



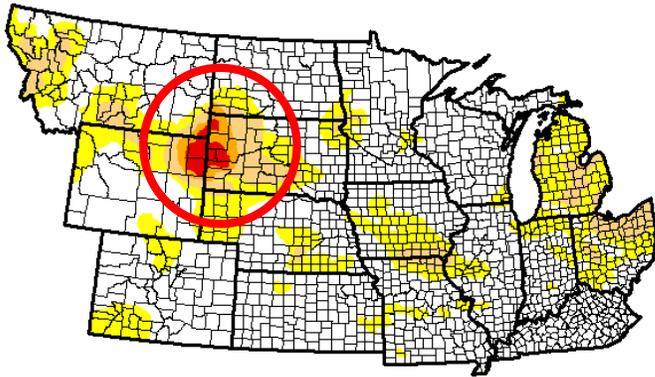
Drought in 2016: Lessons Learned

Brian Fuchs

National Drought Mitigation Center

Two “unique” areas of drought development in 2016

U.S. Drought Monitor NWS Central Region



July 19, 2016
(Released Thursday, Jul. 21, 2016)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	69.65	30.35	9.23	1.86	0.85	0.00
Last Week 7/12/2016	74.89	25.11	7.26	0.85	0.12	0.00
3 Months Ago 4/19/2016	73.62	26.38	4.60	0.25	0.00	0.00
Start of Calendar Year 12/29/2015	78.96	21.04	5.65	2.1		
Start of Water Year 9/29/2015	71.52	28.48	5.67	3.1		
One Year Ago 7/21/2015	84.99	15.01	5.68	3.1		

Intensity:



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

Author:
Chris Fenimore
NCEI/NESDIS/NOAA

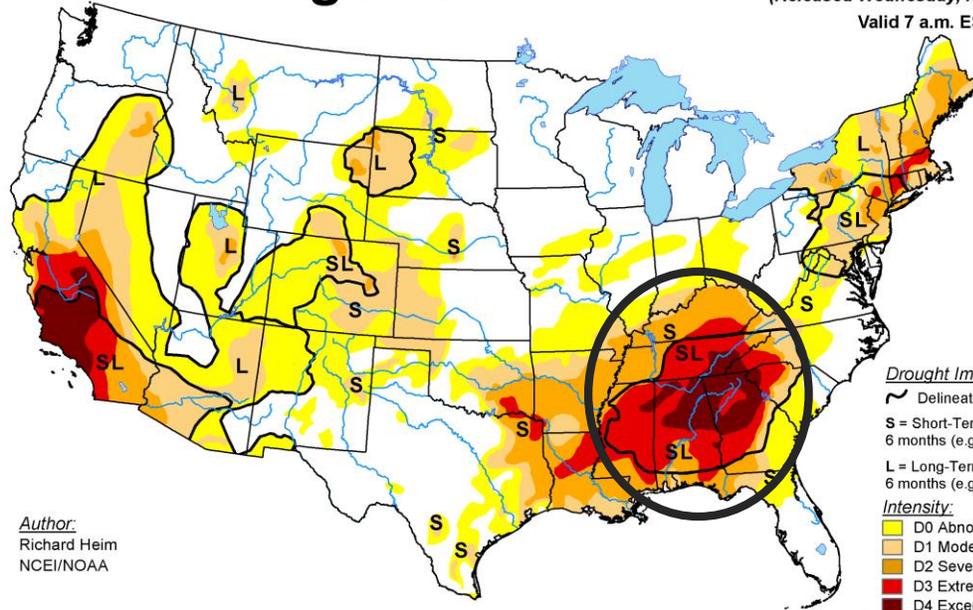


<http://droughtmonitor.u>

A unique “Flash Drought”
developed during the fall season

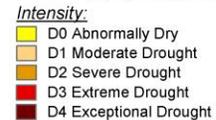
U.S. Drought Monitor

November 22, 2016
(Released Wednesday, Nov. 23, 2016)
Valid 7 a.m. EST



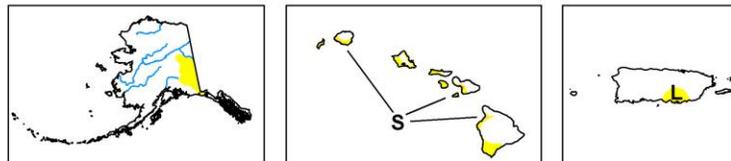
Drought Impact Types:

- ~ 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)



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

Author:
Richard Heim
NCEI/NOAA



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

Severe impacts to pasture and range lands, but physical indicators were lagging or not correlating well with reports on the ground

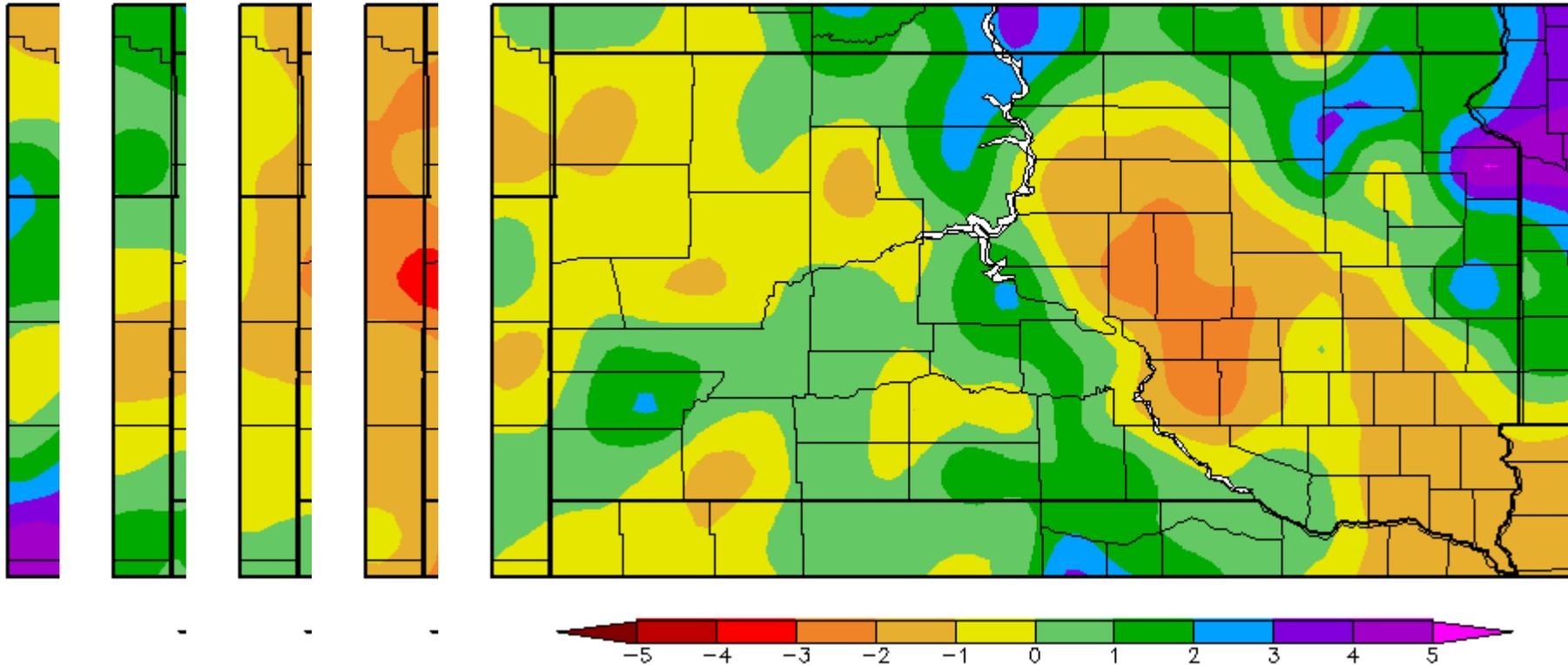


Why were the impacts in South Dakota so severe?

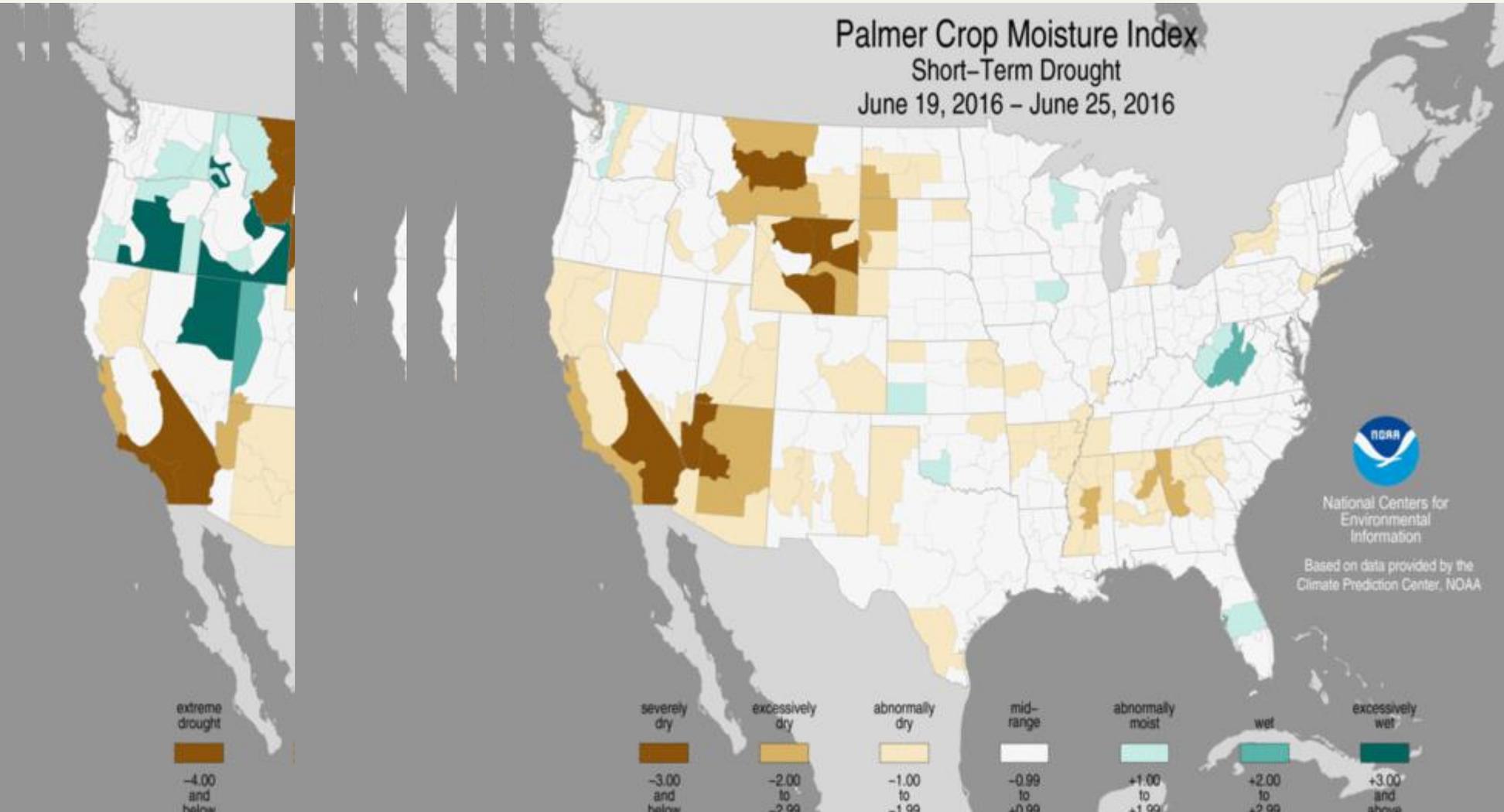


Precipitation Data

Departure from Normal Precipitation (in)
7/1/2016 - 7/31/2016



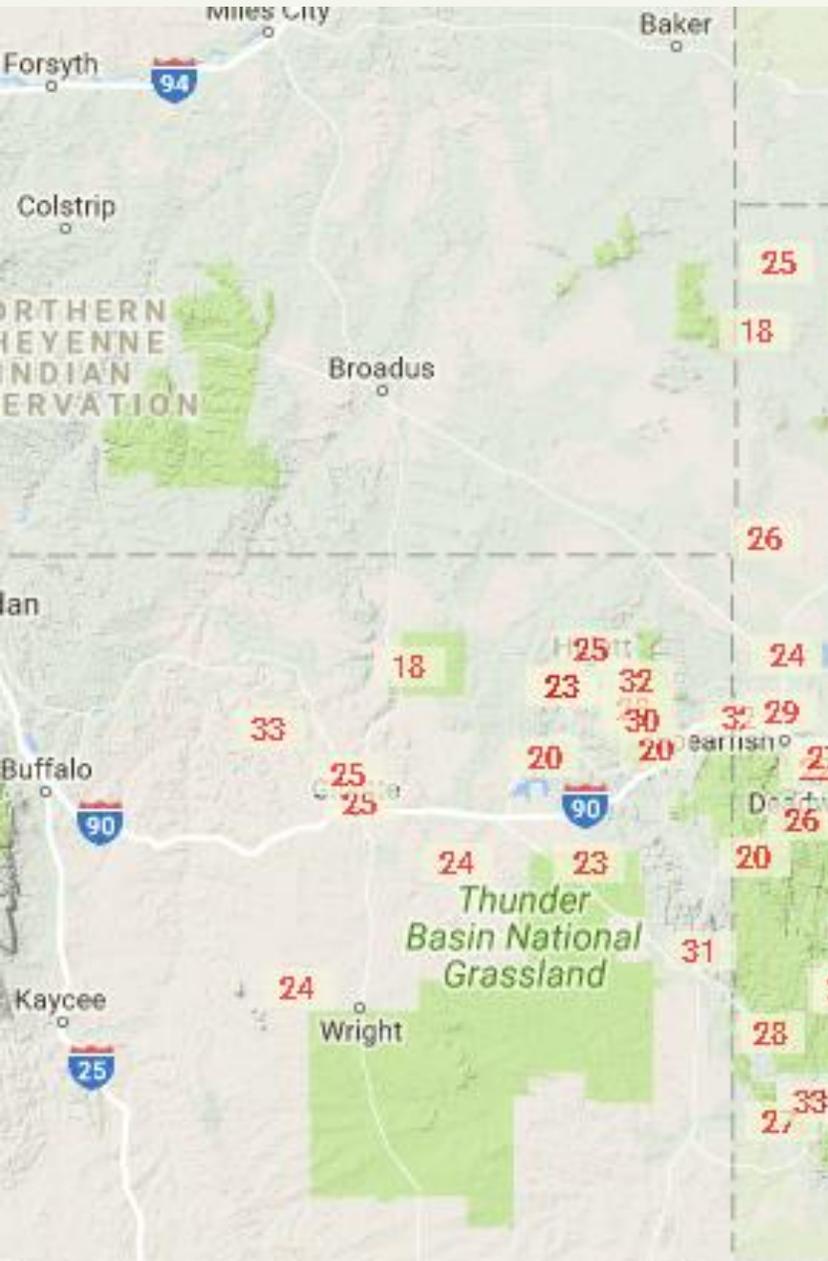
Weekly Palmer Drought Index Long and Short-Term Information



Freeze Damage from

Lowest Min Temperature - May 14 for Rapid City SD NWS CWA

Click column heading to sort ascending, click again to sort descending.



State	Name	Station Type	Record	Year	Valid Date Range
WY	NEWCASTLE	WBAN	25	2016	1906-07-01 to 2016-05-14
WY	GILLETTE CAMPBELL AP	WBAN	21	2016	1998-07-15 to 2016-05-14
WY	SUNDANCE	COOP	23	2016	1893-01-01 to 2016-05-14
WY	DEVILS TWR 2	COOP	19	2016	1959-01-01 to 2016-05-14
WY	WESTON 1 E	COOP	18	2016	1960-12-16 to 2016-05-14
WY	HULETT	COOP	22	2016	1941-07-01 to 2016-05-14
WY	MOORCROFT 12NE DCP	COOP	20	2016	2000-01-01 to 2016-05-14
WY	SUNDANCE 8 NNW	WBAN	18	2016	2007-08-24 to 2016-05-14
WY	BEAR LODGE WYOMING	RAWS	25	2016	1985-01-23 to 2016-05-14
WY	DEVILS TOWER WYOMING	RAWS	19	2016	1999-01-06 to 2016-05-14
WY	ECHETA WYOMING	RAWS	28	2016	1988-08-11 to 2016-05-14
WY	Cole Canyon	Snotel	23	2016	2000-06-14 to 2016-05-14
SD	OELRICHS	COOP	21	2016	1893-01-01 to 2016-05-14
SD	ORAL	COOP	22	2016	1971-05-13 to 2016-05-14
SD	HOT SPRINGS	COOP	24	2016	1894-02-01 to 2016-05-14
SD	WIND CAVE	COOP	22	2016	1990-08-01 to 2016-05-14
SD	EDGEMONT 23 NNW	COOP	23	2016	1989-10-01 to 2016-05-14
SD	INTERIOR 3 NE	COOP	27	2016	1955-07-02 to 2016-05-14
SD	CUSTER	COOP	21	2016	1942-10-01 to 2016-05-14
SD	MT RUSHMORE NATL MEM	COOP	26	2016	1962-02-01 to 2016-05-14
SD	HILL CITY	COOP	19	2016	1968-10-06 to 2016-05-14
SD	ELM SPRINGS 3 ESE	COOP	26	2016	1923-03-10 to 2016-05-14
SD	NEWELL	COOP	24	2016	1920-12-01 to 2016-05-14
SD	CUSTER CO AP	WBAN	20	2016	1999-04-06 to 2016-05-14
SD	HEREFORD 12 SW	COOP	26	2016	1998-04-01 to 2016-05-14
SD	BEAR RIDGE	COOP	28	2016	1998-07-15 to 2016-05-14
SD	RAPID CITY REGIONAL AP	WBAN	25	2016	1948-05-01 to 2016-05-14
SD	BAKER PARK SOUTH DAKOTA	RAWS	26	2016	2001-10-18 to 2016-05-14
SD	CUSTER SOUTH DAKOTA	RAWS	22	2016	2000-05-08 to 2016-05-14
SD	WICA-ELK MOUNTAIN SOUTH DAKOTA	RAWS	26	2016	1996-06-11 to 2016-05-14
SD	MT. RUSHMORE SOUTH DAKOTA	RAWS	27	2016	2000-10-11 to 2016-05-14
SD	NEMO SOUTH DAKOTA	RAWS	21	2016	1993-05-10 to 2016-05-14
SD	PORCUPINE SOUTH DAKOTA	RAWS	30	2016	1992-06-16 to 2016-05-14
SD	PINNACLES SOUTH DAKOTA	RAWS	28	2016	1998-07-29 to 2016-05-14
SD	RED CANYON SOUTH DAKOTA	RAWS	28	2016	1993-10-28 to 2016-05-14
SD	Blind Park	Snotel	9	2016	1990-06-05 to 2016-05-14
SD	North Rapid Creek	Snotel	21	2016	1996-08-12 to 2016-05-14
SD	LADNER 9 SW	COOP	19	2016	2001-03-01 to 2016-05-14
SD	BUFFALO ASOS	WBAN	26	2016	1998-04-16 to 2016-05-14
SD	FAITH MUNI AP	WBAN	28	2016	1998-05-21 to 2016-05-14
SD	HOOVER	COOP	20	2016	2004-05-17 to 2016-05-14
SD	BUFFALO 13 ESE	WBAN	18	2016	2004-09-23 to 2016-05-14
SD	MAGPIE CREEK SOUTH DAKOTA	RAWS	29	2016	1987-04-20 to 2016-05-14



My “theory”

- Freeze damage by itself would have hurt forage production
- Drought development would have impacted forage production
- The combination of the Mid-May freeze and the developing drought by early summer was the “perfect storm” resulting in the widespread impacts to forage in western South Dakota and northeast Wyoming.