

Greater Yellowstone Network RESOURCE BRIEF

National Park Service
U.S. Department of the Interior

Intermountain Region
Inventory & Monitoring Program

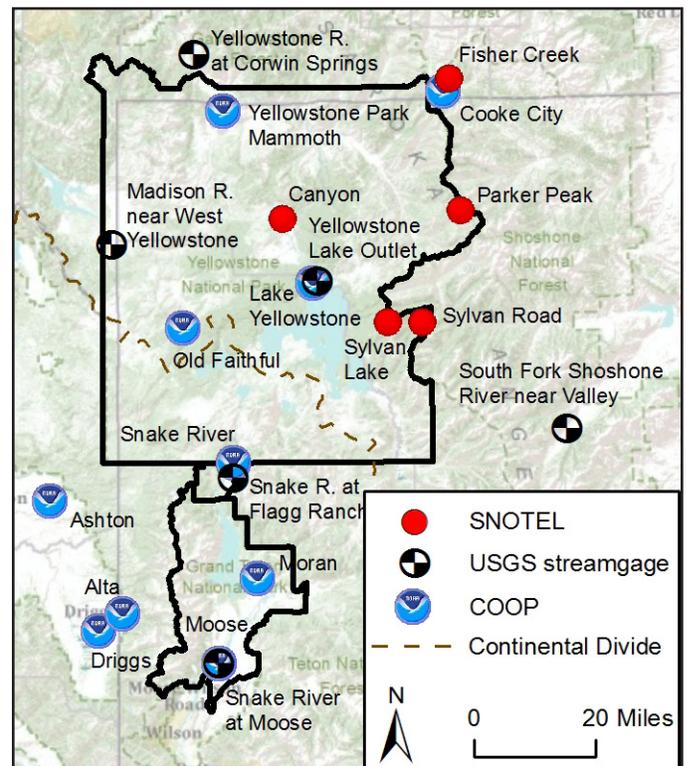


Climate in Yellowstone National Park and Grand Teton National Park

This brief summarizes climate data for 2010 from multiple climate stations in or near John D. Rockefeller Jr. Memorial Parkway, Grand Teton National Park, and Yellowstone National Park following procedures from the Rocky Mountain Climate protocol. Climate data describe precipitation, temperature, streamflow, and snowpack compared primarily to a standard 30-year climatological reference or “normal” period (currently 1971–2000), which is considered “average.”

2010 Climate at a Glance

- Total annual precipitation at Moose was 128% of average; total annual precipitation at Yellowstone Park Mammoth was 104% of average.
- Average annual maximum daily temperatures at Moose and Yellowstone Park Mammoth were near average.
- Average annual minimum daily temperatures were near average at Moose and 2.85°F warmer than average at Yellowstone Park Mammoth.
- The onset of spring and fall at Moose was two to nine days earlier than average; the onset of spring at Yellowstone Park Mammoth was near average while the onset of fall was 22 days later than average.
- Snow water equivalent (SWE) was below average during the 2010 water year. The timing of maximum SWE was near normal and was reached between April and June, depending on the station. Melt out dates were earlier than average by two to three weeks.
- Above average precipitation in June and rapid snowmelt led to higher than average peak flows in June and July.
- Total annual runoff measured at the gauge on the Snake River at Moose was 77% of average; runoff on the Yellowstone River at Corwin Springs was 96% of average; and 98% of average on the Madison River.



Map of SNOTEL and COOP stations and USGS stream gauges for Yellowstone and Grand Teton National Parks.

Temperature

During 2010, annual average minimum and maximum daily temperatures were average or near average at most stations except at Yellowstone Park Mammoth and Cooke City, which reported temperatures nearly 3°F above average. Although there was high variability in temperature among the weather stations, all stations reported cooler than average maximum temperatures in May and June, and warmer than average

minimum temperatures in December. At Lake Yellowstone the average minimum temperature was nearly 10°F above average in December.

The onset of spring is defined as the last day when the minimum temperature dropped below 28°F, and the first day of fall is defined as the first day when minimum temperatures drop below 28°F. Spring came to Yellowstone and Grand Teton National Parks 1 to 12 days earlier than average; and fall came one to two weeks earlier than average, depending on the location. The exceptions are the Snake River and Yellowstone Park Mammoth, for which both spring and fall were later than average. The number of hot days (maximum daily temperatures at or above 90°F) was fewer than average; and the number of frosty nights (minimum daily temperatures at or below 32°F) was fewer than average except at Moose, which was close to average.



NPS/P. H. HATTAWAY

Oxbow Bend with views of Mount Moran in Grand Teton National Park.

Total Annual Precipitation

During 2010, individual weather stations in Yellowstone and Grand Teton National Parks reported total annual precipitation ranging from 90% of average at Snake River to 157% of average at Driggs. Throughout the winter months (January–March), the region experienced mostly below average precipitation. The lowest during this period was 12% of average reported at Old Faithful in February. Spring precipitation (April–June) varied by station, however, most stations reported above average precipitation in April and June, but not in May. At Driggs precipitation was 362% of average in April. Summer precipitation (July–September) was mostly below average in the northern range of Yellowstone but above average elsewhere except in

July, which was below average throughout the region. Fall precipitation (October–December) varied by station, however, most stations reported readings above average. At Yellowstone Park Mammoth, precipitation was 400% of average in November. The station in Cody stands out as an anomaly with precipitation below average during all months of the year except in August.

Streamflow

The U.S. Geological Survey monitors streamflow at numerous locations in the Greater Yellowstone area. The 2010 total annual runoff ranged between 77% of average on the Snake River, to 96% of average on the Yellowstone River, and 98% of average measured on the Madison River.

Winter Snowpack

The Natural Resource Conservation Service operates automated snow measurement (SNOTEL) stations throughout the Western United States. These stations offer the best available information to track accumulation and loss of snowpack, which is measured in terms of snow water equivalent (SWE), or the amount of liquid water held in a given volume of snow. In 2010, SWE was below average. The timing of maximum SWE was near normal and was reached between April and June. Melt out dates were earlier than average by two to three weeks. Above average precipitation in June and rapid snowmelt lead to higher than average peak flows in June and July.



NPS/BOWMAN

Ice melting on an alpine lake in Grand Teton National Park.

December 2011

Jean, C., R. Daley, M. T. Tercek, and S. T. Gray. 2011. High elevation national parks: 2010 climate summary report. Natural Resource Data Series NPS/GRYN/NRDS—2011/203. National Park Service, Fort Collins, Colorado. <https://irma.nps.gov/App/Reference/Profile/2180512?code=2180512>

Rocky Mountain Climate Working Group. 2010. Rocky Mountain climate protocol: Climate monitoring in Greater Yellowstone and Rocky Mountain inventory and monitoring networks, Version 1.0. Natural Resource Report NPS/IMRO/NRR-2010/222. National Park Service, Fort Collins, Colorado. <https://irma.nps.gov/App/Reference/Profile/2124861>