

**WESTERN AREA POWER ADMINISTRATION
HYDRO CONDITIONS AND PURCHASE POWER REPORT
March 2023**

	Generation (Megawatt-Hours [MWh])				Purchase Power (MWh)	Purchase Power Expenses (Dollars)		
	Projected Dry	Most Probable	Average	Actual	Actual	Projected Dry	Most Probable	Actual
Oct 22	1,471,054	1,281,310	2,016,884	1,312,652	195,951	\$ 15,852,897	\$ 9,880,231	\$ 13,903,450
Nov 22	1,134,982	1,182,145	1,855,262	1,276,441	322,030	\$ 20,513,204	\$ 15,163,852	\$ 18,426,107
Dec 22	968,994	1,037,489	1,806,685	1,047,546	635,103	\$ 25,803,693	\$ 20,016,256	\$ 63,858,131
Jan 23	1,008,125	1,262,843	1,908,943	1,146,877	491,866	\$ 23,173,682	\$ 19,950,358	\$ 34,915,260
Feb 23	875,656	1,207,142	1,776,880	1,044,966				
Mar 23								
Apr 23								
May 23								
Jun 23								
Jul 23								
Aug 23								
Sep 23								
Total	5,458,812	5,970,929	9,364,653	5,828,481	1,644,950	\$ 85,343,475	\$ 65,010,697	\$ 131,102,947
	Actual generation as a percentage of average: 62.2%					Cost per MWh: \$79.70		

Western Area Power Administration (WAPA) generated a total of 5,828 gigawatt-hours (GWh) from October through February of fiscal year 2023, or 62.2 percent of 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 1,645 GWh and total purchase power expenses were \$131,102,947, which equates to \$79.70 per MWh overall.

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 22	1.00	1.20	514.42	437.00	15.01	5.83	218,843	271,947	392,070	250,183	16,261	\$ 0	\$ 0	\$ 886,454
Nov 22	4.30	3.80	474.23	349.00	14.91	5.72	115,541	232,979	379,493	225,788	12,799	\$ 0	\$ 0	\$ 854,554
Dec 22	7.80	8.80	362.96	281.00	14.86	5.53	143,368	265,055	449,721	253,334	24,410	\$ 0	\$ 0	\$ 5,147,050
Jan 23	11.20	15.10	361.45	361.00	14.98	5.45	46,967	306,090	457,656	237,467	17,955	\$ 0	\$ 0	\$ 2,199,458
Feb 23	14.80	18.50	392.01	270.00	15.99	5.32	42,649	269,775	389,089	201,464	13,140	\$ 0	\$ 0	\$ 697,832
Mar 23														
Apr 23														
May 23														
Jun 23														
Jul 23														
Aug 23														
Sep 23														
Total							567,369	1,345,846	2,068,029	1,168,236	84,565	\$ 0	\$ 0	\$ 9,785,348

Actual generation as a percentage of average: 56.5%

Cost per MWh: \$115.71

Lake/Reservoir Levels

End of February storage volume for Lake Powell was 5.32 million acre-feet (MAF) or about 23 percent of capacity. Lake Powell reservoir inflow for February was 270,000 acre-feet or 74 percent of average. Lake Powell elevation at the end of February was about 3,521 feet, or about 179 feet from maximum reservoir level and 31 feet from the minimum generation level.

Weather and Other Conditions

Hydrologic conditions in the Colorado River Basin have significantly improved over the last few weeks. Consequently, releases from Lake Powell are expected to increase up 2 MAF over what is currently forecasted. If the expected increased releases occur, Glen Canyon Dam will generate significantly more energy than current forecasts. Until firm decisions are made on release volumes from the Lake Powell for the remainder of water year 2023, hydropower generation forecasts will be variable. Reclamation is currently considering implementing experiments beginning in June 2023 that may result in a significant proportion of water being released through bypass at Glen Canyon Dam. If Reclamation decides to implement these experiments, the Colorado River Storage Project's purchase power costs for the remainder of water year (WY) 2023 would increase dramatically.



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 22	1.00	1.20	60.81	94.00	19.94	9.44	403,200	143,050	374,715	226,279	26,405	\$ 2,587,690	\$ 2,587,690	\$ 2,636,428
Nov 22	4.30	3.80	54.39	18.00	19.94	9.37	315,600	252,200	361,456	328,466	17,711	\$ 2,208,802	\$ 2,208,802	\$ 1,753,563
Dec 22	7.80	8.80	72.64	63.00	20.01	9.49	209,550	145,820	362,198	216,036	45,046	\$ 3,847,693	\$ 3,847,693	\$ 13,754,789
Jan 23	11.20	15.10	92.45	104.00	19.90	9.70	222,150	191,405	385,753	196,764	64,435	\$ 4,018,823	\$ 4,018,823	\$ 13,284,477
Feb 23	14.80	18.50	105.16	46.00	19.93	9.74	236,250	243,135	384,361	245,324	38,936	\$ 1,951,269	\$ 1,951,269	\$ 4,259,534
Mar 23														
Apr 23														
May 23														
Jun 23														
Jul 23														
Aug 23														
Sep 23														
Total							1,386,750	975,610	1,868,483	1,212,869	192,533	\$ 14,614,277	\$ 14,614,277	\$ 35,688,791

Actual generation as a percentage of average: 64.9% Cost per MWh: \$185.36

Lake/Reservoir Levels

Aggregate system storage for the Lower Colorado River Basin, or Lakes Mead, Mohave, and Havasu, was 9.74 MAF at the end of February, or 34 percent of the Lower Basin capacity. The Lower Basin tributary inflow into Lake Mead for February was 46,000 acre-feet, or about 65 percent of the five-year average for the month. The total side inflow into Lake Mead for WY 2023 is projected to be 752,000 acre-feet, which represents a 2.5 percent decrease over last year and 59 percent of the normal annual side inflow. Lake Mead’s elevation at the end of February was 1,047.02 feet, or 172.62 feet below full storage elevation and 97.02 feet above the minimum generation elevation for Hoover Dam. Lake Mead’s current peak elevation for WY 2023 occurred in February at 1,047.02 feet (19.8 feet below the WY 2022 peak elevation) and the minimum elevation of 1,030.27 feet is projected to occur in June.

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 129 percent of average and the snowpack is 154 percent of median.



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 22	0.00	0.20	142.20	127.20	3.90	3.71	46,425	61,900	97,400	50,264	105,370	\$ 10,707,550	\$ 4,716,720	\$ 7,487,439
Nov 22	3.70	3.10	123.80	105.80	3.89	3.71	44,513	59,350	110,000	47,809	117,764	\$ 10,119,341	\$ 4,486,824	\$ 8,815,650
Dec 22	11.80	11.00	101.70	95.40	3.90	3.64	67,688	90,250	123,500	54,084	120,394	\$ 9,118,069	\$ 3,379,154	\$ 18,057,020
Jan 23	20.30	24.10	100.50	102.70	3.88	3.65	100,538	134,050	122,100	101,230	40,185	\$ 5,914,777	\$ 2,063,458	\$ 5,244,225
Feb 23	29.00	36.70	98.30	87.40	3.88	3.62	88,275	117,700	111,600	103,126	32,334	\$ 5,345,785	\$ 1,135,538	\$ 1,942,405
Mar 23														
Apr 23														
May 23														
Jun 23														
Jul 23														
Aug 23														
Sep 23														
Total							347,438	463,250	564,600	356,513	416,047	\$ 41,205,520	\$ 15,781,694	\$ 41,546,739

Actual generation as a percentage of average: 63.1% Cost per MWh: \$99.86

Lake/Reservoir Content

At the end of February, reservoir inflows were 89 percent of average and storage was 93 percent of average.

Weather and Other Conditions

LAP's hydrologic conditions can vary from one river basin and watershed to another. The snowpack is slightly above average for both the Wyoming area and the Colorado East Slope area. The latest National Weather Service forecast indicates April through June temperatures will have equal probability to be either above or below average in northern Colorado and Wyoming. The same forecast indicates precipitation will have an equal chance to be above or below average for the Wyoming area and is leaning to below average in Colorado. Spring generation in the Colorado River Basin, the North Platte Basin and the Bighorn Basin is forecasted to be average.



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 22	N/A	N/A	322.00	189.00	4.94	2.82	63,000	68,000	163,000	56,344	38,052	\$ 2,102,450	\$ 2,102,450	\$ 2,162,501
Nov 22	N/A	N/A	398.00	243.00	4.92	2.76	30,000	15,000	104,000	22,059	38,127	\$ 2,036,081	\$ 2,036,081	\$ 2,185,091
Dec 22	26.25	14.70	822.00	891.00	5.25	3.34	13,000	0	143,000	19,020	44,132	\$ 2,102,450	\$ 2,102,450	\$ 3,658,267
Jan 23	26.33	33.70	1,121.00	2,356.00	5.65	4.82	0	0	163,000	25,336	43,928	\$ 2,874,940	\$ 2,874,940	\$ 3,667,261
Feb 23	25.93	42.00	1,114.00	842.00	6.28	5.20	0	49,000	195,000	8,361	45,937	\$ 4,072,080	\$ 4,072,080	\$ 4,241,556
Mar 23														
Apr 23														
May 23														
Jun 23														
Jul 23														
Aug 23														
Sep 23														
Total							106,000	132,000	768,000	131,120	210,176	\$ 13,188,001	\$ 13,188,001	\$ 15,914,676

Actual generation as a percentage of average: 17.1%

Cost per MWh: \$75.72

Lake/Reservoir Content

As of February 28, reservoir storage was 56 percent of the 15-year average for Trinity, 93 percent for Shasta, 114 percent for Folsom, and 79 percent for New Melones. Accumulated inflow was 97 percent of the 15-year average for Trinity, 97 percent for Shasta, 158 percent for Folsom, and 172 percent for New Melones.

Weather and Other Conditions

December had 15.83 inches of precipitation or 180 percent of the monthly average, January had 17.46 inches or 197 percent of average, and February had 4.79 inches or 58 percent of average. The cumulative total for WY 2023 is at 42.25 inches or 84 percent of average. The statewide snowpack is assumed to reach its peak on April 1, and at the end of February the snowpack was at 162 percent of this average. Based on March 1 conditions, the Sacramento Valley 40-30-30 index at the 50 percent exceedence level is "above normal" while the 90 percent exceedence level is "below normal."

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 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 22	1.20	0.00	7,972.00	6,662.59	56.14	48.67	739,586	736,413	989,699	729,582	9,863	\$ 455,207	\$ 473,370	\$ 730,628
Nov 22	3.80	4.10	7,334.00	5,908.08	55.06	47.47	629,328	622,616	900,312	652,319	135,629	\$ 6,148,980	\$ 6,432,145	\$ 4,817,249
Dec 22	7.10	7.90	6,422.00	4,608.00	54.46	47.01	535,389	536,364	728,266	505,072	401,121	\$ 10,735,481	\$ 10,686,959	\$ 23,241,005
Jan 23	10.30	10.50	6,664.00	5,662.09	54.34	47.16	638,471	631,298	780,434	586,079	325,363	\$ 10,365,142	\$ 10,993,137	\$ 10,519,839
Feb 23	13.10	12.90	6,297.00	4,791.31	54.63	47.38	508,482	527,532	696,830	486,691	*			*
Mar 23														
Apr 23														
May 23														
Jun 23														
Jul 23														
Aug 23														
Sep 23														
Total							3,051,256	3,054,223	4,095,541	2,959,743	871,976	\$ 27,704,810	\$ 28,585,611	\$ 39,308,721

Actual generation as a percentage of average: 72.3% Cost per MWh: \$45.08

Lake/Reservoir Content

The yearly runoff forecast for the Missouri River Basin as of March 1 was 21.7 MAF or 84 percent of average. Runoff above Sioux City for February was 2.28 MAF or 76 percent of average. System storage as of March 28 was 46.5 MAF.

Weather and Other Conditions

On March 29, the mountain snow water equivalent in the total above Fort Peck reach was 17.2 inches or 114 percent of average, and the mountain snow water equivalent in the Fort Peck to Garrison reach was 14.7 inches or 107 percent of average. The normal peak for both reaches occurs on or around April 17. The High Plains region generally saw drier weather recently, with a few areas of the central and northern Great Plains seeing some precipitation. Recent precipitation and lessening long-term precipitation deficits, as well as deep snowpack in some areas, led to some localized improvements to ongoing drought areas in the Dakotas, western Nebraska and far northeast Colorado, while mounting precipitation deficits and low soil moisture led to localized worsening of conditions in eastern Nebraska and northeast North Dakota.

Note: The Upper Great Plains Region reports 50 percent 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.

