

ND State Climate Office Bi-Weekly Drought Update

Adnan Akyuz, Ph.D.

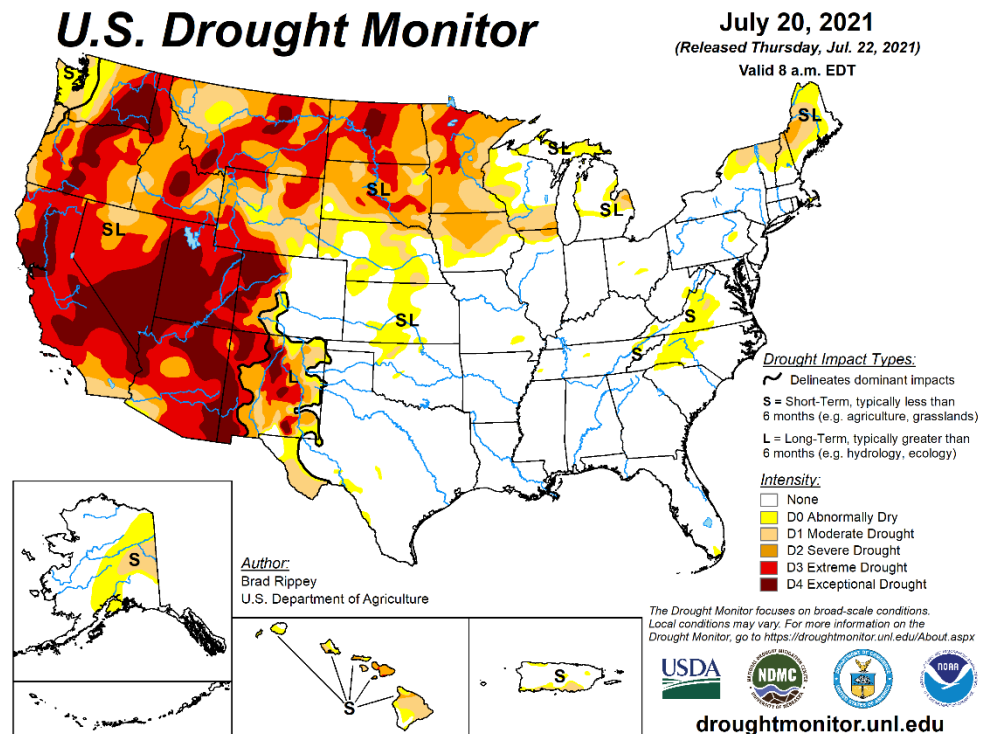
NDSU, AES

State Climatologist

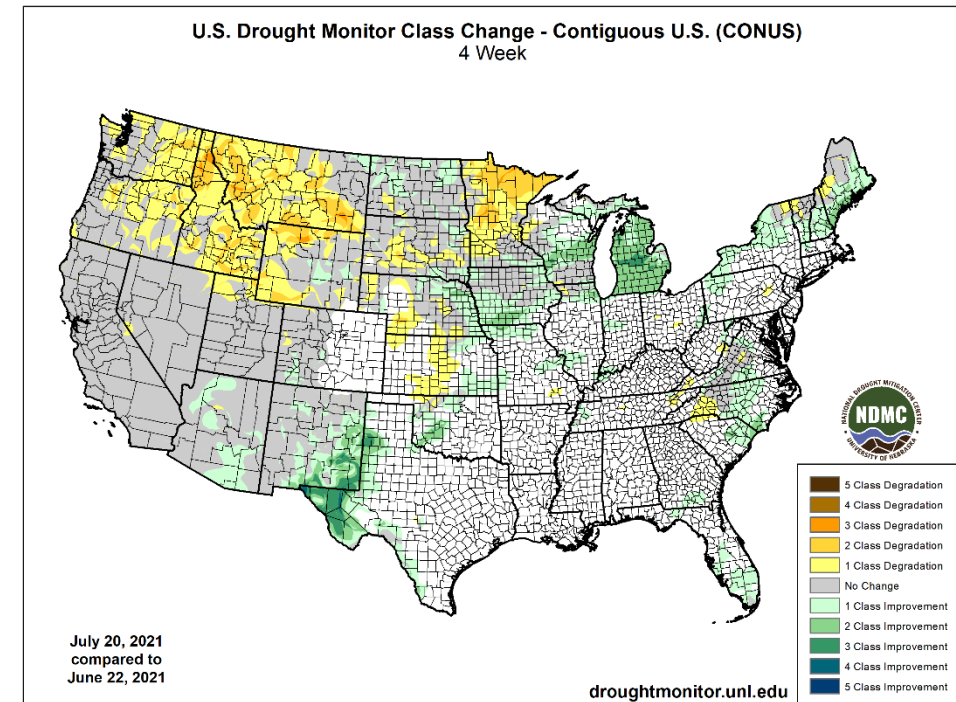
Last Update: 7/22/2021

US Drought Monitor

Current

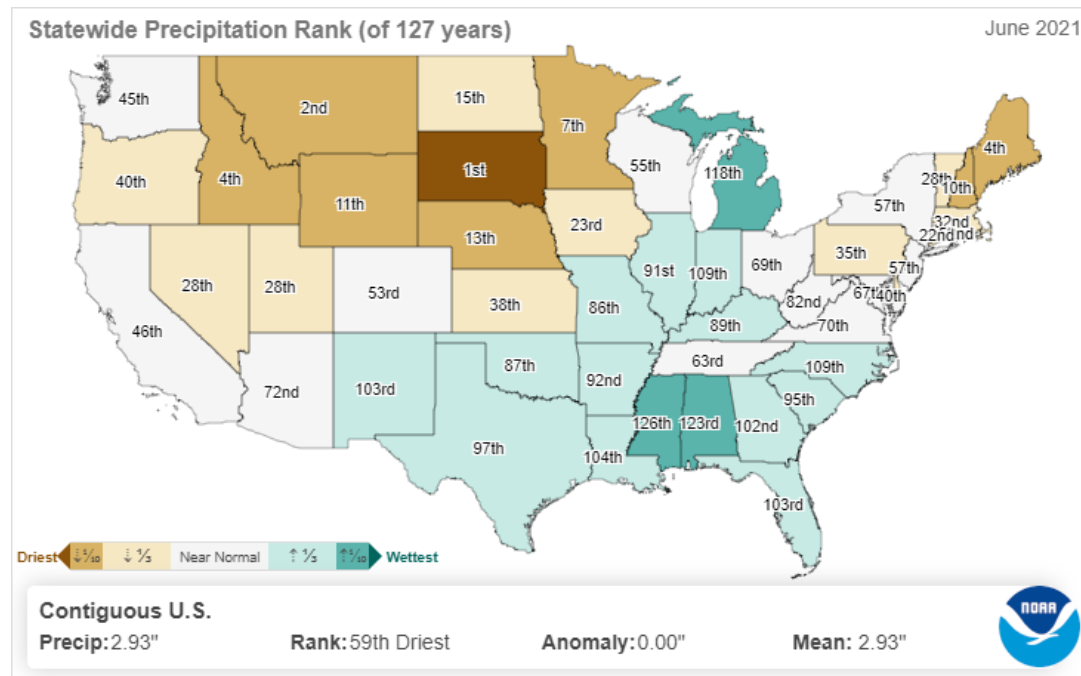


4-week change

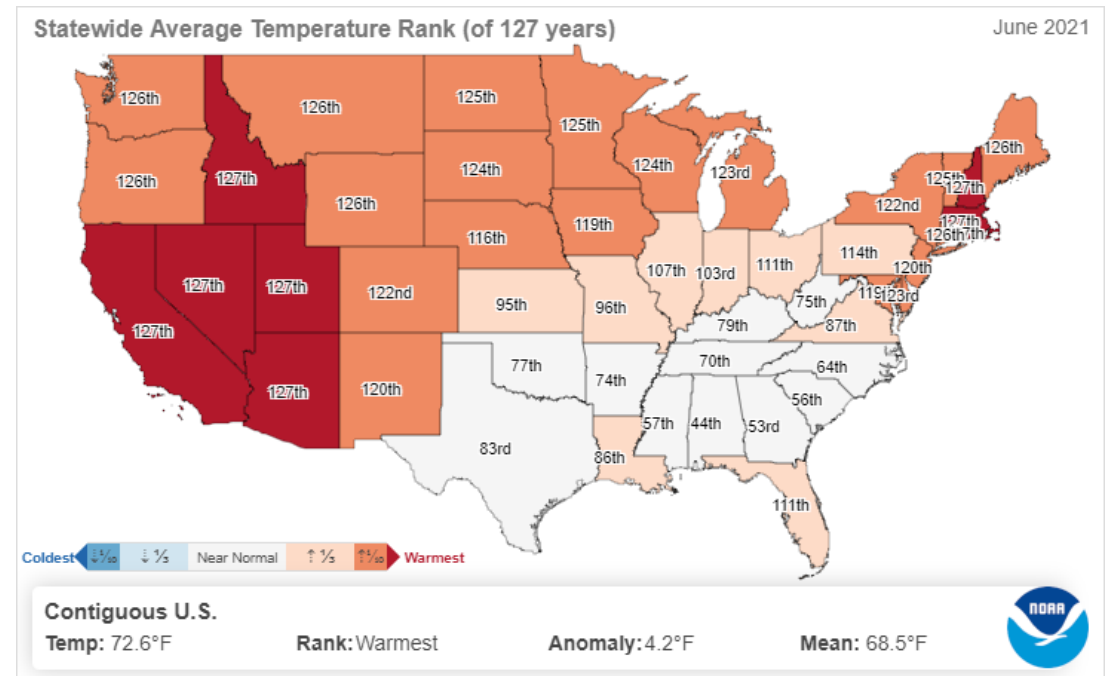


State-wide Precipitation and Temperature Rankings Last Month

**June Precipitation in ND:
15th Driest Month**

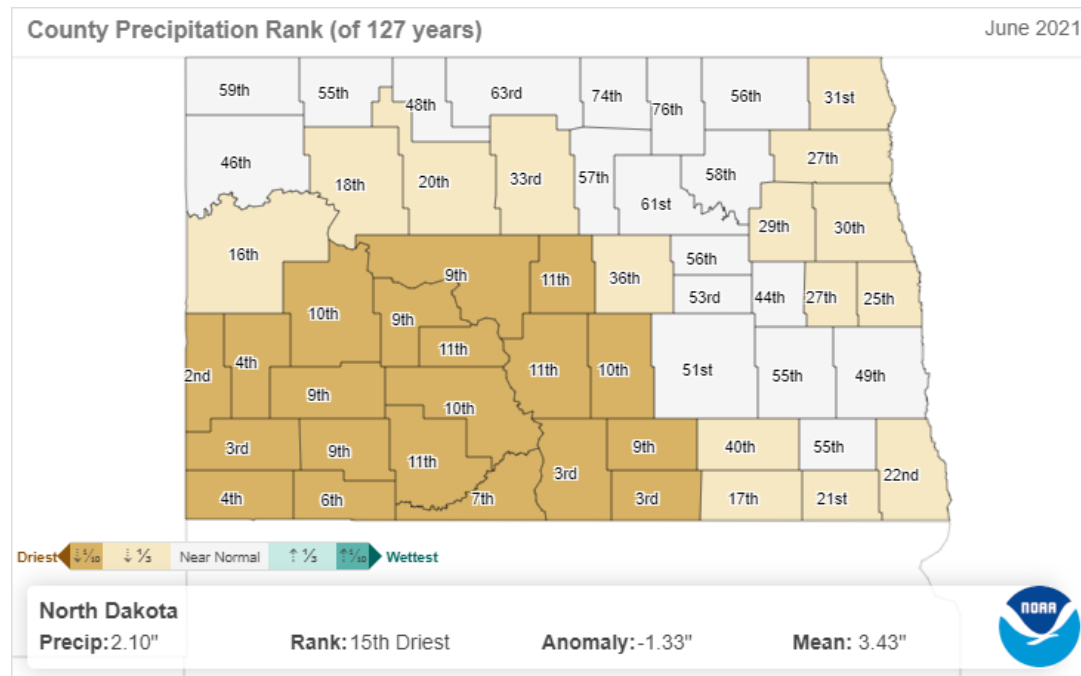


**June Temperature in ND:
3rd Coldest Month**

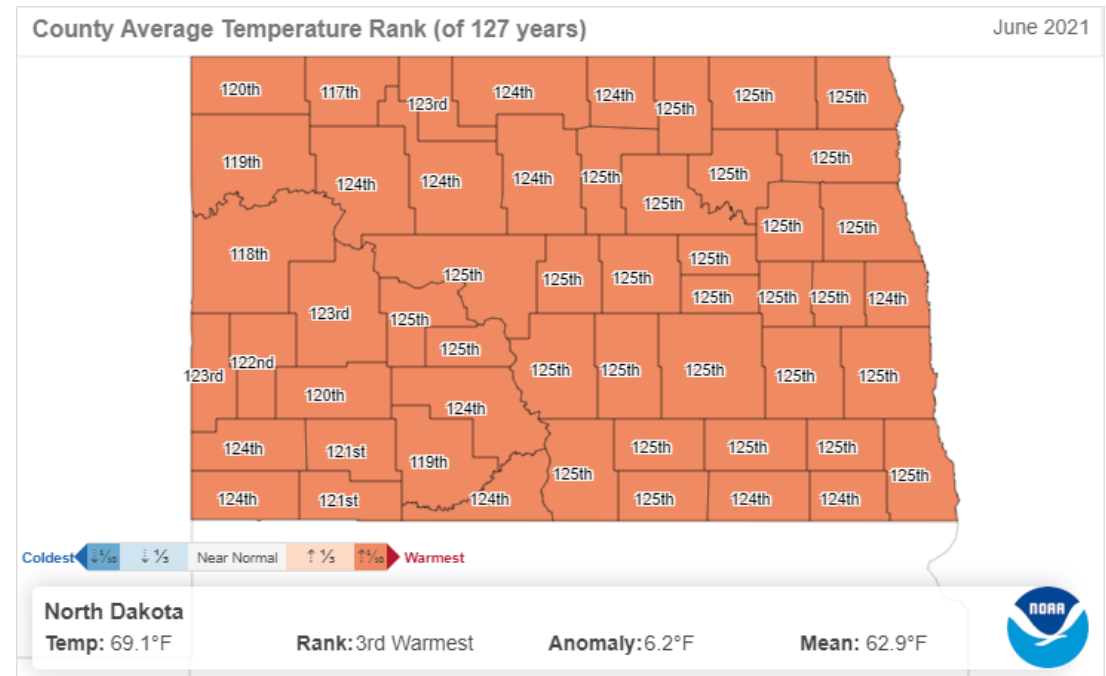


County-wide Precipitation and Temperature Rankings Last Month

June Precipitation

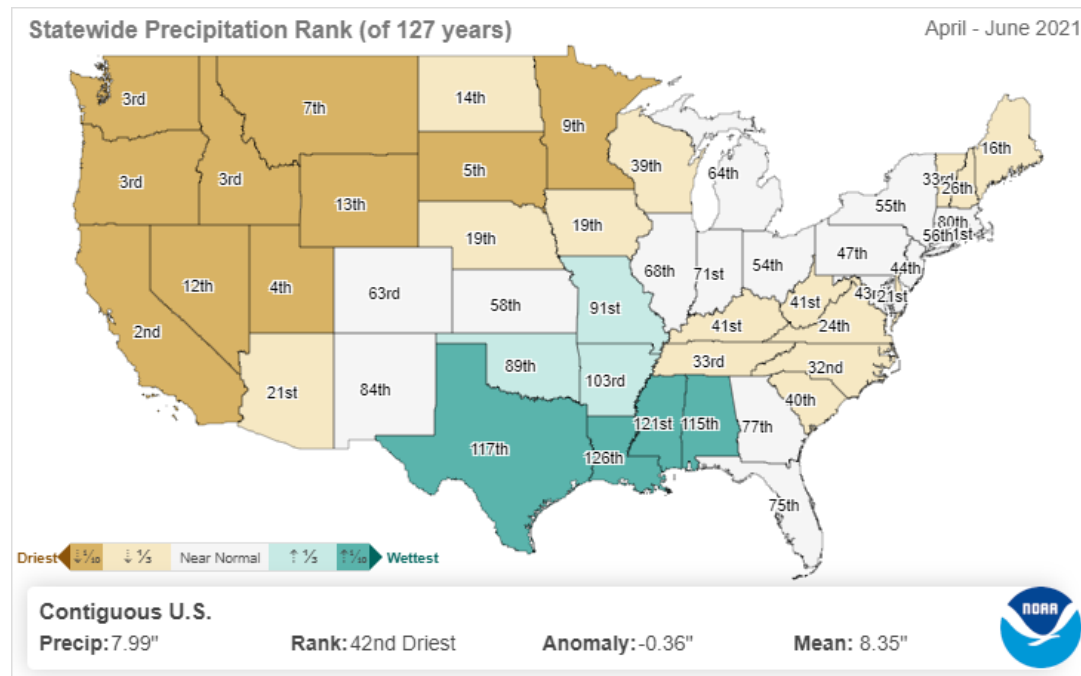


June Temperature

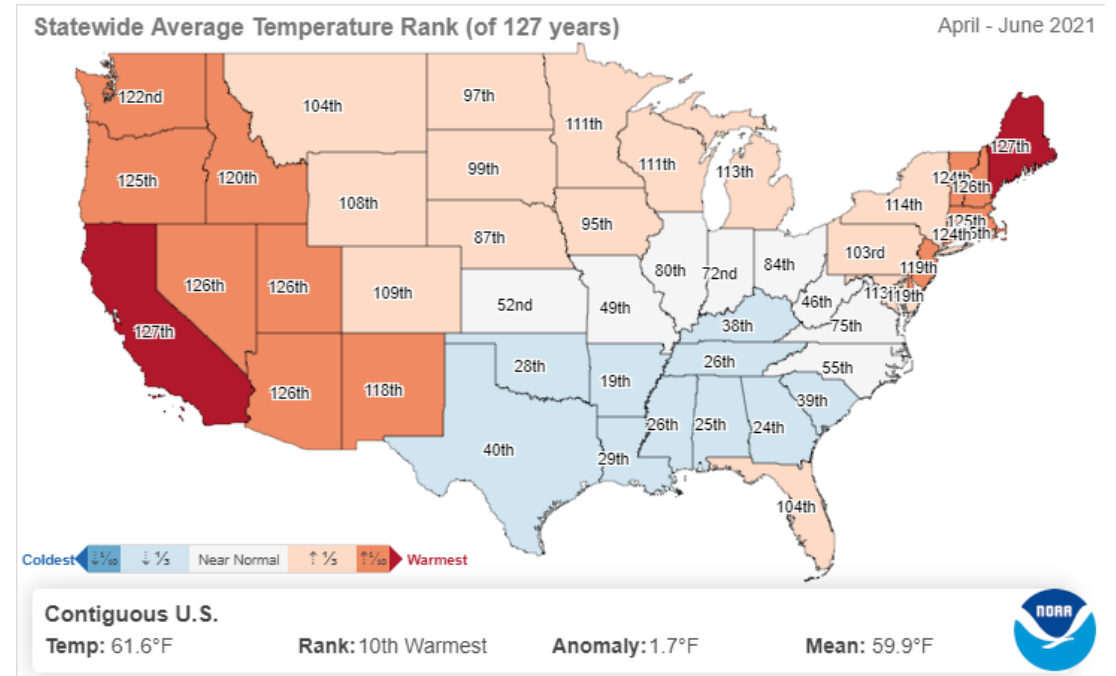


State-wide Precipitation and Temperature Rankings Last 3 Months

**Apr-Jun Precipitation in ND:
14th Driest Season**

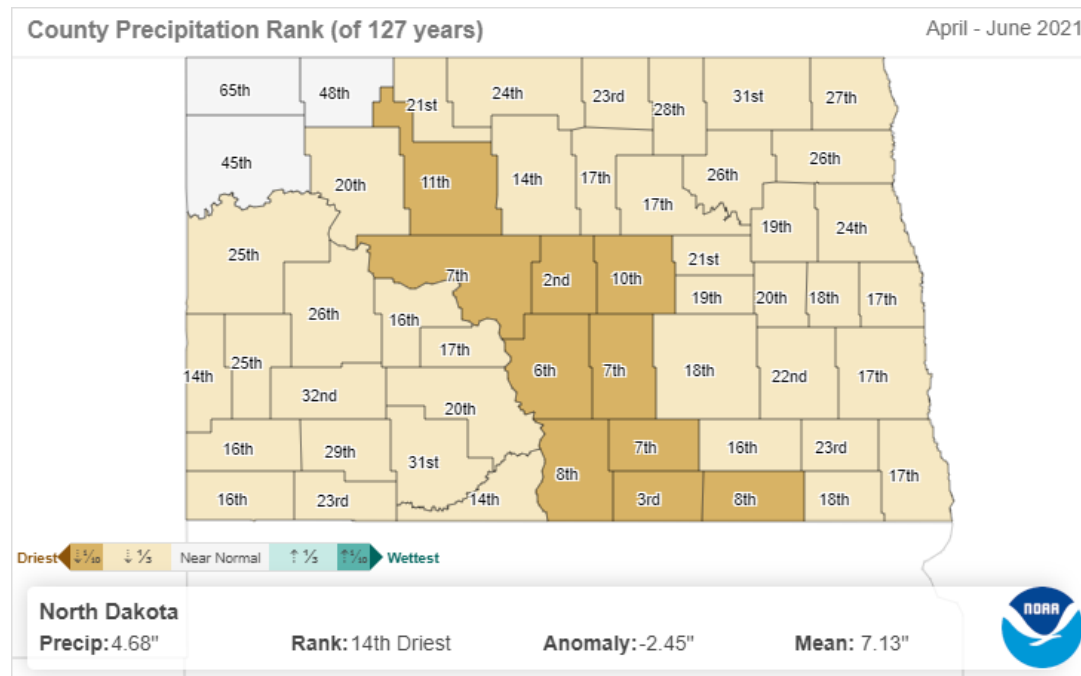


**Apr-Jun Temperature in ND:
31st Warmest Season**

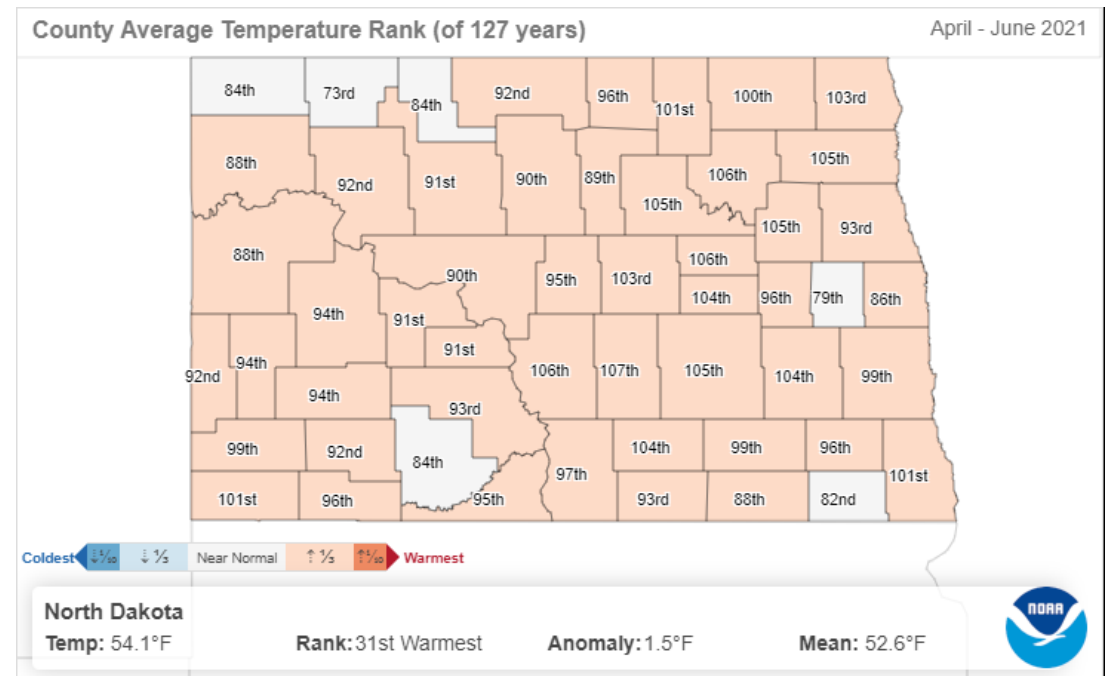


County-wide Precipitation and Temperature Rankings Last 3 Months

Apr-Jun Precipitation

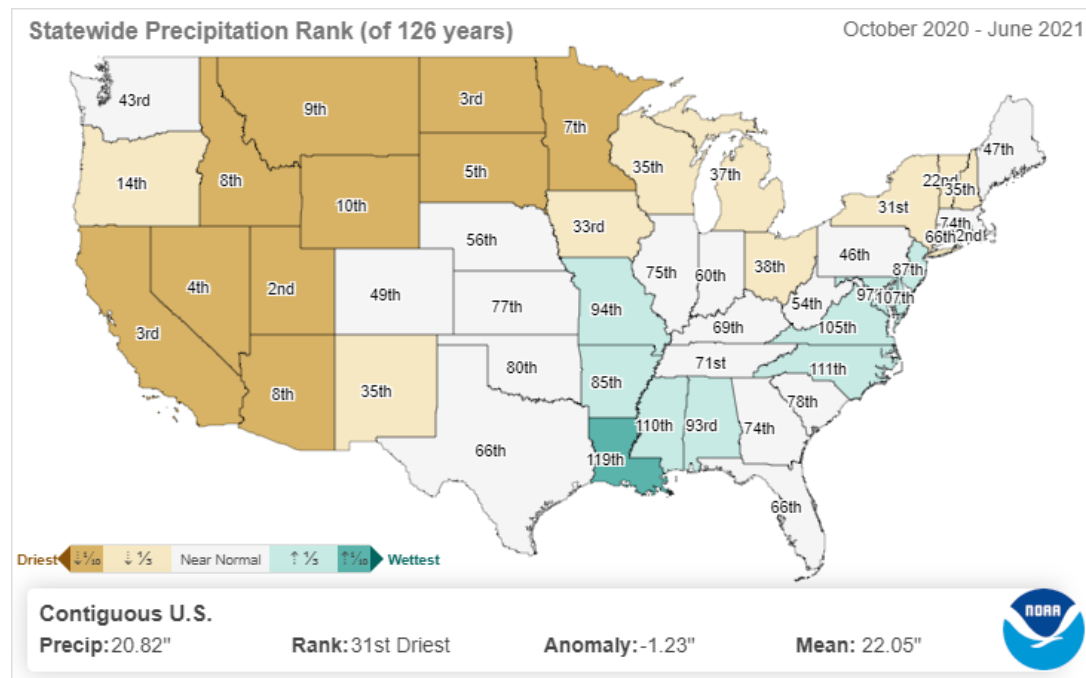


Apr-Jun Temperature

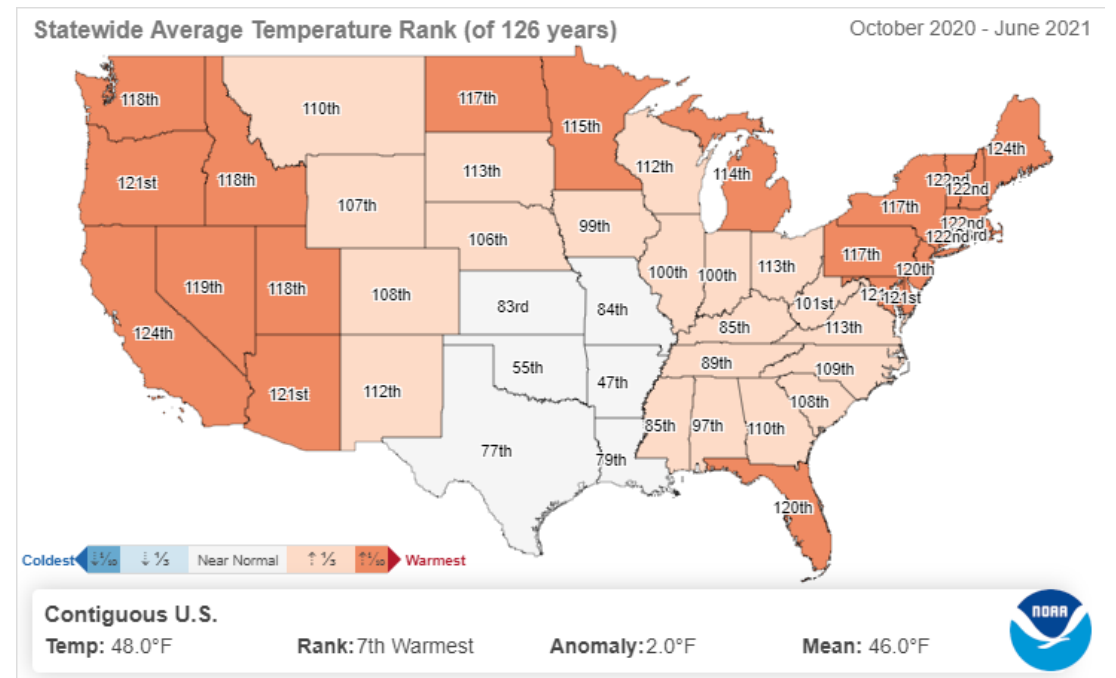


State-wide Precipitation and Temperature Rankings Last 9 Months

**Oct-Jun Precipitation in ND:
3rd Period on Record**

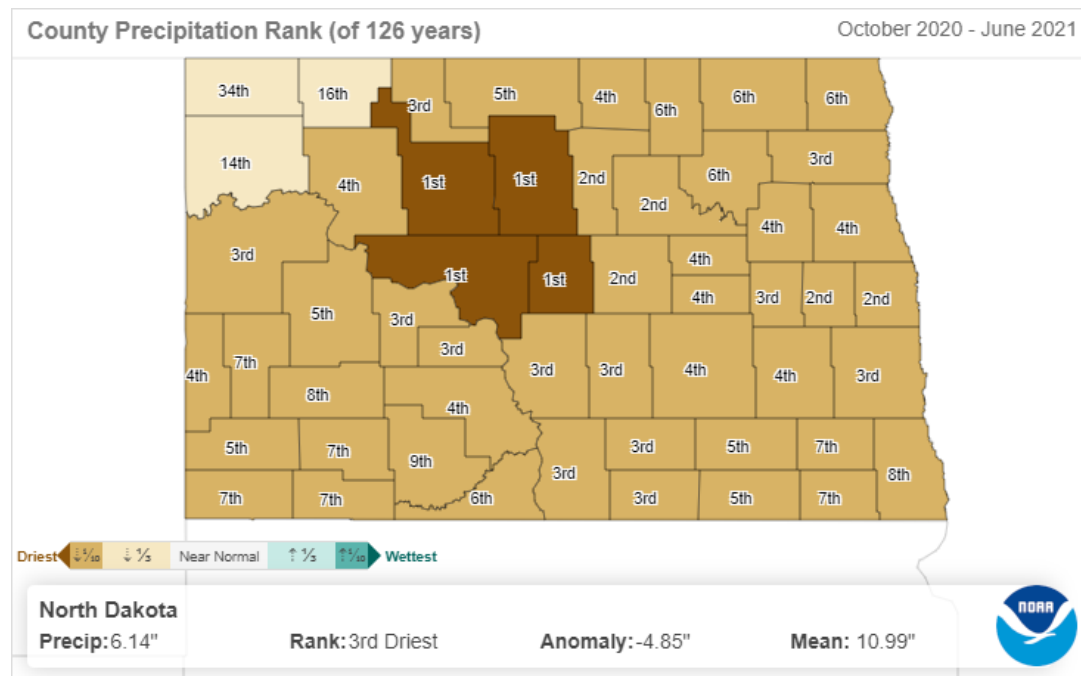


**Oct-Jun Temperature in ND:
10th Warmest Season on Record**

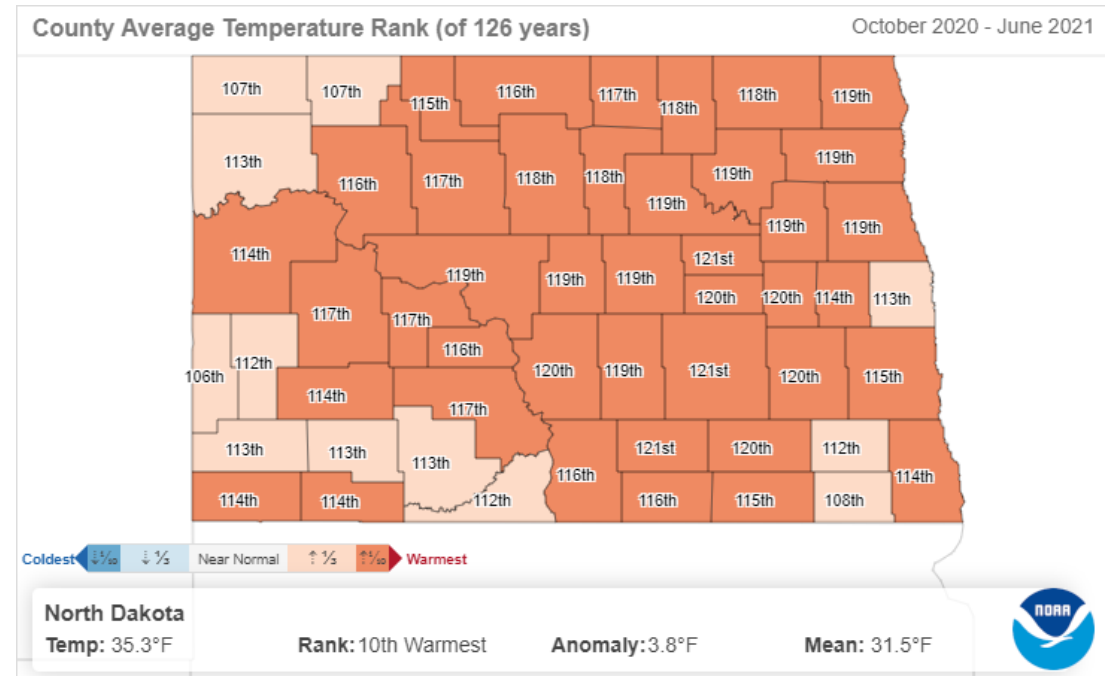


County-wide Precipitation and Temperature Rankings Last 9 Months

Oct-Jun Precipitation

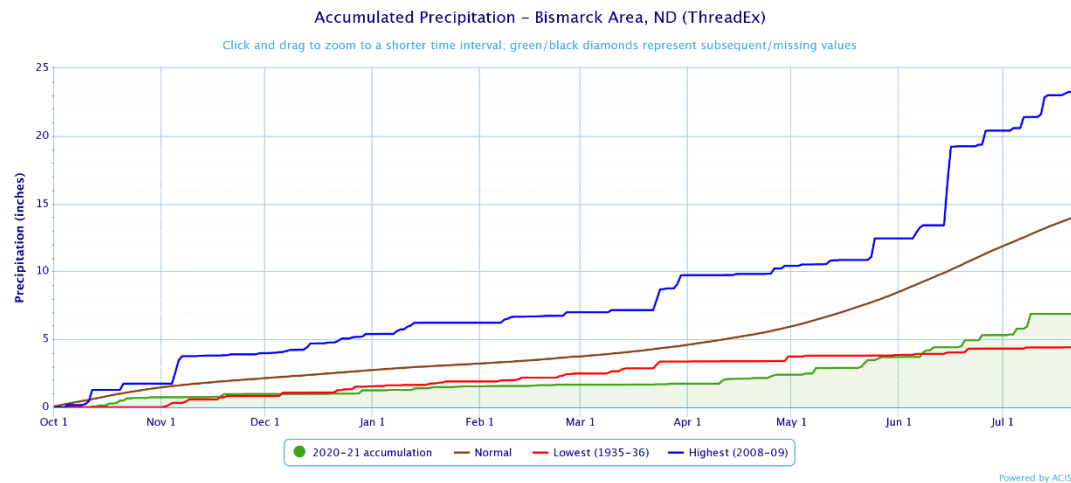


Oct-Jun Temperature



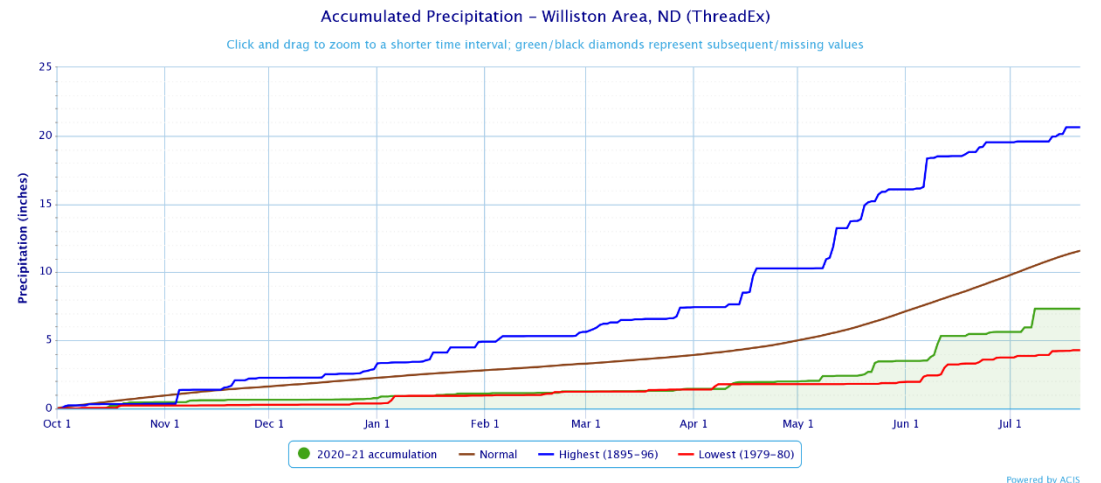
Select City Precipitation Accumulation Deficits

Bismarck (Water-year Accumulation)



	Accumulation (in)
Oct 1 to date (Departure from normal; Ranking)	6.87 (-7.08)
Ranking	3rd Driest since 1873

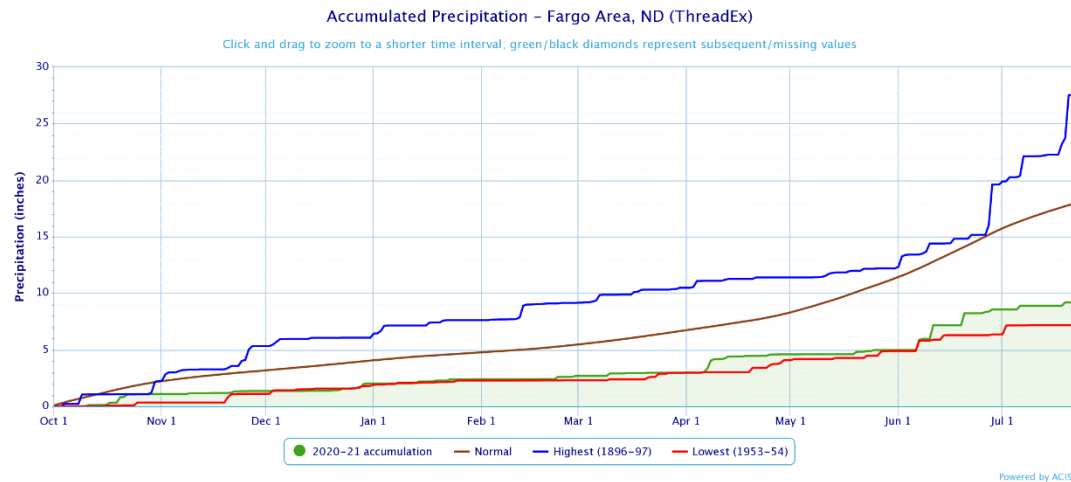
Williston (Water-year Accumulation)



	Accumulation (in)
Oct 1 to date (Departure from normal; Rank)	7.32 (-4.25)
Ranking	12th Driest since 1893

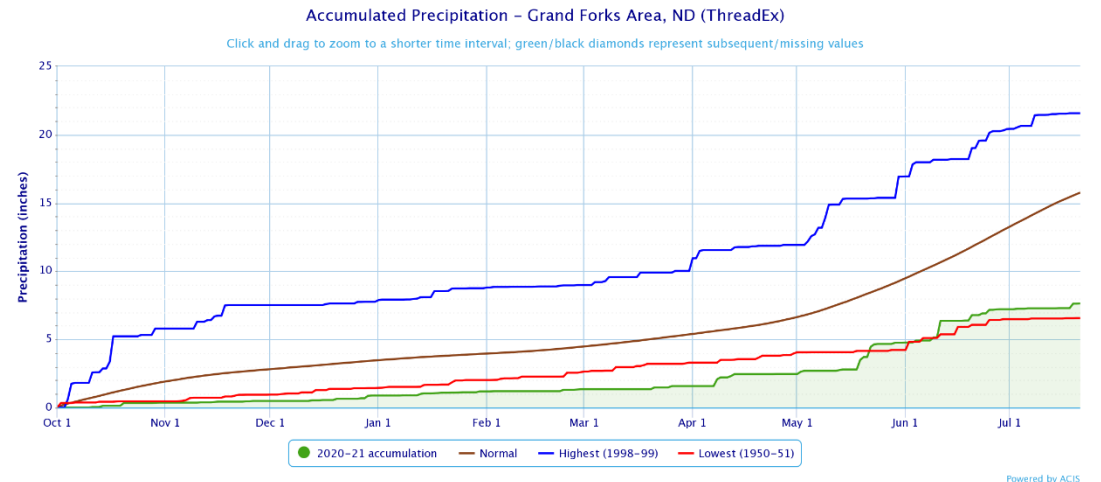
Select City Precipitation Accumulation Deficits

Fargo (Water-year Accumulation)



	Accumulation (in)
Oct 1 to date (Departure from normal; Ranking)	9.18 (-8.69)
Ranking	8th Driest since 1881

Grand Forks (Water-year Accumulation)



	Accumulation (in)
Oct 1 to date (Departure from normal; Rank)	7.63 (-8.12)
Ranking	3rd Driest since 1892

Cumulative % area
(% Weekly Change)

U.S. Drought Monitor North Dakota

July 20, 2021

(Released Thursday, Jul. 22, 2021)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	96.70	48.58	8.21
Last Week 07-13-2021	0.00	100.00	100.00	91.58	47.77	7.77
3 Months Ago 04-20-2021	0.00	100.00	97.84	92.99	75.85	0.00
Start of Calendar Year 12-29-2020	0.00	100.00	83.68	59.44	6.82	0.00
Start of Water Year 09-29-2020	15.13	84.87	51.84	13.94	0.00	0.00
One Year Ago 07-21-2020	47.80	52.20	9.64	0.00	0.00	0.00

Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

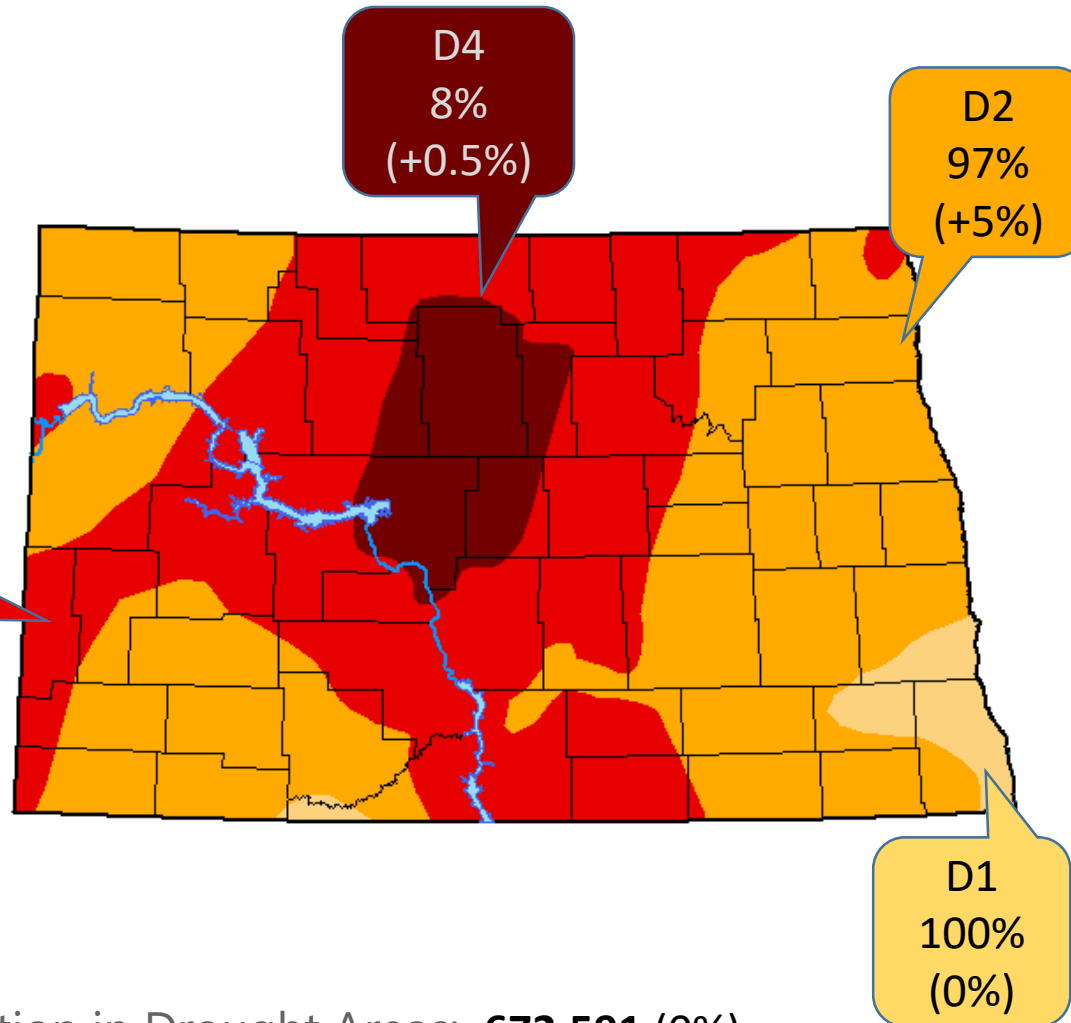
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Brad Rippey
U.S. Department of Agriculture



droughtmonitor.unl.edu

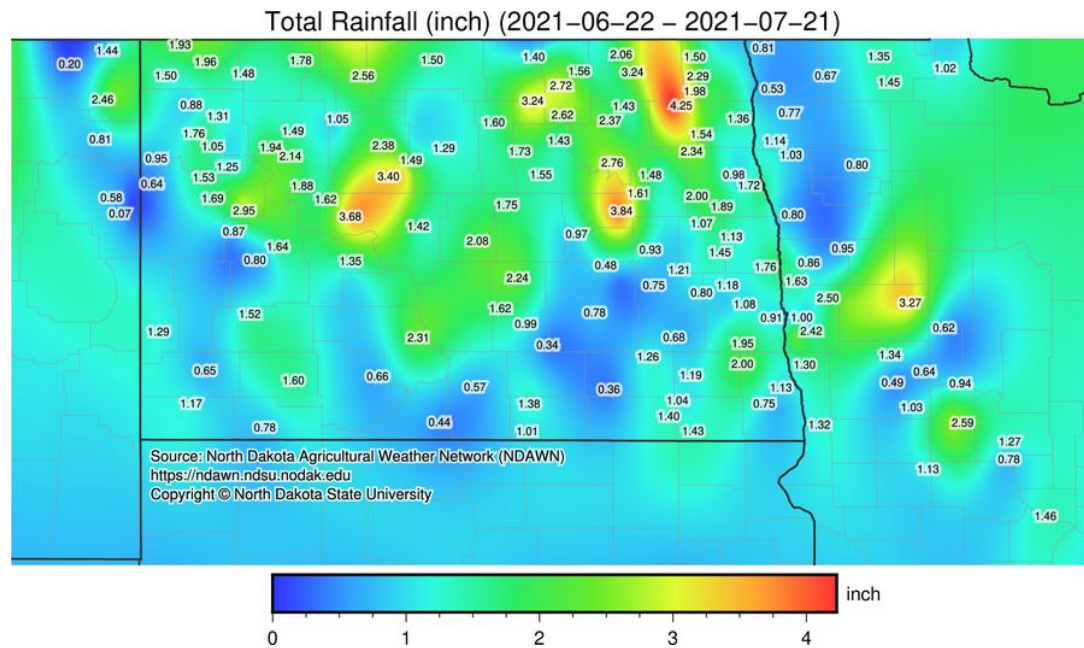


Estimated Population in Drought Areas: **672,591** (0%)

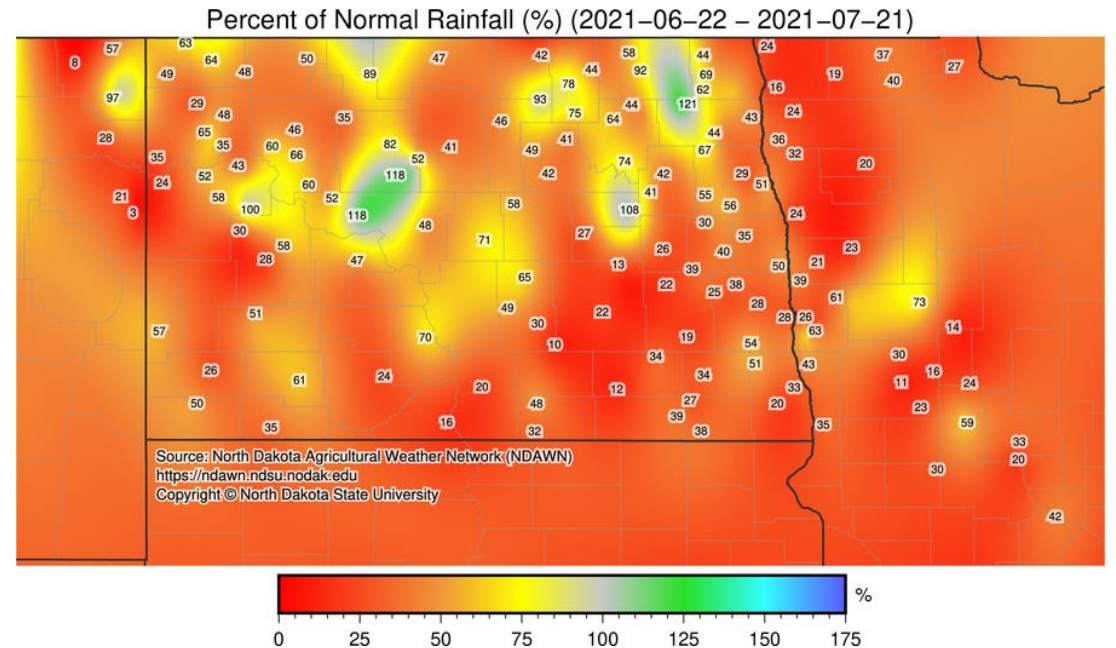
(Weekly change)

Last 30-Day Precipitation

Total Accumulation

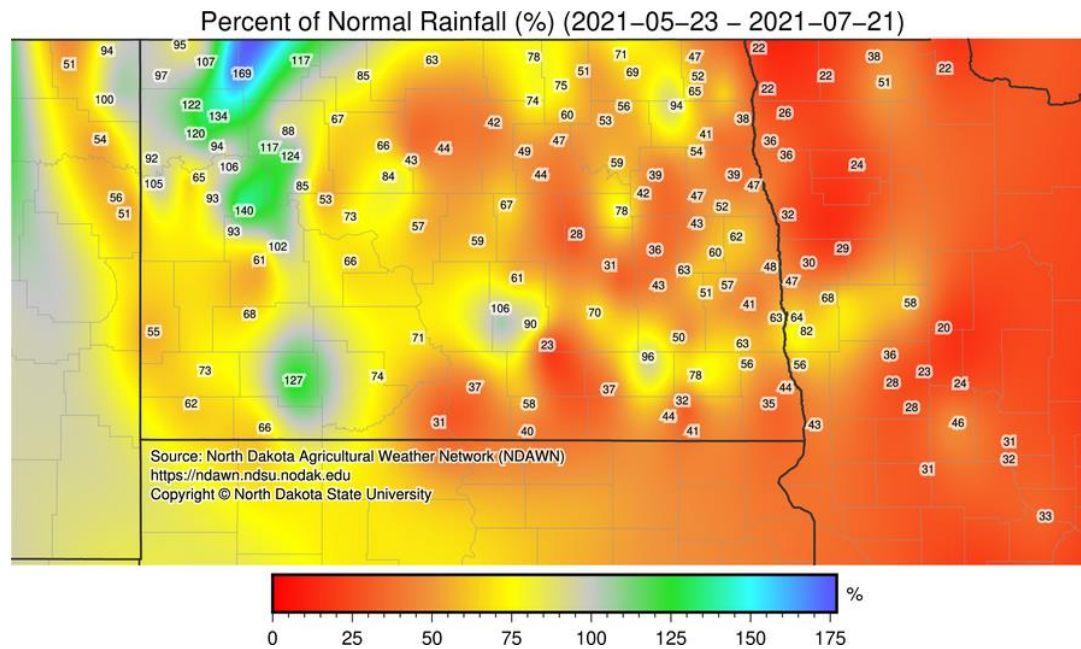


% of Normal

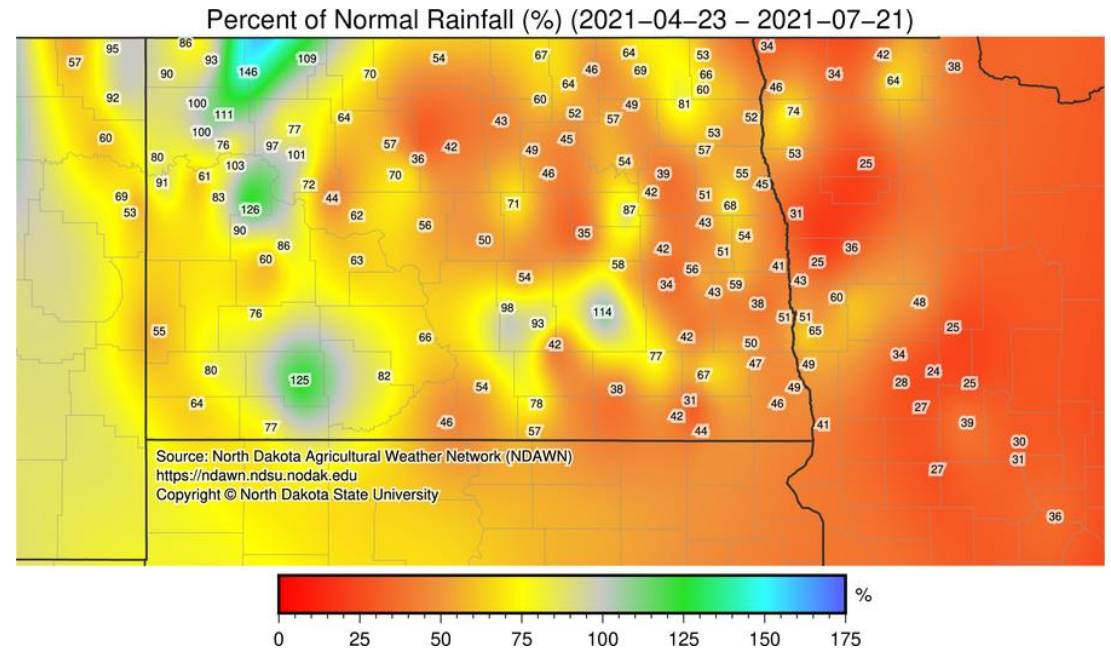


Long Term Precipitation % of Normal

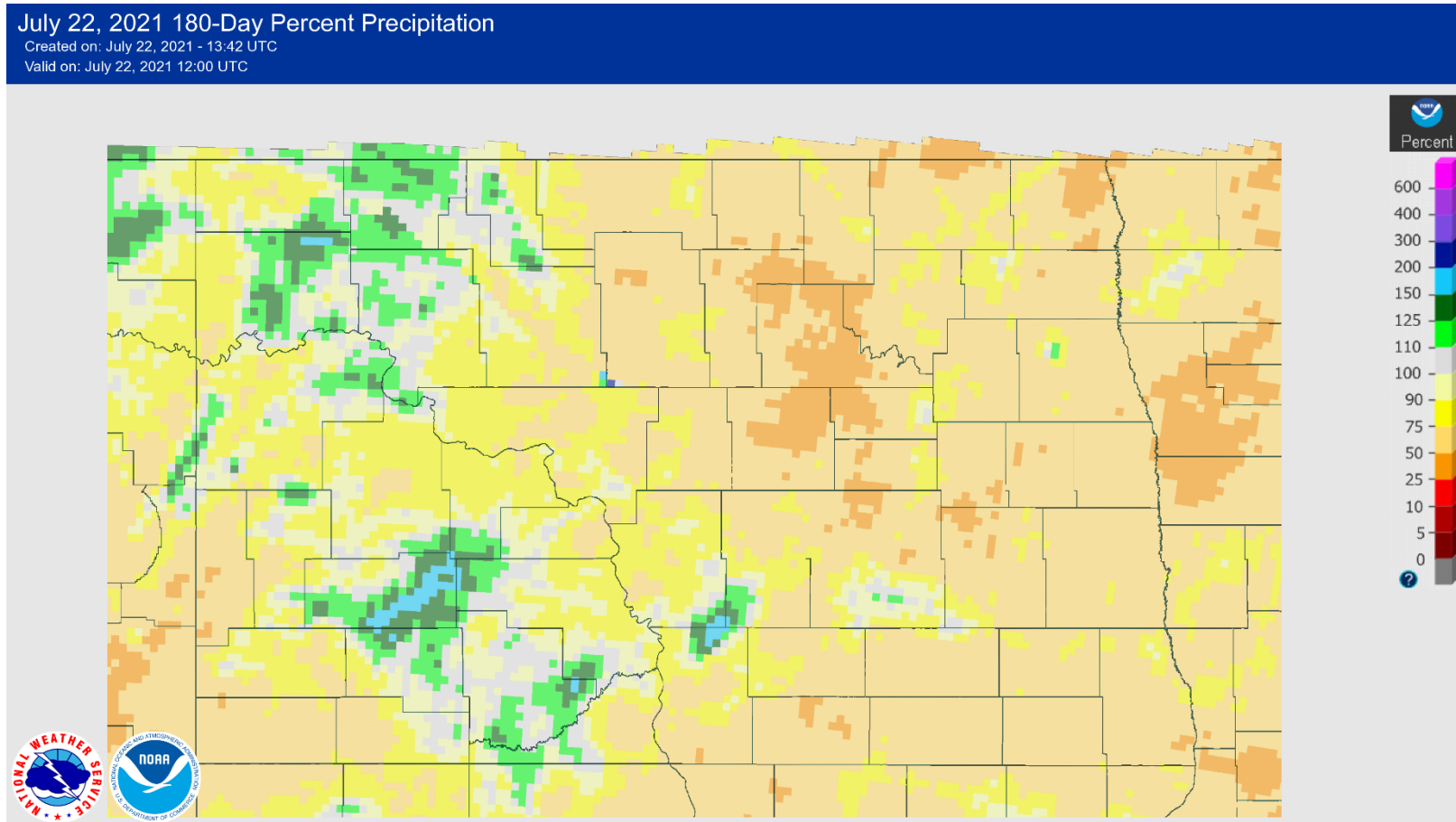
Last 60 Days



Last 90 Days

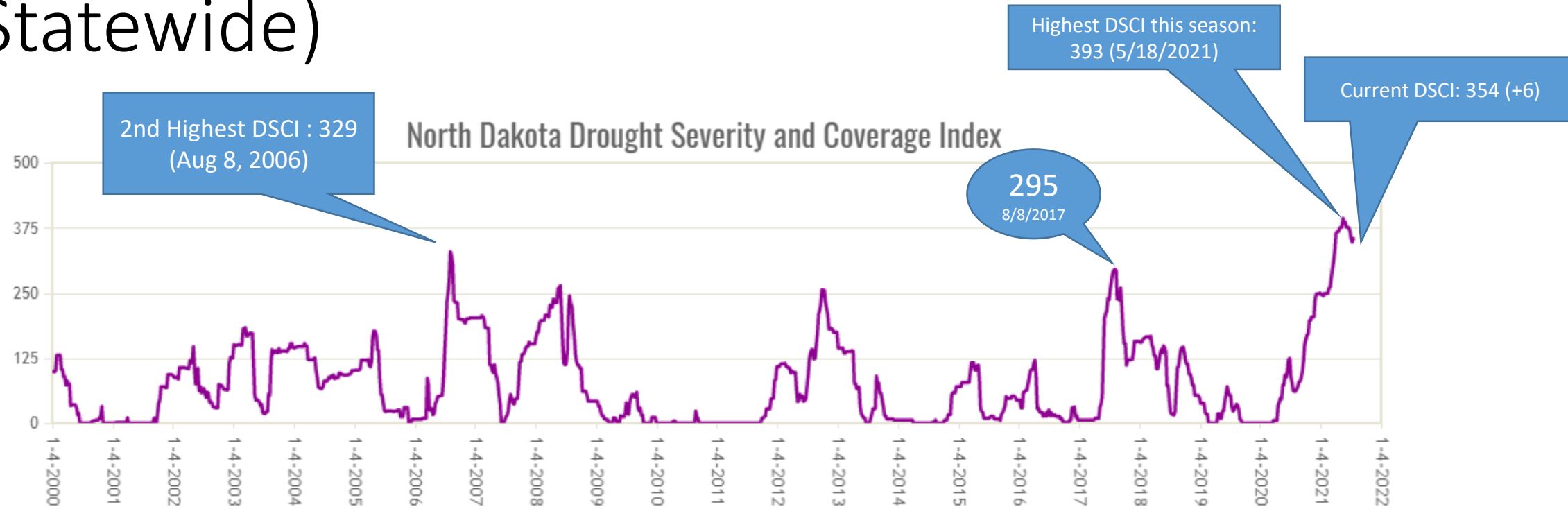


6-Month Precipitation % of Normal



AHPS: <https://water.weather.gov/ahps/>

Drought Severity and Coverage Index (Statewide)

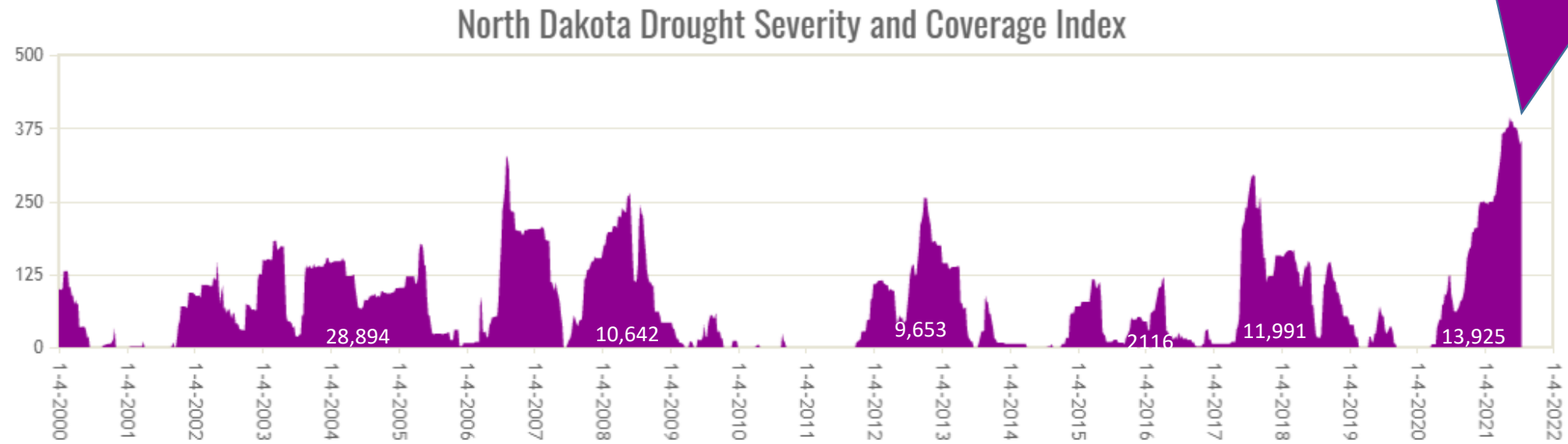


$$\text{Drought Severity and Coverage Index} = A_{D0} + 2A_{D1} + 3A_{D2} + 4A_{D3} + 5A_{D4} \quad (\text{Akyüz, 2007})$$

Where: A is a % of the state covered under the corresponding D-severity

Statewide Accumulated Drought Severity and Coverage

ADSCI for the Current Season: 13,925
62-week Accumulation since 5/19/2020



Numbers indicate the area under the DSCI Curve (Accumulated DSCI*) which is directly correlated with the accumulated drought impact in the state.

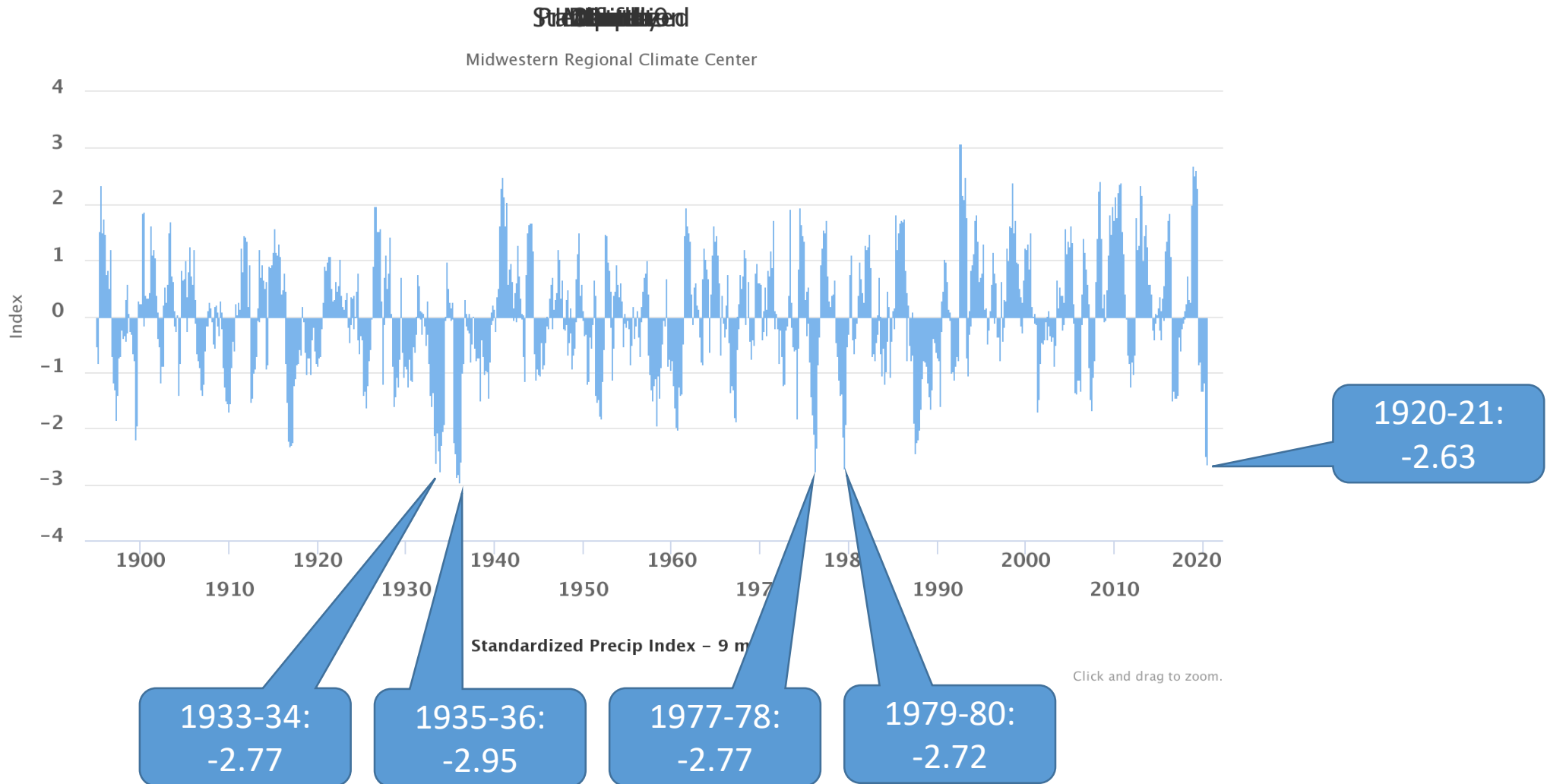
*DSCI values are accumulated since the first week the drought category is at last D1 anywhere in the state.

ND Drought Economic Impact

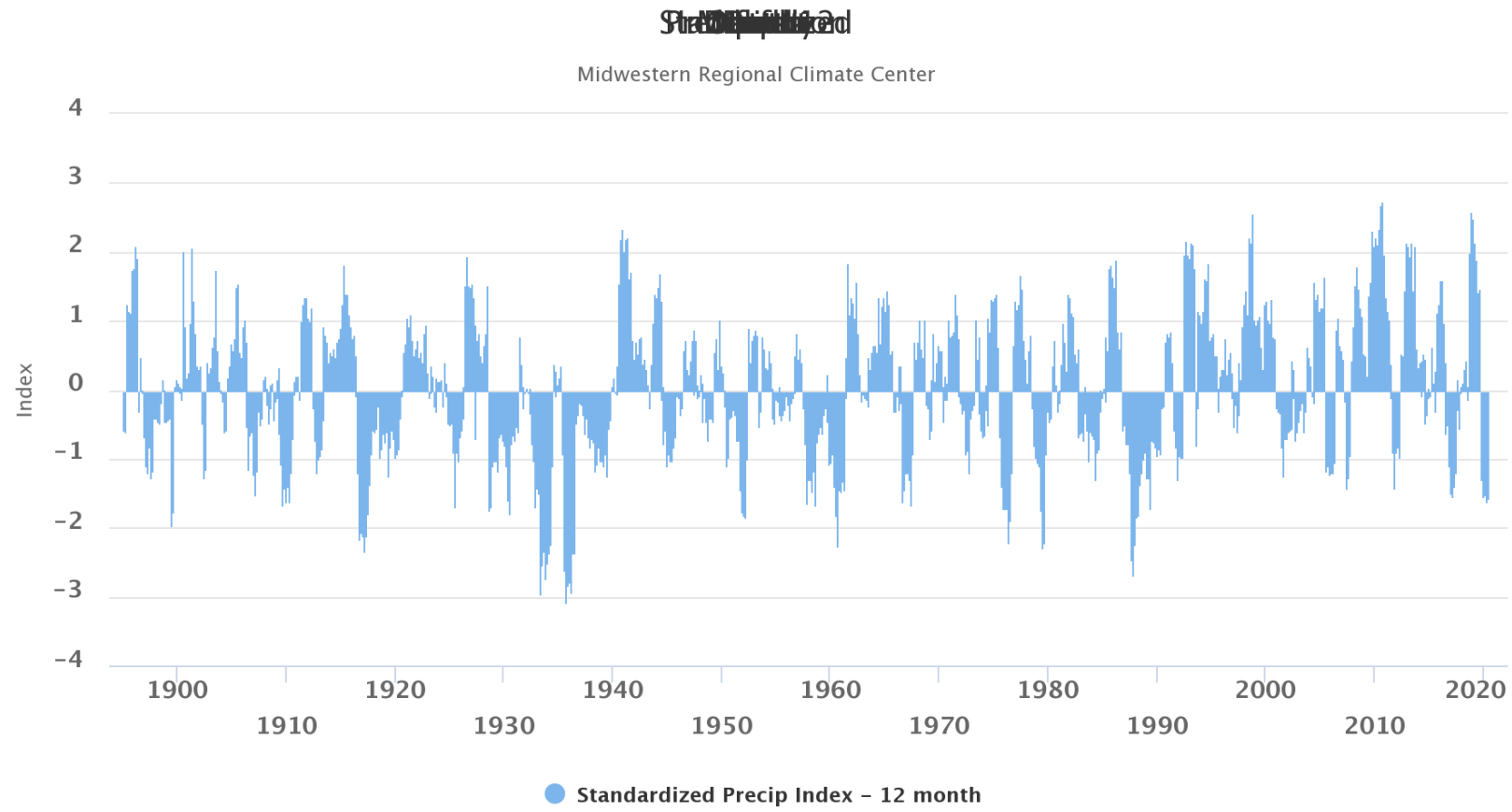
*NOAA Billion-Dollar Weather and Climate Disasters Database

	Event	Economic Impact Rank	CPI Adjusted Estimated Cost (in Billions)*	Total Cost (if Multi-year Drought)
	1980	2	\$5-10	
→	1988	1	\$5-10	
	1989	5	\$0.5-1	\$5.5-11 (1988-89 Drought)
	2002	8	\$0.25-0.5	
	2003	11	\$0.25-0.5	\$0.5-1
→	2006	6	\$0.5-1	\$1-1.5
	2008	4	\$0.5-1	
	2012	10	\$0.25-0.5	
	2013	7	\$0.5-1	\$0.75-1.5
	2017	3	\$1-2	
	2020	9	\$0.25-0.5	
→	2021		\$	\$

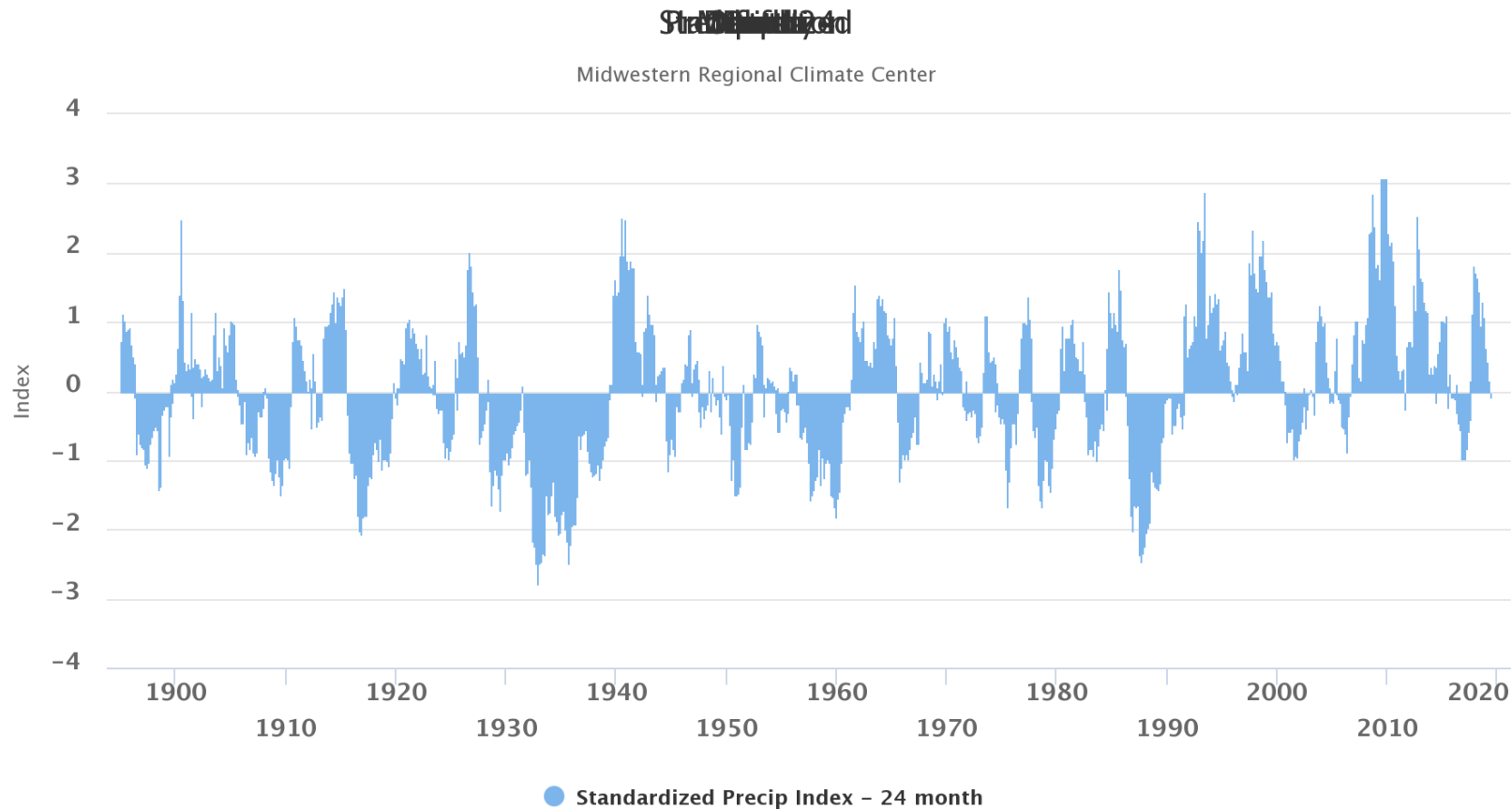
9-Month SPI



12-Month SPI



24-Month SPI: Are we getting into another Mega-Year Drought Period?

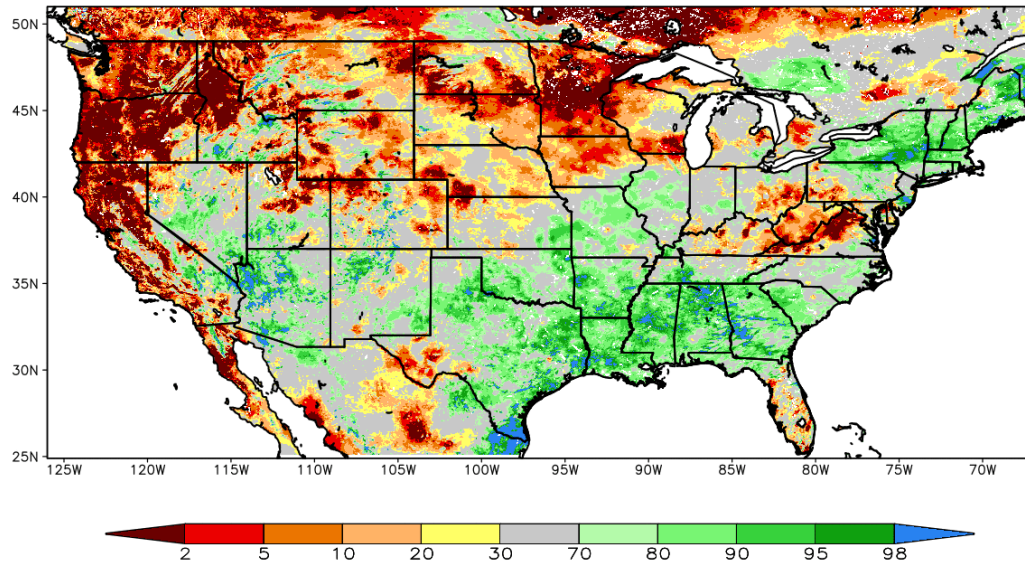


Soil Moisture Ranking Percentile

Short-term Prediction Research and Transition Center: Real-time 3km Land Information System

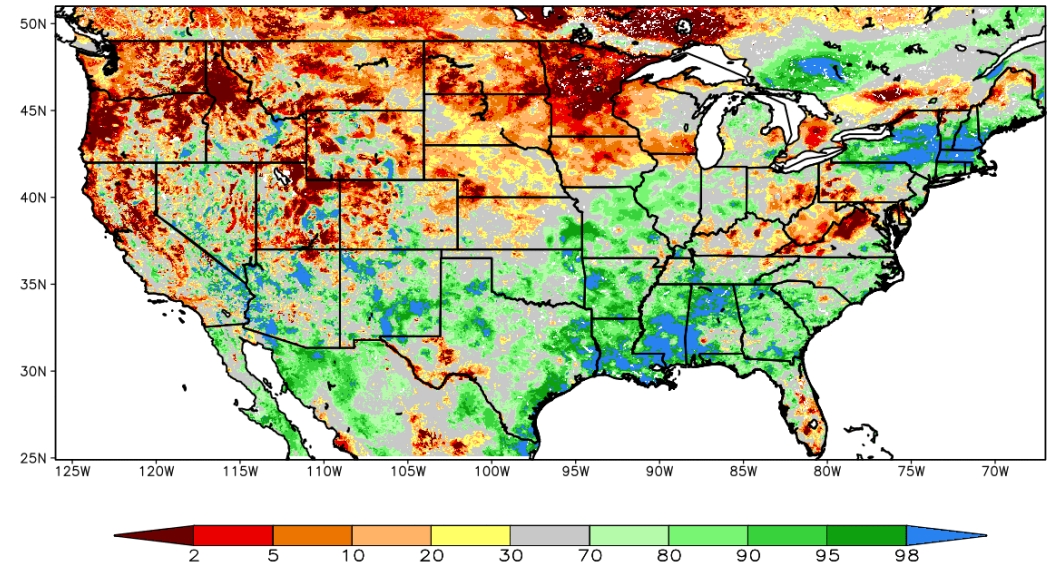
0-10 cm (Surface to 4")

SPoRT-LIS 0-10 cm Soil Moisture percentile valid 22 Jul 2021



0 to 100 cm (Surface to 3')

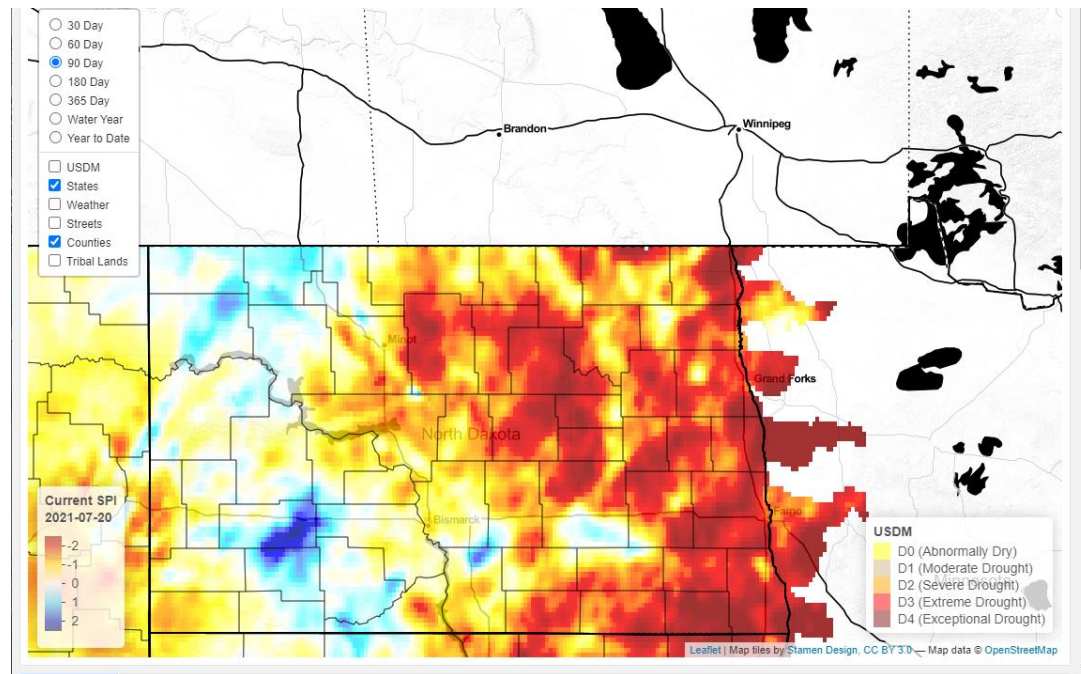
SPoRT-LIS 0-100 cm Soil Moisture percentile valid 22 Jul 2021



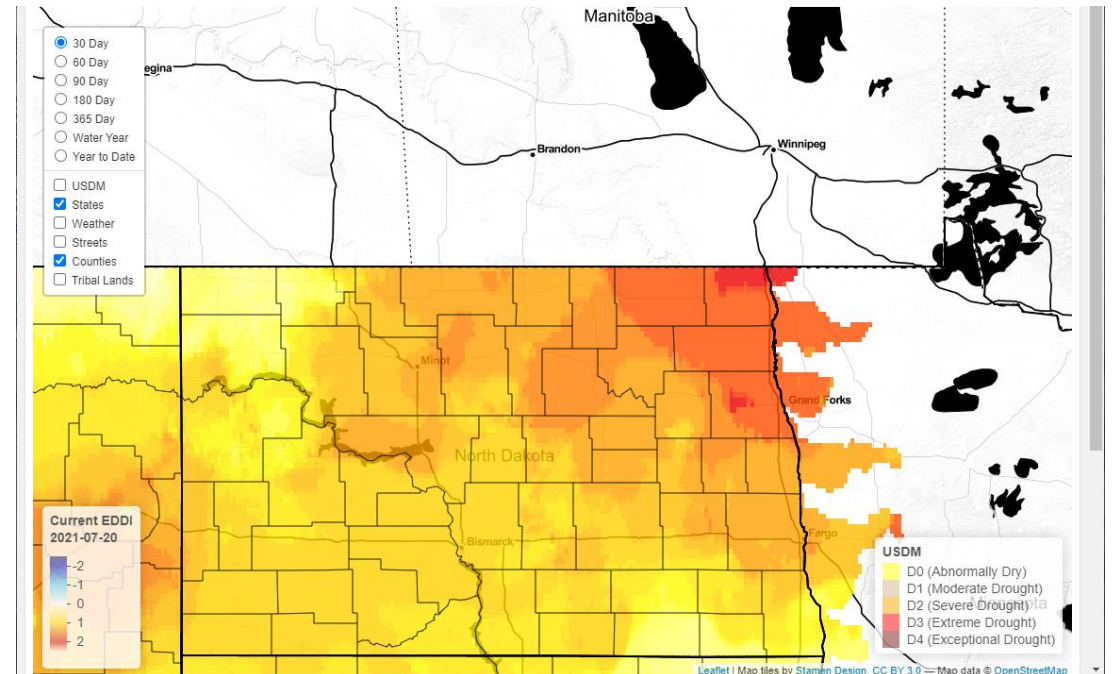
https://weather.msfc.nasa.gov/sport/case_studies/lis_CONUS.html

Other Drought Indices

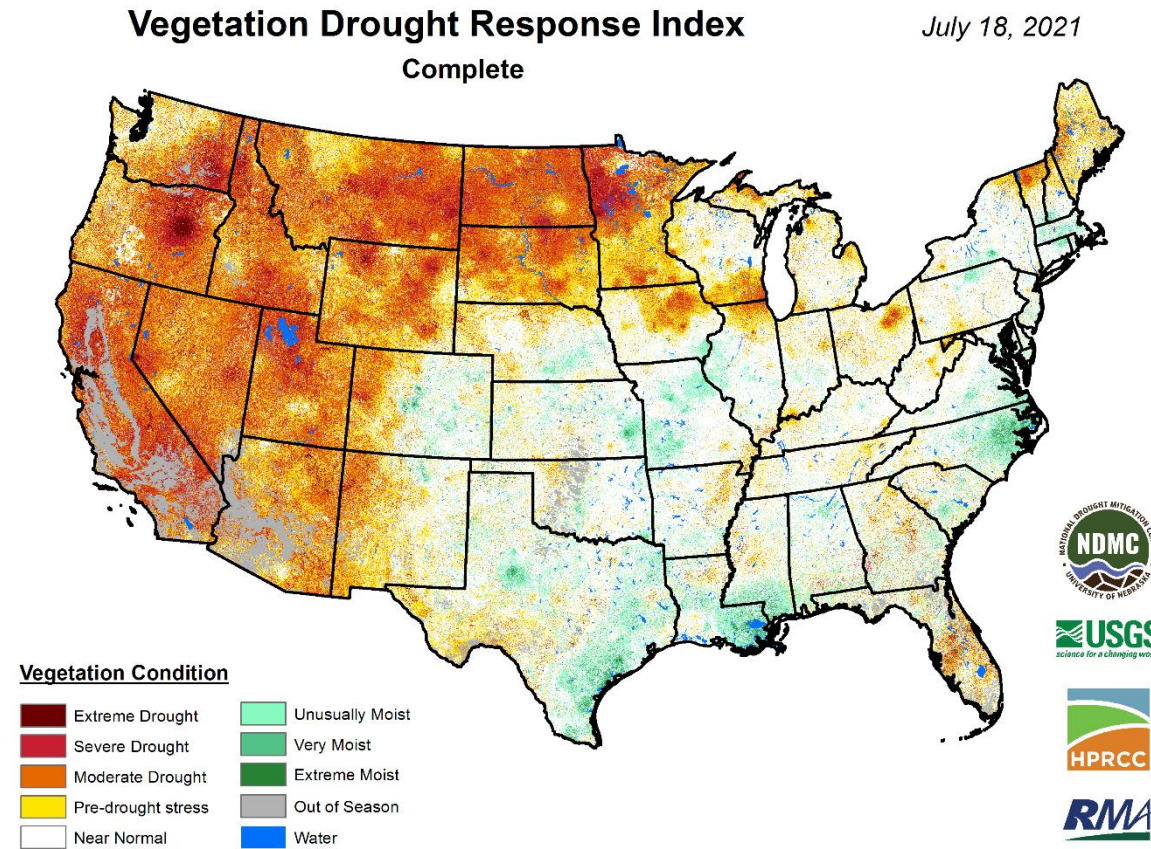
90-Day SPI (Standard Precipitation Index)



30-Day EDDI (Evaporative Demand Drought Index)



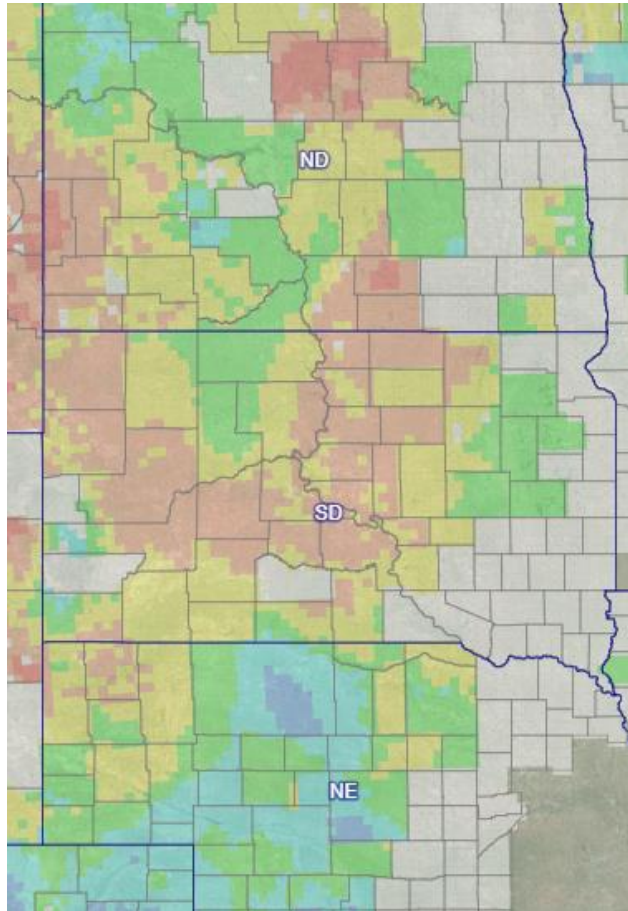
Vegetation Drought Response Index



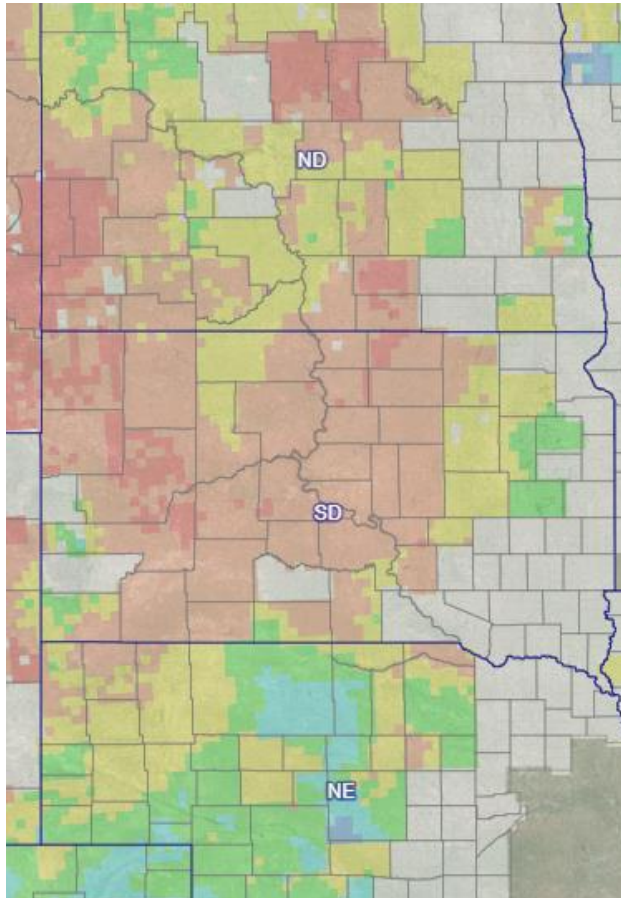
Grass-Cast: Made: July 13, 2021

% Change in Grassland Production Forecast for Your Area through August 31 Compared to Its 38-yr Average

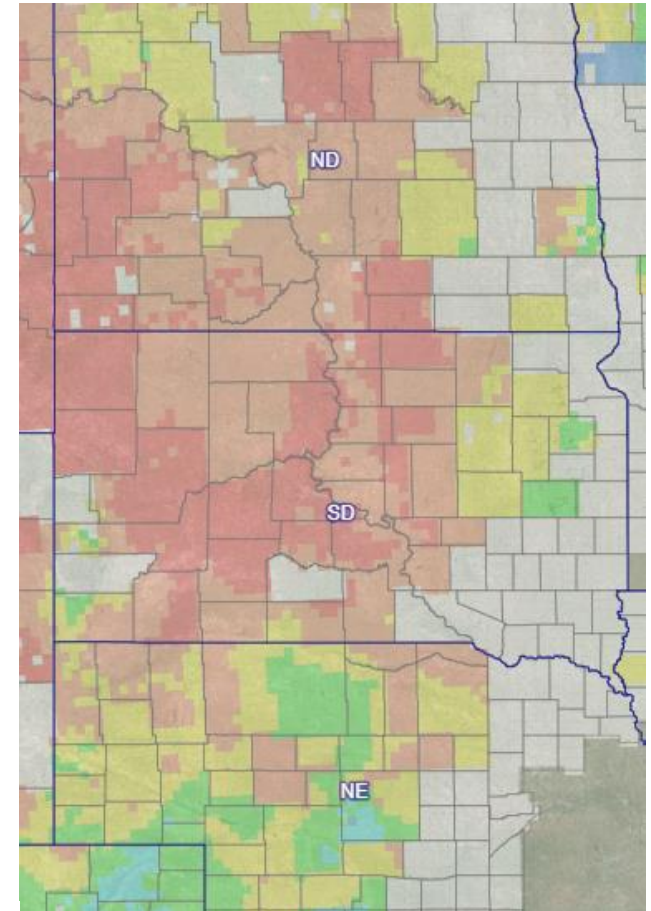
Assuming **ABOVE** Normal Precipitation
through August 31



Assuming **NEAR** Normal Precipitation
through August 31



Assuming **BELOW** Normal Precipitation
through August 31



Percent (%)

< -30
-30 to -15

-15 to -5
-5 to +5

+5 to +15
+15 to +30

> +30
No Data

Countywide Impacts

CD1 (Ward): Widespread drought conditions persist with crop damage significant. Stands are poor and crops are being called a near to complete loss. Hay yields are 1/5-1/3 of normal production (at best). With the weeks of hot weather ahead, many curled crops are projected to dry up even more.



Blue Green Algae



Wheat Field

General Drought Impact Concern

- **Accelerated development of Row Crops:** This 4-foot tall drought impacted corn is tasseling in Adams County, ND. This corn will have less leaves and less leaf-surface area that will limit the photosynthesis process causing smaller heads and less yield. Similar problem exists in Sunflower seed fields across the drought-stricken areas.
- Water quality/availability
- Grasshopper infestation: Stripping alfalfa down to stems.
- Blister beetles on alfalfa: Toxic hay

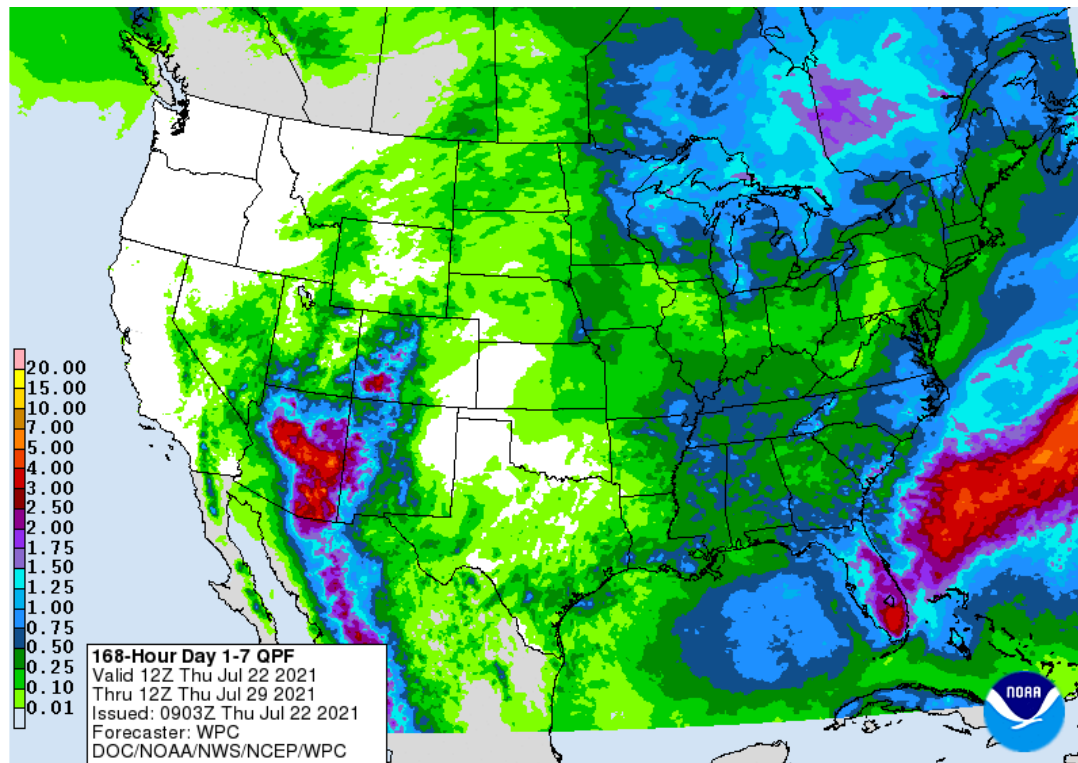


Corn Field in Slope County (July 20, 2021

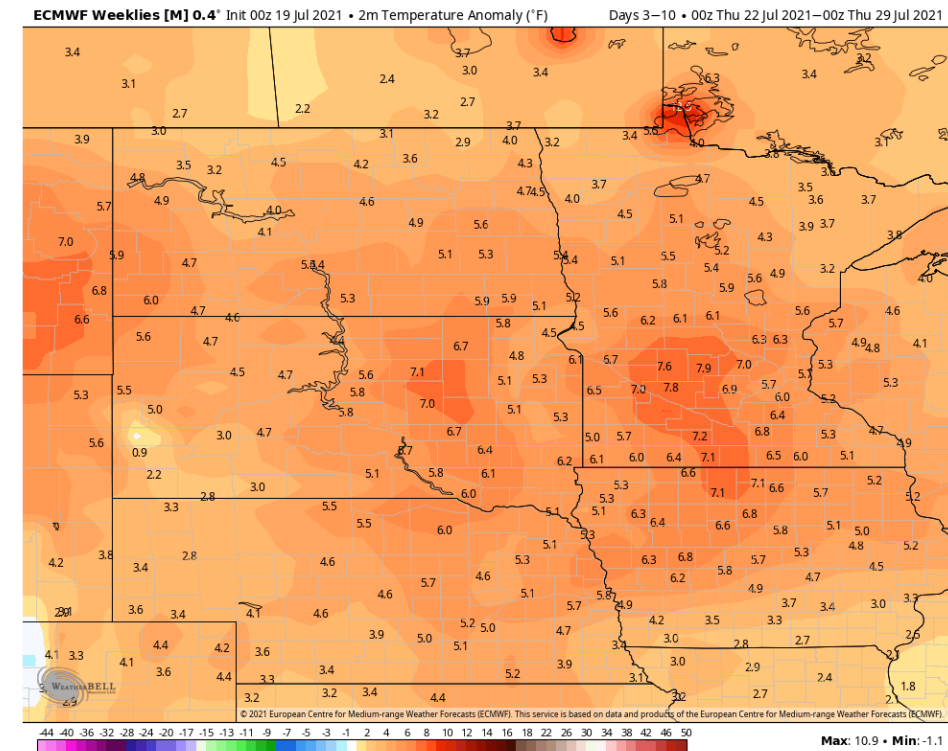
Outlooks

7-day:

Precipitation: Through Thu 7am, July 29



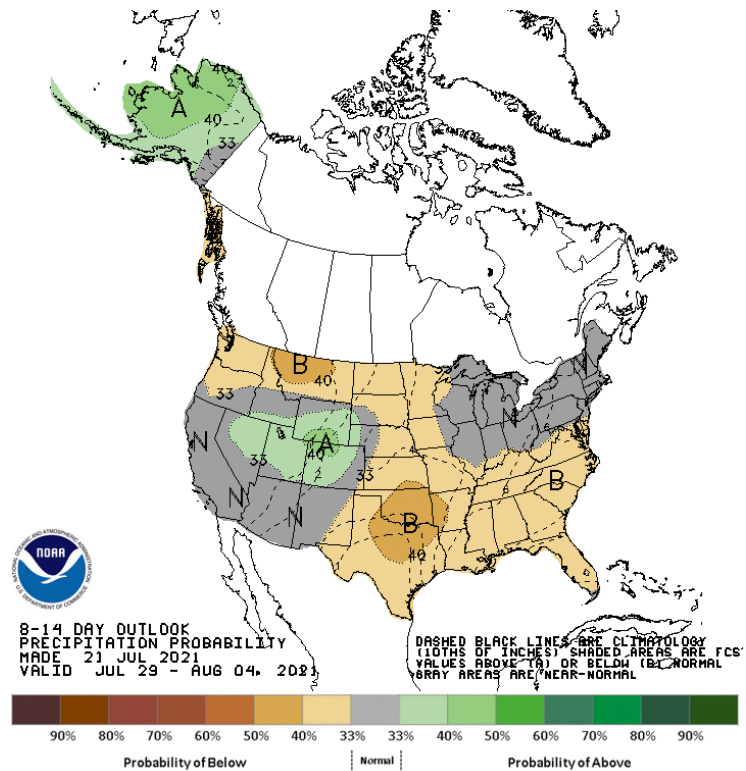
Temperature Departure from Normal: Through Thu 7pm, July 29



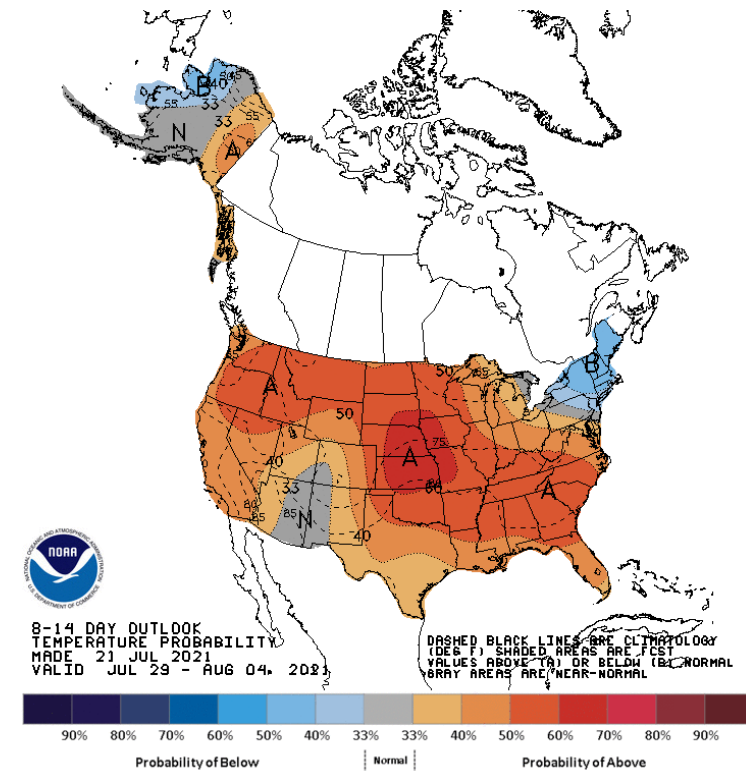
<https://www.wpc.ncep.noaa.gov/#page=qpf>

8-14 Day: July 29- August 4

Precipitation

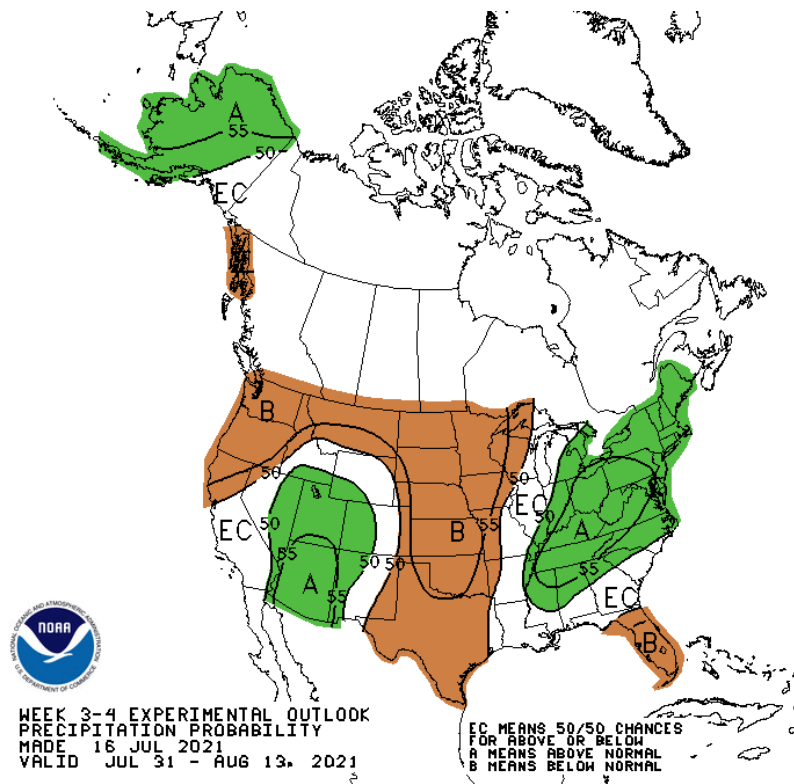


Temperature

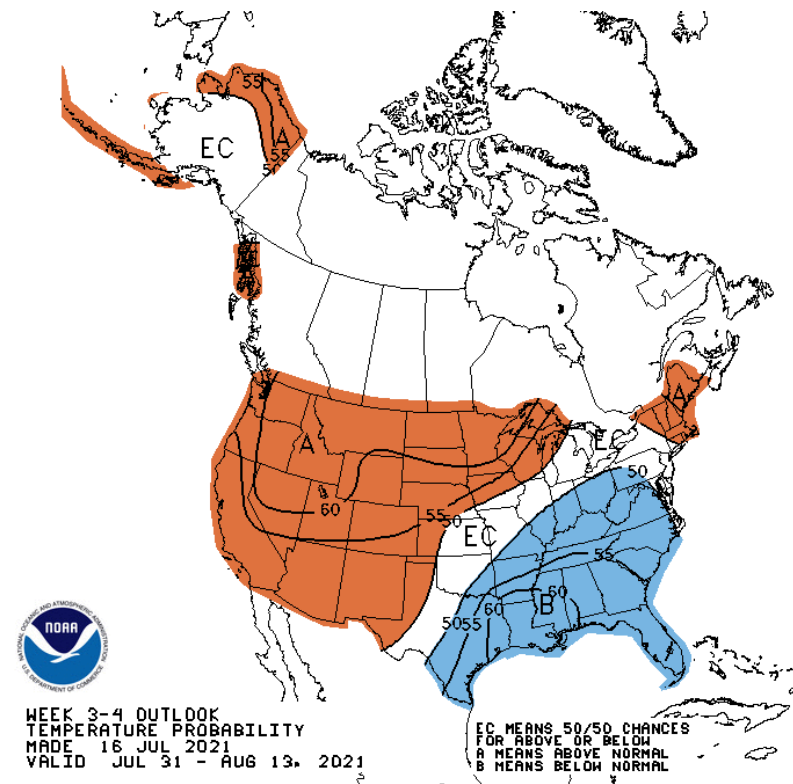


Week 3 and 4: July 31- August 19

Precipitation

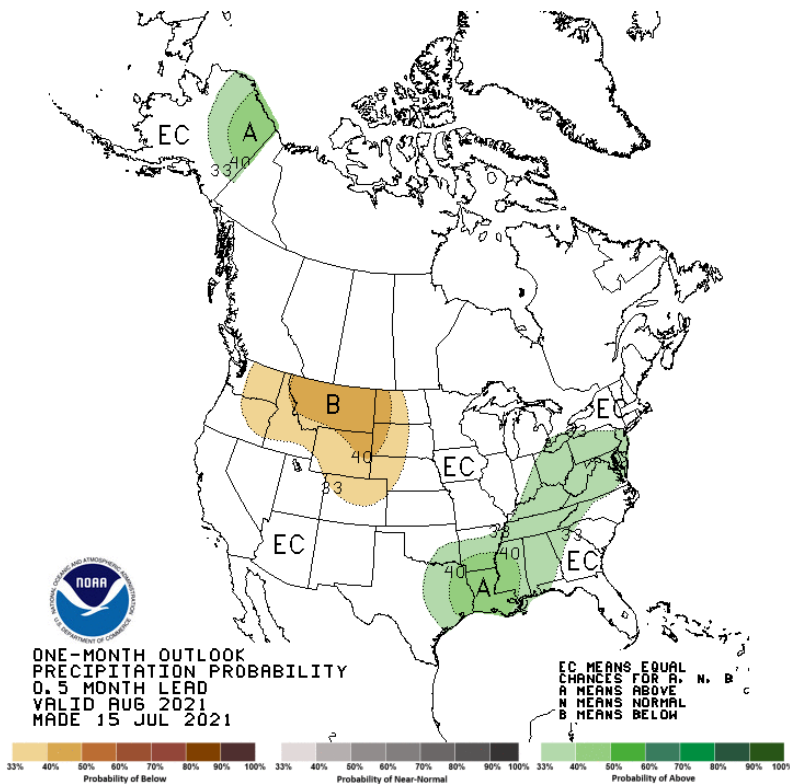


Temperature

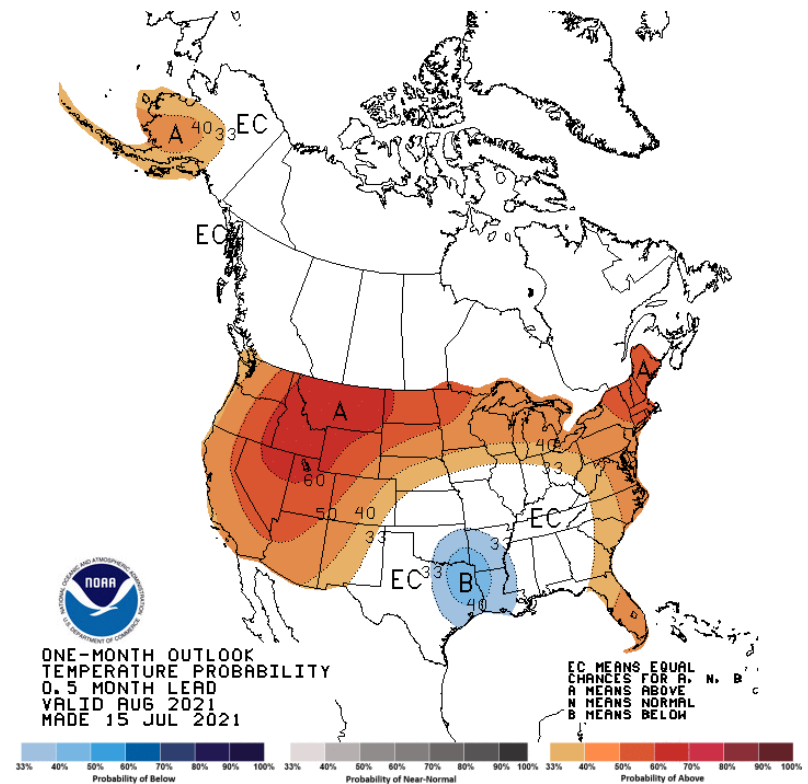


One-Month Outlook: August (Updated Jul 15)

Precipitation

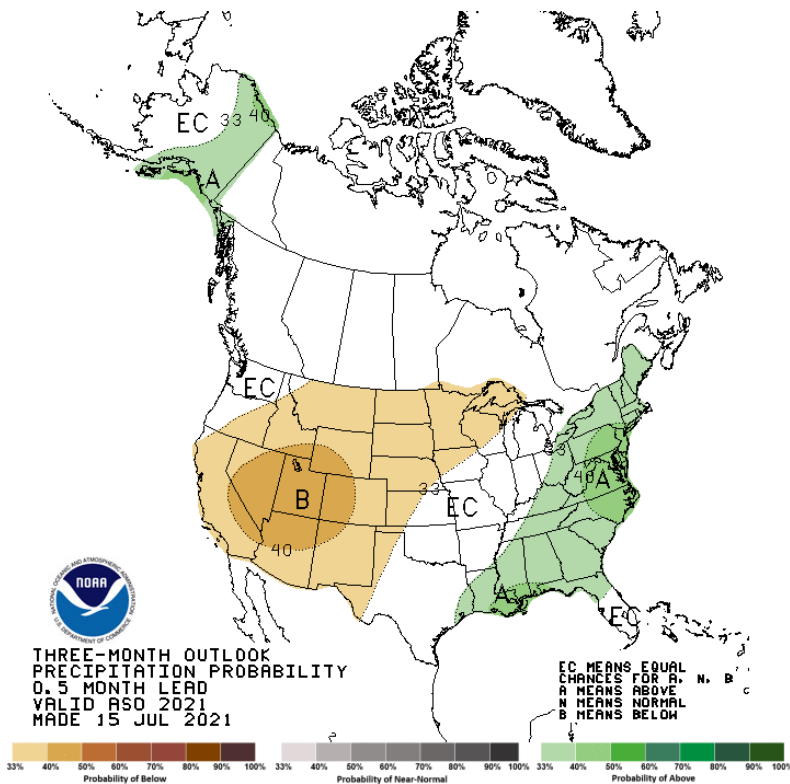


Temperature

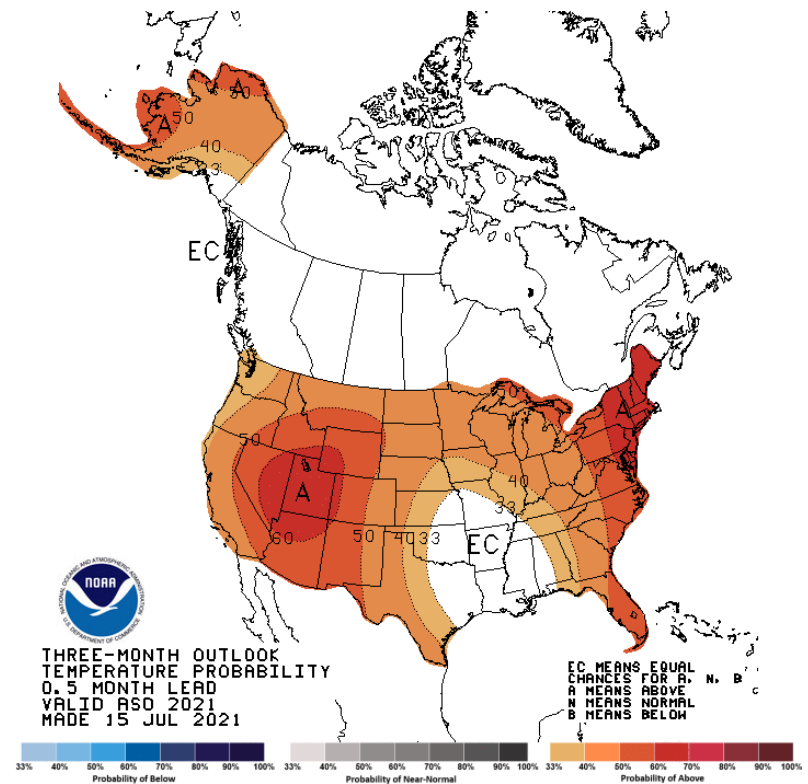


Aug-Oct 2021 Outlook (Updated July 15)

Precipitation

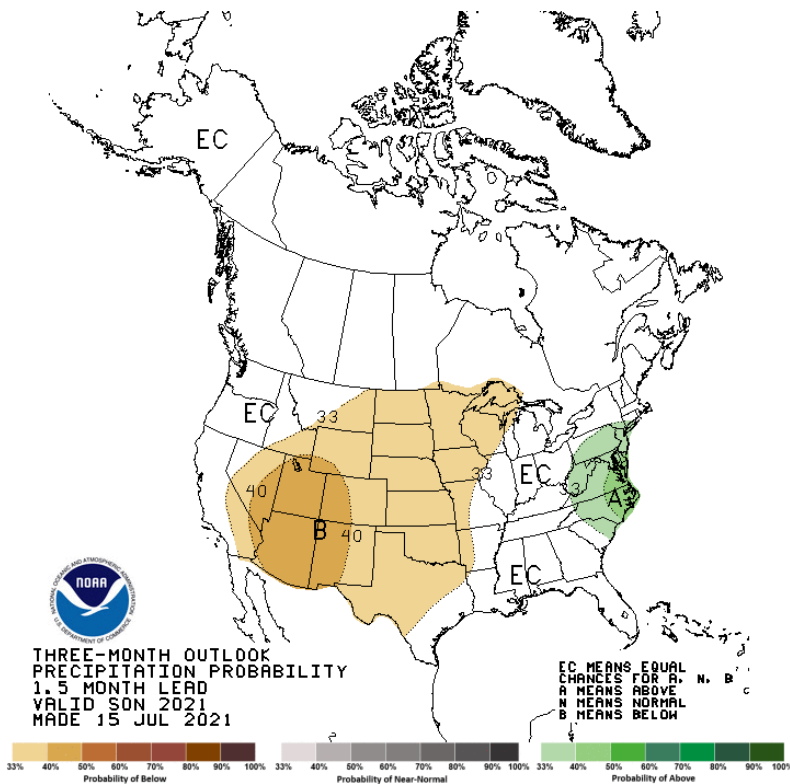


Temperature



Sep-Nov 2021 Outlook (Updated July 15)

Precipitation



Temperature

