

**WESTERN AREA POWER ADMINISTRATION  
HYDRO CONDITIONS AND PURCHASE POWER REPORT  
March 2019**

	Generation (Megawatt-Hours [MWh])				Purchase Power (MWh)	Purchase Power Expenses (Dollars)		
	Projected	Most	Average	Actual	Actual	Projected	Most	Actual
	Dry	Probable				Dry	Probable	
<b>Oct 18</b>	2,191,197	2,291,715	1,776,615	2,166,211	221,956	\$4,702,090	\$4,374,513	\$6,027,880
<b>Nov 18</b>	1,947,604	2,049,917	1,675,280	2,013,457	308,667	\$7,950,056	\$7,668,841	\$9,087,517
<b>Dec 18</b>	1,646,222	1,613,363	1,704,693	1,526,996	472,567	\$10,394,950	\$11,615,895	\$14,216,304
<b>Jan 19</b>	1,676,465	1,704,113	1,861,169	1,623,543	356,494	\$9,616,011	\$8,795,704	\$9,848,371
<b>Feb 19</b>	1,597,167	1,607,587	1,690,559	1,620,346				
<b>Mar 19</b>								
<b>Apr 19</b>								
<b>May 19</b>								
<b>Jun 19</b>								
<b>Jul 19</b>								
<b>Aug 19</b>								
<b>Sep 19</b>								
<b>Total</b>	9,058,656	9,266,695	8,708,316	8,950,553	1,359,684	\$32,663,107	\$32,454,953	\$39,180,072

Actual generation as a percentage of average: 102.8%

Cost per MWh: \$28.82

Western Area Power Administration (WAPA) generated 8,951 gigawatt-hours (GWh) during October through February of fiscal year 2019, or 102.8 percent of the average. Actual purchase power data is currently available from October through January for all of WAPA's Regions, and during this period, total purchase power was 1,360 GWh and total purchase power expenses were \$39,180,072, which equates to \$28.82 per MWh.

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

WAPA's Regions use the monthly purchase power numbers indicated herein as a forecasting tool, and therefore they do not reflect energy imbalance transactions and other such information that is not forecastable. Furthermore, no verification of the purchase power numbers for financial auditing purposes has occurred. Consequently, these numbers will vary from those reported in WAPA's year-end financial statements that should be the definitive source for WAPA's purchase power data.



## 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 18	1.30	1.50	514.42	351.00	15.01	10.86	321,546	322,388	382,430	350,253	85,231	\$2,864,090	\$2,837,493	\$2,445,254
Nov 18	4.80	5.20	474.23	254.00	14.91	10.51	303,372	316,406	388,155	298,876	162,992	\$3,956,202	\$3,856,748	\$5,385,266
Dec 18	8.10	7.60	362.96	228.00	14.86	10.10	355,598	375,353	437,962	376,666	115,368	\$4,457,663	\$5,908,583	\$4,564,811
Jan 19	11.50	12.10	361.45	212.00	14.98	9.63	348,335	396,430	457,394	397,561	104,938	\$4,673,912	\$4,072,956	\$3,614,778
Feb 19	15.10	17.50	392.01	255.00	15.99	9.26	310,650	369,961	390,580	362,157	81,474	\$3,566,014	\$2,230,770	\$3,846,903
Mar 19														
Apr 19														
May 19														
Jun 19														
Jul 19														
Aug 19														
Sep 19														
<b>Total</b>							1,639,502	1,780,538	2,056,521	1,785,513	550,003	\$19,517,881	\$18,906,551	\$19,857,012

Actual generation as a percentage of average: 86.8%

Cost per MWh: \$36.10

### Lake/Reservoir Levels

Lake Powell's elevation was 3,572 feet at the end of February, about 128 feet below the maximum reservoir level and about 82 feet above the minimum generation level. The storage volume for Lake Powell was 9.26 million acre-feet at the end of February, or about 38 percent of capacity.

### Weather and Other Conditions

Snowpack in the Upper Colorado River Basin is slightly above average, but Lake Powell reservoir inflow is about 65% of average for February. However, hydrologic conditions have significantly improved over the last month resulting in a decrease in the forecasted purchase power by about \$10 million for the remaining seven months of water year 2019.



## 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 18	1.30	1.50	93.71	101.00	20.03	12.01	351,400	351,315	377,868	339,511	11,000	\$308,000	\$400,000	\$409,640
Nov 18	4.80	5.20	54.08	68.00	20.08	12.03	367,050	357,160	363,617	357,474	11,001	\$435,640	\$435,640	\$435,640
Dec 18	8.10	7.60	72.32	52.00	20.21	12.32	247,750	244,540	369,749	233,300	30,582	\$1,258,177	\$1,258,177	\$1,549,896
Jan 19	11.50	12.10	93.81	105.00	20.37	12.72	265,650	248,555	392,324	248,683	24,471	\$844,099	\$844,099	\$1,240,190
Feb 19	15.10	17.50	109.59	127.00	20.40	12.96	389,500	330,335	389,146	327,946	25,248	\$744,930	\$744,930	\$1,737,820
Mar 19														
Apr 19														
May 19														
Jun 19														
Jul 19														
Aug 19														
Sep 19														
<b>Total</b>							1,621,350	1,531,905	1,892,704	1,506,913	102,302	\$3,590,846	\$3,682,846	\$5,373,186

Actual generation as a percentage of average: 79.6%

Cost per MWh: \$52.52

### Lake/Reservoir Levels

Lake Mead's elevation was 1,088 feet at the end of February, about 132 feet below the full storage level and about 138 feet above the minimum generation level. Lake Mead's elevation is projecting to peak at 1,088 feet in March and then drop to a minimum elevation of 1,078 feet in July.

### Weather and Other Conditions

The Desert Southwest Region's (DSWR) hydrology is mostly dependent on the Colorado River Basin snowpack and precipitation above Lake Powell. The precipitation is currently 126 percent of average and the snowpack is 138 percent of median.

*Note: DSWR's projected dry and most probable generation data are reported from studies conducted by the U.S. Bureau of Reclamation.*



## 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 18	0.00	0.00	145.00	123.30	3.87	4.16	126,310	140,345	96,983	105,818	70,588	\$1,010,520	\$617,540	\$2,030,037
Nov 18	3.80	3.00	121.90	114.40	3.83	4.15	53,631	59,591	109,895	64,731	81,577	\$3,039,932	\$2,873,052	\$2,144,120
Dec 18	11.70	14.60	100.60	98.60	3.79	4.10	88,802	98,669	123,353	93,787	81,165	\$2,472,344	\$2,196,068	\$2,436,892
Jan 19	28.20	29.90	97.10	98.10	3.77	4.23	114,996	127,774	121,795	122,360	51,409	\$1,612,912	\$1,255,128	\$1,200,497
Feb 19	39.40	35.90	95.50	92.10	3.70	4.01	108,334	120,372	111,291	136,005	24,180	\$802,648	\$465,584	\$840,336
Mar 19														
Apr 19														
May 19														
Jun 19														
Jul 19														
Aug 19														
Sep 19														
<b>Total</b>							492,073	546,751	563,316	522,701	308,919	\$8,938,356	\$7,407,372	\$8,651,882

Actual generation as a percentage of average: 92.8%

Cost per MWh: \$28.01

### Lake/Reservoir Content

Reservoir inflows have been average so far this water year for all of Loveland Area Projects (LAP) area.

### Weather and Other Conditions

Hydrologic conditions for the Loveland Area Projects (LAP) area can vary from one river basin and watershed to another. LAP is currently drought free. The snowpack is right at average in the Colorado River, North Platte, and Bighorn River Basins. The latest National Weather Service forecast indicates March through May temperatures will most likely to be at or below average in Colorado and Wyoming. The same forecast indicates precipitation will be average for all of LAP. Generation forecast to remain average for all of LAP this spring season.

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



## 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 18	N/A	N/A	337.00	267.00	5.33	5.81	66,000	71,000	163,000	122,451	54,606	\$519,480	\$519,480	\$1,136,470
Nov 18	26.67	4.00	413.00	329.00	5.30	5.72	14,000	0	104,000	118,897	50,948	\$499,500	\$499,500	\$1,039,392
Dec 18	28.00	7.00	934.00	489.00	5.69	5.83	39,000	0	143,000	5,086	64,085	\$499,500	\$499,500	\$1,342,138
Jan 19	28.69	17.50	1,120.00	1,349.00	6.11	6.89	0	0	163,000	0	66,444	\$528,840	\$528,840	\$987,373
Feb 19	27.82	37.00	1,321.00	2,148.00	6.67	8.22	0	9,000	195,000	37,424	58,503	\$488,160	\$488,160	\$761,853
Mar 19														
Apr 19														
May 19														
Jun 19														
Jul 19														
Aug 19														
Sep 19														
<b>Total</b>							119,000	80,000	768,000	283,858	294,586	\$2,535,480	\$2,535,480	\$5,267,226

Actual generation as a percentage of average: 37.0%

Cost per MWh: \$17.88

### Lake/Reservoir Content

As of February 28, reservoir storage for the water year was 110 percent of the 15-year average for Trinity, 124 percent for Shasta, 121 percent for Folsom and 135 percent for New Melones. Accumulated inflow for the same date was 93 percent of the 15-year average for Trinity, 114 percent for Shasta, 114 percent for Folsom and 107 percent for New Melones.

### Weather and Other Conditions

February precipitation was 268 percent of average with storms continuing into March. The snowpack went from 7" in December to 18" in January and continued increasing into February. The Bureau of Reclamation continued pumping at maximum in the Delta and into the San Luis Reservoir, then began flood control operations and base resource generation for customer deliveries the last week of February.

*Note: Sierra Nevada Region's (SNR) bases average generation upon long-term modeling done for its "Green Book." SNR does not project purchase power expenses for dry conditions, and its most probable 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 18	1.20	0.60	7,972.00	12,743.92	56.14	61.29	1,325,941	1,406,667	756,334	1,248,178	531	\$0	\$0	\$6,478
Nov 18	3.80	3.49	7,334.00	12,156.48	55.06	58.80	1,209,552	1,316,760	709,613	1,173,480	2,149	\$18,782	\$3,900	\$83,100
Dec 18	7.10	5.70	6,422.00	7,619.10	54.46	58.43	915,072	894,801	630,628	818,157	181,367	\$1,707,266	\$1,753,567	\$4,322,567
Jan 19	10.30	8.70	6,641.00	7,118.20	54.18	57.59	947,484	931,354	726,656	854,939	109,232	\$1,956,248	\$2,094,681	\$2,805,533
Feb 19	13.10	14.10	6,281.00	6,737.50	54.50	57.52	788,683	777,919	604,543	756,814	*	\$1,799,372	\$1,890,792	*
Mar 19														
Apr 19														
May 19														
Jun 19														
Jul 19														
Aug 19														
Sep 19														
<b>Total</b>							5,186,732	5,327,501	3,427,774	4,851,568	293,279	\$5,481,669	\$5,742,940	\$7,217,678

Actual generation as a percentage of average: 141.5%

Cost per MWh: \$24.61

### Lake/Reservoir Content

As of March 15, the active conservation pools for the Canyon Ferry and Yellowtail Dams were 74.6 percent and 76.6 percent full, respectively.

### Weather and Other Conditions

The February runoff was 107 percent of normal. Runoff was above average at Fort Peck, Gavins Point, Fort Randall, Garrison, and Oahe. Snow pack reports show 102 percent of average above Fort Peck and 99 percent of average in the Fort Peck to Garrison reach. The U.S. Drought Monitor shows no draught impact to the upper Missouri River Basin. The Midwest received above-to-greatly above average precipitation during December to February, leaving the area with deep snowpack and overall wet conditions.

*Note: The Upper Great Plains Region reports its 50 percent share of generation from Yellowtail Dam, and RMR reports the snowpack, inflow, content, and remaining share of generation. Asterisks indicate that actual purchase power data is not available for the month, and so the projected dry and most probable purchase power expenses are not included for that month in order to allow for a meaningful comparison between the total amounts.*

