

**WESTERN AREA POWER ADMINISTRATION
HYDRO CONDITIONS AND PURCHASE POWER REPORT
October 2020 – Final**

	Generation (Megawatt-Hours [MWh])				Purchase Power (MWh)	Purchase Power Expenses (Dollars)		
	Projected	Most	<u>Average</u>	<u>Actual</u>	<u>Actual</u>	Projected	Most	<u>Actual</u>
	<u>Dry</u>	<u>Probable</u>				<u>Dry</u>	<u>Probable</u>	
Oct 19	3,234,188	2,557,218	1,905,123	2,547,426	167,584	\$8,232,725	\$3,634,722	\$4,039,531
Nov 19	2,916,091	2,321,588	1,744,440	2,242,597	226,842	\$6,958,854	\$3,094,132	\$6,712,448
Dec 19	2,742,006	1,826,992	1,739,496	1,779,560	284,850	\$12,700,352	\$5,611,408	\$8,270,536
Jan 20	2,966,530	1,926,745	1,885,817	1,791,669	240,549	\$9,907,656	\$6,032,484	\$6,466,172
Feb 20	3,567,534	2,261,069	1,721,387	1,798,829	187,895	\$7,706,513	\$4,922,309	\$4,177,233
Mar 20	4,484,330	2,180,682	1,933,209	2,027,637	187,454	\$8,617,415	\$6,414,599	\$4,910,734
Apr 20	4,303,166	2,421,544	2,292,639	2,353,332	108,389	\$4,127,608	\$1,611,581	\$2,060,274
May 20	4,260,635	2,697,069	2,667,725	2,630,115	72,554	\$2,346,236	\$578,708	\$1,252,561
Jun 20	3,451,147	2,528,300	2,837,139	2,680,191	95,482	\$5,738,885	\$2,865,238	\$2,026,341
Jul 20	3,043,102	2,517,327	3,046,554	2,700,084	143,039	\$11,419,891	\$6,082,019	\$6,350,172
Aug 20	2,757,225	2,347,096	2,867,093	2,464,122	172,056	\$14,369,739	\$9,308,083	\$10,838,896
Sep 20	2,628,851	1,926,440	2,268,004	1,969,090	236,929	\$10,500,261	\$7,312,309	\$8,854,299
Total	40,354,805	27,512,070	26,908,626	26,984,653	2,123,624	\$102,626,135	\$57,467,592	\$65,959,195

Actual generation as a percentage of average: 100.3%

Cost per MWh: \$31.06

Western Area Power Administration (WAPA) generated a total of 26,985 gigawatt-hours (GWh) during October through September of fiscal year 2020, or 100.3 percent of the average. For the same period, total purchase power was 2,124 GWh and total purchase power expenses were \$65,959,195 which equates to \$31.06 per MWh.

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

The monthly purchase power numbers indicated herein are used by WAPA’s Regions as a forecasting tool, and therefore they do not reflect energy imbalance transactions and other such information that cannot be forecasted. Furthermore, the purchase power numbers have not been verified for financial auditing purposes. Consequently, these numbers will vary from those reported in WAPA’s year-end financial statements, and the latter should be considered 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 19	1.90	1.30	514.42	265.00	15.01	13.03	247,024	402,923	382,430	389,492	57,894	\$5,712,150	\$1,470,094
Nov 19	4.80	4.70	474.23	404.00	14.91	12.86	241,664	386,154	388,155	378,475	70,539	\$5,110,150	\$1,581,991	\$2,312,315
Dec 19	8.10	8.40	362.96	353.00	14.86	12.60	279,537	463,233	437,962	465,261	36,300	\$6,299,733	\$1,046,122	\$1,035,644
Jan 20	11.50	12.10	361.45	277.00	14.98	12.28	329,144	451,898	457,394	444,843	59,569	\$5,112,308	\$1,657,329	\$1,488,034
Feb 20	15.10	15.70	392.01	288.00	15.99	12.01	285,980	392,973	390,580	382,355	67,140	\$4,550,403	\$1,638,298	\$1,440,824
Mar 20	18.90	19.50	666.27	475.00	16.77	11.82	300,884	410,473	390,170	401,865	56,174	\$3,588,199	\$952,202	\$1,187,057
Apr 20	19.40	17.30	1,057.14	475.00	16.74	11.69	299,431	404,268	397,861	397,639	39,810	\$1,970,254	\$210,904	\$789,957
May 20	7.90	4.80	2,337.68	1,541.00	16.30	12.24	364,111	449,959	475,860	426,119	26,348	\$1,374,340	\$0	\$447,048
Jun 20	0.00	0.10	2,668.50	1,453.00	16.00	12.79	350,695	403,964	534,248	447,461	28,728	\$3,910,230	\$1,431,620	\$583,187
Jul 20	0.00	0.10	1,093.88	290.00	15.88	12.36	393,842	474,820	536,434	477,522	41,891	\$6,386,456	\$1,249,126	\$1,658,315
Aug 20	0.00	0.20	496.08	-20.00	15.68	11.72	407,318	500,556	558,659	510,240	25,236	\$5,796,958	\$955,007	\$1,511,714
Sep 20	0.00	0.00	405.88	47.00	15.38	11.37	308,163	382,143	449,558	372,479	58,319	\$4,876,945	\$2,002,613	\$2,184,630
Total							3,807,794	5,123,364	5,399,309	5,093,751	567,948	\$54,688,128	\$14,195,307	\$16,259,069

Actual generation as a percentage of average: 94.3%

Cost per MWh: \$28.63

Lake/Reservoir Levels

Lake Powell reservoir inflow for the most recent historical month (September 2020) was 47,000 acre-feet (11 percent of average). Lake Powell's elevation was 3,596 feet at the end of September, about 104 feet below the maximum reservoir level and about 106 feet above the minimum generation level. The storage volume for Lake Powell was 11.4 million acre-feet (MAF) at the end of September, or about 46 percent of capacity.

Weather and Other Conditions

Drought conditions persist in the Upper Colorado River Basin with below average annual inflow forecasted for Lake Powell again in water year (WY) 2021. Currently 9.0 MAF is the forecasted annual release for WY 2021 but it could be reduced to as low as 8.23 MAF.



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 19	1.90	1.30	60.21	34.00	19.92	12.38	327,200	329,395	377,088	330,202	15,083	\$294,158	\$294,158	\$447,125
Nov 19	4.80	4.70	55.46	116.00	19.97	12.61	296,000	290,135	362,492	287,607	18,264	\$427,033	\$427,033	\$949,591
Dec 19	8.10	8.40	73.34	118.00	20.11	13.12	184,850	116,990	366,538	116,854	55,017	\$2,216,576	\$2,216,576	\$2,834,831
Jan 20	11.50	12.10	93.42	75.00	20.27	13.47	207,550	159,910	389,375	220,912	37,881	\$1,705,683	\$1,705,683	\$1,656,511
Feb 20	15.10	15.70	108.62	68.00	20.31	13.66	273,750	394,620	387,932	305,060	15,958	\$653,885	\$653,885	\$631,359
Mar 20	18.90	19.50	105.22	156.00	20.12	13.86	542,600	319,525	526,478	319,340	66,858	\$3,428,841	\$3,428,841	\$2,973,584
Apr 20	19.40	17.30	84.70	83.00	19.94	13.68	492,750	480,530	569,428	482,984	22,734	\$873,879	\$873,879	\$706,345
May 20	7.90	4.80	59.04	33.00	20.03	13.25	560,900	575,115	570,839	578,772	10,286	\$335,328	\$335,328	\$283,025
Jun 20	0.00	0.10	27.15	19.00	20.22	12.89	518,100	526,020	536,369	525,096	34,548	\$470,235	\$470,235	\$989,291
Jul 20	0.00	0.10	65.69	35.00	20.12	12.67	474,100	481,175	546,249	487,899	40,695	\$2,246,069	\$2,246,069	\$2,109,078
Aug 20	0.00	0.20	97.68	69.00	20.00	12.62	446,550	455,015	509,328	455,356	52,020	\$5,480,587	\$5,480,587	\$6,162,037
Sep 20	0.00	0.00	86.45	57.00	19.89	12.36	357,550	359,155	430,351	367,249	48,225	\$3,176,646	\$3,176,646	\$2,805,901
Total							4,681,900	4,487,585	5,572,467	4,477,331	417,569	\$21,308,920	\$21,308,920	\$22,548,678

Actual generation as a percentage of average: 80.3% Cost per MWh: \$54.00

Lake/Reservoir Levels

Lake Mead's elevation was 1,083 feet at the end of September, about 136 feet below the full storage level and about 133 feet above the minimum generation level. Lake Mead's elevation started WY 2020 at a minimum elevation of 1,083 feet in October and its elevation peaked at 1,099 feet in March.

Weather and Other Conditions

The Desert Southwest Region's (DSWR) hydrology is mostly dependent on the Colorado River Basin snow pack and precipitation above Lake Powell. The precipitation is currently 36% of average.

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 19	0.00	0.50	140.00	161.80	3.93	4.77	958,083	114,970	104,469	105,869	53,942	\$1,842,801	\$1,486,854	\$1,436,710
Nov 19	3.90	9.10	123.50	151.50	3.98	4.78	905,908	108,709	71,586	73,486	90,100	\$1,066,471	\$729,908	\$2,582,110
Dec 19	11.90	14.30	100.70	123.10	3.91	4.75	1,236,250	148,350	105,136	107,536	78,461	\$483,802	\$24,510	\$2,320,018
Jan 20	19.70	22.20	99.50	114.90	3.82	4.71	1,337,442	160,493	101,067	103,667	56,015	\$907,287	\$410,401	\$1,377,620
Feb 20	27.90	30.60	98.00	117.10	3.73	4.67	1,972,450	236,694	100,751	103,051	27,562	\$0	\$0	\$622,733
Mar 20	35.90	45.00	159.00	179.00	3.84	4.59	2,505,533	300,664	144,642	146,800	16,906	\$0	\$0	\$315,890
Apr 20	39.80	48.50	252.20	241.10	3.86	4.47	2,135,383	256,246	206,415	208,215	2,665	\$941,791	\$148,453	\$58,000
May 20	43.50	44.20	747.10	819.10	4.33	4.84	1,855,683	222,682	234,507	235,907	5,427	\$393,188	\$0	\$88,130
Jun 20	11.30	10.30	1,192.00	1,004.00	4.83	5.35	1,063,300	127,596	269,854	270,954	562	\$1,143,340	\$748,303	\$14,854
Jul 20	0.00	0.00	543.60	357.20	4.54	4.94	620,317	74,438	260,779	261,779	24,506	\$2,499,880	\$2,269,420	\$951,981
Aug 20	0.00	0.00	187.80	119.40	4.02	4.34	568,425	68,211	199,700	200,700	23,852	\$2,636,097	\$2,424,916	\$1,887,044
Sep 20	0.00	0.00	141.00	93.10	3.82	4.10	870,567	104,468	94,000	95,100	67,301	\$2,197,339	\$1,873,906	\$2,825,286
Total							16,029,342	1,923,521	1,892,907	1,913,065	447,299	\$14,111,995	\$10,116,670	\$14,480,376

Actual generation as a percentage of average: 101.1%

Cost per MWh: \$32.37

Lake/Reservoir Content

Reservoir inflows were 66 percent of average at the end of September, and storage was 107 percent of average.

Weather and Other Conditions

Hydrologic conditions for the Loveland Area Projects (LAP) area can vary from one river basin and watershed to another. All snowpack has melted. The latest National Weather Service forecast indicates November through January temperatures are more likely to be well above average and the precipitation is likely to be slightly below normal. Overall November generation is expected to be well under the marketed amount. Fall generation in the Bighorn, Colorado River, and North Platte River Basins is forecasted to be below average due to generation unit and transmission maintenance needs displaced by COVID-19 and spillway maintenance taking place.

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 19	N/A	N/A	335	349	5.513	7.837	195,000	190,000	163,000	287,596	40,285	\$383,616	\$383,616	\$508,746
Nov 19	22	2	381	356	5.470	7.630	83,000	93,000	104,000	156,862	47,391	\$355,200	\$355,200	\$864,154
Dec 19	27	9	960	692	5.839	7.779	42,000	57,000	143,000	110,113	53,378	\$355,200	\$355,200	\$738,876
Jan 20	28	12	844	736	6.188	7.974	32,000	107,000	163,000	41,046	59,939	\$232,060	\$232,060	\$986,093
Feb 20	28	11	1,533	378	6.808	7.947	46,000	266,000	195,000	103,091	48,897	\$209,420	\$209,420	\$673,863
Mar 20	30	16	1,574	514	7.520	7.943	133,000	138,000	207,000	182,229	42,769	\$231,353	\$231,353	\$358,618
Apr 20	27	8	1,452	899	7.931	8.210	380,000	350,000	288,000	306,150	28,049	\$215,080	\$215,080	\$265,445
May 20	30	0	1,181	695	7.900	8.022	445,000	445,000	442,000	420,710	26,159	\$243,380	\$243,380	\$371,560
Jun 20	-	-	767	384	7.481	7.333	491,000	481,000	440,000	463,808	26,058	\$215,080	\$215,080	\$363,933
Jul 20	-	-	439	317	6.720	6.501	435,000	400,000	524,000	431,144	25,881	\$232,060	\$232,060	\$736,105
Aug 20	-	-	349	315	6.056	5.899	340,000	325,000	402,000	317,812	49,358	\$232,060	\$232,060	\$924,043
Sep 20	-	-	312	267	5.635	5.496	181,000	181,000	269,000	219,256	49,784	\$226,400	\$ 226,400	\$ 870,701
Total							2,803,000	3,033,000	3,340,000	3,039,817	497,949	\$3,130,909	\$3,130,909	\$7,662,135

Actual generation as a percentage of average: 91.0%

Cost per MWh: \$15.39

Lake/Reservoir Content

As of September 30, reservoir storage for the water year was 97 percent of the 15-year average for Trinity, 91 percent for Shasta, 92 percent for Folsom, and 112 percent for New Melones. Accumulated inflow for the same date was 39 percent of the 15-year average for Trinity, 63 percent for Shasta, 57 percent for Folsom, and 60 percent for New Melones.

Weather and Other Conditions

February only had 0.02 inches of precipitation for the month, which is the driest February on the index going back to 1921. March precipitation was 90 percent of average, April was 71 percent, May was 200 percent, June was 39 percent, July was 53 percent, and August was 43 percent. There was no measurable precipitation for September and the water year total is 63 percent of average.

Note: The Sierra Nevada Region's (SNR) average generation is based 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 19	1.20	2.60	7,972.00	18,502.03	56.14	62.49	1,506,881	1,519,930	878,137	1,434,267	380	\$0	\$0	\$26,606
Nov 19	3.80	4.20	7,334.00	17,463.46	55.06	59.17	1,389,518	1,443,590	818,207	1,346,166	548	\$0	\$0	\$4,278
Dec 19	7.10	6.80	6,422.00	10,075.10	54.46	58.43	999,369	1,041,419	686,859	979,796	61,694	\$3,345,041	\$1,969,000	\$1,341,167
Jan 20	10.30	10.20	6,641.00	8,781.15	54.18	57.66	1,060,394	1,047,444	774,981	981,201	27,145	\$1,950,317	\$2,027,011	\$957,914
Feb 20	13.10	13.80	6,281.00	9,216.01	54.50	57.74	989,354	970,782	647,124	905,272	28,338	\$2,292,804	\$2,420,706	\$808,454
Mar 20	0.00	17.00	0.00	11,894.82	0.00	59.92	1,002,312	1,012,020	664,919	977,403	4,747	\$1,369,022	\$1,802,203	\$75,585
Apr 20	0.00	13.80	0.00	9,558.73	0.00	60.04	995,602	930,500	830,935	958,344	15,131	\$126,604	\$163,265	\$240,527
May 20	0.00	4.80	0.00	11,123.84	0.00	61.42	1,034,940	1,004,313	944,519	968,607	4,334	\$0	\$0	\$62,798
Jun 20	0.00	0.40	0.00	11,423.42	0.00	63.14	1,028,052	989,720	1,056,668	972,872	5,586	\$0	\$0	\$75,076
Jul 20	0.00	0.00	0.00	10,276.33	0.00	63.44	1,119,844	1,086,894	1,179,092	1,041,740	10,066	\$55,426	\$85,345	\$894,693
Aug 20	0.00	0.00	0.00	8,073.97	0.00	61.92	994,932	998,314	1,197,406	980,014	21,590	\$224,036	\$215,513	\$354,058
Sep 20	0.00	0.00	0.00	8,011.83	0.00	60.36	911,572	899,674	1,025,095	915,007	13,300	\$22,931	\$32,744	\$167,781
Total							13,032,770	12,944,600	10,703,943	12,460,689	192,859	\$9,386,182	\$8,715,786	\$5,008,937

Actual generation as a percentage of average: 116.4%

Cost per MWh: \$25.97

Lake/Reservoir Content

The yearly runoff forecast for the Missouri River basin is 24,400 MAF or 105 percent of average. Last month's runoff was 887 MAF or 72 percent of normal. System storage is 57.8 MAF. About 89 percent of the designated flood control storage is available to store runoff from mountain snowmelt and spring/summer rainfall events.

Weather and Other Conditions

The snowpack melt for the year is complete. The U.S. Drought Monitor shows large areas of the upper Missouri Basin being impacted by abnormally dry conditions and drought, with much of our service area experiencing moderate drought conditions and small areas in South Dakota and Montana experiencing extreme drought. The 90- to 180-day precipitation averages outlook are above to slightly above normal.

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 to allow for a meaningful comparison between the total amounts.

