

Missouri 2018 Drought Review

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MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

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Extension/State Climatologist
University of Missouri-Columbia

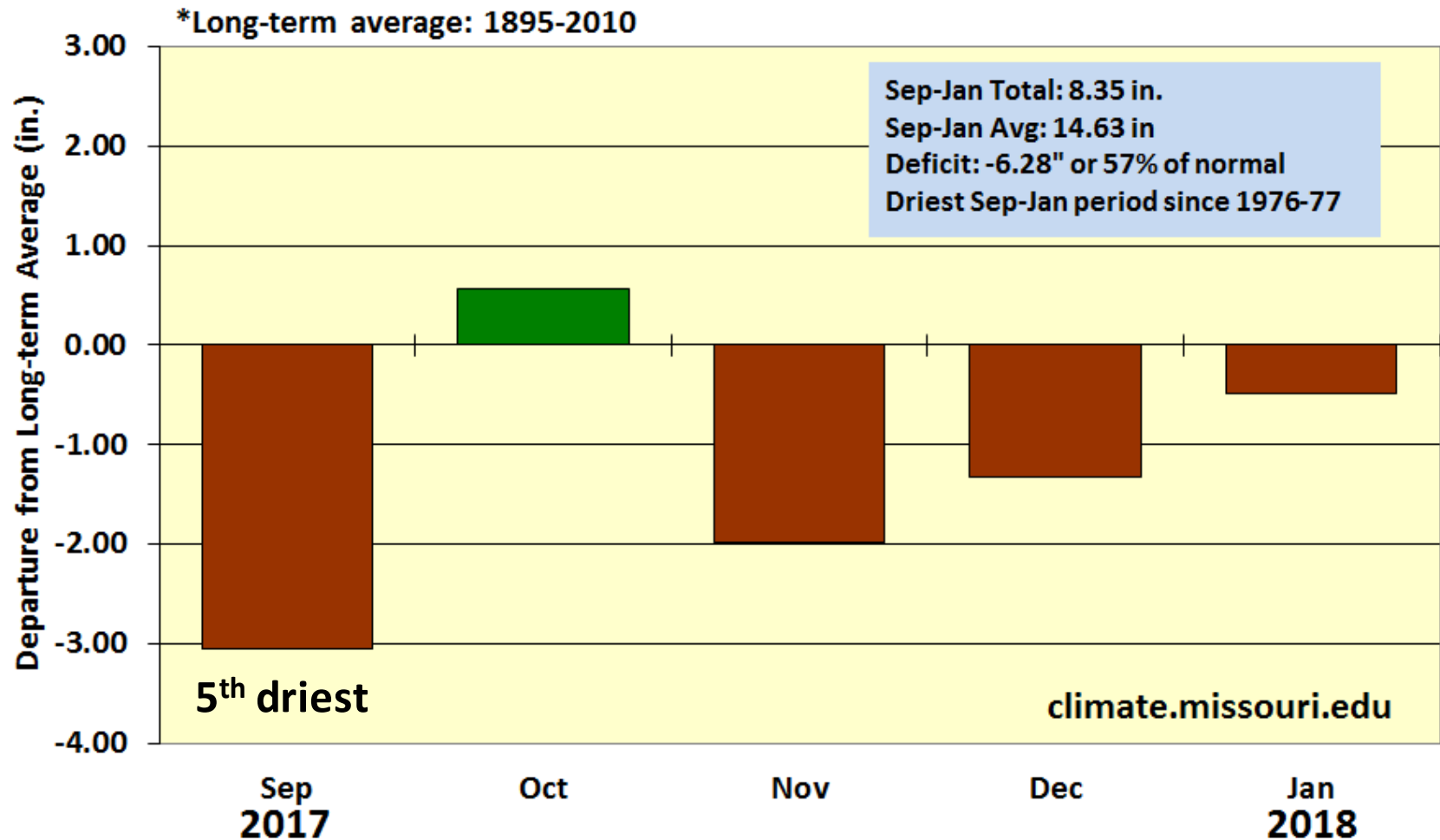
UNIVERSITY OF MISSOURI
M Extension

Interstate Council on Water Policy Annual Meeting
October 8-10, 2019, Mobile, AL

2017-18 Drought: "The Triple Whammy"

1. Autumn and Early Winter Drought in 2017-18

Missouri Monthly Precipitation Departure from Average* September 2017-January 2018



According to livestock specialists, it was a terrible autumn for pasture/stockpile

November 2017 impact reports from Extension Specialists in southern and eastern Missouri...

“Some producers are moving cattle or hauling water because of low or empty ponds, or little to no flow in creeks and springs; many are saying it’s worse than 2012.”

“Failures of fall sown crops germinating and annuals such as oats, turnips, etc. have not produced well. New grass and legume seedlings are not looking good.”

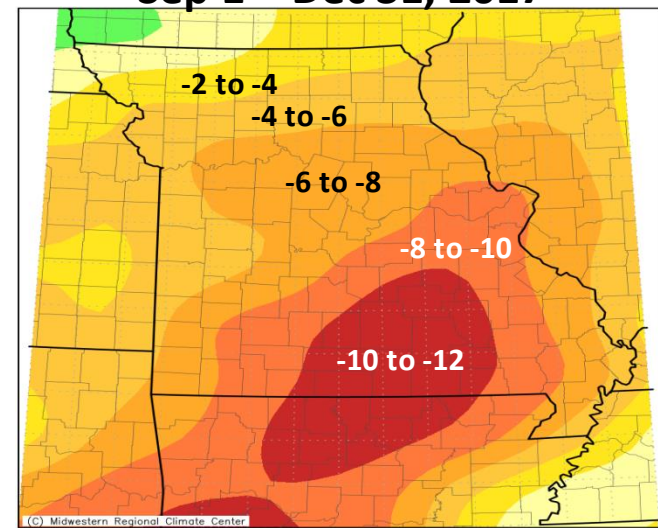
“Producers will likely feed lower quality hay and cows will be in poorer condition coming out of the winter, which may reduce future calf crop numbers.”

“Many farmers are feeding hay earlier than usual, they are beginning to cull their herds to reduce the amount of animals that will need feed through the winter.”

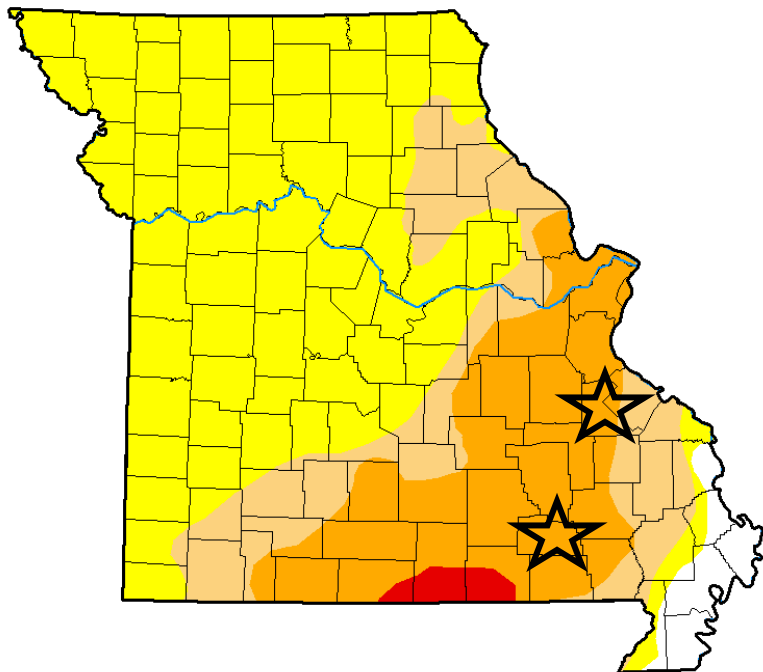
“Fall seeded perennials in some cases germinated then died or didn’t germinate until mid to late October, leaving them immature going into the winter.”

“Winter wheat is not germinating properly.”

**Precip Dept. from Mean (in.)
Sep 1 – Dec 31, 2017**



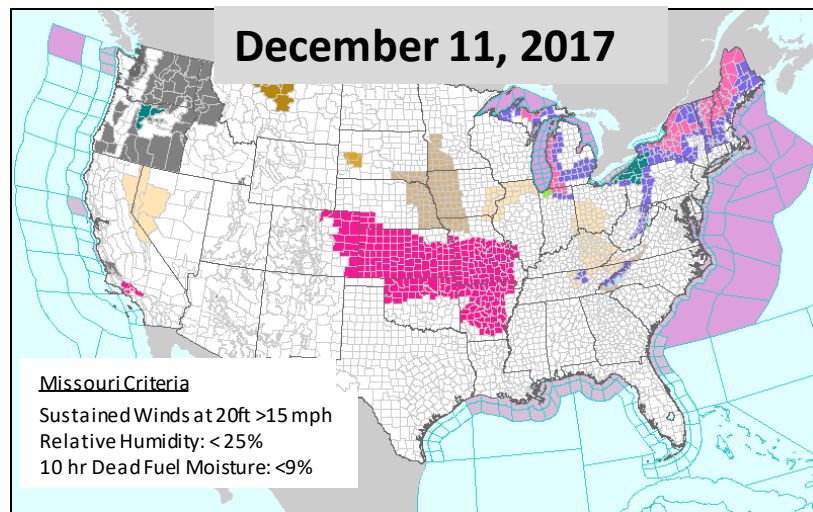
December 26, 2017




Kendra Graham, Livestock Specialist, St. Francois Co., Dec 10, 2017



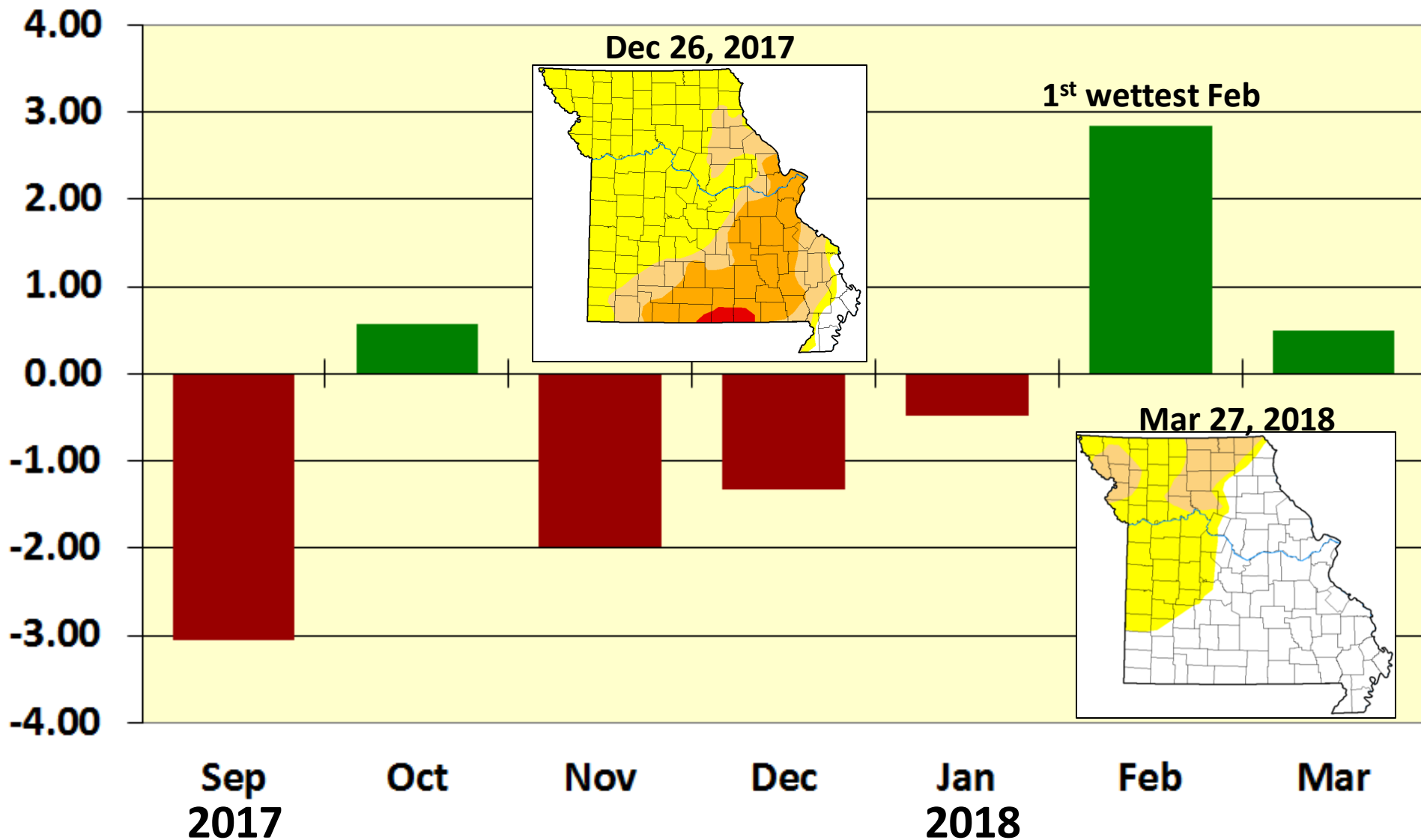
Jamie Gundel, Agronomy Specialist, Carter Co., Dec 8, 2017



 Red Flag Warning (High Fire Danger)

Improving conditions across southeastern half of state...

Missouri Monthly Precip Departure from Average September 2017 – March 2018



**St. Francois Co.,
Dec 10, 2017**



Kendra Graham

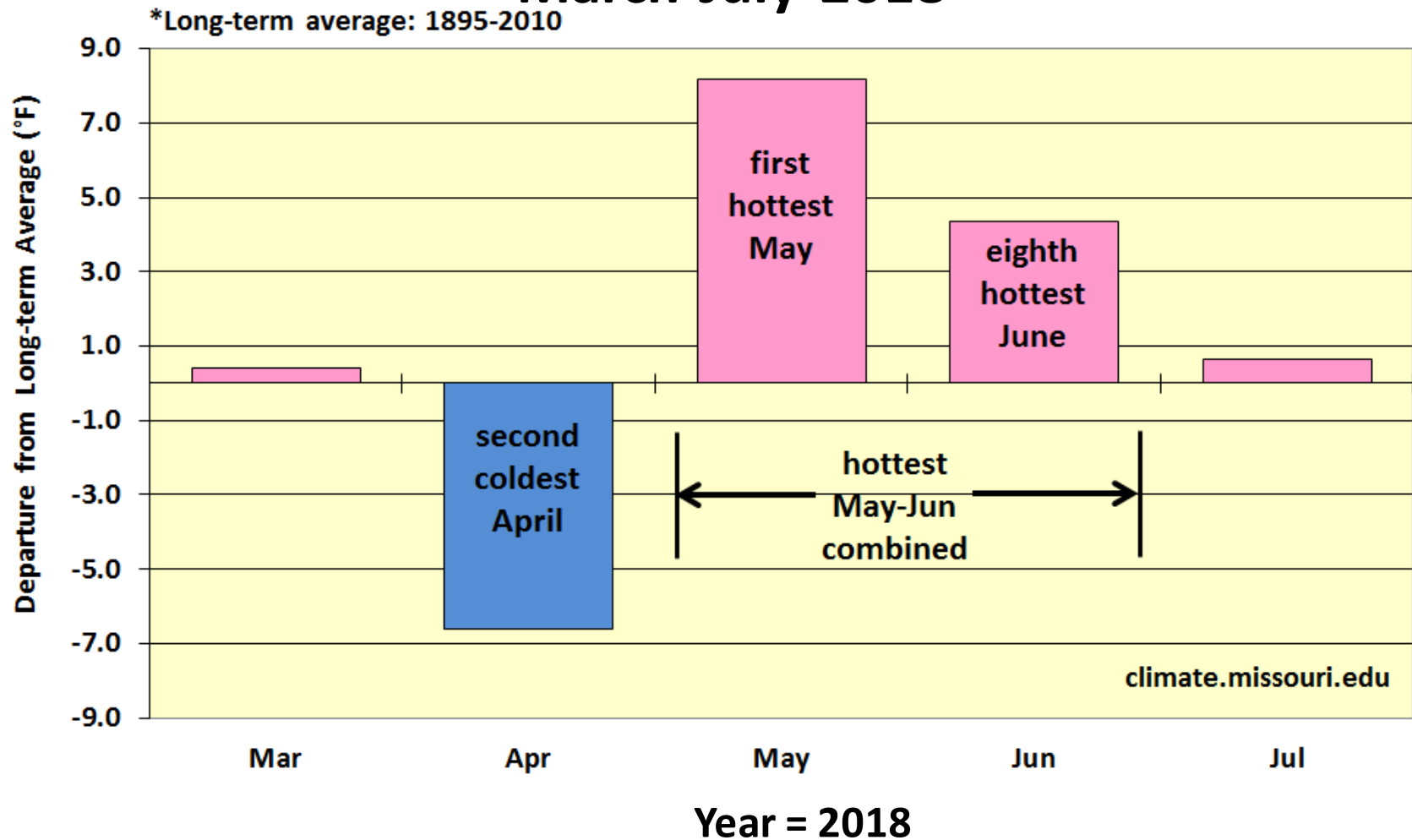
**St. Francois Co.,
Feb 28, 2018**



Kendra Graham

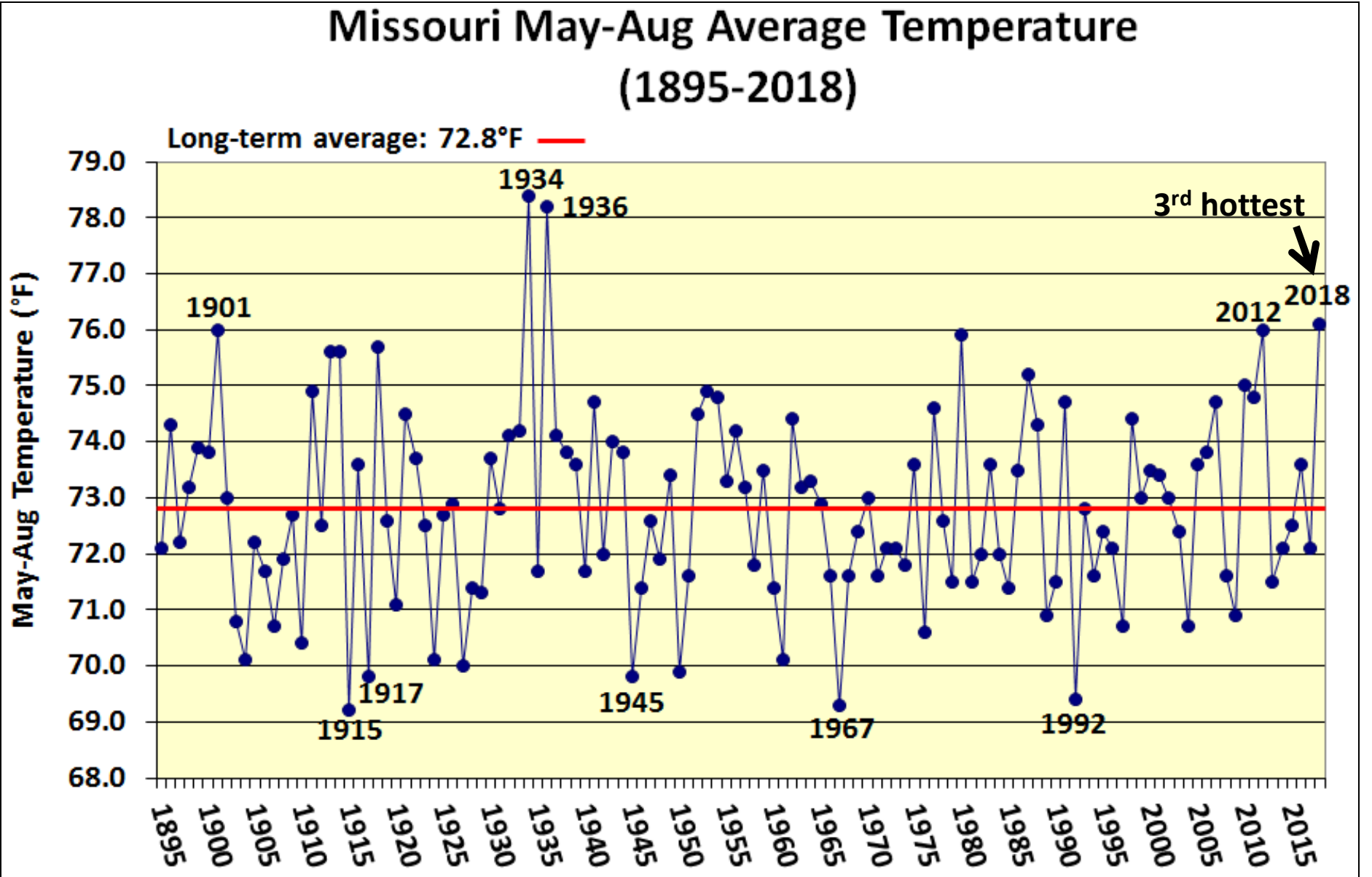
2. Year Without A Spring

Missouri Monthly Temperature Dept from Average* March-July 2018



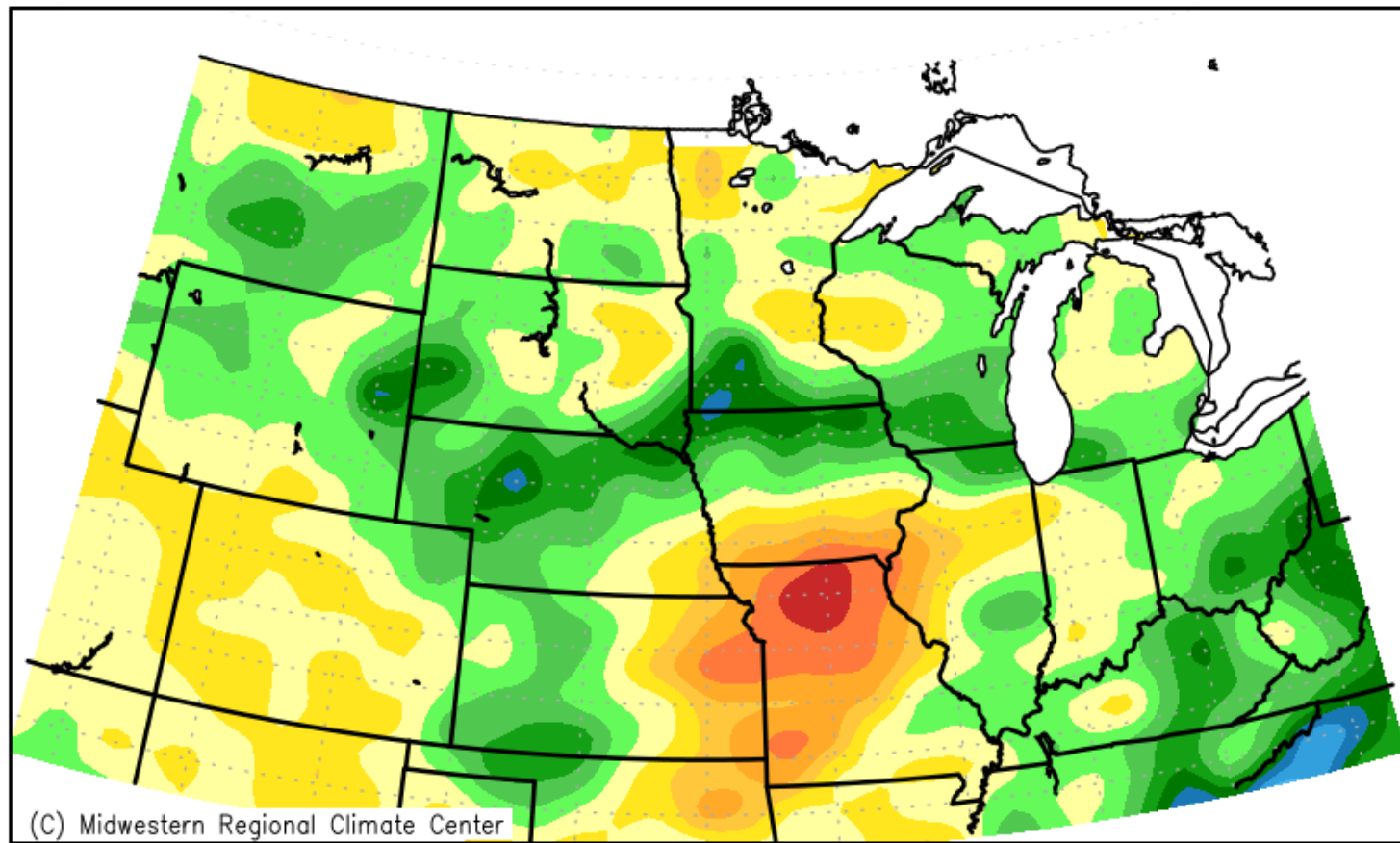
Already stressed pastures took another hit with extreme spring temperature conditions; forage leaf mass and nutrient quality reduced.

3. 2018 Growing Season Heat and Drought

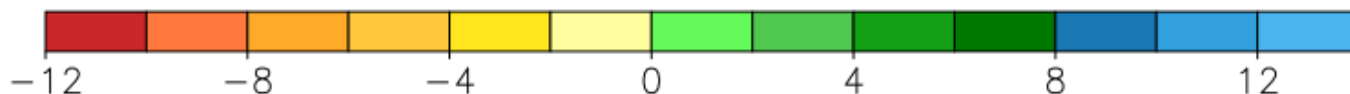


3. cont. 2018 Growing Season Heat and Drought

Accumulated Precipitation Departure from Mean (in) April 1, 2018 to August 14, 2018

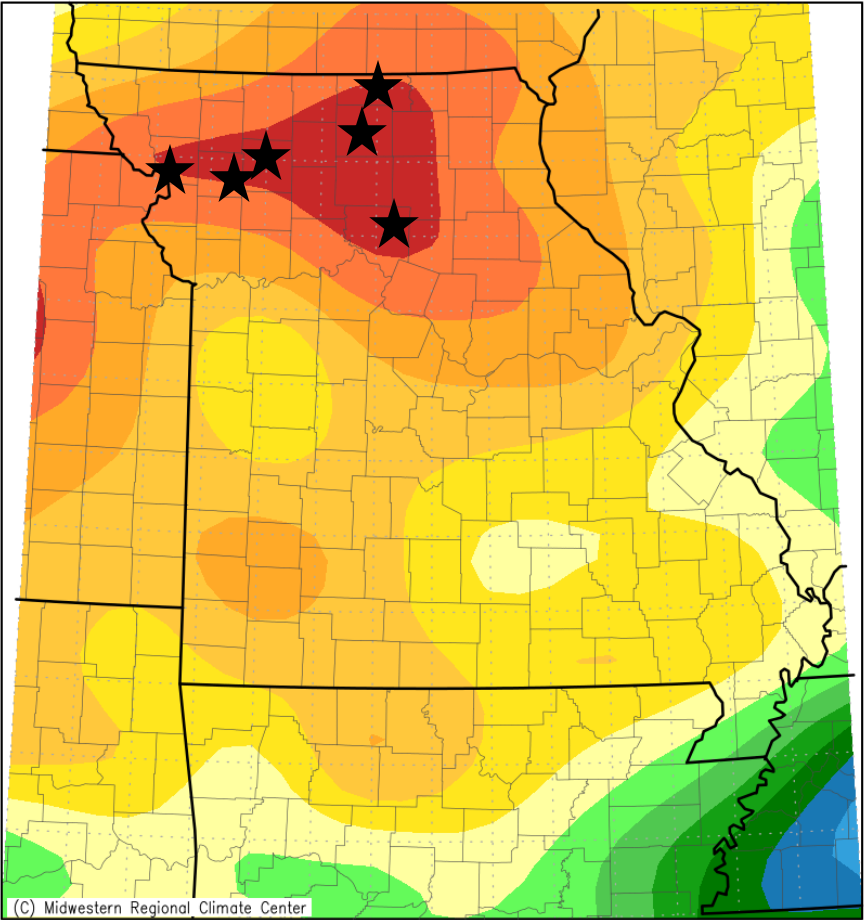


Mean period is 1981–2010.



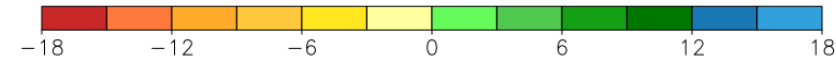
Long-term Hydrological Drought Impacting Northern Missouri

Departure from Mean Precipitation July 1, 2017 to Jul 31, 2018



(C) Midwestern Regional Climate Center

Mean period is 1981–2010.



July 1, 2017 to Jul 31, 2018

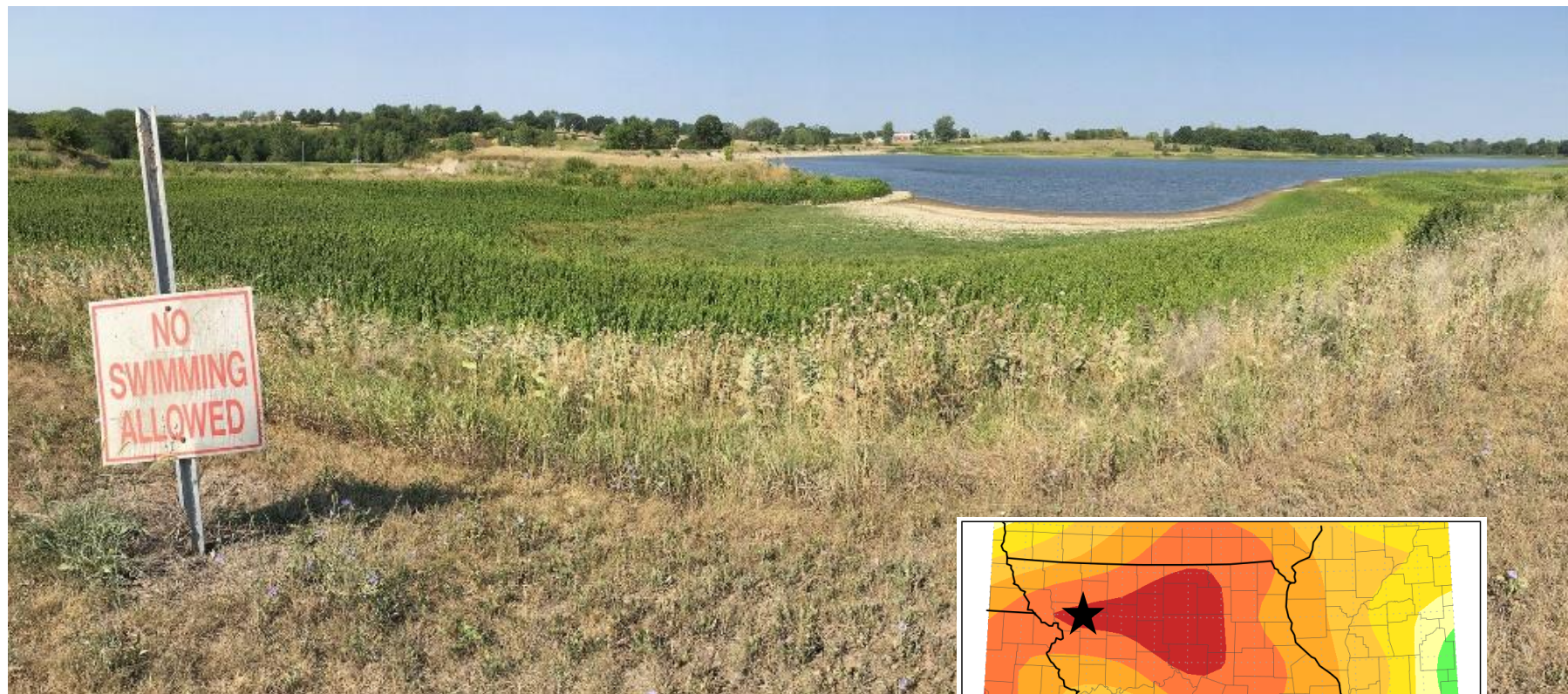
	Total Precip.	Normal	Dept. from	% of Norm
St. Joseph	23.19	40.79	-17.60	57
Cameron	27.84	43.50	-15.66	64
Gallatin	25.97	44.93	-18.96	58
Milan*	23.85	45.83	-21.98	52
Unionville	26.47	46.12	-19.65	57
Salisbury*	28.25	46.27	-18.02	61

Data from National Weather Service Cooperative Stations

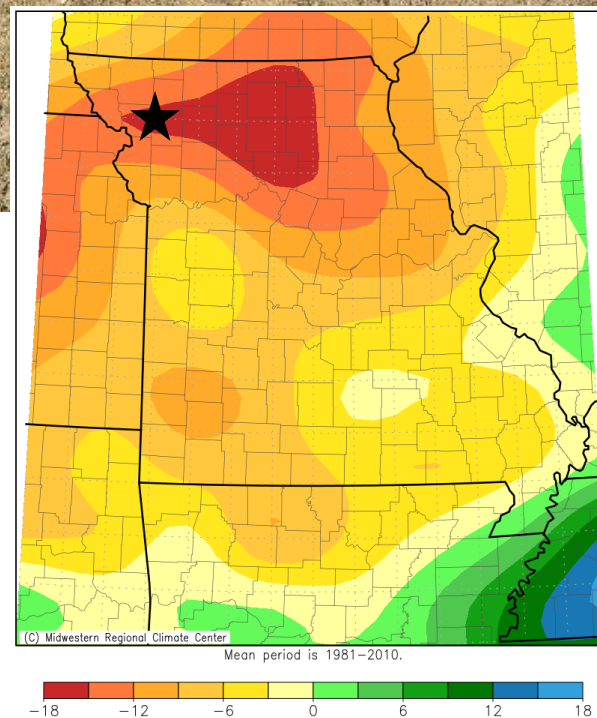
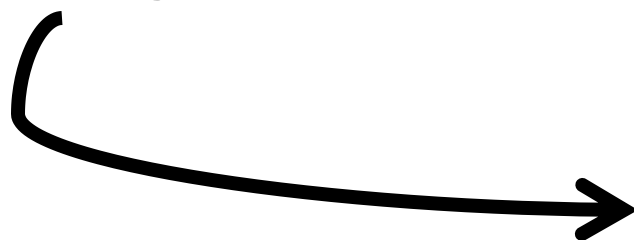
*CoCoRaHS stations used to fill in missing data

City Reservoir, Hamilton, MO, July 2018

Photo by Tim Baker

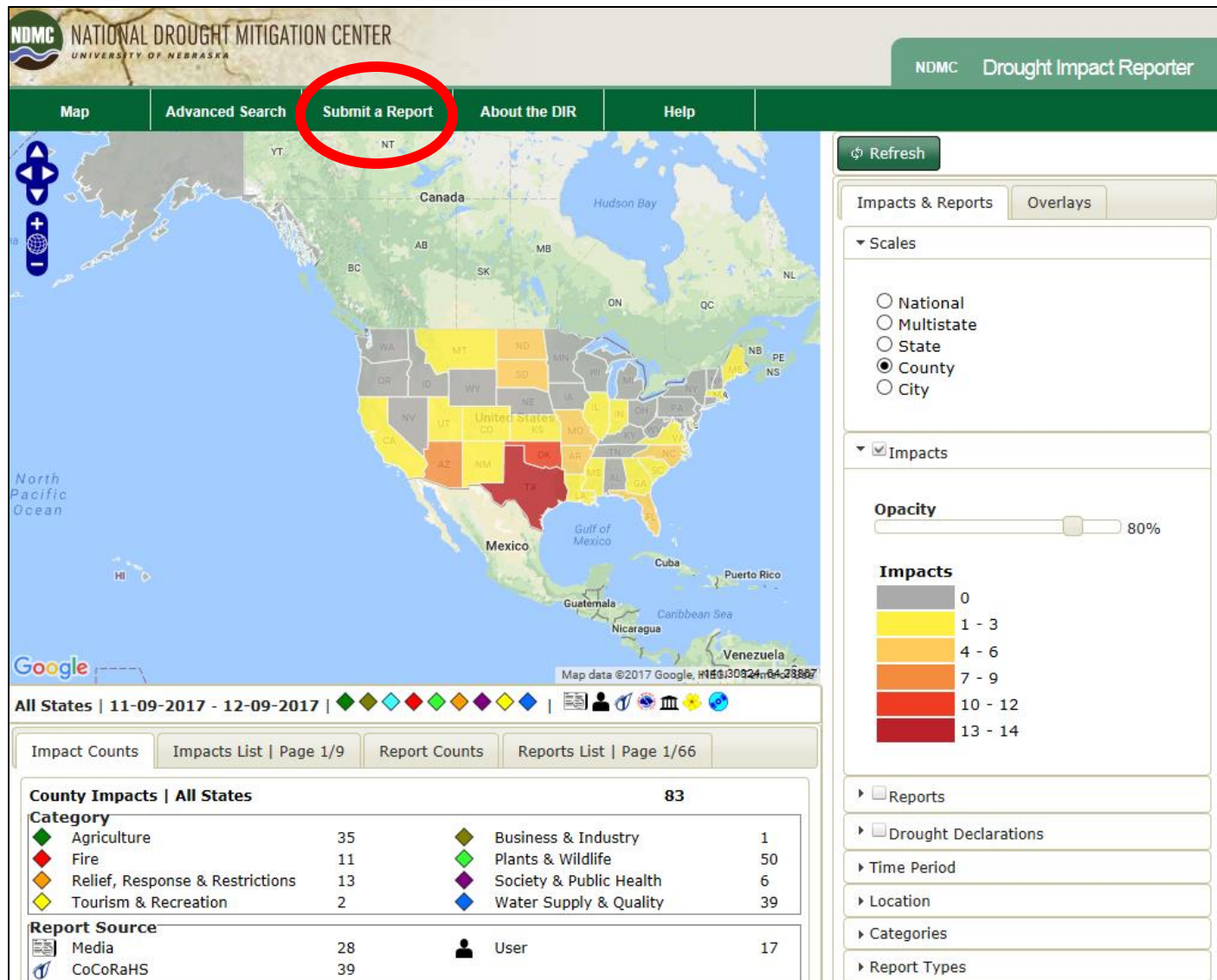


**Precipitation Departure from Mean (in)
July 1, 2017 to August 14, 2018**



How Missourians participated in drought reporting in 2018.

Drought Impact Reporter



<http://droughtreporter.unl.edu/map>

How Missourians participated in drought reporting in 2018.

Missouri Extension Drought Impact Reporter

Missouri Extension Drought Impact Reporter


This is a project of the Missouri State Climatologist's Office, the National Drought Mitigation Center at the University of Nebraska-Lincoln, and the National Integrated Drought Information System. Observations submitted through this survey appear on this map:
<http://unl5.maps.arcgis.com/apps/MapSeries/index.html?appid=0b47ad5785b4405385dbf120dd1fff9d>

Where are you?

Click on the compass icon if you would like to use your current location.

Set Location

What is the date?

 m/d/yy

Degree of dryness

Severely Dry: There is no soil moisture. Ponds, lakes, streams and wells may be nearly empty or dry. Producers may have crop or pasture losses. Mandatory water restrictions may be in place.

Moderately Dry: Plants may be brown due to dry conditions. Streams, reservoirs or well water levels may be low. Voluntary water use restrictions may be in place. There may be water shortages. Plants, crops or pastures may be stressed. Soil is dry.

Mildly Dry: Growth may have slowed for plants, crops or pastures. Soil is somewhat dry. Local plants, pastures or crops may not have fully recovered if conditions are changing from drier to wetter.

Severely Dry

Moderately Dry

Mildly Dry

Sector impacted

☐ Agriculture

☐ Environment

☐ Water

☐ Recreation & tourism

☐ Other business & industry

☐ Public & community health

☐ Fire

☐ Other

Upload photo


Click here to upload file. (<10MB, support: bmp, gif, jp2, jpg, jpeg, jpe, png, psd, sid, tif,...)

Please describe the impact

Please input 1,000 characters at most

Your name

Your email

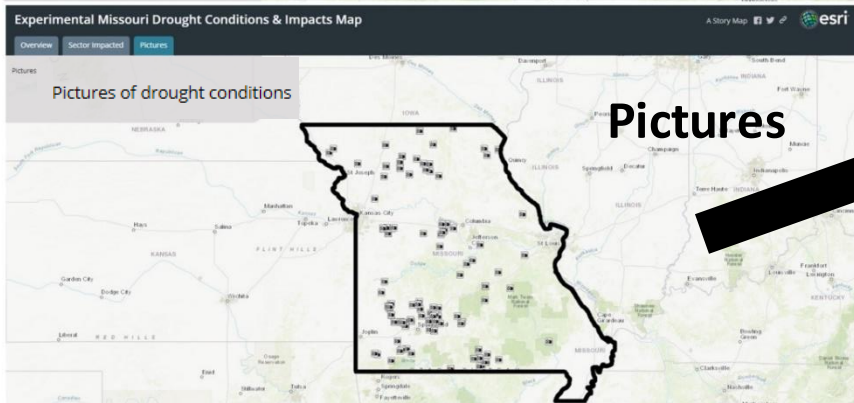
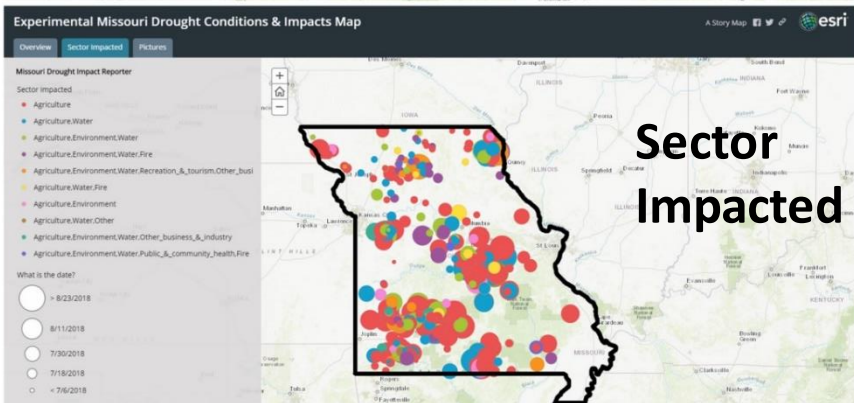
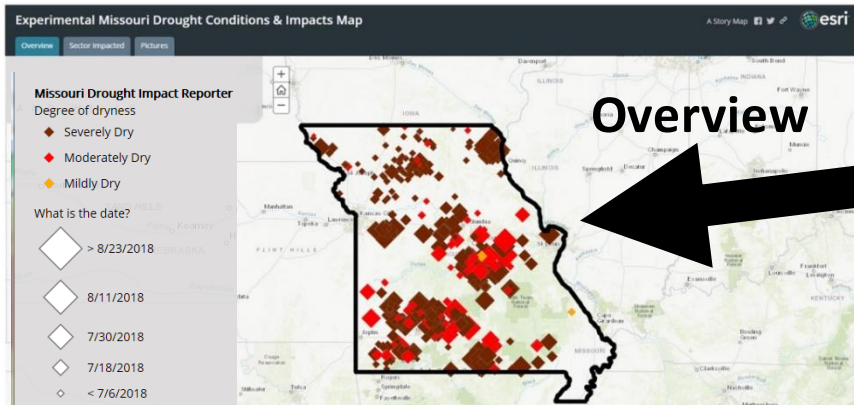


Please provide a valid email address.

Submit

Submit an impact report for Missouri from DNR Drought & Missouri Climate Center websites.

Experimental Missouri Drought Conditions & Impacts Map

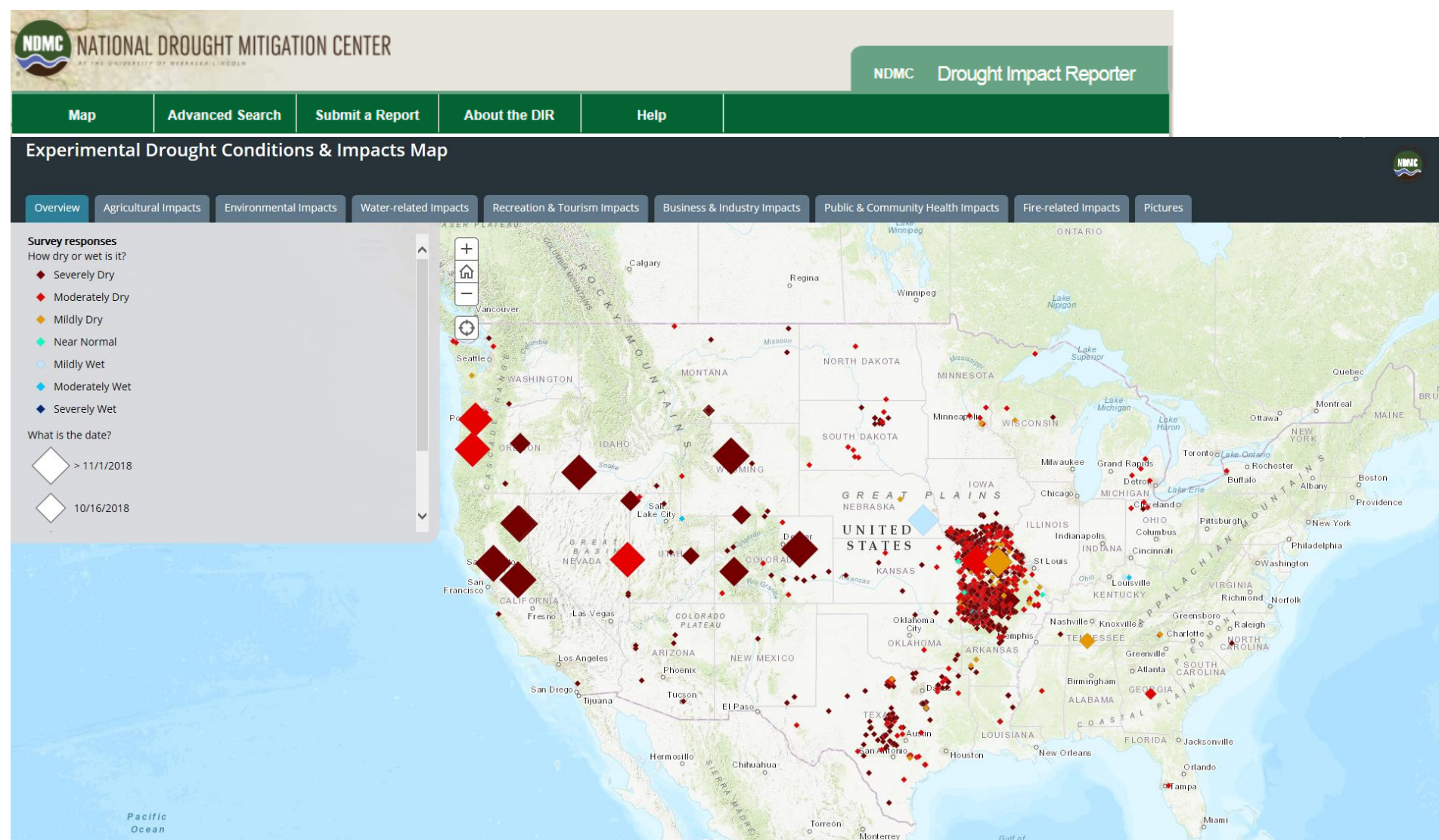


Missouri archive of drought impact reports from 2018 using the Missouri Extension Survey

More than 400 reports and over 100 pictures were submitted in July and August 2018



There were 1,068 Missourians who used the national survey and 420 who used the state survey. When combined Missouri submitted 1,488 reports between May 11 and Oct 23, 2018 & provided 65% of all national reports between Apr 2-Dec 1, 2018.



<https://droughtreporter.unl.edu/submitreport/>

New and improved survey for 2019!!

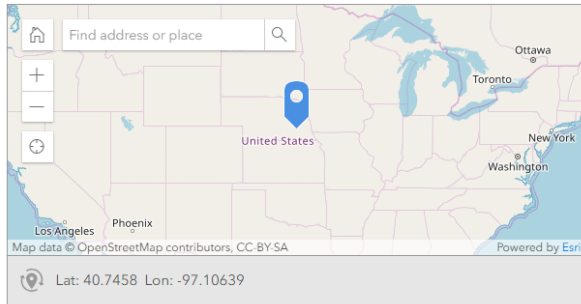
Drought Condition & Impact Reporting

Introduction

Report drought-related conditions and impacts within the U.S. This is a nation-wide service provided by the National Drought Mitigation Center, based at the University of Nebraska, in partnership with the National Integrated Drought Information System. Information submitted by this form appears on [this map](#).

Where are you?*

Please click on the map to tell us the location of your observation. Click on the compass icon to select your current location.



Select your state and county:

Select a state:

Select a county:

What is the date?

Please use the calendar to select the date of your observation, if it is other than today.

How dry or wet is it?*

Please use what you know about your part of the country and base your observation on what is normal for this time of year. A normal dry season is not the same as drought.

Severely Dry: There is no soil moisture. Ponds, lakes, streams and wells may be nearly empty or dry. Producers may have crop or pasture losses. Mandatory water restrictions may be in place.

Moderately Dry: Plants may be brown due to dry conditions. Streams, reservoirs or well water levels may be low. Voluntary water use restrictions may be in place. There may be water shortages. Plants, crops or pastures may be stressed. Soil is dry.

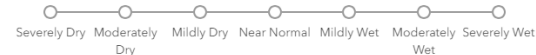
Mildly Dry: Growth may have slowed for plants, crops or pastures. Soil is somewhat dry. Local plants, pastures or crops may not have fully recovered if conditions are changing from drier to wetter.

Near Normal: What you're seeing is what you expect for this time of year.

Mildly Wet: Local plants, crops or pastures are healthy, recovering from dry conditions or draining from wet conditions. Soil moisture is above normal.

Moderately Wet: Local plants, crops or pastures are healthy and lush. Soil is very damp and the ground may be saturated with water. There may be standing water in low areas and ditches. Water bodies may be fuller than normal.

Severely Wet: Water levels in lakes, streams and ponds are well above normal. Standing water covers some areas that are normally dry. Soil is wet and ground is completely saturated. There may be flooding.



— Report crop production impact 

— Report livestock production impact 

— Report domestic or municipal water supply impact 

— Report habitat for wildlife or fish impact 

— Report recreation & tourism impact 

— Report other business & industry impact 

— Report fire impact 

Upload photo

You can upload a photo of up to 10 MB, if you are the photographer or have permission to share the photo. It will be visible on the web. Please be sure to use the description field below for credit and caption information: Who took the photo, what is the location, what is the date, and what is it showing us? By uploading the photo, you agree that it may be used and shared for educational and management purposes.

Press here to choose image file. (<10MB)



Description and/or caption information

Did you upload a photo? If so please tell us how we should credit the photo, and what it is showing us.

Please provide any other description that will help us understand the drought impact or conditions that you checked, for example; What kind of crops do you grow? What kind of animals do you raise? Do you rely on your own well or are you part of a municipal system?

Your name

This is optional and will not be published. It would be helpful in case we need to contact you for more information.

Your organization

This is optional and will not be published. It would be helpful in case we need to contact you for more information.

Your email

This is optional and will not be published. It would be helpful in case we need to contact you for more information.

Submit

<http://droughtreporter.unl.edu/map>

Missourians continue to participate in drought assessment.

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Drought Reporting and Conditions

Home | 2018 Drought News, Resources and Assessment Committee

2018 Drought Response Report

- 2018 Drought Response Report – Missouri's drought of 2018 was notable in its localized intensities and its overall impacts to both agriculture and public water supplies. Abnormally dry conditions extended through fall and winter 2017, with dry conditions re-emerging in late spring 2018. Ninety-eight percent of the state experienced dry to exceptional drought conditions at the peak of the 2018 Drought.

Get Updates on this Issue

Reporting

- Missouri Extension Drought Impact Reporter – Report drought-related conditions and impacts in Missouri. Reports and photos are essential tools used to assess drought conditions.

Conditions

- U.S. Drought Monitor NDMC-UNL, USDA, NOAA
 - Animations
 - Comparison slider
 - Compare two weeks side-by-side
 - Map archives and custom maps
- Missouri Climate Conditions
- U.S. Drought Monitor for Missouri – Broad-scale conditions maps and statistics for Missouri
- About the Data – Drought severity classification and more
- Experimental Missouri Drought Conditions & Impacts Map – Read drought condition reports and see photos submitted by citizens
- Photo gallery submitted by citizens depicting drought conditions in Missouri
- National Weather Service Drought Information Statement
- Missouri Groundwater Conditions U.S. Geological Survey
- Missouri Radar Intellicast
- Missouri Streamflow Conditions U.S. Geological Survey
- Monthly Missouri Precipitation and Temperature Data
- Real-Time Data for Missouri Lakes U.S. Geological Survey
- Real-Time Precipitation Data for Missouri U.S. Geological Survey
- Real-Time Water Quality Data for Missouri U.S. Geological Survey
- Missouri Climate Center University of Missouri
- County Burn Bans in Missouri Missouri Department of Public Safety
- Missouri Natural Cover Fire Risk Missouri Department of Public Safety

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Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102
800-361-4827
573-751-3443
Contact Us
Report an Environmental Concern

U.S. Drought Monitor Missouri

October 1, 2019
(Released Thursday, Oct. 3, 2019)
Valid 8 a.m. EDT

Drought Information for the Nation

- U.S. Drought Monitor for the Nation
- U.S. Seasonal Drought Outlook
- U.S. Weather National Weather Service

Author: Brian Fuchs, National Drought Mitigation Center
USDA droughtmonitor.unl.edu

dnr.mo.gov/drought.htm

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August 2019 Weather and Its Impacts on Missouri

Pat Guinan
State Climatologist
University of Missouri Extension

Seasonable August temperatures dominated in Missouri with preliminary data indicating a statewide average temperature of 75.5°F, or 0.6° below the long-term average, Figure 1. Near to above normal temperatures occurred during the first three weeks of August followed by a pleasant 10-day cool spell to wrap-up the month, Figure 2. Summer conditions were generally benign this year with no prolonged periods of extreme high temperatures reported and timely rain events.

Preliminary summer temperature data indicate June and August were slightly below normal with July near normal, Figure 3. The statewide average summer temperature was 75.2°F, 0.4° below the long-term average. Five out of the past seven summers have been cooler than average, Figure 4. Recent historic summer weather patterns indicate little change in maximum temperature trends whereas minimum summer temperatures have been warming, Figures 5 and 6. This phenomenon has been ongoing the past few decades, primarily due to above average summer dew point temperatures in Missouri, Figure 7, which act to suppress maximum air temperature and elevate minimum air temperature.

Wet summer conditions persisted into August with timely rains mitigating brief spells of dryness in some areas of the state. Preliminary data indicate a statewide average of 5.98 inches, or 2.28 inches above the long-term average. It was the 8th wettest August on record and wettest August since 2016, Figure 8. The month paralleled unusually wet conditions Missouri has experienced this year, Figure 9. April is the only month, so far, reporting slightly below average precipitation. The year is currently on pace to be the wettest on record, with a statewide year-to-date average total of 40.79 inches, slightly ahead of the previous wettest Jan-Aug on record, which occurred in 2008, Figure 10.

Typical of the summer season, August rainfall was highly variable, ranging from less than two inches to over a foot. However, for the majority of locations rainfall was above average. Heaviest amounts occurred over west central and a few far southwestern and east central counties. Lowest totals were confined to some far northeastern counties and few southeastern border counties. Some of the lightest and heaviest monthly totals are listed in Table 1.

August 2019

	Station Name*	County	Rainfall (in.)
Lightest	Kirkville 1.4S	Adair	1.83
	Ste. Genevieve 1.7SSW	Ste. Genevieve	1.96
	Clarence Cannon Dam	Ralls	2.19
	Unionville	Putnam	2.35
	Cape Girardeau 2.2N	Cape Girardeau	2.39

Drought Impact Map

Missouri Mesonet

Temperature Inversion

Design Storm Alert System

Sanborn Field - Columbia

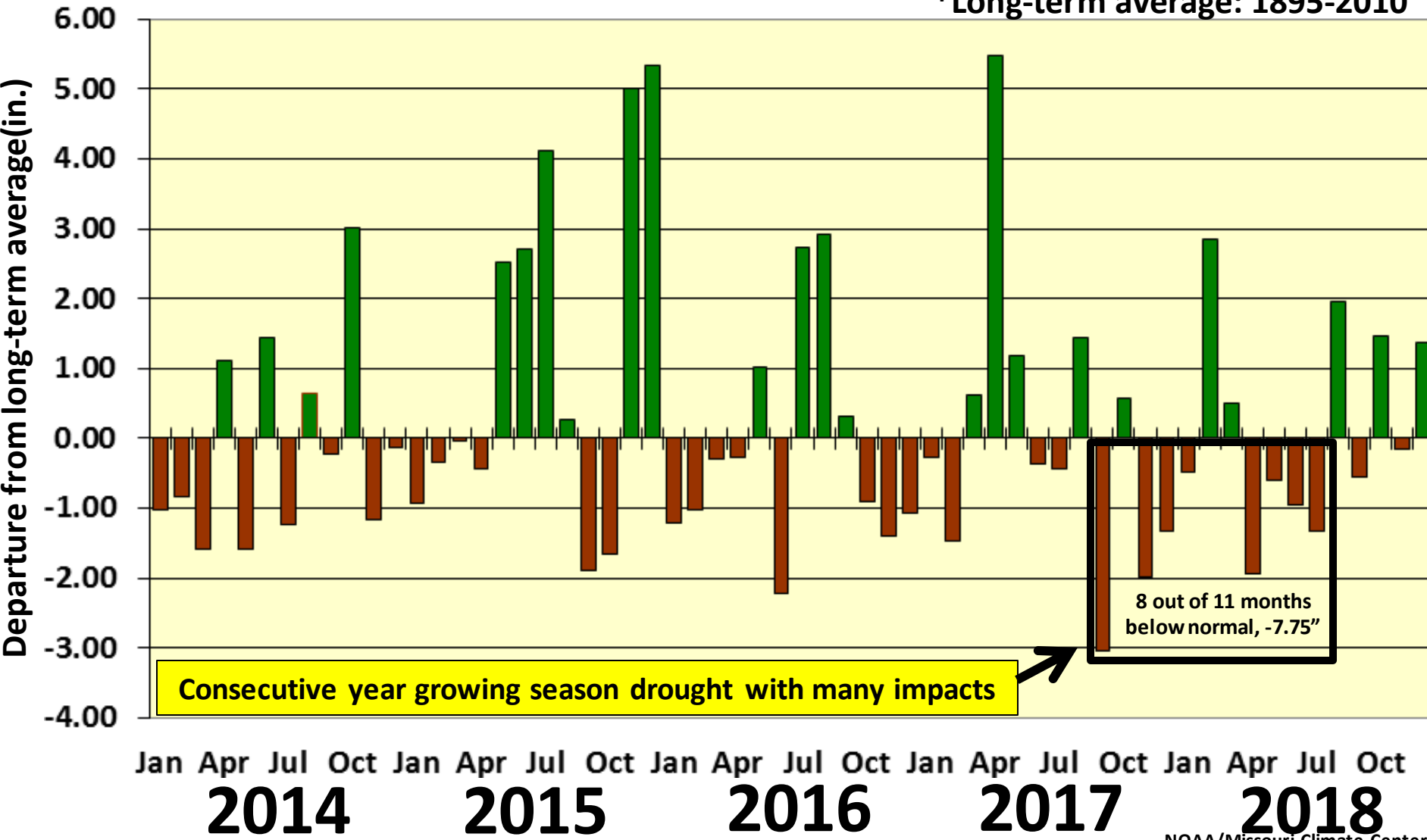
Humidity	63%
Wind Speed	2.4 mph
Wind Dir.	ENE
Pressure	30.19 in. ↑
Soil 2 in.	61.3°F
Rainfall	0.00 in.

climate.missouri.edu

Missouri's biggest climatic vulnerability is drought...

Missouri Monthly Precipitation Departure From Average* Jan 2014 – Dec 2018

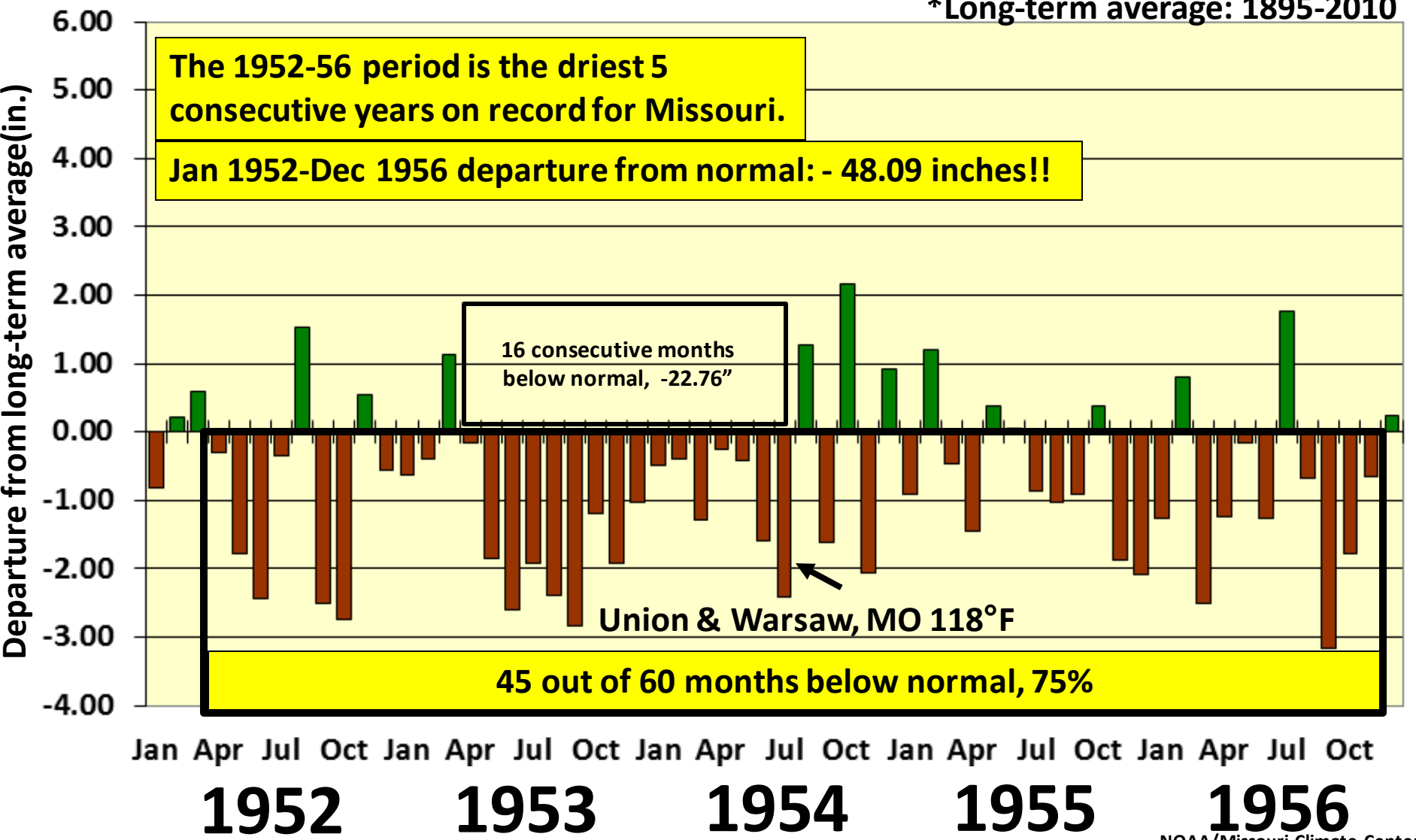
*Long-term average: 1895-2010



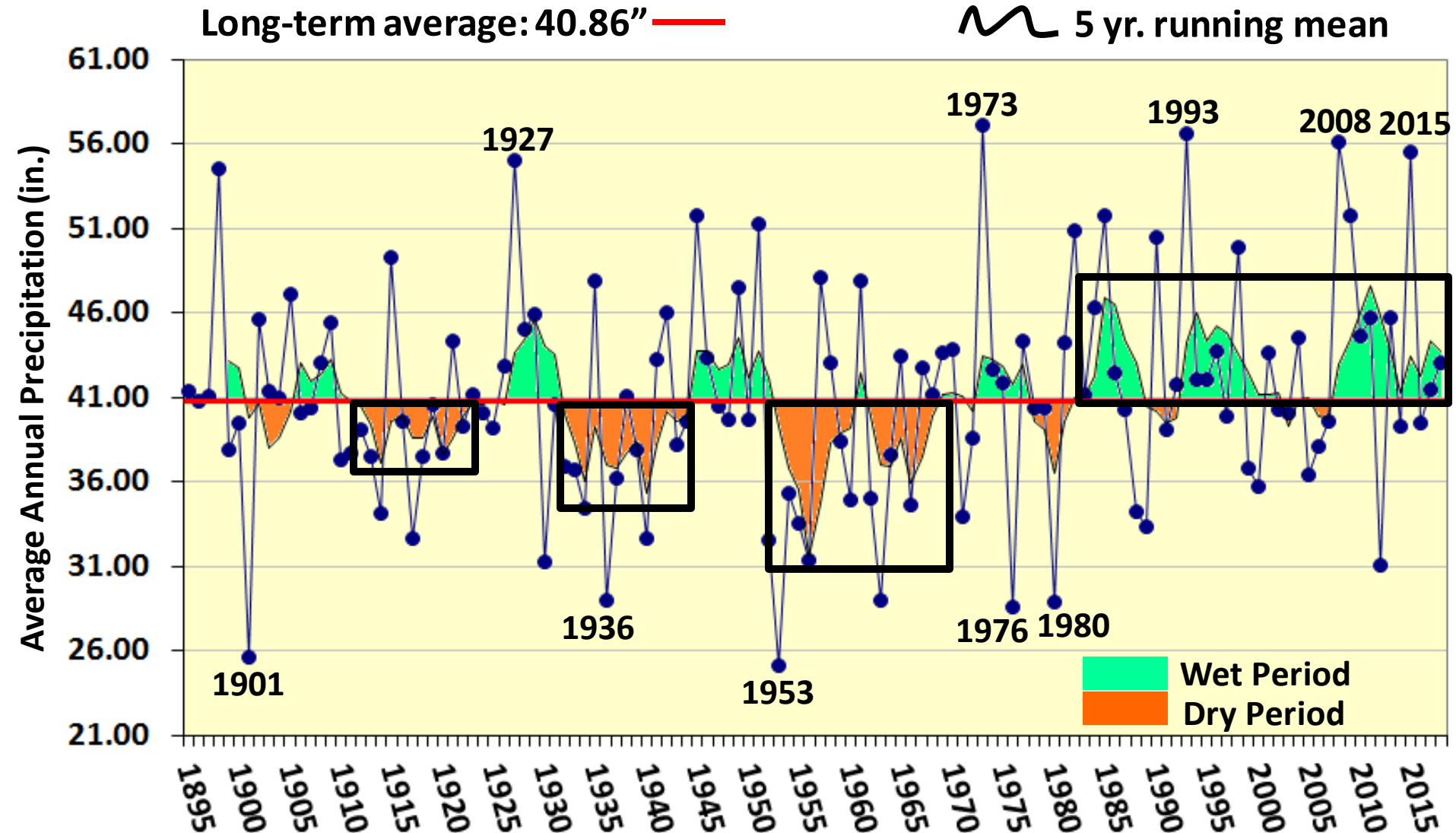
Missouri's biggest climatic vulnerability is drought...

Missouri Monthly Precipitation Departure From Average* Jan 1952 – Dec 1956

*Long-term average: 1895-2010

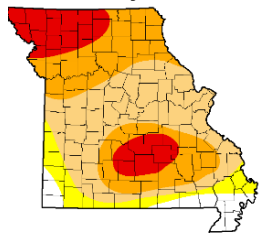


Missouri Average Annual Precipitation (1895-2018)

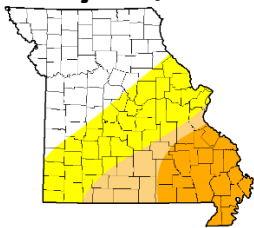


Missouri growing season drought: How common is it?

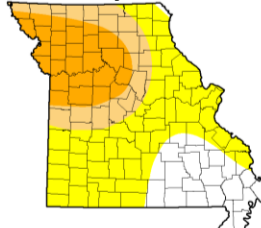
Jun 13, 2000



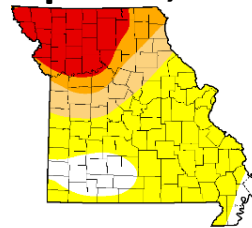
May 15, 2001



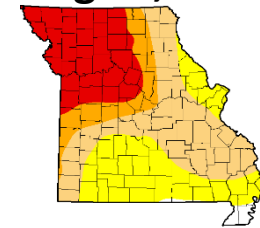
Oct 1, 2002



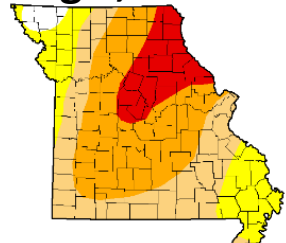
April 15, 2003



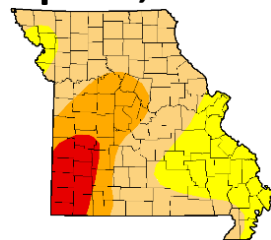
Aug 26, 2003



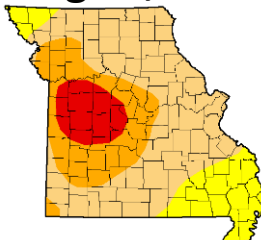
Aug 9, 2005



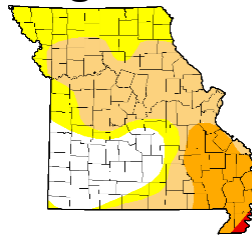
Apr 25, 2006



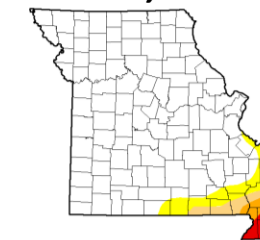
Aug 22, 2006



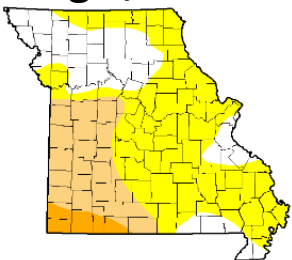
Aug 21, 2007



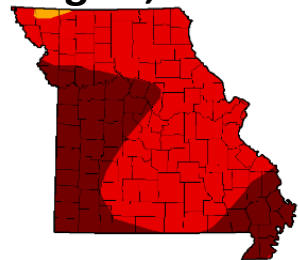
Oct 19, 2010



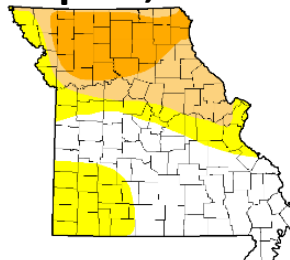
Aug 2, 2011



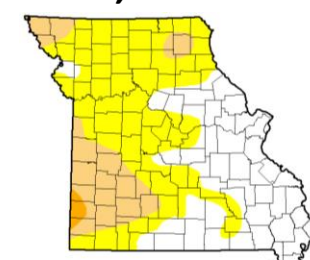
Aug 21, 2012



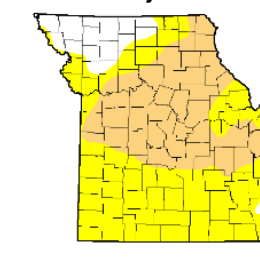
Sep 17, 2013



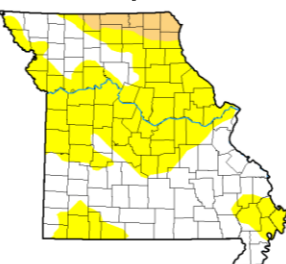
Jun 3, 2014



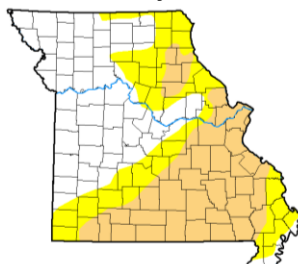
Oct 27, 2015



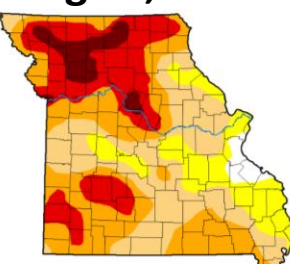
Jun 28, 2016



Oct 31, 2017



Aug 14, 2018



≥ D1: 16/19 years (84%)

≥ D2: 13/19 years (68%)

≥ D3: 8/19 years (42%)

D4: 2/19 years (11%)

Intensity:

Yellow D0 Abnormally Dry

Orange D1 Moderate Drought

Dark Orange D2 Severe Drought

Red D3 Extreme Drought

Dark Red D4 Exceptional Drought

Missouri DNR Water Resources Center

<https://dnr.mo.gov/geology/wrc/>



Missouri Climate Center

<http://climate.missouri.edu>