

Tracking Drought Impacts

MARK SVOBODA, PH.D., DIRECTOR
KELLY HELM SMITH, ASSISTANT DIRECTOR
NATIONAL DROUGHT MITIGATION CENTER
UNIVERSITY OF NEBRASKA-LINCOLN



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What is a drought impact?

“An observable loss or change that occurred at a specific place and time because of drought.”



Why track drought impacts?

RESEARCH: IMPROVE OUR UNDERSTANDING OF HOW BIOPHYSICAL INDICATORS RELATE TO SOCIAL AND ENVIRONMENTAL INDICATORS. NEED TIME SERIES DATA!

RESPONSE & RECOVERY: TO KNOW WHERE TO DIRECT RELIEF (INPUT, REGIONAL REPRESENTATION FOR U.S. DROUGHT MONITOR)

PLANNING: IMPACTS POINT TO UNDERLYING VULNERABILITY. TRACKING DROUGHT IMPACTS CAN HELP DECISION MAKERS FIGURE OUT WHERE TO FOCUS EFFORTS TO REDUCE VULNERABILITY TO THE NEXT DROUGHT.

VALIDATE: MODELS AND SATELLITE DATA NEED VERIFICATION TO MAKE SURE THEY MATCH REALITY ON THE GROUND (SANITY CHECK)



Inventory of drought impact data

BY SECTOR

Agriculture

Hydropower

Tourism & Recreation

Ecosystems: plants & animals

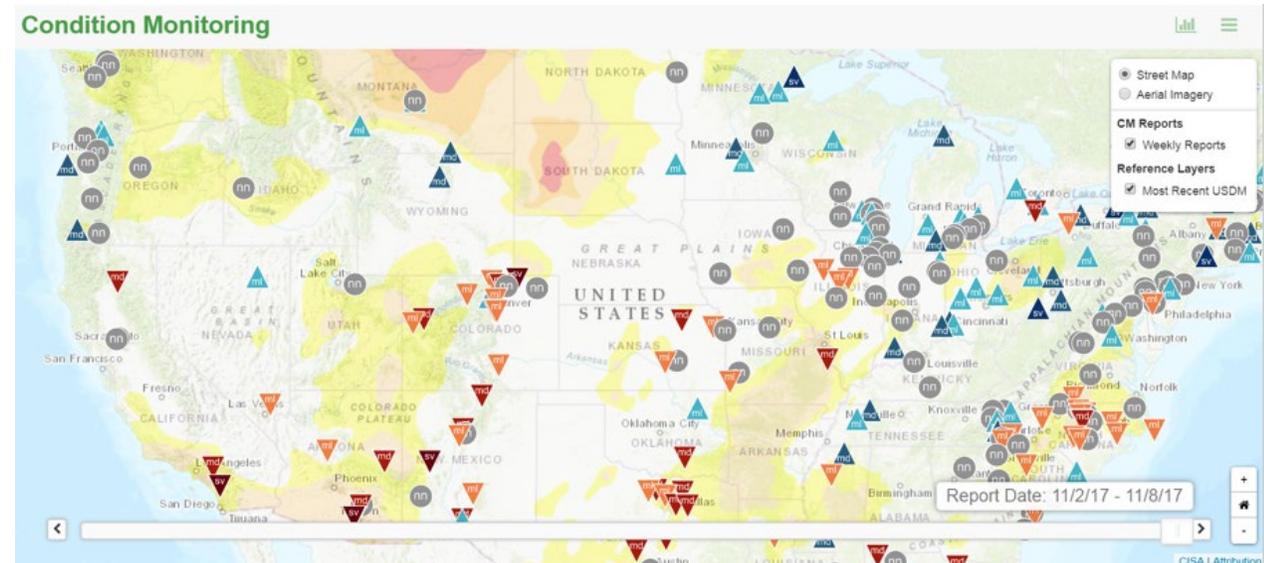
Public health

- Domestic wells
- Environmental health

BY TIME

Cumulative, end-of-season vs.

Real-time, “condition-monitoring”



Agricultural Sector: Data exists, but is it enough?

Could always be better, but fairly well-represented. Some quantification possible, depending on USDA's National Agricultural Statistics Service data collection for particular crops and places.

- NASS data: Not all crops, and not always timely release, to protect proprietary information.
- Farm Service Agency reports: Valuable field-level reports at weekly time intervals, but sometimes aggregated to large spatial area. Requires finding and reading each one individually. Not convenient.
- Risk Management Agency crop indemnity losses: Good source of annual losses to commodity crops due to drought.

AgWeb Crop Comments

Select Crop Category



United States Department of Agriculture National Agricultural Statistics Service

Find Data and Reports by:



[Find a Regional or State Field Office](#)



Cause of Loss Historical Data Files

Summarized participation information broken down by the compressed data containing pipe (|) delimited flat-files that can be used as a CSV and/or database for further analysis. Record description file located in the same directory as the data files.

Hydropower & Energy:

Data exists. Do decision makers need more or something more different?

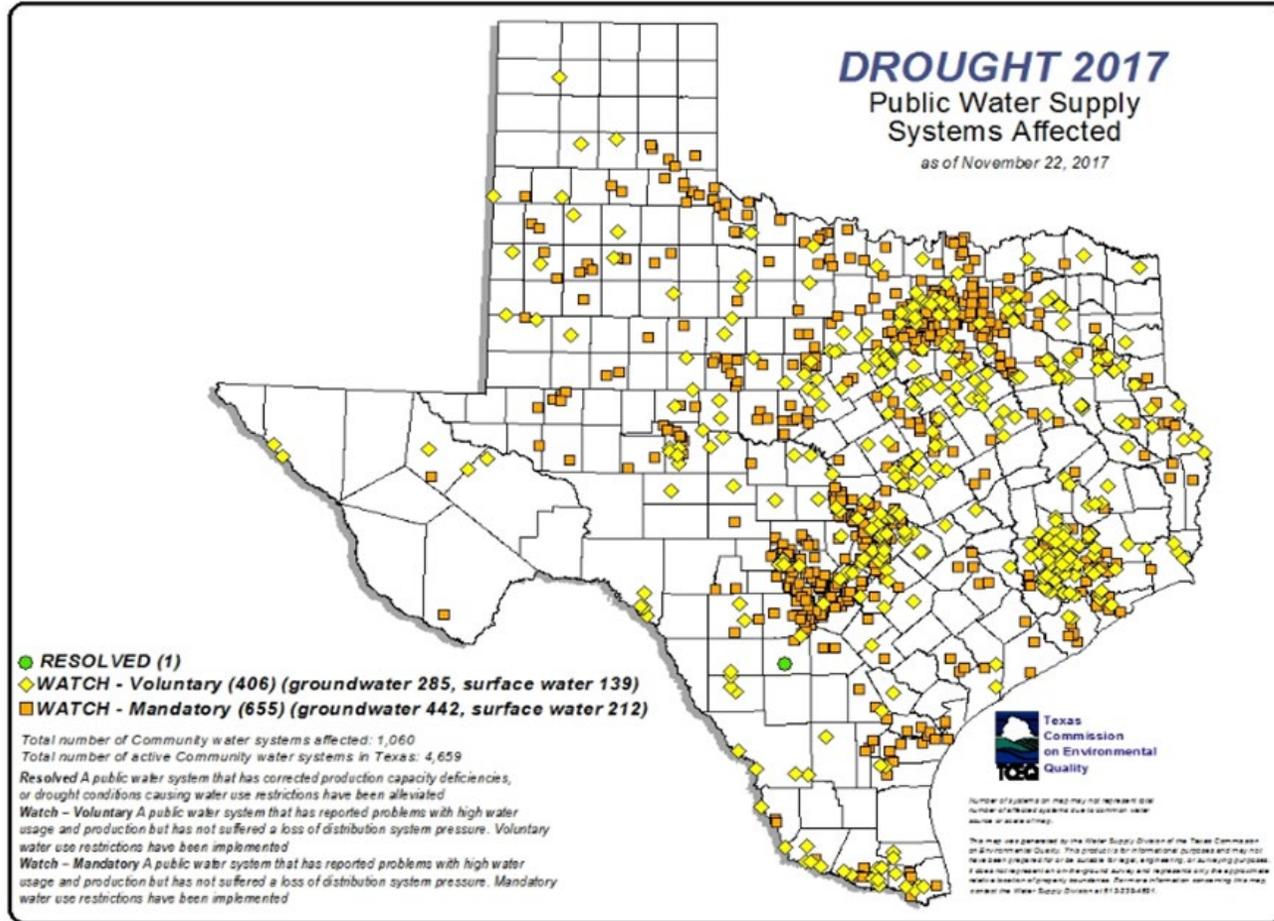
Monthly Recap of Operations Missouri Main Stem System Nov 2017

Day	Maximum Generation		Minimum Generation		Daily Generation MWh	MT Daily Generation MWh	% Load Factor
	hr	MWh	hr	MWh			
W 11/1	10	1434	2	526	25360	25357	73.7
T 11/2	19	1435	24	513	25801	25821	74.9
F 11/3	19	1427	3	497	25521	25500	74.5
S 11/4	19	1236	3	522	22598	20531	76.2
S 11/5	21	1157	25	496	21926	#VALUE!	79.0
M 11/6	20	1444	3	594	26479	26467	76.4
T 11/7	8	1502	3	635	25953	25957	72.0
W 11/8	10	1477	3	622	26813	26808	75.6
T 11/9	18	1429	24	575	26479	26476	77.2
F 11/10	18	1416	24	580	26523	26540	78.0
S 11/11	20	1275	24	565	23999	24001	78.4
S 11/12	19	1272	1	530	22492	22452	73.7
M 11/13	20	1258	24	563	23771	23785	78.7
T 11/14	20	1257	24	560	23626	23623	78.3
W 11/15	8	1354	3	595	25530	25540	78.6
T 11/16	9	1297	3	675	25353	25361	81.4
F 11/17	11	1288	2	572	24830	24835	80.3
S 11/18	20	1280	2	569	23076	23047	75.1
S 11/19	19	1269	24	558	22645	22676	74.4
M 11/20	19	1389	3	470	23080	23061	69.2
T 11/21	20	1281	24	461	22896	22912	74.5
W 11/22	10	1227	1	464	22009	21989	74.7
T 11/23	10	1221	24	473	21753	21762	74.2
F 11/24	19	1219	1	475	21783	21782	74.5
S 11/25	21	1110	1	479	20510	20500	77.0
S 11/26	20	1175	24	475	18925	18944	67.1
M 11/27	20	1262	24	470	21945	21922	72.5
T 11/28	9	1249	24	396	21513	21511	71.8
W 11/29	20	1156	3	425	19995	19997	72.1
T 11/30	8	1156	24	415	19974	19984	72.0
Max		1502					
Min				396			
Total					703158	#VALUE!	
Ave					23439	#VALUE!	75

<https://www.eia.gov>



Public Water Supplies: States track differently...



Private domestic wells: Most states don't track(?)

Cumulative Household Water Supply Shortages Reported to the State

(as of 11/19/2015)



Public health (other than domestic water)

Connections in US not well-articulated.
Anecdotal reports and a few studies on

- Stress
- Mortality
- Hospital admissions due to air quality
- Vector-borne disease



University of Nebraska photo



Tourism & Recreation

Data exists but it may be proprietary, and/or there may be a disincentive to sharing.

Other suggestions:

- Transient Room Taxes, collected by the county
- Pacific Northwest Skiers Association (including some proprietary information)
- Travel Oregon



WASHINGTON STATE SKI VISITS (SOURCE: NATIONAL SKI AREAS ASSOCIATION)
From them Washington State drought plan revision, vulnerability chapter

In the winter of 2004/2005, visitation to Washington State ski resorts dropped by 1.5 million visits from the prior year, a decrease of 77 percent. During the 2014/2015 winter, visitation numbers dropped by more than 900,000 visits from the previous year, a decrease of 59 percent.

Environment / Ecosystem Services

- Perpetually under-resourced.
- Endangered species well-tracked (?)
- Otherwise, could use more data.
- Where to start?
 - Vegetation reports?

Range management suggestion:

DIR or something similar could be used for monitoring native perennials and invasive annuals, especially cheatgrass and more recently, medusa head. “...someone would take a picture and note that this whole hillside is cheatgrass. Grass is relatively easy to identify, and we if have a georeference for that we could probably figure out which hillside is that and in the office we could create a polygon” (6).



Spring Chinook Salmon. Photo courtesy Michael Humling, US Fish & Wildlife Service

Looking for the drought signal (“impacts”) in records of human experience



Allen Telescope Array, courtesy SETI Institute

- “User” reports to DIR
- CoCoRaHS reports
- Media stories
- Social media (tweets, etc.)
- Google Trends



Droughtreporter.unl.edu

Launched in 2005 as nation's on-line archive of drought impacts: **>66,000 reports and >24,000 impacts in our database.**

Reports from media, individual observers ("Users," CoCoRaHS), agencies

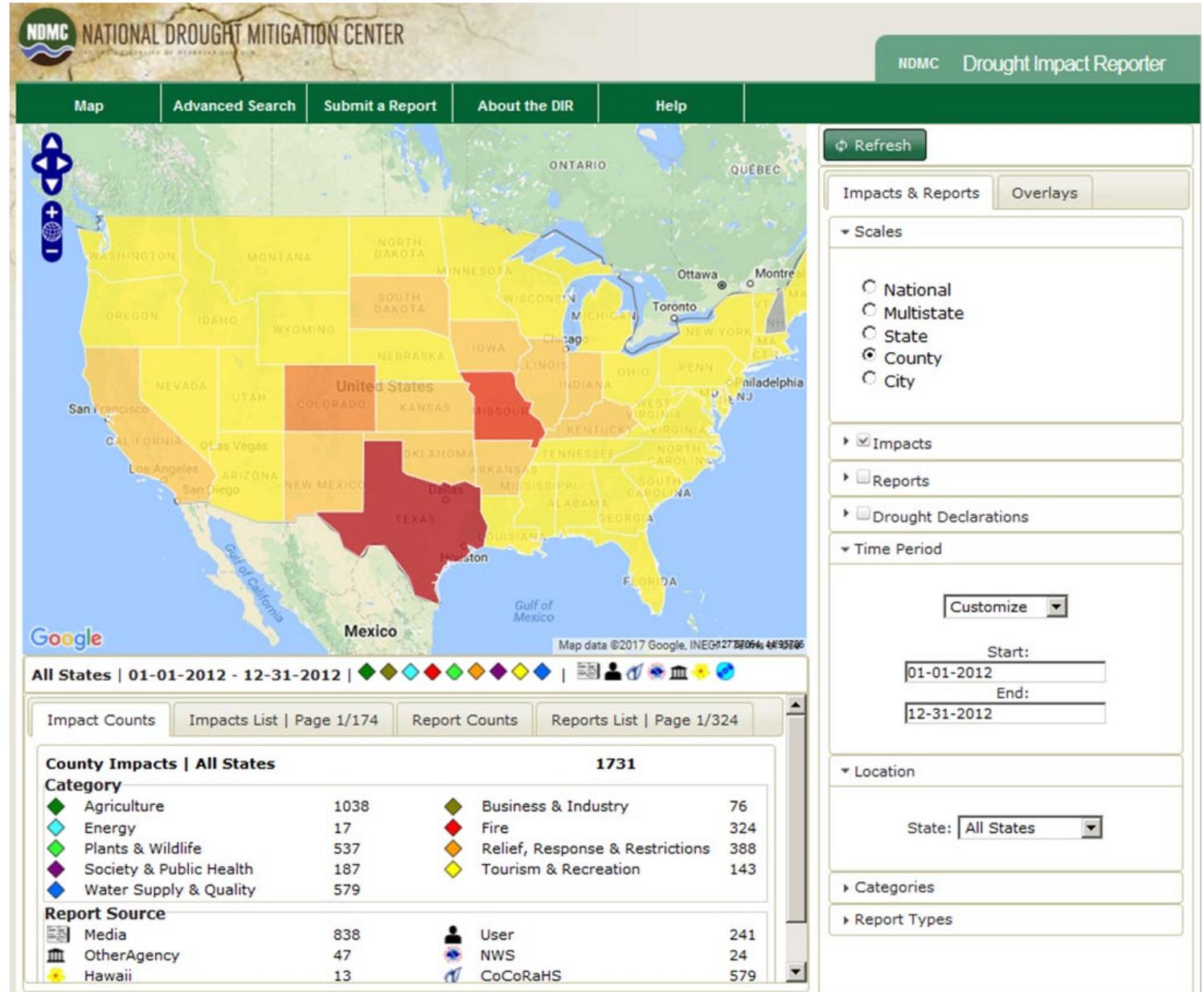
Searchable by time, place, scale, category, term

Establish a drought impact **"baseline"**:

- Face of drought
- Risk/vulnerability
- Climate change

Moderated @ NDMC

Wilhite, Donald A., Mark D. Svoboda, and Michael J. Hayes. "Understanding the complex impacts of drought: a key to enhancing drought mitigation and preparedness." *Water resources management* 21.5 (2007): 763-774.
<http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1042&context=droughtfacpub>



NDMC NATIONAL DROUGHT MITIGATION CENTER

NDMC Drought Impact Reporter

Map | Advanced Search | Submit a Report | About the DIR | Help

Refresh

Impacts & Reports | Overlays

Scales

- National
- Multistate
- State
- County
- City

Impacts

Reports

Drought Declarations

Time Period

Customize

Start: 01-01-2012

End: 12-31-2012

Location

State: All States

Categories

Report Types

All States | 01-01-2012 - 12-31-2012 | Impact Counts | Impacts List | Page 1/174 | Report Counts | Reports List | Page 1/324

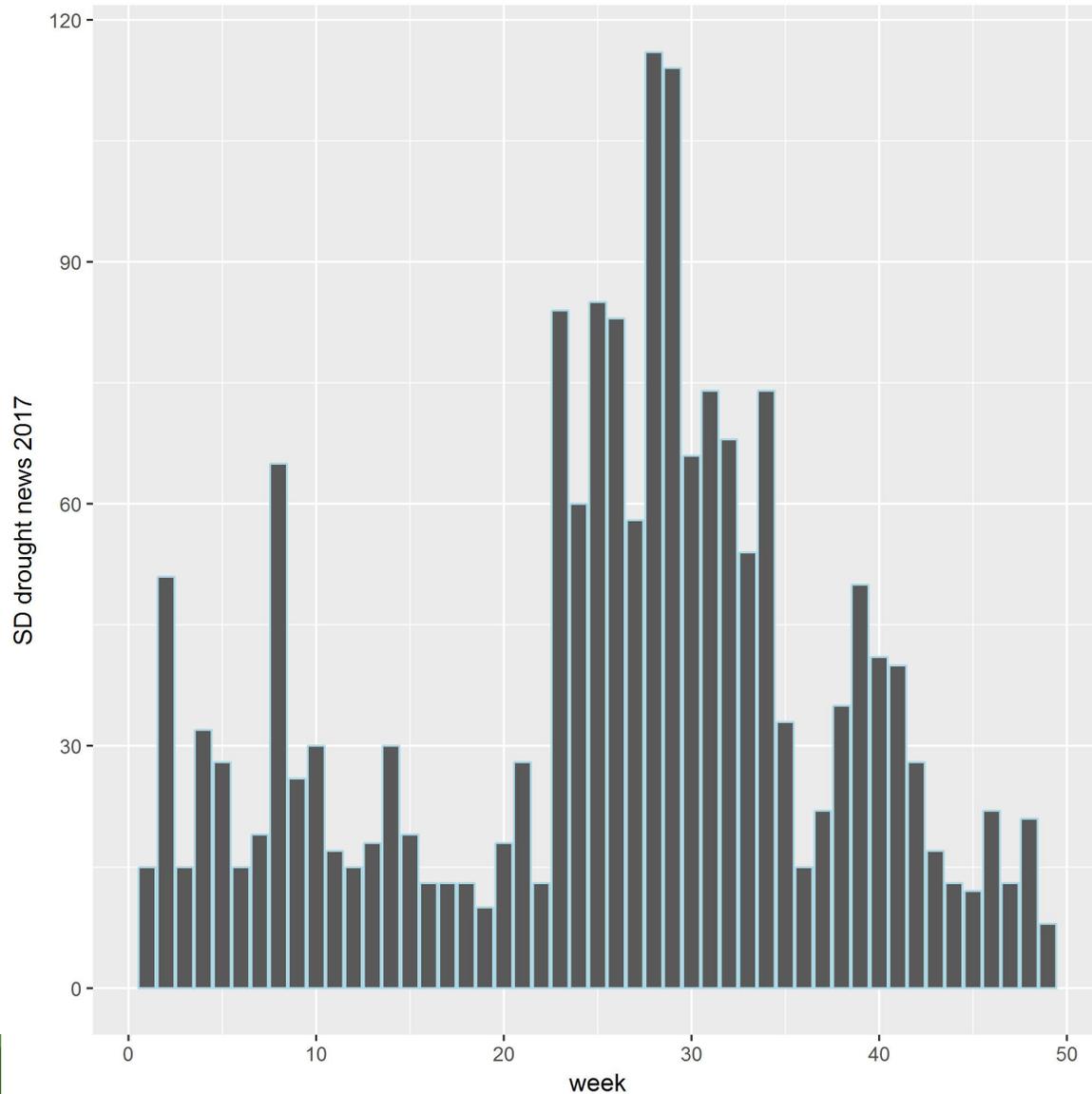
County Impacts | All States 1731

<input checked="" type="checkbox"/> Agriculture	1038	<input checked="" type="checkbox"/> Business & Industry	76
<input checked="" type="checkbox"/> Energy	17	<input checked="" type="checkbox"/> Fire	324
<input checked="" type="checkbox"/> Plants & Wildlife	537	<input checked="" type="checkbox"/> Relief, Response & Restrictions	388
<input checked="" type="checkbox"/> Society & Public Health	187	<input checked="" type="checkbox"/> Tourism & Recreation	143
<input checked="" type="checkbox"/> Water Supply & Quality	579		

Report Source

<input checked="" type="checkbox"/> Media	838	<input checked="" type="checkbox"/> User	241
<input checked="" type="checkbox"/> Other Agency	47	<input checked="" type="checkbox"/> NWS	24
<input checked="" type="checkbox"/> Hawaii	13	<input checked="" type="checkbox"/> CoCoRaHS	579

Number of news stories about drought published in SD, by week, in 2017, collected via Meltwater



Cold and hungry deer crowding Butte County ranchers



By Stewart Huntington | Posted: Tue 6:01 PM, Jan 17, 2017 | Updated: Tue 10:48 PM, Jan 17, 2017



NISLAND, S.D. (KOTA TV) The Christmas Blizzard that came on the heels of a drought is making conditions tough on wildlife.

And also for farmers and ranchers in the irrigated ag land along the Belle Fourche River in Butte County where waves of deer are congregating.

Huge herds of hungry deer gravitate to the irrigated valley because – well – that’s where the green forage and livestock feed is.

It’s gotten so bad in the last couple of weeks that wildlife officials have authorized dozens of special off-season “pool hunts” to trim the herd.

“In my almost 20 years as a conservation officer I don’t believe



South Dakota User Reports, 2017, by week (weeks 22-45)

Grass production, dams affected in Custer County, South Dakota

Report Type:  User

Publication Date: 2017-08-29

Dates of Report: 2017-07-01 to unknown

Source Name:

Summary: Dry conditions have affected grass production and water in the dams.

From Custer County, South Dakota, on August 29, 2017

Url:

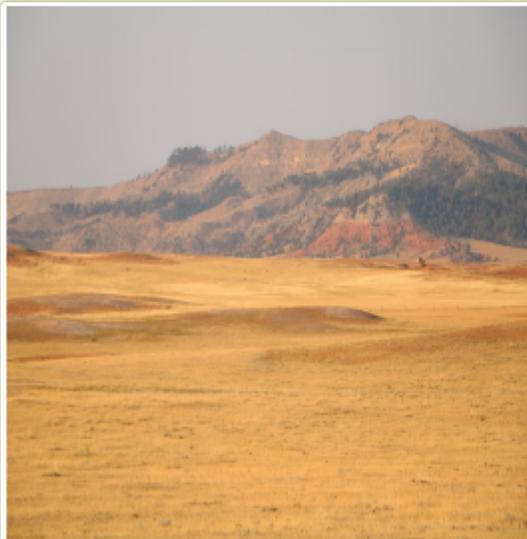
Affected Area(s): Custer County, SD

Categories:

 Agriculture

 Water Supply & Quality

Pictures



Pasture where livestock were taken off a week ago.

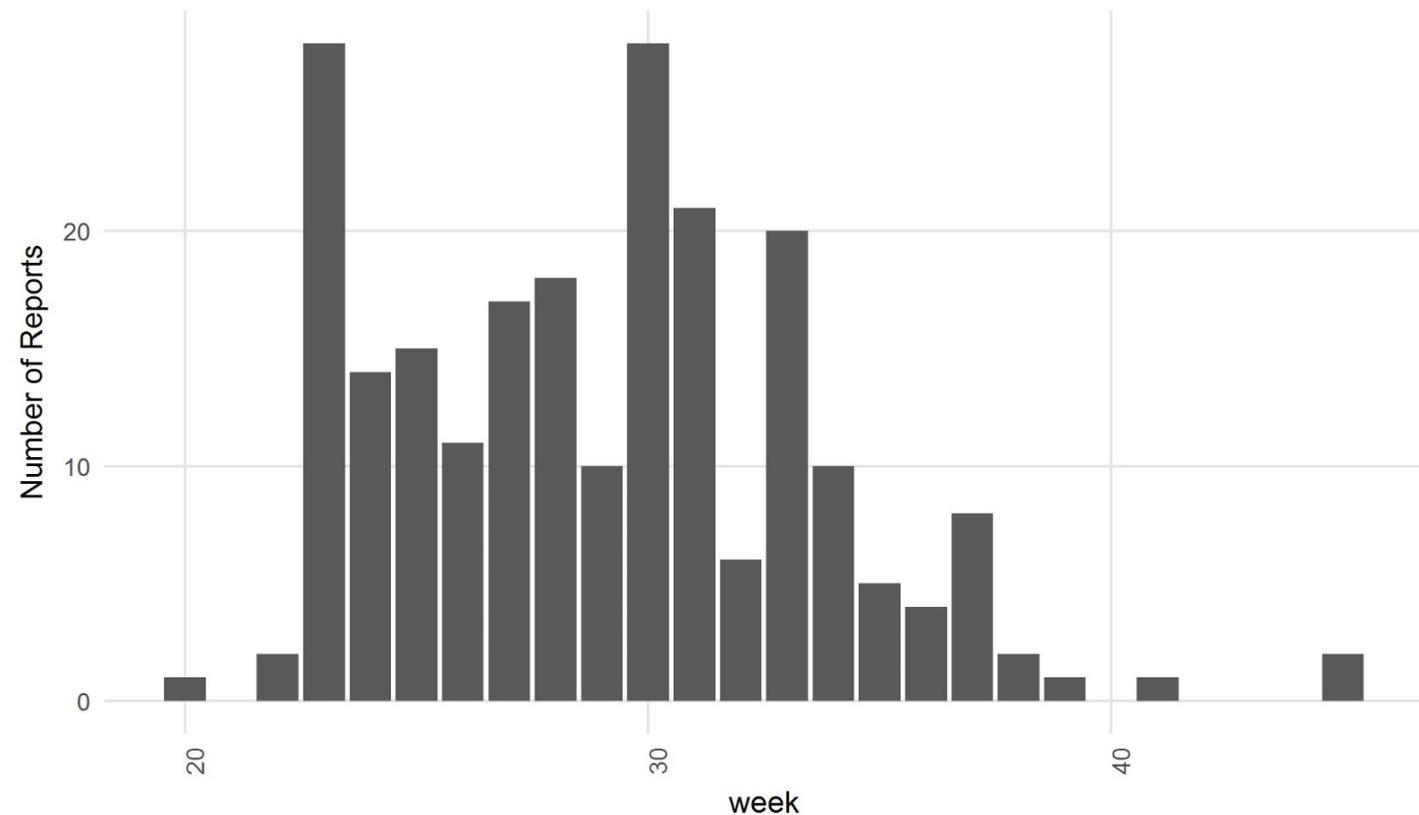
Date Taken:

8/28/2017

Location:

SW of Custer, SD

SD User Reports 2017



Number of CoCoRaHS condition reports from SD, by week, for 2017

CoCoRaHS Report from Station #Newell

6.5 ENE on 10/22/2017

Report Type: CoCoRaHS

Publication Date: 2017-10-22

Dates of Report: 2017-10-22 to 2017-10-22

Source Name: Newell 6.5 ENE

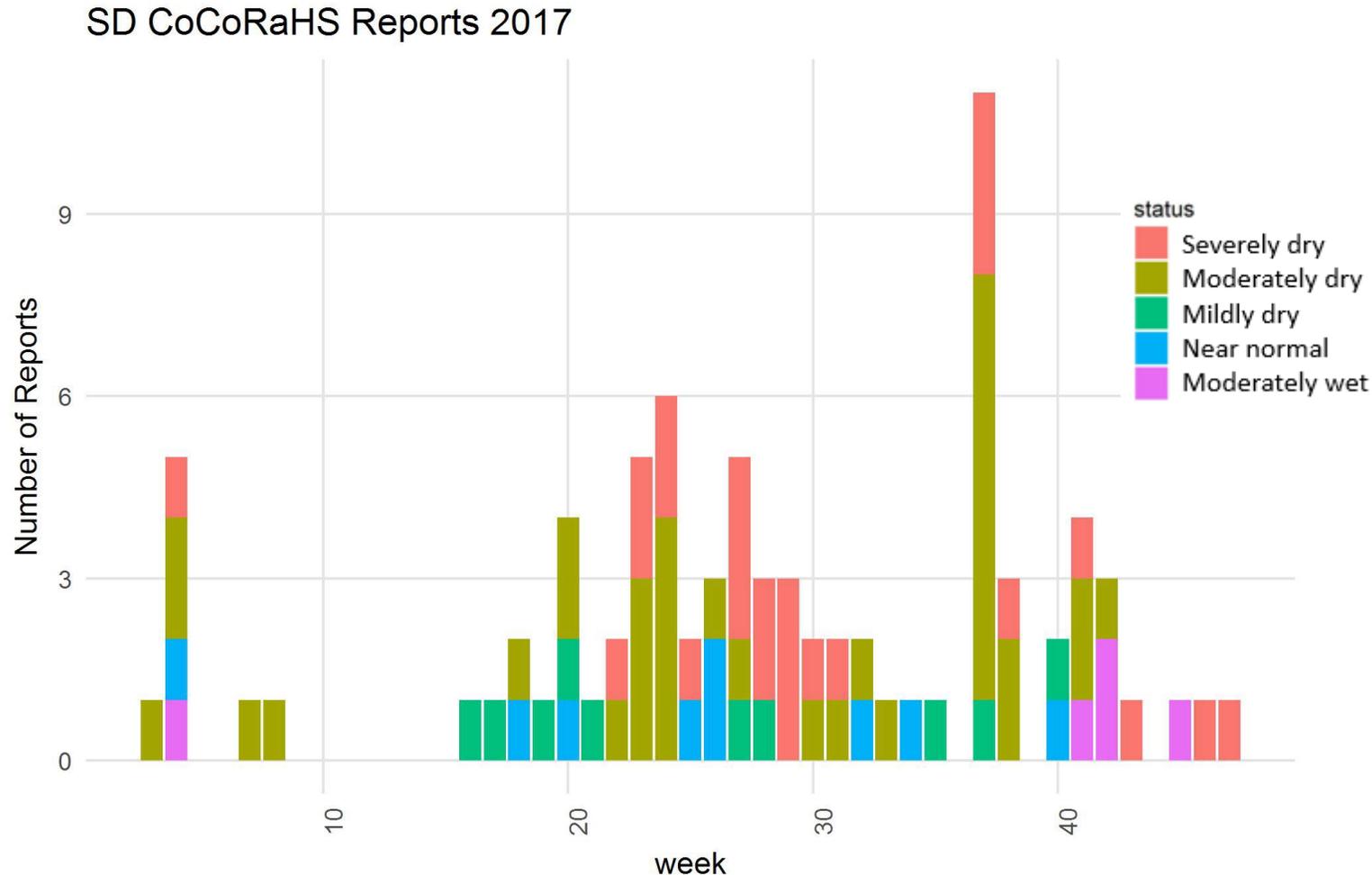
Summary: No rain since the first week of October. Grass has dried off - palatability has decreased for cattle, soil moisture is nonexistent. Dust blows and drifts like snow where there is bare ground. Windy and hot conditions over the past week have exacerbated conditions.

Affected Area(s): Butte County, SD

Categories:

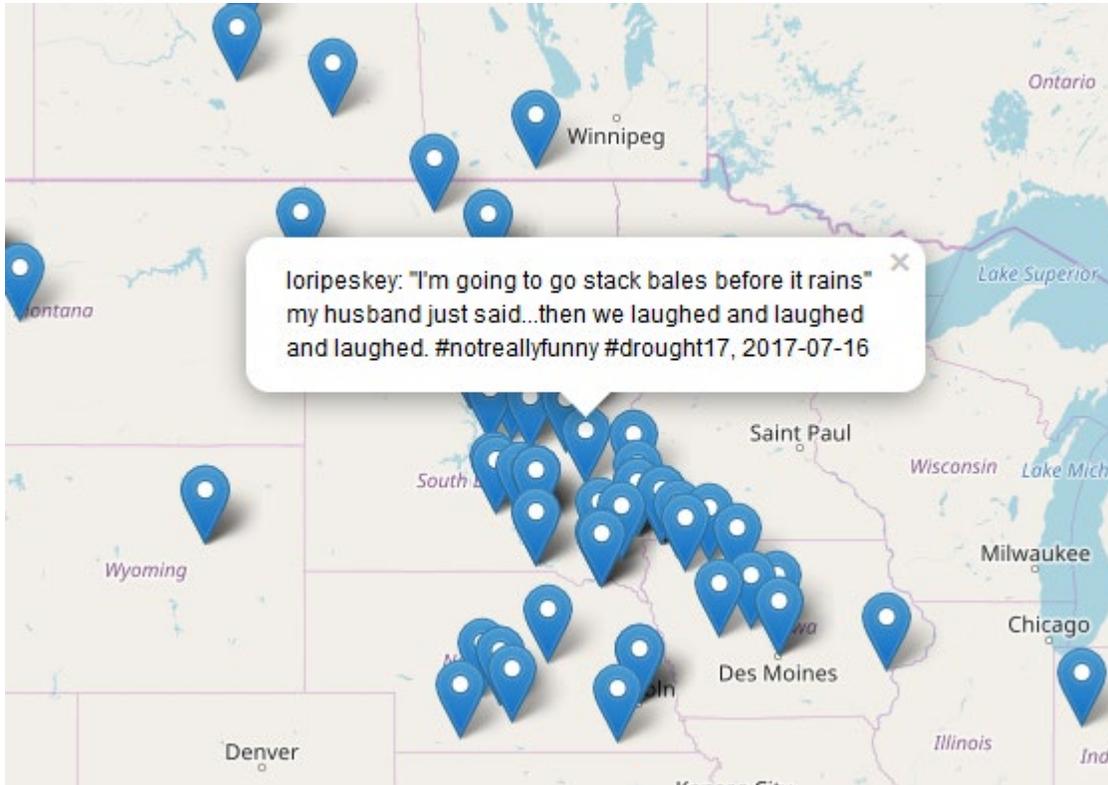
Agriculture

General Awareness

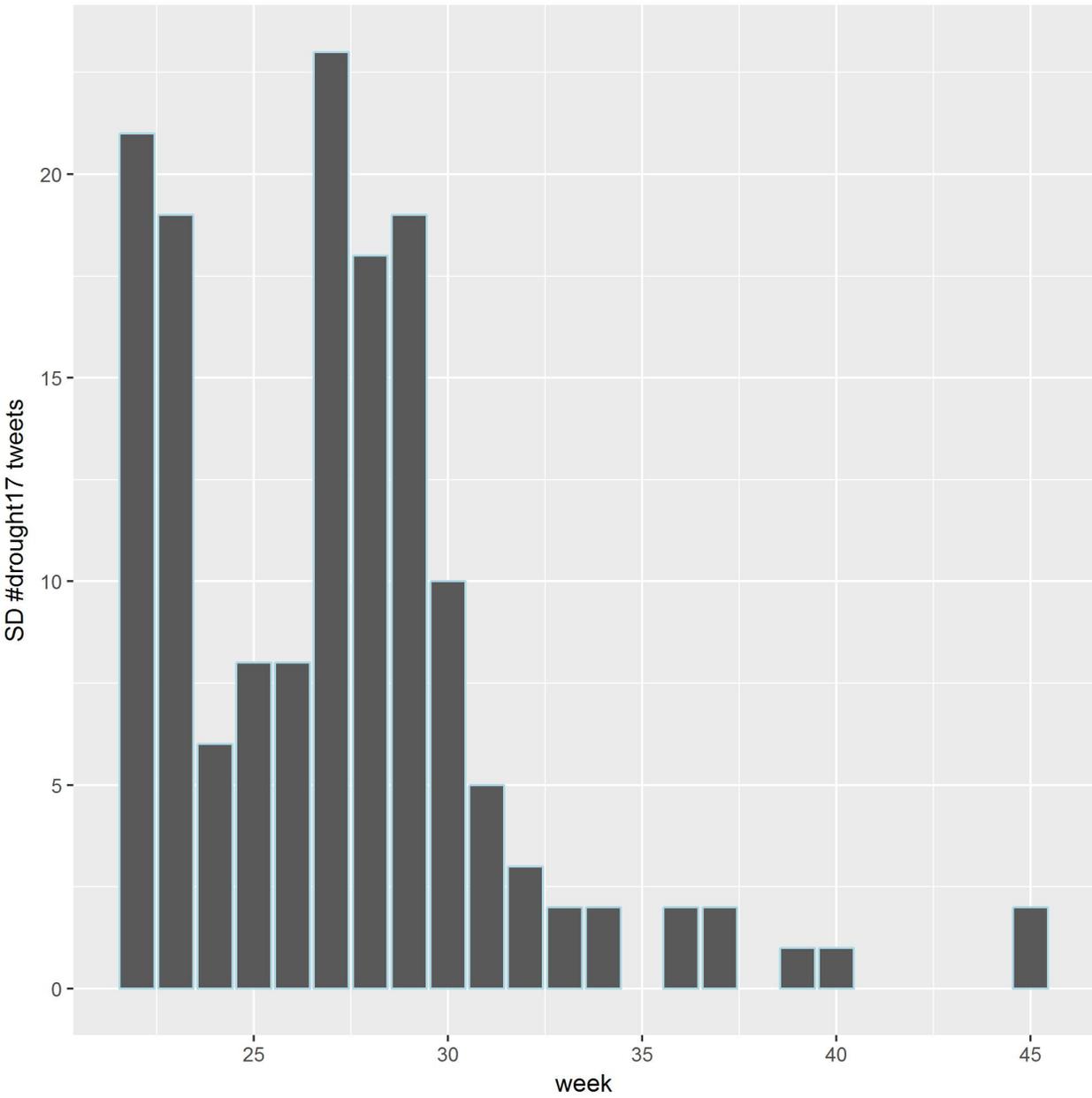


SD “#drought17” tweets

Note that they start abruptly in June – chart only shows weeks 22-45



#drought17 tweets for week ending July 24, 2017



THANKS!

Questions, comments?

Mark Svoboda

msvoboda2@unl.edu

402-472-8238

