79	2.66	105
Jun-16	2.66	3.20	83	0.82	2.86	29	2.45	3.19	77
Jul-16	3.90	2.44	160	4.08	2.46	166	5.88	3.35	176
Aug-16	0.65	1.54	42	1.59	1.58	101	4.59	2.10	219
Sep-16	3.42	1.47	233	2.55	1.32	193	3.91	2.00	196
TOTAL	16.70			15.91			24.43		
AVERAGE		15.77			16.27			18.77	
% OF AVERAGE			106			98			130

2016 WATER YEAR INFLOW (ACRE-FEET)

MONTH	DICKINSON			HEART BUTTE			JAMESTOWN		
	ACTUAL	AVE	%	ACTUAL	AVE	%	ACTUAL	AVE	%
Oct-15	51	640	8	1,559	1,485	105	1,205	1,170	103
Nov-15	13	167	8	1,738	1,267	137	530	980	54
Dec-15	202	132	153	1,574	892	176	670	415	161
Jan-16	482	288	167	864	1,148	75	25	168	15
Feb-16	319	1,061	30	3,214	3,653	88	486	243	200
Mar-16	203	6,931	3	3,391	28,508	12	1,917	6,563	29
Apr-16	477	4,632	10	3,921	25,030	16	1,051	24,968	4
May-16	9	2,544	0	2,251	10,460	22	501	9,636	5
Jun-16	-313	2,413	-13	-125	10,712	-1	-389	4,167	-9
Jul-16	-370	879	-42	456	4,226	11	1,547	4,197	37
Aug-16	-222	396	-56	-950	1,841	-52	480	4,185	11
Sep-16	189	116	163	830	498	167	2,891	1,322	219
TOTAL	1,040			18,723			10,914		
AVERAGE		20,199			89,720			58,014	
% OF AVERAGE			5			21			19

2016 WATER YEAR END OF MONTH STORAGE (ACRE-FEET)

MONTH	DICKINSON			HEART BUTTE			JAMESTOWN		
	ACTUAL	AVE	%	ACTUAL	AVE	%	ACTUAL	AVE	%
Oct-15	4,091	5,530	74	59,319	58,421	102	27,681	25,383	109
Nov-15	4,221	5,464	77	58,918	58,069	101	27,449	24,990	110
Dec-15	4,423	5,465	81	58,485	57,666	101	27,787	25,024	111
Jan-16	4,905	5,564	88	57,210	57,670	99	27,324	25,032	109
Feb-16	5,062	5,871	86	58,519	59,164	99	27,808	25,161	111
Mar-16	5,265	6,995	75	60,654	69,822	87	29,725	30,952	96
Apr-16	5,742	7,161	80	64,466	69,976	92	30,723	46,560	66
May-16	5,751	7,141	81	65,113	69,155	94	30,889	41,436	75
Jun-16	5,395	7,103	76	62,799	69,988	90	30,371	35,216	86
Jul-16	4,979	6,559	76	59,474	66,186	90	31,829	32,645	98
Aug-16	4,632	6,078	76	55,349	62,390	89	31,488	31,649	99
Sep-16	4,775	5,760	83	54,167	59,962	90	29,520	28,001	105
TOTAL	59,241			714,473			352,594		
AVERAGE		74,691			758,469			372,049	
% OF AVERAGE			79			94			95

2016 WATER YEAR PRECIPITATION (INCHES)

MONTH	ANGOSTURA			BELLE FOURCHE			DEERFIELD			KEYHOLE			PACTOLA			SHADEHILL		
	ACTUAL	AVE	%	ACTUAL	AVE	%	ACTUAL	AVE	%	ACTUAL	AVE	%	ACTUAL	AVE	%	ACTUAL	AVE	%
Oct-15	1.94	1.28	152	1.89	1.35	140	0.94	0.99	95	1.56	1.64	95	0.97	1.50	65	1.32	1.33	99
Nov-15	0.80	0.50	160	0.34	0.64	53	0.17	0.41	41	0.29	1.00	29	0.37	0.61	61	0.04	0.70	6
Dec-15	0.75	0.36	208	0.58	0.38	153	0.31	0.19	163	0.31	0.63	49	0.38	0.34	112	0.84	0.42	200
Jan-16	0.11	0.34	32	0.15	0.30	50	0.18	0.21	86	0.32	0.66	48	0.10	0.28	36	0.04	0.35	11
Feb-16	0.13	0.48	27	0.36	0.45	80	1.00	0.27	370	0.91	0.77	118	0.62	0.48	129	0.54	0.49	110
Mar-16	0.98	1.07	92	0.87	1.03	84	0.88	0.62	142	1.74	1.07	163	1.11	1.13	98	0.40	1.01	40
Apr-16	1.95	2.01	97	2.81	1.71	164	1.23	1.29	95	1.81	2.25	80	1.11	2.15	52	3.90	1.62	241
May-16	2.09	3.15	66	0.28	3.09	9	1.87	2.58	72	1.65	3.16	52	1.31	3.97	33	1.60	2.85	56
Jun-16	1.87	2.89	65	1.85	2.77	67	1.39	2.31	60	0.82	2.85	29	1.45	3.20	45	1.01	2.89	35
Jul-16	2.92	2.39	122	2.03	1.92	106	1.19	2.49	48	2.72	2.18	125	3.35	2.72	123	3.44	2.80	123
Aug-16	1.47	1.77	83	1.18	1.16	102	1.56	1.55	101	1.88	1.68	112	2.74	2.26	121	3.65	1.99	183
Sep-16	2.08	1.43	145	2.22	1.06	209	0.87	1.08	81	1.86	1.31	142	2.11	1.67	126	0.77	1.41	55
TOTAL	17.09			14.56			11.59			15.87			15.62			17.55		
AVERAGE		17.67			15.86			13.99			19.20			20.31			17.86	
% OF AVERAGE			97			92			83			83			77			98

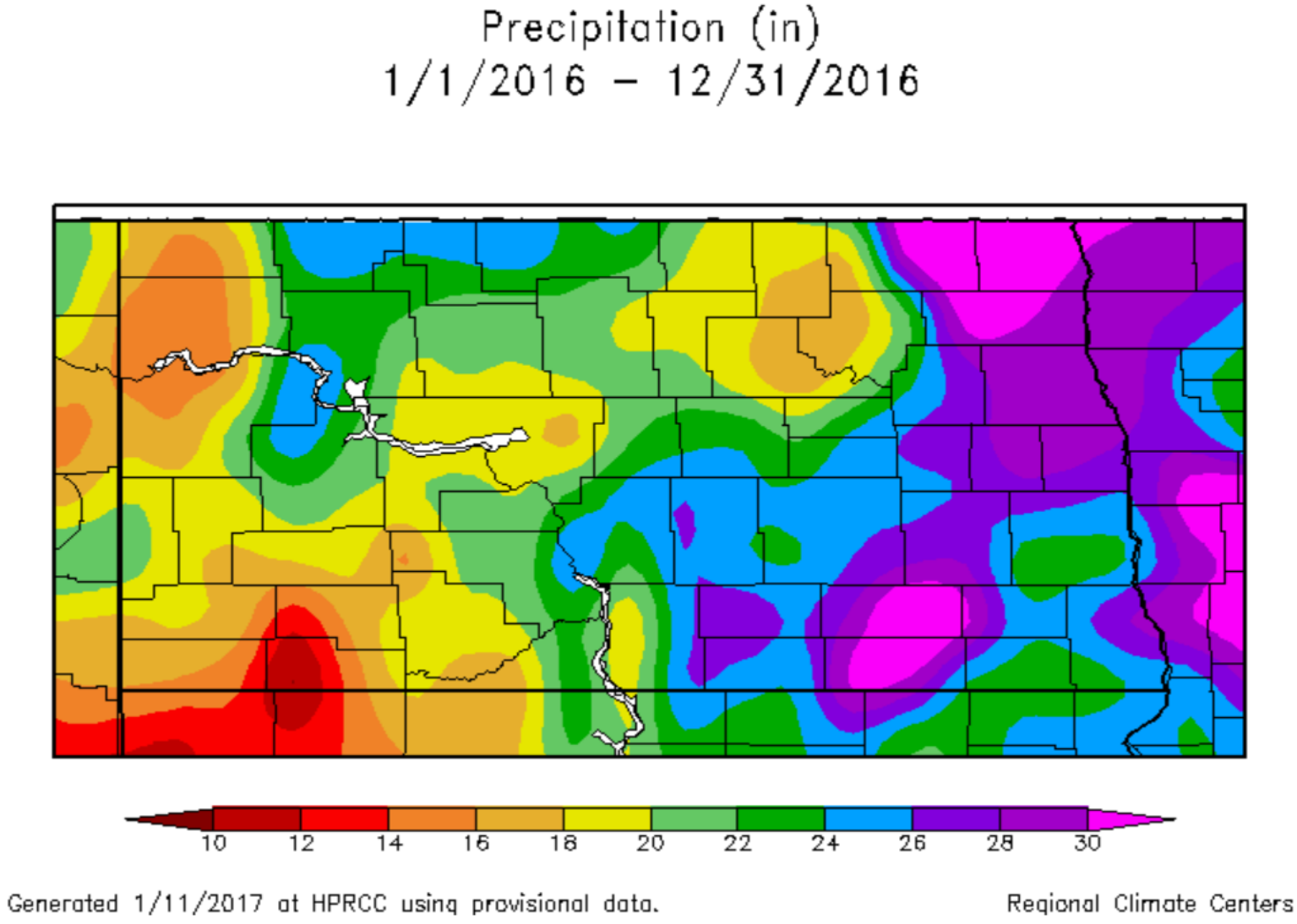
2016 WATER YEAR INFLOW (ACRE-FEET)

MONTH	ANGOSTURA			BELLE FOURCHE			DEERFIELD			KEYHOLE			PACTOLA			SHADEHILL		
	ACTUAL	AVE	%	ACTUAL	AVE	%	ACTUAL	AVE	%	ACTUAL	AVE	%	ACTUAL	AVE	%	ACTUAL	AVE	%
Oct-15	3,623	2,149	169	9,419	10,642	89	1,193	672	178	-1,210	-309	392	4,510	2,170	208	423	1,239	34
Nov-15	2,916	2,233	131	13,813	9,757	142	1,059	605	175	-1,031	-299	345	3,526	1,620	218	58	915	6
Dec-15	4,422	1,851	239	9,539	8,980	106	1,099	633	174	343	152	226	3,095	1,374	225	1,283	804	160
Jan-16	3,608	2,137	169	73	9,172	1	1,068	629	170	604	523	115	3,375	1,425	237	513	1,003	51
Feb-16	5,460	4,423	123	74	9,789	1	1,081	582	186	1,379	2,806	49	3,365	1,423	236	4,514	3,325	136
Mar-16	5,182	11,444	45	6,808	15,853	43	1,287	877	147	173	6,874	3	3,703	2,466	150	1,780	23,471	8
Apr-16	7,277	7,497	97	14,545	13,709	106	1,275	1,196	107	610	2,465	25	3,691	4,212	88	2,441	20,856	12
May-16	8,912	17,908	50	1,298	14,754	9	1,073	1,418	76	-2,594	5,080	-51	3,186	6,860	46	587	11,400	5
Jun-16	1,169	20,481	6	461	11,894	4	778	1,252	62	-3,670	3,471	-106	1,781	7,126	25	-2,380	9,528	-25
Jul-16	564	6,924	8	6,126	3,703	165	681	879	77	-3,631	-894	406	1,776	3,938	45	-1,683	3,778	-45
Aug-16	744	3,041	24	-578	2,603	-22	688	695	99	-3,767	-1,771	213	1,956	2,778	70	-273	437	-62
Sep-16	1,205	1,005	120	9,999	4,894	204	727	618	118	-1,009	-1,703	59	1,982	2,242	88	-1,028	66	-1558
TOTAL	45,082			71,577			12,009			-13,803			35,946			6,235		
AVERAGE		81,093			115,750			10,056			16,395			37,634			76,822	
% OF AVERAGE			56			62			119			-84			96			8

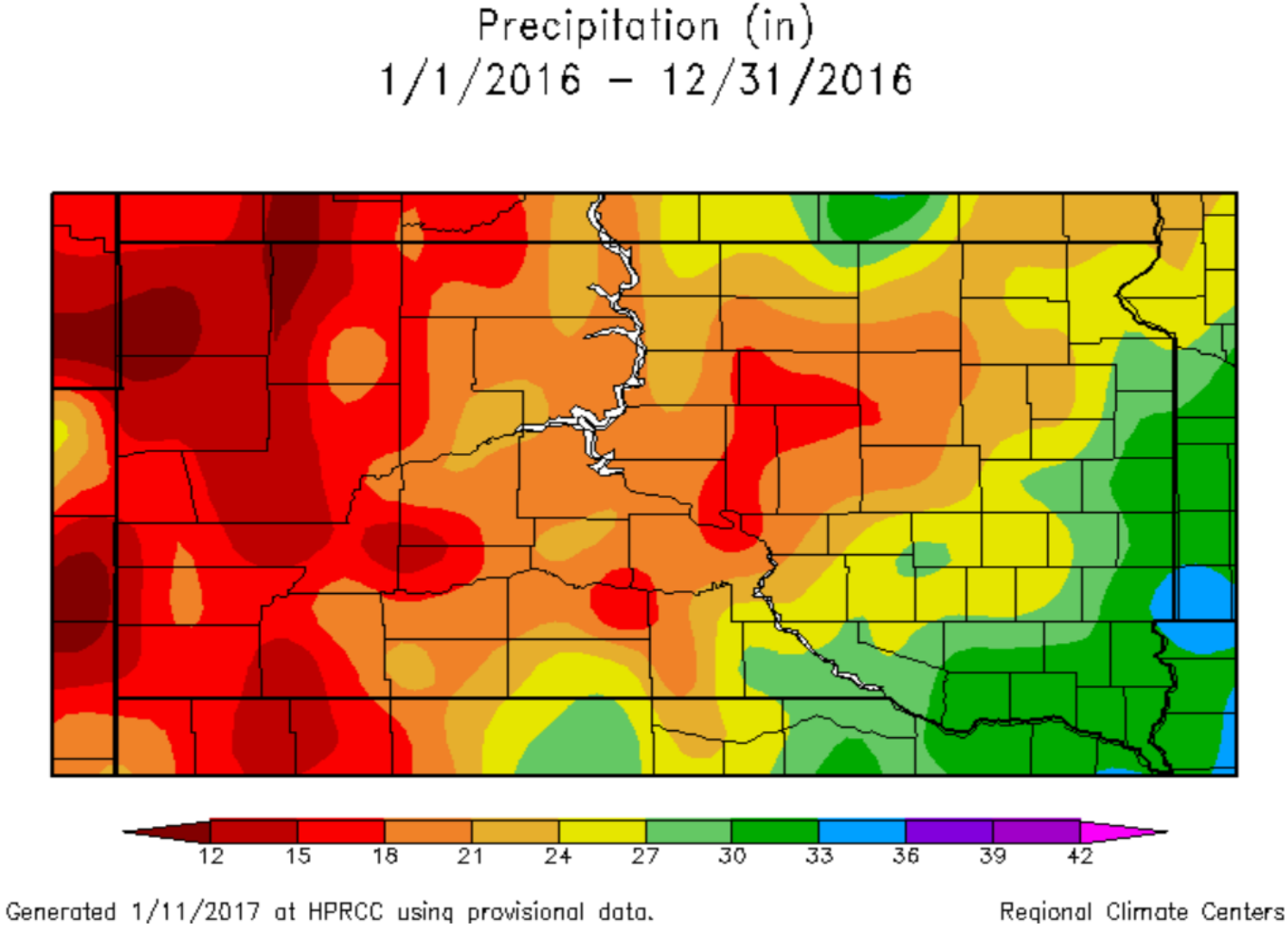
2016 WATER YEAR END OF MONTH STORAGE (ACRE-FEET)

MONTH	ANGOSTURA			BELLE FOURCHE			DEERFIELD			KEYHOLE			PACTOLA			SHADEHILL		
	ACTUAL	AVE	%	ACTUAL	AVE	%	ACTUAL	AVE	%	ACTUAL	AVE	%	ACTUAL	AVE	%	ACTUAL	AVE	%
Oct-15	104,510	97,650	107	121,505	74,807	162	14,788	12,654	117	167,046	93,572	179	50,570	45,053	112	105,167	109,549	96
Nov-15	106,255	98,522	108	135,318	84,184	161	14,657	12,856	114	166,015	93,104	178	50,316	45,245	111	98,994	107,283	92
Dec-15	108,614	99,913	109	144,856	92,900	156	14,526	13,123	111	166,358	93,240	178	50,832	45,132	113	97,283	105,587	92
Jan-16	110,321	101,584	109	144,929	101,758	142	14,364	13,391	107	166,962	93,761	178	52,088	45,160	115	94,818	104,230	91
Feb-16	113,787	105,125	108	145,003	111,235	130	14,295	13,610	105	168,341	96,448	175	53,461	45,318	118	96,542	105,433	92
Mar-16	116,880	112,292	104	151,811	126,683	120	14,352	13,875	103	168,514	102,499	164	55,025	46,010	120	95,332	118,486	80
Apr-16	118,537	115,962	102	166,339	139,681	119	14,437	14,051	103	169,124	102,702	165	55,674	47,376	118	95,462	121,549	79
May-16	119,530	120,154	99	159,772	146,823	109	14,424	14,116	102	166,530	106,053	157	55,984	48,616	115	93,793	122,348	77
Jun-16	109,806	119,839	92	127,659	142,188	90	14,603	14,068	104	161,104	107,533	150	54,584	49,219	111	89,772	123,111	73
Jul-16	99,075	111,066	89	100,306	109,270	92	14,669	13,805	106	151,773	102,625	148	53,353	47,556	112	87,080	121,191	72
Aug-16	90,890	101,330	90	70,259	76,826	91	14,742	13,303	111	146,959	97,249	151	52,759	45,374	116	85,878	117,176	73
Sep-16	89,106	96,898	92	63,841	64,531	99	14,874	12,772	116	145,950	94,828	154	52,455	44,756	117	83,946	113,515	74
ANNUAL	107,276			127,633			14,561			162,056			53,092			93,672		
AVERAGE		106,695			105,907			13,469			98,635			46,235			114,122	
% OF AVERAGE			101			121			108			164			115			82

NORTH DAKOTA 2016 YEARLY PRECIPITATION



SOUTH DAKOTA 2016 YEARLY PRECIPITATION



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 2016. They are: 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 2016
ACCUMULATED TOTAL 1950-2016

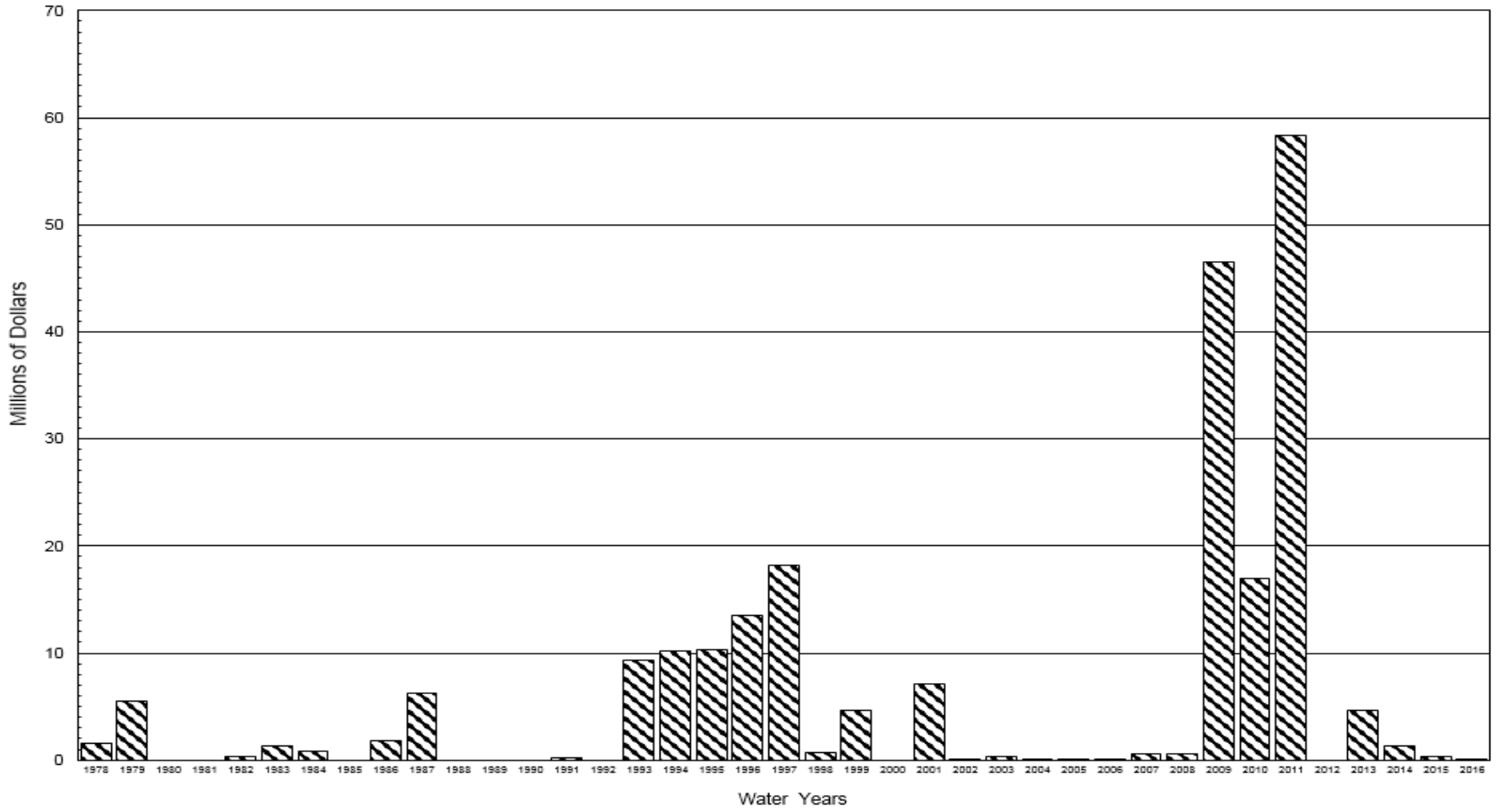
Reservoir	Local	Main-Stem	2016 Total	Previous Accumulations	1950-2016 Accumulation Totals
Heart Butte	$0	$0	$0	$15,570,700	$15,570,700
Shadehill	$0	$10,000	$10,000	$12,240,500	$12,250,500
Angostura	$0	$0	$0	$22,800	$22,800
Pactola	$0	$2,800	$2,800	$3,717,000	$3,719,800
Keyhole	$0	$0	$0	$4,257,800	$4,257,800
Jamestown	$0	$0	$0	$208,052,100	$208,052,100
Total	$0	$12,800	$12,800	$244,036,500	$244,049,300

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



Angostura Reservoir

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 kW. 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.

Angostura Reservoir started WY 2016 at an elevation of 3,182.09 feet and storage of 100,959 AF, which is 5.11 feet and 22,089 AF below the top of the conservation pool. Precipitation was 97 percent of average. Inflows for WY 2016 totaled 45,082 AF (56 percent of the average). Peak inflows occurred in April 2016 totaling 7,277 AF. The peak reservoir elevation of 3186.76 feet and storage of 121,029 AF occurred on May 22, 2016. The minimum elevation of 3,178.81 feet and storage of 88,333 AF occurred on September 16, 2016. WY 2016 ended with an elevation of 3179.02 feet and storage of 89,106 AF, which is 8.18 feet and 33,942 AF below the top of the conservation pool. Angostura Reservoir ended WY 2106 with 46,901 AF in active storage.

The Angostura Irrigation District had a full water allotment for its irrigators. Releases for irrigation began May 24, 2016 and reached a peak of 257 cfs on June 26, 2016. The irrigation release was terminated on September 25, 2016. Total irrigation releases were 35,156 AF.

Angostura Reservoir went into IA status on April 29, 2016 after reaching reservoir elevation of 3186.0 feet and stayed in IA until June 9, 2016. The river outlet gate was operated to drop the reservoir pool down to 3186.0 feet, and then set to match inflows and/or allow the reservoir to slowly fill.

The Corps estimated that during WY 2016 Angostura Reservoir prevented $0 in local and main stem flood damages and has now reduced flood damages by a total of $22,800 since construction was completed in 1952.

Keyhole Reservoir

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 furnishes 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 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 CCID'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 year's 1992 to 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.

Keyhole Reservoir started WY 2016 at an elevation of 4,097.04 feet and storage of 168,256 AF, which is 2.26 feet and 20,415 AF below the top of the conservation pool. Precipitation for WY 2016 was 83 percent of average. Inflows for WY 2016 totaled -13,803 AF (-84 percent of average). Peak inflows occurred in February, totaling 1,379 AF for the month. The peak reservoir elevation for WY 2016 was 4,097.15 feet, storage of 169,209 AF, and occurred on April 23, 2016. The minimum elevation for WY 2016 was 4,094.21 feet, storage of 145,100 AF, and occurred on September 22, 2016. WY 2016 ended at an elevation of 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. Keyhole Reservoir ended WY 2016 with 139,358 AF in active storage.

BFID ordered 744 AF and the Crook County Irrigation District ordered 216 AF for WY 2016.

The Corps estimated that during WY 2016 Keyhole Reservoir prevented $0 in local and main stem flood damages and has now reduced flood damages by a total of $4,257,800 since construction was completed in 1952.

Pactola Reservoir

Pactola Reservoir, Rapid Valley Unit P-S MBP, located on Rapid Creek above Rapid City, South Dakota, acts in conjunction with Deerfield Reservoir, Rapid Valley Project, 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. North Rapid Creek and Blind Park Snotel sites were installed in the Pactola and Deerfield drainage basin in May of 1990.

Pactola Reservoir started WY 2016 at an elevation of 4,574.15 feet and storage of 50,952 AF, which is 6.05 feet and 5,020 AF below the top of the conservation pool elevation of 4,580.20 feet. Precipitation for WY 2016 was 77 percent of average. Inflows for WY 2016 totaled 35,946 AF (96 percent of average). Peak inflows occurred in October 2015, totaling 4,510 AF for the month. The peak reservoir elevation for WY 2016 was 4,580.22 feet, storage of 55,993 AF, and occurred on May 30, 2016. The minimum elevation for WY 2016 was 4,572.33 feet, storage of 49,516 AF, and occurred on October 15, 2015. WY 2016 ended at an elevation of 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. Pactola Reservoir ended WY 2016 with 51,438 AF in active storage.

The District ordered 770 AF of water from storage for irrigation. Rapid City released 620.1 AF of water from storage for the municipal water supply in 2016.

The Corps estimated that during WY 2016 Pactola Reservoir prevented $2,800 in local and main stem flood damages and has now reduced flood damages by a total of $3,719,800 since construction was completed in 1956.

Shadehill Reservoir

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, flood control, recreation, 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.

Shadehill Reservoir started WY 2016 at an elevation of 2,270.44 feet and storage of 112,506 AF, which is 1.56 feet and 7,666 AF below the top of the conservation pool. Precipitation for WY 2016 was 98 percent of average. Inflows for WY 2016 totaled 6,235 AF (8 percent of the average).

Peak inflows occurred in February 2016 totaling 4,514 AF for the month. The peak reservoir elevation for WY 2016 occurred on October 1, 2015 with 2,270.40 feet, storage of 112,314 AF. The minimum elevation for WY 2016 was 2,263.64 feet, storage of 82,936 AF, and occurred on September 23, 2016. WY 2016 ended at an elevation pf 2,263.90 feet and storage of 83,946 AF, which is 8.10 feet and 36,226 AF below the top of the conservation pool. Shadehill Reservoir ended WY 2016 with 40,077 AF in active storage.

All irrigation demands were met from river maintenance releases. There were no storage releases for irrigation needed during WY 2016.

The Corps estimated that during WY 2016 Shadehill Reservoir prevented $0 in local and main stem flood damages and has now reduced flood damages by a total of $12,240,500 since construction was completed in 1951.

Heart Butte Reservoir

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 primarily used for flood control and the authorized irrigation of up to 13,100 acres of which about 7,320 acres are now being irrigated.

Heart Butte Reservoir started WY 2016 at an elevation of 2062.32 and storage of 60,156 AF, which is 2.18 feet, and 6,986 AF below the top of conservation pool (elevation 2064.50 feet and storage 67,142 AF). Heart Butte Reservoir peaked at an elevation of 2064.18 feet on May 11, 2016 with 66,090 AF of storage. The minimum reservoir elevation for WY 2016 was 2060.16 and storage of 53,638 AF occurred on September 22, 2016. The reservoir elevation on September 30, 2016 was 2060.34 feet with storage of 54,167 AF, which is 4.16 feet and 12,975 AF below the top of conservation pool.

A maximum discharge of 129 cfs occurred on October 28, 2015. Reservoir net inflows for WY 2016 were the twelfth lowest on record for the dam and totaled 18,724 AF, 21 percent of average. The maximum 24 hour computed inflow occurred on October 11, 2015 with 302 cfs. Precipitation for WY 2016 totaled 15.91 inches, which is 98 percent of average. A total of 7,311 AF was released specifically for downstream irrigation.

The Corps estimated that during WY 2016 Heart Butte Reservoir prevented $10,000 in local and main stem flood damages and has now reduced flood damages by a total of $15,580,700 since construction was completed in 1949.

Jamestown Reservoir

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.

Jamestown Reservoir started WY 2016 at an elevation of 1430.61 feet and storage of 29,589 AF, which is 2.61 feet, and 5,363 AF above the top of the conservation pool (elevation 1428.00 feet and storage 24,226 AF). Jamestown Reservoir peaked at an elevation of 1432.01 feet on September 7, 2016 with 32,947 AF of storage. The minimum reservoir elevation for WY 2016

occurred on February 3, 2016 with 1429.56 feet and storage of 27,303 AF. The reservoir elevation on September 30, 2016 was 1430.58 with storage of 29,520 AF, which is 2.58 feet, and 5,294 AF above the top of active conservation pool.

The maximum instantaneous discharge of 122 cfs occurred on September 15, 2016. Reservoir net inflows for WY 2016 were the twenty-sixth lowest inflows on record for the dam and totaled 10,913 AF, 19 percent of average. The maximum 24 hour computed inflow occurred on September 4, 2016 with 566 cfs. Precipitation for WY 2016 totaled 24.43 inches at 130 percent of average. No water was released specifically for downstream irrigation.

On April 25, 2016 Jamestown Reservoir went into IA with a reservoir elevation over 1431.00 feet and remained there until May 8, 2016 when the reservoir elevation dropped below elevation 1431.00 feet and normal operating conditions resumed.

On May 12, 2016 the reservoir went back into IA with a reservoir elevation over 1431.00 feet and remained there until May 14, 2016 when the reservoir elevation dropped below elevation 1431.00 feet and normal operating conditions resumed.

On May 22, 2016 the reservoir went back into IA with a reservoir elevation over 1431.00 feet and remained there until June 27, 2016 when the reservoir elevation dropped below elevation 1431.00 feet and normal operating conditions resumed.

On July 11, 2016 the reservoir went back into IA with a reservoir elevation over 1431.00 feet and remained there until September 21, 2016 when the reservoir elevation dropped below elevation 1431.00 feet and normal operating conditions resumed.

The Corps estimated that during WY 2016 Jamestown Reservoir prevented zero dollars in local and main stem flood damages and has now reduced flood damages by a total of $208,052,100 since construction was completed in 1954.

CORPS OF ENGINEERS

MAIN STEM RESERVOIRS

AND

ENERGY GENERATION

DATA

CORPS OF ENGINEERS 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' 2016-17 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 normally is from late March to late November. Generally, 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 2015-2016, 2014-2015, 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 2016 price levels.

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

Regulated				
Navigation[1]	Apr. - Dec.[2]	0.269 million tons (2016)	0.269 million tons (2015)	1.66 million Tons[3]
Flood Damages Prevented	Oct. – Sept.	$680.0 million (2016)	$ 906.0 million (2015)	$ 60.0 billion[4]
Energy	Aug. - Jul.	7.7 billion KWH (Aug. 15-July 16)	9.7 billion KWH (Aug. 14-July 15)	9.3 billion KWH[5]

[1]If sand, gravel, and waterway material are included:
4.298 million tons (2016)
4.402 million tons (2015)
6.63 million tons (1967-2016 average)
[2]End of navigation season extended 0 days in 2015 and 0 days in 2016
[3]1967-2016 average. Peak tonnage shipped in 1977 (3.336 million tons)
[4]Total damages prevented (1938-2016)
[5]1968-2016 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 kW. 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 2016 was 8,816.969 million kilowatt hours, 1,472.254 million kilowatt hours less than in WY 2015. A summary of the past 10 years of energy generation within the Upper Missouri River Basin is shown below.

USBR and COE Energy Generation
(Million Kilowatt Hours)

Year	USBR	USACE	TOTAL
2016	1,164.801	7,652.168	8,816.969
2015	1,316.344	9,323.682	10,289.223
2014	1,559.297	8,729.714	9,144.909
2013	840.209	8,183.967	11,920.936
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
2007	794.348	5,061.000	5,855.348

A comparison of 2015 and 2016 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 2016 operation summaries. Information on the Corps' powerplants operations can be obtained from the annual operating reports prepared by and available for distribution from the Reservoir Control Center, U.S. Army Corps of Engineers, Omaha, Nebraska.

TABLE CET2

ANNUAL ENERGY PRODUCTION DATA

WATER YEAR 2016

				WATER USED FOR GENERATION IN 2015				TOTAL
	CAPACITY (KW)		2016					
Canyon Ferry	50,000	332.551	305.357	2,512.692	91.97	121.53	2,631.0	2,732.2
Pilot Butte[1]	1,600	0.000	0.000	0.000	0.00	N/A	142.3	142.3
Boysen	15,000	65.408	67.344	815.134	75.21	82.62	1,083.9	1,083.9
Buffalo Bill Reservoir Units								
Shoshone	3,000	19.270	17.029	105.846	14.00	160.88	See below for	total.
Buffalo Bill	18,000	67.601	56.814	269.487	35.65	210.82	See below for	total.
Heart Mountain	6,000	18.308	18.330	86.112	11.39	212.86	See below for	total.
Spirit Mountain [2]	4,500	18.844	17.389	167.374	22.14	103.89	See below for	total.
Total for Buffalo Bill Reservoir[3]	31,500	124.023	109.562	628.819	83.19	174.23	503.6	755.9
Yellowtail	250,000	794.362	682.538	1,975.431	94.09	345.51	2,034.5	2,099.4
Fort Peck	185,250	794.547	785.498	4,784.00	100.00	164.19	4,784.0	4,784.0
Garrison	583,300	2,292.228	1,913.684	12,383.00	100.00	154.54	12,383.0	12,383.0
Oahe	786,030	2,677.675	2,051.136	13,159.00	100.00	155.87	13,159.0	13,159.0
Big Bend	494,320	984.650	746.601	12,224.00	100.00	61.08	12,224.0	12,224.0
Fort Randall	320,000	1,780.622	1,460.986	14,075.00	100.00	103.80	14,075.0	14,075.0
Gavins Point	132,300	793.960	694.263	15,312.00	97.11	45.34	15,767.0	15,767.0
TOTAL MISSOURI BASIN	**2,849,300**							

[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 2016

	BUREAU OF RECLAMATION PLANTS								
					MOUNTAIN	**BUFFALO**			
October	23.229	0.000	4.030	1.343	1.604	1.506	1.500	60.680	
November	22.544	0.000	4.383	0.000	0.000	0.863	1.167	52.052	
December	23.206	0.000	4.523	0.000	0.000	1.123	1.216	50.225	
January	24.442	0.000	4.474	0.000	0.000	0.976	1.215	49.332	
February	24.268	0.000	4.101	0.000	0.000	1.277	0.288	45.456	
March	26.165	0.000	3.004	0.000	0.000	0.637	1.221	41.510	
April	25.771	0.000	2.495	1.125	0.634	5.949	1.443	47.541	
May	32.302	0.000	10.136	3.289	2.830	10.378	1.741	91.877	
June	30.333	0.000	10.830	3.054	2.963	12.640	1.870	94.362	
July	25.767	0.000	8.590	3.218	3.322	9.991	1.988	54.342	
August	24.678	0.000	6.351	3.178	3.088	8.223	1.817	50.958	
September	22.652	0.000	4.427	3.123	2.948	3.251	1.563	44.203	
	305.357				**.3**			**682.5**	
	CORPS OF ENGINEERS PLANTS								
October	47.142	125.213	171.167	59.534	172.745	74.895			
November	44.347	118.133	161.244	60.144	128.954	58.269			
December	53.490	138.635	142.271	54.798	87.728	48.849			
January	69.177	165.103	240.317	86.149	121.139	59.124			
February	56.083	169.121	151.204	60.992	83.159	44.802			
March	58.250	152.137	151.674	58.151	89.811	45.715			
April	62.730	136.677	165.295	62.019	99.708	47.771			
May	77.316	171.709	82.384	28.136	91.423	53.526			
June	86.822	194.624	155.852	55.353	136.605	64.375			
July	85.392	195.216	225.974	76.465	157.708	68.801			
August	82.371	191.826	233.853	83.398	159.448	69.252			
September	62.378	155.290	169.901	61.462	132.558	58.884			

TABLE CET4

WATER USED FOR POWER GENERATION (1,000 ACRE-FEET)
WATER YEAR 2016

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	192.946	51.280	0.000	9.778	10.153	6.430	15.858	151.626	289.000	821.000	1,058.000	958.000	1,693.000	1,753.000
November	186.394	48.615	0.000	10.292	3.994	0.000	0.000	142.297	283.000	770.000	1,003.000	955.000	1,350.000	1,263.000
December	192.877	50.004	0.000	10.724	4.048	0.000	0.000	144.963	330.000	896.000	899.000	865.000	923.000	1,046.000
January	205.402	50.107	0.000	10.715	4.226	0.000	0.000	148.966	420.000	1,070.000	1,526.000	1,383.000	1,281.000	1,276.000
February	207.286	47.089	0.000	2.540	5.665	0.000	0.000	139.857	354.000	1,099.000	1,015.000	971.000	800.000	962.000
March	221.068	41.705	0.000	6.478	5.348	0.000	0.000	134.573	369.000	992.000	998.000	931.000	847.000	998.000
April	217.652	24.467	0.000	7.659	27.914	5.205	6.629	144.333	389.000	886.000	1,053.000	1,025.000	929.000	1,042.000
May	259.936	124.158	0.000	9.241	50.097	15.169	27.493	248.019	457.000	1,114.000	536.000	491.000	811.000	1,158.000
June	236.439	155.127	0.000	9.926	49.484	14.542	28.333	256.893	514.000	1,246.000	1,003.000	937.000	1,246.000	1,420.000
July	207.251	96.752	0.000	10.552	43.342	15.323	31.256	163.622	510.000	1,247.000	1,444.000	1,282.000	1,470.000	1,537.000
August	198.322	75.703	0.000	9.645	41.992	14.914	29.528	160.153	495.000	1,234.000	1,506.000	1,399.000	1,489.000	1,537.000
September	187.119	50.127	0.000	8.296	23.224	14.529	28.277	140.129	374.000	1,008.000	1,118.000	1,027.000	1,236.000	1,320.000
TOTAL	**2,512.692**	**815.134**	**0.000**	**105.846**	**269.487**	**86.112**	**167.374**	**1,975.431**	**4,784.000**	**12,383.000**	**13,159.000**	**12,224.000**	**14,075.000**	**15,312.000**

[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 2016

MONTH	CANYON FERRY	BOYSEN	PILOT BUTTE	BUFFALO BILL	BULL LAKE	ANCHOR	YELLOWTAIL	FORT PECK	GARRISON	OAHE	BIG BEND	FORT RANDALL	GAVINS POINT
October	193.166	51.280	0.000	43.567	1.559	0.456	151.626	289.000	821.000	1,058.000	958.000	1,693.000	1,753.000
November	186.709	48.615	0.000	12.173	1.497	0.000	142.297	283.000	770.000	1,003.000	955.000	1,350.000	1,500.000
December	192.877	50.004	0.000	13.143	1.559	0.000	144.963	330.000	896.000	899.000	865.000	923.000	1,046.000
January	205.402	50.107	0.000	13.360	1.564	0.000	148.966	420.000	1,070.000	1,526.000	1,383.000	1,281.000	1,377.000
February	207.286	47.089	0.000	12.504	1.463	0.000	139.857	354.000	1,099.000	1,015.000	971.000	800.000	979.000
March	221.235	44.487	0.000	13.275	1.559	0.000	134.573	369.000	992.000	998.000	931.000	847.000	998.000
April	233.069	42.571	3.455	52.051	1.536	0.452	144.333	389.000	886.000	1,053.000	1,025.000	929.000	1,142.000
May	310.412	243.954	10.693	114.863	1.774	0.946	301.714	457.000	1,114.000	536.000	491.000	811.000	1,158.000
June	279.651	278.859	34.728	166.142	41.395	4.227	327.207	514.000	1,246.000	1,003.000	937.000	1,246.000	1,420.000
July	252.230	97.760	42.353	121.424	53.083	4.511	163.622	510.000	1,247.000	1,444.000	1,282.000	1,470.000	1,537.000
August	237.371	75.703	35.002	113.801	65.784	0.558	160.153	495.000	1,234.000	1,506.000	1,399.000	1,489.000	1,537.000
September	212.780	53.430	16.021	79.551	28.652	0.443	140.129	374.000	1,008.000	1,118.000	1,027.000	1,236.000	1,320.000
TOTAL	**2,732.188**	**1,083.859**	**142.252**	**755.854**	**201.425**	**11.593**	**2,099.440**	**4,784.000**	**12,383.000**	**13,159.000**	**12,224.000**	**14,075.000**	**15,767.000**

TABLE CET6

TOTAL RESERVOIR STORAGE CONTENTS (1,000 ACRE-FEET)
WATER YEARS 2015 AND 2016

BUREAU RESERVOIRS	TOP OF CONSERVATION CAPACITY [3]	DEAD AND INACTIVE CAPACITY	TOTAL STORAGE SEPTEMBER 30		END OF SEPTEMBER PERCENT OF AVERAGE	
			2015	2016	2015	2016
Clark Canyon	174.4	1.1	55.0	52.0	58%	55%
Canyon Ferry	1,891.9	396.0	1,486.0	1,485.4	92%	92%
Helena Valley	10.5	4.6	8.6	9.1	115%	121%
Gibson	96.5	0.0	5.4	5.5	23%	23%
Willow Creek	31.8	1.0	17.5	16.8	87%	83%
Pishkun	46.7	16.0	21.6	20.1	67%	62%
Lake Elwell	925.6	554.3	819.4	755.3	103%	95%
Sherburne	66.1	1.9	16.2	23.6	95%	139%
Fresno	92.9	0.4	59.8	57.6	129%	124%
Nelson	79.0	18.1	66.5	26.1	117%	46%
Bull Lake	152.5	0.7	63.7	38.3	84%	51%
Pilot Butte	33.7	3.8	15.4	7.4	85%	41%
Boysen	741.6	219.2	631.1	624.9	105%	104%
Anchor[1]	17.2	0.1	0.5	0.5	141%	167%
Buffalo Bill[2]	646.6	41.7	430.8	421.3	97%	95%
Bighorn Lake	1,020.6	469.9	969.5	942.4	102%	99%
E. A. Patterson	8.6	0.5	4.0	4.8	65%	77%
Lake Tschida	67.1	5.2	60.2	54.2	106%	95%
Jamestown Reservoir	31.5	0.8	29.6	29.5	103%	103%
Shadehill Reservoir	120.2	43.9	112.5	83.9	107%	80%
Angostura Reservoir	123.0	42.2	101.0	89.1	119%	105%
Deerfield Reservoir	15.7	0.2	14.8	14.9	111%	111%
Pactola Reservoir	56.0	1.0	51.0	52.5	110%	113%
Keyhole Reservoir	188.7	6.6	168.3	146.0	190%	165%
Belle Fourche Reservoir	172.9	3.1	112.1	63.8	151%	86%
Subtotal	**6,811.2**	**1,832.3**	**5,320.4**	**5,024.9**		
CORPS RESERVOIRS						
Fort Peck	17,578.0	4,073.0	14,949.0	14,659.0		
Garrison	22,332.0	4,980.0	19,087.0	18,040.0		
Oahe	22,035.0	5,373.0	19,862.0	19,428.0		
Big Bend	1,738.0	1,621.0	1,654.0	1,650.0		
Fort Randall	4,433.0	1,517.0	3,366.0	3,276.0		
Gavins Point	393.0	307.0	360.0	355.0		
Subtotal	**68,509.0**	**17,871.0**	**59,278.0**	**57,408.0**		
TOTAL UPPER MISSOURI BASIN	**75,320.2**	**19,703.3**	**64,598.4**	**62,432.9**		

[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 2016
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	63.4	73.9	84.6	94.2	103.4	114.1	123.5	121.9	98.9	70.4	54.5	52.0
% of Average	61.3%	65.9%	71.8%	76.6%	81.0%	84.1%	86.5%	88.3%	75.3%	63.6%	58.0%	55.2%
CANYON FERRY RESERVOIR	1,467.0	1,480.0	1,479.0	1,473.6	1,474.8	1,473.0	1,582.2	1,791.2	1,876.2	1,738.6	1,580.6	1,485.4
% of Average	89.7%	89.5%	92.3%	96.0%	99.2%	100.8%	106.5%	109.0%	101.3%	97.4%	94.4%	91.7%
HELENA VALLEY RESERVOIR	8.3	7.9	7.7	7.4	7.1	6.6	9.9	9.8	10.1	9.0	9.5	9.1
% of Average	118.7%	117.9%	118.4%	121.2%	123.5%	115.6%	107.2%	107.2%	112.7%	121.5%	117.2%	121.3%
GIBSON RESERVOIR	5.7	7.5	14.2	20.6	27.0	36.0	76.3	98.6	70.1	6.3	5.0	5.5
% of Average	19.3%	22.4%	38.9%	51.7%	62.5%	75.2%	121.8%	109.8%	77.8%	12.2%	18.7%	23.0%
WILLOW CREEK	22.2	27.4	27.8	27.9	28.0	27.8	28.8	31.8	28.1	17.2	15.7	16.8
% of Average	0.1%	127.2%	126.7%	125.6%	123.5%	118.4%	113.4%	111.9%	96.5%	71.0%	76.7%	83.4%
PISHKUN RESERVOIR	21.6	21.6	21.6	21.6	21.6	21.6	40.9	45.5	31.5	37.3	19.9	20.1
% of Average	0.1%	63.0%	63.3%	64.1%	64.0%	63.2%	102.6%	99.1%	75.3%	100.6%	55.6%	62.0%
LAKE ELWELL (TIBER DAM)	796.3	777.4	762.4	748.0	740.7	727.6	757.4	811.6	829.3	808.4	778.5	755.3
% of Average	104.6%	103.5%	103.4%	103.6%	103.5%	101.2%	102.7%	99.3%	94.4%	94.3%	94.7%	95.2%
SHERBURNE LAKE	19.0	26.0	33.5	36.0	39.0	41.5	36.1	54.4	60.3	44.4	21.0	23.6
% of Average	95.2%	103.6%	120.2%	116.4%	117.8%	144.3%	177.5%	158.5%	107.2%	90.6%	74.7%	139.0%
FRESNO RESERVOIR	59.5	58.3	56.6	54.8	62.1	64.0	85.9	95.3	85.5	73.1	64.4	57.6
% of Average	131.2%	128.8%	129.5%	129.8%	142.4%	108.2%	113.6%	131.4%	112.8%	125.7%	141.2%	124.4%
NELSON RESERVOIR	64.5	62.4	61.1	59.6	58.4	60.8	68.5	76.6	68.7	45.5	26.8	26.1
% of Average	109.6%	108.2%	109.2%	109.6%	109.9%	111.6%	111.5%	126.1%	113.2%	82.6%	49.2%	45.9%
BULL LAKE	69.4	70.7	71.2	71.3	71.1	71.3	77.1	110.0	149.9	118.1	61.3	38.3
% of Average	92.8%	93.7%	93.8%	93.7%	93.5%	93.7%	101.7%	123.7%	118.9%	91.6%	59.4%	50.5%
PILOT BUTTE RESERVOIR	28.0	27.7	27.6	27.6	27.4	27.4	30.3	30.0	30.0	16.7	10.2	7.4
% of Average	105.4%	100.1%	99.7%	99.0%	98.1%	93.0%	98.7%	111.6%	100.8%	65.6%	47.6%	41.0%
BOYSEN RESERVOIR	619.5	612.9	601.5	585.7	581.1	586.1	612.1	641.3	725.8	676.2	633.5	624.9
% of Average	104.0%	103.8%	105.1%	105.2%	106.3%	108.6%	116.4%	116.8%	110.7%	104.2%	102.6%	104.3%
ANCHOR RESERVOIR	0.51	0.00	0.00	0.00	0.00	0.00	0.79	4.26	5.13	0.45	0.44	0.55
% of Average[1]	178.2%	0.0%	0.0%	0.0%	0.0%	0.0%	157.9%	278.5%	151.0%	20.3%	73.8%	167.1%
BUFFALO BILL RESERVOIR	415.7	423.4	424.7	426.6	428.1	432.7	449.3	509.1	624.9	570.4	481.0	421.3
% of Average[2]	98.3%	99.3%	100.0%	100.9%	102.3%	104.5%	113.9%	116.2%	110.1%	99.2%	94.6%	94.6%
BIGHORN LAKE	951.4	930.1	901.3	870.5	854.1	831.0	808.7	865.2	960.9	925.9	901.7	942.4
% of Average	98.9%	99.4%	101.5%	103.4%	105.1%	103.5%	102.5%	100.2%	96.2%	94.2%	95.5%	99.3%
E. A. PATTERSON LAKE	4.1	4.2	4.4	4.7	5.1	5.3	5.7	5.8	5.4	5.0	4.6	4.8
% of Average	68.5%	71.5%	75.3%	80.0%	78.4%	67.2%	72.6%	74.0%	70.4%	69.8%	70.1%	76.7%
LAKE TSCHIDA	59.3	58.9	58.5	57.2	58.5	60.7	64.5	65.1	62.8	59.5	55.3	54.2
% of Average	103.8%	102.5%	101.7%	99.6%	98.0%	89.3%	97.9%	99.5%	96.1%	96.0%	95.1%	95.4%
JAMESTOWN RESERVOIR	27.7	27.4	27.8	27.3	27.8	29.7	30.7	30.9	30.4	31.8	31.5	29.5
% of Average	102.9%	103.8%	104.5%	102.3%	103.0%	81.6%	54.2%	68.0%	81.6%	93.6%	96.4%	102.8%
SHADEHILL RESERVOIR	105.2	99.0	97.3	94.8	96.5	95.3	95.5	93.8	89.8	87.1	85.9	83.9
% of Average	102.6%	97.7%	97.3%	96.1%	95.6%	82.8%	81.6%	80.1%	77.5%	76.4%	78.3%	79.6%
ANGOSTURA RESERVOIR	104.5	106.3	108.6	110.3	113.8	116.9	118.5	119.5	109.8	99.1	90.9	89.1
% of Average	120.9%	121.5%	121.8%	120.8%	118.9%	114.1%	112.1%	109.2%	101.0%	100.1%	102.3%	105.0%
DEERFIELD RESERVOIR	14.8	14.7	14.5	14.4	14.3	14.4	14.4	14.4	14.6	14.7	14.7	14.9
% of Average	110.4%	108.4%	105.7%	102.9%	101.3%	100.2%	100.4%	99.7%	101.4%	103.8%	108.1%	111.4%
PACTOLA RESERVOIR	50.6	50.3	50.8	52.1	53.5	55.0	55.7	56.0	54.6	53.4	52.8	52.5
% of Average	108.5%	107.5%	109.2%	111.9%	114.7%	116.1%	114.4%	112.1%	108.2%	109.7%	112.1%	113.0%
KEYHOLE RESERVOIR	167.0	166.0	166.4	167.0	168.3	168.5	169.1	166.5	161.1	151.8	147.0	146.0
% of Average	189.1%	188.6%	188.6%	188.2%	184.4%	172.8%	171.0%	163.8%	158.7%	158.2%	162.0%	164.6%
BELLE FOURCHE RESERVOIR	121.5	135.3	144.9	144.9	145.0	151.8	166.3	159.8	127.7	100.3	70.3	63.8
% of Average	147.5%	146.6%	143.1%	131.2%	121.4%	113.7%	115.1%	102.9%	85.5%	84.9%	81.8%	86.3%
CORPS RESERVOIRS	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
FORT PECK RESERVOIR	12,793.0	12,734.0	12,624.0	12,564.0	12,520.0	12,913.0	13,151.0	13,634.0	13,966.0	13,978.0	14,417.0	14,502.0
GARRISON RESERVOIR	16,827.0	16,702.0	16,391.0	16,204.0	15,201.0	15,157.0	15,422.0	15,810.0	17,593.0	17,647.0	16,875.0	16,678.0
OAHE RESERVOIR	17,030.0	16,744.0	16,829.0	16,990.0	17,222.0	17,961.0	18,143.0	18,777.0	20,257.0	20,697.0	21,222.0	20,478.0
BIG BEND RESERVOIR	1,653.0	1,652.0	1,652.0	1,633.0	1,645.0	1,661.0	1,669.0	1,674.0	1,681.0	1,635.0	1,656.0	1,664.0
FORT RANDALL RESERVOIR	2,746.0	2,307.0	2,208.0	2,625.0	2,926.0	3,115.0	3,337.0	3,432.0	3,574.0	3,501.0	3,527.0	3,108.0
GAVINS POINT RESERVOIR	368.0	365.0	361.0	365.0	332.0	332.0	337.0	336.0	345.0	336.0	348.0	334.0

[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

TABLE CET8
WATER YEAR 2016
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	10.3	12.2	12.7	11.5	11.1	12.6	11.3	12.6	10.5	14.9	11.2	12.1	142.9
% of Average	49.0%	61.1%	76.1%	81.0%	87.3%	77.0%	66.2%	59.2%	33.3%	57.3%	59.2%	67.4%	61.2%
CANYON FERRY RESERVOIR	174.1	199.7	192.0	200.0	208.5	219.4	342.2	519.5	364.6	114.5	79.4	117.6	2,731.6
% of Average	68.4%	75.3%	88.3%	93.6%	100.9%	86.7%	111.8%	104.3%	53.2%	39.0%	51.7%	64.4%	77.4%
HELENA VALLEY RESERVOIR	-0.3	-0.3	-0.3	-0.3	-0.2	0.2	3.3	12.7	18.4	19.2	18.1	12.9	83.5
% of Average	N/A	N/A	N/A	N/A	N/A	4.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
GIBSON RESERVOIR	9.5	10.8	9.2	8.8	8.9	12.4	69.8	98.5	72.0	24.5	12.3	9.9	346.6
% of Average	58.9%	65.3%	67.5%	73.1%	82.0%	85.1%	166.4%	67.0%	47.6%	43.5%	51.6%	57.4%	66.5%
WILLOW CREEK	4.7	5.2	0.4	0.2	0.0	-0.2	1.0	3.1	-0.4	-0.4	0.1	1.1	14.8
% of Average	0.6%	0.7%	0.1%	0.0%	0.0%	N/A	0.0%	0.1%	N/A	N/A	N/A	0.3%	0.1%
PISHKUN RESERVOIR	0.0	0.0	0.0	0.0	0.0	0.0	19.3	46.3	76.3	79.8	-0.8	0.2	221.1
% of Average	N/A	N/A	N/A	N/A	N/A	N/A	0.3%	0.1%	0.1%	0.1%	N/A	0.0%	0.1%
LAKE ELWELL (TIBER DAM)	8.2	11.7	16.1	16.4	21.5	18.2	60.4	86.1	47.8	9.1	1.7	7.5	304.7
% of Average	48.7%	55.0%	94.5%	103.0%	99.1%	47.1%	114.7%	69.5%	35.6%	21.8%	13.6%	65.3%	60.0%
SHERBURNE LAKE	2.8	7.0	7.5	2.5	3.0	5.0	18.8	26.1	25.9	13.0	7.0	7.4	126.0
% of Average	42.7%	101.6%	220.0%	82.0%	131.5%	143.2%	172.8%	84.8%	69.9%	69.5%	79.3%	123.3%	91.4%
FRESNO RESERVOIR	2.6	1.8	1.1	1.2	10.0	5.5	31.3	35.8	17.9	27.1	27.2	8.4	170.0
% of Average	36.8%	82.6%	134.5%	133.6%	258.7%	23.1%	105.1%	83.1%	36.7%	80.1%	90.5%	40.7%	69.4%
NELSON RESERVOIR	-1.9	-2.1	-1.3	-1.5	-1.1	2.4	7.7	12.6	9.3	7.3	4.8	-0.7	35.4
% of Average	N/A	N/A	N/A	N/A	N/A	0.2%	0.1%	0.2%	0.1%	0.1%	0.1%	N/A	0.1%
BULL LAKE	7.2	2.8	2.1	1.7	1.2	1.8	7.3	34.7	81.3	21.3	8.9	5.7	176.0
% of Average	129.1%	89.5%	85.5%	77.4%	78.0%	99.2%	194.8%	124.1%	132.0%	46.1%	42.7%	59.8%	94.3%
PILOT BUTTE RESERVOIR[1]	12.6	-0.3	-0.1	-0.1	-0.1	-0.1	6.3	10.5	34.7	29.0	28.5	13.3	134.3
% of Average	112.9%	N/A	N/A	N/A	N/A	N/A	89.8%	44.5%	93.2%	70.4%	87.8%	56.6%	75.0%
BOYSEN RESERVOIR	39.7	42.1	38.6	34.4	42.5	49.4	70.0	271.2	363.4	48.2	33.0	41.5	1,073.7
% of Average	67.2%	85.7%	102.5%	93.8%	113.7%	95.0%	143.1%	226.1%	141.9%	36.8%	57.6%	79.5%	114.6%
ANCHOR RESERVOIR	0.50	0.01	0.00	0.00	0.00	0.00	0.22	4.55	5.09	-0.17	0.55	0.55	11.31
% of Average[2]	0.1%	0.0%	N/A	N/A	N/A	N/A	0.0%	0.1%	0.1%	N/A	0.2%	0.1%	0.1%
BUFFALO BILL RESERVOIR	28.9	22.2	16.3	17.0	14.5	17.9	68.7	174.6	282.0	66.9	24.5	19.8	753.1
% of Average	112.3%	103.7%	103.8%	115.9%	111.1%	94.7%	167.8%	110.0%	93.7%	41.7%	54.5%	79.9%	89.7%
BIGHORN LAKE	133.5	121.1	116.1	118.1	123.5	111.5	122.0	358.3	422.8	128.7	135.9	180.9	2,072.4
% of Average	79.5%	93.8%	106.1%	107.0%	110.5%	75.5%	85.8%	140.6%	103.6%	50.6%	89.9%	109.2%	96.3%
E. A. PATTERSON LAKE	0.1	0.1	0.2	0.3	0.3	0.2	0.5	0.0	-0.3	-0.4	-0.2	0.2	1.0
% of Average	12.6%	57.0%	133.8%	142.2%	19.2%	3.1%	14.3%	0.8%	N/A	N/A	N/A	116.0%	5.8%
LAKE TSCHIDA	1.6	1.7	1.6	0.9	3.2	3.4	3.9	2.3	-0.1	0.5	-1.0	0.8	18.7
% of Average	104.4%	115.8%	164.0%	102.4%	66.6%	11.6%	23.3%	41.2%	N/A	12.4%	N/A	313.2%	25.4%
JAMESTOWN RESERVOIR	1.2	0.5	0.7	0.0	0.5	1.9	1.1	0.5	-0.4	1.5	0.5	2.9	10.9
% of Average	74.7%	40.8%	108.2%	8.9%	113.8%	17.7%	2.9%	5.4%	N/A	27.9%	9.8%	143.5%	14.1%
SHADEHILL RESERVOIR	0.4	0.1	1.3	0.5	4.5	1.8	2.4	0.6	-2.4	-1.7	-0.3	-1.0	6.2
% of Average	40.3%	5.0%	139.8%	56.0%	103.4%	7.0%	13.1%	4.6%	N/A	N/A	N/A	N/A	8.2%
ANGOSTURA RESERVOIR	3.6	2.9	4.4	3.6	5.5	5.2	7.3	8.9	1.2	0.6	0.7	1.2	45.1
% of Average	150.4%	92.0%	222.5%	158.4%	107.8%	45.5%	86.3%	66.9%	7.5%	17.1%	44.4%	113.1%	64.8%
DEERFIELD RESERVOIR	1.2	1.1	1.1	1.1	1.1	1.3	1.3	1.1	0.8	0.7	0.7	0.7	12.0
% of Average	156.2%	154.8%	157.7%	156.6%	174.4%	129.3%	96.2%	69.4%	55.7%	68.4%	85.0%	102.3%	107.0%
PACTOLA RESERVOIR	4.5	3.5	3.1	3.4	3.4	3.7	3.7	3.2	1.8	1.8	2.0	2.0	35.9
% of Average	208.9%	189.5%	205.5%	214.6%	216.1%	132.4%	81.1%	46.2%	26.4%	46.9%	67.2%	92.7%	93.4%
KEYHOLE RESERVOIR	-1.2	-1.0	0.3	0.6	1.4	0.2	0.6	-2.6	-3.7	-3.6	-3.8	-1.0	-13.8
% of Average	N/A	N/A	180.5%	122.5%	53.1%	2.8%	28.4%	N/A	N/A	N/A	N/A	N/A	-103.4%
BELLE FOURCHE RESERVOIR	9.4	13.8	9.5	0.1	0.1	6.8	14.5	1.3	0.5	6.1	-0.6	5.5	67.0
% of Average	81.8%	139.7%	106.7%	0.8%	0.8%	47.9%	124.2%	7.7%	4.5%	125.4%	N/A	114.5%	59.1%

[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.

FIGURE CEG1

ANNUAL GENERATION AT USBR PLANTS

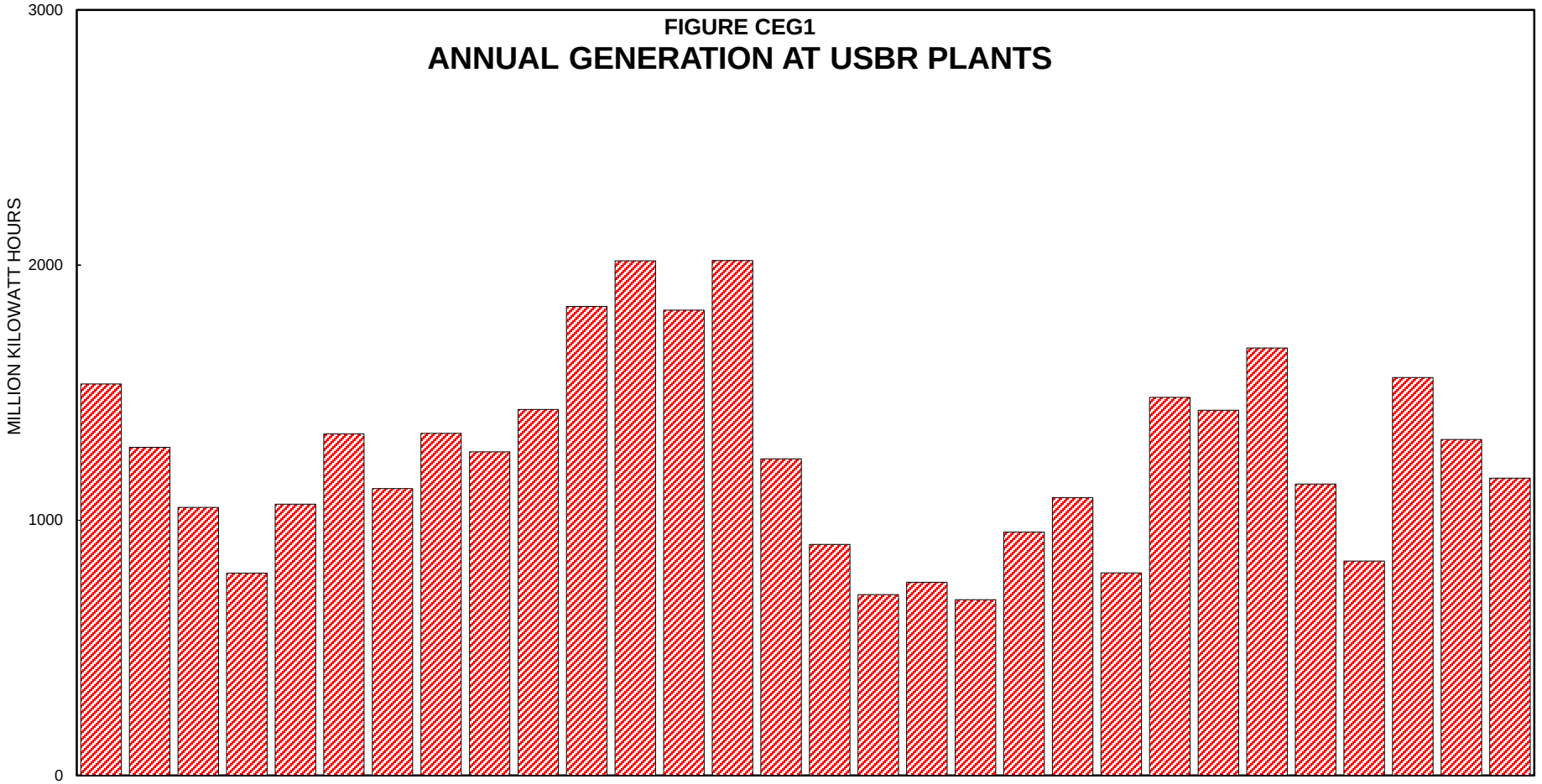


FIGURE CEG2

MONTHLY GENERATION AT USBR PLANTS

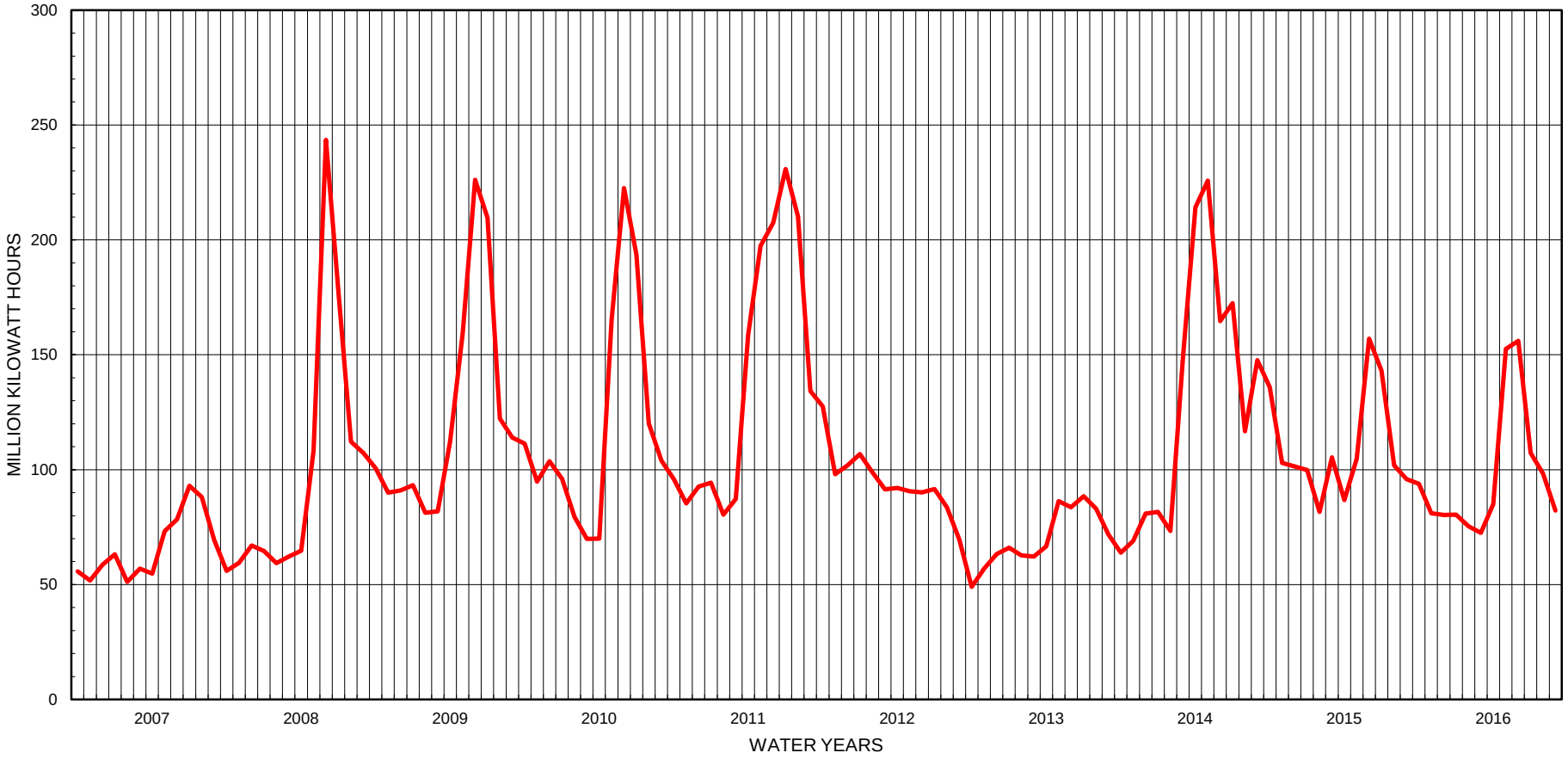


FIGURE CEG3

ANNUAL GENERATION AT COE PLANTS

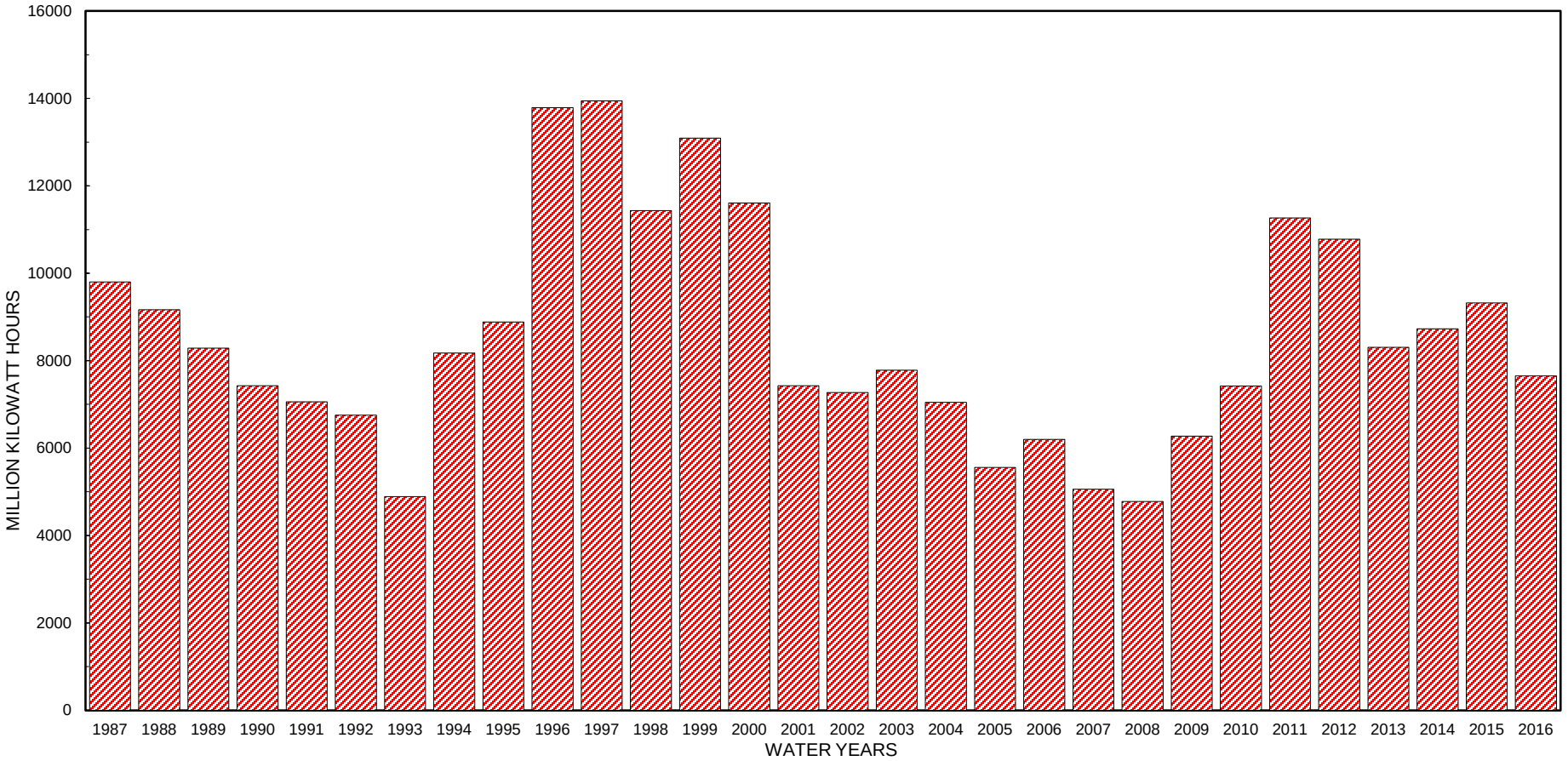


FIGURE CEG4

MONTHLY GENERATION AT COE PLANTS

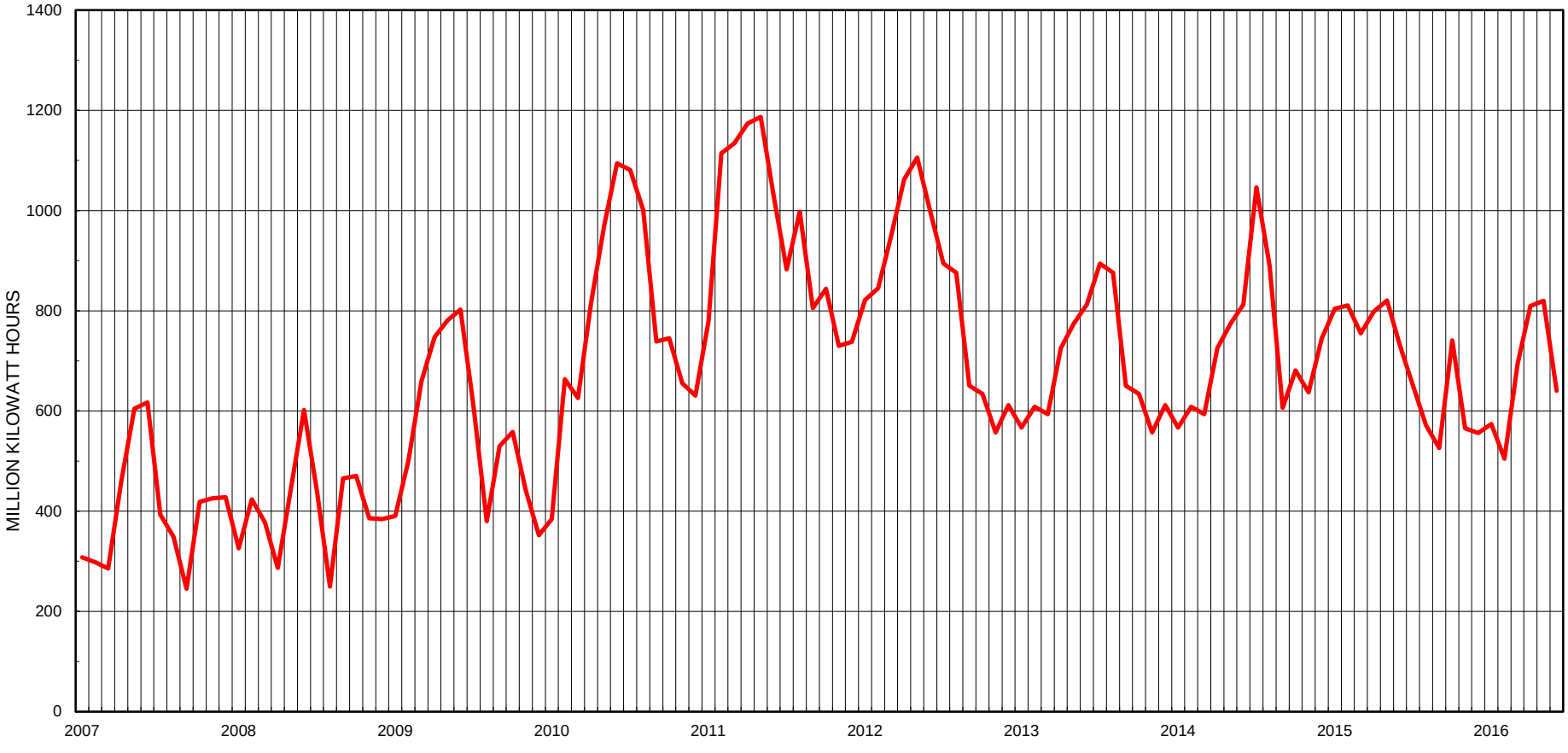


FIGURE CEG5

ANNUAL GENERATION - USBR & COE PLANTS

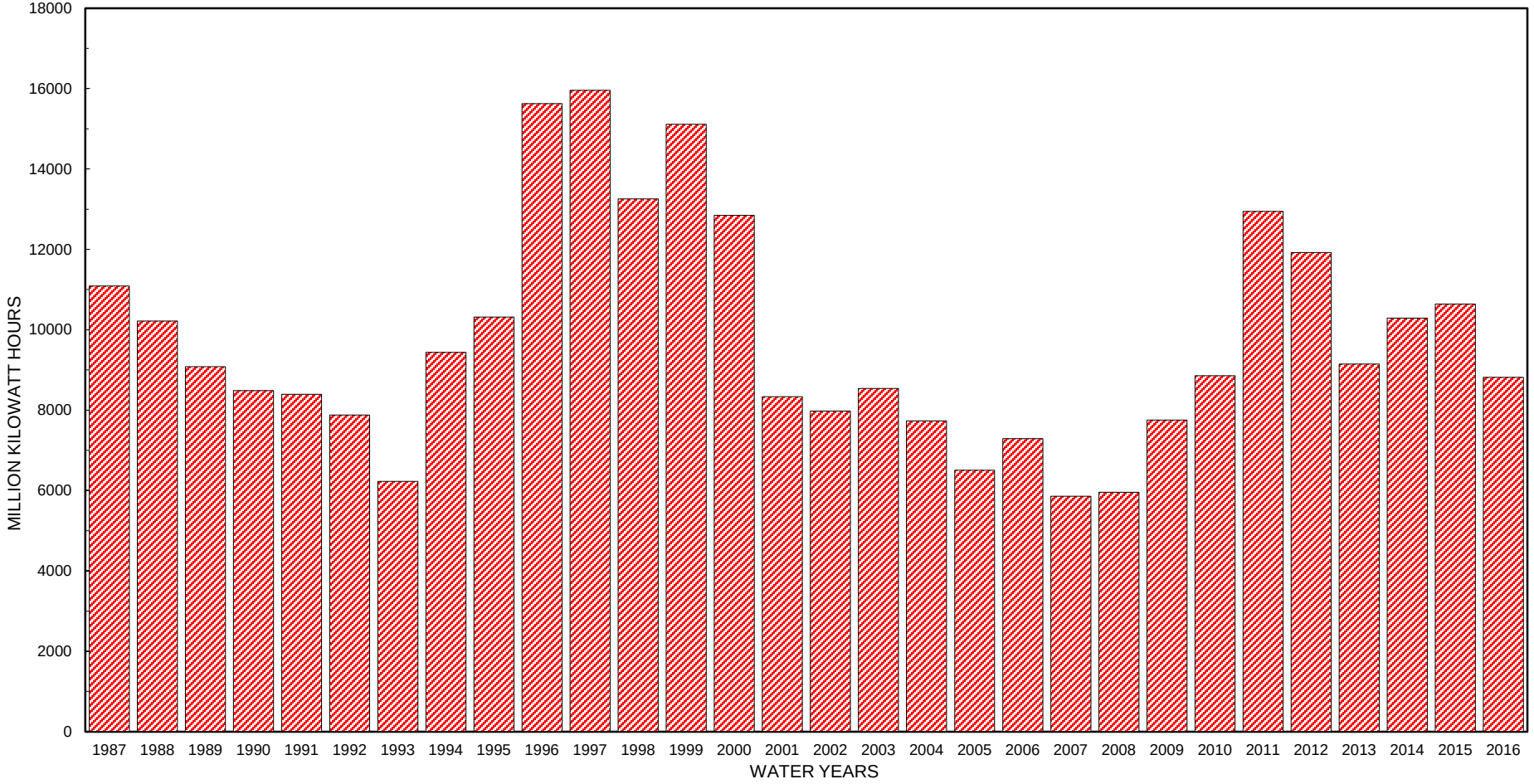
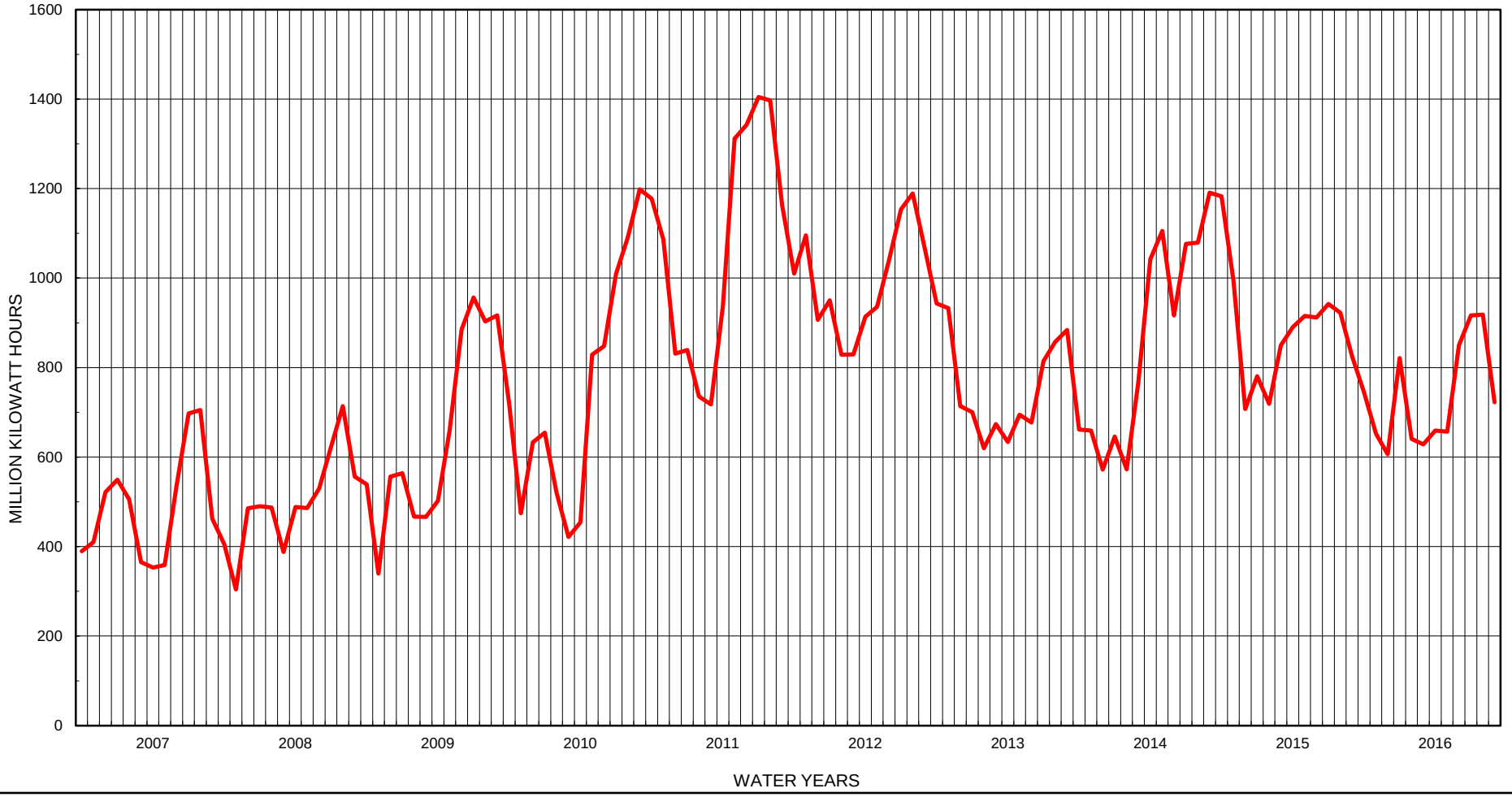


FIGURE CEG6

MONTHLY GENERATION - USBR & COE PLANTS



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DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
UPPER MISSOURI RIVER BASIN

RESERVOIRS AND POWERPLANTS

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