

**Fall Committee Report
Water Resources Data System and State Climate Office**

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Climate Summary: Water Years 2009 & 2010

Water Year 2009 (October '08 – September '09) brought significant drought relief to the state (see accompanying maps). Relative to the previous 8-9 years, runoff and reservoir storage were greatly improved in WY '09. Forage production was also high compared to most years since 1999, though other climatic events (e.g., late-summer wetness) had some negative impacts on agriculture. The current water year (i.e., 2010) began with an October that featured cool temperatures and wetness. October 2009 set records for cold temperatures in locations such as Casper, and Cheyenne experienced record monthly snowfall. In contrast, November 2009 has been marked by warmer-than-average temperatures across most of the state along with very dry conditions. While rain and snowfall totals are still preliminary, it appears that over half of the state received less than 25% of historical average precipitation (compared to 1971-2000) for the month of November.

WY '09 was also characterized by large month-to-month swings between predominately wet and dry conditions. Of particular interest was a lack of rain and snow in May 2009, when much of the state received less than 50% of historical average precipitation (vs. 1971-2000). Given that statewide precipitation for the months of January through April 2009 had been average at best, this dry month had the potential to pull Wyoming back into drought. Moreover, May is key for determining summer forage production and runoff, as it is historically the wettest month in many parts of the state. Fortunately, unusual wetness in June 2009 helped reverse the impacts of May dryness. June brought > 200% of historical average precipitation to the southeast corner of the state, and parts of the Green River basin saw over 300% of average. June alone was responsible for much of the drought recovery and reservoir recharge the state experienced in WY '09. Mirroring the events of May and June, September 2009 was particularly dry, while October brought record the snowfalls discussed above. Again, November 2009 has featured a return to dryness over a 30-day timescale.

Temperature also played an important role in the climate of WY '09. Temperatures in May 2009 were generally warmer-than-average across all but the northeast corner of the state, thereby increasing the chances for a return to drought. June 2009, on the other hand, was 2-6° F cooler than average (vs. 1971-2000), thus reducing demand for irrigation water and evapotranspiration. This coolness continued through the months of July and August 2009, further increasing runoff, reservoir storage, and soil-moisture recharge in many parts of the state. October 2009 was also very cold.

Ongoing Preparations for Climate Change and Drought

The Water Resources Data System (WRDS) and its State Climate Office (SCO) branch are developing a suite of products and services to help the State of Wyoming prepare for drought and climate change. The majority of these products address data and information needs related to the State Water Plan process, while also supporting the many state agencies and stakeholder groups that are impacted by climate variability/change. Recent highlights include the creation of a new climate data portal, and development of an online mapping tool that allows users to explore numerous aspects of Wyoming's climate and water resources. For more information, please see:

<http://www.wrds.uwyo.edu/>

http://www.wrds.uwyo.edu/sco/climate_office.html

<http://www.wrds.uwyo.edu/sco/data/data.html>

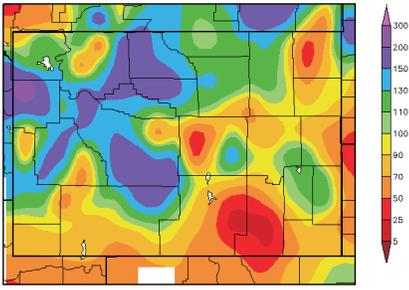
<http://www.wrds.uwyo.edu/sco/gis/IMS.html>

WRDS and the SCO are also working to ensure that data generated by several new monitoring programs and research initiatives can be applied to “real world” problems related to drought and climate change. In one example, a large consortium of University of Wyoming researchers has requested \$20 million in National Science Foundation funding for a project that would explore the interactions between climate change, vegetation, snowpack, and runoff across complex terrain. This so-called FoSTER (Forest, Steppe and Tundra Ecosystems Research) initiative is of tremendous interest to WRDS/SCO because it would directly address “...*how major vegetation disturbances associated with drought and pest outbreaks will impact snow accumulation and ablation, soil moisture storage, deep percolation, evapotranspiration, and runoff...*” WRDS and the SCO will summarize and distribute data from this project. We are also providing historical water and climate data from our extensive archives, and helping to design aspects of this research program so that it best meets the needs of our state.

In another example, WRDS and the SCO are helping to develop a soil-moisture monitoring network for the state. Sponsored by the State Department of Agriculture and maintained by Drs. Ginger Paige and Thijs Kelleners of the UW Department of Renewable Resources, this network currently consists of 25 sites around Wyoming, each of which collect soil moisture readings at three depths. Each site also features an automated precipitation gage, and the sensor platform is designed to accommodate additional measurements (e.g., soil temperatures) as funding allows. WRDS/SCO are currently developing products that will summarize soil moisture observations in an easy-to-use and easily-accessible format. Soil moisture products will also be fully integrated into existing tools designed to support the State Water Plan process and drought monitoring efforts (e.g., <http://www.wrds.uwyo.edu/sco/gis/IMS.html>).

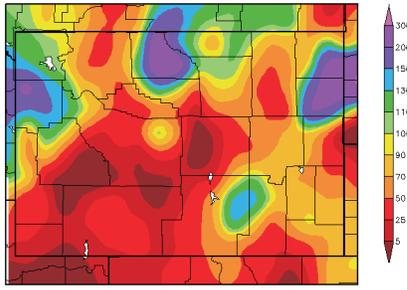
Wyoming Precipitation: Departures from Normal

Percent of Normal Precipitation (%)
10/1/2008 – 10/31/2008



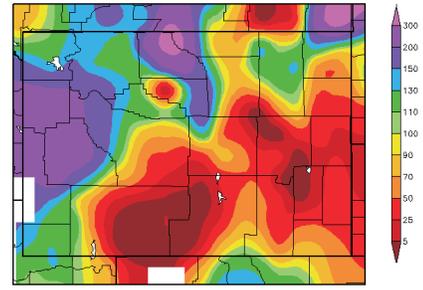
Generated 11/11/2008 at HPRCC using provisional data. NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
11/1/2008 – 11/30/2008



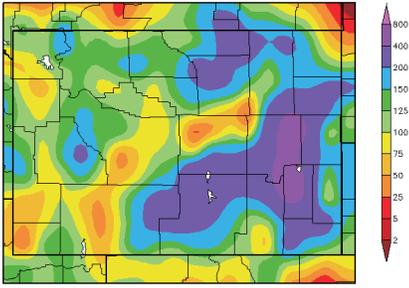
Generated 12/11/2008 at HPRCC using provisional data. NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
12/1/2008 – 12/31/2008



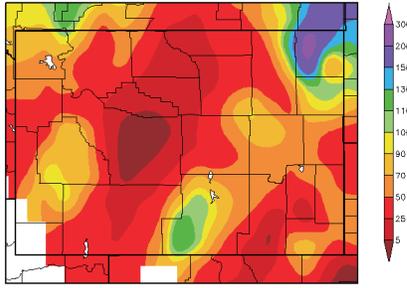
Generated 1/11/2009 at HPRCC using provisional data. NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
1/1/2009 – 1/31/2009



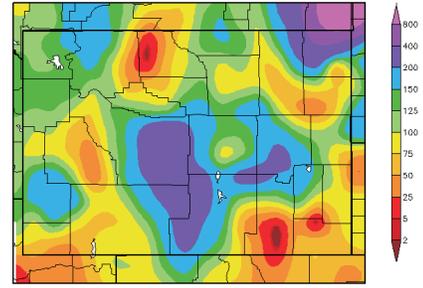
Generated 5/19/2009 at HPRCC using provisional data. NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
2/1/2009 – 2/28/2009



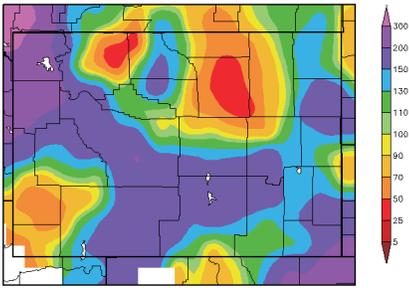
Generated 5/19/2009 at HPRCC using provisional data. NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
3/1/2009 – 3/31/2009



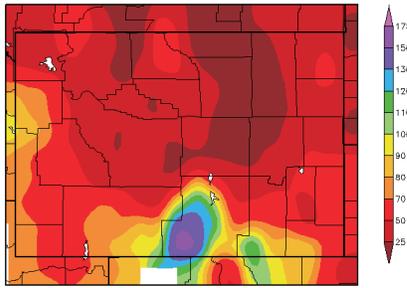
Generated 5/19/2009 at HPRCC using provisional data. NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
4/1/2009 – 4/30/2009



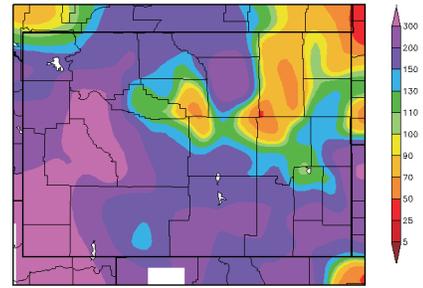
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Percent of Normal Precipitation (%)
5/1/2009 – 5/31/2009



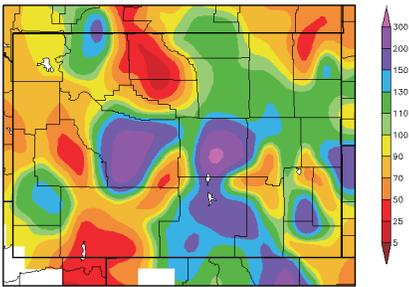
Generated 5/11/2009 at HPRCC using provisional data. NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
6/1/2009 – 6/30/2009



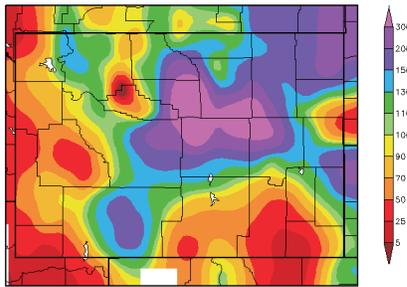
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Percent of Normal Precipitation (%)
7/1/2009 – 7/31/2009



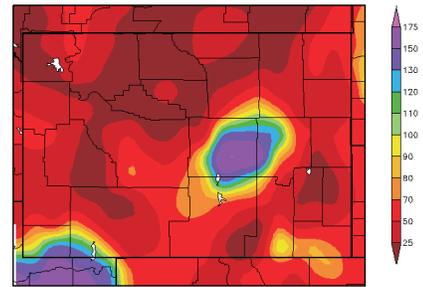
Generated 8/11/2009 at HPRCC using provisional data. NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
8/1/2009 – 8/31/2009



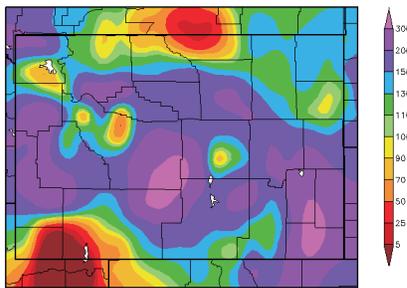
Generated 9/11/2009 at HPRCC using provisional data. NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
9/1/2009 – 9/30/2009



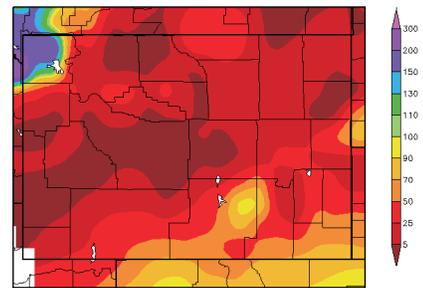
Generated 10/11/2009 at HPRCC using provisional data. NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
10/1/2009 – 10/31/2009



Generated 11/11/2009 at HPRCC using provisional data. NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
11/1/2009 – 11/30/2009



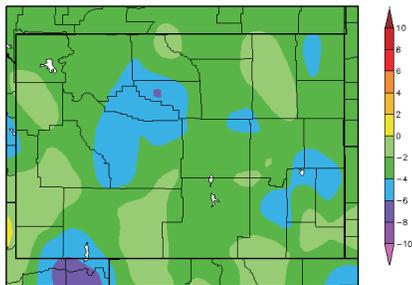
Generated 12/11/2009 at HPRCC using provisional data. NOAA Regional Climate Centers

Product of the
Wyoming Water Resources Data System
<http://www.wrds.uwyo.edu/>

Data Courtesy:
High Plains Regional Climate Center
<http://www.hprcc.unl.edu/>

Wyoming Temperature: Departures from Normal

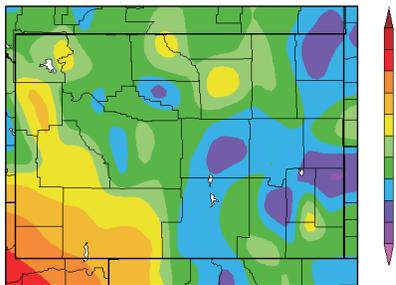
Departure from Normal Temperature (F)
6/1/2009 - 6/30/2009



Generated 7/11/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

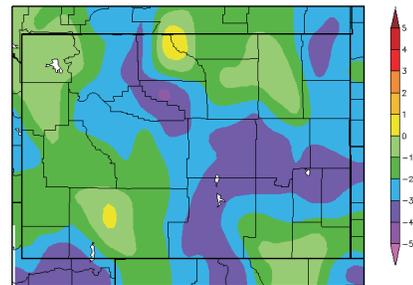
Departure from Normal Temperature (F)
7/1/2009 - 7/31/2009



Generated 8/11/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Departure from Normal Temperature (F)
8/1/2009 - 8/31/2009



Generated 9/11/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

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<http://www.hprcc.unl.edu/>