

KANSAS-NEBRASKA BIG BLUE RIVER COMPACT REPORT
U.S. Geological Survey—Water Year 2020

The U.S. Geological Survey (USGS) continues to operate two streamflow gaging stations for the Compact Administration—Big Blue River at Barneston, NE (06882000), and Little Blue River at Hollenberg, KS (06884025). An electronic data logger (EDL) at each station automatically records streamflow stage every 15 minutes. Every hour, these instantaneous values are transmitted via satellite to USGS offices, where they are used to compute preliminary values of instantaneous and daily discharge that are immediately posted to the USGS National Water Information System (NWIS) website (addresses shown below). Before the data are finalized, updates and revisions are made as needed, based on a series of quality checks and reviews. Finalized values of daily discharge and daily gage height, along with associated summary statistics are published annually on a site-by-site basis on the NWIS web page (address shown below).

During water year (WY) 2020 (October 1, 2019 to September 30, 2020), periodic visits were made to the stations to maintain and calibrate the sensing and recording equipment, make discharge measurements, and download the data directly from the EDLs, as a backup to the satellite-telemetered data. The discharge measurements were used to determine shifts from the stage-discharge relations (rating curves) that were then used to convert stage values to corresponding values of discharge.

For each of the State delegations and the Compact chairman, copies of the WY 2020 published data (manuscript, discharge daily values, statistics tables, and daily discharge hydrograph) from the NWIS web page are attached for each station. These water-year summaries (PDF files) are available online within the NWIS site page for each of the streamgages, along with data for other streamgages for the Nation. Also attached are plots of the annual mean discharges for the periods of record, and plots of the daily discharges for WY 2020 compared to those for the median daily statistic for each day of the year.

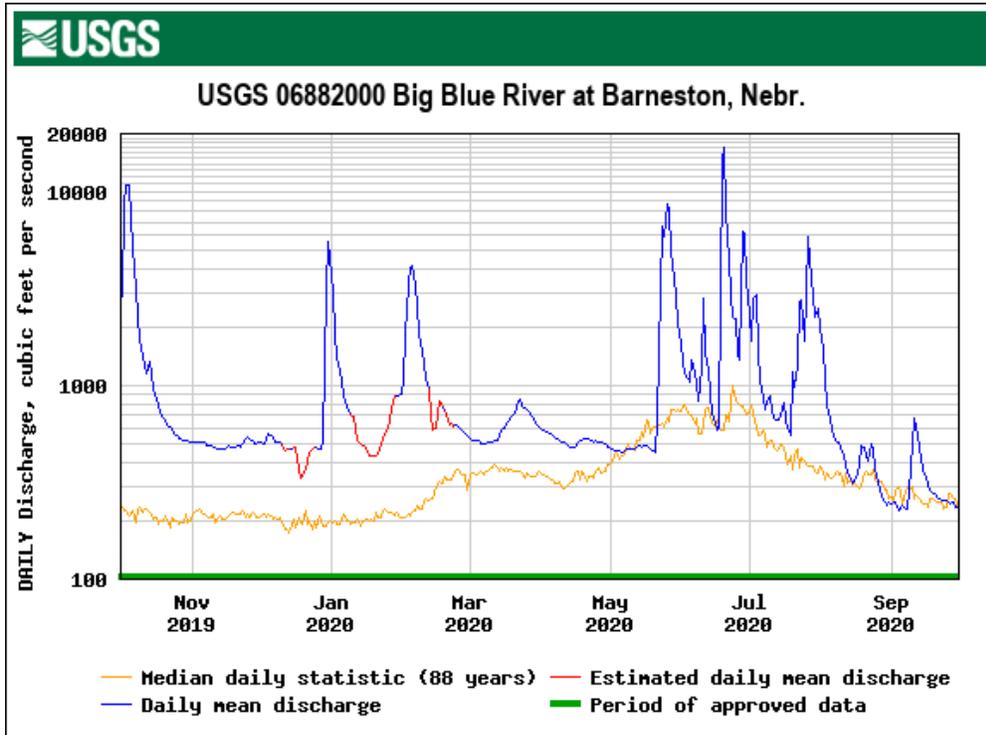
Current (real-time) and historical data on surface water, groundwater, and water quality for the Nation can be accessed and downloaded via the Water Resources of the United States website (<https://www2.usgs.gov/water/>) or from the Nebraska Water Science Center website (<https://www.usgs.gov/centers/ne-water>). All unit values of discharge data and all daily values of discharge can be accessed using the NWIS web, as well as all unit values and daily values of gage height since October 2007.

Jason Lambrecht
Deputy Director, Hydrologic Observations Chief

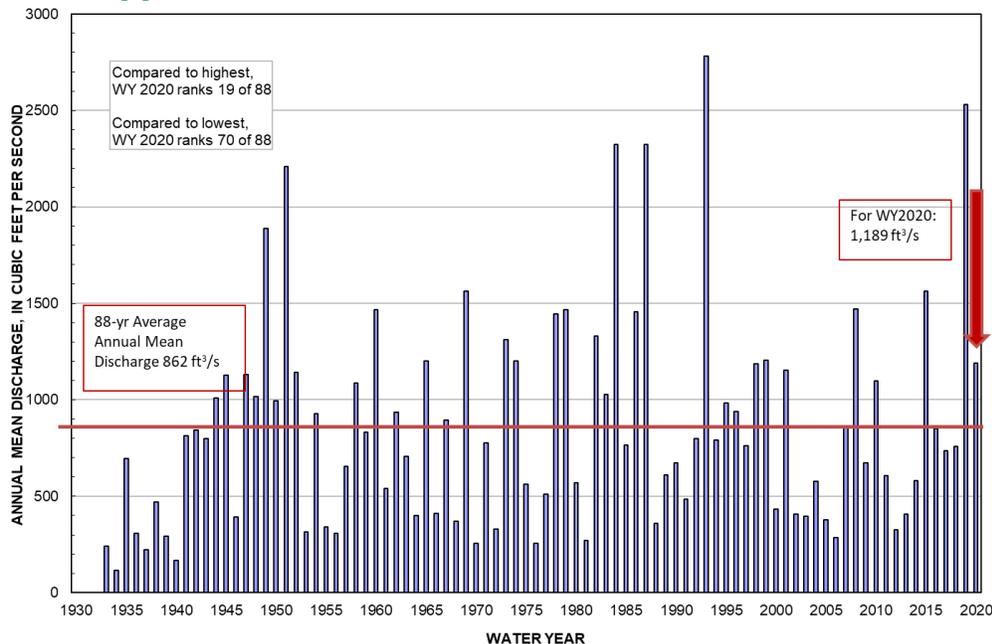
U.S. Geological Survey, Nebraska Water Science Center
5231 S. 19th St., Lincoln, NE 68512-1271
(jlambre@usgs.gov)
402-328-4124 (office), 402-416-2363 (mobile)

May 4, 2021

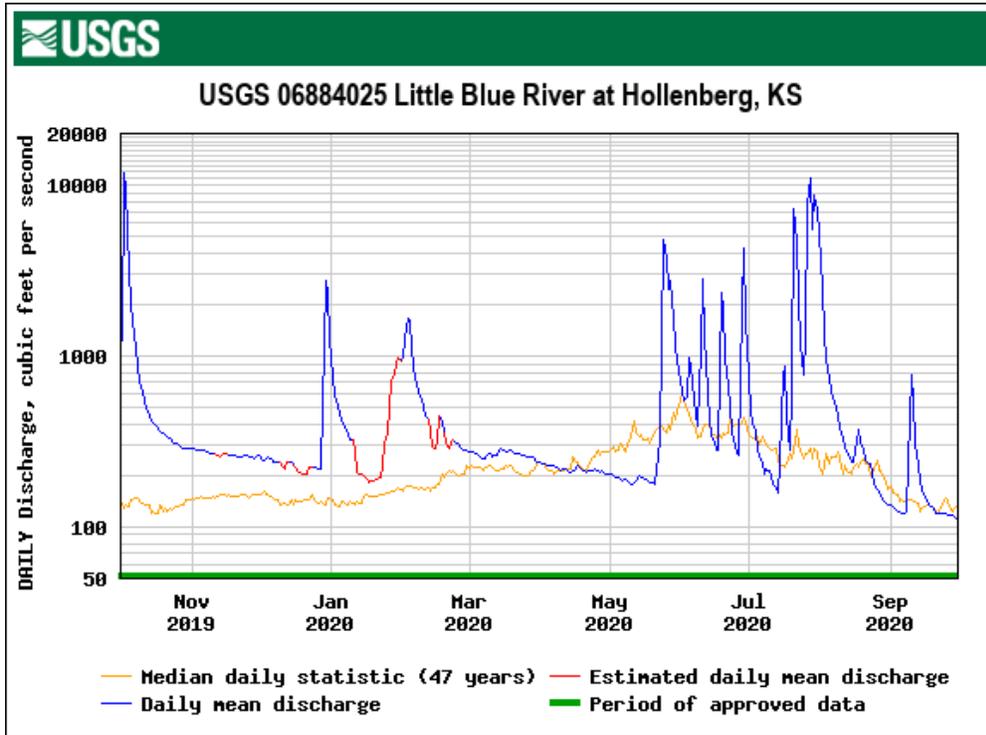
For station **06882000 Big Blue River at Barneston**, 12 discharge (and stage) measurements, ranging from 228 ft³/s (3.73 ft stage) to 17,200 ft³/s (20.10 ft stage), were made during WY 2020. The annual mean discharge of 1,189 ft³/s was 2.1 times less than that of the WY 2019 mean of 2,529 ft³/s; and 1.4 times higher than the new historical mean of 862 ft³/s for WYs 1933–2020 (88 years of record). The maximum and minimum daily discharges were 17,100 ft³/s on June 20, 2020 (peak of record daily was 50,000 ft³/s on June 9, 1941); and 227 ft³/s on September 4, 2020.



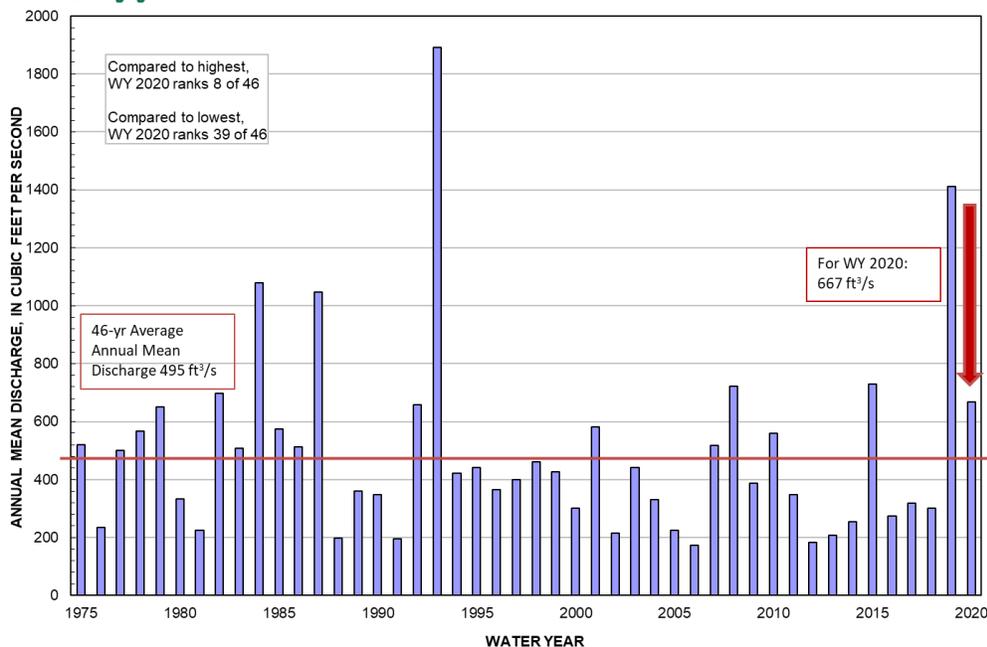
06882000 Big Blue River at Barneston, NE



For station **06884025 Little Blue River at Hollenberg**, 14 discharge (and stage) measurements, ranging from 127 ft³/s (2.16 ft stage) to 14,200 ft³/s (13.61 ft stage), were made during WY 2020. The annual mean discharge of 667.1 ft³/s was 2.1 times less than that of the WY 2019 mean of 1,411 ft³/s; and 1.3 times higher than the new historical mean of 495 ft³/s for WYs 1975–2020 (46 years of record). The maximum and minimum daily discharges were 11,800 ft³/s on October 2, 2019 (peak of record daily was 39,300 ft³/s on July 26, 1992); and 112 ft³/s on September 30, 2020.



06884025 Little Blue River at Hollenberg, KS





USGS Water-Year Summary 2020

06882000 Big Blue River at Barneston, Nebr.

LOCATION - Lat 40°02'41", long 96°35'14" referenced to North American Datum of 1983, in NE 1/4 NW 1/4 sec.24, T.1 N., R.7 E., Gage County, NE, Hydrologic Unit 10270202, on right bank just downstream of bridge on State Highway 8, 0.6 mi southwest of Barneston, 1.3 mi upstream from Plum Creek, and 4.3 mi upstream from Nebraska-Kansas State line.

DRAINAGE AREA - 4,447 mi² of which 77 mi² probably is noncontributing.

[REVISIONS HISTORY](#) - WSP 896: 1932, 1935. WSP 1919: Drainage area.

SURFACE-WATER RECORDS

PERIOD OF RECORD - May 1932 to current year.

GAGE - Water-stage recorder with satellite telemetry. Datum of gage is 1,162.20 ft above sea level. Prior to June 9, 1941, water-stage recorder at site 0.3 mi downstream at datum 1.56 ft higher. June 9 to Nov. 17, 1941, non-recording gage, and Nov. 18, 1941 to Sept. 30, 1979, water-stage recorder at site 0.7 mi upstream at datum 2.0 ft higher.

REMARKS - Accuracy of records for water years prior to 2014 are noted in the individual Annual Data Reports for those water years. For water years 2014 onward, records fair to good except for estimated daily discharges, which are poor, unless otherwise noted.

EXTREMES FOR PERIOD OF RECORD - Maximum peak flow, 57,700 ft³/s, June 9, 1941, gage height, 34.30 ft, at site datum then in use.

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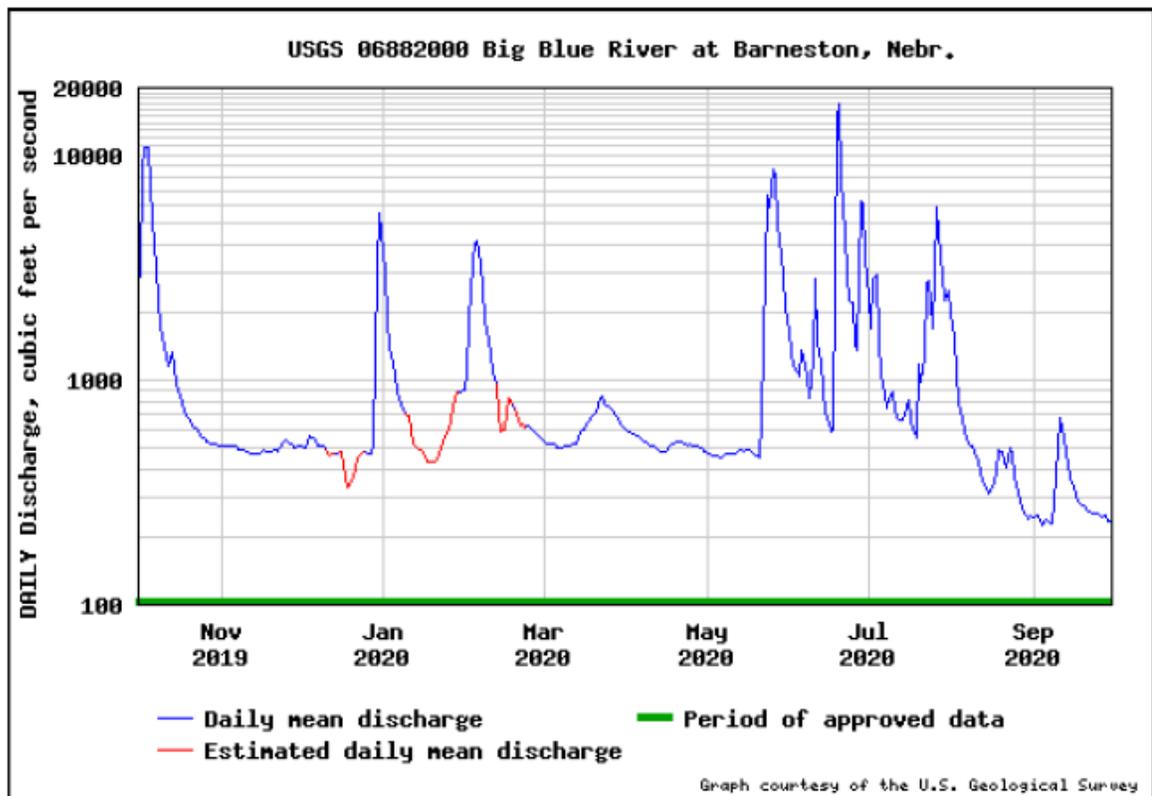
Suggested citation: U.S. Geological Survey, 2021, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [May 4, 2021], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&93783&adr_begin_date=2019-10-01&adr_end_date=2020-09-30&site_no=06882000&agency_cd=USGS

Water-Data Report 2020
06882000 Big Blue River at Barneston, Nebr. -- Continued

SUMMARY STATISTICS

| | Water Year 2020 | | Water Years 1933 - 2020 | |
|-------------------------------|-----------------|--------|-------------------------|--------------|
| Annual total | 435,000 | | | |
| Annual mean | 1,189 | | 861.9 | |
| Highest annual mean | | | 2,781 | 1993 |
| Lowest annual mean | | | 115.0 | 1934 |
| Highest daily mean | 17,100 | Jun 20 | 50,000 | Jun 09, 1941 |
| Lowest daily mean | 227.0 | Sep 04 | 1.00 | Nov 30, 1945 |
| Annual 7-day minimum | 236.7 | Sep 02 | 15.1 | Aug 03, 1934 |
| Maximum peak flow | 20,400 | Jun 19 | 57,700 | Jun 09, 1941 |
| Maximum peak stage | 22.97 | Jun 19 | 34.30 ^a | Jun 09, 1941 |
| Annual runoff (cfsm) | 0.267 | | 0.194 | |
| Annual runoff (inches) | 3.64 | | 2.63 | |
| 10 percent exceeds | 2,839 | | 1,770 | |
| 50 percent exceeds | 537.0 | | 287.0 | |
| 90 percent exceeds | 359.0 | | 110.0 | |

^a Gage height at different site and(or) datum





USGS Water-Year Summary 2020

06884025 Little Blue River at Hollenberg, KS

LOCATION - Lat 39°58'49", long 97°00'17" referenced to North American Datum of 1983, in NE 1/4 SW 1/4 sec.8, T.1 S., R.4 E., Washington County, KS, Hydrologic Unit 10270207, on right bank just downstream from bridge on county road, 0.6 mi west of Hollenberg, 1.8 mi downstream from Nebraska-Kansas State line, and at mile 43.1.

DRAINAGE AREA - 2,752 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD - March 1973 to February 1974 (discharge measurements only), March 1974 to current year.

GAGE - Water-stage recorder with satellite telemetry. Datum of gage is 1,216.10 ft above sea level.

REMARKS - Accuracy of records for water years prior to 2014 are noted in the individual Annual Data Reports for those water years. For water years 2014 onward, records good except for estimated daily discharges, which are poor, unless otherwise noted. Discharge measurements made prior to 1974 water year are published in table of miscellaneous sites in WDR NE-73.

EXTREMES OUTSIDE PERIOD OF RECORD - A gage height of 23.07 ft, present datum, from floodmark, discharge not determined, occurred October 12, 1973.

EXTREMES FOR PERIOD OF RECORD -

Maximum peak flow, 59,200 ft³/s, May 7, 2015, gage height, 22.97 ft, site and datum then in use.

U.S. Department of the Interior
U.S. Geological Survey

Suggested citation: U.S. Geological Survey, 2021, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [May 4, 2021], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=893795&adr_begin_date=2019-10-01&adr_end_date=2020-09-30&site_no=06884025&agency_cd=USGS

Water-Data Report 2020
06884025 Little Blue River at Hollenberg, KS -- Continued

**DISCHARGE, CUBIC FEET PER SECOND
YEAR 2019-10-01 to 2020-09-30
DAILY MEAN VALUES**

[e, Value has been estimated.]

| Day | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|
| | 2019 | 2019 | 2019 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 | 2020 |
| 1 | 1,220 | 285 | 250 | 755 | 979 | 278 | 239 | 203 | 729 | 764 | 5,200 | 134 |
| 2 | 11,800 | 285 | 246 | 595 | 1,260 | 276 | 232 | 202 | 615 | 472 | 2,540 | 132 |
| 3 | 9,380 | 283 | 253 | 547 | 1,660 | 275 | 233 | 197 | 543 | 404 | 1,330 | 127 |
| 4 | 3,170 | 281 | 255 | 459 | 1,570 | 270 | 229 | 196 | 569 | 360 | 948 | 123 |
| 5 | 2,060 | 281 | 249 | 418 | 1,090 | 262 | 228 | 196 | 974 | 283 | 748 | 122 |
| 6 | 1,590 | 281 | 242 | 394 | 722 | 254 | 226 | 188 | 877 | 257 | 617 | 121 |
| 7 | 1,100 | 277 | 240 | 367 | 703 | 250 | 226 | 185 | 565 | 233 | 569 | 121 |
| 8 | 868 | 272 | 239 | 338 | 609 | 249 | 224 | 189 | 443 | 205 | 497 | 124 |
| 9 | 711 | 271 | 237 | 324 | 546 | 263 | 218 | 185 | 391 | 219 | 439 | 232 |
| 10 | 615 | 270 | e229 | 321 | 495 | 266 | 215 | 181 | 1,060 | 211 | 383 | 770 |
| 11 | 542 | 266 | e220 | e276 | 446 | 257 | 216 | 178 | 2,800 | 195 | 327 | 549 |
| 12 | 486 | e260 | e238 | e208 | 422 | 264 | 216 | 183 | 1,290 | 179 | 295 | 299 |
| 13 | 443 | e259 | 242 | e206 | e357 | 261 | 213 | 185 | 619 | 168 | 276 | 228 |
| 14 | 417 | e262 | 237 | e203 | e296 | 277 | 210 | 199 | 420 | 158 | 259 | 185 |
| 15 | 403 | e271 | 229 | e201 | e285 | 286 | 212 | 195 | 350 | 234 | 242 | 163 |
| 16 | 389 | 269 | e222 | e192 | e317 | 282 | 213 | 193 | 311 | 784 | 238 | 150 |
| 17 | 375 | 264 | e210 | e181 | 450 | 277 | 231 | 189 | 282 | 870 | 319 | 142 |
| 18 | 360 | 262 | e207 | e185 | 408 | 275 | 225 | 185 | 284 | 433 | 375 | 136 |
| 19 | 355 | 263 | e205 | e186 | 357 | 284 | 218 | 182 | 2,360 | 282 | 305 | 130 |
| 20 | 344 | 260 | e205 | e188 | e312 | 277 | 214 | 180 | 1,900 | 625 | 284 | 128 |
| 21 | 338 | 259 | e206 | e191 | e289 | 270 | 210 | 177 | 947 | 7,210 | 247 | 119 |
| 22 | 327 | 257 | e223 | e195 | e311 | 269 | 211 | 211 | 655 | 4,660 | 242 | 121 |
| 23 | 318 | 259 | 223 | e228 | 320 | 270 | 214 | 324 | 501 | 2,150 | 235 | 121 |
| 24 | 309 | 262 | 223 | e306 | 310 | 262 | 213 | 1,210 | 364 | 1,180 | 203 | 119 |
| 25 | 305 | 261 | 221 | e356 | 305 | 262 | 219 | 4,850 | 297 | 779 | 179 | 119 |
| 26 | 299 | 255 | 218 | e497 | 295 | 256 | 213 | 3,720 | 266 | 1,310 | 165 | 118 |
| 27 | 293 | 256 | 217 | e713 | 284 | 256 | 209 | 2,460 | 265 | 7,580 | 157 | 117 |
| 28 | 289 | 252 | 497 | e797 | 284 | 257 | 211 | 2,740 | 1,930 | 11,000 | 150 | 117 |
| 29 | 290 | 258 | 2,770 | e883 | 279 | 256 | 206 | 1,660 | 4,320 | 5,530 | 141 | 114 |
| 30 | 288 | 261 | 2,310 | e967 | | 247 | 204 | 1,150 | 1,570 | 8,710 | 138 | 112 |
| 31 | 287 | | 1,260 | 928 | | 241 | | 924 | | 7,180 | 136 | |
| Total | 39,970 | 8,002 | 13,020 | 12,600 | 15,960 | 8,229 | 6,548 | 23,220 | 28,499 | 64,620 | 18,180 | 5,293 |
| Mean | 1,288 | 267 | 420 | 407 | 550 | 265 | 218 | 749 | 950 | 2,085 | 587 | 176 |
| Max | 11800 | 285 | 2770 | 967 | 1660 | 286 | 239 | 4850 | 4320 | 11000 | 5200 | 770 |
| Min | 287 | 252 | 205 | 181 | 279 | 241 | 204 | 177 | 265 | 158 | 136 | 112 |
| Ac-ft | 79,280 | 15,870 | 25,829 | 25,000 | 31,660 | 16,320 | 12,989 | 46,050 | 56,520 | 128,200 | 36,070 | 10,500 |

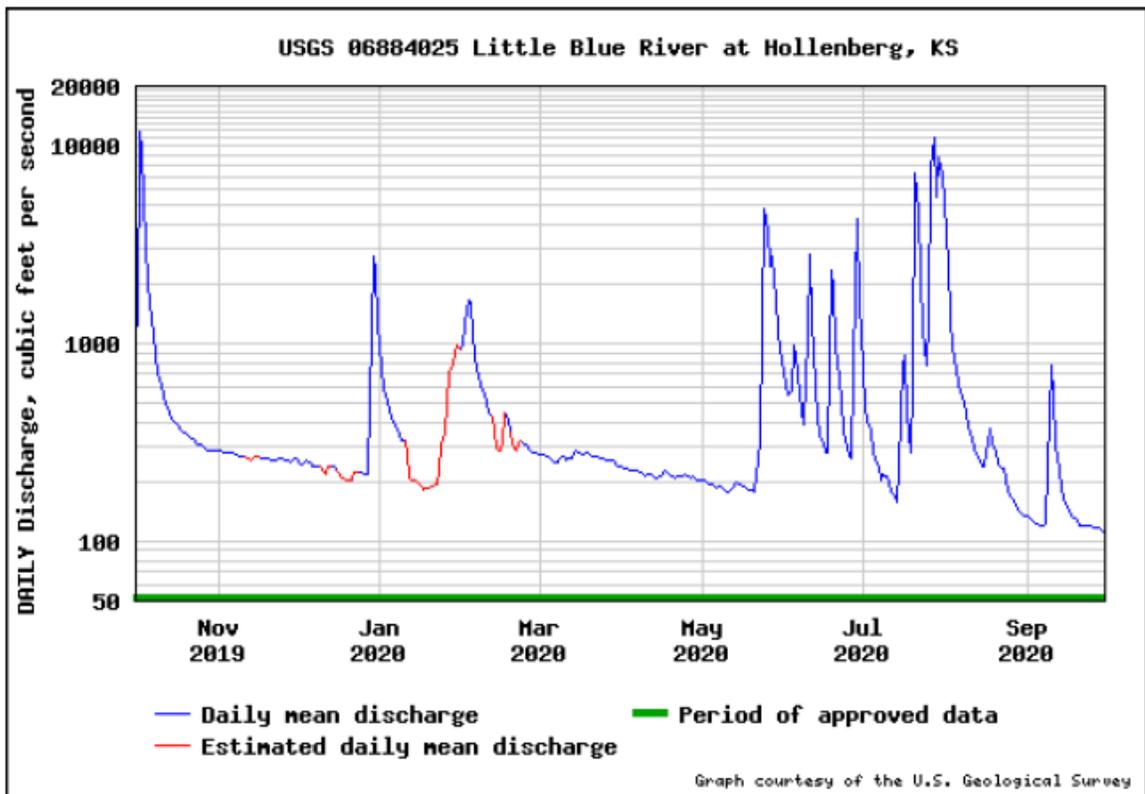
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 2020, BY WATER YEAR (WY)

| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Mean | 350 | 212 | 205 | 185 | 291 | 648 | 446 | 857 | 981 | 829 | 489 | 371 |
| Max | 2,163 | 1,113 | 1,646 | 577 | 1,059 | 3,816 | 2,379 | 2,638 | 4,654 | 9,014 | 2,572 | 1,696 |
| (WY) | (1987) | (1997) | (2019) | (1984) | (1993) | (1993) | (1987) | (2015) | (2015) | (1993) | (1985) | (2018) |
| Min | 45.3 | 81.1 | 87.2 | 74.0 | 89.1 | 118 | 117 | 103 | 151 | 68.1 | 51.5 | 32.0 |
| (WY) | (1992) | (1992) | (2013) | (2018) | (2018) | (1981) | (2018) | (2018) | (1981) | (2013) | (2012) | (1991) |

Water-Data Report 2020
06884025 Little Blue River at Hollenberg, KS -- Continued

SUMMARY STATISTICS

| | Water Year 2020 | | Water Years 1974 - 2020 | |
|-------------------------------|------------------------|--------|--------------------------------|--------------|
| Annual total | 244,200 | | | |
| Annual mean | 667.1 | | 494.8 | |
| Highest annual mean | | | 1,891 | 1993 |
| Lowest annual mean | | | 172.9 | 2006 |
| Highest daily mean | 11,800 | Oct 02 | 39,300 | Jul 26, 1992 |
| Lowest daily mean | 112.0 | Sep 30 | 24.2 | Sep 12, 2012 |
| Annual 7-day minimum | 116.6 | Sep 24 | 26.0 | Sep 06, 2012 |
| Maximum peak flow | 17,500 | Oct 03 | 59,200 | May 07, 2015 |
| Maximum peak stage | 15.03 | Oct 03 | 23.07 | Oct 12, 1973 |
| Annual runoff (cfs) | 0.242 | | 0.179 | |
| Annual runoff (inches) | 3.30 | | 2.43 | |
| 10 percent exceeds | 1,213 | | 823.4 | |
| 50 percent exceeds | 270.0 | | 191.0 | |
| 90 percent exceeds | 179.7 | | 96.6 | |



Water Year 2020 Discharge Measurements

| Site # | Meas. # | Meas. Date & Time | Meas. Used | Meas. Party | Meas. Agency | Gage Height | Discharge | Meas. Rating |
|----------|---------|-------------------|------------|-------------|--------------|-------------|-----------|--------------|
| 06882000 | 1482 | 10/2/2019 12:05 | Yes | BHI/JTC | USGS | 7430 | 13.44 | Fair |
| 06882000 | 1483 | 11/18/2019 10:10 | Yes | BHI | USGS | 504 | 4.44 | Fair |
| 06882000 | 1484 | 12/18/2019 13:03 | Yes | BHI | USGS | 319 | 4.07 | Fair |
| 06882000 | 1485 | 2/6/2020 9:55 | Yes | KEK | USGS | 3320 | 8.66 | Fair |
| 06882000 | 1486 | 3/3/2020 13:39 | Yes | BHI | USGS | 539 | 4.53 | Fair |
| 06882000 | 1487 | 4/20/2020 12:58 | Yes | KEK | USGS | 532 | 4.46 | Fair |
| 06882000 | 1488 | 5/27/2020 8:54 | Yes | NDS | USGS | 8710 | 14.34 | Fair |
| 06882000 | 1489 | 6/19/2020 11:10 | Yes | LWN/MJA | USGS | 17000 | 20.10 | Fair |
| 06882000 | 1490 | 7/27/2020 10:02 | Yes | BHI | USGS | 7320 | 14.01 | Fair |
| 06882000 | 1491 | 7/28/2020 11:25 | Yes | BHI | USGS | 3660 | 9.16 | Fair |
| 06882000 | 1492 | 8/31/2020 8:51 | Yes | BHI | USGS | 241 | 3.77 | Fair |
| 06882000 | 1493 | 10/15/2020 11:02 | Yes | BHI | USGS | 228 | 3.73 | Fair |
| | | | | | | | | |
| 06884025 | 597 | 10/2/2019 13:49 | Yes | BHI/JTC | USGS | 12600 | 12.96 | Fair |
| 06884025 | 598 | 11/18/2019 12:20 | Yes | BHI | USGS | 256 | 2.57 | Fair |
| 06884025 | 599 | 12/18/2019 11:03 | Yes | BHI | USGS | 207 | 2.44 | Poor |
| 06884025 | 600 | 2/6/2020 11:36 | Yes | KEK | USGS | 706 | 3.37 | Fair |
| 06884025 | 601 | 3/3/2020 11:43 | Yes | BHI | USGS | 271 | 2.55 | Fair |
| 06884025 | 602 | 4/21/2020 10:57 | Yes | KEK | USGS | 206 | 2.44 | Fair |
| 06884025 | 603 | 5/27/2020 10:24 | Yes | NDS | USGS | 2510 | 5.75 | Fair |
| 06884025 | 604 | 6/11/2020 12:10 | Yes | KEK | USGS | 2930 | 6.32 | Fair |
| 06884025 | 605 | 6/24/2020 12:10 | Yes | BHI/KEK | USGS | 377 | 2.83 | Fair |
| 06884025 | 606 | 7/21/2020 16:30 | Yes | BHI | USGS | 9100 | 11.12 | Fair |
| 06884025 | 607 | 7/28/2020 9:23 | Yes | BHI | USGS | 14200 | 13.61 | Fair |
| 06884025 | 608 | 8/31/2020 10:51 | Yes | BHI | USGS | 131 | 2.21 | Fair |
| 06884025 | 609 | 9/23/2020 13:01 | Yes | BHI | USGS | 127 | 2.16 | Fair |