



Rosebud Sioux Tribe Climate and Drought Summary

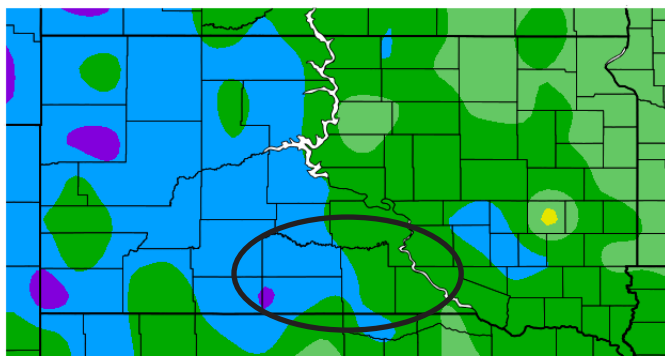
Winter Events & Spring Outlook 2018

Winter Was Cold And Snowy

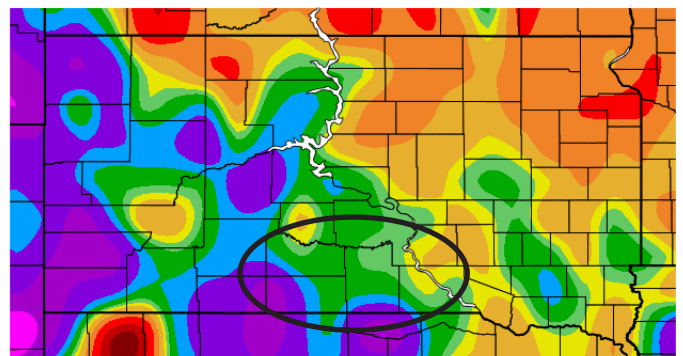
It was a cold and snowy winter for the Rosebud Sioux Tribe Lands and surrounding area. Temperatures ranged from 4-6°F below normal in the western part of the region to 2-4°F below normal in the east (see map below left). Several locations had a top 10 coolest winter on record, including Murdo (7th coolest), Winner (7th coolest), and Wood (9th coolest). Most of the region had a wet winter, receiving 110-130 percent of normal precipitation with southern and western parts of the region receiving greater than 200 percent of normal (see map below right). Below-normal temperatures and above-normal precipitation led to quite the snowy winter for most of the region, making up for the deficit that was present during the fall and early winter. For more temperature and precipitation data from local stations, please see the data table on page 2.

Looking at each month of the winter season, December temperatures were near normal, while precipitation varied from wetter conditions in the southwest to drier conditions in the east. January was cool, with temperature departures ranging from 2-4°F below normal, and it was also wet, with Mission 14S having its 8th wettest January. February was quite cold with widespread temperature departures of 9-15°F below normal. The following locations had a top 10 coolest February on record: Mission 14S (tied for 2nd coolest), Murdo (3rd coolest), Wood (5th coolest), and Winner (7th coolest). While precipitation was above normal for most of South Dakota in February, eastern portions of the Rosebud Sioux Tribe Lands and surrounding area missed out, receiving only 50-75 percent of normal precipitation.

Departure from Normal Temperature (°F)
December 1, 2017 - February 28, 2018



Percent of Normal Precipitation (%)
December 1, 2017 - February 28, 2018

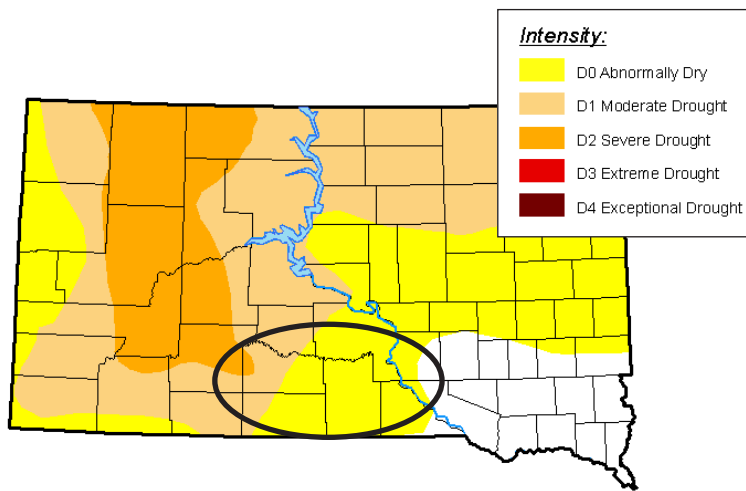


Maps produced by the High Plains Regional Climate Center and are available at: <http://www.hprcc.unl.edu/maps/current>

Drought Conditions Change Little During Winter

Going into the winter months, western areas of the Rosebud Sioux Tribe Lands were experiencing drought, while much of the rest of the region had been abnormally dry, according to the U.S. Drought Monitor. These conditions changed very little over the winter, as is commonly the case when soils are frozen and moisture is locked in for the season. However, according to the U.S. Drought Monitor, the area to the northwest of the Rosebud Sioux Tribe Lands experiencing extreme drought (D3) conditions was improved to severe drought (D2) due to a reanalysis of data. The eastern part of the state had a dry winter, leading to the expansion of drought and dryness across that region. Now that it is spring, soils will begin to thaw and plants will emerge from dormancy, using water from the soil. Receiving ample precipitation during spring is important, and the drought situation should be monitored closely.

U.S. Drought Monitor of South Dakota - February 27, 2018
Released March 1, 2018 Valid 7 a.m. EST



	<i>Drought Conditions (Percent Area)</i>					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	10.85	89.15	56.73	16.01	0.00	0.00
Last Week <i>02-20-2018</i>	3.70	96.30	58.49	16.01	0.00	0.00
3 Months Ago <i>11-28-2017</i>	26.85	73.15	49.06	18.64	5.92	0.00
Start of Calendar Year <i>01-02-2018</i>	6.68	93.32	52.84	18.64	5.92	0.00
Start of Water Year <i>09-26-2017</i>	19.56	80.44	59.35	32.30	5.62	0.00
One Year Ago <i>02-28-2017</i>	69.93	30.07	17.85	0.00	0.00	0.00

The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration. Map courtesy of NDMC-UNL. For more information on the U.S. Drought Monitor, go to: <http://droughtmonitor.unl.edu>

Summary Of Station Data (December 2017 - February 2018)

Station	Average Temp. (°F)	Dep. from Normal Temp. (°F)	Temp. Rank	Total Precip. (in.)	Dep. from Normal Precip. (in.)	Percent of Normal Precip.	Precip. Rank	Period of Record
Cedar Butte	-	-	-	-	-	-	-	1918-2018
Kilgore 1 NE	20.9*	-5.3	-	3.02*	1.65	220	-	1998-2018
Hamill (SD Mesonet)	22.8	-	-	-	-	-	-	2008-2018
Magpie Creek SD	22.4*	-	-	-	-	-	-	1987-2018
Martin 19.6 ENE	-	-	-	-	-	-	-	2007-2018
Mission 14 S	19.1	-4.8	-	1.88	0.39	126	16th wettest	1951-2018
Murdo	18.7	-5.2	7th coolest	1.50	-0.15	91	near normal	1907-2018
Norris 2.0 SSW	-	-	-	2.18*	-	-	-	2008-2018
Olsonville 4.5 SE	-	-	-	1.60*	-	-	-	2013-2018
Winner	20.1*	-4.5	7th coolest	2.11	0.36	121	near normal	1910-2018
Wood	19.9	-4.5	9th coolest	1.77	0.37	126	near normal	1913-2018

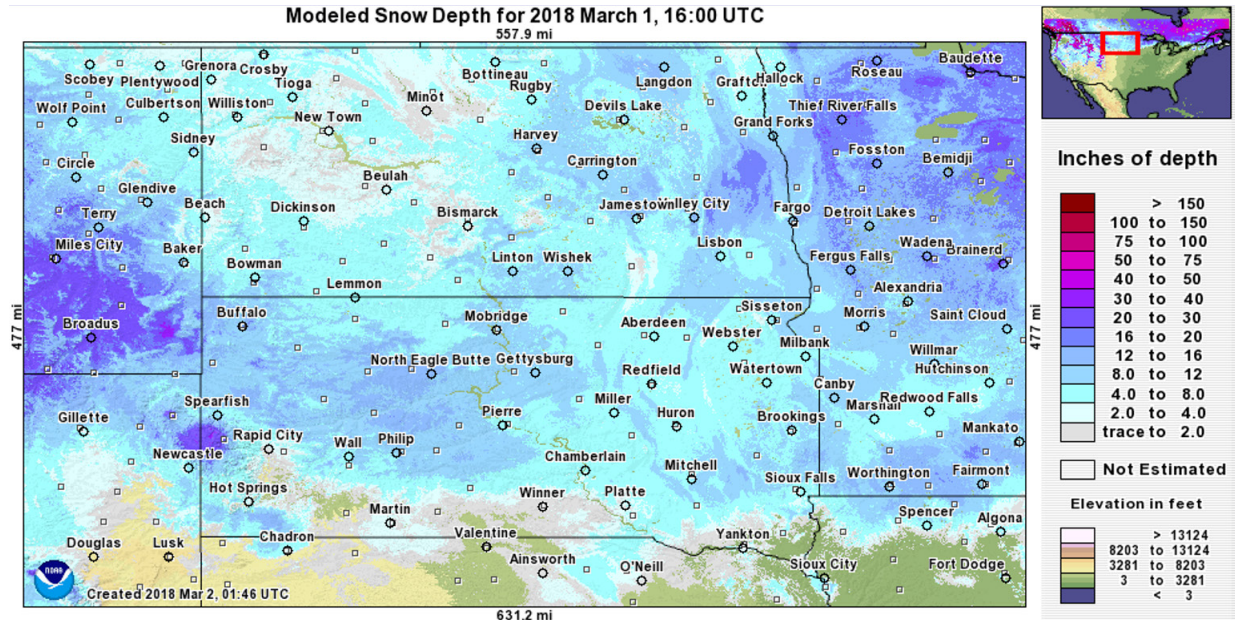
A dash (-) indicates insufficient data for calculation. An asterisk (*) indicates some missing data for this period.

All data are preliminary and subject to change.

Unless noted otherwise, data were retrieved from the Applied Climate Information System (ACIS): rcc-acis.org

Abundant Winter Snowfall Brings Seasonal Totals Above Normal

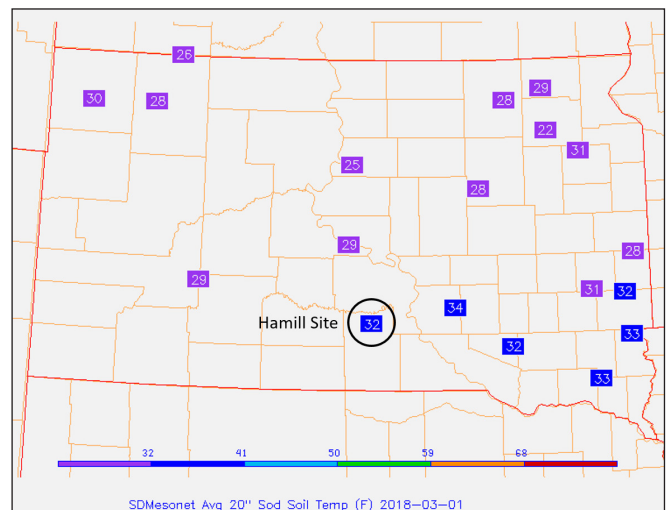
Despite a slow start to the snow season, winter brought ample snowfall to the Dakotas, including the Rosebud Sioux Tribe Lands. Thanks in part to the presence of La Niña, snowfall was above normal for the winter and offset the early-season deficit. For instance, at the end of fall, Mission 14S's season-to-date snowfall was the 7th least snowiest on record. But, with 28.0 inches of snow during the winter months, it had its 8th snowiest winter on record. This brought the seasonal snowfall total through the end of February to 30.0 inches, which was the location's 19th snowiest for this period. Murdo received 34.9 inches of snow from December-February, having its 6th snowiest winter, while it was the 8th snowiest winter for Wood. Winter snowfall in Winner was slightly above normal but not record-breaking.



The modeled snow depth map above is produced by NOAA's National Operational Hydrologic Remote Sensing Center (NOHRSC). For the entire suite of maps, including snow water equivalent (SWE), please visit: <https://www.nohrsc.noaa.gov/interactive/html/map.html>. Please note that snow depth is simply the depth of the snow on the ground at a particular time, and is not indicative of the amount of water contained in the snow (SWE).

Cold Temperatures and Lack of Snowfall Cause Deep Frost Depths

The lack of snow cover across portions of the Dakotas during cold outbreaks throughout the winter drove frost depths deep into the soil. Frost depth is the deepest occurrence of 32°F in the soil profile. On March 1, the frost depth at the Hamill mesonet station under sod was at least 20 inches (this is the deepest soil sensor at the site). According to the National Weather Service North Central River Forecast Center, deep frost depths limit infiltration of water into the soil, which generates more runoff from rain and snowmelt. Deep frost depths can also cause water main breaks, which occurred in February in Webster, SD where water was shut off to the town for several days.

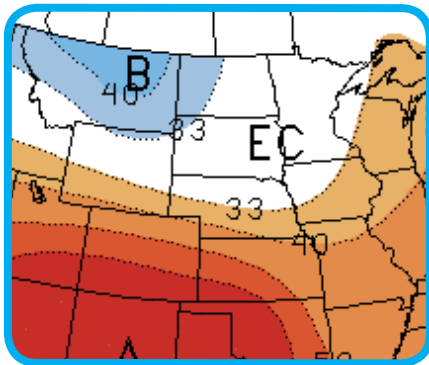


The Mesonet at South Dakota State University provides current and archived weather and climate information from a high-quality network of meteorological stations across the state. This network includes a station sponsored by the Hamill and Clearfield-Keyapaha Conservation Districts that is located near tribal lands. For more information about the mesonet and the data it offers, please see: <https://climate.sdstate.edu/>. For questions about the mesonet, please contact Nathan Edwards, Mesonet Engineer/Director, at 605-626-2870 or nathan.edwards@sdstate.edu.

No Strong Temperature or Precipitation Signal Detected for Spring

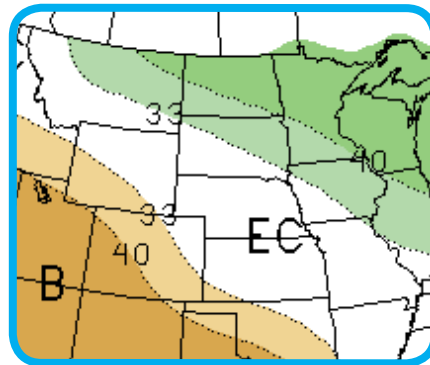
La Niña conditions are present but should transition to neutral conditions during the spring. The spring outlook from NOAA's Climate Prediction Center indicates an increased chance for below-normal temperatures and above-normal precipitation across the Upper Missouri Basin. For the Rosebud Sioux Tribe Lands, there are equal chances for above-, near-, or below- normal temperature and precipitation, although above-normal precipitation is predicted just to the north and east (see maps below - left and center). The U.S. Seasonal Drought Outlook indicates that drought in western and central South Dakota should improve or be removed, which includes western portions of the Rosebud Sioux Tribe Lands (see map below right). Additional drought development is not expected on the Rosebud Sioux Tribe Lands through the end of spring and early summer. CPC outlooks are available at: <http://www.cpc.ncep.noaa.gov/>.

3-Month Temperature Outlook
Valid April - June 2018

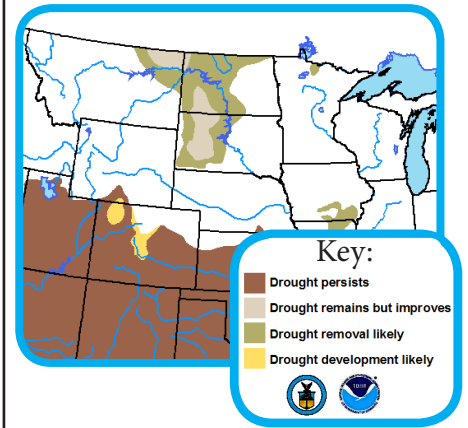


EC: Equal chances of above, near, or below normal
A: Above normal B: Below normal

3-Month Precipitation Outlook
Valid April - June 2018



U.S. Seasonal Drought Outlook
Valid March 15 - June 30, 2018



Drought Outlook explanation:

The Climate Prediction Center issues a seasonal drought outlook for the U.S. that is based on probabilities for drought development, persistence and intensification, improvement, and removal at a large scale. Local-scale changes in drought conditions may not be captured by this outlook. "On-going" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4). The tan areas on the map imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none). The white areas imply no drought present.

Three-Month Temperature and Precipitation Outlook explanation:

Each month, the Climate Prediction Center issues a new three-month outlook for temperatures and precipitation for the lower 48 states and Alaska. These outlooks indicate the probability of temperatures and precipitation being above, near, or below normal. ("Normal" is what is expected based on average temperatures and precipitation during the period of 1981-2010.) In general, the colors on the map will indicate warmer/cooler or wetter/drier conditions. In the temperature outlook, the oranges signify above normal temperatures, while the blues signify below normal temperatures. In the precipitation outlook, the greens indicate above normal precipitation, while the browns indicate below normal precipitation. You will also see probabilities on the map (e.g. 33, 40, 50, 60, 70, and 80). For a location and season, forecasters divide the 30 observations from 1981-2010 into thirds: 1/3 is the coldest or driest, 1/3 is the warmest or wettest, and 1/3 is in between. When forecasters indicate that an area will have above normal precipitation, for example, they are saying that the probability is greater than 33 percent. The outlooks are for the 3-month period as a whole and do not indicate when certain conditions would occur or the duration and intensity of any particular event. Areas of white are marked by "EC," which means equal chances of above, near, or below normal temperatures/precipitation. EC does not mean near normal.

Collaborators and Partners:



Contact Information: Please direct questions and feedback on this climate summary to Crystal Stiles, High Plains Regional Climate Center, 402-202-3320.