# Streamflow—Water Year 2022

## Introduction

The maps and graphs in this summary describe national streamflow conditions for water year 2022 in the context of streamflow ranks relative to the 93-year period of water years 1930–2022, unless otherwise noted. A water year is defined as the period from October 1 to September 30 and designated by the year in which it ends; for example, water year 2022 was from October 1, 2021, to September 30, 2022. The figures are based on observed data (U.S. Geological Survey, 2023a) from the U.S. Geological Survey (USGS) National Streamgage Network (U.S. Geological Survey, 2023b). The water years 1930–2022 were evaluated because the number of streamgages in the network before 1930 did not provide enough statistically significant data to compute meaningful statistics in most regions of the country.

In this summary, reference is made to the term "runoff," which is defined as the amount of water flowing through a stream divided by the drainage area of the stream. Runoff represents an equivalent depth of water over the basin. Normalizing the flow by dividing by drainage area results in quantities that can be compared from one area to another. In this summary, runoff for a specified period and geographic area is computed from all streamgages with complete streamflow records in the geographic area. In the figures, a rank of 1 indicates the maximum annual flow of all years analyzed, and a rank of 93 indicates the minimum annual flow of all years analyzed. Rankings of streamflow are grouped into categories of much below normal, below normal, normal, above normal, and much above normal based on percentiles of flow (less than 10 percent, 10–24 percent, 25–75 percent, 76–90 percent, and greater than 90 percent, respectively; U.S. Geological Survey, 2023c). Streamflow conditions for States or water-resources regions are presented in the text in order of ranking from maximum to minimum flow; a maximum or minimum flow rank is not shown when there are ties in the rankings.



U.S. Geological Survey employee surveys streamgage datum for the Snake River near Alpine, Wyoming. Photograph by Cheryl Eddy-Miller, U.S. Geological Survey.
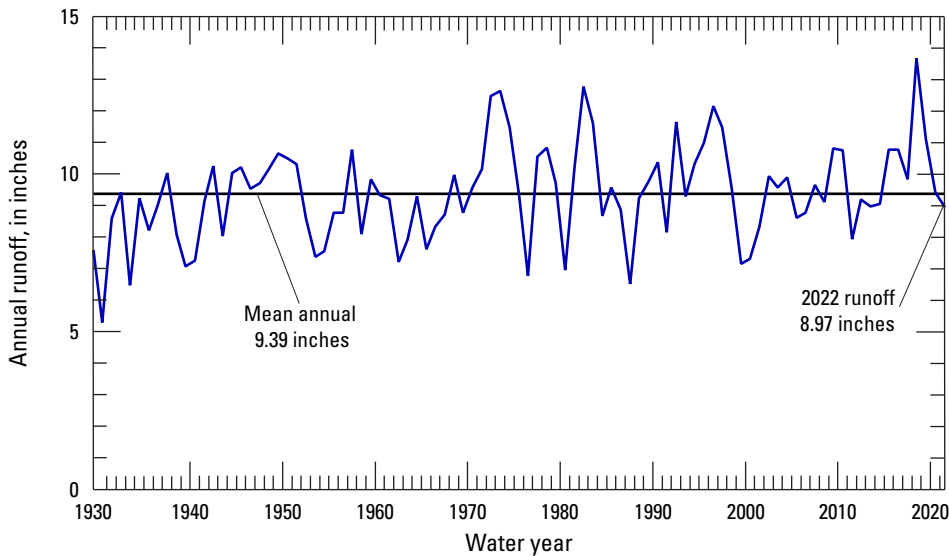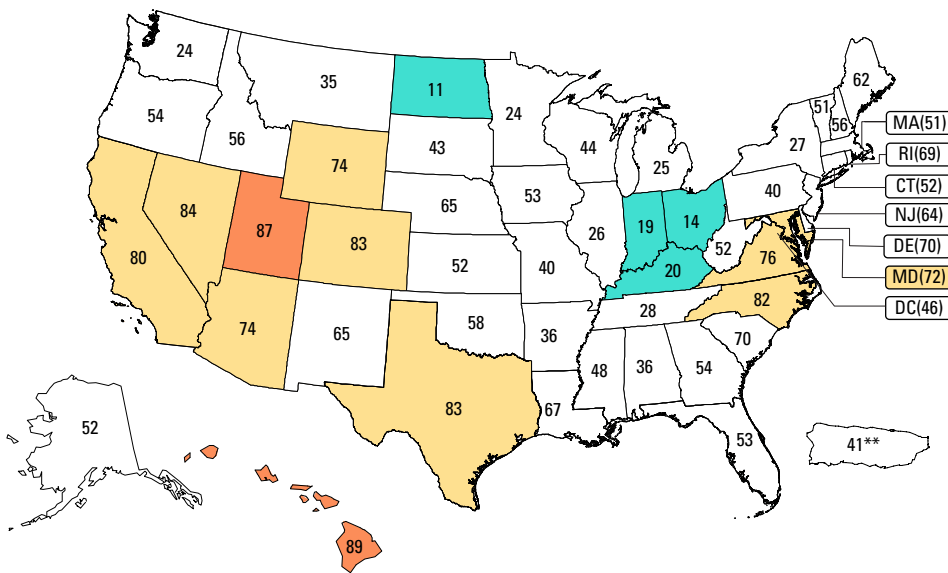
**Figure 1.** Annual runoff in the contiguous United States, water years 1930–2022.



**EXPLANATION**

[Some colors in the explanation may not be used on the map;
**, for Puerto Rico and the Virgin Islands, 79 years of available
data were used and the rank was adjusted accordingly]

**Rank**

| 93 | 85–92 | 71–84 | 24–70 | 10–23 | 2–9 | 1 |
|---|---|---|---|---|---|---|
| Lowest (driest) | Much below normal | Below normal | Normal | Above normal | Much above normal | Highest (wettest) |

**Figure 2.** Statewide streamflow ranks of the United States for water year 2022 compared to annual streamflows for water years 1930–2022.

# National Overview

Annual runoff in the Nation's rivers and streams during water year 2022 (8.97 inches) was slightly lower than the long-term (1930–2022) mean annual runoff of 9.39 inches for the contiguous United States (fig. 1). Nationwide, the 2022 annual mean streamflow ranked the 60th highest out of the 93 years.

Annual mean streamflow also was ranked by State, which in this summary includes the District of Columbia, and Puerto Rico combined with the Virgin Islands. Streamflow was much below normal in Hawaii and Utah (fig. 2). Streamflow was below normal in Arizona, California, Colorado, Maryland, Nevada, North Carolina, Texas, Virginia, and Wyoming. Streamflow was above normal in Indiana, Kentucky, North Dakota, and Ohio.

# Regional Patterns

The United States, the District of Columbia, and Puerto Rico combined with the Virgin Islands lie in 21 large drainages, or water-resources regions (fig. 3). These water-resources regions are based on surface topography and contain the drainage area of a major river; the combined drainage areas of a series of rivers, such as the Texas-Gulf region, which includes several rivers draining into the Gulf of Mexico; or the area of an island or island group. Water-resources regions provide a coherent, watershed-based framework for depicting streamflow variations.

Annual streamflow was ranked much below normal in the Hawaii and Great Basin regions (fig. 4). Annual streamflow was ranked below normal in the Upper Colorado, Texas-Gulf, and California regions. Annual streamflow was ranked above normal in the Ohio region. Annual streamflow was ranked much above normal in the Souris-Red-Rainy region.
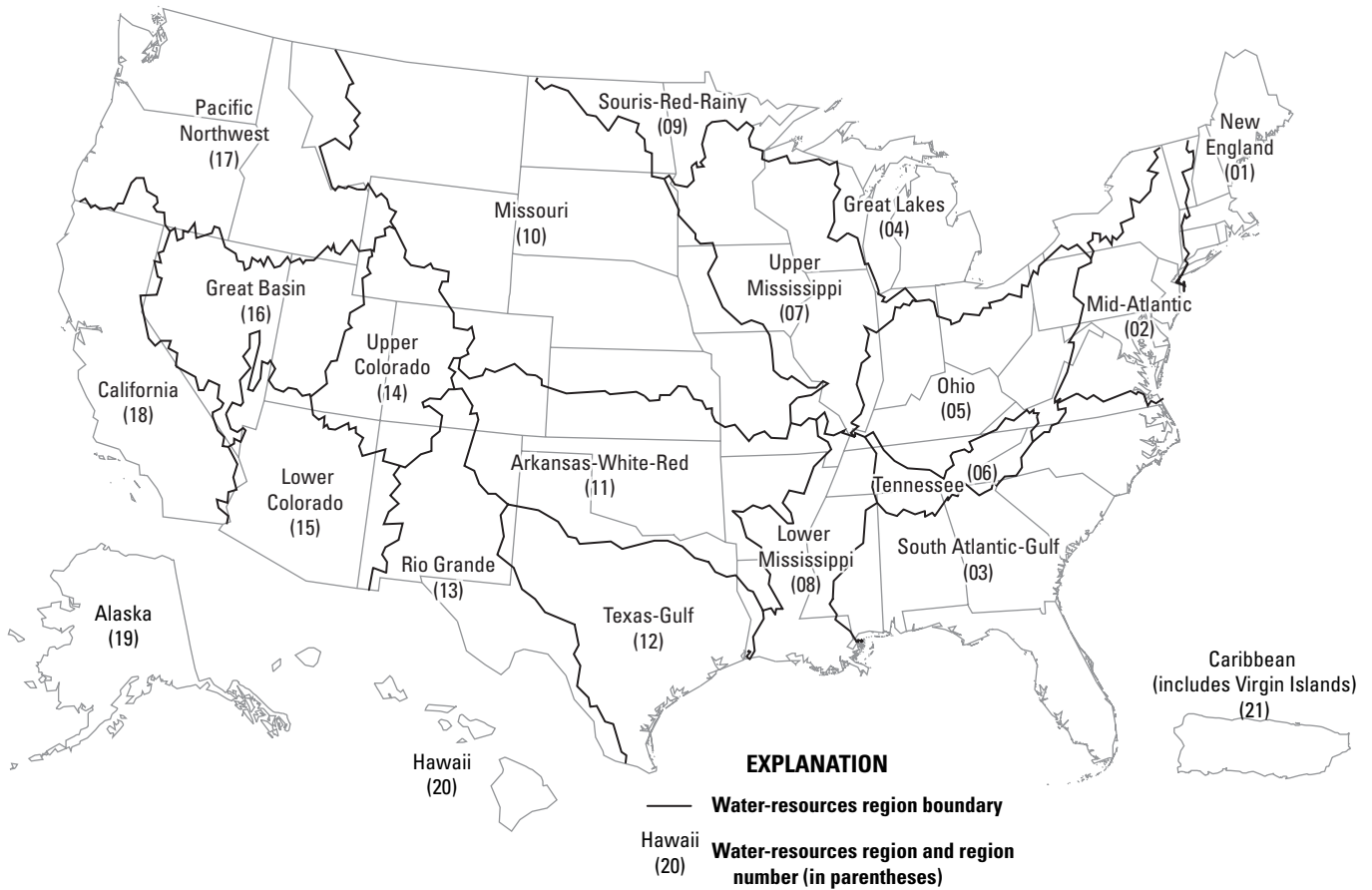
**Figure 3.** Water-resources regions of the United States.



**EXPLANATION**

[Some colors in the explanation may not be used on the map; **, for Puerto Rico and the Virgin Islands, 79 years of available data were used and the rank was adjusted accordingly]

**Rank**

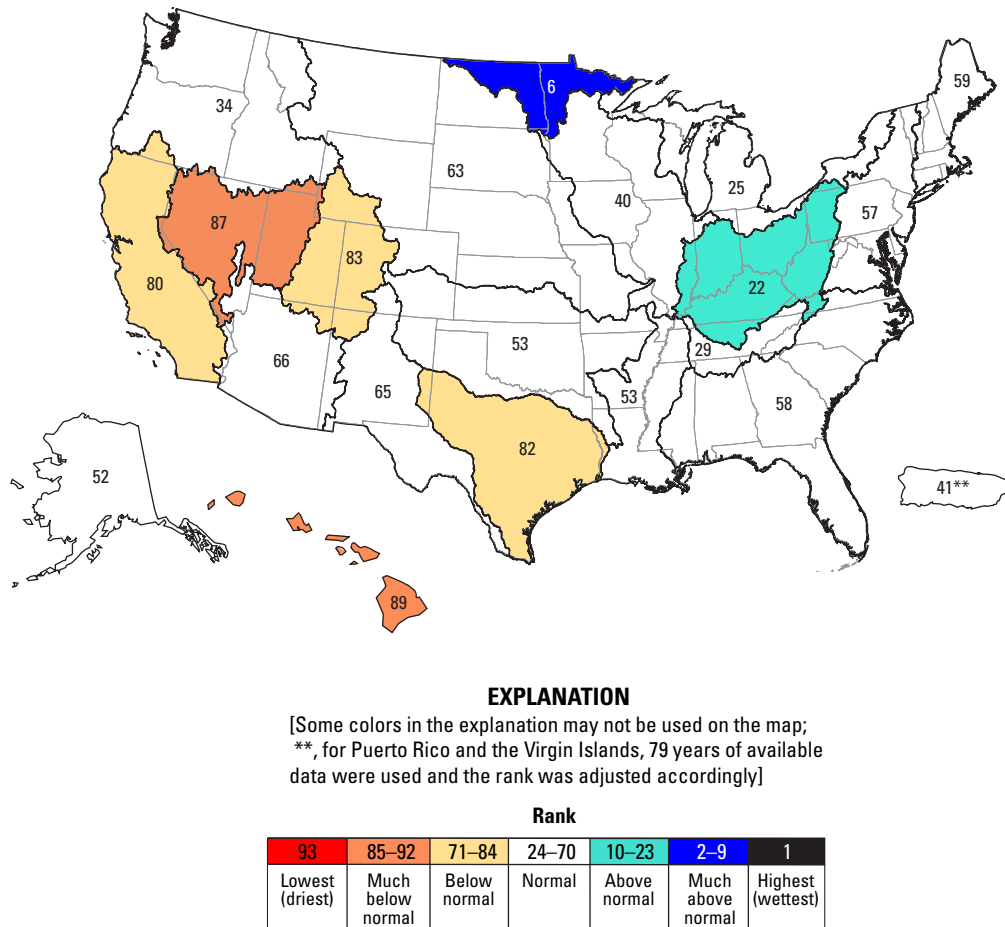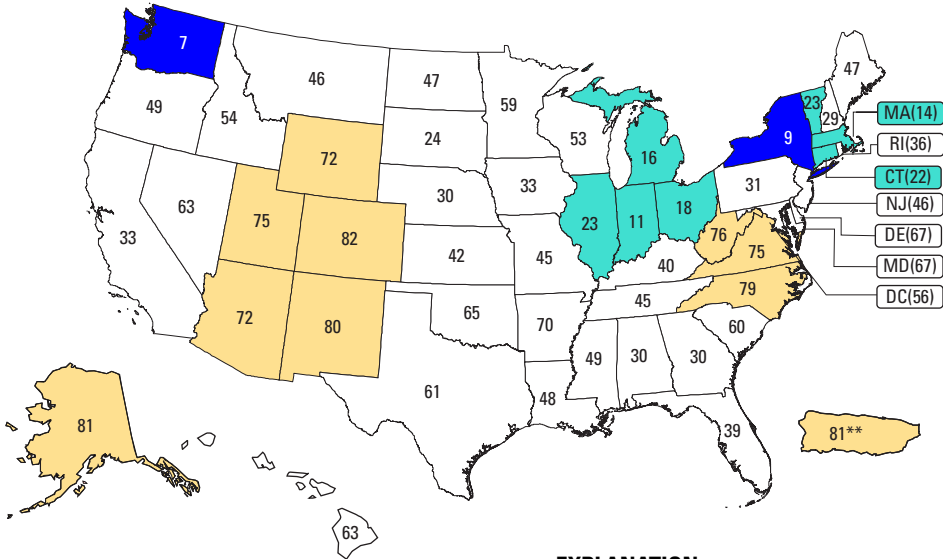| 93 | 85–92 | 71–84 | 24–70 | 10–23 | 2–9 | 1 |
|---|---|---|---|---|---|---|
| Lowest (driest) | Much below normal | Below normal | Normal | Above normal | Much above normal | Highest (wettest) |

**Figure 4.** Regional streamflow ranks in the United States for water year 2022 compared to annual streamflows for water years 1930–2022.

# Seasonal Characteristics

Autumn (October–December 2021) streamflow was ranked below normal in Alaska, Arizona, Colorado, New Mexico, North Carolina, Puerto Rico and the Virgin Islands, Utah, Virginia, West Virginia, and Wyoming (fig. 5). Streamflow was ranked above normal in Connecticut, Illinois, Indiana, Massachusetts, Michigan, Ohio, and Vermont. Streamflow was ranked much above normal in New York and Washington. Nationwide, autumn-season streamflow ranked the 42d highest out of 93 years.
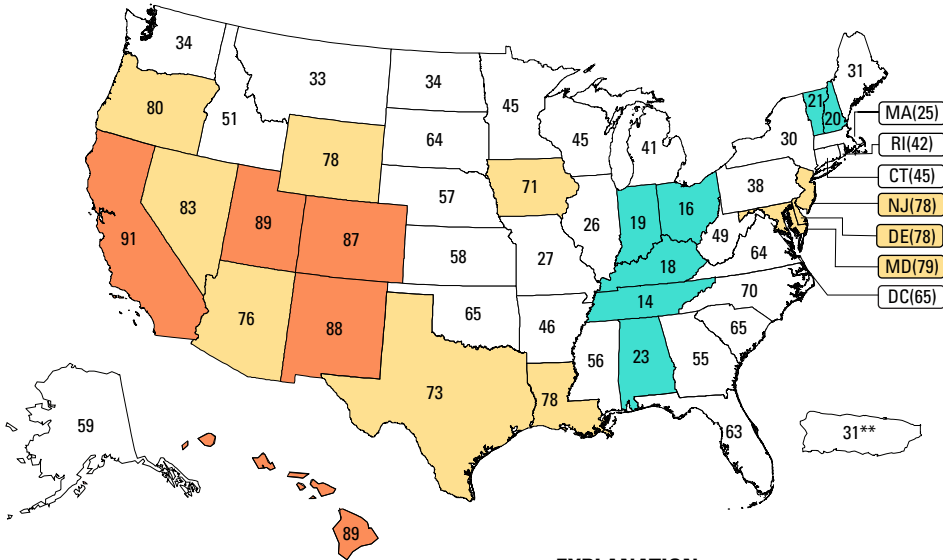
**EXPLANATION**

[Some colors in the explanation may not be used on the map; **, for Puerto Rico and the Virgin Islands, 79 years of available data were used and the rank was adjusted accordingly]

**Rank**

| 93 | 85–92 | 71–84 | 24–70 | 10–23 | 2–9 | 1 |
|----|-------|-------|-------|-------|-----|---|
| Lowest (driest) | Much below normal | Below normal | Normal | Above normal | Much above normal | Highest (wettest) |

**Figure 5.** Autumn (October–December 2021) statewide streamflow ranks in the United States compared to autumn streamflows for water years 1930–2022.

Winter (January–March 2022) streamflow was ranked much below normal in California, Colorado, Hawaii, New Mexico, and Utah (fig. 6). Streamflow was ranked below normal in Arizona, Delaware, Iowa, Louisiana, Maryland, Nevada, New Jersey, Oregon, Texas, and Wyoming. Streamflow was ranked above normal in Alabama, Indiana, Kentucky, New Hampshire, Ohio, Tennessee, and Vermont. Nationwide, winter-season streamflow ranked the 57th highest out of 93 years.
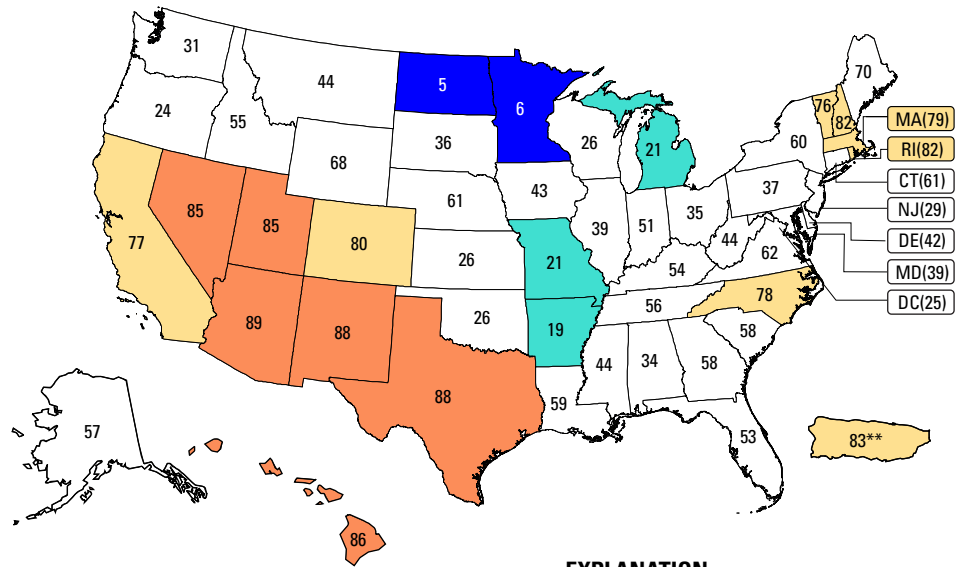
**EXPLANATION**

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**Rank**

| 93 | 85–92 | 71–84 | 24–70 | 10–23 | 2–9 | 1 |
|----|-------|-------|-------|-------|-----|---|
| Lowest (driest) | Much below normal | Below normal | Normal | Above normal | Much above normal | Highest (wettest) |

**Figure 6.** Winter (January–March 2022) statewide streamflow ranks in the United States compared to winter streamflows for water years 1930–2022.

Spring (April–June 2022) stream-flow was ranked much below normal in Arizona, Hawaii, Nevada, New Mexico, Texas, and Utah (fig. 7). Streamflow was ranked below normal in California, Colorado, Massachusetts, New Hampshire, North Carolina, Puerto Rico and the Virgin Islands, Rhode Island, and Vermont. Streamflow was ranked above normal in Arkansas, Michigan, and Missouri. Streamflow was ranked much above normal in Minnesota and North Dakota. Nationwide, spring-season streamflow ranked the 53d highest out of 93 years.
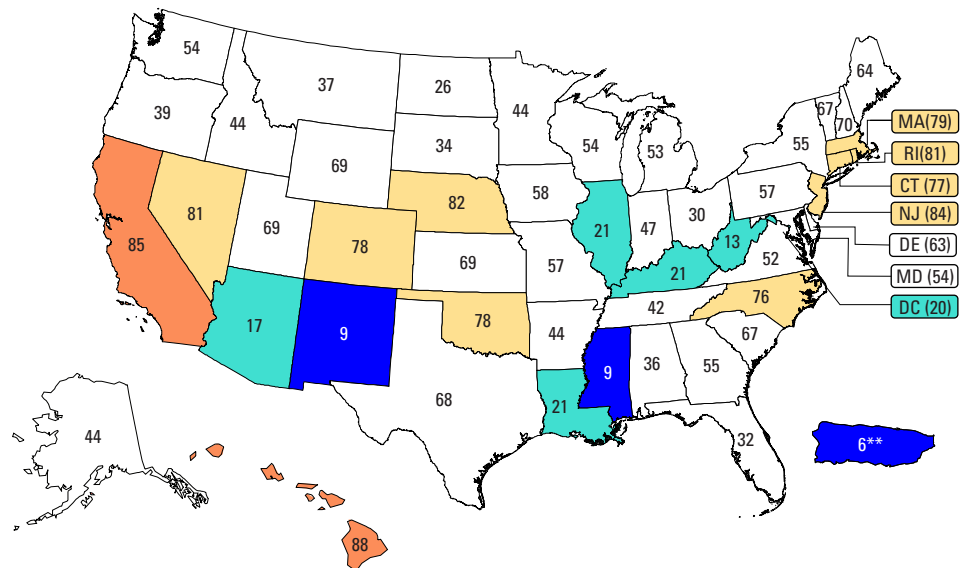


**EXPLANATION**

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**Rank**

| 93 | 85–92 | 71–84 | 24–70 | 10–23 | 2–9 | 1 |
|---|---|---|---|---|---|---|
| Lowest (driest) | Much below normal | Below normal | Normal | Above normal | Much above normal | Highest (wettest) |

**Figure 7.** Spring (April–June 2022) statewide streamflow ranks in the United States compared to spring streamflows for water years 1930–2022.

Summer (July–September 2022) streamflow was ranked much below normal in California and Hawaii (fig. 8). Streamflow was ranked below normal in Colorado, Connecticut, Massachusetts, Nebraska, Nevada, New Jersey, North Carolina, Oklahoma, and Rhode Island. Streamflow was ranked above normal in Arizona, District of Columbia, Illinois, Kentucky, Louisiana, and West Virginia. Streamflow was ranked much above normal in New Mexico, Mississippi, and Puerto Rico and the Virgin Islands. Nationwide, summer-season streamflow ranked the 67th highest out of 93 years.



**EXPLANATION**

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**Rank**

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|---|---|---|---|---|---|---|
| Lowest (driest) | Much below normal | Below normal | Normal | Above normal | Much above normal | Highest (wettest) |

**Figure 8.** Summer (July–September 2022) statewide streamflow ranks in the United States compared to summer streamflows for water years 1930–2022.

## High and Low Streamflows

Assuming individual streamgage data are independent of other streamgage data and are normally distributed, the monthly streamflow is expected to be high (greater than the 95th percentile) at 5 percent of the streamgages and is expected to be low (less than the 5th percentile) at 5 percent of the streamgages during any given month. The percentages of streamgages reporting high streamflow only in 1 month of water year 2022 (October 2021) were greater than or equal to the expected percentages (7 percent; fig. 9). In contrast, there were five months (February, March, April, May, and August 2022) with a greater-than-or-equal-to expected percentage of streamgages reporting low streamflow (6, 6, 5, 5, and 5 percent, respectively).
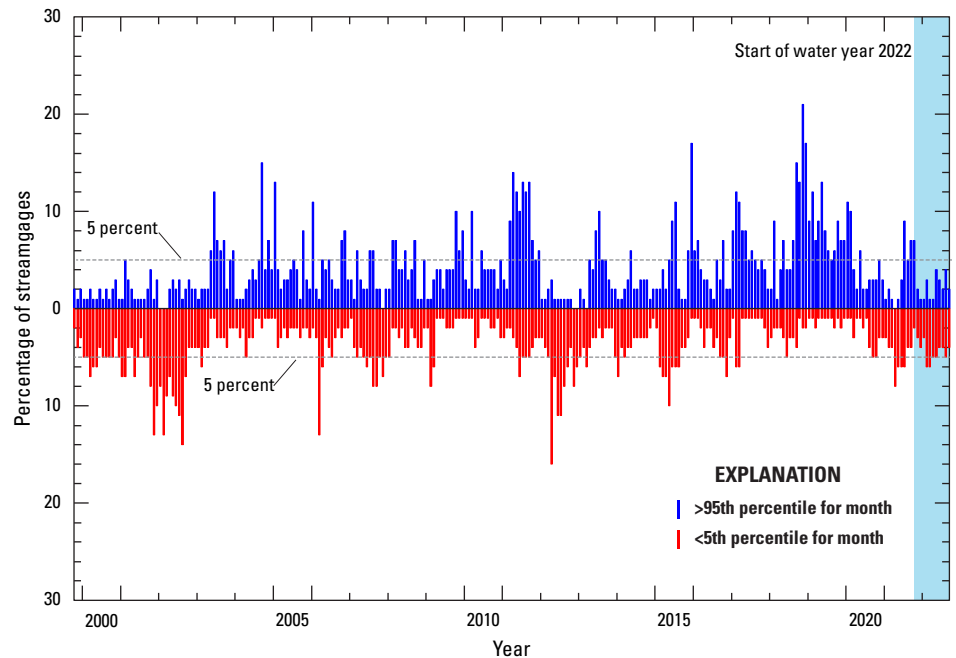
**Figure 9.** Percentage of streamgages with high and low monthly streamflow, October 1999– September 2022.

## Additional Information

The USGS operated a nationwide network of more than 8,400 year-round, real-time streamgages in water year 2022. The real-time data from these streamgages are available at https://waterwatch.usgs.gov. The streamflow information used to prepare this summary also is used for water management, flood and drought monitoring, bridge design, and recreational activities. To obtain real-time and archived streamflow data and information, visit the USGS National Water Information System database at https://doi.org/10.5066/F7P55KJN (U.S. Geological Survey, 2023a). The National Streamflow Network, which is part of the Groundwater and Streamflow Information Program, is operated primarily by the USGS; however, funding to operate the network is provided by the USGS and about 1,885 Federal, State, Tribal, regional, and local partners. Additional streamflow information can be accessed at https://www.usgs.gov/water-resources/groundwater-and-streamflow-information/streamflow-monitoring?qt-science_support_page_related_con=0#qt-science_support_page_related_con.

## References Cited

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U.S. Geological Survey, 2023c, Map of real-time streamflow compared to historical streamflow for the day of the year (United States): U.S. Geological Survey web page, accessed April 2023 at https://waterwatch.usgs.gov/?id=ww_current.

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Lees Ferry streamgage and cableway downstream on the Colorado River, Arizona. Photograph by U.S. Geological Survey.