

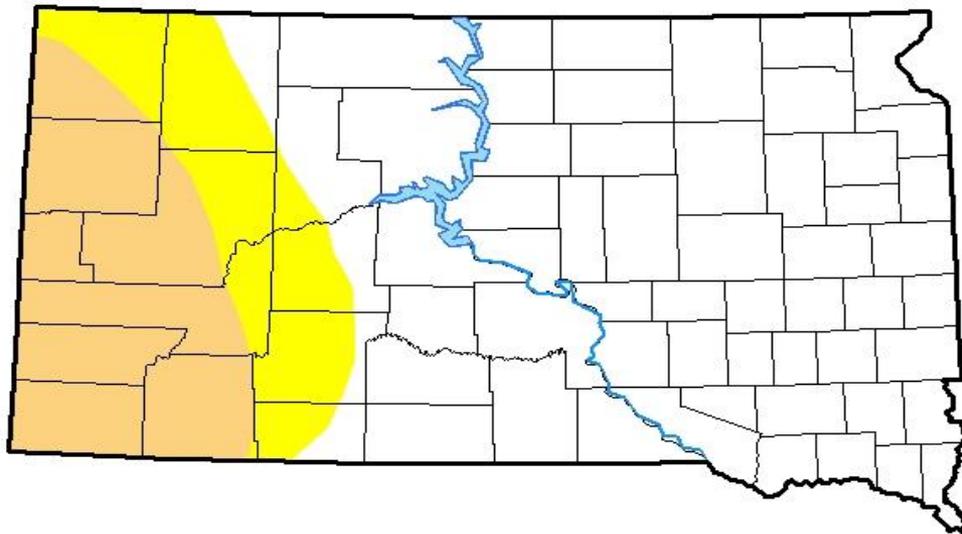
Drought conditions in the GPR - BIA



SD Drought

U.S. Drought Monitor South Dakota

March 21, 2017
(Released Thursday, Mar. 23, 2017)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	69.93	30.07	17.85	0.00	0.00	0.00
Last Week <i>03-14-2017</i>	69.93	30.07	17.85	0.00	0.00	0.00
3 Months Ago <i>12-20-2016</i>	37.76	62.24	30.69	9.14	0.00	0.00
Start of Calendar Year <i>01-03-2017</i>	61.22	38.78	26.01	6.00	0.00	0.00
Start of Water Year <i>09-27-2016</i>	47.50	52.50	20.95	4.93	1.09	0.00
One Year Ago <i>03-22-2016</i>	76.21	23.79	0.08	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.

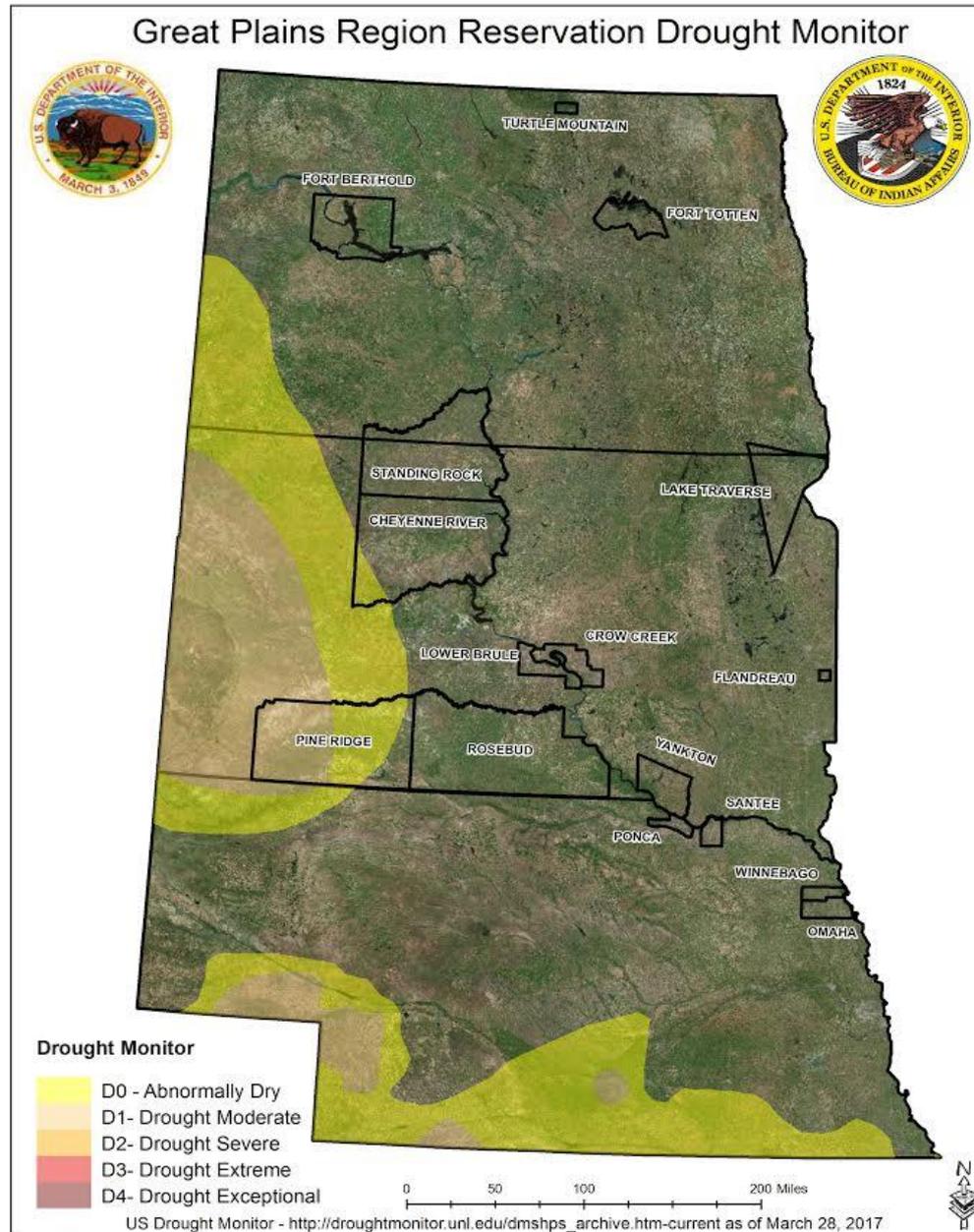
Author:

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U. S. Department of Agriculture



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

GPR - BIA



3 dimensional fire environment

- Fire weather
- Fuel conditions (curing levels)
- Soil moisture (lack thereof)

*Fire weather is highly used throughout fire mgt organizations today. Highly analyzed.

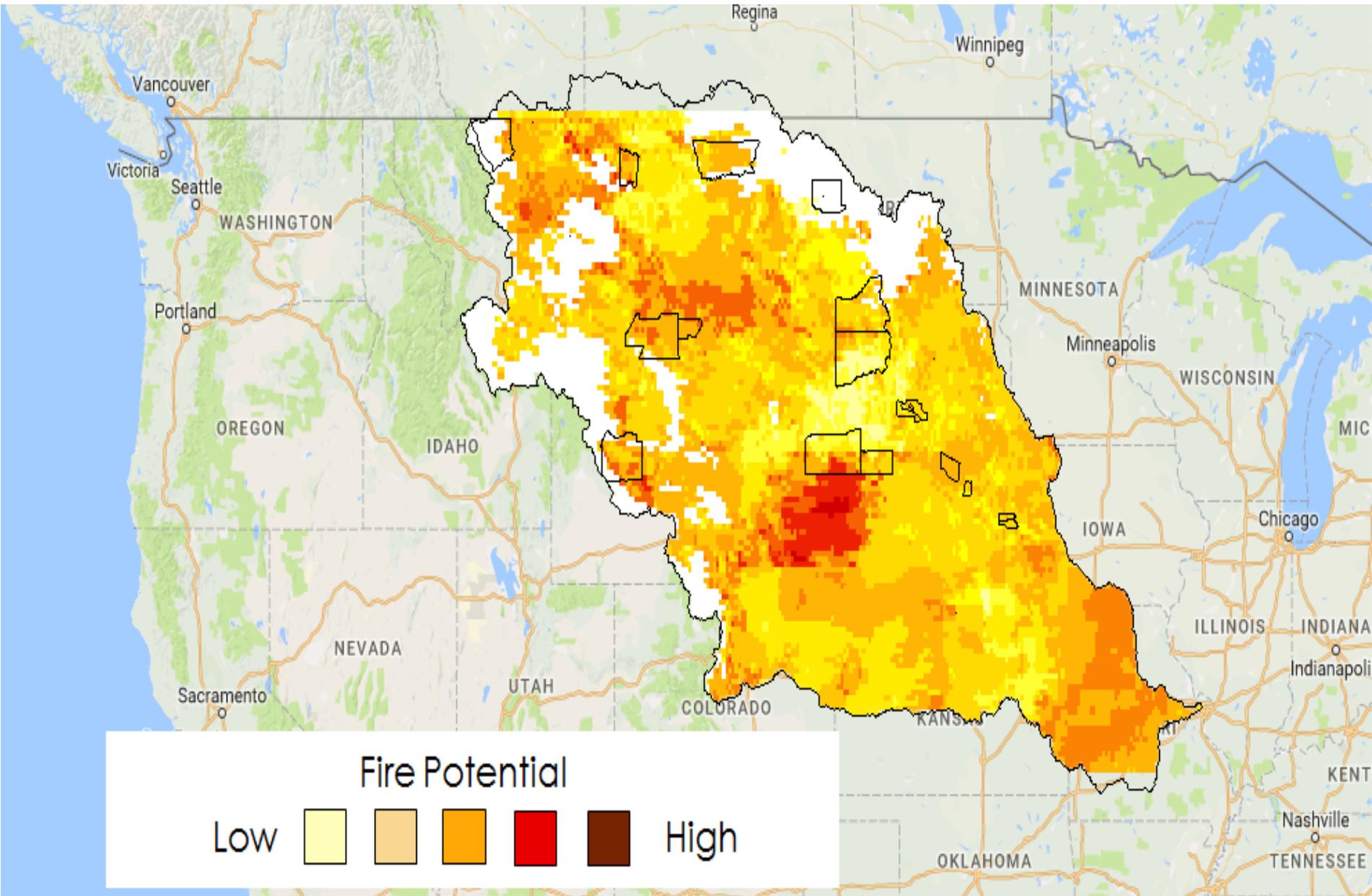
*Fuel conditions is currently being quantified by NASA using NDII imagery. Curing levels with the transition to green up. Been coordinating and working with NASA since Dec 7, 2016 on this research project.

*Soil moisture using the US Drought Monitor map or other indexes are not being currently used in the fire danger notification process on a local, statewide, regional, or national levels.

*Our region (GPR-BIA) has been using the US Drought Monitor Map for the last 8 years to notify and prepare our agencies and various states for large fire possibilities involving drought impacted areas. This includes some local county EMC`s.

*What makes drought so dangerous...the impacts cannot be readily seen.

NASA Fire Potential Matrix (draft)



10 WFMI Fire History (GPR – BIA)

BIA - Great Plains Region 10 year fire history (WFMI) 2007-2017										
Agency	Year	Fire Name	Cause	Start Date	Control Date	Acres	Out Date	LatNAD83	LongNAD83	Drought level
Pine Ridge Agency	2007	Stampede	Human	20070707	20070714	22,454	20070717	43.0419	-102.6542	D1-D2
Turtle Mountain Agency	2007	Woodtick	Human	20070419	20070419	2,560	20070420	48.863	-100.1136	D0 Ab Dry
Fort Berthold Agency	2007	Muskrat Lake	Human	20070814	20070817	2,180	20070830	47.8489	-102.4278	D0 Ab Dry
Turtle Mountain Agency	2007	Star	Human	20070416	20070416	1,400	20070417	48.9247	-100.0842	D0 Ab Dry
Turtle Mountain Agency	2007	Too Big	Human	20070416	20070416	1,288	20070416	48.798	-99.8103	D0 Ab Dry
Pine Ridge Agency	2007	4th Complex	Human	20070629	20070705	1,123	20070705	43.0256	-102.5589	D1 Moderate
Fort Totten Agency	2008	104	Human	20080414	20080414	1,900	20080414	47.8583	-98.8678	D0 Ab Dry
Fort Berthold Agency	2009	Squaw Creek	Human	20091106	20091108	1,580	20091110	47.6189	-102.4881	No drought
Rosebud Agency	2011	OKREEK	Human	20111005	20111009	17,500	20111009	43.317656	-100.249361	No drought
Pine Ridge Agency	2011	Wild Stallion	Human	20110823	20110827	2,510	20110829	43.0658	-102.8192	No drought
Lower Brule Agency	2011	Highway 47	Human	20111005	20111007	1,790	20111007	43.99231	-99.48581	No drought
Rosebud Agency	2012	Long Horn Complex	Natural	20120727	20120728	43,639	20120728	43.200553	-100.972733	D3 Extreme
Pine Ridge Agency	2012	Wellnitz	Natural	20120831	20120905	28,800	20120906	43.54236	-102.6903	D3 Extreme
Rosebud Agency	2012	CROOKSTON	Human	20121017	20121019	14,453	20121022	43.059847	-100.972106	D4 Exceptional
Pine Ridge Agency	2012	Wick	Natural	20120424	20120426	7,665	20120426	43.2861	-102.9853	D1 Moderate
Rosebud Agency	2012	TOWER	Human	20120225	20120227	4,723	20120228	43.5775	-100.8461	D0 Ab Dry
Standing Rock Agency	2012	McIntosh	Human	20120824	20120830	2,575	20120924	45.925	-101.3756	D0-D1
Winnebago Agency	2012	Six Pack	Human	20120310	20120311	2,464	20120315	42.3563	-96.4721	D0-D1
Standing Rock Agency	2012	Corn Stalk	Human	20120921	20120922	2,282	20121003	45.97803	-100.86833	D1 Moderate
Standing Rock Agency	2012	Crow Flats	Natural	20120824	20120830	1,280	20120924	45.68	-101.622	D1 Moderate
Rosebud Agency	2014	OKREEK	Human	20141016	20141019	1,236	20141031	43.6222	-100.2383	No drought
Pine Ridge Agency	2014	Red Owl	Human	20141026	20141028	1,125	20141030	43.31272	-102.24064	No drought
Standing Rock Agency	2015	Cannon Ball	Human	20151011	20151014	2,896	20151028	46.3706	-100.6414	D0 Ab Dry
Rosebud Agency	2015	FORT	Natural	20150328	20150331	1,745	20150404	43.1094	-101.1092	D0 Ab Dry
Standing Rock Agency	2015	Big Lake	Human	20150330	20150331	1,549	20150407	46.3636	-100.5881	D0 Ab Dry
Pine Ridge Agency	2016	FREEMAN	Natural	20160726	20160727	18,815	20160731	43.50181	-102.94708	D1 Moderate
Pine Ridge Agency	2016	EXPLOSION	Human	20161113	20161117	3,070	20161120	43.37842	-102.1695	D1 Moderate
Pine Ridge Agency	2017	Kyle Fire	Human	20170304	20170304	1,151	20170305	43.46456	-102.11267	D1 Moderate

195,753 acres

28 wildland fires occurred in 10 years region wide (2007-2017 at the 1,000 acre size or larger)

*6 fires were started by lightning strikes on drought impacted ground (D0, D1, and D3 drought conditions)

22 fires were human caused

2009, 2010, 2011, and 2014 were wet years for our agency areas

Summary. In the last 10 years our (large) fire history indicates that...

79% of our large fires over 1,000 acres occurred on drought impacted ground (22 fires)

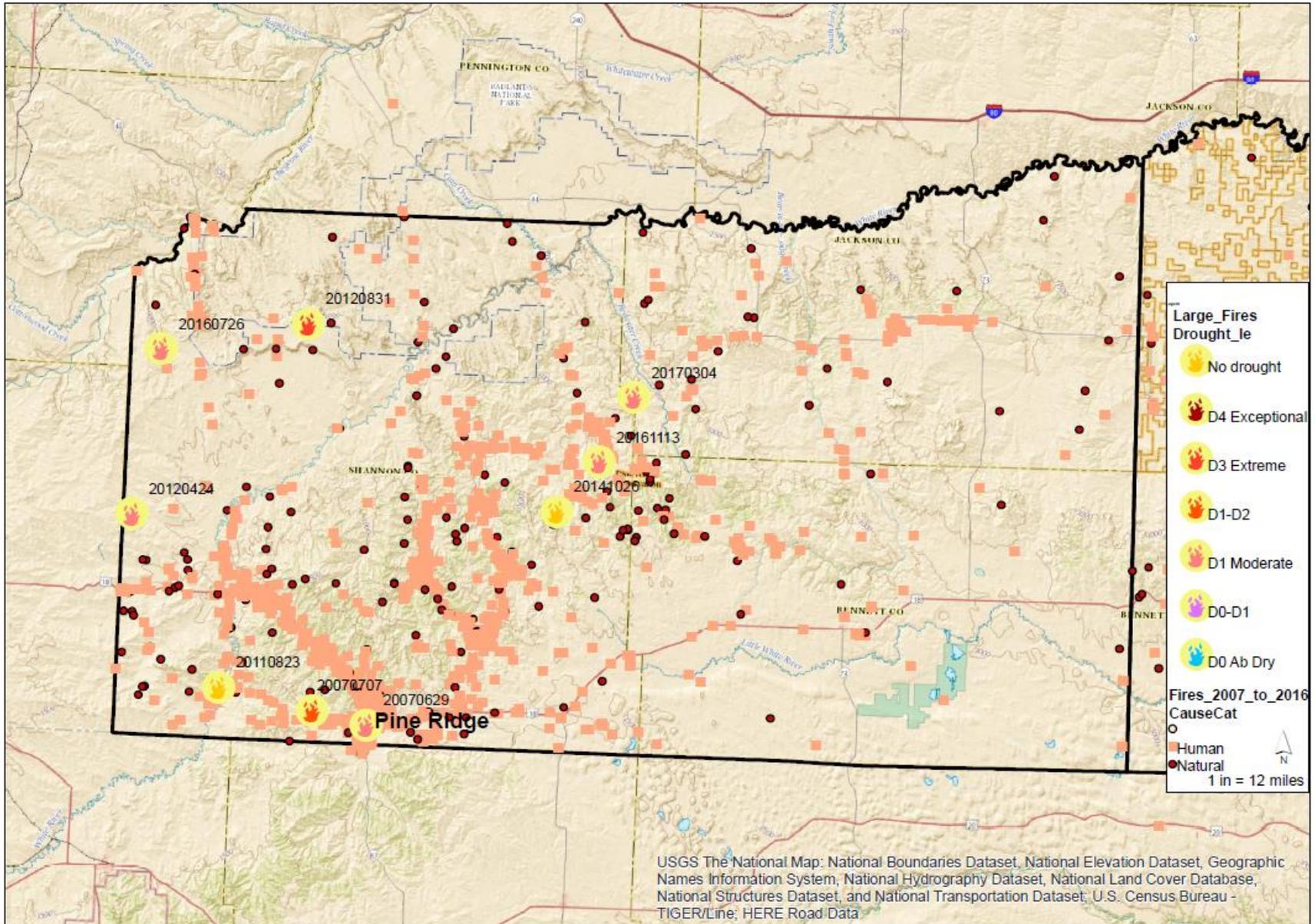
21% of our large fires over 1,000 acres occurred on non drought impacted ground (6 fires)

195,753 total acres burned on large fires in 10 years

170,012 acres burned on drought impacted ground (86%)

25,741 acres burned on non drought impacted ground (14%)

Great Plains Region Pine Ridge Reservation Fire Analysis



GPR Large fire activity within 14 years with drought conditions (2002-2016)

Fire information

Drought level

- | | |
|--|-------------|
| • 2002 ND-SRA Kraft fire - 10,420 acres ** | D2 Severe |
| • 2003 (Brown County EMD) Bath fire - 2,000 acres | D1 Moderate |
| • 2007 SD-PRA Stampede fire - 22,454 acres | D1 Moderate |
| • 2012 SD-RBA Longhorn fire - 43,639 acres ** | D2 Severe |
| • 2012 SD-PRA Wellnitz fire - 28,800 acres ** | D3 Extreme |
| • 2013 ND-DPF Pasture 3B escaped RX fire - 10,679 acre | D2 Severe |
| • 2015 ND-SRA Big Lake fire - 1,549 acres | D1 Moderate |
| • 2016 SD-PRA Freeman fire – 18,816 acres ** | D1 Moderate |

**lightning strike started fires. 4 out of the 8 above listed wildland fires were started by lightning strikes over very large areas.

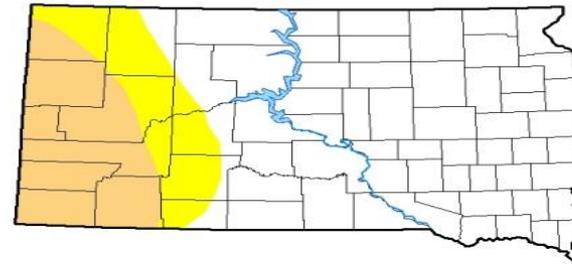
SDGFDI and SD Drought Map

*We use both maps currently to depict daily and weekly fire danger within our agency and regional areas. Send out daily emails to the agencies and FMO's.

*Wherever the drought indices and high, very high, and extreme fire danger overlap then that area will have the highest probability of large fires occurring (80%).

*Any other areas where fires start without drought impacts will usually have a 20% chance of large fires occurring.

U.S. Drought Monitor South Dakota



March 21, 2017
(Released Thursday, Mar. 23, 2017)
Valid 8 a.m. EDT

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Current	69.93	30.07	17.85	0.00	0.00	0.00
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3 Months Ago 12-20-2016	37.76	62.24	30.69	9.14	0.00	0.00
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Intensity:

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

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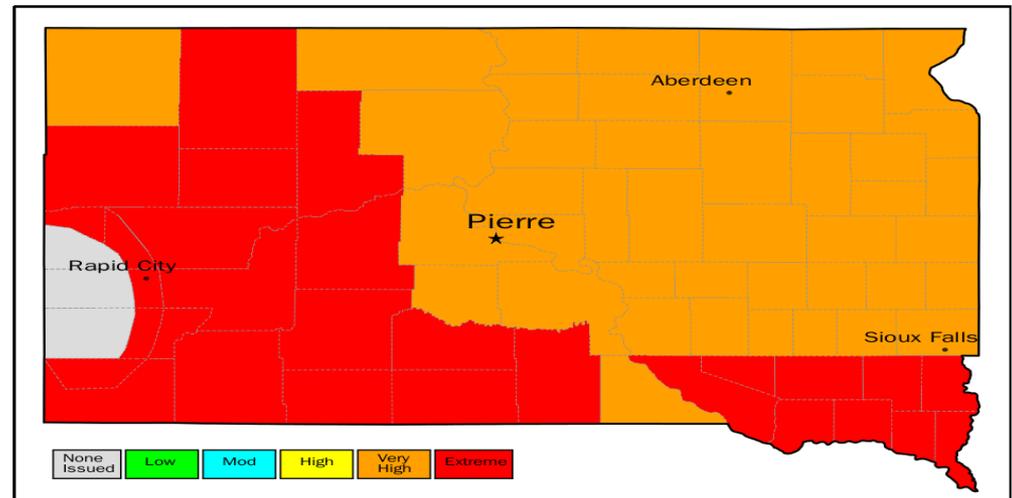
Author:

Eric Liebheusen
U.S. Department of Agriculture



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

SD Grassland Fire Danger: Tue, Mar 7, 2017



Drought impacts on our agency areas

- When our fires get this size (1,000 acres) or larger than outside agency area firefighting resources need to be mobilized to assist. This can involve ground and fire aviation resources locally, regionally, or nationally. These fires will usually transition into extended attack managed fires (type 3 level). Costs will generally run up to the \$100,000 plus level depending on resources being used.
- Fires that occur in drought impacted areas will need 2-3 times the amount of firefighting resources and time to contain and control these fires as compared to fires that start on non drought impacted areas.
- Bladed dozer or motor grader firelines need to be used to safely contain and control the fires on drought impacted areas. This is not needed on fires that start on non drought impacted areas. Riparian areas will not stop or slow down fire spread on areas with drought.
- Fires will go underground into the root systems of grass, brush, and trees extending mop up operations. Fires can also rekindle on the perimeters of existing older fires a week or longer after it has been totally declared controlled and out (we call this resistance to control).

Kyle fire (PRA) 1,151 acres
March 5, 2017 on D1 moderate drought area



Kyle Fire (PRA) northern perimeter



Kyle Fire (PRA) southeast perimeter



Explosion fire (PRA) 3,070 acres Nov 13, 2016.
D1 moderate drought area



Explosion Fire (PRA)



Explosion Fire (PRA)



- A major issue that we deal with within our regional area is that when the drought indices reach the D0 level or higher (D1 - D4) for any given area then lightning strike fires become a significant factor for large fire development and resistance to control for fire suppression operations. **Our 10 fire history indicates that 101,944 acres have burned on 6 lightning strike fires that occurred on drought impacted areas on 3 of our agencies (PRA, RBA, and SRA).**

When these 5 variables align then large, complex, and dangerous fires can or will occur (80% of the time in our areas):

- 1). High temps. 40 degrees or higher.
- 2). high winds 30 mph or higher
- 3). RH values at 30% or lower
- 4). Fuel beds at 70%-100% cured level or higher
- 5). Drought at the D0 - D4 level is in place (without drought, occurrence is at 20%)

The 5 variables have been determined by actual observed fire weather conditions during those large fires listed above and also by my fire experience in having over 14 years of wildland firefighting experience in the Dakotas. In addition to my Rx fire experience in over 11 years of conducting RX burning in the Dakotas and by conducting extensive technical reviews (for both BIA and FWS RX burn projects) on type 2 RX burn plans utilizing the BEHAVE 5.1.3 software for burn window parameters as well.

Current drought conditions

- All of PRA (D1) and southwestern area of CRA (D0) have drought conditions now.
- PRA is the driest area within our region so far to date. The Kyle fire occurred on March 5th and burned 1,151 acres on D1 moderate level drought impacted area (2.5 miles north of the town of Kyle). There was another fire that occurred at the same time but off of PRA, the Wolf Fire which burned 1800 acres on D1 moderate level drought impacted ground as well. This was a SD state jurisdiction fire east of Wall, SD.
- During winter, with freezing temps and snow accumulations, the drought conditions will actually “freeze” in place until the snow melts and all ground frost is gone.
- Only actual springtime rains can lessen drought impacts from that point on. Don't be misled about lots of snow lessening current drought conditions overall in the High Plains area. We have found this to not be true to our actual on the ground observations.

What does all this mean?

- When your agency area has D0 indices and is moving into D1 conditions or higher and....
- Our local agency areas are getting multiple fires a day and fire size starts to get bigger than average....those are good trigger points and justification to order more ground resources and fire aviation resources ahead of time before large fires become an issue.
- That also indicates that the agency might need to submit a long term severity request if no rain is forecasted within the next 2-4 weeks.

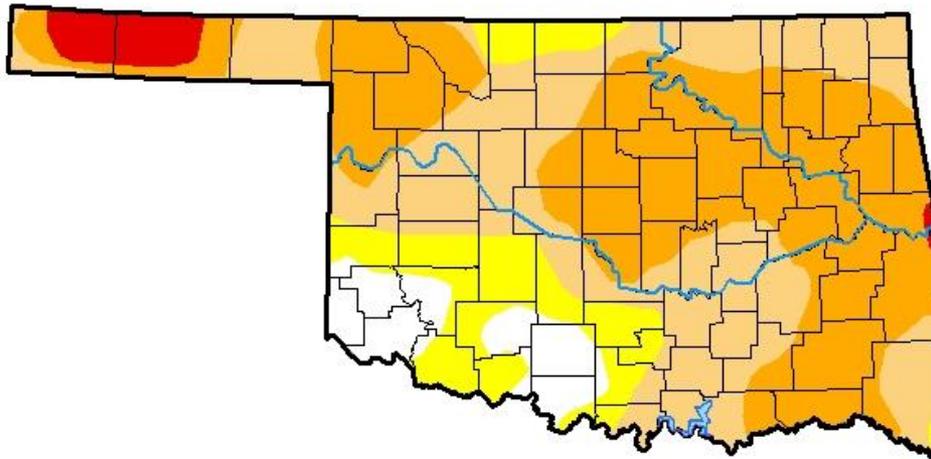
Oklahoma Drought 2017

U.S. Drought Monitor Oklahoma

March 21, 2017
(Released Thursday, Mar. 23, 2017)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	7.21	92.79	80.56	46.04	3.17	0.00
Last Week <i>03-14-2017</i>	9.91	90.09	74.21	41.16	3.17	0.00
3 Months Ago <i>12-20-2016</i>	11.94	88.06	72.83	42.47	3.14	0.00
Start of Calendar Year <i>01-03-2017</i>	5.61	94.39	83.21	55.75	5.55	0.00
Start of Water Year <i>09-27-2016</i>	57.82	42.18	19.04	3.05	0.00	0.00
One Year Ago <i>03-22-2016</i>	65.15	34.85	14.26	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:

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U.S. Department of Agriculture

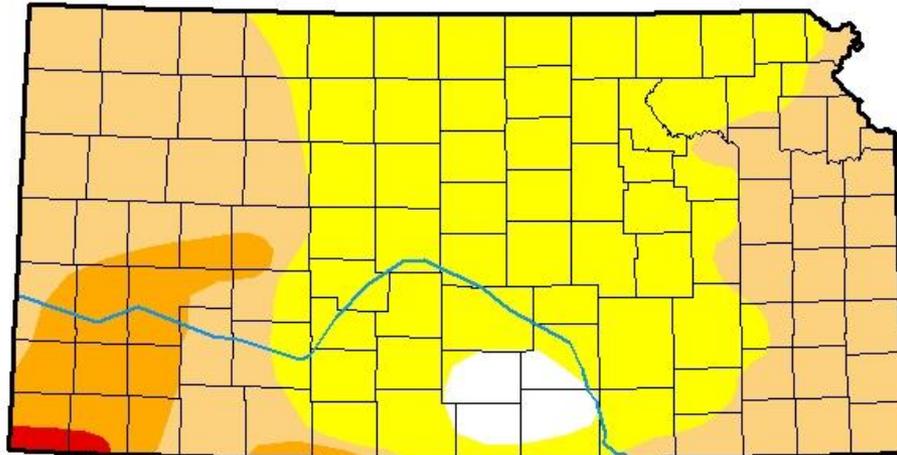


<http://droughtmonitor.unl.edu/>

Kansas Drought spring 2017

U.S. Drought Monitor Kansas

March 21, 2017
(Released Thursday, Mar. 23, 2017)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	3.00	97.00	47.87	9.01	0.57	0.00
Last Week <i>03-14-2017</i>	31.83	68.17	39.34	9.01	0.57	0.00
3 Months Ago <i>12-20-2016</i>	47.18	52.82	30.71	13.58	0.00	0.00
Start of Calendar Year <i>01-03-2017</i>	17.31	82.69	30.71	13.58	0.00	0.00
Start of Water Year <i>09-27-2016</i>	100.00	0.00	0.00	0.00	0.00	0.00
One Year Ago <i>03-22-2016</i>	43.24	56.76	7.25	0.00	0.00	0.00

Intensity:

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

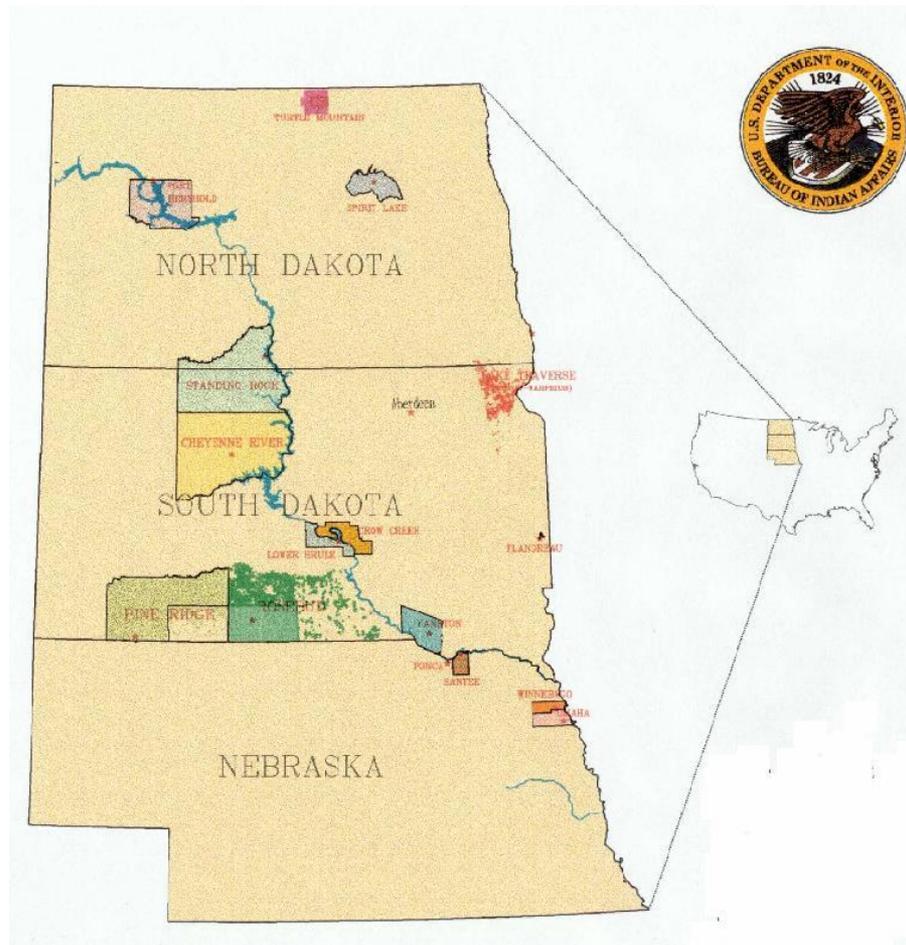
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Eric Luebehusen
U.S. Department of Agriculture



Range Management at GPR



Grazing Lands in the Great Plains Region

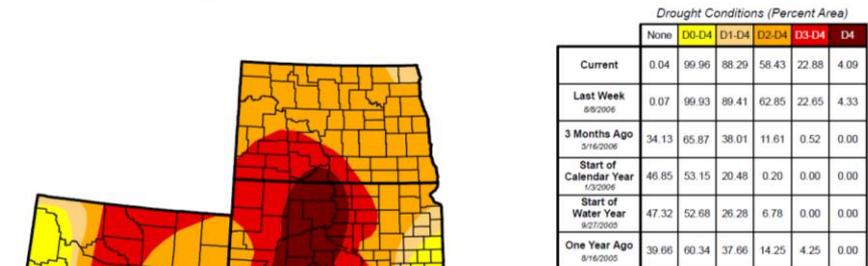
- There are Range Programs on 7 of the 13 Reservations in the Great Plains Region. All Reservations have pasture lands which are managed with Leases.
- There are 1,250 grazing permits covering over 3.8 million acres, valued at \$35 million dollars of income to the Trust Land Owners.
- The grazing permits run over 162,000 head of livestock.

2006 DROUGHT

- There was a D4 Drought in 2006 covering several of the Reservations in the Region.
- The Drought Monitor was used to support decisions to reduce grazing capacities on Range Units particularly on the Cheyenne River and Standing Rock Reservations
- This reduced the numbers of livestock on the Rangeland

U.S. Drought Monitor High Plains

August 15, 2006
(Released Thursday, Aug. 17, 2006)
Valid 7 a.m. EST



Intensity:



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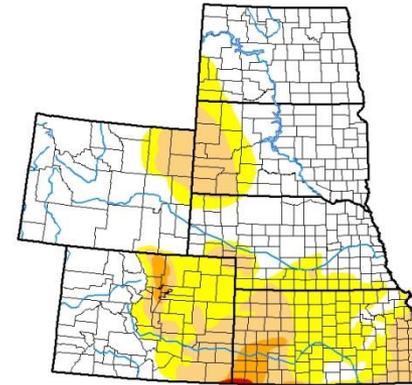
Author:

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National Drought Mitigation Center

Monitoring Drought Conditions

- Resource managers constantly use the drought to monitor not only drought but lack of drought.
- In addition to review of carrying capacity of range and pasture, drought condition and predicted condition is used for grazing rental rate determinations.

U.S. Drought Monitor High Plains



March 28, 2017
(Released Thursday, Mar. 30, 2017)
Valid 8 a.m. EDT

	Drought Conditions (Percent Area)					
	None	D0-D1	D1-D2	D2-D3	D3-D4	D4
Current	62.61	37.39	17.01	2.11	0.13	0.00
Last Week 03-21-2017	59.21	40.79	22.12	2.51	0.13	0.00
3 Months Ago 12-27-2016	50.65	49.35	21.54	4.05	0.00	0.00
Start of Calendar Year 01-01-2017	50.65	49.35	21.54	3.95	0.00	0.00
Start of Water Year 09-01-2016	70.86	29.14	8.86	2.68	0.17	0.00
One Year Ago 03-28-2016	50.67	49.33	8.61	0.41	0.00	0.00

Intensity:
■ D0 Abnormally Dry ■ D3 Extreme Drought
■ D1 Moderate Drought ■ D4 Exceptional Drought
■ D2 Severe Drought

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