

**WESTERN AREA POWER ADMINISTRATION  
HYDRO CONDITIONS AND PURCHASE POWER REPORT  
April 2017**

**Agency-wide**

	Generation (Megawatt-Hours [MWh])				Purchase Power (MWh)	Purchase Power Expenses (Dollars)		
	Projected Dry	Most Probable	Average	Actual	Actual	Projected Dry	Most Probable	Actual
<b>Oct 16</b>	1,315,017	1,426,426	1,875,969	1,427,953	334,086	\$14,667,625	\$9,521,646	\$8,311,130
<b>Nov 16</b>	1,383,358	1,355,599	1,760,444	1,389,326	435,683	\$16,259,488	\$12,897,315	\$10,321,160
<b>Dec 16</b>	1,328,808	1,461,830	1,702,290	1,591,771	418,448	\$18,684,123	\$12,067,535	\$10,681,879
<b>Jan 17</b>	1,491,887	1,745,023	1,873,622	1,855,506	418,457	\$12,363,090	\$9,284,807	\$10,229,253
<b>Feb 17</b>	1,398,791	1,649,920	1,721,646	1,734,010	461,396	\$11,517,410	\$7,943,048	\$8,691,421
<b>Mar 17</b>	1,925,710	2,008,918	1,965,516	2,193,546				
<b>Apr 17</b>								
<b>May 17</b>								
<b>Jun 17</b>								
<b>Jul 17</b>								
<b>Aug 17</b>								
<b>Sep 17</b>								
<b>Total</b>	8,843,572	9,647,716	10,899,486	10,192,113	2,068,070	\$73,491,737	\$51,714,350	\$48,234,843
	Actual generation as a percentage of average: 93.5%					Cost per MWh: \$23.32		

Western Area Power Administration (WAPA) generated a total of 10,192 gigawatt-hours (GWh) during October through March of fiscal year 2017, or 93.5 percent of the average. Actual purchase power data is currently available from October through February for all of WAPA's Regions, and during this period total purchase power was 2,068 GWh and total purchase power expenses were \$48,234,843, which equates to \$23.32 per MWh.

The following pages indicate WAPA's Regional snowpack, lake/reservoir inflow and content, generation, and purchase power expenses, among other things. Snowpack is reported as snow water equivalent, which is the depth of water that theoretically would result if the entire snowpack is melted instantaneously.

## Colorado River Storage Project

	Snowpack (Inches in Snow Water Equivalent)		Lake/Reservoir Inflow (Thousand Acre-Feet)		Lake/Reservoir Content (Million Acre-Feet)		Generation (MWh)				Purchase Power (MWh)	Purchase Power Expenses (Dollars)		
	Median	Actual	Average	Actual	Average	Actual	Projected Dry	Most Probable	Average	Actual	Actual	Projected Dry	Most Probable	Actual
Oct 16	1.30	0.20	514.42	381.00	15.01	12.68	248,012	340,536	382,430	384,045	64,165	\$6,704,081	\$1,491,591	\$1,683,280
Nov 16	4.80	2.60	474.23	383.00	14.91	12.31	230,952	315,541	388,155	334,811	127,238	\$7,549,826	\$2,850,078	\$3,213,841
Dec 16	8.10	8.50	362.96	300.00	14.86	11.80	270,310	445,186	437,962	460,333	48,822	\$7,692,571	\$1,292,373	\$1,282,528
Jan 17	11.50	16.00	361.45	359.00	14.98	11.36	355,138	431,244	457,394	455,508	57,227	\$4,412,679	\$1,231,482	\$1,678,096
Feb 17	15.10	21.00	392.01	555.00	15.99	11.22	265,647	387,432	390,580	393,646	61,657	\$5,024,221	\$1,531,108	\$1,555,701
Mar 17	18.90	22.00	666.27	1,110.00	16.77	11.36	272,465	405,609	390,170	458,176	29,840	\$5,517,603	\$1,111,921	\$644,587
Apr 17														
May 17														
Jun 17														
Jul 17														
Aug 17														
Sep 17														
<b>Total</b>							1,642,525	2,325,548	2,446,691	2,486,519	388,949	\$36,900,980	\$9,508,554	\$10,058,033

Actual generation as a percentage of average: 101.6%

Cost per MWh: \$25.86

### Lake/Reservoir Levels

Lake Powell's elevation was 3,596 feet at the end of March, about 104 feet below the maximum reservoir level and about 106 feet above the minimum generation level. The storage volume for Lake Powell was 11.36 million acre-feet (MAF) at the end of March, which is about 47 percent of capacity.

### Weather and Other Conditions

The April-July inflow forecasts peaked on March 1 at 145 percent of average; however, the April 15 forecast was 123 percent of average due to drier conditions in the basin.

## Desert Southwest Region

	Snowpack (Inches in Snow Water Equivalent)		Lake/Reservoir Inflow (Thousand Acre-Feet)		Lake/Reservoir Content (Million Acre-Feet)		Generation (MWh)				Purchase Power (MWh)	Purchase Power Expenses (Dollars)		
	Median	Actual	Average	Actual	Average	Actual	Projected Dry	Most Probable	Average	Actual	Actual	Projected Dry	Most Probable	Actual
Oct 16	1.30	0.20	60.29	79.00	20.40	11.75	282,630	282,630	378,811	290,888	5,020	\$165,459	\$165,459	\$165,459
Nov 16	4.80	2.60	54.10	78.00	20.31	11.90	345,830	373,020	363,391	374,705	1,919	\$90,031	\$64,805	\$65,277
Dec 16	8.10	8.50	73.53	63.00	20.44	12.31	254,600	268,015	372,094	277,597	13,258	\$388,103	\$289,603	\$510,168
Jan 17	11.50	16.00	93.88	126.00	20.59	12.80	284,450	253,225	395,966	255,068	21,520	\$535,169	\$535,169	\$800,974
Feb 17	15.10	21.00	110.31	148.00	20.62	13.11	328,350	292,965	390,077	268,179	2,595	\$0	\$0	\$83,974
Mar 17	18.90	22.00	102.80	99.00	20.40	13.00	558,800	504,200	531,483	496,001	12,330	\$72,840	\$391,582	\$330,814
Apr 17														
May 17														
Jun 17														
Jul 17														
Aug 17														
Sep 17														
<b>Total</b>							2,054,660	1,974,055	2,431,822	1,962,438	56,642	\$1,251,602	\$1,446,618	\$1,956,666

Actual generation as a percentage of average: 80.7%

Cost per MWh: \$34.54

### Lake/Reservoir Levels

Lake Mead's elevation was 1,088 feet at the end of March, about 131 feet below full storage level and about 138 feet above the new minimum generation level of 950 feet. Lake Mead started the water year with a minimum elevation of 1,076 feet in October and reached a peak elevation of 1,090 feet in February.

### Weather and Other Conditions

The Desert Southwest Region's hydrology is mostly dependent on the Colorado River Basin snowpack and precipitation above Lake Powell. The water year 2017 precipitation is currently 118 percent of average.

## Rocky Mountain Region

	Snowpack (Inches in Snow Water Equivalent)		Lake/Reservoir Inflow (Thousand Acre-Feet)		Lake/Reservoir Content (Million Acre-Feet)		Generation (MWh)				Purchase Power (MWh)	Purchase Power Expenses (Dollars)		
	Median	Actual	Average	Actual	Average	Actual	Projected Dry	Most Probable	Average	Actual	Actual	Projected Dry	Most Probable	Actual
	Oct 16			138.60	177.30	3.85	4.66	93,769	98,500	82,866	90,186	62,778	\$1,918,912	\$1,768,512
Nov 16			120.30	145.10	3.85	4.72	57,639	59,762	78,718	56,073	88,908	\$3,104,240	\$3,033,840	\$2,226,606
Dec 16	268.10	160.50	98.80	106.40	3.82	4.69	91,252	93,448	101,061	102,574	73,018	\$2,601,536	\$2,534,336	\$2,020,033
Jan 17	417.90	452.40	96.60	114.70	3.79	4.67	108,118	110,236	111,274	127,252	33,352	\$2,062,592	\$1,995,392	\$1,205,222
Feb 17	849.60	1,170.80	96.30	173.50	3.79	4.79	97,795	99,700	99,585	129,713	19,023	\$1,254,624	\$1,193,824	\$474,331
Mar 17	1,105.20	1,524.90	159.00	293.50	4.13	4.70	124,712	136,697	118,178	191,665	1,445	\$785,728	\$401,728	\$24,749
Apr 17														
May 17														
Jun 17														
Jul 17														
Aug 17														
Sep 17														
<b>Total</b>							573,284	598,343	591,682	697,463	278,524	\$11,727,632	\$10,927,632	\$7,463,154

Actual generation as a percentage of average: 117.9%

Cost per MWh: \$26.80

### Lake/Reservoir Content

The overall reservoir content at the end of March was 114 percent of average.

### Weather and Other Conditions

None of the high-elevation areas from which Loveland Area Projects (LAP) snowmelt originates are considered to be in drought status, but the eastern plains of Colorado are considered to be in drought status. The snowpack in the Bighorn Basin remains well above average; however, the snowpack is now below average in the Upper Colorado River headwaters and the Upper North Platte River Basin due to recent warm weather. The April forecasts of most probable reservoir inflows from spring runoff is above average in the Upper Colorado River and well above average in the North Platte and Bighorn basins. The overall LAP reservoir storage at the end of March was above average and higher than it was at the same time last year. The latest National Weather Service forecast indicates May through July temperatures and precipitation are more likely to be above normal in the LAP area.

*Note: The Rocky Mountain Region's (RMR) most recent reported purchase power data are provisional values and may change.*



## Sierra Nevada Region

	Snowpack (Inches in Snow Water Equivalent)		Lake/Reservoir Inflow (Thousand Acre-Feet)		Lake/Reservoir Content (Million Acre-Feet)		Generation (MWh)				Purchase Power (MWh)	Purchase Power Expenses (Dollars)		
	Median	Actual	Average	Actual	Average	Actual	Projected Dry	Most Probable	Average	Actual	Actual	Projected Dry	Most Probable	Actual
Oct 16			336.00	561.00	5.26	4.66	121,000	146,000	163,000	100,955	56,052	\$1,179,286	\$1,179,286	\$1,536,064
Nov 16	4.76	3.00	399.00	706.00	5.21	4.99	104,000	34,000	104,000	42,525	57,080	\$1,139,734	\$1,139,734	\$1,582,259
Dec 16	9.09	6.00	1,046.00	1,621.00	5.72	5.63	79,000	19,000	143,000	115,177	54,748	\$1,179,286	\$1,179,286	\$1,280,611
Jan 17	27.78	30.00	1,167.00	3,436.00	6.13	6.43	78,000	293,000	163,000	385,479	32,534	\$499,500	\$499,500	\$643,343
Feb 17	27.78	45.00	1,339.00	5,725.00	6.71	7.68	139,000	300,000	195,000	439,436	19,673	\$479,520	\$479,520	\$579,856
Mar 17	28.22	46.00	1,553.00	2,574.00	7.46	8.61	290,000	330,000	207,000	399,223	26,567	\$539,460	\$539,460	\$642,682
Apr 17														
May 17														
Jun 17														
Jul 17														
Aug 17														
Sep 17														
<b>Total</b>							811,000	1,122,000	975,000	1,482,796	246,655	\$5,016,786	\$5,016,786	\$6,264,815

Actual generation as a percentage of average: 152.1%

Cost per MWh: \$25.40

### Lake/Reservoir Content

As of March 31, accumulated inflow for the water year was 215 percent of the 15-year average for Trinity, 207 percent for Shasta, 351 percent for Folsom, and 311 percent for New Melones. Reservoir storage as of the same date was 123 percent of the 15-year average for Trinity, 112 percent for Shasta, 95 percent for Folsom, and 123 percent for New Melones. The Shasta and Folsom Reservoirs returned to flood control operations by the end of March, while snowpack above New Melones was forecast to exceed storage capacity by 1 MAF.

### Weather and Other Conditions

As of March 31, cumulative precipitation of the Northern Sierra Eight Station Index was at 192 percent of average for the date. The forecast based upon April 1, 2017, for the 50 percent exceedence case is "wet" as is the 90 percent exceedence case, reflecting continuous storm events.

*Note: The Sierra Nevada Region's (SNR) average generation is based upon long-term modeling done for its "Green Book." SNR's projected power expenses are based upon term purchases of 35 to 65 percent of projected power needs, with the difference being left to day-ahead markets after project pumping and generation have been scheduled.*



## Upper Great Plains Region

	Snowpack (Inches in Snow Water Equivalent)		Lake/Reservoir Inflow (Thousand Acre-Feet)		Lake/Reservoir Content (Million Acre-Feet)		Generation (MWh)				Purchase Power (MWh)	Purchase Power Expenses (Dollars)		
	Median	Actual	Average	Actual	Average	Actual	Projected Dry	Most Probable	Average	Actual	Actual	Projected Dry	Most Probable	Actual
Oct 16	1.20	0.40	8,092.00	5,601.83	55.94	58.67	569,606	558,761	868,863	561,879	146,071	\$4,699,887	\$4,916,797	\$3,414,114
Nov 16	3.80	1.40	7,411.00	5,690.87	54.83	58.32	644,937	573,277	826,179	581,212	160,538	\$4,375,658	\$5,808,858	\$3,233,177
Dec 16	7.10	5.60	6,468.00	5,454.05	54.23	57.60	633,647	636,181	648,173	636,090	228,602	\$6,822,627	\$6,771,937	\$5,588,539
Jan 17	10.30	7.80	6,659.00	5,727.89	54.03	57.50	666,182	657,318	745,987	632,199	273,824	\$4,853,151	\$5,023,264	\$5,901,618
Feb 17	12.90	12.70	6,300.00	5,706.99	54.34	58.54	568,000	569,823	646,404	503,036	358,448	\$4,759,045	\$4,738,596	\$5,997,559
Mar 17	15.80	14.80	8,219.00	7,544.34	56.08	59.94	679,733	632,412	718,685	648,481	*	\$2,140,470	\$2,713,970	*
Apr 17														
May 17														
Jun 17														
Jul 17														
Aug 17														
Sep 17														
<b>Total</b>							3,762,104	3,627,771	4,454,291	3,562,897	1,167,483	\$27,650,838	\$29,973,422	\$24,135,007

Actual generation as a percentage of average: 80.0%

Cost per MWh: \$20.67

### Lake/Reservoir Content

As of April 19, the active conservation pools for the Canyon Ferry and Yellowtail Dams were 84.0 percent and 73.3 percent full, respectively.

### Weather and Other Conditions

Warm weather in March continued to melt the plains snowpack which produced an above-average runoff of 111 percent, with the runoff mainly originating from the lower part of the Missouri River Basin. Snowpack accumulations are 92 percent of average above Fort Peck and 135 percent of average on the Garrison to Fort Peck reach.

*Note: The Upper Great Plains Region (UGPR) reports its 50 percent share of generation from Yellowtail Dam, while RMR reports the snowpack, inflow, content, and remaining share of generation. Asterisks indicate that actual data is not available for the month.*