



September 2024 Climate Summary

Storms outside of Lincoln, Nebraska, Photo Courtesy of Gannon Rush

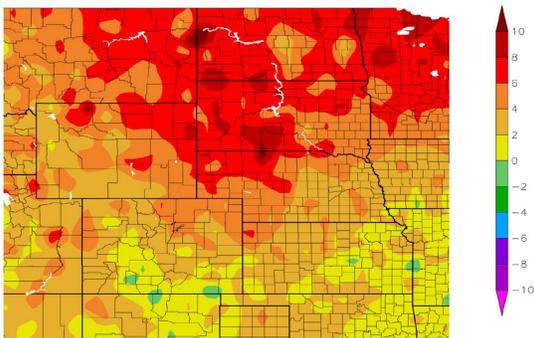
Regional Breakdown

September was a significant step in the wrong direction for the High Plains. Record-breaking heat and dryness plagued the region, with drought concerns amplified heading into the fall months. Conditions also became conducive to wildfires as the month progressed, with several small fires breaking out across the Dakotas.

The warmth early in the year and the recent heat have led to an early harvest across the High Plains. The corn and soybean harvests are ahead of schedule in nearly every state, with near-record corn yields projected in Nebraska. Despite lower rainfall in the previous months, record to near-record yields are expected in Nebraska. On the flip side, those planting winter wheat must make the choice of either planting in dry soils or wait and hope for moisture in the near future. Topsoil moisture conditions that were rated as short to very short in Kansas and South Dakota were above 55 percent, while subsoil moisture was equally poor.

Temperature and Precipitation Overview

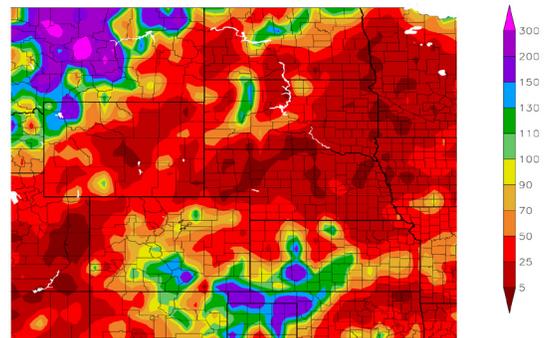
Departure from Normal Temperature (F)
9/1/2024 - 9/30/2024



Generated 10/10/2024 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
9/1/2024 - 9/30/2024



Generated 10/10/2024 at HPRCC using provisional data.

NOAA Regional Climate Centers

Above: Departure from 1991-2020 normal temperature (left) and percent of normal precipitation (right) for September 2024 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

Large swathes of the High Plains received less than an inch (25.4 mm) of precipitation this month, with only a few places in the region reporting above-normal precipitation. The lack of rain led to at least one prominent location in every state to record their driest month.

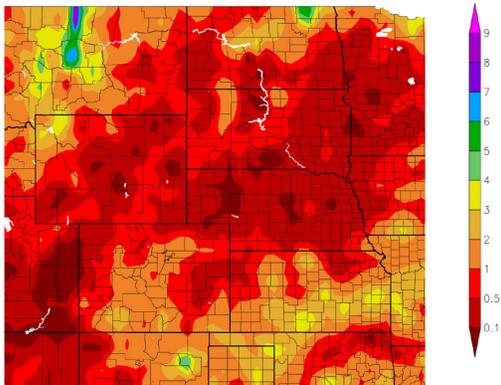
Nebraska was the driest, with 21 stations recording their driest September. Norfolk only observed a mere 0.03 inches (0.76 mm) of precipitation this month, beating their previous record by 0.23 inches (5.84 mm). Nearby Omaha also ranked driest, with only 0.09 inches (2.29 mm) falling. Elsewhere in the state, Chadron, Grand Island, Hastings, Lincoln, and Valentine ranked in the top 5 driest. Outside of a few pockets, the state has not seen widespread rainfall in several months.

The Dakotas were also exceptionally dry this month, with only a few locations in both states observing meaningful rainfall. In South Dakota, Sioux Falls and Mobridge received less than 0.05 inches (1.27 mm) to rank driest. Sisseton and Huron also ranked in the top 5. Up in North Dakota, Fargo ranked driest with only 0.08 inches (2.03 mm)

Wyoming has been extraordinarily dry this year, with parts of the state below 5 inches (12.7 cm) of rain through the end of September. Big Piney in the western part of the state has only recorded 3.32 inches (8.43 cm), with most of it falling in the first half of the year. Combined with the warm temperatures this summer, drought has significantly intensified in Wyoming.

Regional Precipitation

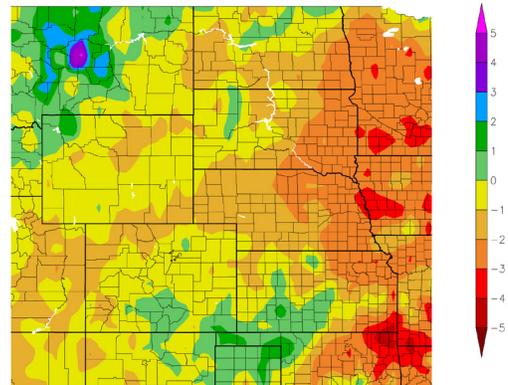
Precipitation (in)
9/1/2024 – 9/30/2024



Generated 10/10/2024 at HPRCC using provisional data.

NOAA Regional Climate Centers

Departure from Normal Precipitation (in)
9/1/2024 – 9/30/2024



Generated 10/10/2024 at HPRCC using provisional data.

NOAA Regional Climate Centers

Above: Total precipitation in inches (left) and departure from normal precipitation in inches (right) for September 2024. 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

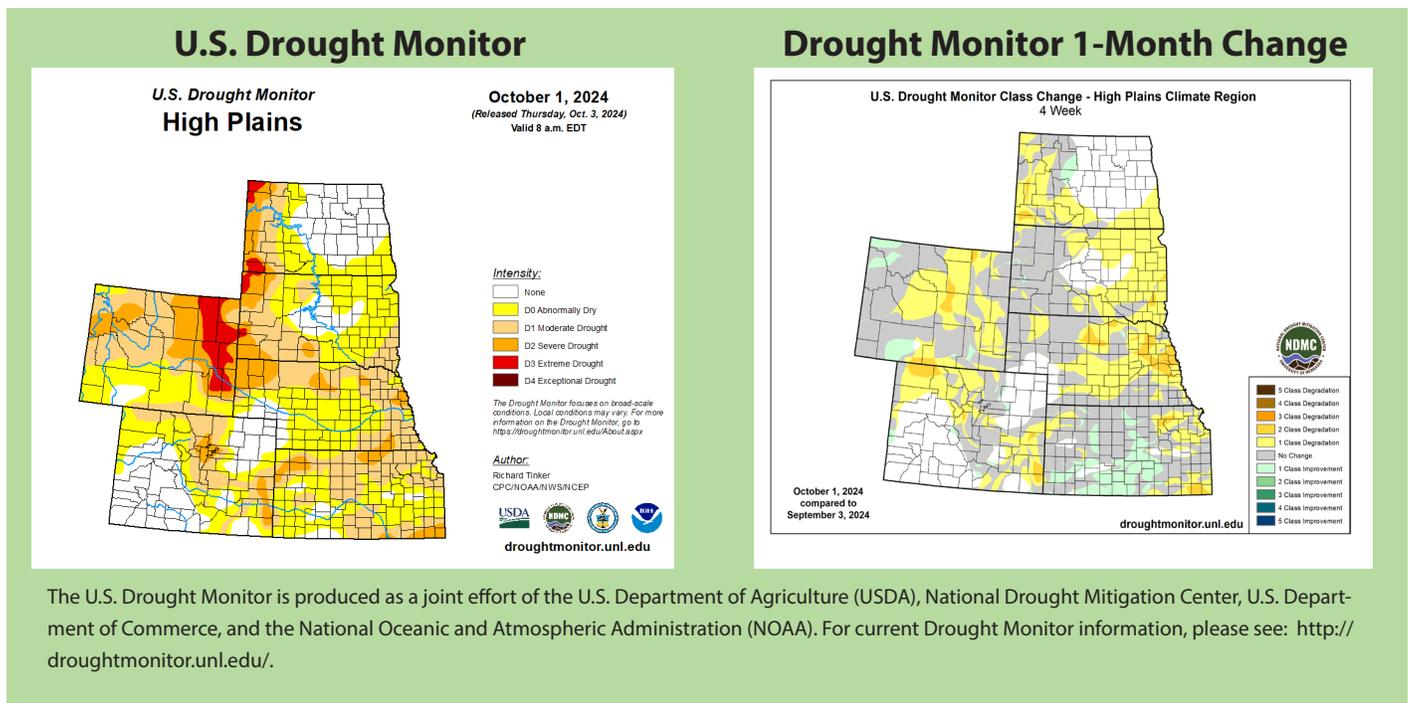
September was scorching hot across the region, with some areas 10 degrees F (5.6 degrees C) above normal. Monthly records were shattered by up to 3 degrees F (1.7 degrees C) in the Dakotas, while every state had a location rank in the top 5 warmest.

Every major location and 19 locations in total in North Dakota recorded their warmest September on record, with several remarkable records coming from the state. Grand Forks recorded an average temperature of 67 degrees F (19.4 degrees C) this month, beating the previous record by 2.8 degrees F (1.6 degrees C). Just to the south, Fargo narrowly missed the statewide average temperature record for September. The town of Hettinger in southwestern North Dakota set the statewide average maximum temperature, with an average high of 86 degrees F (30 degrees C) this month.

Drought Conditions

The heat and dryness this month led to the widespread introduction and intensification of drought in the High Plains. Wyoming was hit the hardest this month, while the western portions of the Dakotas were also taking a significant step backward. Overall, the region observed an increase of 13 percent in abnormally dry to exceptional drought conditions (D0 to D4).

Wyoming, and particularly the eastern part of the state, has experienced below-normal precipitation for nearly a year. Extreme drought (D3) rapidly expanded this month, with 12 percent of the state encompassed at the end of the month. At the beginning of October, nearly 97 percent of the state is in D0 to D4.



Climate Outlooks

According to the Climate Prediction Center, ENSO-neutral conditions are present. A La Niña watch is currently in effect. 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 increased chances of Minor Flooding along the Missouri River through November. According to the National Inter-agency Fire Center (NIFC), fire potential will be elevated in Wyoming and South Dakota in September.

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

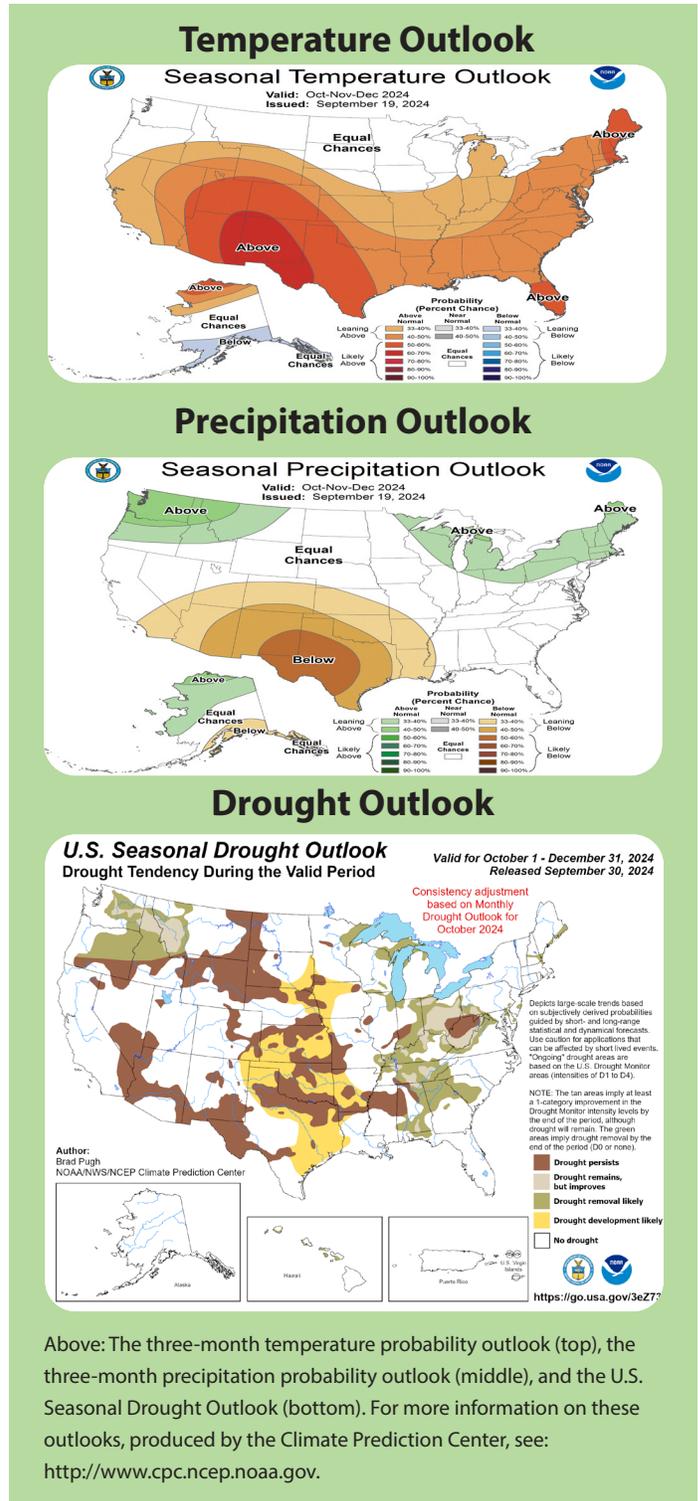
The three-month temperature outlook shows an increased chance of above-normal temperatures across the much of the United States. Above-normal temperatures are possible across the entire High Plains, with Colorado heavily favored.

Precipitation

The outlook for the next three months indicates below-normal precipitation across the west-central United States, while above-normal is possible in the east. Below-normal precipitation is possible in nearly every state in the High Plains.

Drought

The U.S Seasonal Drought Outlook released on August 31st indicates that drought development and expansion is likely throughout the southern High Plains.



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	85.0	52.5	68.7	4.6	95	09/03	43	09/09+	1.13	-0.11	91
Alamosa San Luis Airport	76.8	36.6	56.7	0.8	84	09/03+	30	09/19+	0.77	-0.21	79
Colorado Springs Municipal Airport	81.7	51.0	66.4	3.4	91	09/30	40	09/23	0.87	-0.48	64
Denver International Airport	85.5	54.5	70.0	5.2	94	09/03	44	09/19	1.24	-0.11	92
Grand Junction Walker Field Airport	87.8	59.1	73.4	6.3	93	09/03	49	09/18	0.27	-0.92	23
Pueblo Memorial Airport	87.3	51.2	69.2	2.6	97	09/26	39	09/23	0.67	0.02	103

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	86.4	57.2	71.8	3.3	96	09/20	48	09/23	0.58	-2.22	21
Dodge City Regional Airport	87.3	57.7	72.5	2.5	96	09/17	44	09/23	2.56	1.25	195
Goodland Renner Field	88.7	53.8	71.3	6.0	98	09/15	41	09/23	0.37	-1.03	26
Topeka Municipal Airport	86.0	57.5	71.9	2.7	96	09/19+	48	09/07+	1.37	-2.15	39
Wichita Mid-Continent Airport	86.8	60.0	73.4	1.7	102	09/19	52	09/25	1.87	-1.18	61

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	89.4	49.9	69.7	6.9	101	09/03	34	09/22+	0.09	-1.50	6
Grand Island Airport	84.7	56.4	70.6	4.0	94	09/20	44	09/23	0.36	-1.64	18
Lincoln Municipal Airport	86.9	55.4	71.2	4.0	96	09/20	42	09/07	0.20	-2.70	7
Norfolk Karl Stefan Airfield	84.4	54.9	69.7	5.3	92	09/20+	38	09/23	0.03	-2.34	1
North Platte Regional Airport	85.8	51.8	68.8	4.6	95	09/09	34	09/23	0.23	-1.38	14
Omaha Eppley Airport	84.1	56.9	70.5	2.9	94	09/20	47	09/07+	0.09	-2.87	3
Valentine Miller Field	87.3	53.4	70.4	6.2	97	09/10	38	09/22	0.09	-1.63	5

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismarck Municipal Airport	83.6	50.9	67.3	7.6	97	09/29	35	09/22	0.21	-1.51	12
Fargo International Airport	80.9	55.6	68.2	8.2	91	09/17	39	09/22	0.08	-2.60	3
Grand Forks International Airport	80.1	53.9	67.0	9.1	88	09/08+	39	09/22	0.43	-1.83	19
Theodore Roosevelt Airport	83.2	47.3	65.3	6.8	97	09/02	32	09/22	0.22	-1.40	14
Williston International Airport	81.2	51.0	66.1	8.1	95	09/03+	38	09/22	0.74	-0.62	54

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>.

September 2024 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	82.6	52.8	67.7	6.8	92	09/28	36	09/22	0.42	-1.57	21
Huron Regional Airport	83.0	53.3	68.1	5.5	90	09/15+	37	09/22	0.16	-2.27	7
Pierre Regional Airport	86.1	55.5	71.2	7.6	98	09/29	45	09/06+	1.13	-0.61	65
Rapid City Regional Airport	87.8	52.1	70.0	8.7	100	09/02+	36	09/22	1.18	-0.04	97
Sioux Falls Joe Foss Field Airport	82.2	55.3	68.7	4.9	91	09/28	42	09/23	0.04	-2.69	1

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	82.4	44.2	63.3	4.4	94	09/02	30	09/14+	0.24	-0.71	26
Cheyenne Municipal Airport	79.9	48.2	64.0	4.4	89	09/03	40	09/23	0.37	-1.10	25
Lander Hunt Field Airport	80.8	48.6	64.7	5.1	91	09/01	36	09/22	0.40	-0.58	41
Laramie Regional Airport	78.5	41.6	60.0	5.7	88	09/25	34	09/20	0.50	-0.61	45
Rawlins Municipal Airport	78.6	42.4	60.5	4.0	88	09/01	30	09/14	0.02	-0.87	2
Sheridan County Airport	85.6	46.7	66.2	7.1	102	09/25	33	09/22	0.39	-1.08	27

September 2024 Highlights

Monthly Rankings

Temperature in degrees Fahrenheit, Precipitation in inches

Temperature	Temperature / Ranking	Record / Year	Period of Record
Sisseton, South Dakota	67.9 / Warmest	67.0 / 1933	1931-2024
Mobridge, South Dakota	70.8 / Warmest	67.5 / 1940	1911-2024
Rapid City, South Dakota	70.0 / Warmest	67.1 / 1952	1871-2024
Bismarck, North Dakota	67.3 / Warmest	67.1 / 1897	1874-2024
Williston, North Dakota	66.1 / Warmest	64.3 / 2009	1894-2024
Dickinson, North Dakota	65.3 / Warmest	64.2 / 1998	1938-2024
Fargo, North Dakota	68.2 / Warmest	67.0 / 2023	1881-2024
Grand Forks, North Dakota	67.0 / Warmest	64.2 / 2009	1893-2024
Denver, Colorado	70.0 / Warmest	69.4 / 2015	1872-2024
Grand Junction, Colorado	73.4 / Warmest	72.0 / 1979	1893-2024
Sheridan, Wyoming	66.2 / Warmest	65.3 / 1963	1907-2024
Chadron, Nebraska	69.7 / Warmest	67.7 / 2022	1941-2024
Valentine, Nebraska	70.4 / Warmest	69.9 / 1897	1889-2024
Precipitation	Precipitation / Ranking	Record / Year	Period of Record
Mobridge, South Dakota	0.01 / Driest	0.05 / 2012	1911-2024
Omaha, Nebraska	0.09 / Driest	0.24 / 1888	
Sioux Falls, South Dakota	0.04 / Driest	0.20 / 2011	1893-2024
Fargo, North Dakota	0.08 / Driest	0.12 / 2012	1881-2024

All data are preliminary and subject to change. + indicates multiple dates, latest date listed. * indicates some missing data for the period. 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>.

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. Key sections include "National - Significant Events for September - November 2014", "Regional - Impacts for September - November 2014", "Regional - Climate Overview for September - November 2014", "Drought Co-Occurrence", "3 Month Precipitation and Temperature Outlooks", and "Soil Moisture Conditions".

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 for a webinar titled "20141120 Monthly Climate and Drought Webinar". The main content is a map titled "Forecast Precipitation Amounts (7 day)" showing precipitation forecasts for the Midwest and Great Plains regions. The map uses a color scale from blue (low) to red (high). A play button is visible in the center of the map.

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

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

Author Information

For questions, comments, or suggestions, please contact:
Gannon Rush
711 Hardin Hall, 3310 Holdrege Street
Lincoln, NE 68583-0997
402-472-8968
<https://hprcc.unl.edu/contact.php>

