August 2024 Climate Summary

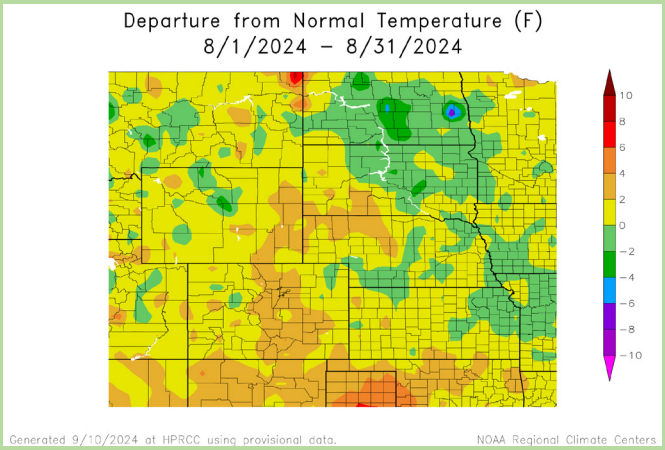
Regional Breakdown

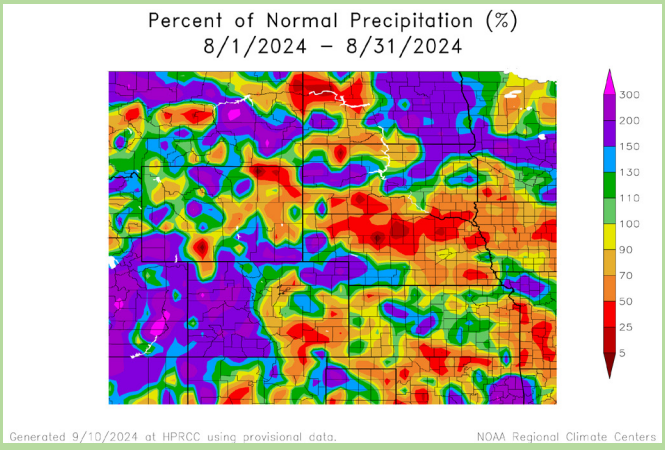
The heat that impacted the northwestern part of the region in July spread south this month, with nearly the entire western half of the High Plains experiencing above-normal temperatures. Parts of Colorado and Wyoming skyrocketed over 100 degrees F (37.8 degrees C), with areas above 6500 feet (1981 meters) even passing the century mark.

While severe weather was relatively quiet for the region outside of Colorado, several notable events occurred this month. On the 25th, a microburst from a surprise storm occurred during an air show at McConnell Air Force Base in Wichita, Kansas, leaving 10 injured and canceling a performance by the Blue Angels. In Wyoming, Devil's Tower was pummeled by 2.75-inch (6.99 cm) hail and caused significant damage. The National Park Service was forced to close the monument for two days due to the destruction.

Colorado was the epicenter of unusual weather this month. Early in the month, an EF1 tornado with 100 mph (161 km/h) winds carved a 0.92 mile (1.48 kilometers) long path near Pikes Peak. At 10,050 feet (3063 meters), tornadoes do not normally form at such high elevations. Later in the month, the nearby town of Cascade was buried beneath a deep layer of hail. So much had fallen, that it caused a layer of "hail fog" to form.

Temperature and Precipitation Overview





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

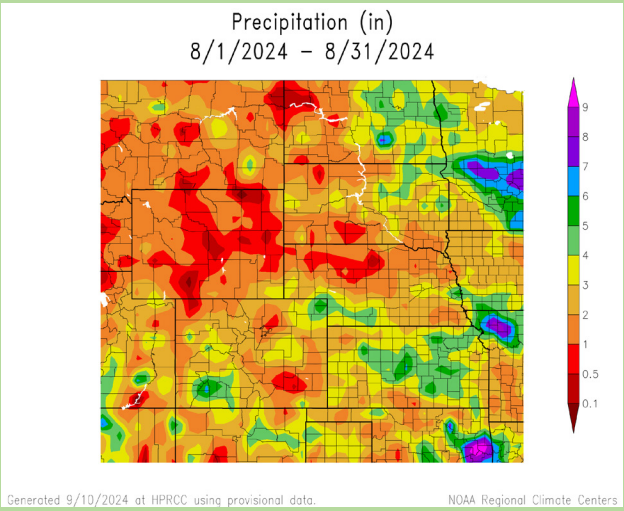
Precipitation in August was plentiful west of the Rockies this month, with the North American Monsoon in overdrive for western Colorado and into southern Wyoming. Kansas and Nebraska were not as fortunate, with large portions of both states with below normal precipitation.

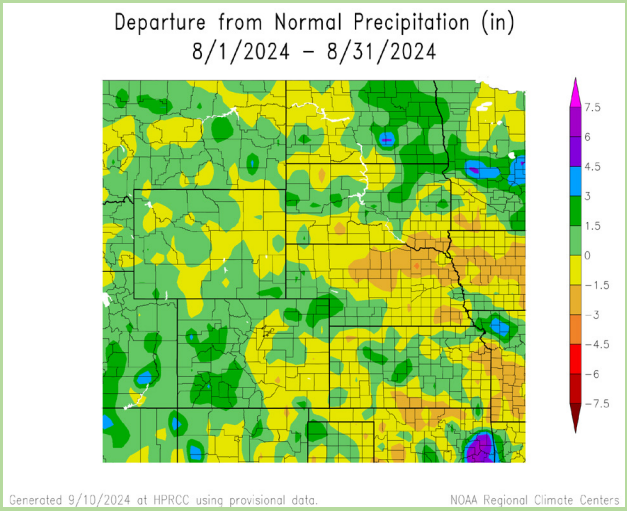
Concerns about drought in western Colorado were increasing at the beginning of the month, however, monsoon rains alleviated those concerns. Monte Vista observed their wettest August and their wettest month on record, with 4.44 inches (11.28 cm) of rain. Altenbern crushed their record for August and was just short of the all-time monthly record, with 5.26 inches (13.36 cm) of rain. Several Snow Telemetry (SNOTEL) stations in the higher elevations also recorded their wettest August. Multiple stations across the western part of the state also recorded their wettest summer, further highlighting the impact of the monsoon this year.

Outside of Colorado, a few other places received record to near-record amounts of rain this past month. Parts of eastern North Dakota surpassed their monthly precipitation records, with soil moisture percentiles above 95 percent at the end of the month in the area.

With the end of summer, some were more fortunate than others. Dodge City, Kansas recorded its third wettest and most summertime rain totals since 1889, with 17.75 inches (45.09 cm). To the south in Colorado, Alamosa tied with 2017 for the 8th wettest with 4.44 inches (11.28 cm). Eastern Wyoming and western South Dakota were below 50 percent of their normal precipitation this summer. Rapid City ranked 5th driest, with only 2.87 inches falling through the end of August.

Regional Precipitation





Above: Total precipitation in inches (left) and departure from normal precipitation in inches (right) for August 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

Temperatures were near normal for much of the region this month. Parts of the Dakotas were slightly below normal, while the Front Range into western Nebraska experienced warmer than normal temperatures.

Several locations in the west ranked in the top 10 warmest this month, with Alamosa, Colorado just barely breaking their record. The average temperature was 66.1 degrees F (18.9 degrees C), narrowly topping the previous record of 66.0 degrees F (18.9 degrees C). To the east, Denver ranked 4th warmest, while Pueblo ranked 7th and Colorado Springs tied for 8th. In southeastern Wyoming, Laramie recorded their 2nd warmest August and fell just short of the record set in 2020.

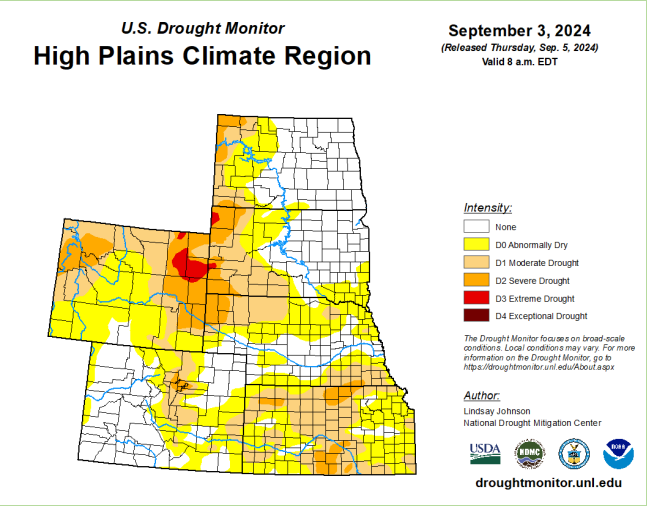
Drought Conditions

Outside of the beneficial rains in Colorado and parts of Kansas, much of the region was dry and drought intensified as a result. Several states experienced a two-category degradation, while the areas that did receive rain improved by two categories. Overall, the region observed an increase of over 13 percent in D0 to D4 (abnormally dry to exceptional drought conditions).

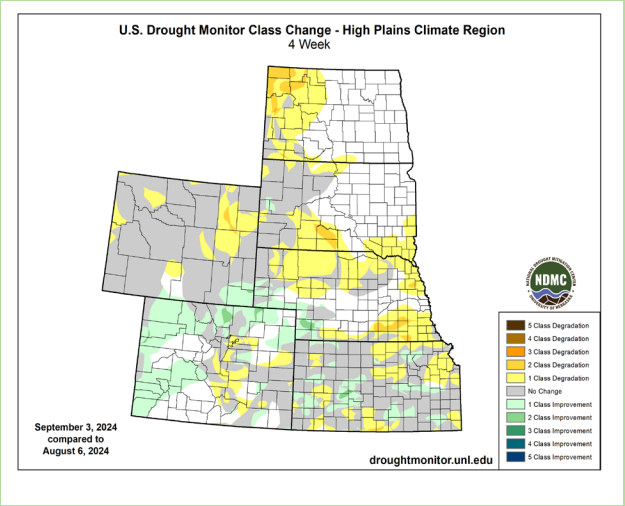
Wyoming was hit hardest this month, with extreme drought (D3) introduced and expanded in the northeastern part of the state. Large fires broke out in the state due to persistent dryness and 96 percent of the state is abnormally dry at the end of August.

While parts of Kansas did see improvement, the state observed a 14 percent increase in drought conditions, and 50 percent of the state is being impacted. The north and south-central parts of the state currently have several counties in severe drought (D2), leading to concerns for winter wheat planting.

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/.

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 Interagency 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.

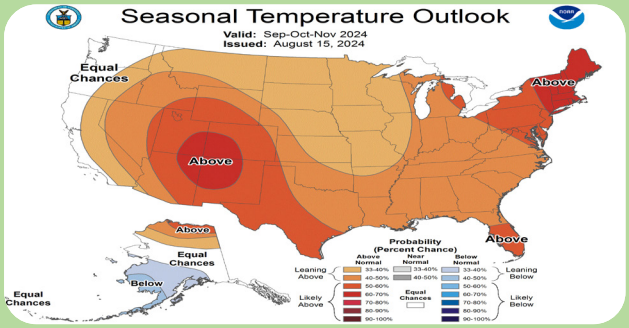
Precipitation

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.

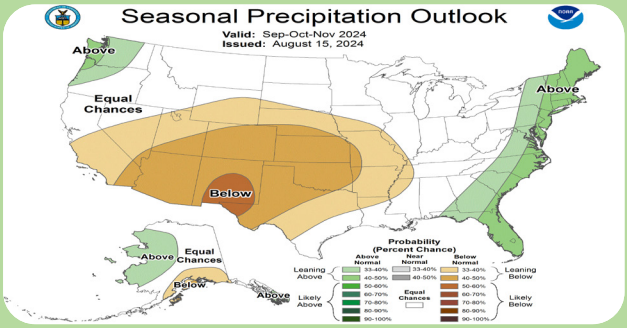
Drought

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

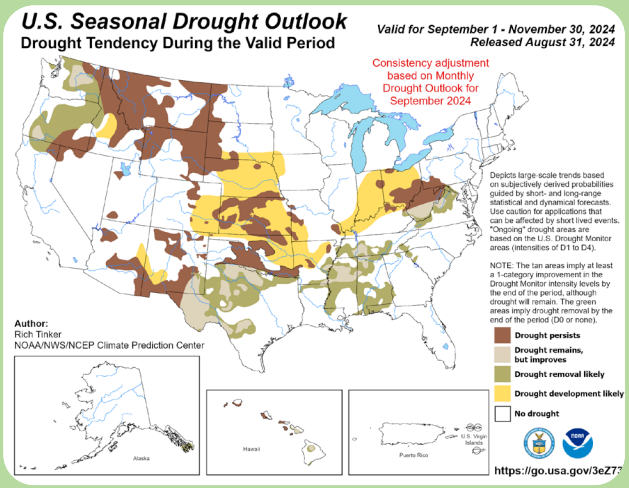
Temperature Outlook



Precipitation Outlook



Drought Outlook



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	87.0	59.5	73.3	0.8	98	08/02	48	08/30	3.10	0.74	131
Alamosa San Luis Airport	83.0	49.2	66.1	2.9	92	08/05	39	08/31	1.80	0.51	140
Colorado Springs Municipal Airport	85.4	58.5	71.9	1.8	93	08/03+	50	08/31	2.83	-0.13	96
Denver International Airport	90.6	60.6	75.6	2.7	102	08/04	50	08/30	0.92	-0.66	58
Grand Junction Walker Field Airport	92.7	64.7	78.7	2.4	103	08/01	56	08/27	1.62	0.70	176
Pueblo Memorial Airport	93.2	62.3	77.8	3.0	102	08/17+	52	08/31	0.81	-1.30	38

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	88.8	65.5	77.0	0.6	107	08/05	57	08/09+	2.83	-0.66	81
Dodge City Regional Airport	91.4	65.6	78.5	0.4	105	08/18+	56	08/10+	3.28	0.29	110
Goodland Renner Field	89.4	62.2	75.8	2.2	105	08/05+	52	08/30	2.03	-1.03	66
Topeka Municipal Airport	89.2	66.9	78.0	0.1	102	08/26	54	08/09	2.71	-1.84	60
Wichita Mid-Continent Airport	91.0	68.9	79.9	0.0	105	08/14	62	08/09+	4.17	-0.13	97

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	92.4	58.3	75.4	2.6	106	08/03	43	08/03	1.94	0.67	153
Grand Island Airport	85.6	63.1	74.4	-0.2	96	08/25	54	08/09+	2.08	-1.12	65
Lincoln Municipal Airport	87.5	64.6	76.1	0.5	100	08/25	52	08/31	1.50	-1.82	45
Norfolk Karl Stefan Airfield	84.0	62.5	73.2	0.8	96	08/02	50	08/10	1.74	-1.76	50
North Platte Regional Airport	86.2	60.8	73.5	0.5	98	08/04	44	08/30	1.55	-1.01	61
Omaha Eppley Airport	85.4	65.1	75.2	-0.5	97	08/25+	52	08/09	3.00	-1.60	65
Valentine Miller Field	89.4	60.7	75.0	1.4	104	08/03	48	08/30	1.50	-0.54	74

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismarck Municipal Airport	80.4	56.8	68.6	-1.0	98	08/01	44	08/10	2.93	0.43	117
Fargo International Airport	80.1	59.0	69.5	0.7	93	08/03	46	08/10	2.88	0.28	111
Grand Forks International Airport	80.4	57.7	69.1	2.1	93	08/01	46	08/10	4.83	2.02	172
Theodore Roosevelt Airport	81.1	54.6	67.9	-0.6	100	08/02	41	08/08	2.28	0.75	149
Williston International Airport	83.3	56.8	70.1	1.1	100	08/02	41	08/08	0.41	-1.16	26

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.

August 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	81.8	59.3	70.5	0.8	98	08/03	44	08/10	4.64	2.4	207
Huron Regional Airport	81.6	59.7	70.7	-0.6	98	08/03	44	08/09	2.86	0.27	110
Pierre Regional Airport	85.3	59.9	72.6	-0.4	102	08/03	44	08/09	3.54	1.59	182
Rapid City Regional Airport	89.0	58.4	73.7	2.9	103	08/02	44	08/10	0.97	-0.62	61
Sioux Falls Joe Foss Field Airport	82.0	61.1	71.6	-0.4	93	08/02	48	08/10	2.19	-1.15	66

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	88.4	51.5	70.0	1.0	99	08/03	34	08/30	0.39	-0.40	49
Cheyenne Municipal Airport	83.3	55.4	69.3	1.2	94	08/01	45	08/30	3.24	1.72	213
Lander Hunt Field Airport	86.9	54.5	70.7	0.9	100	08/03	42	08/29	0.74	0.22	142
Laramie Regional Airport	83.1*	50.6*	66.9*	4.1*	94*	08/02	38*	08/27+	2.99	1.85	262
Rawlins Municipal Airport	84.7	51.0	67.9	2.1	97	08/03	36	08/30	0.58	-0.15	79
Sheridan County Airport	88.6	53.7	71.2	2.1	105	08/02	41	08/29	0.82	0.11	115

August 2024 Highlights

Monthly Rankings

Temperature in degrees Fahrenheit, Precipitation in inches

Temperature	**Temperature / Ranking**	**Record / Year**	**Period of Record**
Alamosa, Colorado	66.1 / Warmest	66.0 / 2011	1906-2024
Denver, Colorado	75.6 / 4th Warmest	77.0 / 2020 and 2011	1872-2024
Pueblo, Colorado	77.8 / 7th Warmest	79.8 / 1970	1888-2024
Precipitation	**Precipitation / Ranking**	**Record / Year**	**Period of Record**
Laramie, Wyoming	2.99 / 2nd Wettest	3.58 / 1958	1948-2024

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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.

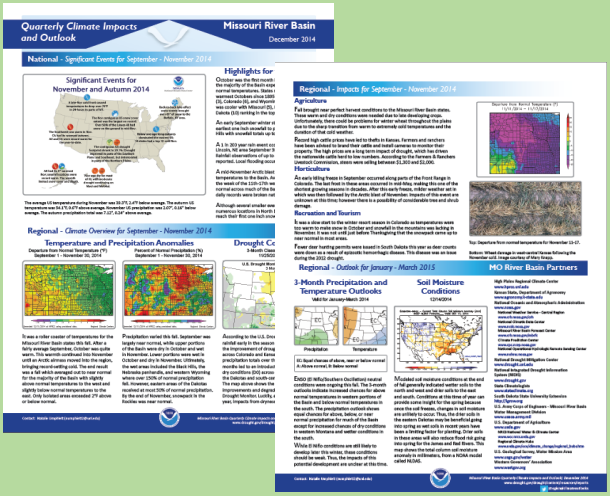
Much of the data and products found throughout this publication were built on the Applied Climate Information System (ACIS) framework. ACIS was designed to manage the complex flow of information from climate data collectors to the end users of climate data information. The main purpose of ACIS is to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

ACIS Applied Climate Information System

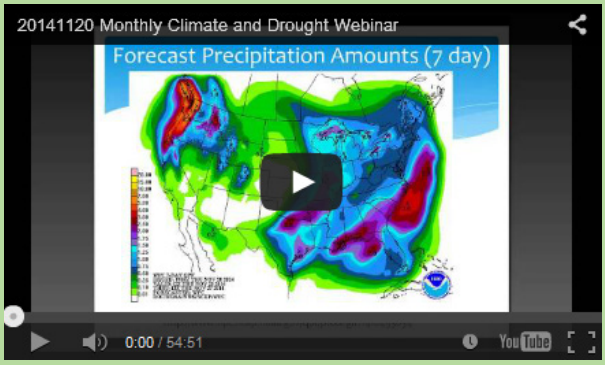
Additional Summary Information for the High Plains

Missouri River Basin Quarterly Climate Impacts and Outlook



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



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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HPRCC

NOAA National Oceanic and Atmospheric Administration, US Department of Commerce