

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

	Generation (Megawatt-Hours [MWh])				Purchase Power (MWh)	Purchase Power Expenses (Dollars)		
	Projected	Most	Average	Actual	Actual	Projected	Most	Actual
	Dry	Probable				Dry	Probable	
Oct 20	1,637,082	1,678,382	1,967,791	1,707,748	330,036	\$9,229,116	\$5,508,878	\$9,801,302
Nov 20	1,413,902	1,450,220	1,822,863	1,442,689	480,048	\$10,118,812	\$9,189,960	\$12,556,811
Dec 20	1,276,475	1,347,536	1,800,527	1,367,249	639,892	\$15,963,137	\$14,405,573	\$16,561,267
Jan 21	1,403,979	1,482,387	1,933,074	1,456,026	528,281	\$13,163,488	\$11,038,437	\$12,744,567
Feb 21	1,417,880	1,362,132	1,763,834	1,396,003	431,892	\$11,692,250	\$10,359,333	\$122,454,189
Mar 21	1,832,993	1,770,184	1,441,669	1,681,182	350,180	\$6,603,587	\$7,804,168	\$7,814,970
Apr 21	2,101,732	2,082,367	2,313,461	2,011,044	205,375	\$4,703,774	\$4,505,043	\$4,575,283
May 21								
Jun 21								
Jul 21								
Aug 21								
Sep 21								
Total	11,084,043	11,173,208	13,043,219	11,061,941	2,965,704	\$71,474,165	\$62,811,392	\$186,508,389

Actual generation as a percentage of average: 84.8%

Cost per MWh: \$62.89

Western Area Power Administration (WAPA) generated a total of 11,062 gigawatt-hours (GWh) during October through April of fiscal year 2021, or 84.8 percent of the average. During this period total purchase power was 2,965 GWh and total purchase power expenses were \$186,508,389, which equates to \$62.89 per MWh overall, across WAPA. The February polar vortex caused high purchase power prices which are still reflected in 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 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 20	1.30	0.80	514.42	78.00	15.01	10.98	247,024	346,535	382,430	352,623	96,196	\$5,712,150	\$2,383,148	\$2,993,074
Nov 20	4.80	3.40	474.23	261.00	14.91	10.62	241,664	290,211	388,155	310,304	136,279	\$5,110,150	\$4,402,490	\$4,502,668
Dec 20	8.10	6.30	362.96	169.00	14.86	10.13	279,537	323,530	437,962	345,778	156,942	\$6,299,733	\$5,277,929	\$5,473,649
Jan 21	11.50	8.60	361.45	198.00	14.98	9.64	329,144	335,021	457,394	358,646	140,939	\$5,112,308	\$4,064,075	\$4,072,438
Feb 21	15.10	12.60	392.01	201.00	15.99	9.23	285,980	298,455	390,580	315,532	108,150	\$4,550,403	\$3,198,843	\$5,267,596
Mar 21	18.90	16.30	666.27	297.00	16.77	8.84	300,884	313,168	390,170	330,480	118,883	\$3,588,199	\$3,937,998	\$3,687,171
Apr 21	19.40	13.90	1,057.14	289.00	16.74	8.50	299,431	305,061	397,861	340,907	83,599	\$1,970,254	\$1,901,016	\$2,481,139
May 21														
Jun 21														
Jul 21														
Aug 21														
Sep 21														
Total							1,983,664	2,211,981	2,844,551	2,354,271	840,988	\$32,343,198	\$25,165,500	\$28,477,734

Actual generation as a percentage of average: 82.8%

Cost per MWh: \$33.86

Lake/Reservoir Levels

End of April storage volume for Lake Powell was 8.5 million acre-feet or 35 percent of capacity. Lake Powell reservoir inflow for April was 289,000 acre-feet or 27 percent of average. End of April Lake Powell elevation was about 3,562 feet, 138 feet from maximum reservoir level, and 72 feet from the minimum generation level.

Weather and Other Conditions

The Upper Colorado River Basin is currently experiencing a protracted drought that began in 2000 with hydrologic conditions in April through December being some of the driest on record. Dry conditions have resulted in low water releases and low reservoir conditions that reduce power head, greatly reducing power generation. Due to the dry hydrologic conditions, purchase power estimates for FY 2021 are expected to be very high.



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	1.30	0.80	59.65	35.00	19.82	12.25	407,200	384,190	377,268	391,920	27,216	\$498,024	\$498,024	\$1,510,510
Nov 20	4.80	3.40	55.47	56.00	19.86	12.28	361,600	360,155	362,391	355,236	21,032	\$800,684	\$800,684	\$1,098,412
Dec 20	8.10	6.30	73.06	60.00	20.00	12.46	217,750	256,520	365,340	266,410	24,797	\$1,639,676	\$1,639,676	\$1,208,261
Jan 21	11.50	8.60	93.00	74.00	20.16	12.78	274,050	299,265	388,937	296,996	33,596	\$907,204	\$907,204	\$1,391,031
Feb 21	15.10	12.60	107.50	56.00	20.20	12.88	318,150	305,675	386,998	311,351	14,841	\$747,756	\$747,756	\$760,432
Mar 21	18.90	16.30	103.81	34.00	20.01	12.63	522,450	517,060	526	517,092	10,701	\$1,092,436	\$1,092,436	\$475,939
Apr 21	19.40	13.90	83.65	37.00	19.84	12.22	553,400	567,845	569,446	570,700	9,356	\$286,954	\$286,954	\$453,665
May 21														
Jun 21														
Jul 21														
Aug 21														
Sep 21														
Total							2,654,600	2,690,710	2,450,906	2,709,707	141,539	\$5,972,734	\$5,972,734	\$6,898,250

Actual generation as a percentage of average: 110.6%

Cost per MWh: \$48.74

Lake/Reservoir Levels

Aggregate system storage for the Lower Colorado River Basin, or Lakes Mead, Mohave and Havasu, was 12.22 million acre-feet at the end of April, or 42.8 percent of the Lower Basin capacity. The lower basin tributary inflow into Lake Mead for March was 37,000 acre-feet and the total side inflow into Lake Mead projected for WY21 is 643,000 acre-feet, which is 49 percent of average.

Weather and Other Conditions

The Desert Southwest Region's (DSWR) 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 75 percent of average and the snowpack is currently 58 percent 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 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	\$3,246,505
Nov 20	3.70	4.00	125.30	111.10	3.702	4.020	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	\$0	\$0	\$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	\$0	\$0	\$894,723
Apr 21	45.70	43.50	252.20	191.20	3.82	4.13	123,233	133,233	206,415	151,191	21,931	\$1,322,176	\$1,002,176	\$593,809
May 21														
Jun 21														
Jul 21														
Aug 21														
Sep 21														
Total							687,313	757,313	834,067	668,707	487,916	\$7,327,232	\$5,727,232	\$16,531,055

Actual generation as a percentage of average: 80.2% Cost per MWh: \$33.88

Lake/Reservoir Content

At the end of April, reservoir inflows were 76 percent of average and reservoir storage was at 108 percent of average.

Weather and Other Conditions

LAP’s hydrologic conditions can vary from one river basin and watershed to another. Snowpack is below average in Colorado and most of southwestern Wyoming, with snowpack in northeastern Wyoming reaching average due to late season storms. Runoff has started and snowpack is decreasing. May through July temperatures are projected to be above average, and precipitation is projected to be below average. Spring generation in the Colorado River Basin, North Platte Basin and Big Horn Basin is forecasted to be average this spring due to decent storage and water movement.



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	5.38	5.23	139,000	79,000	163,000	119,699	55,232	\$659,220	\$659,220	\$979,064
Nov 20	N/A	N/A	399.00	283.00	5.34	5.13	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	5.62	5.12	30,000	-	143,000	74,714	55,552	\$654,300	\$654,300	\$1,302,849
Jan 21	28.29	11.60	949.00	417.00	6.03	5.22	-	-	163,000	38,018	58,365	\$634,400	\$634,400	\$1,330,776
Feb 21	27.96	15.10	1,216.00	501.00	6.62	5.45	56,000	-	195,000	11,982	53,443	\$578,400	\$578,400	\$1,111,030
Mar 21	28.00	16.80	1,439.00	515.00	7.31	5.58	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	7.67	5.41	234,000	219,000	288,000	143,983	47,646	\$496,000	\$496,000	\$520,900
May 21														
Jun 21														
Jul 21														
Aug 21														
Sep 21														
Total							619,000	428,000	1,263,000	544,079	376,551	\$4,291,783	\$4,291,783	\$7,307,545

Actual generation as a percentage of average: 43.1%

Cost per MWh: \$19.41

Lake/Reservoir Content

As April 30, reservoir storage for the water year was 73 percent of the 15-year average for Trinity, 63 percent for Shasta, 50 percent for Folsom, and 97 percent for New Melones. Accumulated inflow was 35 percent of the 15-year average for Trinity, 48 percent for Shasta, 35 percent for Folsom, and 46 percent for New Melones.

Weather and Other Conditions

April precipitation was 19 percent of average and the water year total is 45 percent of average. Based upon April 1 conditions, the Sacramento River Index forecast for 50 percent exceedance at 6.7 is "critical" and the 90 percent exceedance at 6.0 is also "critical."

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 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	\$1,072,149
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														
Jun 21														
Jul 21														
Aug 21														
Sep 21														
Total							5,139,466	5,085,204	5,650,694	4,785,177	1,118,710	\$21,539,217	\$21,654,143	\$127,293,805

Actual generation as a percentage of average: 84.7%

Cost per MWh: \$113.79

Lake/Reservoir Content

The yearly runoff forecast for the Missouri River basin as of May 1 was 17.8 million acre-feet (MAF) or 69 percent of average and runoff above Sioux City for the month of April was 1.3 MAF or 44 percent of average. System storage is at 55.0 MAF. On May 23 the mountain Snow Water Equivalent (SWE) in the “Total above Fort Peck” reach was 7.2 inches or 84 percent of average and this reach peaked on March 31 at 14.1 inches SWE, or 86 percent of the normal peak. The mountain SWE in the “Fort Peck to Garrison” reach was 6.9 inches, or 79 percent of the normal May 23 average. This reach peaked on April 26 at 14.0 inches SWE or 96 percent of the normal peak.

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 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 FY21 in just the month of February.



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.

