

2016 Drought in Western South Dakota

Laura Edwards
State Climatologist

USDAM contributors



- Darren Clabo, State Fire Meteorologist, SDSM&T
- Melissa Smith, Matt Bunkers, Travis Tarver, Mike Gillespie, NWS
- Extension staff, mostly agriculture and natural resource areas
 - Input via conference calls, direct contacts
- State & federal agency partners
- Neighboring states

Weekly Weather & Fuels Updates



Weekly Climate, Weather, and Fuels Update



Tuesday 28 March 2017

(Climate) It was another week of little to no precipitation in eastern SD, and some showers in the west. The east had zero to a couple of tenths, with the exception of the far southeast along the Nebraska border. Some local totals there were one to 1.5 inches. In the western half of the state, average rainfall for the week totaled around .3 to .5 inches.

Temperatures were warm in the west, as the Black Hills region had some locations reporting 9 to 12 degrees above average for the week. In the east, temperatures have been closer to average, just a couple of degrees above average in the last seven days. A few locations in Day county and south into Kingsbury county were slightly cooler than average for the week.

Soil temperatures are warming up steadily, given recent warmth. All locations in the SD Mesonet are above freezing at 4 inch depth under bare soil, and many are above 40F. Annual grasses have been greening up, winter wheat has broken dormancy.

Soil moisture is still below average for this time of year in the southwest and Black Hills. Northwest, north central and James River valley are all near average for soil moisture. The far eastern basins, Red River and Big Sioux, remain above average for soil moisture this week. (Laura Edwards)

(Weather) An upper level storm system is emerging from the Rockies and pushing out over the Great Plains. This system is bringing ample rain showers to southwestern SD while the rest of the state is seeing partly to mostly cloudy skies. High temperatures will range from the mid-40s across western SD to the upper 50s over eastern SD. The higher elevations of the Black Hills might not get out of the 30s and a few snow showers are expected there. Light easterly winds are expected through the end of the day.

Wednesday will bring mostly cloudy to cloudy skies across the state. Scattered rain showers are likely across southern and southeastern SD. High temperatures will be in the 50s, warmest over north-central SD. Skies will range from partly cloudy over northern SD to cloudy over southern SD where those showers are expected. Once again, we'll see light easterly winds.

High temperatures on Thursday will range from near 50 over eastern SD to the mid-60s over western SD as weak upper level ridging moves into the Great Plains. Southeast winds are likely statewide. Skies should be mostly clear to partly cloudy across all but far southeastern SD where a couple of scattered rain showers are possible. Southeast winds will continue on Friday ahead of yet another upper level storm system. Rain is expected over

Compiled by Darren Clabo

Contributors:

Laura Edwards

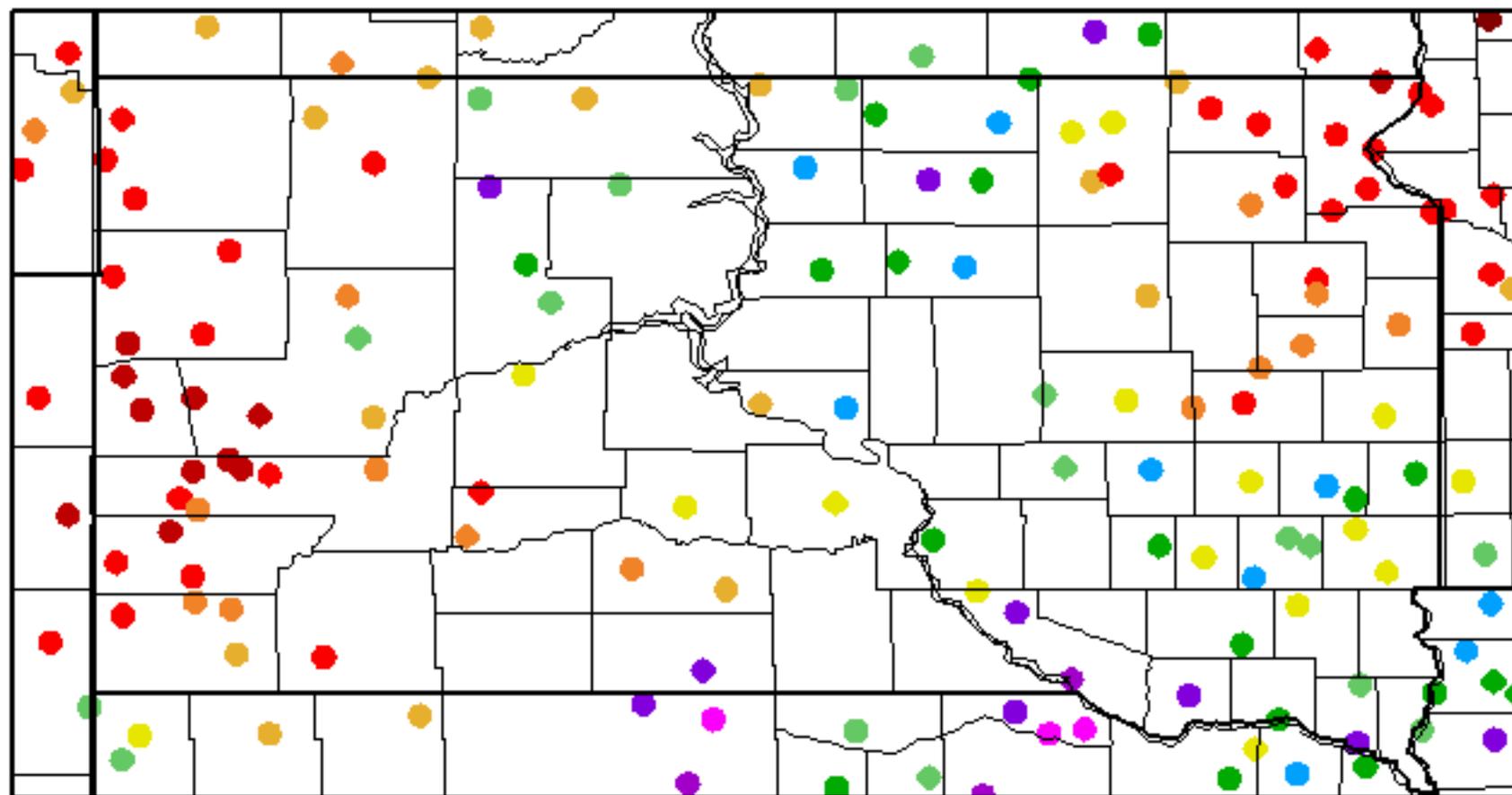
Jim Strain

Darren Clabo

Distributed by email, web & Twitter

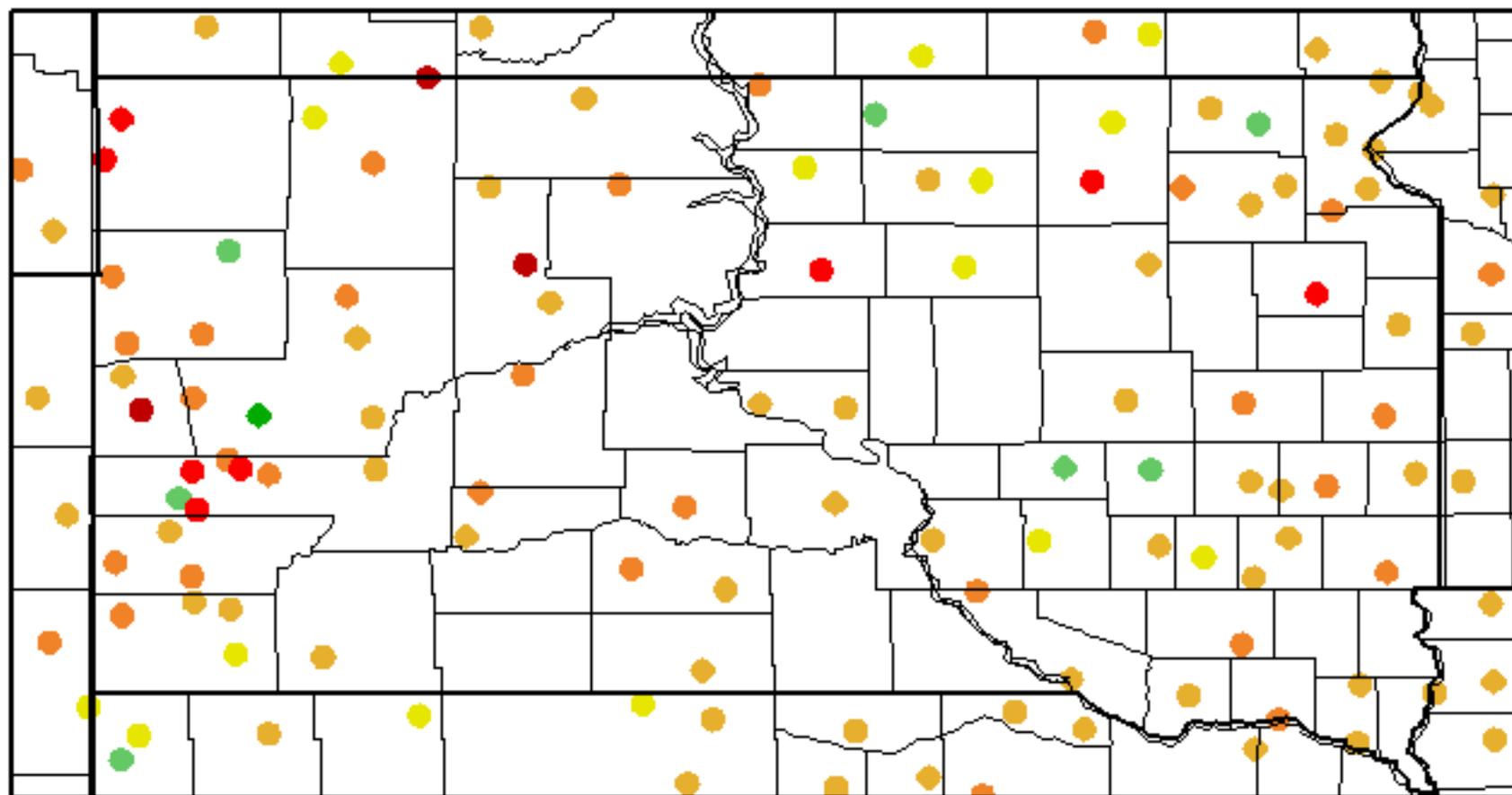
Percent of Normal Precipitation (%)

4/1/2016 – 6/30/2016

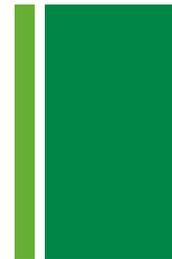


Departure from Normal Temperature (F)

4/1/2016 – 6/30/2016

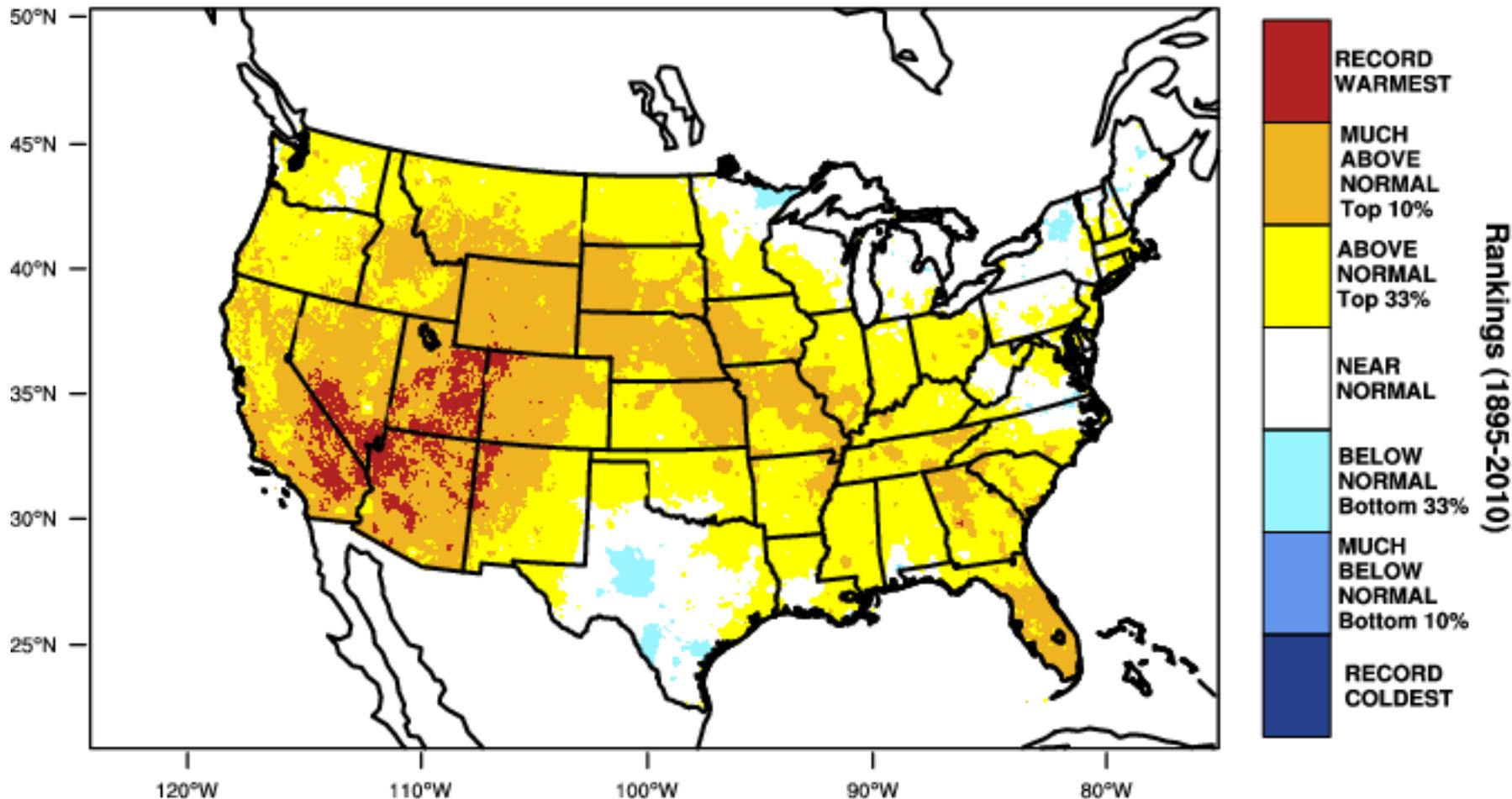


June 2016 Avg Temp

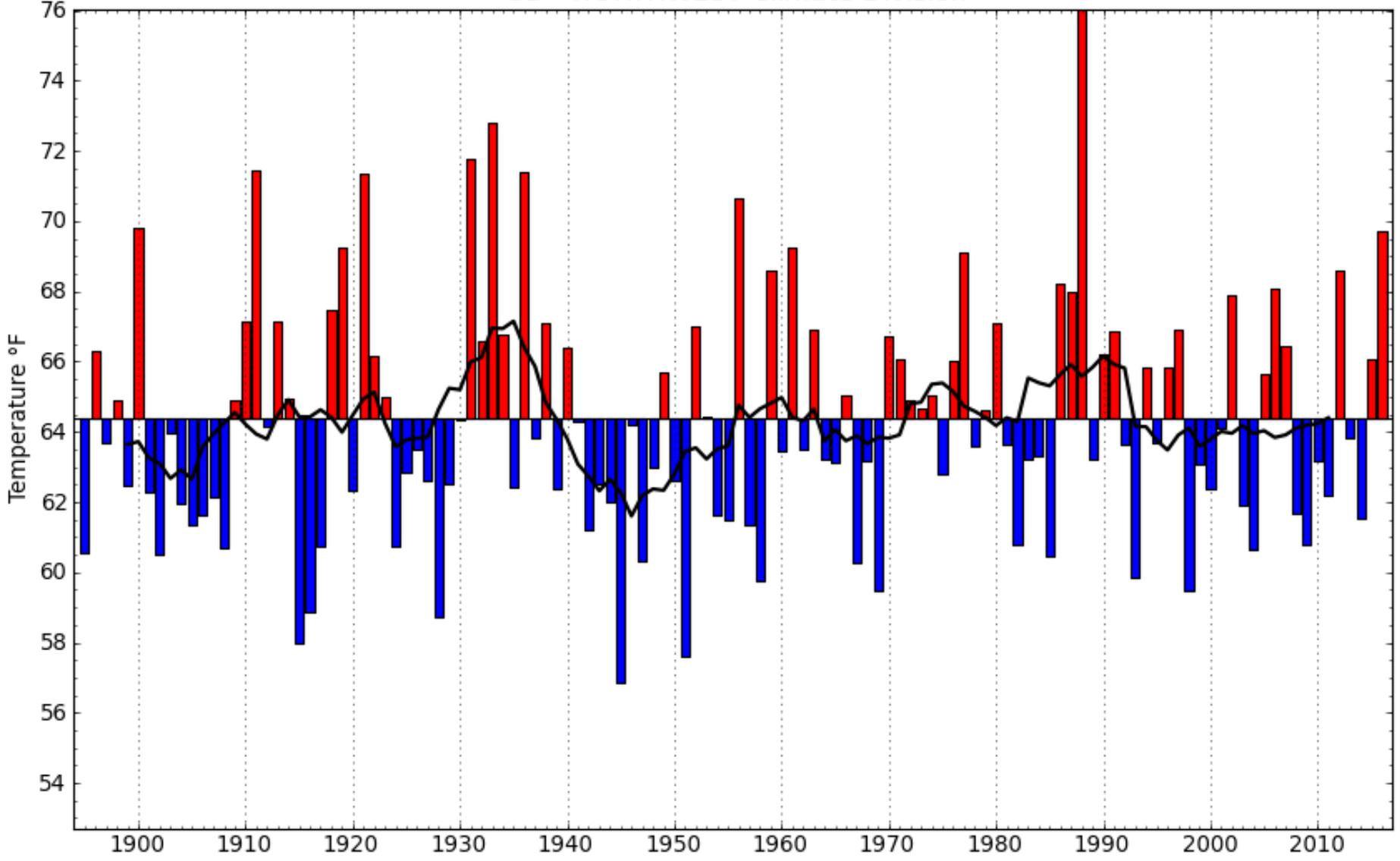


Continental United States - Mean Temperature

June 2016 Percentile



Mean Temperature, June SD - NORTHWEST Climate Division



— Normal Period: 1981-2010
— 10 Year Average

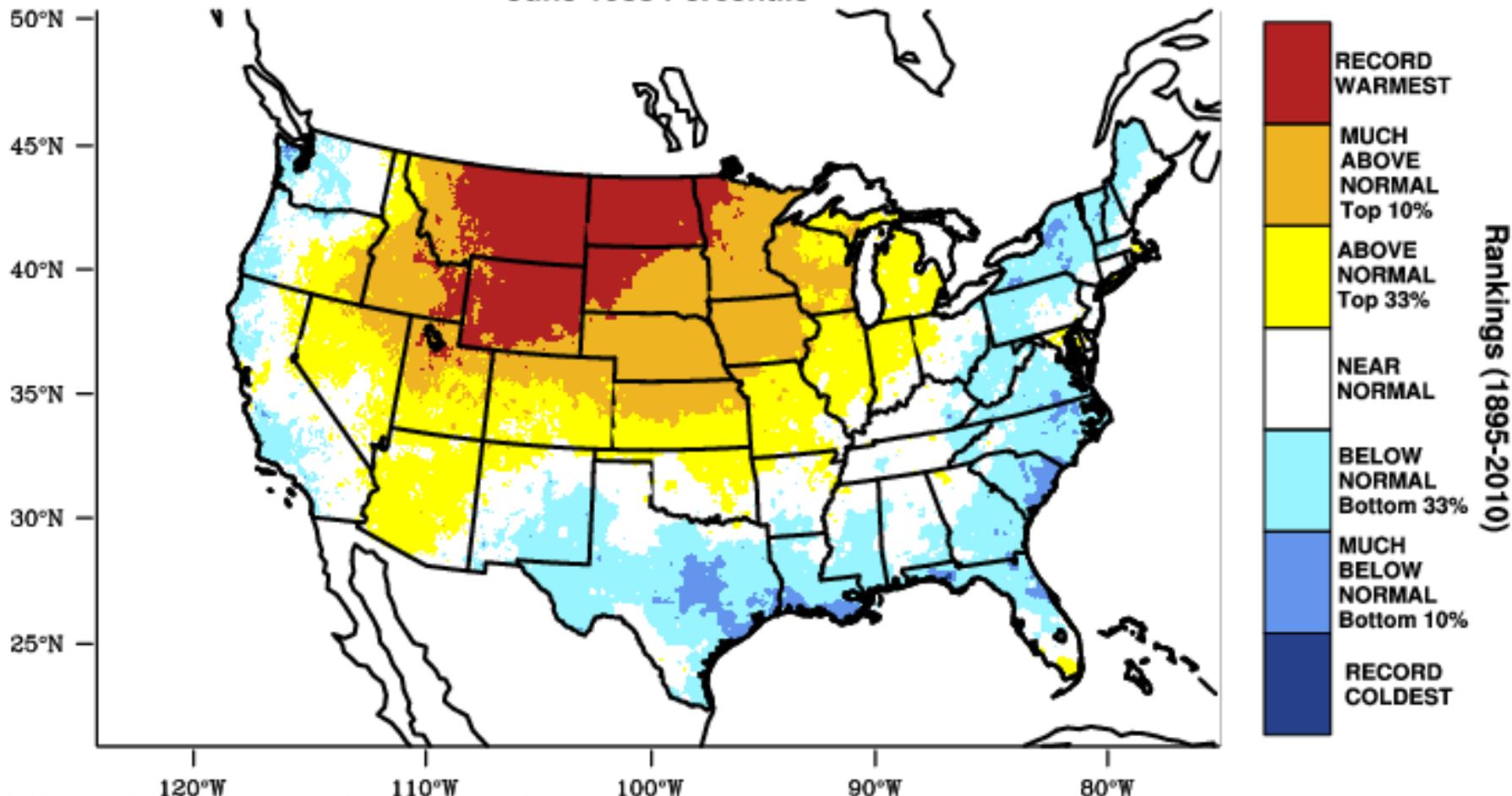
Data Source: WRCC/UI, Created: 4-03-2017

June 1988 Avg Temp



Continental United States - Mean Temperature

June 1988 Percentile

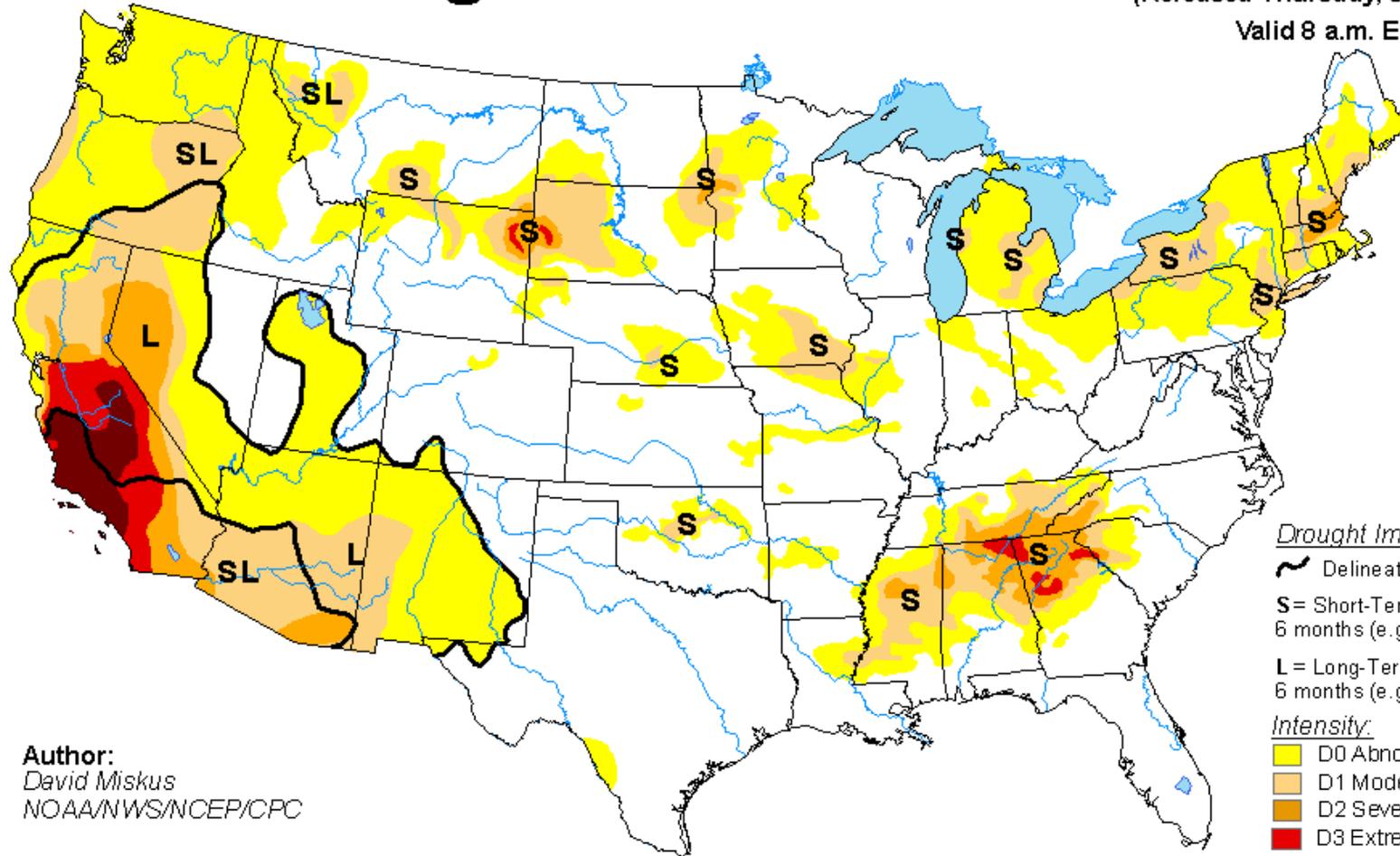


U.S. Drought Monitor

July 5, 2016

(Released Thursday, Jul. 7, 2016)

Valid 8 a.m. EDT



Drought Impact Types:

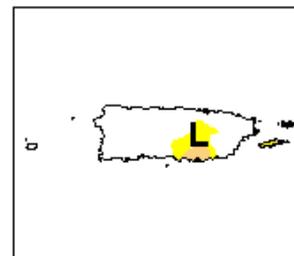
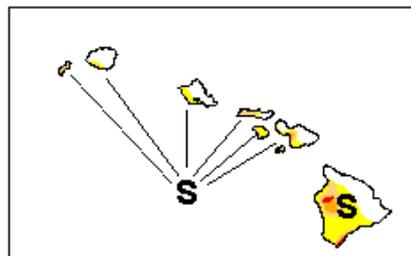
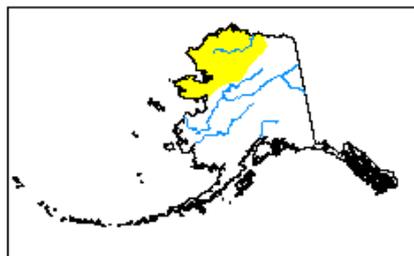
- ~ Delineates dominant impacts
- S= Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L= Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

Author:
David Miskus
NOAA/NWS/NCEP/CPC

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



<http://droughtmonitor.unl.edu/>

U.S. Drought Monitor South Dakota

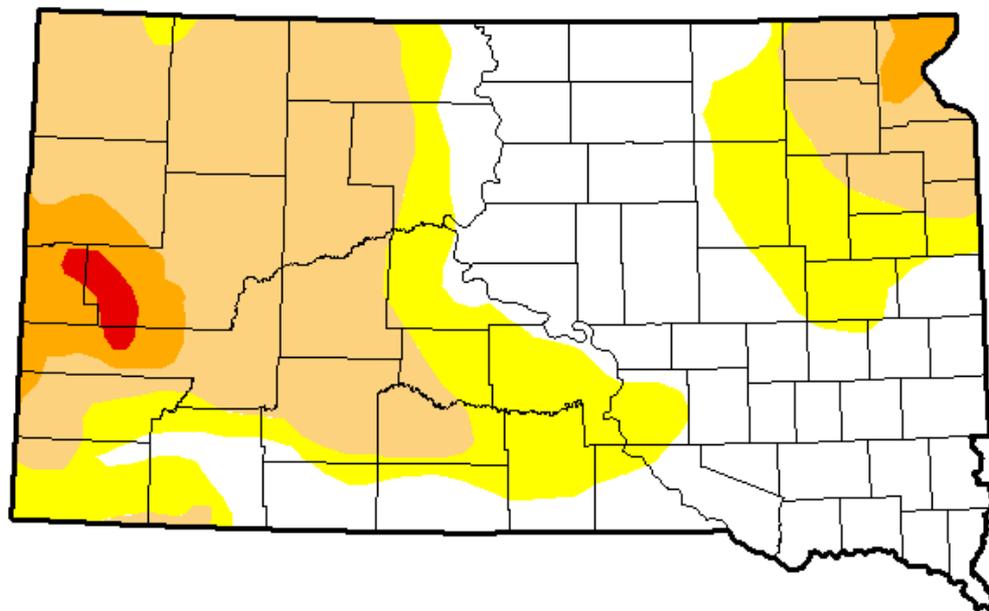
July 5, 2016

(Released Thursday, Jul. 7, 2016)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	40.45	59.55	38.36	5.62	0.81	0.00
Last Week <i>8/28/2016</i>	38.52	61.48	38.91	5.81	0.81	0.00
3 Months Ago <i>4/5/2016</i>	74.27	25.73	0.00	0.00	0.00	0.00
Start of Calendar Year <i>12/29/2015</i>	89.43	10.57	0.00	0.00	0.00	0.00
Start of Water Year <i>9/29/2015</i>	94.77	5.23	0.00	0.00	0.00	0.00
One Year Ago <i>7/7/2015</i>	95.43	4.57	0.00	0.00	0.00	0.00



Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

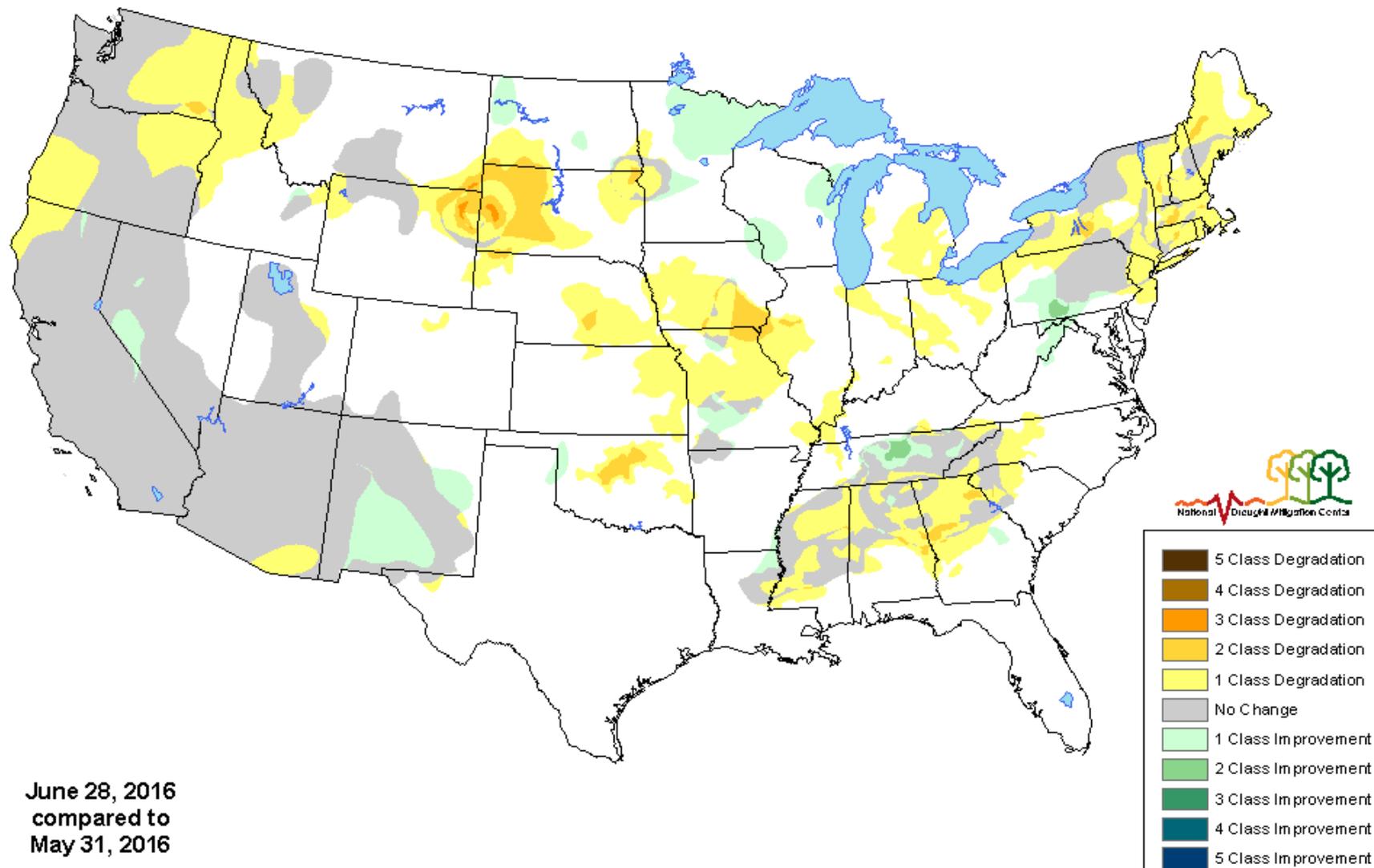
Author:

David Miskus
NOAA/NWS/NCEP/CPC



<http://droughtmonitor.unl.edu/>

U.S. Drought Monitor Class Change 1 Month



SD Drought Task Force



- D2 on USDM: “soft” trigger
- July 11: Gov. Daugaard activates DTF in Pierre
- Conference calls through Sep 6
- Weather/climate briefing, with written summary by State Climatologist
- SDSU Extension drought team called to action

Special Drought Updates (SD)



South Dakota Climate & Drought Summary

July 22, 2016

Laura Edwards

SDSU Extension Acting State Climatologist, laura_edwards@sdstate.edu, 605-626-2870

U.S. Drought Monitor

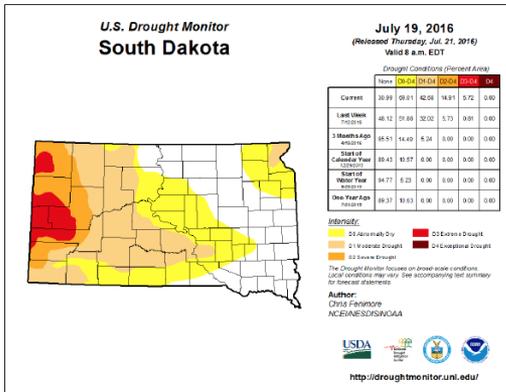
As of July 21, 2016, the U.S. Drought Monitor shows over 42% of South Dakota in drought, defined as D1 (Moderate) or worse. About 9% of the state is in Severe (D2) drought, and almost 6% is in Extreme (D3) drought.

Over the last two weeks, drought conditions have eased in the far northeast and worsened in the West. There has been an expansion from three to six counties that have some of their area in the D3 category. In the last 4 weeks, Harding county has degraded 3 categories. The U.S. Drought Monitor map can be found at: <http://droughtmonitor.unl.edu>

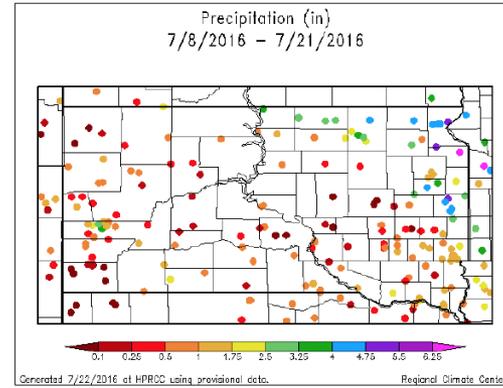
14-day Summary

Substantial rainfall has fallen in the northeast region of South Dakota, with totals of 3 inches or more from Brown county to Brookings county, and towards the North Dakota/Minnesota border. This area had largely been in D0 or worse on the US Drought Monitor. There was some local flooding in Roberts county and the surrounding area on/around July 11.

On Saturday, July 16, another series of storms affected the northeast corner and east central counties. Some hail damage occurred in agricultural areas. High winds in excess of 70 mph in



Brown county and the surrounding area caused some downed trees and damage to buildings. Localized thunderstorms in the Black Hills that same day brought some rain, especially in the northern Hills region.



<http://www.hprcc.unl.edu/maps.php?map=ACISClimateMaps>

Temperatures over the last two weeks have been a mixed bag. The week of July 11 was cooler than average across the state. The week of July 18 brought the most significant heat wave of the season, as temperatures soared to 110F or higher in central SD (near Pierre), and 100F at many other locations. Humidity raised heat indices to 110F or higher for 2-3 days as Excessive Heat Warnings were issued for the eastern 2/3 of the state this week.

Figure: 14-day rainfall totals for South Dakota. Source: High Plains Regional Climate Center,

Impacts

- Dry weather during the last week has caused some counties to implement burn bans in eastern SD.
- There has been an increase in awareness of vehicle and farm equipment fires due to the hot and dry conditions.
- Much of the corn crop is in tasseling and pollination stage. The high heat and dry conditions may affect the effectiveness of pollination at this water-intense development stage. Yields may be lower due to drought stress. Some leaf curling and early drought stress has been observed. Near Pierre, corn in non-irrigated fields have been especially vulnerable and are in poor condition.
- Many total losses have been reported in Harding county and surrounding area for forage crops.
- Water quality continues to be a concern for livestock health in the western counties. Young cattle are experiencing illness due to poor water quality.

Forecast

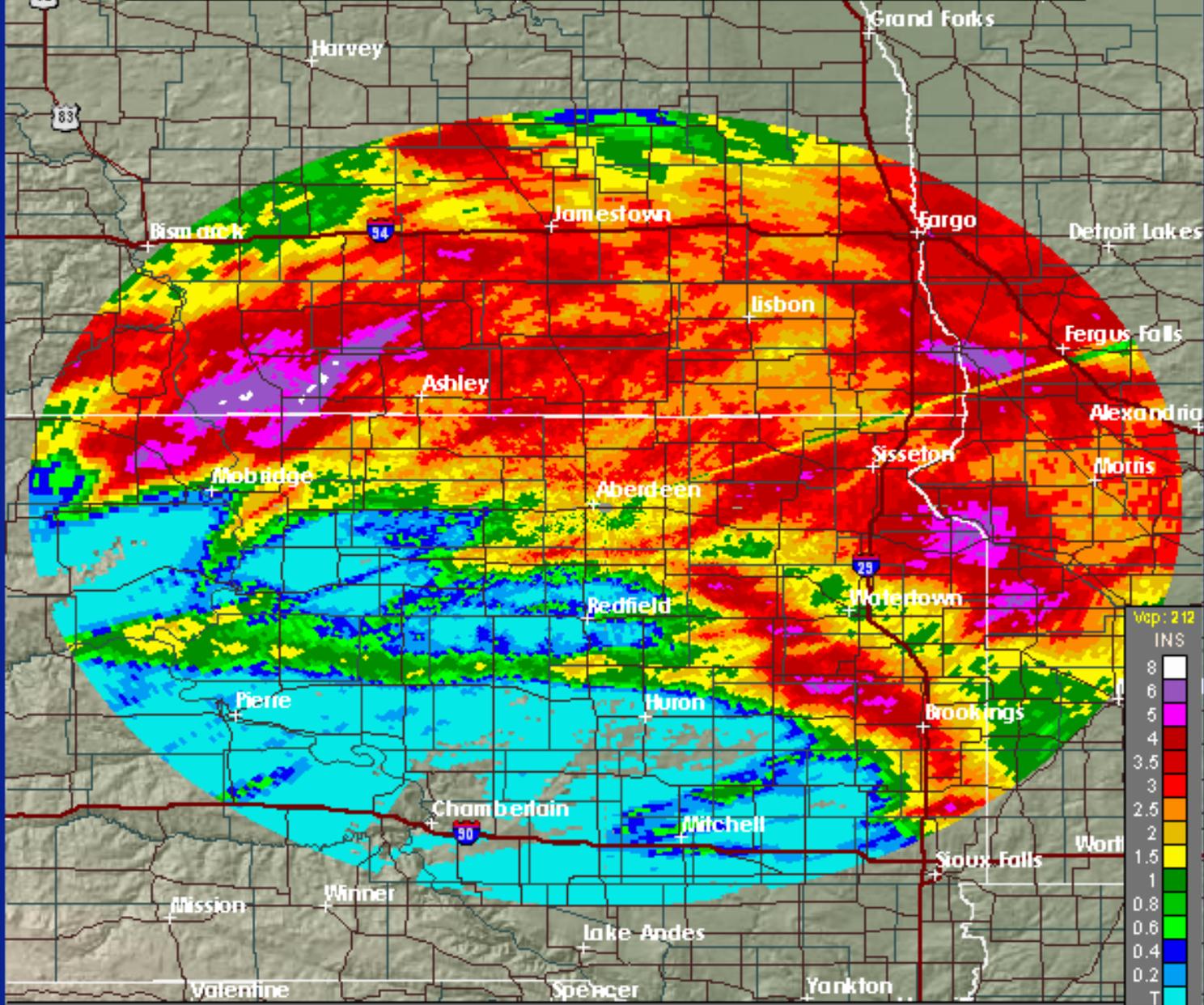
An active weather pattern is forecast to return, which is more likely to bring rain to the eastern side of the state over the coming few days. One to two more systems are projected to cross South Dakota in the coming week, with some additional chances of rainfall. Weekly totals could be more than 1.5 to 2 or more inches in the next 7 days across the eastern half of the state. The wettest areas will likely be in the northern tier counties.

After the weekend's slight cool-down, temperatures are not likely to reach triple digits in the next week. Overall we will see more seasonal temperatures, highs primarily in the 80s and low 90s, with lows in the 60s.



South Dakota State University, South Dakota counties, and U.S. Department of Agriculture cooperating. South Dakota State University is an Affirmative Action/Equal Opportunity Employer and offers all benefits, services, education, and employment opportunities without regard for race, color, creed, religion, national origin, ancestry, citizenship, age, gender, sexual orientation, disability, or Vietnam Era veteran status.

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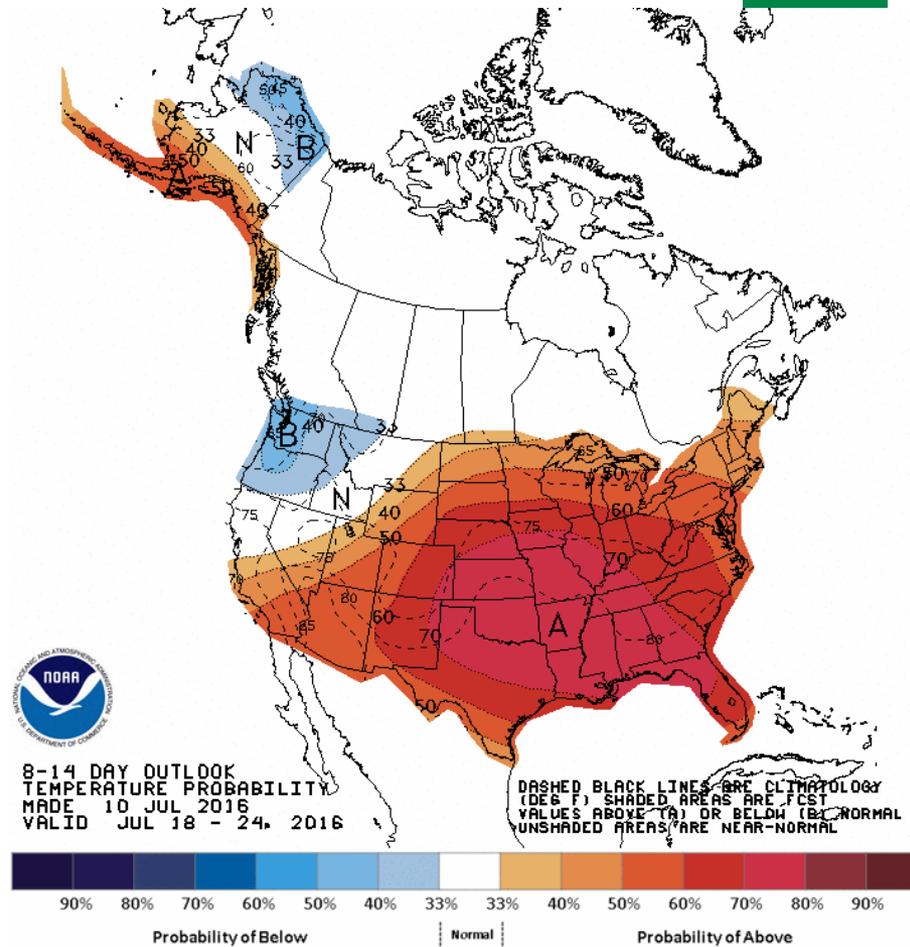
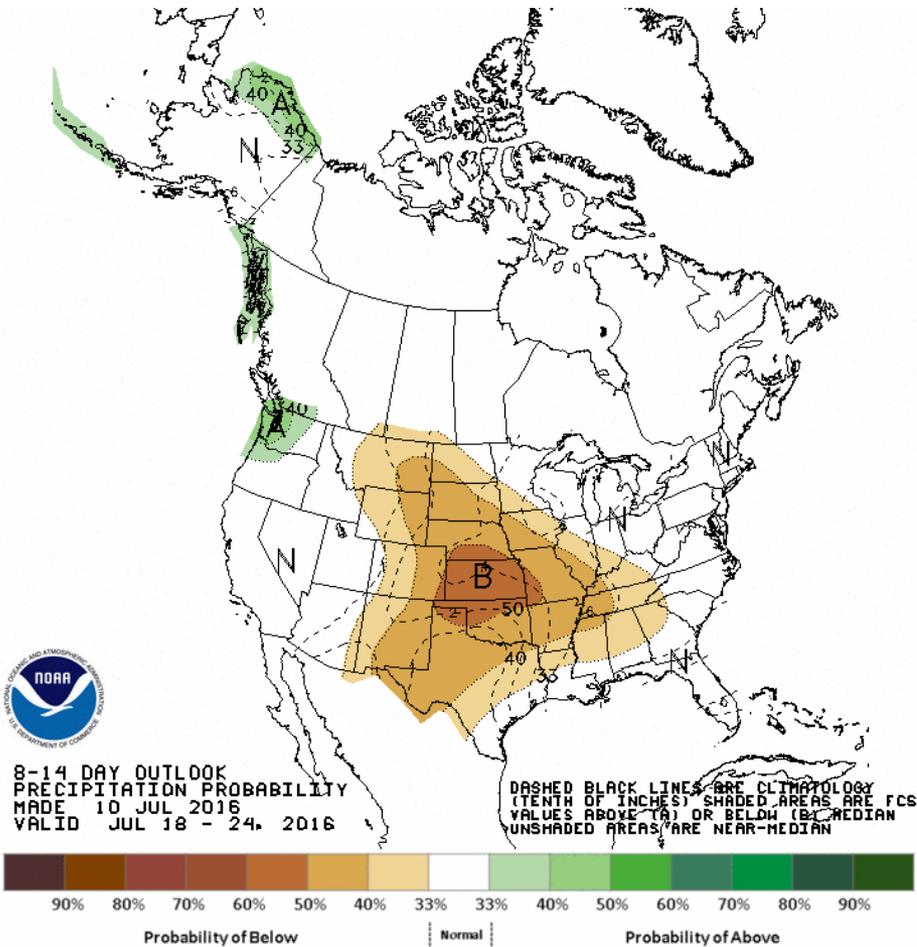
Warnings: **Tornado** Severe Thunderstorm Flash Flood Special Marine

Topo Radar Counties Rivers Highways Cities Warnings Legend

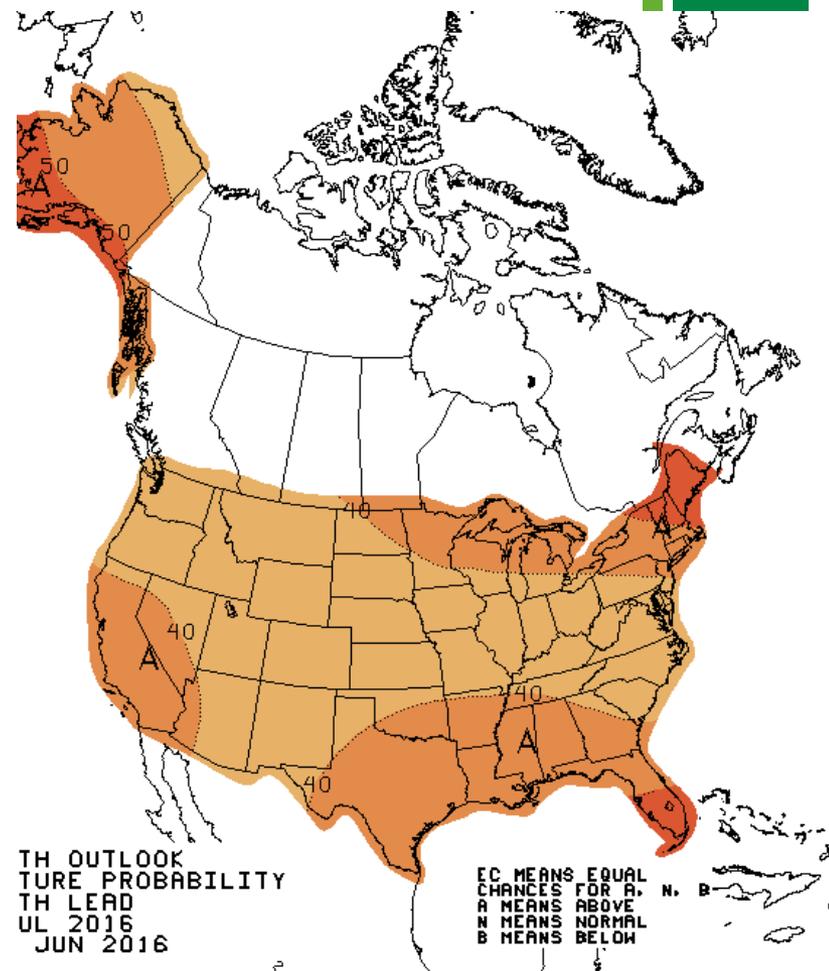
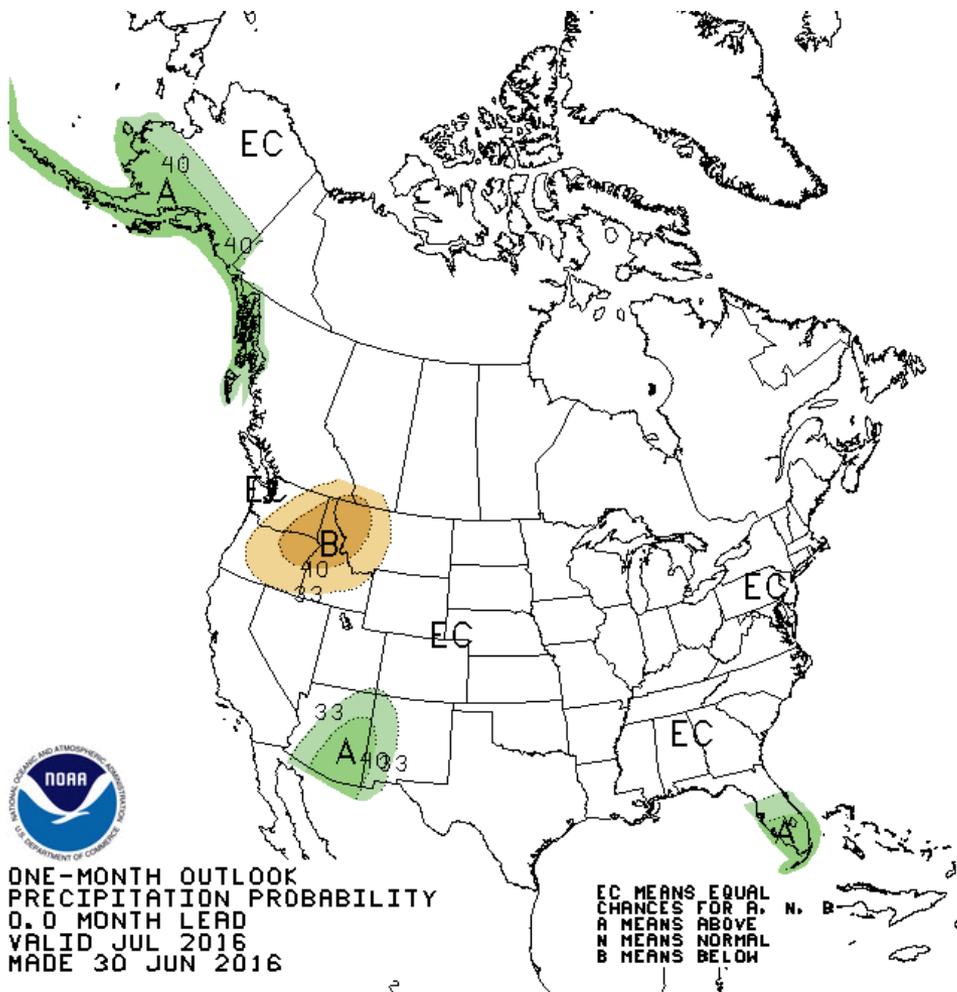
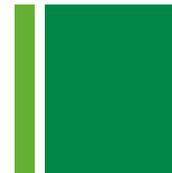


8-14 Day Outlook

Eastern SD: Corn pollination



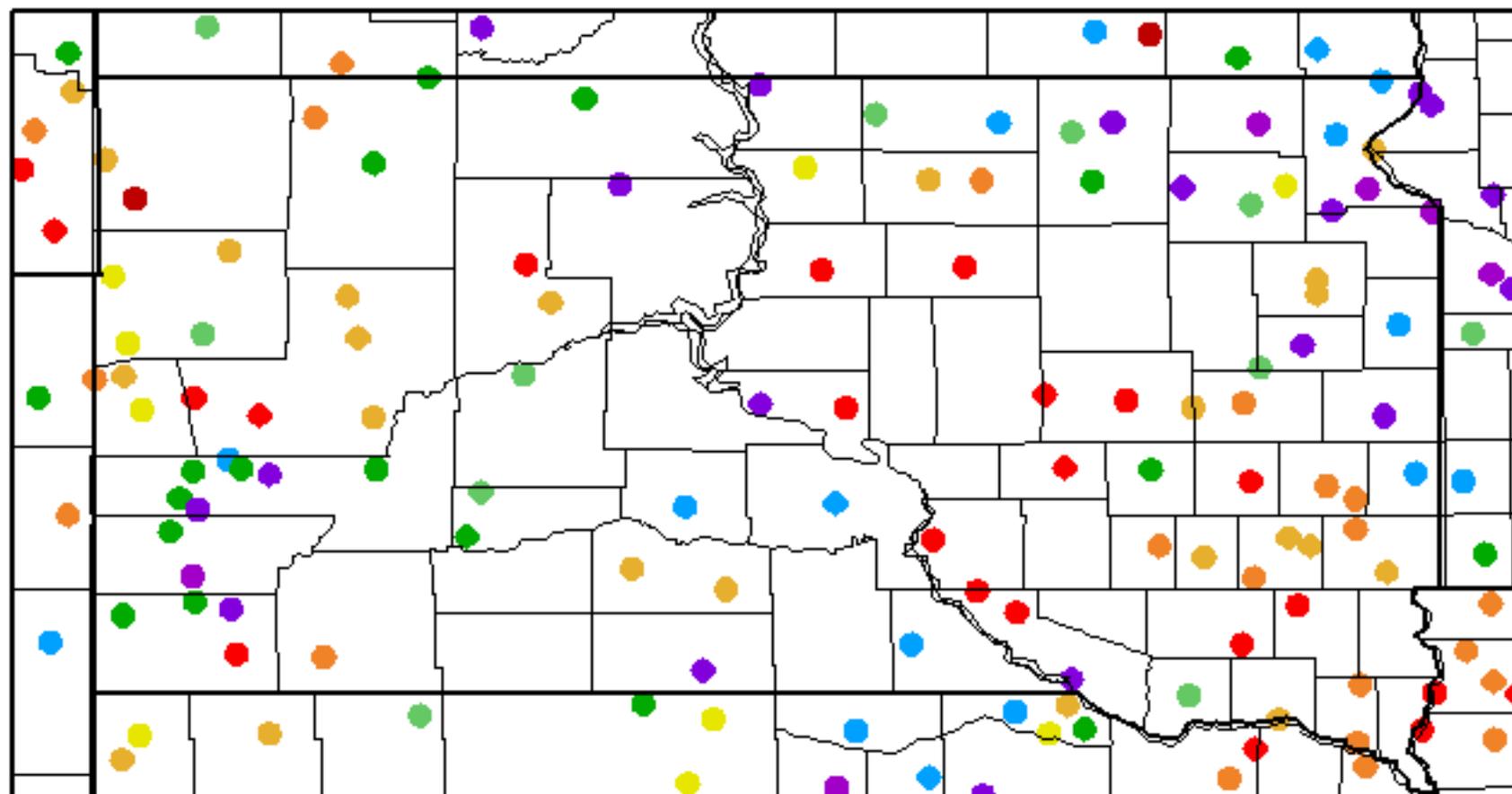
July Climate Outlook



http://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead14/

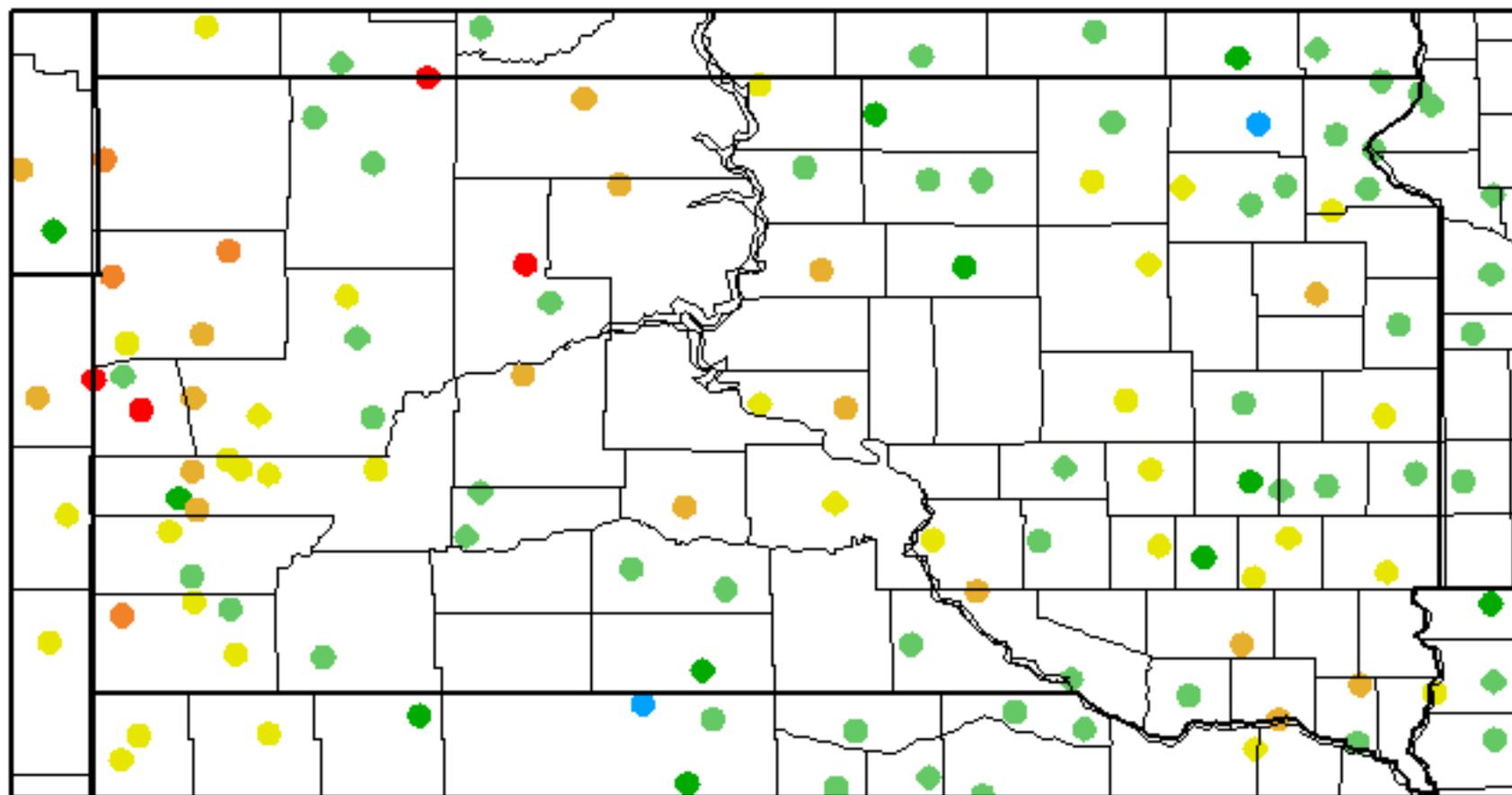
Percent of Normal Precipitation (%)

7/1/2016 - 7/31/2016



Departure from Normal Temperature (F)

7/1/2016 – 7/31/2016



Poor corn pollination

Didn't know until September!



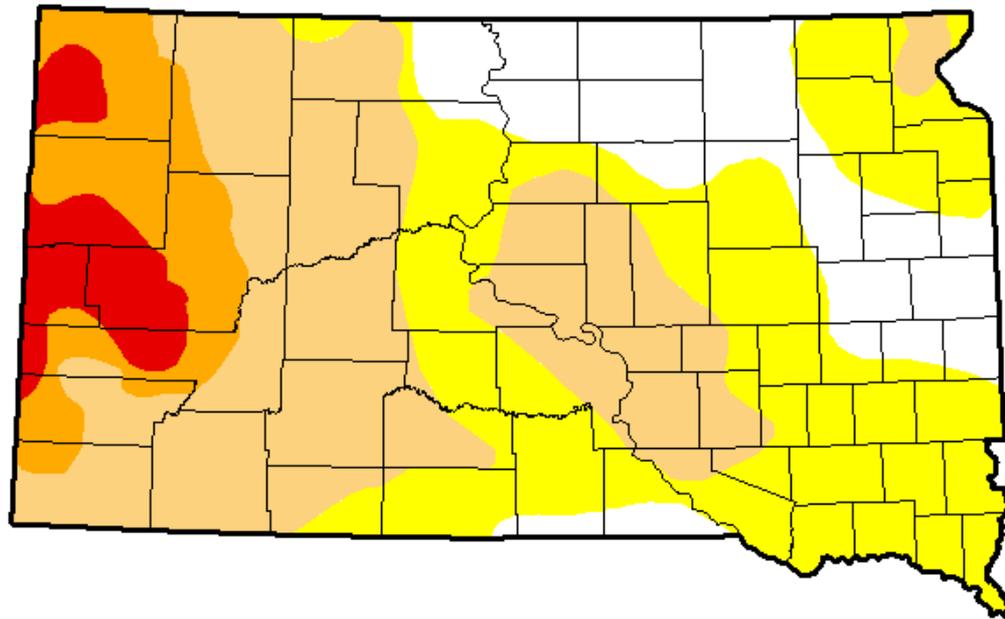
Photos: Sara Berg, SDSU Extension, 9/4/16

U.S. Drought Monitor South Dakota

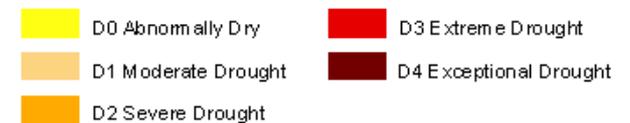
August 2, 2016
(Released Thursday, Aug. 4, 2016)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	17.28	82.72	49.00	14.37	5.07	0.00
Last Week <i>7/26/2016</i>	22.00	78.00	47.96	14.93	5.72	0.00
3 Months Ago <i>5/3/2016</i>	93.62	6.38	0.00	0.00	0.00	0.00
Start of Calendar Year <i>12/29/2015</i>	89.43	10.57	0.00	0.00	0.00	0.00
Start of Water Year <i>9/29/2015</i>	94.77	5.23	0.00	0.00	0.00	0.00
One Year Ago <i>8/4/2015</i>	91.45	8.55	0.00	0.00	0.00	0.00



Intensity:



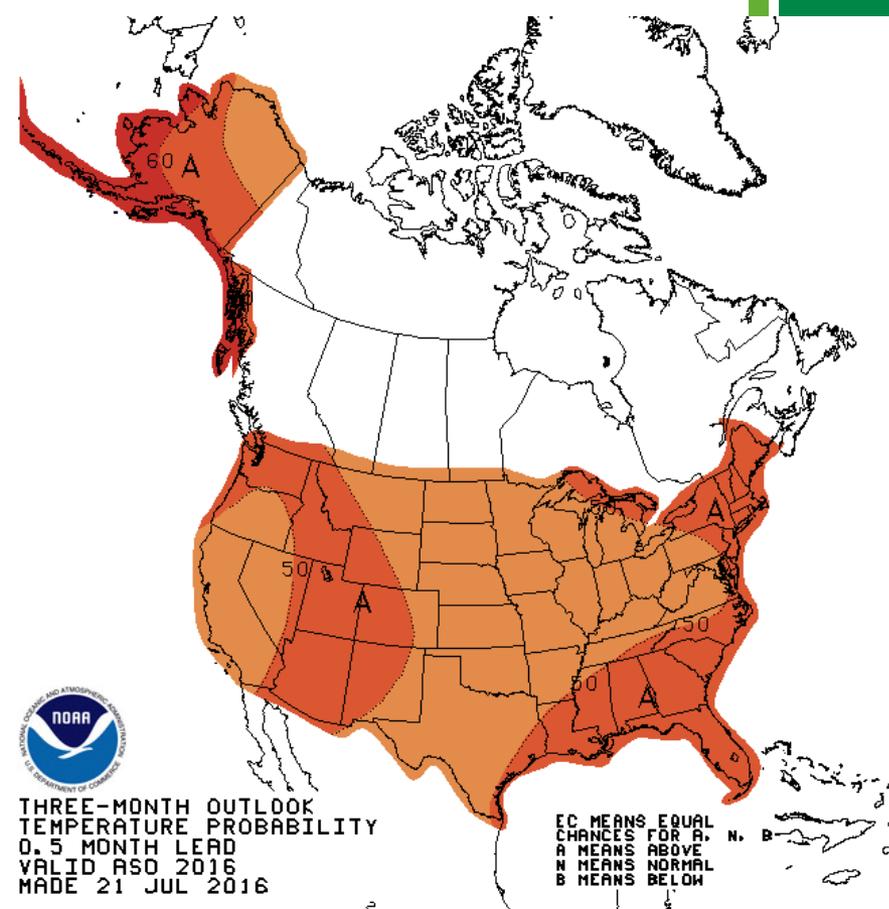
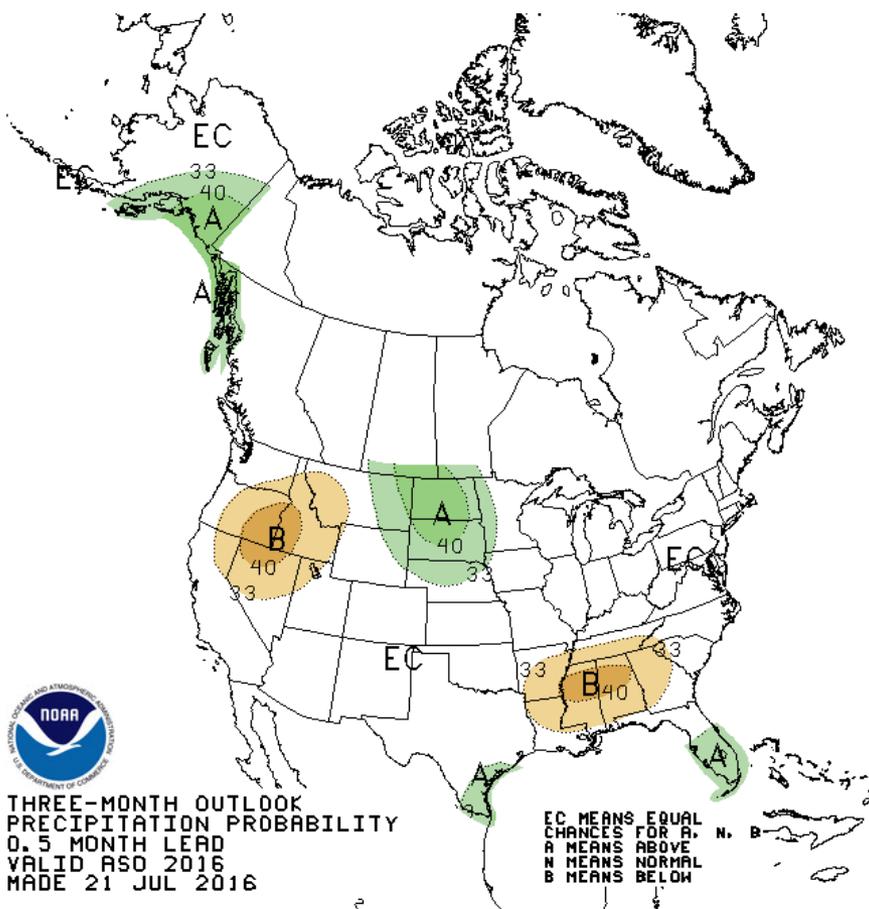
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

Richard Tinker
CPC/NOAA/NWS/NCEP

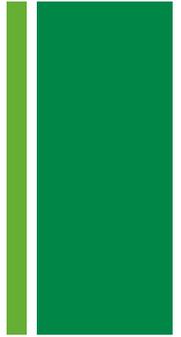


Aug-Sep-Oct Climate Outlook



http://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=1

Mold issues in September



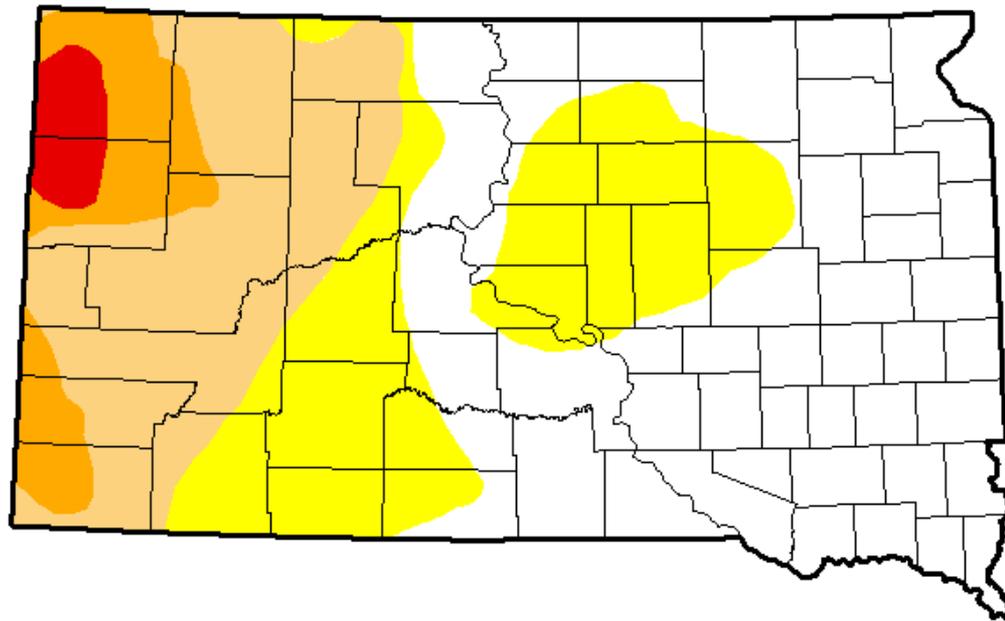
Emmanuel Byamukama, SDSU

Sara Berg, SDSU Extension



U.S. Drought Monitor South Dakota

September 6, 2016
(Released Thursday, Sep. 8, 2016)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	48.12	51.88	28.58	8.52	2.09	0.00
Last Week 8/30/2016	41.59	58.41	35.13	13.45	1.42	0.00
3 Months Ago 6/7/2016	57.82	42.18	3.51	0.42	0.00	0.00
Start of Calendar Year 1/22/2015	89.43	10.57	0.00	0.00	0.00	0.00
Start of Water Year 9/29/2015	94.77	5.23	0.00	0.00	0.00	0.00
One Year Ago 9/8/2015	100.00	0.00	0.00	0.00	0.00	0.00

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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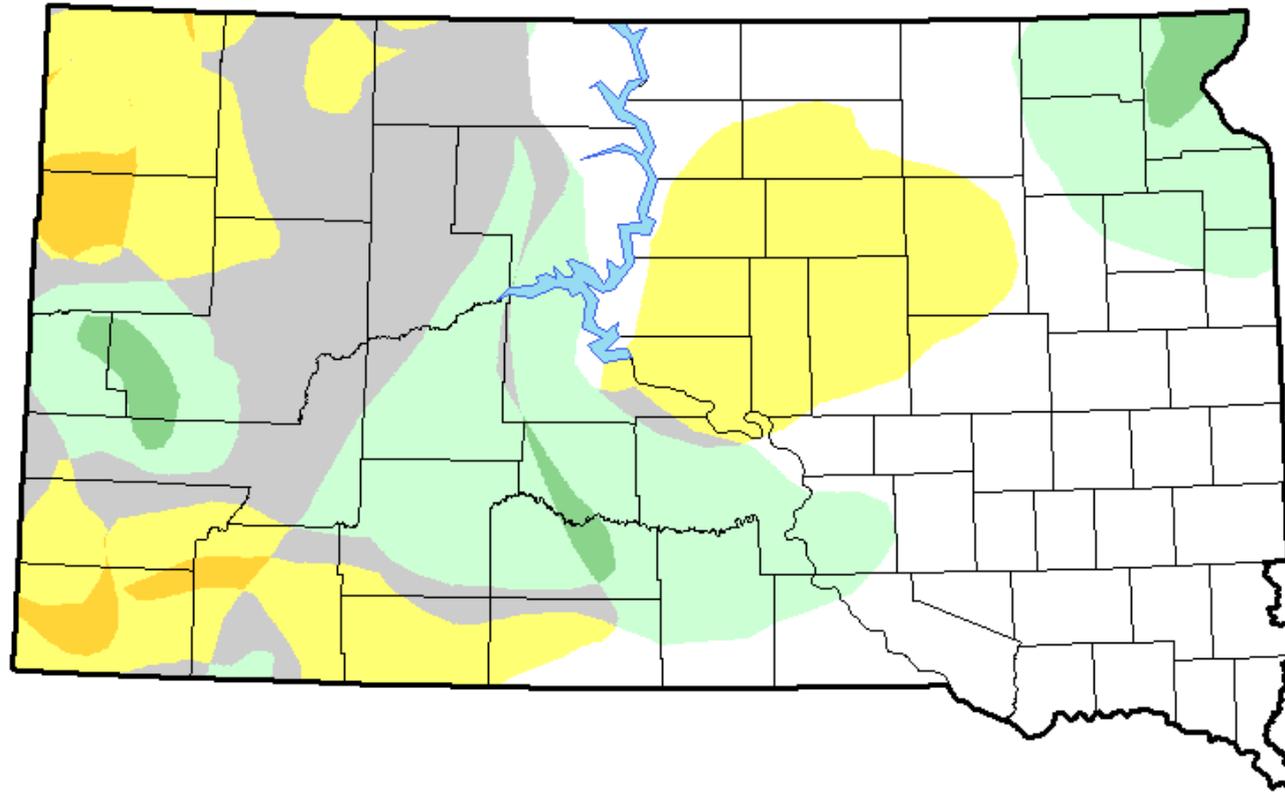
Author:

David Simeral
Western Regional Climate Center

The last DTF meeting was held Sep 6.



U.S. Drought Monitor Class Change - South Dakota 2 Months

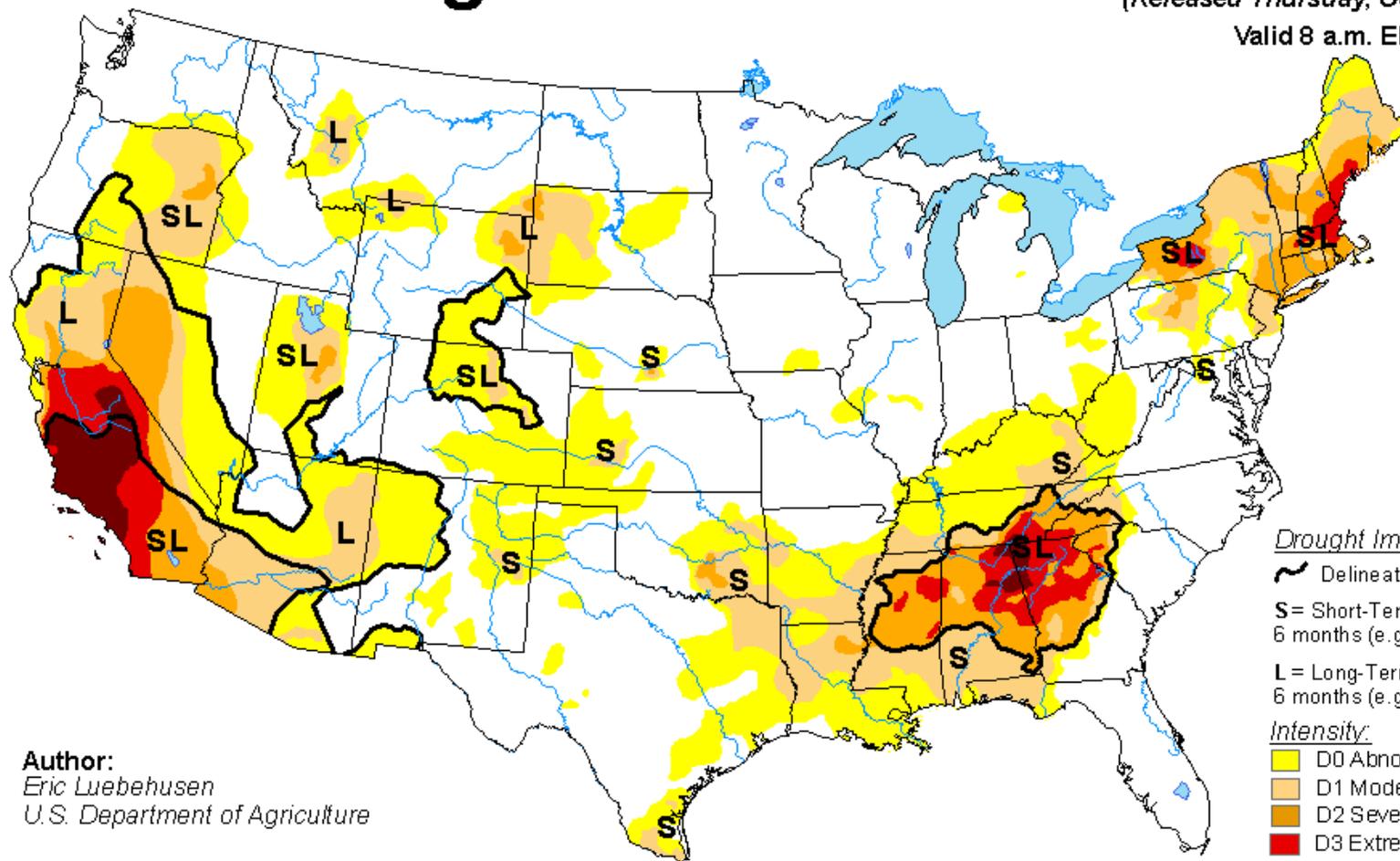


-  5 Class Degradation
-  4 Class Degradation
-  3 Class Degradation
-  2 Class Degradation
-  1 Class Degradation
-  No Change
-  1 Class Improvement
-  2 Class Improvement
-  3 Class Improvement
-  4 Class Improvement
-  5 Class Improvement

September 6, 2016
compared to
July 12, 2016

U.S. Drought Monitor

October 18, 2016
(Released Thursday, Oct. 20, 2016)
Valid 8 a.m. EDT



Author:
Eric Luebehusen
U.S. Department of Agriculture

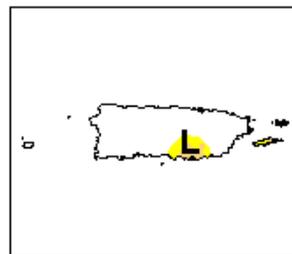
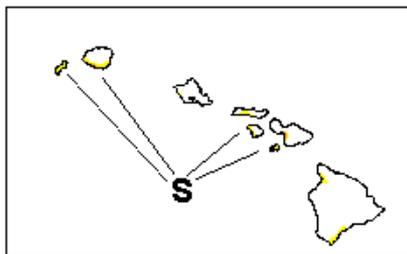
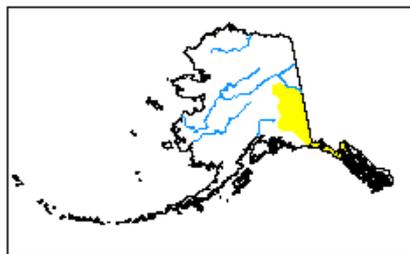
Drought Impact Types:

- ~ Delineates dominant impacts
- S= Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

- Yellow: D0 Abnormally Dry
- Light Orange: D1 Moderate Drought
- Dark Orange: D2 Severe Drought
- Red: D3 Extreme Drought
- Dark Red: D4 Exceptional Drought

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<http://droughtmonitor.unl.edu/>



Cottonwood Fire
17 Oct 2016
Photo credit:
SD Division of Wildland Fire

For more weather and climate information from SDSU:

- SD Climate & Drought Dashboard:
 - <http://climate.sdstate.edu/dashboard/>
- SDSU Extension:
 - igrow.org
- SD Mesonet:
 - climate.sdstate.edu/mobile (Live current weather)
- Facebook:
 - [SDSU Climate](#)
- Twitter:
 - [@SDSUclimate](#)

Fire weather from SDSM&T



- Darren Clabo's homepage
 - <http://www.ias.sdsmt.edu/clabo/>
 - Weekly weather updates, briefing center & outlooks
- Twitter
 - @SDFireWeather

Thanks!



Laura Edwards

Climate Field Specialist



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