

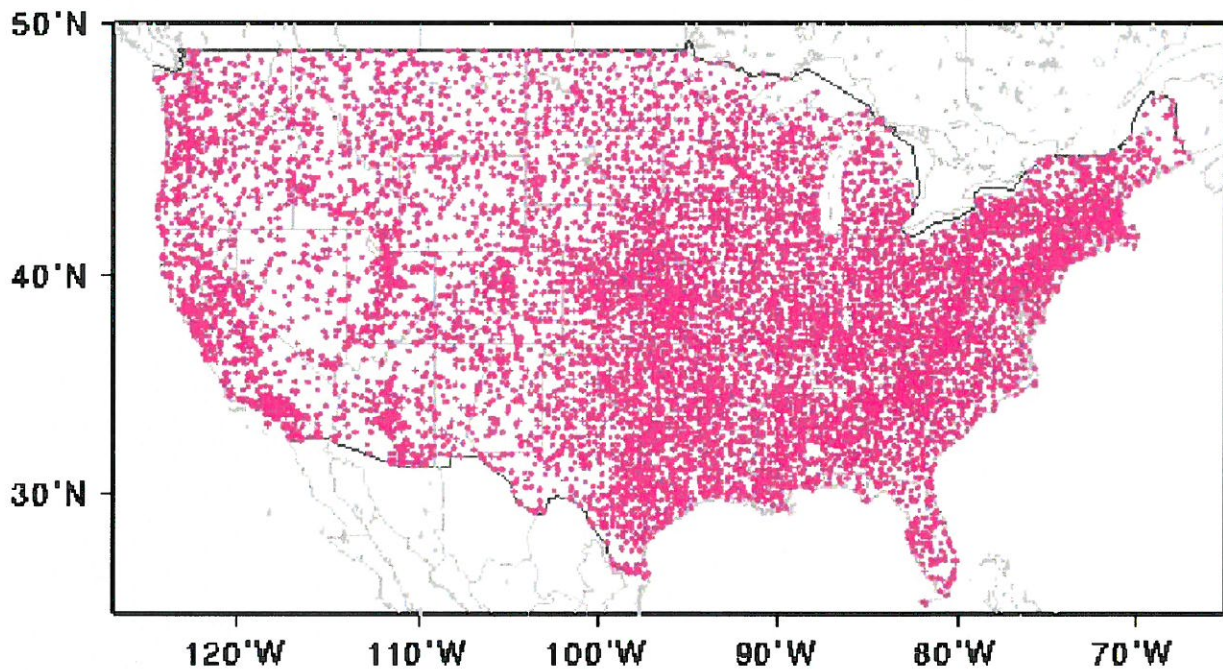
Missouri's Biggest Climate Challenge

Pat Guinan
Extension\State Climatologist
University of Missouri
Commercial Agriculture Program



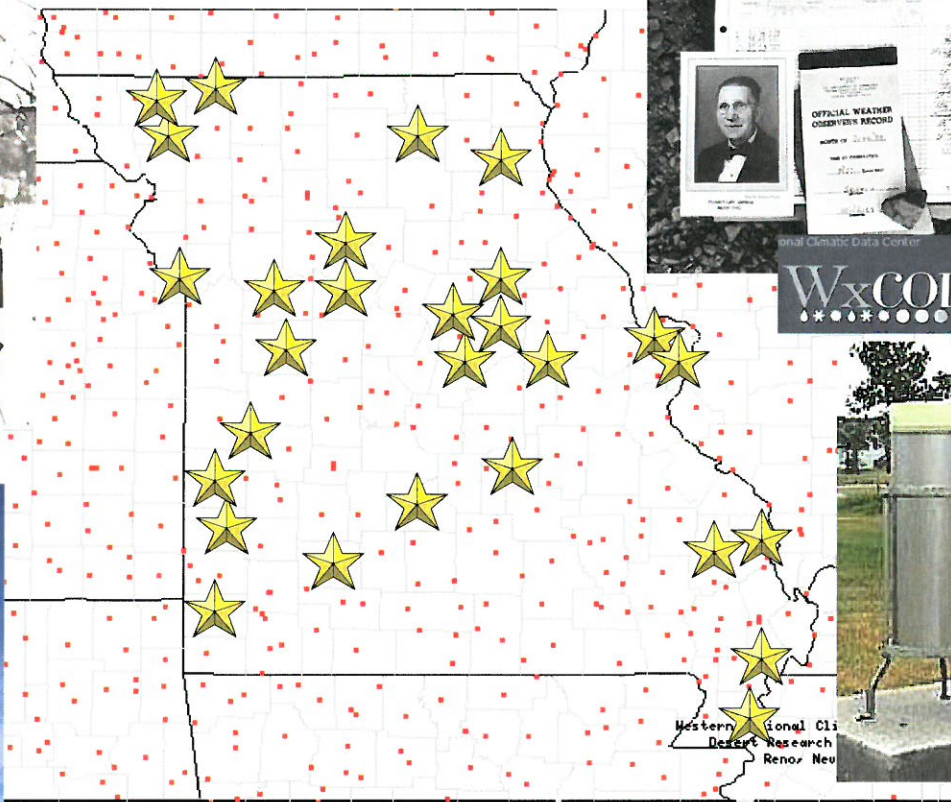
Governor's Conference on Natural Resources
Panel Discussion: Environmental Impacts of Extreme Events
White River Conference Center, Springfield, MO, Nov 11-13, 2014

**U.S. National Weather Service
Cooperative Weather Station Network
“The Backbone of the Nation’s Climate Records”**



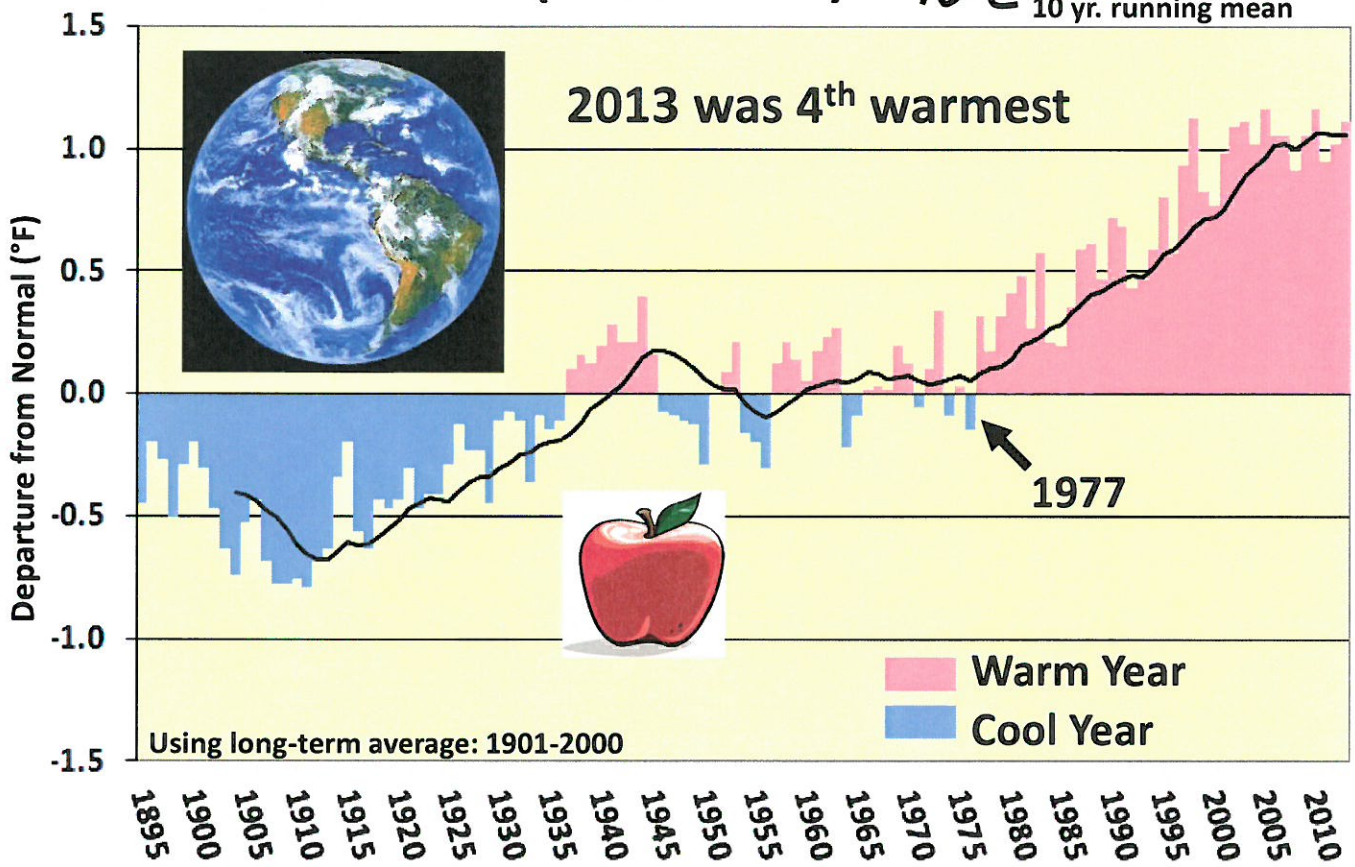
NWS Cooperative Network in Missouri

★ 28 Pioneer Stations (still active)



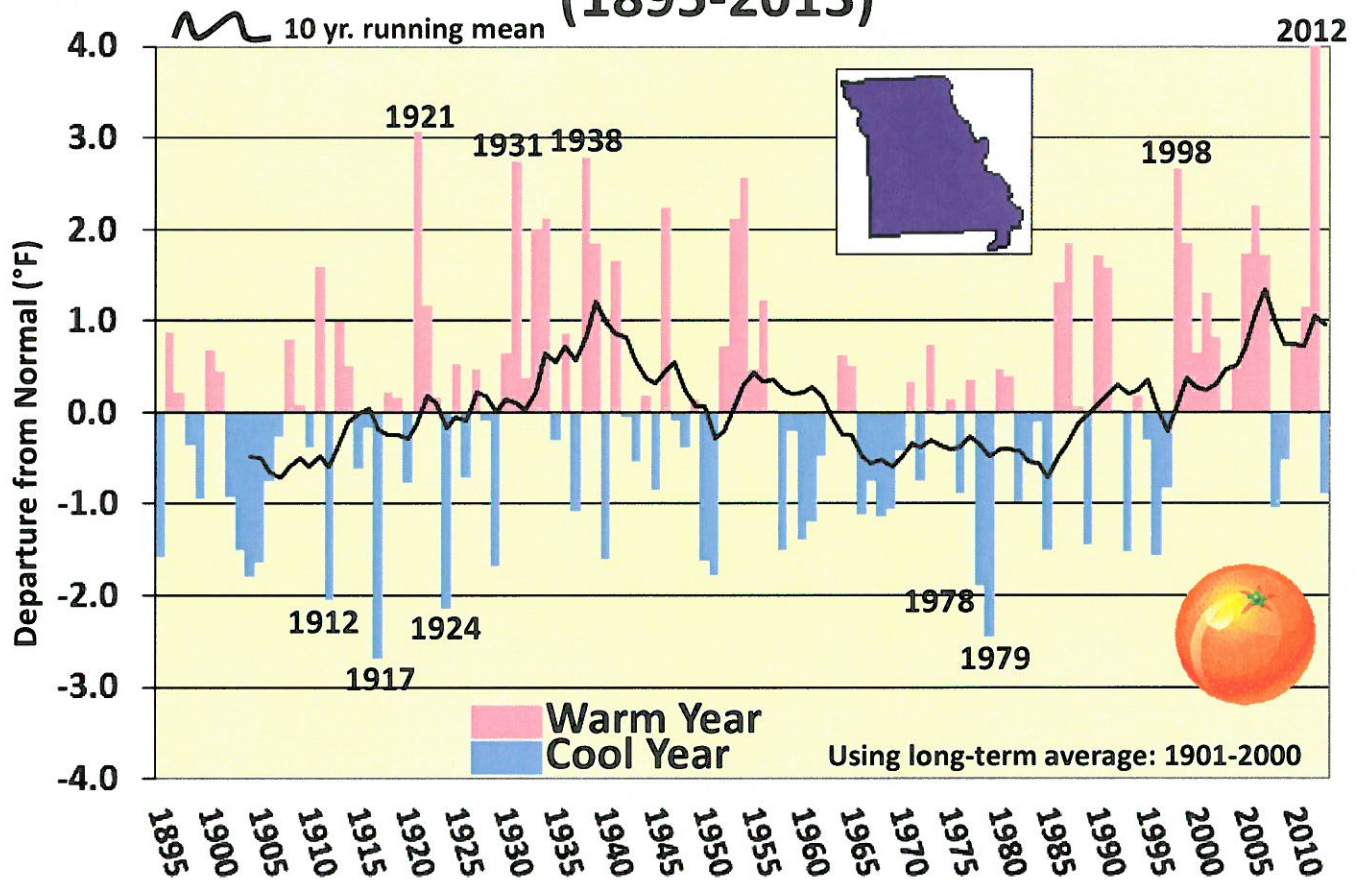
Western Regional Climate Data Center
Desert Research Institute
Reno, Nev

GLOBAL TEMPERATURE ANOMALIES (1895-2013)



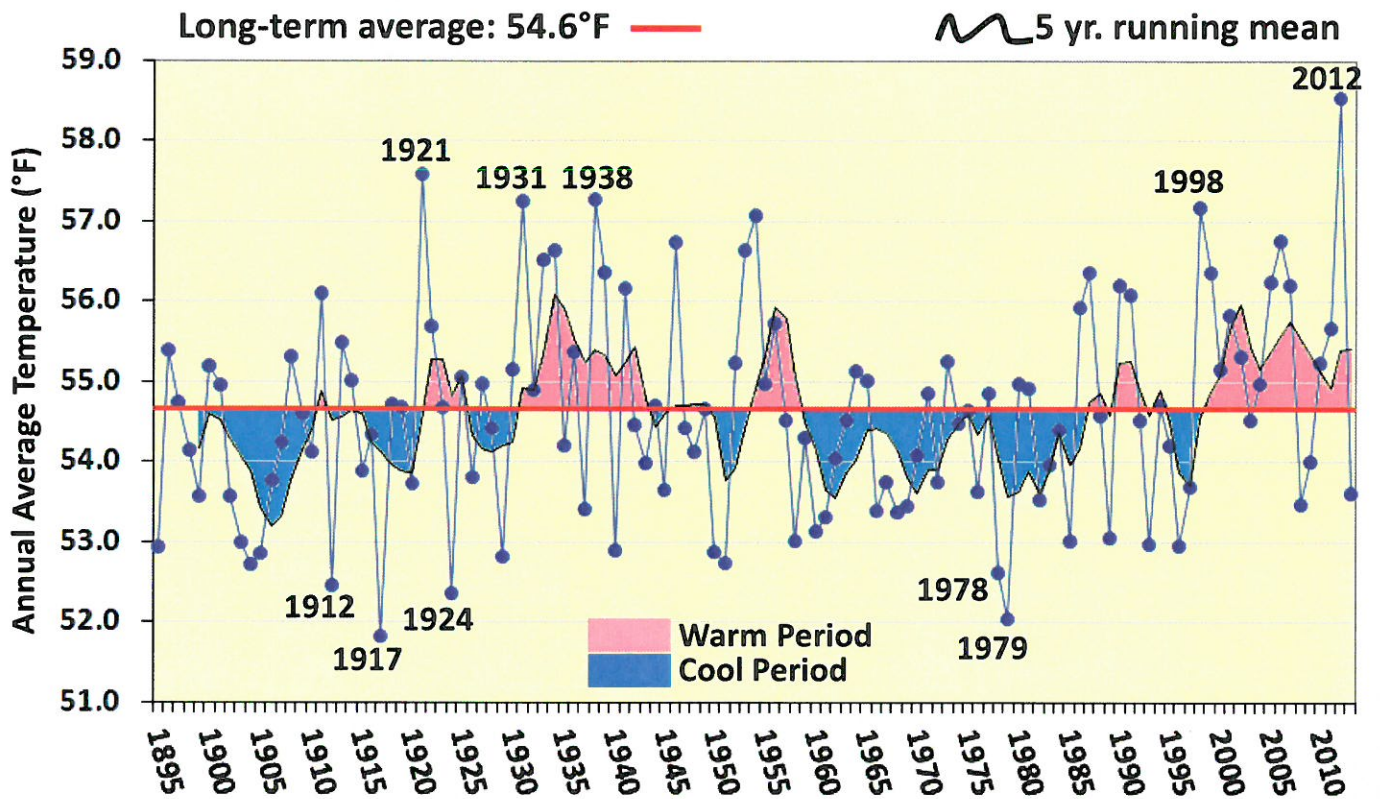
Source: NOAA/Missouri Climate Center

MISSOURI TEMPERATURE ANOMALIES (1895-2013)



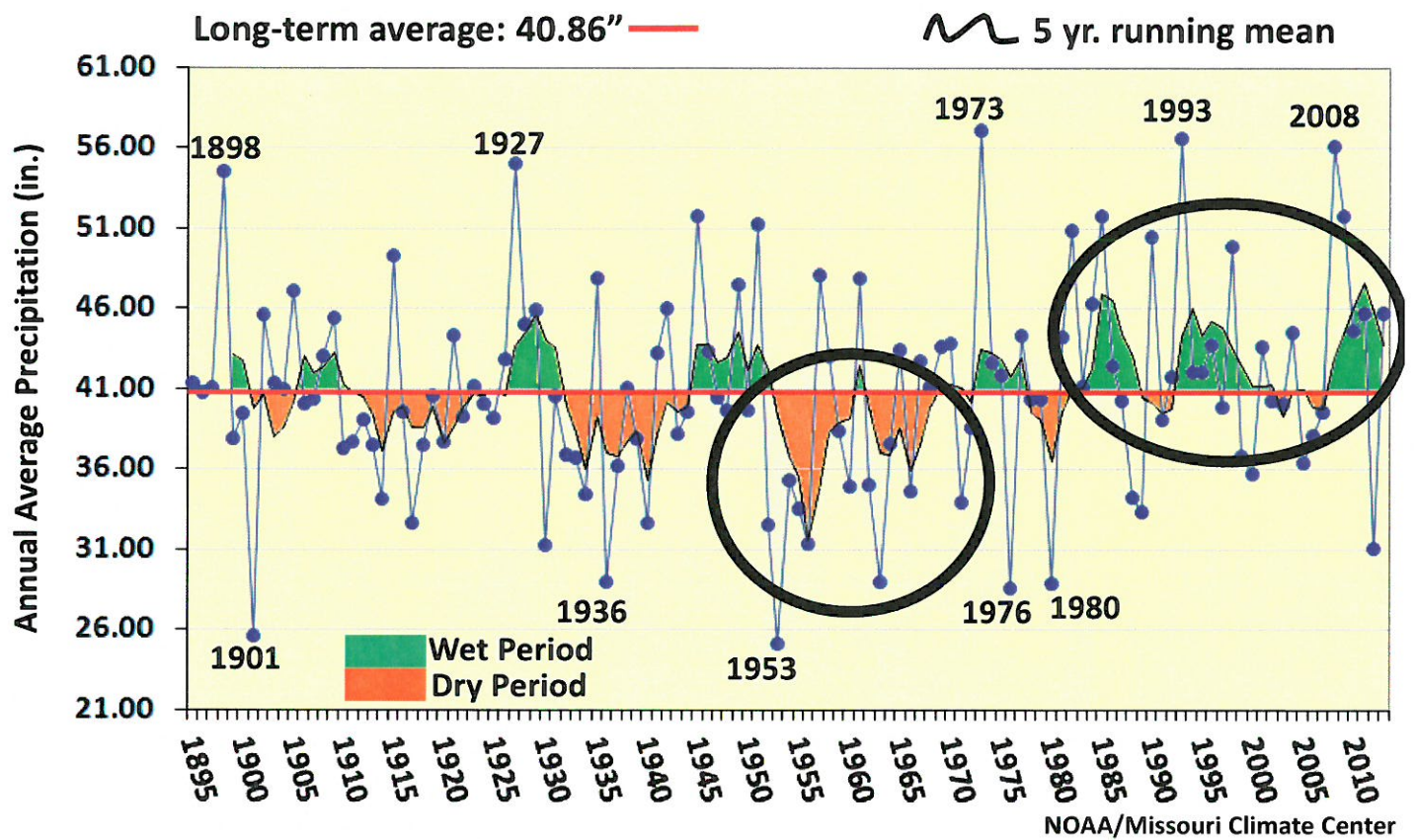
Source: NOAA/Missouri Climate Center

Missouri Annual Average Temperature (1895-2013)

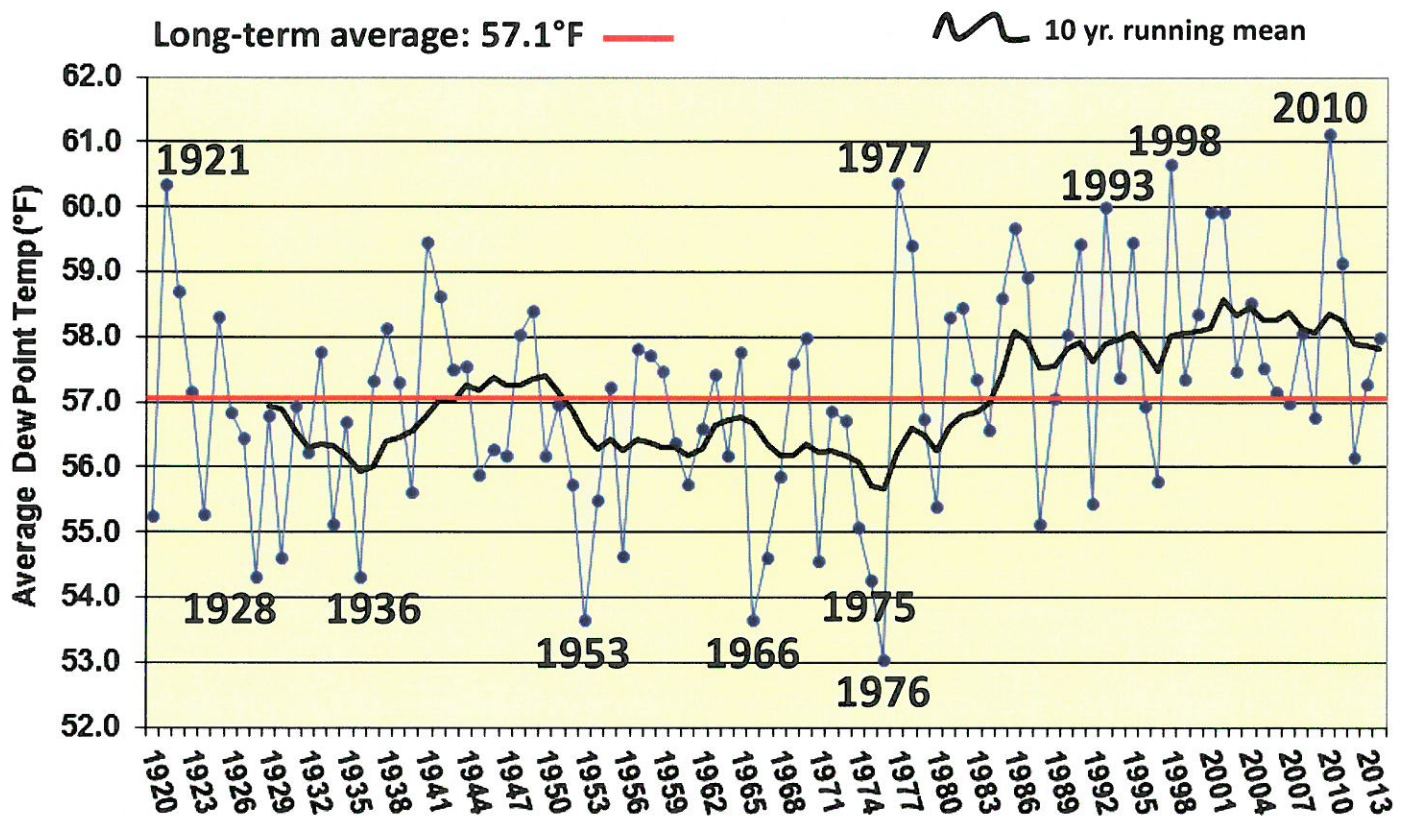


Data Source: Missouri Climate Center/NOAA

Missouri Annual Average Precipitation (1895-2013)

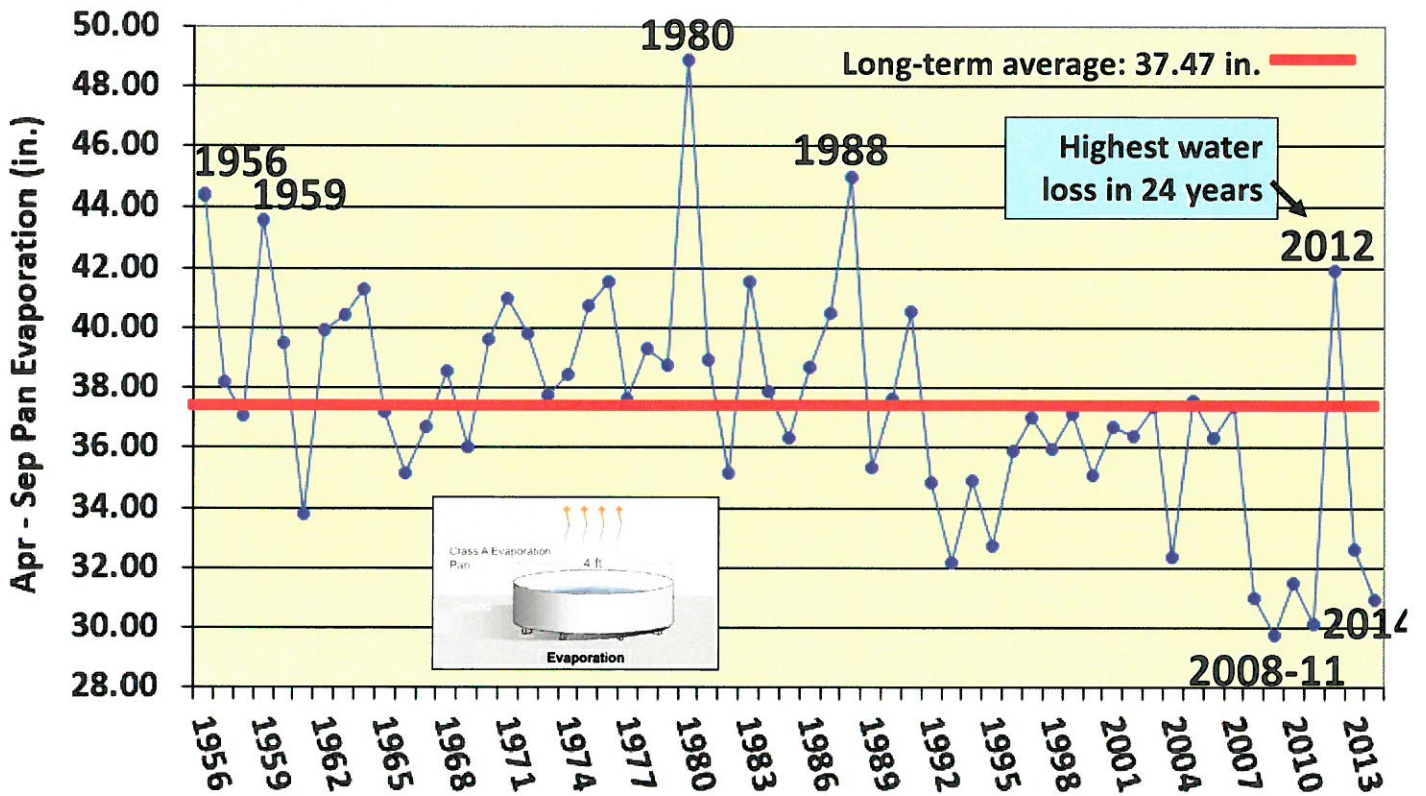


Average Apr-Sep Dew Point Temperature Columbia, MO, 1920-2014



Source: Missouri Climate Center/NOAA

Class A Pan Evaporation Apr-Sep (in.) HARC*, New Franklin, MO, 1956-2014



* Horticulture and Agroforestry Research Center

Recovery comes quick with a few significant precipitation events...



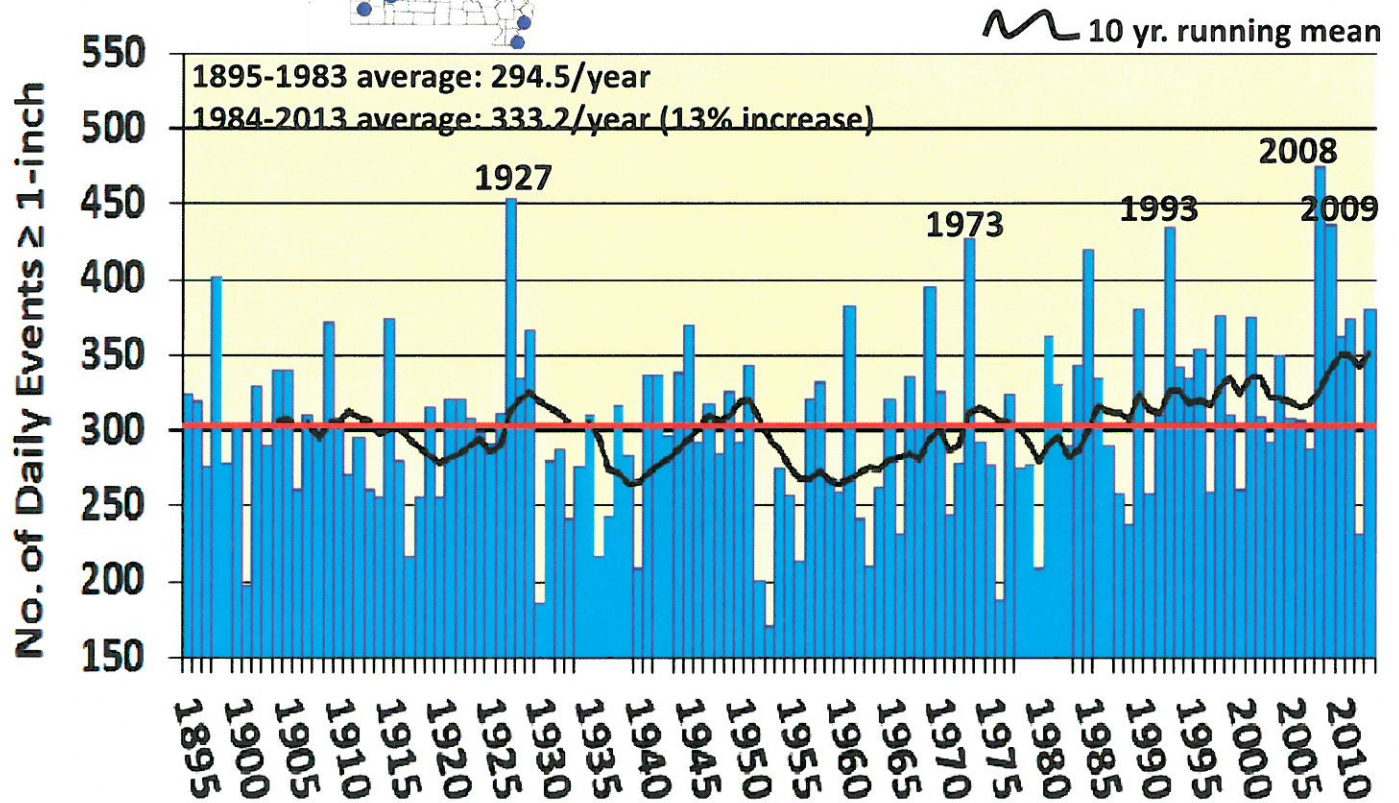
P. Guinan, Columbia, MO
Photo taken Feb 19, 2013

Jan 29-Mar 10, 2013 precipitation: 7.58 inches



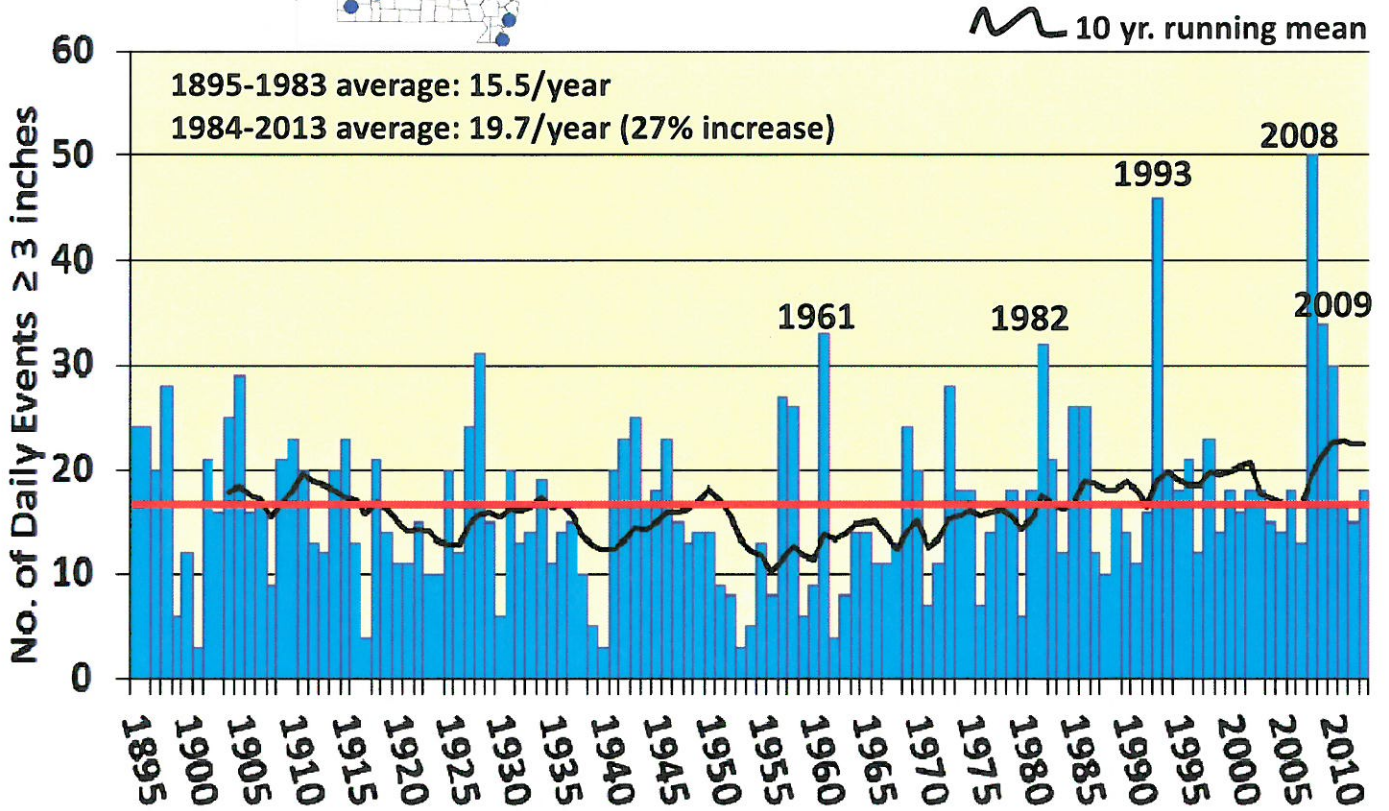
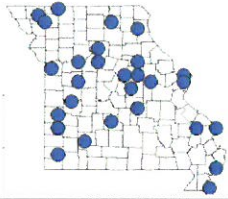
P. Guinan, Columbia, MO
Photo taken Mar 10, 2013

Number of Daily Rainfall Events \geq 1-inch in Missouri 1895-2013



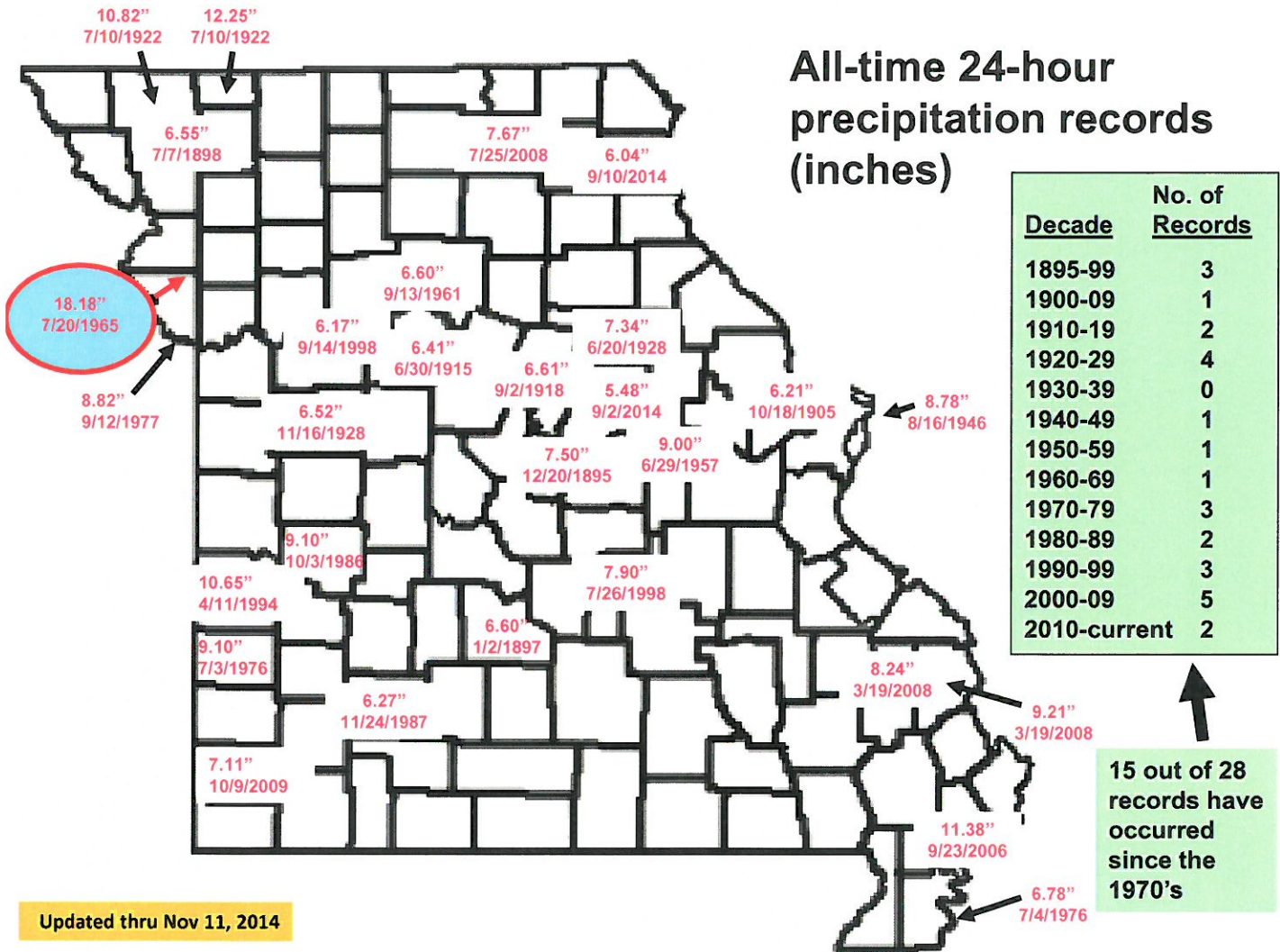
Data Source: Missouri Climate Center/NOAA

Number of Daily Rainfall Events \geq 3-inches in Missouri 1895-2013



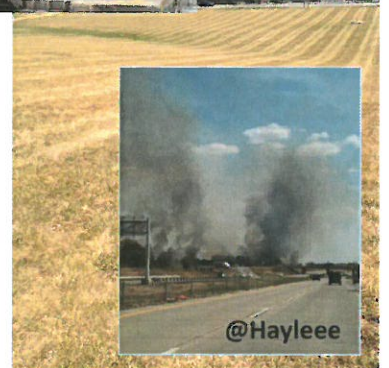
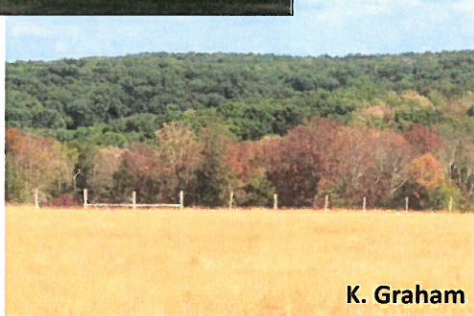
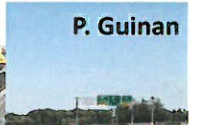
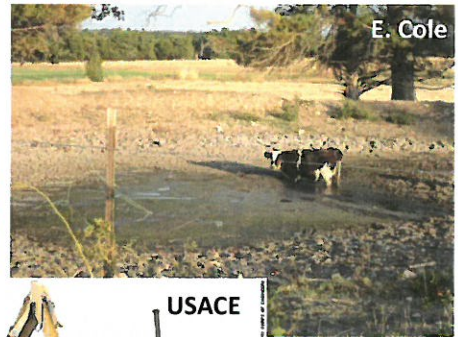
Data Source: Missouri Climate Center/NOAA

All-time 24-hour precipitation records (inches)

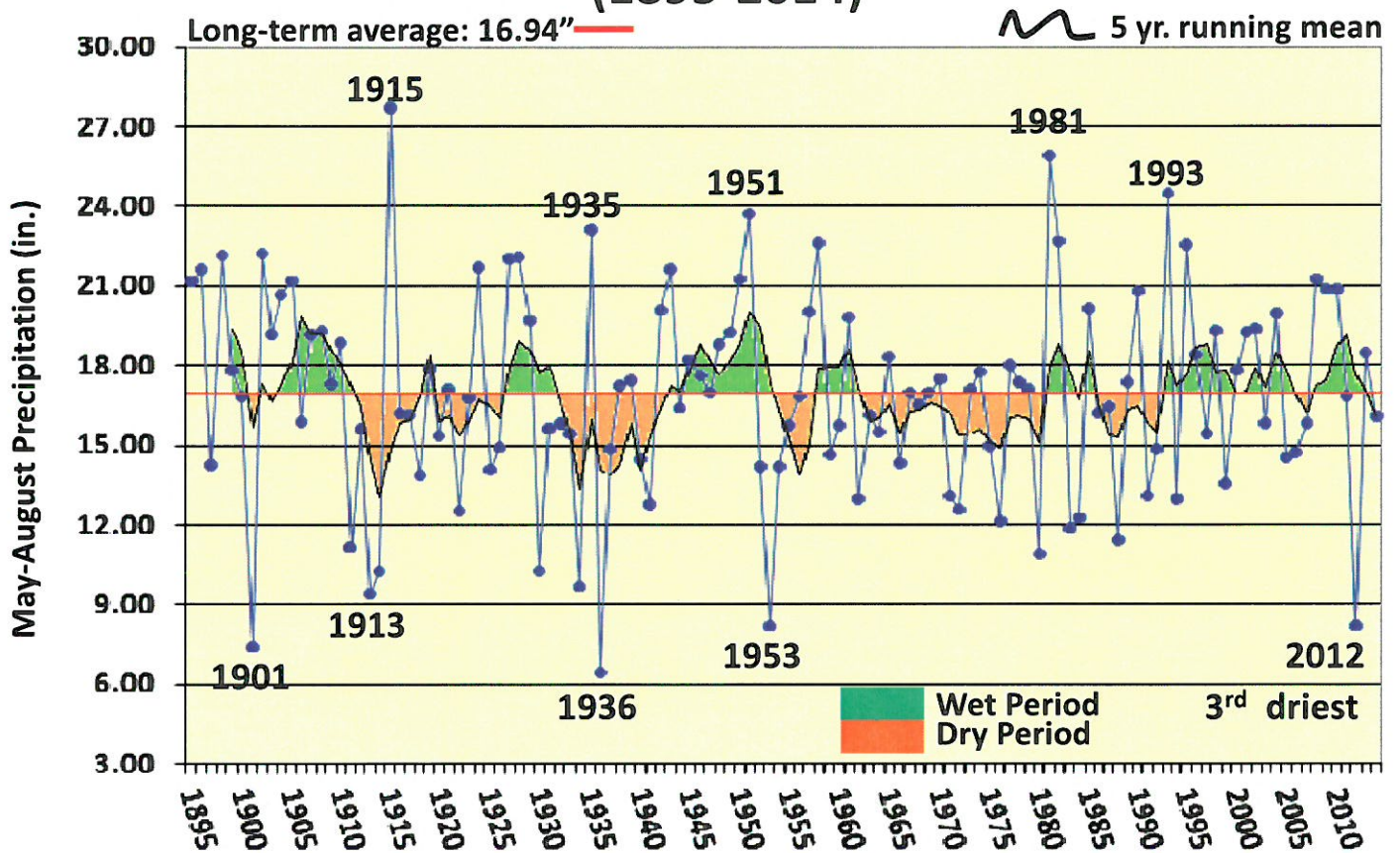


Updated thru Nov 11, 2014

Missouri's biggest vulnerability in climate is DROUGHT...



Missouri May-Aug Average Precipitation (1895-2014)

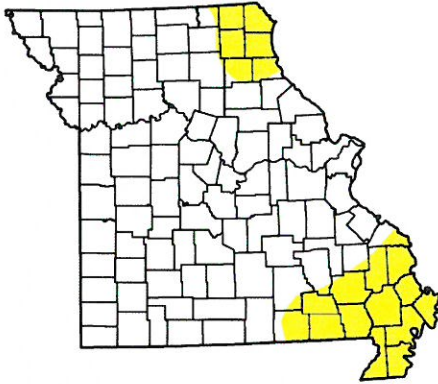


Data Source: Missouri Climate Center/NOAA

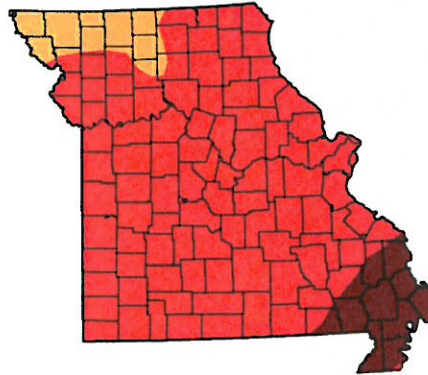
A rapidly developing drought impacted Missouri in Spring 2012

U.S. Drought Monitor, Missouri

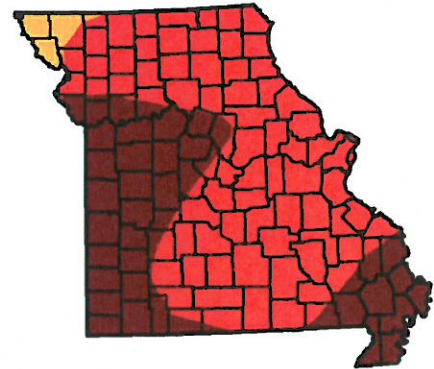
May 1, 2012



July 31, 2012








Aug 28, 2012

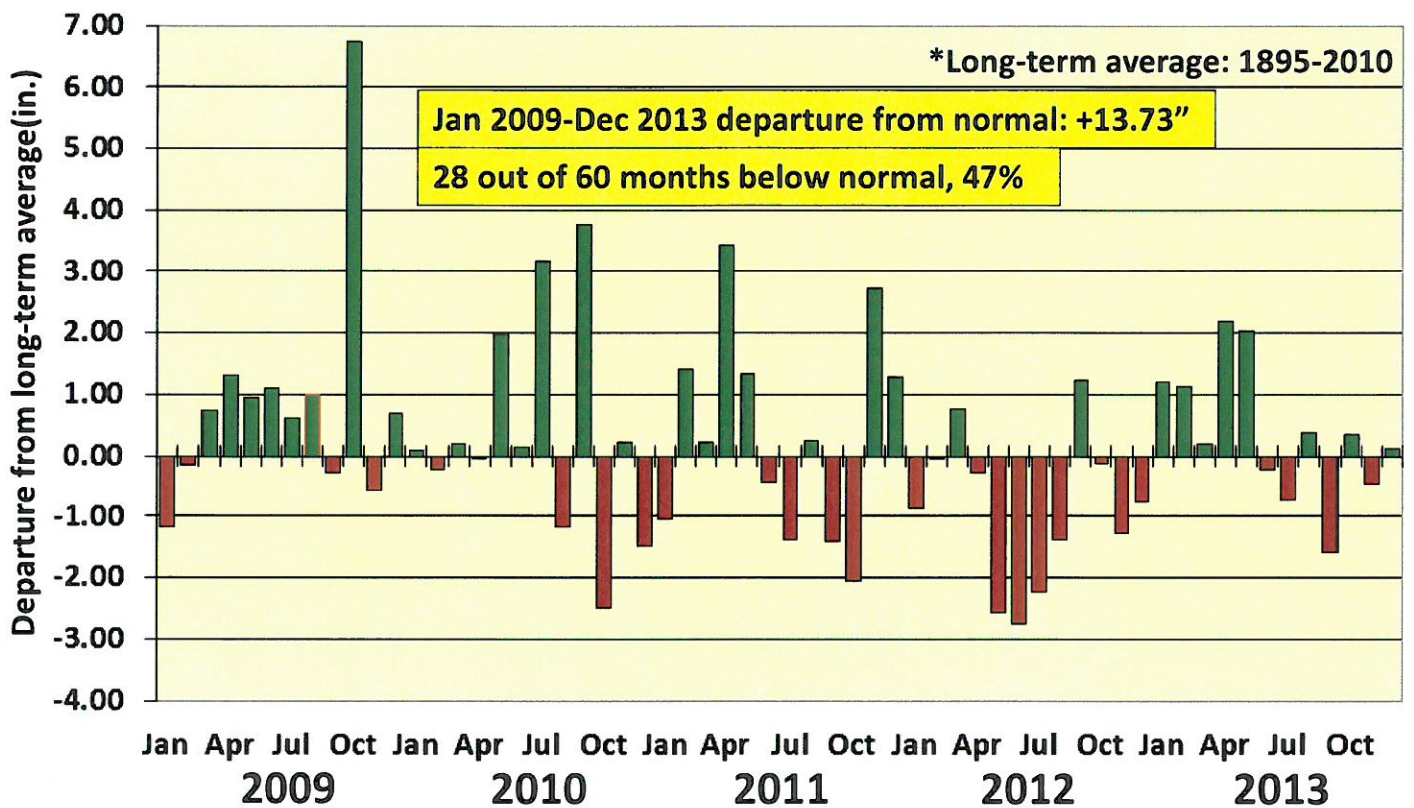


<http://droughtmonitor.unl.edu/>

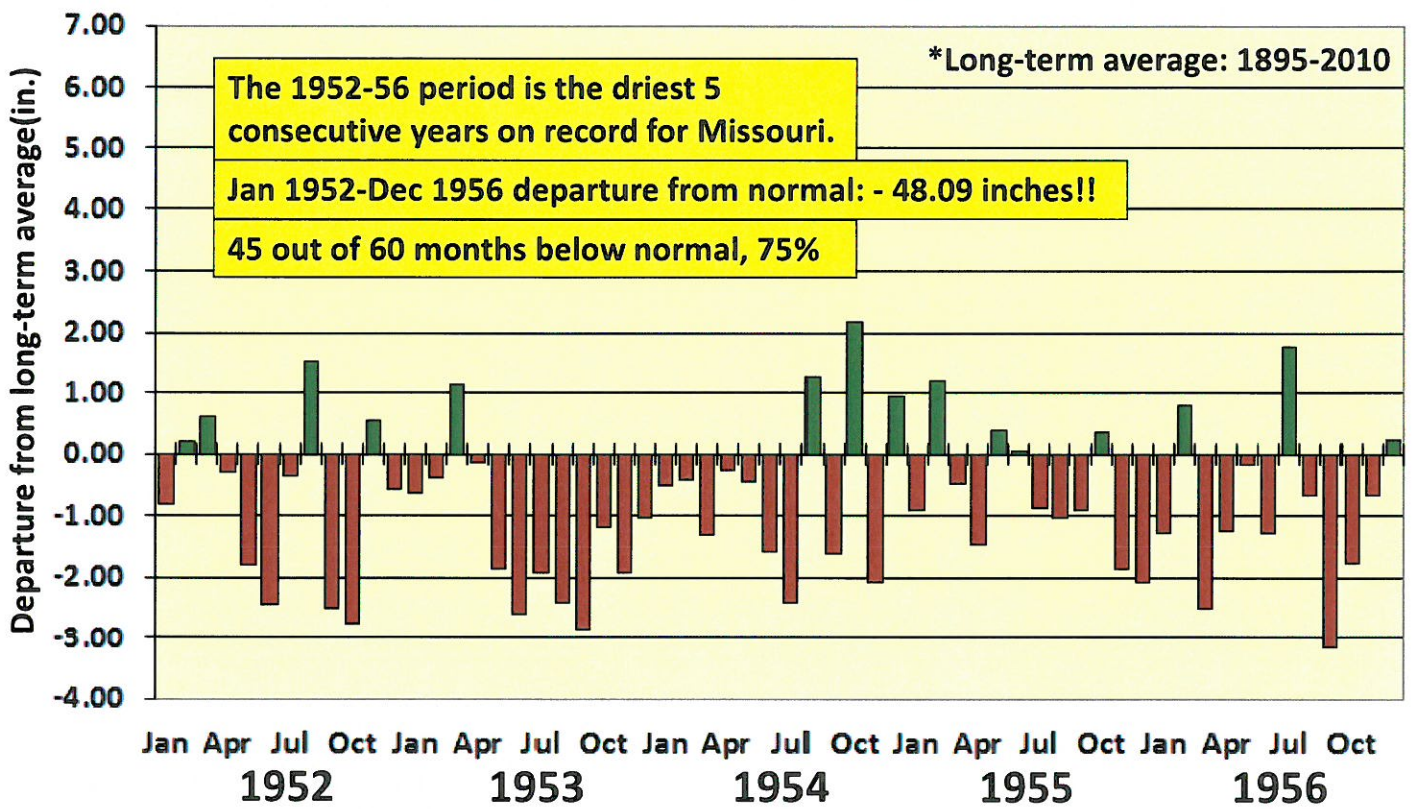
Intensity:

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

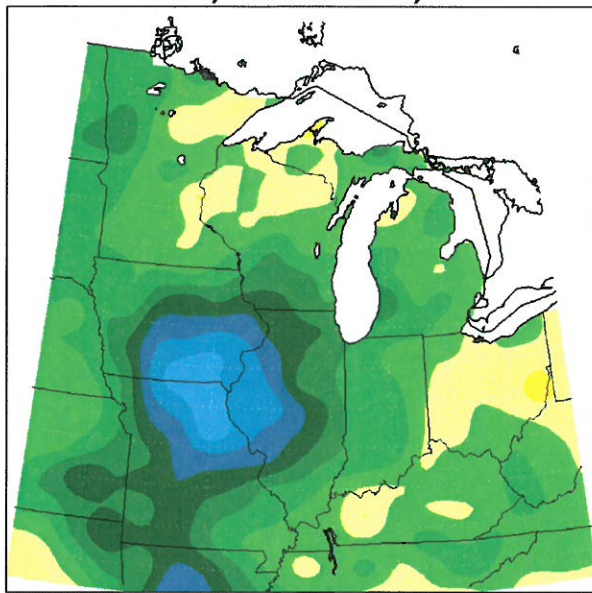
Missouri Monthly Precipitation Departure From Average* Jan 2009 – Dec 2013



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



**Total Precip. (in.): Departure From Mean
Jan 1, 2008-Dec 31, 2010**

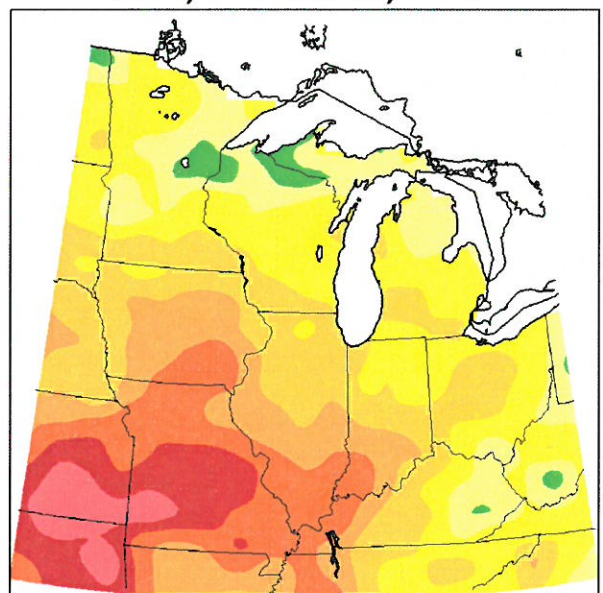


Mean period is 1981-2010.

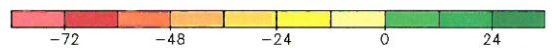


Midwestern Regional Climate Center

**Total Precip. (in.): Departure From Mean
Jan 1, 1952-Dec 31, 1956**



Mean period is 1981-2010.



Midwestern Regional Climate Center

Missouri Climate Trends

- Recent historical trends for Missouri indicate an unprecedented multi-decadal wet period beginning in the early 1980's. Conversely, there have been multi-decadal dry periods, i.e. 1950's and 1960's.
- Dew point temperatures have trended above normal over the past few decades. Since 1981, 76% of the years have had above normal dew points for the Apr-Sep period. Also, since the early 1980's, 70% of the years have reported below normal evaporation totals for the Apr-Sep period, and the five lowest pan evaporation periods have occurred since 2008.
- No one anticipated the severity and magnitude of the 2012 drought and, similarly, no one knows what will happen next year.
- Extended dry and wet patterns can change abruptly and there are numerous occasions, where Missouri transitioned from one extreme to another in a short period of time.
- The 2012 drought resulted in numerous impacts, affecting many sectors in Missouri. However, it was a young drought when compared to other historic droughts, i.e. 1952-56. An important question we all need to consider is how prepared are we when the next 1950's drought affects the Show Me State?
- Using history as an indicator, I have a hard time believing the unprecedented wet trend we're currently experiencing will continue for another 30 years.

Weather Resources on the Internet

<http://agebb.missouri.edu/weather/wealinks.htm>

Missouri Climate Center

<http://climate.missouri.edu>

River Information Resources for Missouri

<http://agebb.missouri.edu/weather/river.htm>

