

**WESTERN AREA POWER ADMINISTRATION
HYDRO CONDITIONS AND PURCHASE POWER REPORT
October 2019 Final**

	Generation (Megawatt-Hours [MWh])				Purchase Power (MWh)	Purchase Power Expenses (Dollars)		
	Projected	Most	Average	Actual	Actual	Projected	Most	Actual
	Dry	Probable				Dry	Probable	
Oct 18	2,191,197	2,291,715	1,776,615	2,166,211	205,310	\$4,702,090	\$4,374,513	\$6,000,929
Nov 18	1,947,604	2,049,917	1,675,280	1,967,804	317,190	\$7,950,056	\$7,668,841	\$9,326,440
Dec 18	1,646,222	1,613,363	1,704,693	1,526,996	469,863	\$10,394,950	\$11,615,895	\$14,109,722
Jan 19	1,676,465	1,704,113	1,861,169	1,623,543	353,851	\$9,616,011	\$8,795,704	\$9,745,492
Feb 19	1,597,167	1,607,587	1,690,559	1,596,912	334,823	\$7,909,927	\$6,371,208	\$11,548,500
Mar 19	1,971,097	1,730,792	1,957,827	1,936,390	446,033	\$8,153,711	\$6,680,118	\$14,320,839
Apr 19	2,423,249	2,460,532	2,249,272	2,479,470	108,527	\$3,640,422	\$1,903,748	\$2,750,624
May 19	2,972,853	3,088,102	2,609,363	2,697,984	46,222	\$2,349,096	\$1,113,563	\$825,041
Jun 19	3,192,285	3,299,121	2,722,229	3,105,470	44,907	\$3,993,143	\$1,124,626	\$970,975
Jul 19	2,989,676	3,467,580	2,930,599	3,412,648	74,214	\$7,641,487	\$1,627,925	\$2,243,401
Aug 19	3,133,782	3,331,589	2,764,475	3,307,603	87,207	\$7,878,756	\$2,892,926	\$3,327,658
Sep 19	2,617,811	2,898,411	2,246,425	2,703,098	108,575	\$8,128,953	\$2,058,611	\$2,814,026
Total	28,359,409	29,542,822	26,188,505	28,524,131	2,596,722	\$82,358,604	\$56,227,678	\$77,983,646

Actual generation as a percentage of average: 108.9%

Cost per MWh: \$30.03

Western Area Power Administration (WAPA) generated 28,524 gigawatt-hours (GWh) during October through September of fiscal year 2019, or 108.9 percent of the average. For the same period, total purchase power was 2,597 GWh and total purchase power expenses were \$77,983,646, which equates to \$30.03 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.



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
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	18.90	24.50	666.27	624.00	16.77	9.05	330,574	345,266	390,170	369,565	87,114	\$2,714,461	\$86,268	\$2,817,982
Apr 19	19.40	23.40	1,057.14	1,244.00	16.74	9.20	320,609	334,927	397,861	360,975	46,344	\$1,315,218	\$44,534	\$958,598
May 19	7.90	20.80	2,337.68	2,511.00	16.30	10.30	353,950	504,794	475,860	451,987	9,376	\$1,241,595	\$6,062	\$165,993
Jun 19	0.00	2.90	2,668.50	4,206.00	16.00	12.91	349,453	645,461	534,248	570,597	1,631	\$2,868,517	\$0	\$21,418
Jul 19	0.00	0.00	1,093.88	2,451.00	15.88	13.93	367,403	561,751	536,434	574,299	5,700	\$5,732,050	\$206,528	\$200,378
Aug 19	0.00	0.50	496.08	472.00	15.68	13.61	394,874	585,249	558,659	581,221	6,197	\$4,416,757	\$21,223	\$220,529
Sep 19	0.00	0.10	405.88	143.00	15.38	13.28	287,347	468,111	449,558	423,469	17,867	\$6,037,820	\$20,622	\$418,448
Total							4,043,711	5,226,097	5,399,309	5,117,626	724,232	\$43,844,299	\$19,291,789	\$24,660,358

Actual generation as a percentage of average: 94.8%

Cost per MWh: \$34.05

Lake/Reservoir Levels

Lake Powell's elevation was 3,615 feet at the end of September, about 85 feet below the maximum reservoir level and about 125 feet above the minimum generation level. The storage volume for Lake Powell was 13.3 million acre-feet at the end of September, or about 55 percent of capacity.

Weather and Other Conditions

Inflows into Lake Powell were 35 percent of average for September. Currently, water year 2020 forecasts are for an inflow of 9,500,000 acre-feet (88% of average) and an annual release of 8,230,000 acre-feet.



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	\$976,017
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	\$236,572
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	\$1,560,188
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	\$1,240,246
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	18.90	24.50	104.25	202.00	20.21	13.14	532,700	418,160	529,401	412,674	31,605	\$1,262,021	\$1,262,021	\$1,404,210
Apr 19	19.40	23.40	84.70	117.00	20.03	13.02	528,100	515,415	570,854	502,066	8,134	\$349,070	\$349,070	\$252,755
May 19	7.90	20.80	59.61	107.00	20.13	12.86	570,400	542,410	571,052	542,012	7,054	\$622,861	\$622,861	\$229,980
Jun 19	0.00	2.90	27.36	70.00	20.32	12.69	500,200	499,765	536,860	497,829	13,585	\$639,986	\$639,986	\$471,548
Jul 19	0.00	0.00	66.43	21.00	20.23	12.54	452,100	509,190	547,335	510,582	22,071	\$876,897	\$876,897	\$1,124,517
Aug 19	0.00	0.50	98.31	65.00	20.09	11.03	426,300	429,625	510,301	437,466	35,541	\$2,272,779	\$2,272,779	\$2,243,166
Sep 19	0.00	0.10	87.12	60.00	19.99	12.43	346,600	394,295	431,349	381,354	43,233	\$1,515,269	\$1,515,269	\$1,455,372
Total							4,977,750	4,840,765	5,589,856	4,790,896	263,525	\$11,129,729	\$11,221,729	\$12,932,391

Actual generation as a percentage of average: 85.7%

Cost per MWh: \$49.07

Lake/Reservoir Levels

Lake Mead's elevation was 1,083 feet at the end of September, about 137 feet below the full storage level and about 133 feet above the minimum generation level. For water year 2019, Lake Mead's elevation dropped to a minimum of 1,078 feet in November and rose to a peak of 1,090 feet in March.

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 26 percent of average and the snowpack is too early to measure.

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	3.871	4.163	126,310	140,345	96,983	105,818	53,942	\$ 1,010,520	\$ 617,540
Nov 18	3.80	3.00	121.90	114.40	3.834	4.153	53,631	59,591	109,895	64,731	90,100	\$ 3,039,932	\$ 2,873,052	\$ 2,582,110
Dec 18	11.70	14.60	100.60	98.60	3.788	4.095	88,802	98,669	123,353	93,787	78,461	\$ 2,472,344	\$ 2,196,068	\$ 2,320,018
Jan 19	28.20	29.90	97.10	98.10	3.768	4.233	114,996	127,774	121,795	122,360	48,766	\$ 1,612,912	\$ 1,255,128	\$ 1,097,562
Feb 19	39.40	35.90	95.50	92.10	3.698	4.007	108,334	120,372	111,291	112,571	21,400	\$ 802,648	\$ 465,584	\$ 809,202
Mar 19	44.90	52.30	158.60	149.70	3.842	4.033	110,289	122,544	128,512	107,241	40,055	\$ 1,092,308	\$ 749,168	\$ 1,259,871
Apr 19	43.40	47.10	246.70	344.50	3.883	4.207	159,352	177,058	144,007	178,116	2,955	\$ 477,344	\$ -	\$ 64,833
May 19	43.40	47.10	737.90	674.70	4.419	5.099	231,213	256,904	196,456	216,137	53	\$ -	\$ -	\$ 721
Jun 19	17.10	37.20	1,149.50	1,251.30	4.911	5.441	236,362	262,625	246,058	270,954	889	\$ -	\$ -	\$ 12,971
Jul 19	0.00	3.60	534.50	904.90	4.577	5.587	244,570	271,745	260,985	319,432	7,639	\$ 488,040	\$ -	\$ 132,762
Aug 19	0.00	0.00	185.20	233.60	4.063	5.084	189,730	210,812	214,441	257,486	3,021	\$ 601,160	\$ 10,864	\$ 87,693
Sep 19	0.00	0.00	128.70	115.50	3.82	4.19	158,498	176,109	141,232	185,083	3,328	\$53,144	\$0	\$107,967
Total							1,822,087	2,024,548	1,895,008	2,033,716	350,609	\$11,650,352	\$8,167,404	\$9,912,420

Actual generation as a percentage of average: 107.3%

Cost per MWh: \$28.27

Lake/Reservoir Content

Reservoir inflows are 90 percent of average for all of the Loveland Area Projects (LAP).

Weather and Other Conditions

The latest National Weather Service forecast indicates November through January temperatures are more likely to be at or above normal and precipitation is expected to be slightly above normal in the LAP area. For LAP as a whole, November generation is expected to be below the marketed amount due to maintenance on the hydro units. November, December and January generation in the Colorado River Basin, North Platte Basin, and Big Horn Basin is forecasted to be average for this time of year as winter flow rates are set.

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	73,243	50,948	\$499,500	\$499,500	\$1,039,392
Dec 19	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	28.57	46.00	1,646.00	2,592.00	7.28	8.62	208,000	138,000	207,000	536,195	15,116	\$488,160	\$488,160	\$369,408
Apr 19	27.43	31.00	1,481.00	2,637.00	7.96	9.27	353,000	423,000	288,000	585,381	12,324	\$466,000	\$466,000	\$369,408
May 19	26.15	17.00	1,305.00	1,933.00	7.99	9.85	511,000	501,000	442,000	388,517	29,266	\$484,640	\$484,640	\$399,176
Jun 19	N/A	N/A	832.00	1,429.00	7.62	9.81	460,000	485,000	440,000	467,578	27,173	\$484,640	\$484,640	\$412,652
Jul 19	N/A	N/A	460.00	501.00	6.86	9.21	514,000	514,000	524,000	429,888	36,199	\$544,500	\$544,500	\$711,458
Aug 19	N/A	N/A	356.00	550.00	6.20	8.58	480,000	470,000	402,000	415,692	40,374	\$588,060	\$588,060	\$766,426
Sep 19	N/A	N/A	317.00	415.00	5.82	8.23	311,000	311,000	269,000	251,221	43,322	\$522,720	\$522,720	\$768,116
Total							2,956,000	2,922,000	3,340,000	3,312,677	498,360	\$6,114,200	\$6,114,200	\$9,063,870

Actual generation as a percentage of average: 99.2%

Cost per MWh: \$18.19

Lake/Reservoir Content

As of September 30, reservoir storage for the water year was 143 percent of the 15-year average for Trinity, 138 percent for Shasta, 150 percent for Folsom and 147 percent for New Melones. Accumulated inflow for the same date was 133 percent of the 15-year average for Trinity, 135 percent for Shasta, 144 percent for Folsom and 153 percent for New Melones.

Weather and Other Conditions

September precipitation was 267 percent of its monthly average, following 87 percent precipitation for August. The Sacramento River Index forecast for 50 percent exceedance is "wet" and the 90 percent exceedance is "wet."

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	148,198	\$2,308,176	\$2,441,763	\$4,392,721
Mar 19	15.80	15.30	8,151.00	12,477.60	56.20	64.04	789,534	706,822	702,744	510,715	272,143	\$2,596,762	\$4,094,500	\$8,469,368
Apr 19	14.90	15.00	8,041.00	13,424.98	57.06	66.22	1,062,188	1,010,132	848,551	852,932	38,770	\$1,032,790	\$1,044,144	\$1,105,030
May 19	6.30	7.20	9,654.00	16,590.74	58.35	69.02	1,306,290	1,282,994	923,995	1,099,332	473	\$0	\$0	\$29,171
Jun 19	0.50	1.00	11,746.00	17,798.80	60.54	69.89	1,646,270	1,406,270	965,062	1,298,513	1,629	\$0	\$0	\$52,386
Jul 19	0.00	0.00	10,694.00	19,014.47	60.49	69.82	1,411,603	1,610,894	1,061,846	1,578,447	2,605	\$0	\$0	\$74,286
Aug 19	0.00	0.00	9,716.00	17,176.08	58.91	67.27	1,642,878	1,635,903	1,079,074	1,615,738	2,074	\$0	\$0	\$9,844
Sep 19	0.09	0.70	8,629.00	17,470.60	57.38	65.69	1,514,366	1,548,896	955,286	1,461,971	825	\$0	\$0	\$64,123
Total							14,559,861	14,529,412	9,964,332	13,269,216	759,996	\$9,620,024	\$11,432,556	\$21,414,607

Actual generation as a percentage of average: 133.2%

Cost per MWh: \$28.18

Lake/Reservoir Content

As of October 19, the active conservation pools for the Canyon Ferry Dam is 85.8 percent full and Yellowtail Dam is 99.4 percent full.

Weather and Other Conditions

The yearly runoff was 241 percent of normal. The U.S. Drought Monitor shows no areas of the upper Basin impacted by abnormally dry conditions. The Midwest/High Plains has been wetter than normal in the northern region and drier than normal in the southern region of the region.

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.

