



March 2023 Climate Summary



Regional Breakdown

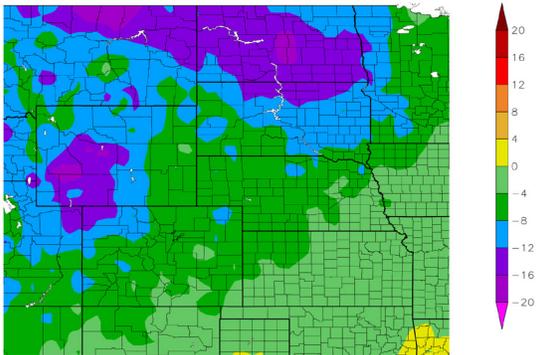
While snow continued to impact the northern states in March, precipitation was notably absent for much of the High Plains. Cooler temperatures helped with drought conditions; however, many places desperately need moisture this spring.

As the significant drought affecting Kansas enters the second year, a number of impacts are becoming apparent. Winter wheat is in incredibly poor shape, with some places not having meaningful precipitation in nearly 200 days. Fields are already being evaluated by insurance adjusters and being adjusted out, despite no wheat emerging. Farmers will be forced to find ways to hold soil in place in the coming months, as blowing dust has been an issue over the past year. The groundwater has been depleted, with water levels dropping nearly three feet near Garden City. A very unusual impact comes from the Kansas Department of Wildlife and Parks. Game Wardens within the state are seeing increased numbers of coyotes in towns this year due to the extreme drought conditions. The dry conditions have caused them to become desperate for sources of food and water.

After a quiet winter for wildfires, conditions rapidly became conducive for fires late in the month. Two separate fires broke out in Colorado on the 30th, with the town of Simla being evacuated after the flames poised a threat to the public.

Temperature and Precipitation Overview

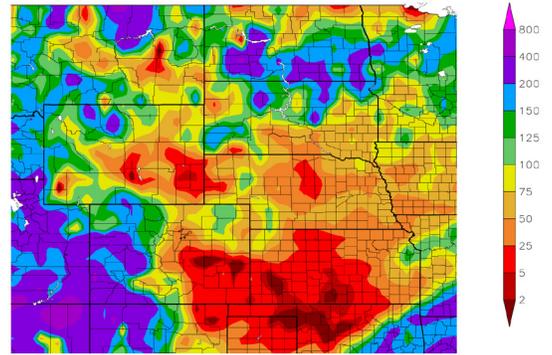
Departure from Normal Temperature (F)
3/1/2023 – 3/31/2023



Generated 4/4/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
3/1/2023 – 3/31/2023



Generated 4/4/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

Above: Departure from 1991-2020 normal temperature (left) and percent of normal precipitation (right) for March 2023 in the High Plains region. Maps produced by the High Plains Regional Climate Center and are available at: <http://hprcc.unl.edu/maps/current>.

Precipitation and Water Resources

Precipitation was once again spotty this month. Several winter storms impacted the Dakotas, however, much of Kansas and Nebraska were bone dry.

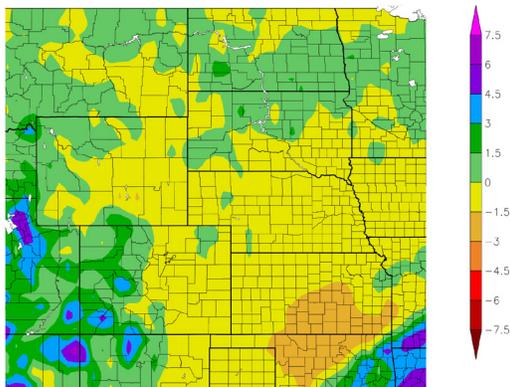
Southwestern Kansas has been on the short end of the stick when it comes to precipitation for the past year, and March was no exception. Many places received less than 0.10 inches (2.54 mm) of precipitation, including Hays, Garden City, and Great Bend. Since the start of 2023, numerous locations have received less than 0.50 inches (12.7 mm) of precipitation. After record to near-record dryness last year, the situation continues to become dire and dire each month.

The onslaught of snowstorms in the Dakotas carried over into March. Blizzards continued to ravage both states, with record to near-record snowfall this month. Sisseton, South Dakota measured 31.3 inches (79.5 cm) of snow which set the record for March. This large amount of snow also propelled them to observe their snowiest January to March, with 48.5 inches (123.2 cm) of snow. Pierre ranked second after 19.1 inches (48.5 cm) of snow, but well short of the record at 31.8 inches (80.8 cm) set in 1975. Ranking third snowiest includes Aberdeen and Fargo, North Dakota.

As winter has ended and spring begins, snowpack is in great shape. At the end of March, the majority of the Dakotas and Wyoming have snow on the ground. Mountain snowpack is above normal for most basins, which should greatly benefit the water supply. Streamflow is well below normal across southern Nebraska and most of Kansas at the beginning of April.

Regional Precipitation

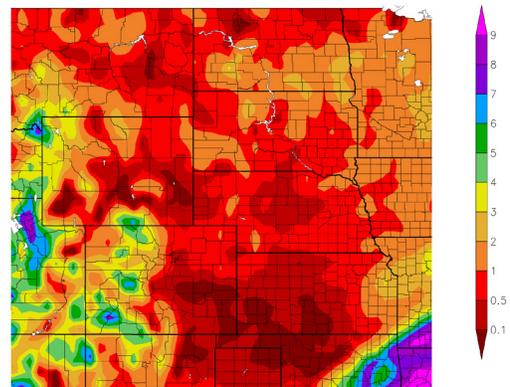
Departure from Normal Precipitation (in)
3/1/2023 – 3/31/2023



Generated 4/4/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

Precipitation (in)
3/1/2023 – 3/31/2023



Generated 4/4/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

Above: Total precipitation in inches (left) and departure from normal precipitation in inches (right) for March 2023. These maps are produced by HPRCC and can be found on the Current Climate Summary Maps page at: <http://hprcc.unl.edu/maps/current>.

Temperatures

March was chilly, particularly in parts of the Dakotas, Colorado, and Wyoming. Departures were up to 20 degrees F (11.1 degrees C) below normal in those states, with many locations ranking in the top 10 coldest. Temperatures were slightly below-normal for the rest of the region.

North Dakota was brutally cold, with the highest average temperature in the state being 20.6 degrees F (-6.3 degrees C) in the southwestern part of the state. The town of Mayville was the coldest place in the state, with an average temperature of 9.3 degrees F (-12.6 degrees C), which was also the coldest March on record for that station. Nearby Grand Forks observed their 3rd coldest March, with an average temperature of 12.6 degrees F (-10.8 degrees C). Other notable locations such as Bismarck, Dickinson, and Williston also ranked in the top 10.

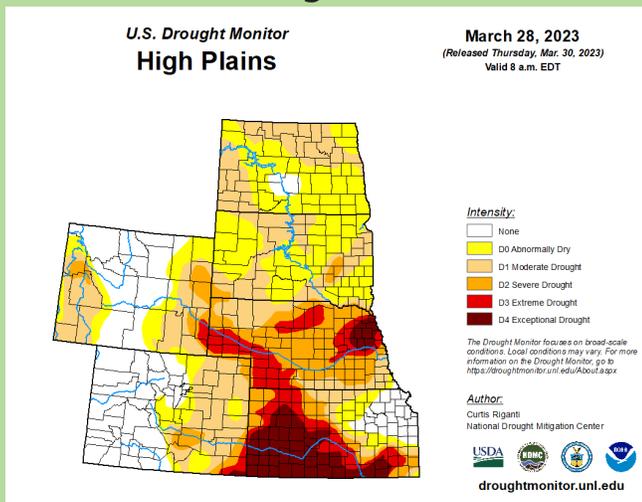
Portions of Wyoming have been exceptionally cold in 2023. Casper and Rawlins recorded their 4th coldest January to March, while Lander was the coldest on record. The average temperature in the past three months was a meager 16.4 degrees F (-8.7 degrees C).

Drought Conditions

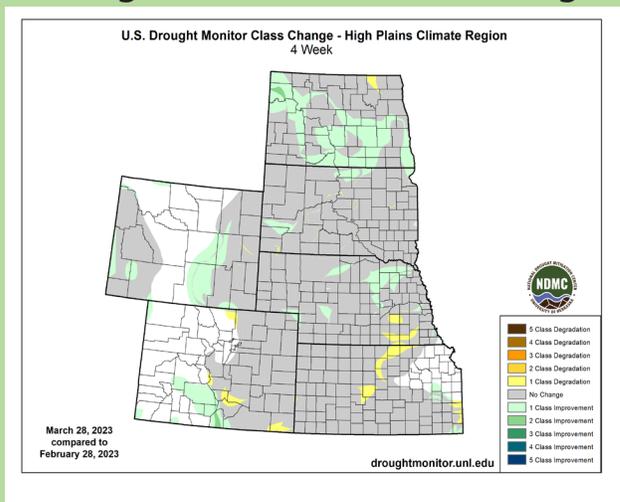
Drought conditions improved this month, primarily in North Dakota. Conditions did degrade in the southern portions of the region after minimal precipitation occurred. Overall, there was a 3 percent decrease in D0 to D4 (abnormally dry to exceptional drought conditions).

After a bitterly cold and wet month, North Dakota experienced a 30 percent reduction in D1-D4 (moderate to exceptional). Despite the reduction in drought conditions, there was a minimal reduction in abnormally dry conditions with 95 percent of the state still observing D0-D4. While drought still remains entrenched in Nebraska, D3 to D4 (extreme to exceptional) was reduced by eight percent. Elsewhere in the region, other improvements and degradation were observed. According to the Climate Prediction Center’s U.S. Monthly Drought Outlook for March, drought conditions will improve in Wyoming, South Dakota, and parts of Nebraska and North Dakota.

U.S. Drought Monitor



Drought Monitor 1-Month Change



The U.S. Drought Monitor is produced as a joint effort of the U.S. Department of Agriculture (USDA), National Drought Mitigation Center, U.S. Department of Commerce, and the National Oceanic and Atmospheric Administration (NOAA). For current Drought Monitor information, please see: <http://droughtmonitor.unl.edu/>.

March 2023 Climate Summary

Climate Outlooks

According to the Climate Prediction Center, La Niña conditions have ended and transitioned to ENSO-neutral. The final La Niña advisory was issued on March 9th. For more information, visit https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf

The National Weather Service's long-range flood outlook indicates high chances of Major Flooding in central South Dakota and western North Dakota. According to the National Interagency Fire Center (NIFC), fire potential will be limited across the region through July.

The seasonal temperature and precipitation outlooks presented below combine the effects of long-term trends, soil moisture, and when applicable, the El Niño Southern Oscillation cycle (ENSO). To learn more about these outlooks, please visit <http://www.cpc.ncep.noaa.gov>.

Temperature

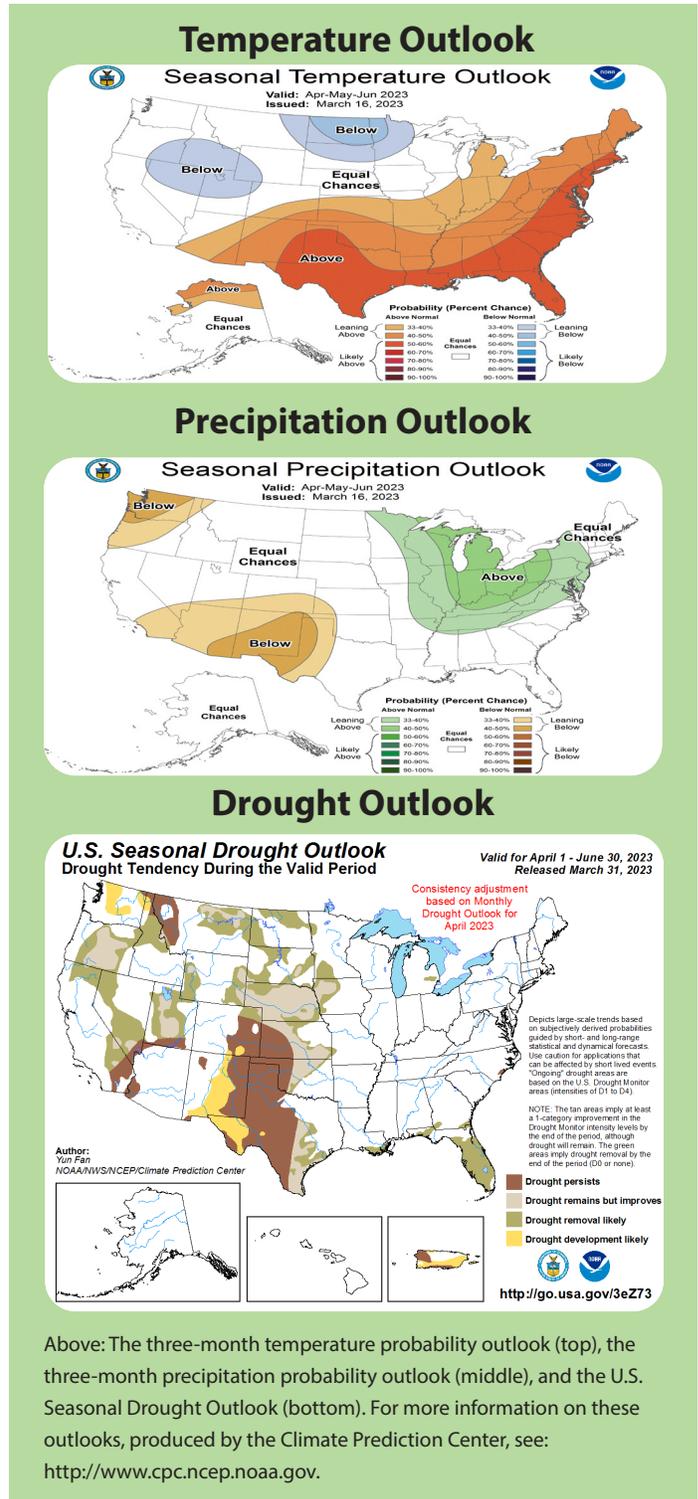
The three-month temperature outlook shows an increased chance of above-normal temperatures across the southern and eastern United States. Increased chances of below-normal temperatures are present in North Dakota and northern South Dakota, while above-normal temperatures are favored in Kansas and south-eastern Colorado.

Precipitation

The outlook for the next three months indicates below-normal precipitation across the southwestern and northwestern United States, while above-normal precipitation is favored for the Midwest. Southern Colorado and southwestern Kansas slightly lean towards below-normal precipitation, while the rest of the region has equal chances.

Drought

The U.S Seasonal Drought Outlook released on March 31st indicates that improvements to drought conditions will continue across the majority of the region.



Above: The three-month temperature probability outlook (top), the three-month precipitation probability outlook (middle), and the U.S. Seasonal Drought Outlook (bottom). For more information on these outlooks, produced by the Climate Prediction Center, see: <http://www.cpc.ncep.noaa.gov>.

Station Summaries: By the Numbers

Colorado	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Akron Washington County Airport	44.1	20.5	32.3	-8.2	70	03/15	8	03/04	0.61	-0.10	86
Alamosa San Luis Airport	47.9	17.7	32.8	-2.4	60	03/10	-1	03/28	0.37	-0.14	73
Colorado Springs Municipal Airport	51.5	24.0	37.8	-3.3	70	03/15	9	03/28	0.08	-0.71	10
Denver International Airport	49.1	22.7	35.9	-5.7	71	03/15	13	03/18	0.49	-0.37	57
Grand Junction Walker Field Airport	48.7	28.5	38.6	-6.4	64	03/29	16	03/27	1.70	0.90	213
Pueblo Memorial Airport	57.1	22.7	39.9	-4.0	78	03/15	6	03/28	0.10	-0.72	12

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	53.5	30.4	41.9	-1.6	76	03/30	14	03/19	0.49	-1.04	32
Dodge City Regional Airport	57.0	28.5	42.7	-2.7	78	03/22	8	03/19	0.23	-1.12	17
Goodland Renner Field	50.1	22.3	36.2	-5.2	80	03/30	11	03/18	1.00	0.12	114
Topeka Municipal Airport	55.5	33.2	44.4	-1.2	81	03/31	14	03/19	1.61	-0.64	72
Wichita Mid-Continent Airport	57.9	35.1	46.5	-0.9	79	03/22	12	03/19	0.12	-2.18	5

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	43.4	19.4	31.4	-6.5	65	03/15+	10	03/04	0.91	0.10	112
Grand Island Airport	48.1	24.5	36.3	-4.4	76	03/30	9	03/27	1.09	-0.30	78
Lincoln Municipal Airport	50.6	25.9	38.3	-2.9	79	03/30	6	03/19	0.63	-0.92	41
Norfolk Karl Stefan Airfield	45.2	23.2	34.2	-3.6	72	03/30	10	03/19	0.56	-0.88	39
North Platte Regional Airport	47.7	21.5	34.6	-5.0	74	03/15	12	03/28+	0.41	-0.59	41
Omaha Eppley Airport	47.6	25.5	36.5	-4.5	75	03/30	10	03/19+	0.82	-0.97	46
Valentine Miller Field	40.7	19.3	30.0	-7.6	74	03/15	8	03/18	0.70	-0.22	78

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismarck Municipal Airport	25.7	3.6	14.7	-15.4	38	03/03	-16	03/13	1.57	0.73	187
Fargo International Airport	27.2	3.7	15.5	-11.7	38	03/31	-18	03/02	1.79	0.54	143
Grand Forks International Airport	23.4	1.7	12.6	-11.8	37	03/03	-13	03/29	1.05	0.14	115
Theodore Roosevelt Airport	25.4	8.3	16.8	-13.5	41	03/14	-7	03/18	0.12	-0.44	21
Williston International Airport	24.2	7.1	15.6	-13.2	39	03/14	-9	03/18	1.16	0.53	184

All data are preliminary and subject to change. + indicates multiple dates, latest date listed. * indicates some missing data for the period. ** indicates value is under evaluation. Data are retrieved through the Applied Climate Information System (ACIS) and are available online through the CLIMOD system. For more information please contact us: <http://www.hprcc.unl.edu/contact.php>.

March 2023 Climate Summary

South Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Aberdeen Regional Airport	28.5	6.7	17.6	-12.9	41	03/03	-14	03/29	2.31	1.42	260
Huron Regional Airport	31.2	15.2	23.2	-9.7	43	03/19	4	03/18+	1.15	0.00	100
Pierre Regional Airport	34.6	17.0	25.8	-8.5	55	03/19	3	03/13	1.59	1.66	166
Rapid City Regional Airport	37.7	15.9	26.8	-8.6	66	03/15	6	03/12	1.52	0.61	167
Sioux Falls Joe Foss Field Airport	35.5	19.0	27.2	-7.5	49	03/15	5	03/19+	1.17	-0.43	73

Wyoming	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Casper Natrona County International AP	37.5	15.9	26.7	-9.1	53	03/30	-6	03/08	0.65	-0.19	77
Cheyenne Municipal Airport	41.8	20.5	31.2	-5.9	62	03/30	12	03/02	0.46	-0.50	48
Lander Hunt Field Airport	32.0	12.2	22.1	-13.9	49	03/15	-2	03/08	0.58	-0.71	45
Laramie Regional Airport	38.5	15.3	26.9	-4.9	55	03/30	-1	03/17	0.25	-0.23	52
Rawlins Municipal Airport	31.5	14.4	22.9	-10.7	49	03/29	0	03/01	0.50	-0.16	76
Sheridan County Airport	35.3	11.3	23.3	-12.4	58	03/14	-1	03/12+	1.65	0.63	162

March 2023 Highlights

Monthly Rankings

Temperature in degrees Fahrenheit, Precipitation in inches

Precipitation	Precipitation/ Ranking	Record / Year	Period of Record
Rawlins, Wyoming	0.18 / 4th Driest	0.07 / 2012	1951-2023
Wichita, Kansas	0.12 / 5th Driest	Trace / 1936 and 1910	1888-2023
Sisseton, South Dakota	2.40 / 6th Wettest	5.19 / 1977	1931-2023
Snowfall	Snowfall/ Ranking	Record / Year	Period of Record
Sisseton, South Dakota	31.3 / Snowiest	22.5 / 1989	1931-2023
Pierre, South Dakota	19.1 / 2nd Snowiest	31.8 / 1975	1893-2023
Aberdeen, South Dakota	26.3 / 3rd Snowiest	28.0 / 1893	1893-2023
Fargo, North Dakota	23.3 / 3rd Snowiest	28.1 / 2009	1885-2023
Bismarck, North Dakota	25.4 / 5th Snowiest	31.1 / 1975	1886-2023
Grand Forks, North Dakota	17.0 / 5th Snowiest	29.3 / 1966	1893-2023
Temperature	Temperature/ Ranking	Record / Year	Period of Record
Aberdeen, South Dakota	17.6 / 3rd Coldest	15.8 / 1951	1893-2023
Grand Forks, North Dakota	12.6 / 3rd Coldest	9.6 / 1970	1893-2023
Lander, Wyoming	22.1 / 3rd Coldest	16.1 / 1912	1891-2023
Sisseton, South Dakota	19.5 / 4th Coldest	18.2 / 2013	1931-2023

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About the High Plains Regional Climate Center

The High Plains Regional Climate Center (HPRCC) is one of six NOAA Regional Climate Centers (RCCs) that has been providing timely climate data and information to the public for cost effective decision-making since 1987. The HPRCC primarily serves the six-state region of Colorado, Kansas, Nebraska, North Dakota, South Dakota, and Wyoming, but has also served people from all across the country and even throughout the world. HPRCC operates under a three-tiered structure of climate services and works closely with other organizations on the local, regional, and national levels. HPRCC staff engage with a wide range of stakeholders including K-20 education, the public, media, private industry, research, and state/tribal/federal entities, among others.

Much of the data and products found throughout this publication were built on the Applied Climate Information System (ACIS) framework. ACIS was designed to manage the complex flow of information from climate data collectors to the end users of climate data information. The main purpose of ACIS is to alleviate the burden of climate information management for people who use climate information to make management decisions.

HPRCC is involved in the ongoing development and management of ACIS. In the spring of 2014, the RCCs released a new website for ACIS. This new and improved website not only contains descriptions of ACIS and the sources of data found within, but also features real-world examples of how RCCs and external groups are using ACIS for their particular climate data needs. In addition to these examples, there is extensive documentation and tutorials on how ACIS can be used and accessed by external clients using Web Services. For more information see: <http://rcc-acis.org>.



Additional Summary Information for the High Plains

Missouri River Basin Quarterly Climate Impacts and Outlook

The screenshot shows the cover page of a report titled "Missouri River Basin Quarterly Climate Impacts and Outlook" for September-October 2014. It features a map of the basin, a table of contents, and several sections of text and graphics, including "Highlights for November and October 2014", "Regional - Impacts for September - November 2014", "Regional - Outlook for January - March 2015", and "MO River Basin Partners".

For more information:
<https://www.drought.gov/drought/dews/missouri-river-basin/reports-assessments-and-outlooks>

Midwest and Great Plains Monthly Climate and Drought Webinar

The screenshot shows a video player interface for a webinar titled "20141120 Monthly Climate and Drought Webinar". The video content displays a "Forecast Precipitation Amounts (7 day)" map of the Midwest and Great Plains regions, with a color scale ranging from 0.00 to 2.00 inches.

To sign up for future webinars:
<https://www.drought.gov/drought/calendar/webinars>

For an archive:
www.hprcc.unl.edu/webinars.php

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