

WESTERN AREA POWER ADMINISTRATION
HYDRO CONDITIONS AND PURCHASE POWER REPORT
October 2021

	Generation (Megawatt-Hours [MWh])				Purchase Power (MWh)	Purchase Power Expenses (Dollars)		
	Projected Dry	Most Probable	Average	Actual	Actual	Projected Dry	Most Probable	Actual
Oct 20	1,637,082	1,708,515	1,967,791	1,707,748	330,036	\$9,229,116	\$5,508,878	\$9,801,302
Nov 20	1,413,902	1,475,455	1,822,863	1,442,689	480,048	\$10,118,812	\$9,189,960	\$12,556,811
Dec 20	1,276,475	1,375,669	1,800,527	1,367,249	639,892	\$15,963,137	\$14,405,573	\$16,561,267
Jan 21	1,403,979	1,511,519	1,933,074	1,456,026	528,281	\$13,163,488	\$11,038,437	\$12,744,567
Feb 21	1,417,880	1,388,085	1,763,834	1,396,003	457,148	\$11,692,250	\$10,359,333	\$125,044,358
Mar 21	1,832,993	1,797,417	1,967,511	1,681,182	364,245	\$6,603,587	\$7,804,168	\$7,898,312
Apr 21	2,101,732	2,108,894	2,313,461	2,011,044	189,417	\$4,703,774	\$4,505,043	\$3,863,739
May 21	2,278,194	2,330,224	2,689,563	2,192,273	150,782	\$2,528,661	\$3,808,755	\$3,674,161
Jun 21	2,308,513	2,344,781	2,863,634	2,252,205	193,587	\$7,904,393	\$8,050,265	\$11,800,145
Jul 21	2,413,875	2,422,616	3,078,737	2,317,160	225,959	\$15,217,449	\$19,972,457	\$19,302,166
Aug 21	2,143,092	2,088,522	2,885,690	2,307,892	202,564	\$20,371,242	\$22,235,195	\$13,054,954
Sep 21	1,852,360	1,902,606	2,293,950	1,784,840				
Total	22,080,078	22,454,303	27,380,633	21,916,310	3,761,959	\$117,495,910	\$116,878,065	\$236,301,782
	Actual generation as a percentage of average: 80.0%					Cost per MWh: \$62.81		

Western Area Power Administration (WAPA) generated a total of 21,916 gigawatt-hours (GWh) in fiscal year 2021, or 80% of average. Actual purchase power data is currently available from October through August for all WAPA’s regions, and during this period, total purchase power was 3,762 GWh and total purchase power expenses were \$236,301,782, which equates to \$62.81 per megawatt-hour (MWh) overall, across WAPA. High purchase power prices during the February polar vortex contribute to the average.

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 melted instantaneously.

The monthly purchase power numbers in this report are used by WAPA’s Regions as a forecasting tool; 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 20	1.30	0.80	514.42	78	15.01	10.98	247,024	376,668	382,430	352,623	96,196	\$5,712,150	\$2,383,148
Nov 20	4.80	3.40	474.23	261	14.91	10.62	241,664	315,446	388,155	310,304	136,279	\$5,110,150	\$4,402,490	\$4,502,668
Dec 20	8.10	6.30	362.96	169	14.86	10.13	279,537	351,663	437,962	345,778	156,942	\$6,299,733	\$5,277,929	\$5,473,649
Jan 21	11.50	8.60	361.45	198	14.98	9.64	329,144	364,153	457,394	358,646	140,939	\$5,112,308	\$4,064,075	\$4,072,438
Feb 21	15.10	12.60	392.01	201	15.99	9.23	285,980	324,408	390,580	315,532	133,406	\$4,550,403	\$3,198,843	\$7,857,765
Mar 21	18.90	16.30	666.27	297	16.77	8.84	300,884	340,401	390,170	330,480	132,948	\$3,588,199	\$3,937,998	\$3,770,513
Apr 21	19.40	13.90	1,057.14	289	16.74	8.5	299,431	331,588	397,861	340,907	67,641	\$1,970,254	\$1,901,016	\$1,769,595
May 21	7.90	4.00	2,337.68	543	16.3	8.37	364,111	335,179	475,860	374,602	61,640	\$1,374,340	\$2,528,177	\$1,769,724
Jun 21	0.00	0.30	2,668.50	810	16	8.33	350,695	402,219	534,248	377,717	81,446	\$3,910,230	\$3,769,301	\$5,403,667
Jul 21	0.00	0.30	1,093.88	209	15.88	7.87	393,842	429,051	536,434	418,129	80,576	\$6,386,456	\$11,472,558	\$7,018,209
Aug 21	0.00	0.00	496.08	294	15.68	7.51	407,318	445,460	558,659	431,182	66,171	\$5,796,958	\$7,771,409	\$2,711,975
Sep 21	0.00	0.10	405.88	159	15.38	7.26	308,163	361,991	449,558	353,456	80,859	\$4,876,945	\$6,433,617	\$3,379,102
Total							3,807,794	4,378,227	5,399,309	4,309,357	1,235,043	\$54,688,128	\$57,140,561	\$50,722,378

Actual generation as a percentage of average: 79.8%

Cost per MWh: \$41.07

Lake/Reservoir Levels

End of September storage volume for Lake Powell was 7.3 million acre-feet or about 30% of capacity. Lake Powell reservoir inflow for September was 159,000 acre-feet or 39% of average. End of September Lake Powell elevation was about 3,545 feet, 155 feet from maximum reservoir level and 55 feet from the minimum generation level.

Weather and Other Conditions

Extreme drought throughout the Colorado River Basin has resulted in about 181,000 acre-feet of additional water being released from Upper Colorado River Basin reservoirs to try and maintain Lake Powell elevation above 3,525 feet. However, even with additional releases from upstream reservoirs, Lake Powell is expected to drop below 3,525 feet. Consequently, additional releases from these reservoirs are currently being considered.



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 20	1.3	0.8	59.65	35	19.82	12.25	407,200	384,190	377,268	391,920	27,216	\$498,024	\$498,024
Nov 20	4.8	3.4	55.47	56	19.86	12.28	361,600	360,155	362,391	355,236	21,032	\$800,684	\$800,684	\$1,098,412
Dec 20	8.1	6.3	73.06	60	20	12.46	217,750	256,520	365,340	266,410	24,797	\$1,639,676	\$1,639,676	\$1,208,261
Jan 21	11.5	8.6	93	74	20.16	12.78	274,050	299,265	388,937	296,996	33,596	\$907,204	\$907,204	\$1,391,031
Feb 21	15.1	12.6	107.5	56	20.2	12.88	318,150	305,675	386,998	311,351	14,841	\$747,756	\$747,756	\$760,432
Mar 21	18.9	16.3	103.81	34	20.01	12.63	522,450	517,060	526,368	517,092	10,701	\$1,092,436	\$1,092,436	\$475,939
Apr 21	19.4	13.9	83.65	37	19.84	12.22	553,400	567,845	569,446	570,700	9,356	\$286,954	\$286,954	\$453,665
May 21	7.9	4	58.4	28	19.92	11.75	535,900	582,945	570,961	592,962	10,127	\$383,310	\$383,310	\$516,477
Jun 21	0	0.3	26.28	-13	20.09	11.4	493,750	508,340	535,980	505,949	11,268	\$3,097,474	\$3,097,474	\$3,295,728
Jul 21	0	0.3	66.28	93	20	11.31	455,000	454,435	545,092	452,862	9,229	\$6,398,969	\$6,398,969	\$5,041,605
Aug 21	0	0	97.47	89	19.88	11.32	394,150	396,310	507,986	400,165	37,055	\$10,525,501	\$10,525,501	\$5,182,292
Sep 21	0	0.1	85	50	19.77	11.17	362,500	340,650	429,334	344,981.8	44,865	\$5,587,271	\$5,587,271	\$4,584,278
Total							4,895,900	4,973,390	5,566,101	5,006,627	254,083	\$31,965,259	\$31,965,259	\$25,518,630

Actual generation as a percentage of average: 89.9%

Cost per MWh: \$100.43

Lake/Reservoir Levels

Aggregate system storage for the Lower Colorado River Basin, or Lakes Mead, Mohave and Havasu, was 11.2 million acre-feet (MAF) at the end of September or 39% of the Lower Basin capacity. The Lower Basin tributary inflow into Lake Mead for August 2021 was 50,000 acre-feet. The total side inflow into Lake Mead for Water Year 2021 was 593,000 acre-feet, which represents a 31% decrease over last year's actual of 863,000 acre-feet and 46% of the normal annual side inflow of 1.3 MAF. Lake Mead elevation at the end of September 2021 was 1,067.68 feet or about 117.8 feet above the minimum generation elevation for Hoover Dam.

Weather and Other Conditions

The Desert Southwest Region's hydrology, or the Lower Colorado River Basin, is mostly dependent on the Colorado River Basin snowpack and precipitation above Lake Powell. The precipitation is currently 151% of average.

Note: DSW'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 20	0.00	0.00	142.50	95.30	3.854	4.138	97,268	107,268	104,469	73,515	103,847	\$ 1,853,600	\$ 1,533,600
Nov 20	3.70	4.00	125.30	111.10	3.702	4.02	49,932	59,932	71,586	48,589	124,138	\$ 1,131,072	\$ 811,072	\$ 3,817,277
Dec 20	11.80	8.90	126.10	111.20	3.794	4.105	92,471	102,471	105,136	81,323	99,875	\$ 1,319,040	\$ 999,040	\$ 3,007,865
Jan 21	18.60	20.40	100.40	84.30	3.788	4.075	114,675	124,675	101,067	112,305	65,082	\$ 1,701,344	\$ 1,381,344	\$ 1,576,446
Feb 21	25.80	27.90	99.30	78.60	3.771	4.064	101,654	111,654	100,751	95,375	37,972	\$ -	\$ -	\$ 3,394,430
Mar 21	37.30	33.90	160.50	130.80	3.785	4.125	108,080	118,080	144,642	106,409	35,071	\$ -	\$ -	\$ 894,723
Apr 21	45.70	43.50	252.20	191.20	3.819	4.129	123,233	133,233	206,415	151,191	21,931	\$ 1,322,176	\$ 1,002,176	\$ 593,809
May 21	43.30	36.70	759.80	536.80	4.143	4.341	197,390	207,390	234,507	181,846	10,531	\$ -	\$ -	\$ 332,956
Jun 21	11.30	9.00	1197.50	870.70	3.733	4.665	211,066	221,066	269,854	204,831	21,365	\$ 89,312	\$ 230,688	\$ 1,310,337
Jul 21	0.00	0.00	543.10	334.00	4.373	4.443	220,682	230,682	260,779	235,935	20,052	\$ 2,084,224	\$ 1,764,224	\$ 1,828,652
Aug 21	0.00	0.00	165.10	145.50	3.835	3.883	221,646	231,646	199,700	193,651	16,655	\$ 3,592,576	\$ 3,272,576	\$ 828,711
Sep 21	0.00	0.00	128.70	85.90	3.700	3.669	153,809	163,809	94,000	110,044	35,561	\$ 2,708,128	\$ 2,388,128	\$ 2,415,965
Total							1,691,906	1,811,906	1,892,907	1,595,014	592,080	\$15,801,472	\$13,382,848	\$23,247,676

Actual generation as a percentage of average: 84.3%

Cost per MWh: \$39.26

Lake/Reservoir Content

At the end of September, reservoir inflows were 67% of average and reservoir storage was at 99% of average.

Weather and Other Conditions

LAP's hydrologic conditions can vary from one river basin and watershed to another. The runoff is complete; no snow accumulation yet. The latest National Weather Service forecast indicates November through January temperatures will most likely be above average in Wyoming and Colorado. The same forecast indicates precipitation will be below average for Wyoming and Colorado. Winter generation in the Colorado River Basin, the North Platte Basin and the Big Horn Basin is forecasted to be below average due to unit and transmission maintenance schedules.



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 20	N/A	N/A	328.00	256.00	5.383	5.233	139,000	79,000	163,000	119,699	55,232	\$ 659,220	\$ 659,220
Nov 20	N/A	N/A	399.00	283.00	5.338	5.133	53,000	38,000	104,000	70,365	53,796	\$ 628,188	\$ 628,188	\$ 1,150,708
Dec 20	27.37	5.20	791.00	303.00	5.617	5.117	30,000	0	143,000	74,714	55,552	\$ 654,300	\$ 654,300	\$ 1,302,849
Jan 21	28.29	11.60	949.00	417.00	6.032	5.223	0	0	163,000	38,018	58,365	\$ 634,400	\$ 634,400	\$ 1,330,776
Feb 21	27.96	15.10	1,216.00	501.00	6.620	5.451	56,000	0	195,000	11,982	53,443	\$ 578,400	\$ 578,400	\$ 1,111,030
Mar 21	28.00	16.80	1,439.00	515.00	7.309	5.584	107,000	92,000	207,000	85,317	52,517	\$ 641,275	\$ 641,275	\$ 912,219
Apr 21	27.37	5.20	1,241.00	486.00	7.667	5.414	234,000	219,000	288,000	143,983	47,646	\$ 496,000	\$ 496,000	\$ 520,900
May 21	0.00	0.00	1,017.00	364.00	7.587	5.058	264,000	319,000	442,000	172,564	49,957	\$ 514,400	\$ 514,400	\$ 673,243
Jun 21	0.00	0.00	694.00	224.00	7.122	4.399	353,000	358,000	440,000	282,859	45,421	\$ 496,000	\$ 496,000	\$ 807,686
Jul 21	0.00	0.00	412.00	216.00	6.367	3.744	339,000	319,000	524,000	343,572	40,993	\$ 237,800	\$ 237,800	\$ 3,370,811
Aug 21	0.00	0.00	331.00	220.00	5.72	3.22	84,000	49,000	402,000	291,047	38,879	\$ 237,800	\$ 237,800	\$ 3,390,629
Sep 21	0.00	0.00	301.00	199.00	5.31	2.86	187,000	182,000	269,000	180,475	46,931	\$ 232,000	\$ 232,000	\$3,296,347
Total							1,846,000	1,655,000	3,340,000	1,814,597	598,732	\$6,009,783	\$6,009,783	\$18,846,261

Actual generation as a percentage of average: 54.3%

Cost per MWh: \$31.48

Lake/Reservoir Content

As of September 30, reservoir storage was 54% of the 15-year average for Trinity, 47% for Shasta, 53% for Folsom and 66% for New Melones. Accumulated inflow was 32% of the 15-year average for Trinity, 52% for Shasta, 35% for Folsom and 36% for New Melones.

Weather and Other Conditions

September's precipitation was 0.80 inch while October's was 0.01 inch. Water year total ended with 24 inches or 48% of average. Based on May 1 conditions, the Sacramento River Index forecast for 50% exceedance at 6.7 remains "critical" as does the 90% exceedance at 6.0.

Note: The Sierra Nevada Region's average generation is based upon long-term modeling done for its "Green Book." The region does not project purchase power expenses for dry conditions, and its most probable expenses are based upon term purchases of 35 to 65% 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 20	1.20	1.80	7,972.00	7,076.94	56.14	58.83	746,590	761,389	940,624	769,992	47,545	\$506,122	\$434,886
Nov 20	3.80	3.60	7,334.00	6,581.48	55.06	57.86	707,706	701,922	896,730	658,194	144,803	\$2,448,719	\$2,547,526	\$1,987,746
Dec 20	7.10	5.80	6,422.00	5,580.68	54.46	57.57	656,717	665,015	749,088	599,023	302,726	\$6,050,388	\$5,834,628	\$5,568,644
Jan 21	10.30	8.20	6,641.00	5,891.16	54.18	57.41	686,110	723,426	822,676	650,060	230,299	\$4,808,232	\$4,051,414	\$4,373,877
Feb 21	13.10	12.40	6,281.00	5,848.92	54.50	57.08	656,096	646,348	690,506	661,762	217,486	\$5,815,691	\$5,834,334	\$111,920,701
Mar 21	15.80	14.00	8,151.00	6,911.39	56.20	57.66	794,579	729,876	699,331	641,883	133,008	\$1,281,677	\$2,132,459	\$1,844,918
Apr 21	14.90	11.40	8,041.00	7,292.99	57.06	56.84	891,668	857,228	851,739	804,263	42,843	\$628,390	\$818,897	\$525,770
May 21	6.30	5.00	9,654.00	8,690.01	58.35	56.76	916,793	885,710	966,235	870,298	18,527	\$256,611	\$382,869	\$381,761
Jun 21	0.50	0.00	11,746.00	9,067.75	60.54	56.84	900,002	855,156	1,083,552	880,848	34,087	\$311,377	\$456,802	\$982,727
Jul 21	0.00	0.00	10,694.00	7,809.00	60.49	53.87	1,005,351	989,448	1,212,432	866,662	75,109	\$110,000	\$98,906	\$2,042,889
Aug 21	0.00	0.00	9,716.00	8,523.33	58.91	53.54	1,035,978	966,106	1,217,345	991,847	43,804	\$218,407	\$427,909	\$941,347
Sep 21	0.09	0.00	8,629.00	7,190.29	57.38	52.15	840,888	854,156	1,052,058	795,883	*	\$623,881	\$542,235	*
Total							9,838,478	9,635,780	11,182,315	9,190,715	1,290,237	\$23,059,493	\$23,562,864	\$131,642,529

Actual generation as a percentage of average: 82.2%

Cost per MWh: \$102.03

Lake/Reservoir Content

The yearly runoff forecast for the Missouri River basin as of October 1 was 14.8 million acre-feet (MAF) or 57% of average. Runoff above Sioux City for September was 798 MAF or 67% of average. System storage as of October 19 is at 50 MAF. The snowpack has melted.

Weather and Other Conditions

The U.S. Drought Monitor shows large areas of the upper Basin continue to be impacted by drought. Extreme Drought conditions are occurring in most of North Dakota, northwest South Dakota and northeastern Montana with some Exceptional Drought conditions in north-central Montana and North Dakota. Severe, Moderate Drought and Abnormally Dry conditions are occurring in much of the lower half of South Dakota.

Average purchase power amounts and prices for the year are skewed by the extreme pricing and increased purchasing during the polar vortex on February 15 and 16, with UGP significantly exceeding its purchase power estimates for fiscal year 2021 in just February.

Note: The Upper Great Plains Region reports 50% share of Yellowtail Dam generation while Rocky Mountain Region reports the snowpack, inflow, content and remaining share of generation. Asterisks indicate that actual purchase power data is not available for the month.

