# WESTERN AREA POWER ADMINSTRATION
# HYDRO CONDITIONS AND PURCHASE POWER REPORT
# August 2019

| | Generation (Megawatt-Hours [MWh]) | | | | Purchase Power (MWh) | Purchase Power Expenses (Dollars) | | |
|---|---|---|---|---|---|---|---|---|
| | Projected Dry | Most Probable | Average | Actual | Actual | Projected Dry | Most Probable | Actual |
| **Oct 18** | 2,191,197 | 2,291,715 | 1,776,615 | 2,166,211 | 221,956 | $4,702,090 | $4,374,513 | $6,594,257 |
| **Nov 18** | 1,947,604 | 2,049,917 | 1,675,280 | 1,967,804 | 308,667 | $7,950,056 | $7,668,841 | $8,888,450 |
| **Dec 18** | 1,646,222 | 1,613,363 | 1,704,693 | 1,526,996 | 460,159 | $10,394,950 | $11,615,895 | $11,792,614 |
| **Jan 19** | 1,676,465 | 1,704,113 | 1,861,169 | 1,623,543 | 343,552 | $9,616,011 | $8,795,704 | $9,344,452 |
| **Feb 19** | 1,597,167 | 1,607,587 | 1,690,559 | 1,596,912 | 324,181 | $7,909,927 | $6,371,208 | $11,012,653 |
| **Mar 19** | 1,971,097 | 1,730,792 | 1,957,827 | 1,936,390 | 438,263 | $8,153,711 | $6,680,118 | $14,095,317 |
| **Apr 19** | 2,423,249 | 2,460,532 | 2,249,272 | 2,479,470 | 101,292 | $3,640,422 | $1,903,748 | $2,485,389 |
| **May 19** | 2,972,853 | 3,088,102 | 2,609,363 | 2,697,984 | 46,678 | $2,349,096 | $1,113,563 | $839,762 |
| **Jun 19** | 3,192,285 | 3,299,121 | 2,722,229 | 3,105,466 | 44,860 | $3,993,143 | $1,124,626 | $993,131 |
| **Jul 19** | 2,989,676 | 3,467,580 | 2,930,599 | 3,412,648 | | | | |
| **Aug 19** | | | | | | | | |
| **Sep 19** | | | | | | | | |
| **Total** | 22,607,816 | 23,312,822 | 21,177,606 | 22,513,425 | 2,289,608 | $58,709,407 | $49,648,215 | $66,046,025 |
| Actual generation as a percentage of average: | | | | 106.3% | | | Cost per MWh: | $28.85 |

Western Area Power Administration (WAPA) generated 22,513 gigawatt-hours (GWh) during October through July of fiscal year 2019, or 106.73 percent of the average. Actual purchase power data is currently available from October through June for all of WAPA's Regions, and during this period, total purchase power was 2,290 GWh and total purchase power expenses were $66,046,025, which equates to $28.85 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.

WAPA's Regions use the monthly purchase power numbers indicated herein as a forecasting tool, and therefore they do not reflect energy imbalance transactions and other such information that is not forecastable. Furthermore, no verification of the purchase power numbers for financial auditing purposes has occurred. Consequently, these numbers will vary from those reported in WAPA's year-end financial statements that are 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 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 | $2,445,254 |
| **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** | | | | | | | | | | | | | | |
| **Sep 19** | | | | | | | | | | | | | | |
| **Total** | | | | | | | 3,361,491 | 4,172,737 | 4,391,093 | 4,112,936 | 700,168 | $33,389,721 | $19,249,943 | $24,021,381 |
| | | | | | | | Actual generation as a percentage of average: | | | 93.7% | | | Cost per MWh: | $34.31 |

Lake/Reservoir Levels

Lake Powell's elevation was 3,622 feet at the end of July, about 78 feet below the maximum reservoir level and about 132 feet above the minimum generation level. The storage volume for Lake Powell was 13.93 million acre-feet at the end of July, or about 57 percent of capacity.

Weather and Other Conditions

Inflows into Lake Powell are now projected to be 125 percent of average. As a result of above-average inflows, Lake Powell is expected to end water year 2019 with about 2.7 million acre-feet more storage and about 28 feet higher elevation compared to the end of water year 2018.

## 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** | | | | | | | | | | | | | | |
| **Sep 19** | | | | | | | | | | | | | | |
| **Total** | | | | | | | 4,204,850 | 4,016,845 | 4,648,206 | 3,972,075 | 184,751 | $7,341,681 | $7,433,681 | $9,233,853 |
| | | | | | | | Actual generation as a percentage of average: | | | 85.5% | | | Cost per MWh: | $49.98 |

Lake/Reservoir Levels

Lake Mead's elevation was 1,083 feet at the end of July, 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 118 percent of average and the snowpack is negligible.

*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 | 3.87 | 4.16 | 126,310 | 140,345 | 96,983 | 105,818 | 70,588 | $1,010,520 | $617,540 | $2,030,037 |
| **Nov 18** | 3.80 | 3.00 | 121.90 | 114.40 | 3.83 | 4.15 | 53,631 | 59,591 | 109,895 | 64,731 | 81,577 | $3,039,932 | $2,873,052 | $2,144,120 |
| **Dec 18** | 11.70 | 14.60 | 100.60 | 98.60 | 3.79 | 4.10 | 88,802 | 98,669 | 123,353 | 93,787 | 68,757 | $2,472,344 | $2,196,068 | $2,910 |
| **Jan 19** | 28.20 | 29.90 | 97.10 | 98.10 | 3.77 | 4.23 | 114,996 | 127,774 | 121,795 | 122,360 | 38,467 | $1,612,912 | $1,255,128 | $696,522 |
| **Feb 19** | 39.40 | 35.90 | 95.50 | 92.10 | 3.70 | 4.01 | 108,334 | 120,372 | 111,291 | 112,571 | 10,758 | $802,648 | $465,584 | $273,355 |
| **Mar 19** | 44.90 | 52.30 | 158.60 | 149.70 | 3.84 | 4.03 | 110,289 | 122,544 | 128,512 | 107,241 | 32,285 | $1,092,308 | $749,168 | $1,034,349 |
| **Apr 19** | 43.40 | 47.10 | 246.70 | 344.50 | 3.88 | 4.21 | 159,352 | 177,058 | 144,007 | 178,116 | -4,280 | $477,344 | $0 | -$200,402 |
| **May 19** | 43.40 | 47.10 | 737.90 | 674.70 | 4.42 | 5.10 | 231,213 | 256,904 | 196,456 | 216,137 | 509 | $0 | $0 | $15,442 |
| **Jun 19** | 17.10 | 37.20 | 1,149.50 | 1,251.30 | 4.91 | 5.44 | 236,362 | 262,625 | 246,058 | 270,954 | 842 | $0 | $0 | $35,127 |
| **Jul 19** | 0.00 | 3.60 | 534.50 | 904.90 | 4.58 | 5.59 | 244,570 | 271,745 | 260,985 | 319,432 | 0 | $488,040 | $0 | $0 |
| **Aug 19** | | | | | | | | | | | | | | |
| **Sep 19** | | | | | | | | | | | | | | |
| **Total** | | | | | | | 1,473,859 | 1,637,627 | 1,539,334 | 1,591,147 | 299,503 | $10,996,048 | $8,156,540 | $6,031,461 |
| | | | | | | | Actual generation as a percentage of average: | | | 103.4% | | | Cost per MWh: | $20.14 |

Lake/Reservoir Content

Reservoir inflows are 169 percent of average for all of the Loveland Area Projects (LAP).

Weather and Other Conditions

The snowpack numbers are now at zero all has melted off. The latest National Weather Service forecast indicates September through November temperatures are more likely to be above normal and the precipitation is likely to be above normal in the LAP area. For LAP as a whole, September generation is expected to stay close to the marketed amount. Fall generation in the Colorado River Basin is forecasted to be average. Fall generation in the North Platte Basin will be slightly above average due to slight increase in July storage. September generation in the Big Horn Basin will be slightly above average.

*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 18** | 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 | 467,574 | 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 | 36,194 | $544,500 | $544,500 | $711,353 |
| **Aug 19** | | | | | | | | | | | | | | |
| **Sep 19** | | | | | | | | | | | | | | |
| **Total** | | | | | | | 2,165,000 | 2,141,000 | 2,669,000 | 2,645,760 | 414,658 | $5,003,420 | $5,003,420 | $7,529,223 |
| | | | | | | | Actual generation as a percentage of average: | | | 99.1% | | | Cost per MWh: | $18.16 |

Lake/Reservoir Content

As of July 31, reservoir storage for the water year was 133 percent of the 15-year average for Trinity, 131 percent for Shasta, 133 percent for Folsom and 143 percent for New Melones. Accumulated inflow for the same date was 133 percent of the 15-year average for Trinity, 137 percent for Shasta, 144 percent for Folsom and 154 percent for New Melones.

Weather and Other Conditions

June precipitation was 47 percent of its monthly average, but there was no measurable precipitation for July. 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 | * | $0 | $0 | * |
| **Aug 19** | | | | | | | | | | | | | | |
| **Sep 19** | | | | | | | | | | | | | | |
| **Total** | | | | | | | 11,402,617 | 11,344,613 | 7,929,972 | 10,191,507 | 754,492 | $9,620,024 | $11,432,556 | $21,266,354 |
| | | | | | | | Actual generation as a percentage of average: | | | 128.5% | | | Cost per MWh: | $28.19 |

Lake/Reservoir Content

As of August 12, the active conservation pools for the Canyon Ferry Dam is 96.3 percent full and Yellowtail Dam is 99.5 percent full.

Weather and Other Conditions

The July runoff was 213 percent of normal. The U.S. Drought Monitor shows a small northern area of the upper Basin is impacted by abnormally dry conditions, with a small portion in moderate to severe drought. The Midwest/High Plains had isolated areas of moderate rainfall but conditions remained essentially unchanged, with the exception of some additional areas of moderate drought in the North Central areas of the North Dakota region but not yet severe enough to constitute an “abnormally dry” classification for the entire area.

*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.*