



## Climate in Bighorn Canyon National Recreation Area

Climate is the set of long-term, average meteorological conditions that occur over decades and centuries. Unlike weather, which fluctuates greatly in the short term and is difficult to predict, climate is relatively stable, and many organisms have adapted to its predictable rhythms. As a result, climate is a driving force behind many ecological processes. For example, average temperature and moisture determine which species can live in an area, the rate at which they grow, and the frequency and severity of wildfires. Temperature and precipitation patterns also strongly influence the intensity and timing of stream flows, which are important factors in both agricultural and natural ecosystems.

### 2012 Climate at a Glance

The Greater Yellowstone Network annual climate report for 2012 (Jean et al. 2013) summarizes climate data from multiple climate stations in and near Bighorn Canyon National Recreation Area (Figure 1). The report summarized in this brief, describes precipitation, temperature, snowpack, and streamflow compared mainly to a standard 30-year climatological reference or “normal” period, 1981-2010.

#### Precipitation

The year 2012 featured below-average precipitation throughout the Bighorn Basin and surrounding area. Compared to 2011, when the region experienced extreme flooding, 2012 was especially dry, ranking as the driest on record for the past 50 years at Hardin and Yellowtail Dam, and second driest at Lovell and Shell 1NE COOP Stations. Total annual precipitation ranged from 3 inches (48% of average) at Lovell to 8 inches (47% of average) at Yellowtail Dam.

Drought conditions developed early in the summer and by late summer, the U.S. Drought Monitor had classified the Bighorn region as having extreme drought, a condition that lingered through the fall and early winter.

#### Temperature

Average annual daily temperatures at Lovell ranked the second highest in 50 years. At Lovell and Yellowtail Dam, both average annual maximum and minimum daily temperatures were warmer than average. Temperatures stayed above freezing sooner



Bighorn Lake at Bighorn Canyon National Recreation Area.

than average in the spring and continued later in the fall and, consequently, the number of Accumulated Growing Degree Days were higher than average.

#### Snowpack

Maximum snowpack measured at Bald Mountain and Shell Creek was above the 1981-2010 average, but close to or below the 1971-2000 average. Late-season snowpack on June 1 was near average at Bald Mountain, but over 150% of average at Shell Creek. The timing of snowmelt was similar to the 1981-2010 average, but earlier than the 1971-2000 average.

#### Streamflow

The timing of peak streamflow on the Bighorn and Shoshone rivers was earlier than average. Total annual run-off in 2012 was 83% of average on the Bighorn River at St. Xavier and 74% of average on the Shoshone River near Lovell.

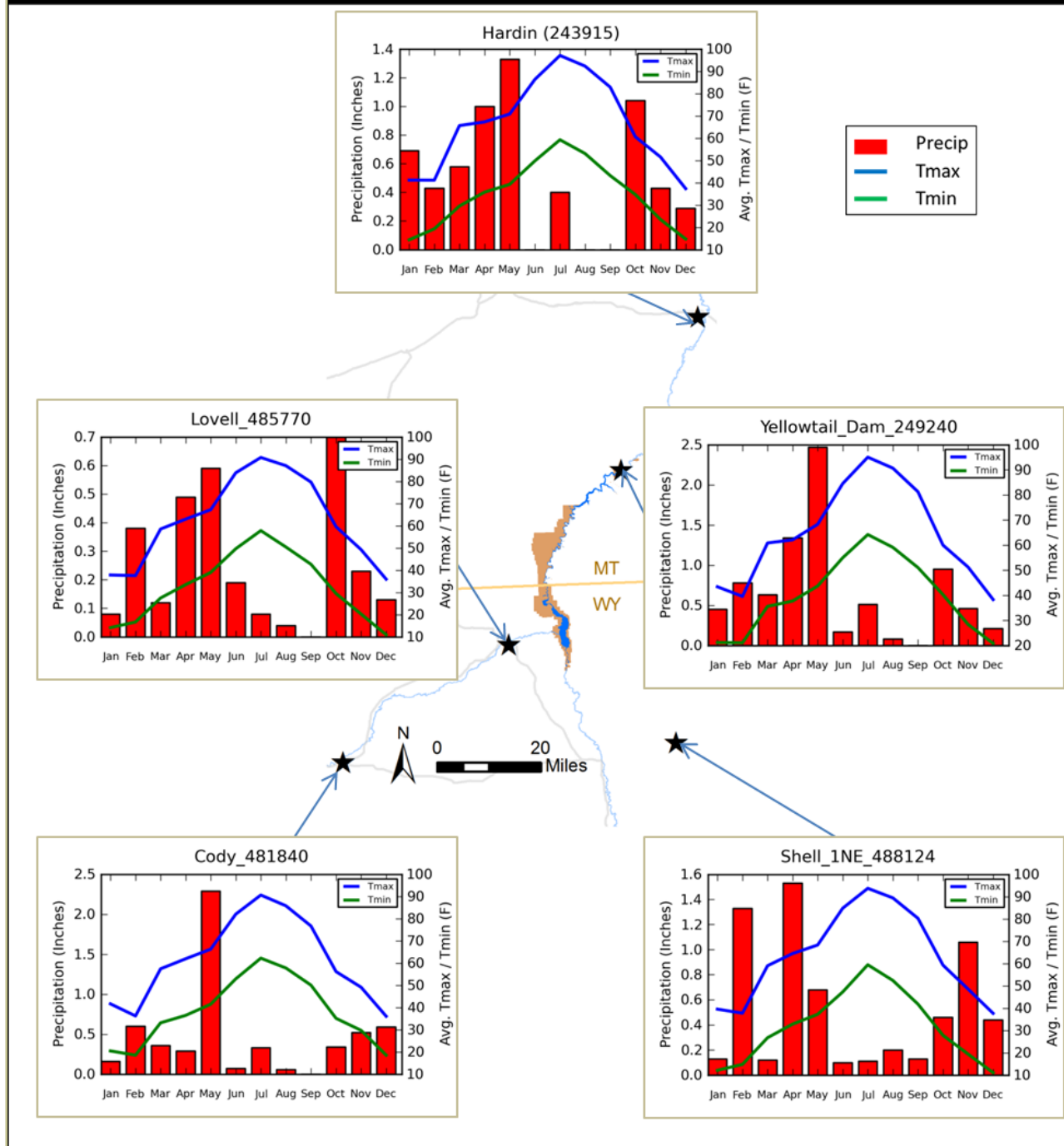


**Figure 1.** Monthly precipitation, average daily maximum temperature (Tmax), and average daily minimum temperatures (Tmin) during 2012 at key stations in and near Bighorn Canyon National Recreation Area.

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Jean, C., R. Daley, and M. Tercek. 2013. Greater Yellowstone Network climate: 2012 data summary report. Natural Resource Data Series NPS/GRYN/NRDS—2013/534. National Park Service, Fort Collins, Colorado.

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>