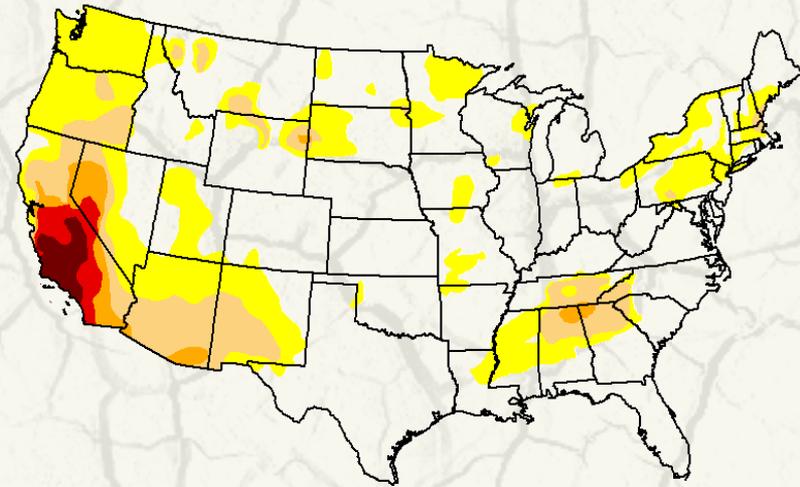


# GIS Applications Used in Making the U.S. Drought Monitor

U.S. Drought Monitor  
CONUS

June 7, 2016  
(Released Thursday, Jun. 9, 2016)  
Valid 8 a.m. EDT



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:**

Deborah Bathke  
National Drought Mitigation Center



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

Deborah J. Bathke  
National Drought Mitigation Center  
NOAA's Drought Risk Management Research Center  
University of Nebraska-Lincoln

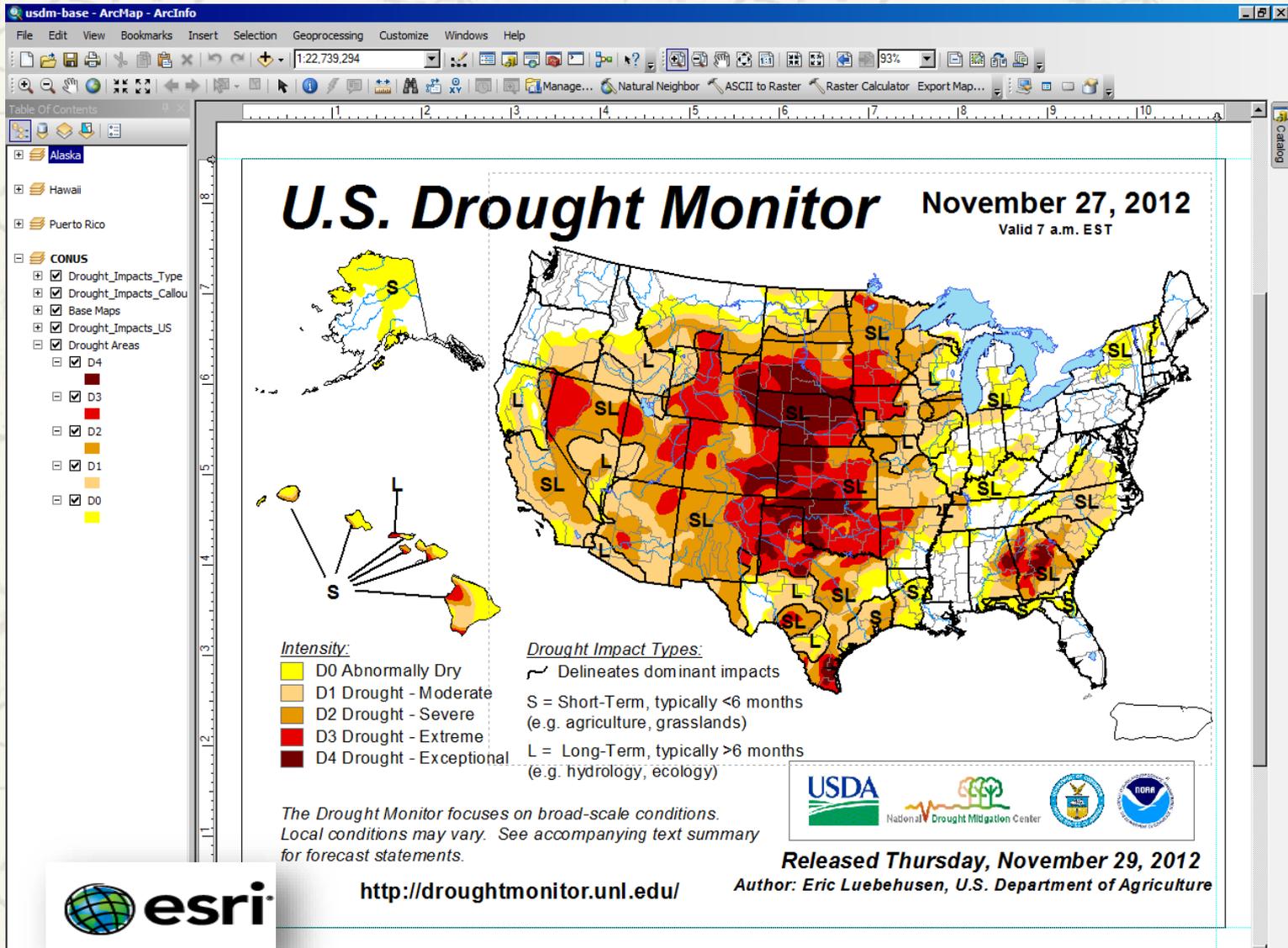


UNIVERSITY OF  
**Nebraska**  
Lincoln

10<sup>th</sup> Biennial U.S. Drought Monitor Forum  
Keystone, SD  
April 3, 2017

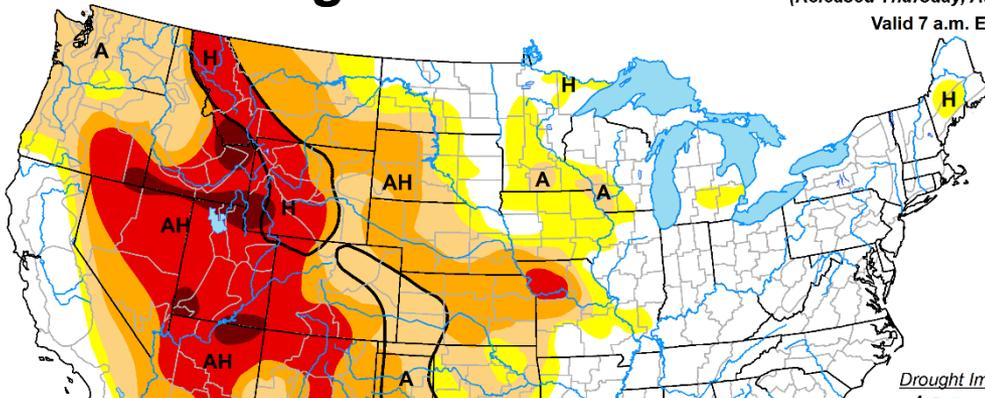
Slides courtesy of Eric Luebehusen

# Created & edited in GIS Software

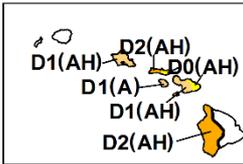
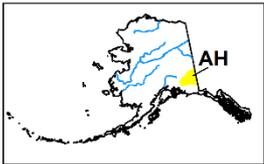


# U.S. Drought Monitor

August 12, 2003  
(Released Thursday, Aug. 14, 2003)  
Valid 7 a.m. EST



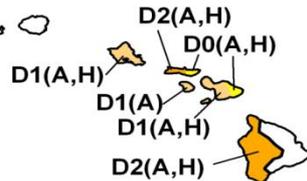
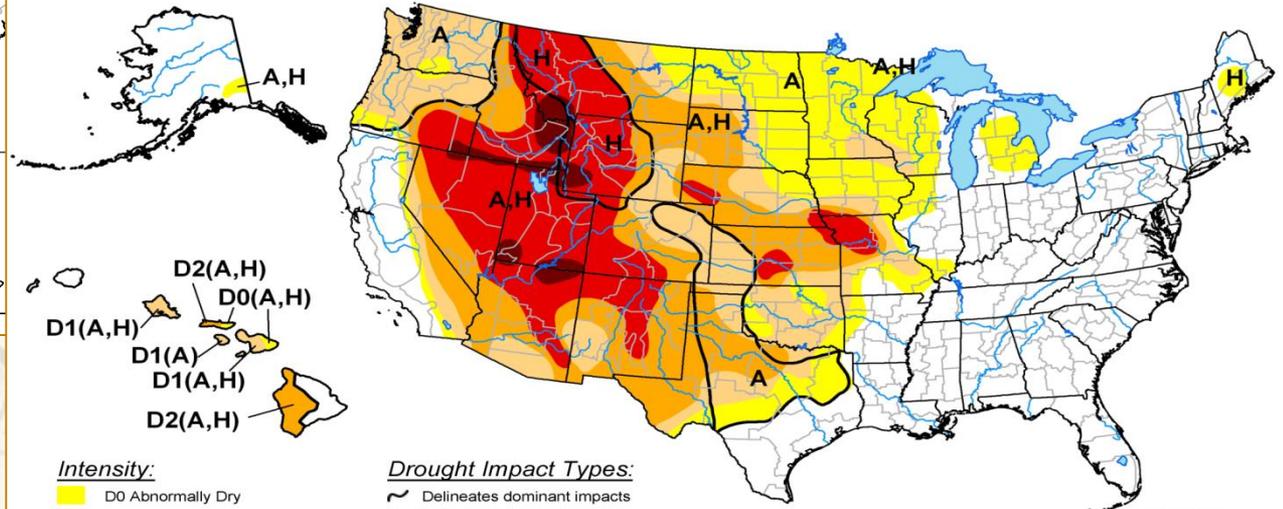
Author:  
Douglas Le Comte  
CPC/NOAA



Transitioned from  
Corel Draw to  
ArcMAP (GIS) in  
August, 2003.

# U.S. Drought Monitor

August 19, 2003  
Valid 7 a.m. EST



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

**Drought Impact Types:**  
 ~ Delineates dominant impacts  
 A = Agricultural (crops, pastures, grasslands)  
 H = Hydrological (water)

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

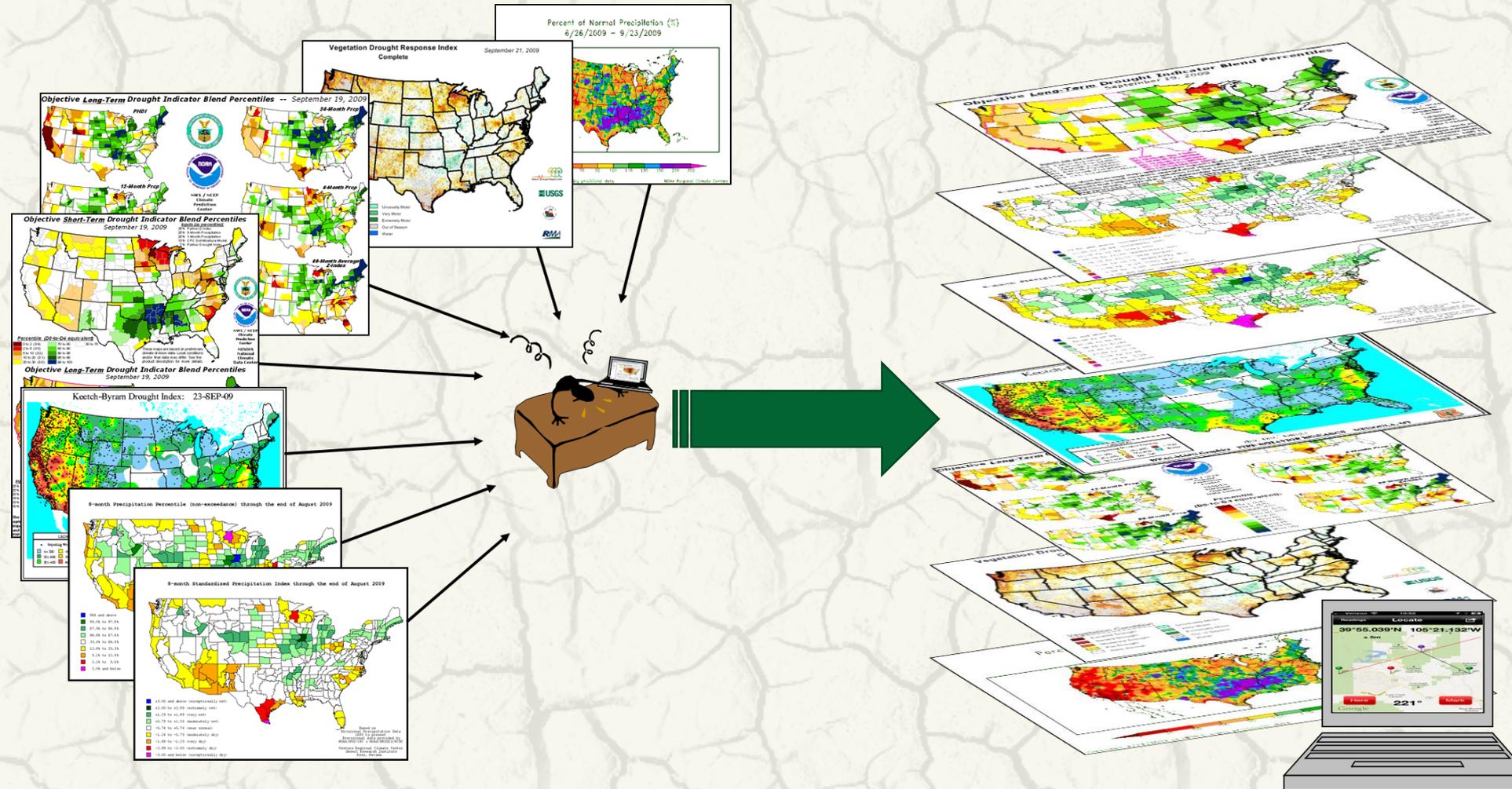
<http://drought.unl.edu/dm>



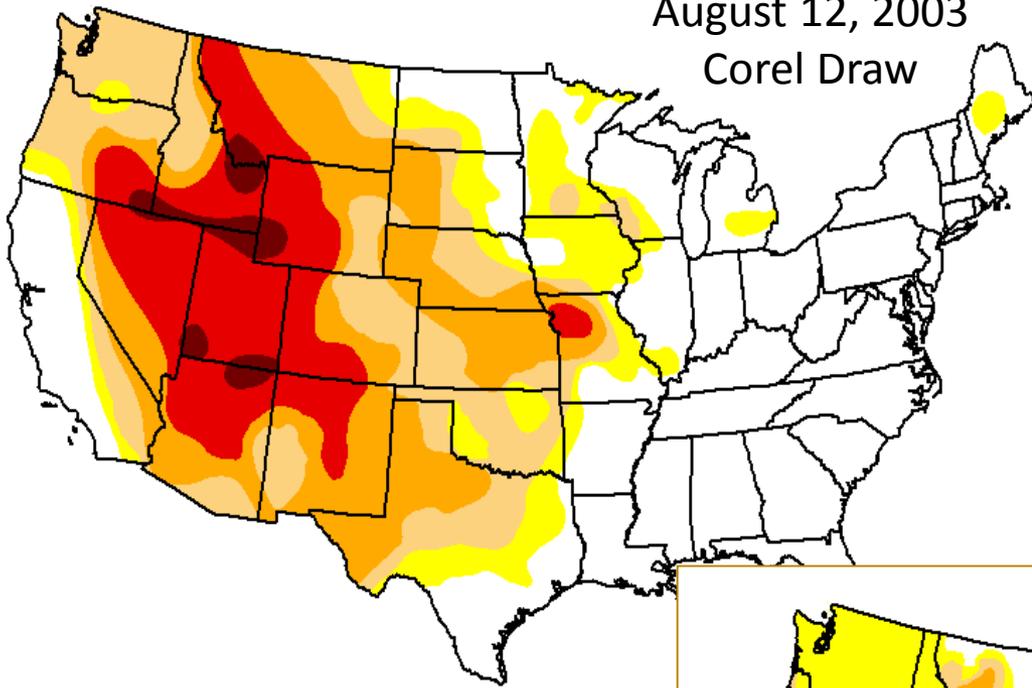
Released Thursday, August 21, 2003

Author: Candace Tankersley/Richard Heim, NOAA/NCDC

# GIS allowed for a new way of assessing drought information...

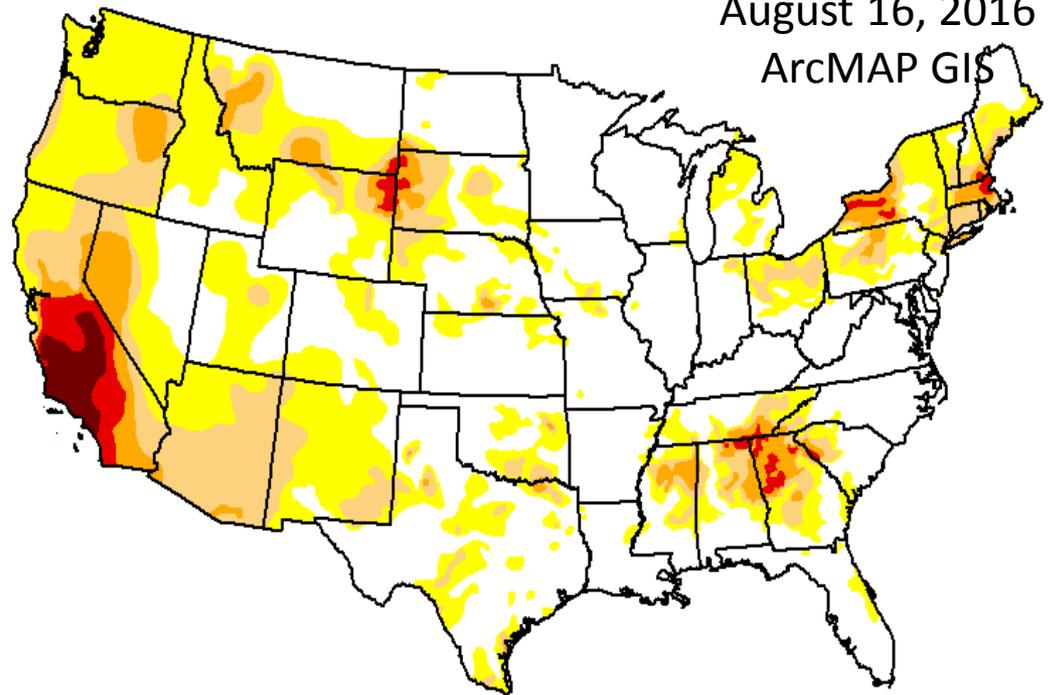


August 12, 2003  
Corel Draw



**Increased detail  
in drought  
depiction**

August 16, 2016  
ArcMAP GIS



# Agricultural-specific statistical assessments

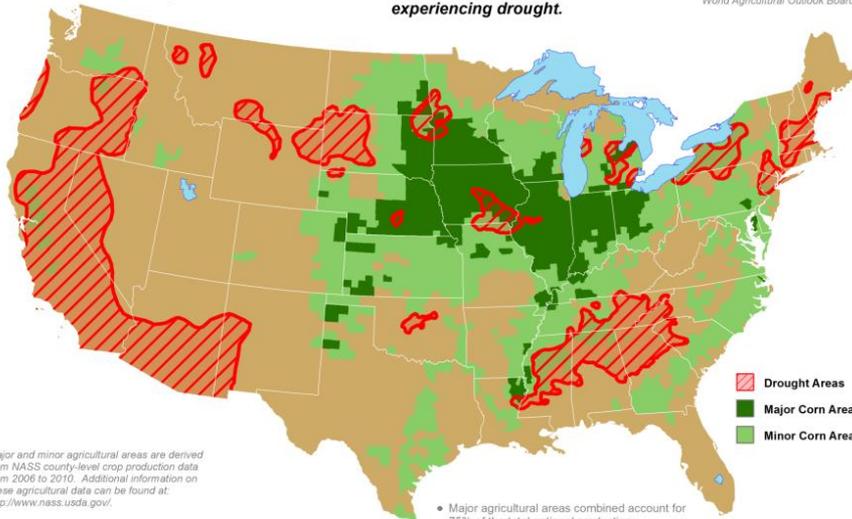
## U.S. Corn Areas Experiencing Drought

Reflects July 5, 2016  
U.S. Drought Monitor data

Less than 7% of corn production is within an area experiencing drought.



This product was prepared by the  
USDA Office of the Chief Economist  
World Agricultural Outlook Board

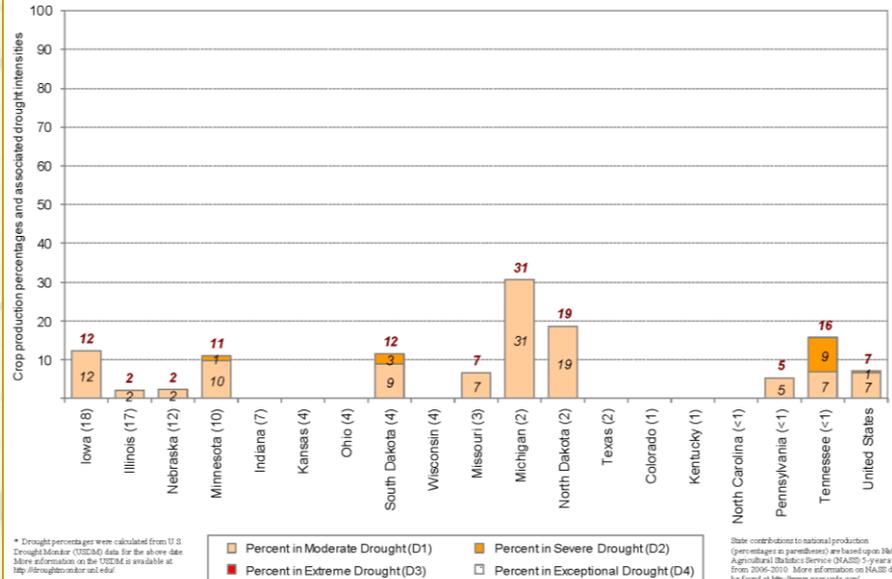


Major and minor agricultural areas are derived from NASS county-level crop production data from 2006 to 2010. Additional information on these agricultural data can be found at: <http://www.nass.usda.gov/>.

Mapped drought areas are derived from the U.S. Drought Monitor product and do not depict the intensity of drought in any particular location. More information on the Drought Monitor can be found at: <http://droughtmonitor.unl.edu/>.

- Major agricultural areas combined account for 75% of the total national production.
- Major and minor agricultural areas combined account for 99% of the total national production.

Approximate Percentage of Corn Located in Drought \*  
July 5, 2016



\* Drought percentages were calculated from U.S. Drought Monitor (USDM) data for the above date. More information on the USDM is available at: <http://droughtmonitor.unl.edu/>

USDA Agricultural Weather Assessments  
World Agricultural Outlook Board

State contributions to national production (percentages in parentheses) are based upon National Agricultural Statistics Service (NASS) 5-year averages from 2006-2010. More information on NASS data can be found at <http://www.nass.usda.gov/>

# 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-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	62.61	37.39	17.01	2.11	0.13	0.00
<b>Last Week</b> 03-21-2017	59.21	40.79	22.12	2.51	0.13	0.00
<b>3 Months Ago</b> 12-27-2016	50.65	49.35	21.54	4.05	0.00	0.00
<b>Start of Calendar Year</b> 01-03-2017	50.65	49.35	21.54	3.85	0.00	0.00
<b>Start of Water Year</b> 09-27-2016	70.86	29.14	8.66	2.68	0.17	0.00
<b>One Year Ago</b> 03-29-2016	50.67	49.33	8.61	0.41	0.00	0.00

**Intensity**

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought

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

**Author**

Eric Luebchen  
U.S. Department of Agriculture



<http://droughtmon>

# Extract data by different boundaries

National  Statistics type:  Legend

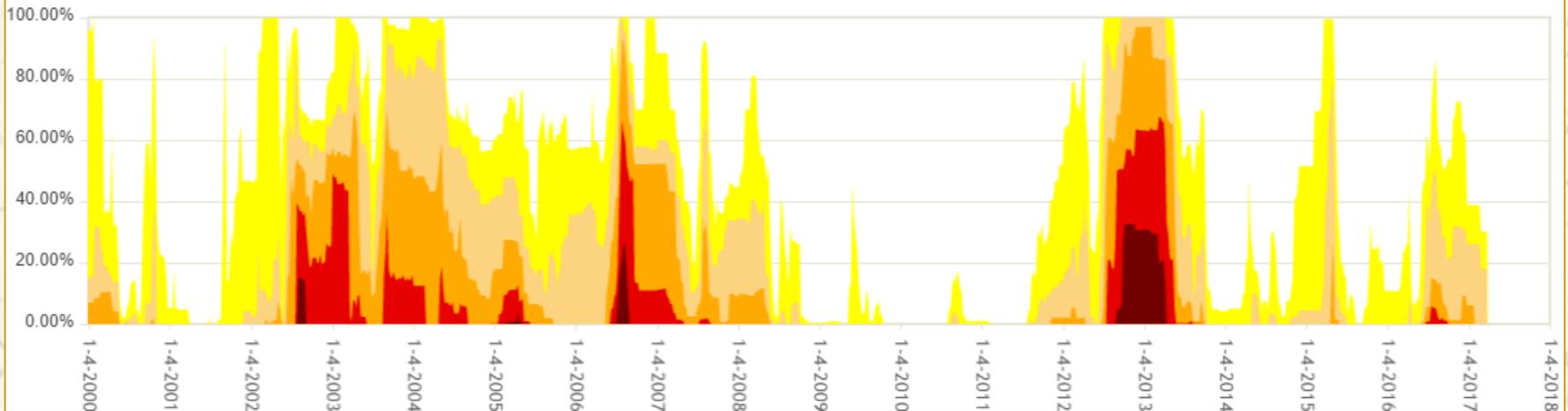
## Total Population in U.S. Drought Monitor Categories

Show 25 entries

Search:

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
2017-03-28	154,788,853	150,608,602	77,653,985	16,001,627	457,331	0
2017-03-21	153,649,941	151,747,513	78,903,777	17,850,352	1,464,225	0
2017-03-14	150,711,269	154,686,186	89,870,737	24,871,154	1,611,812	0
2017-03-07	141,676,862	163,720,593	90,125,259	24,123,715	1,930,504	0
2017-02-28	138,231,703	167,165,751	87,534,655	25,550,785	2,834,137	0
2017-02-21	153,352,654	152,044,801	86,800,273	19,983,104	2,296,669	0
2017-02-14	152,068,379	153,329,076	90,015,434	22,094,656	1,961,650	0
2017-02-07	157,016,261	148,381,194	88,799,092	23,214,200	2,049,605	0
2017-01-31	159,170,732	146,226,722	88,997,879	35,531,232	5,092,920	0
2017-01-24	158,161,975	147,235,480	91,391,891	37,066,491	5,515,863	0
2017-01-17	134,533,885	170,863,570	107,745,451	55,670,381	26,924,848	2,822,291
2017-01-10	128,471,572	176,925,883	113,259,540	58,360,246	27,524,942	2,822,291
2017-01-03	122,365,162	183,032,292	119,291,508	63,675,502	29,070,972	9,231,253
2016-12-27	105,894,105	199,503,350	126,614,948	68,432,545	36,698,993	13,086,968

## South Dakota Percent Area



# Use of the USDM as a tool for triggering aid to producers

## FSA Eligibility Tool: Summary Data (2014 Criteria)

The Summary Data tool provides county-level data for the country or for a state to determine which counties meet the Livestock Forage Disaster Program requirements.

The FSA Eligibility Tool does not guarantee any financial aid. It simply estimates which U.S. counties meet the criteria, based on the U.S. Drought Monitor. Eligibility will be confirmed by the FSA once the signup period has begun. Please contact your [local FSA agent](#) for more details and to verify eligibility after the start of the signup period.

If you would like information for one county, please visit the [County Eligibility](#) section or return to the [home page](#).

For help with this tool, please visit the [FSA Eligibility Tool Help](#) pages.

### Criteria

- D2 for at least eight consecutive weeks during the grazing period
- D3 at any time during the grazing period
- D3 for at least four (nonconsecutive) weeks during the grazing period
- D4 at any time during the grazing period
- D4 for at least four (nonconsecutive) weeks during the grazing period

While authors are flattered such critical decisions are based on the USDM, aid triggers do **NOT** factor into the USDM depiction.

### Location

U.S.     By State   

### Grazing Period

Start of Grazing Period\*     

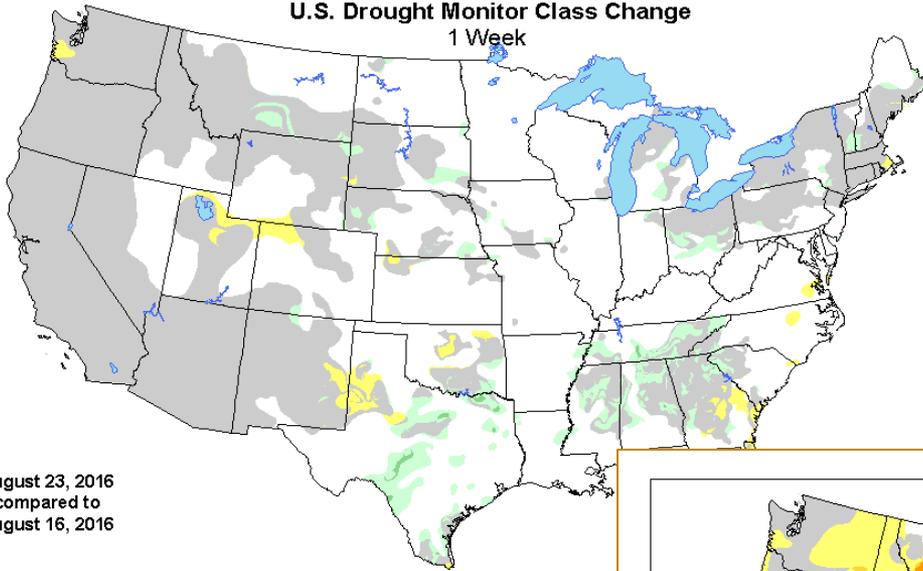
End of Grazing Period\*     

\* Grazing periods vary by location and forage type. Please check with your local FSA agent for the applicable grazing period.

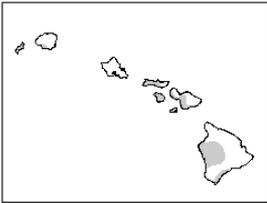
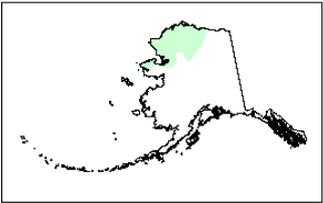
Number of counties affected: 165

# Change maps

**U.S. Drought Monitor Class Change  
1 Week**

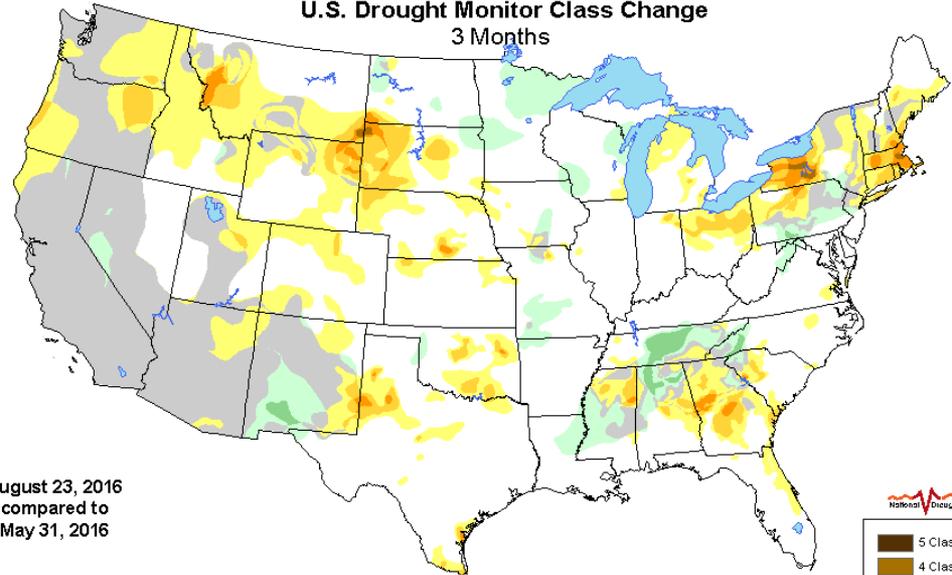


August 23, 2016  
compared to  
August 16, 2016

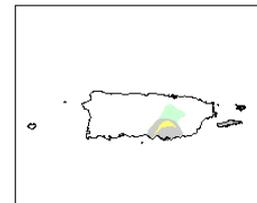
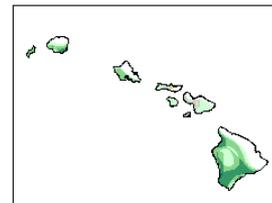
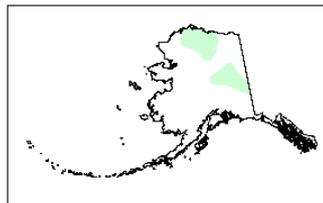


<http://droughtmonitor.unl.edu>

**U.S. Drought Monitor Class Change  
3 Months**



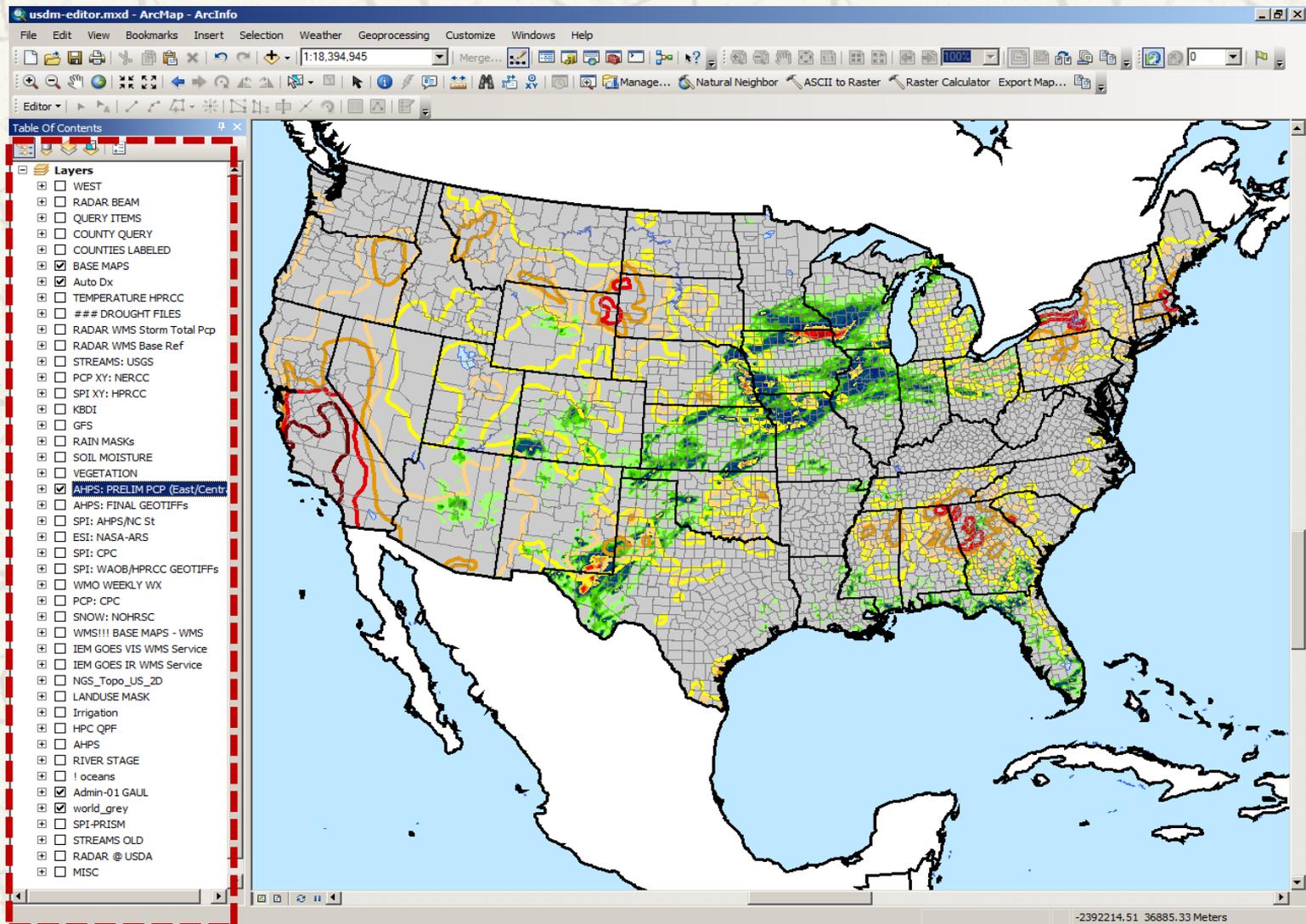
August 23, 2016  
compared to  
May 31, 2016



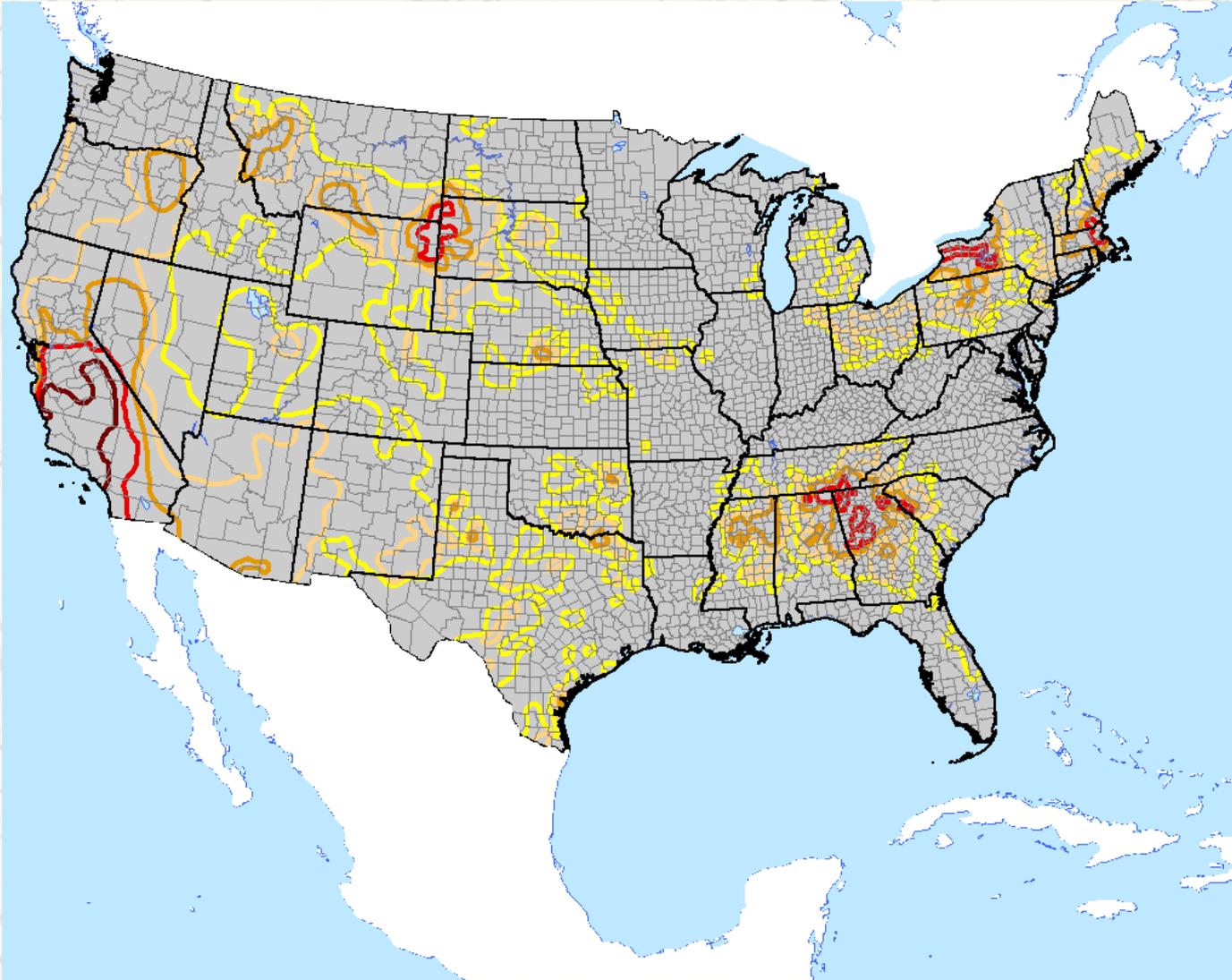
- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement

<http://droughtmonitor.unl.edu>

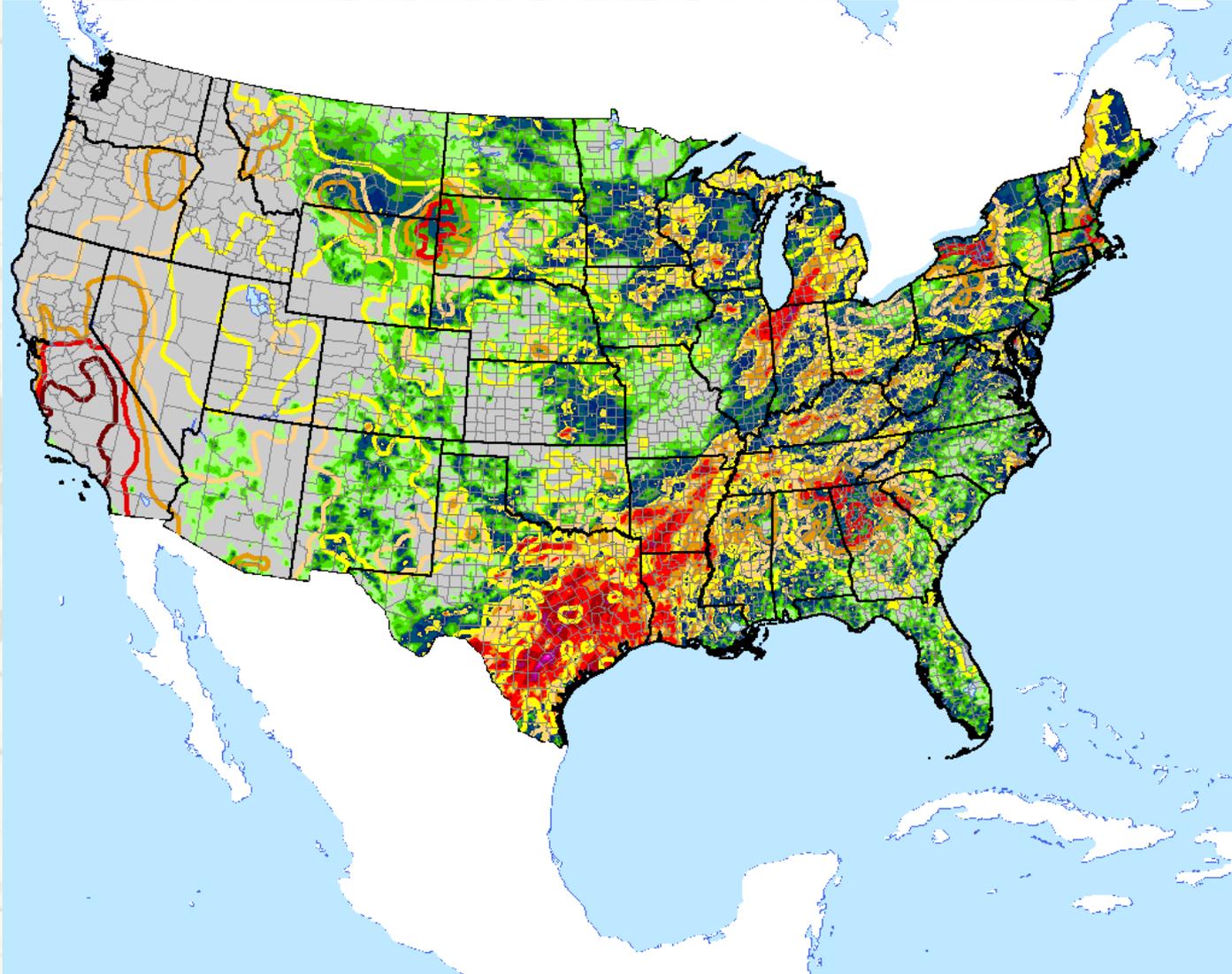
# Wealth of GIS data that allows authors to depict different types of drought on one map

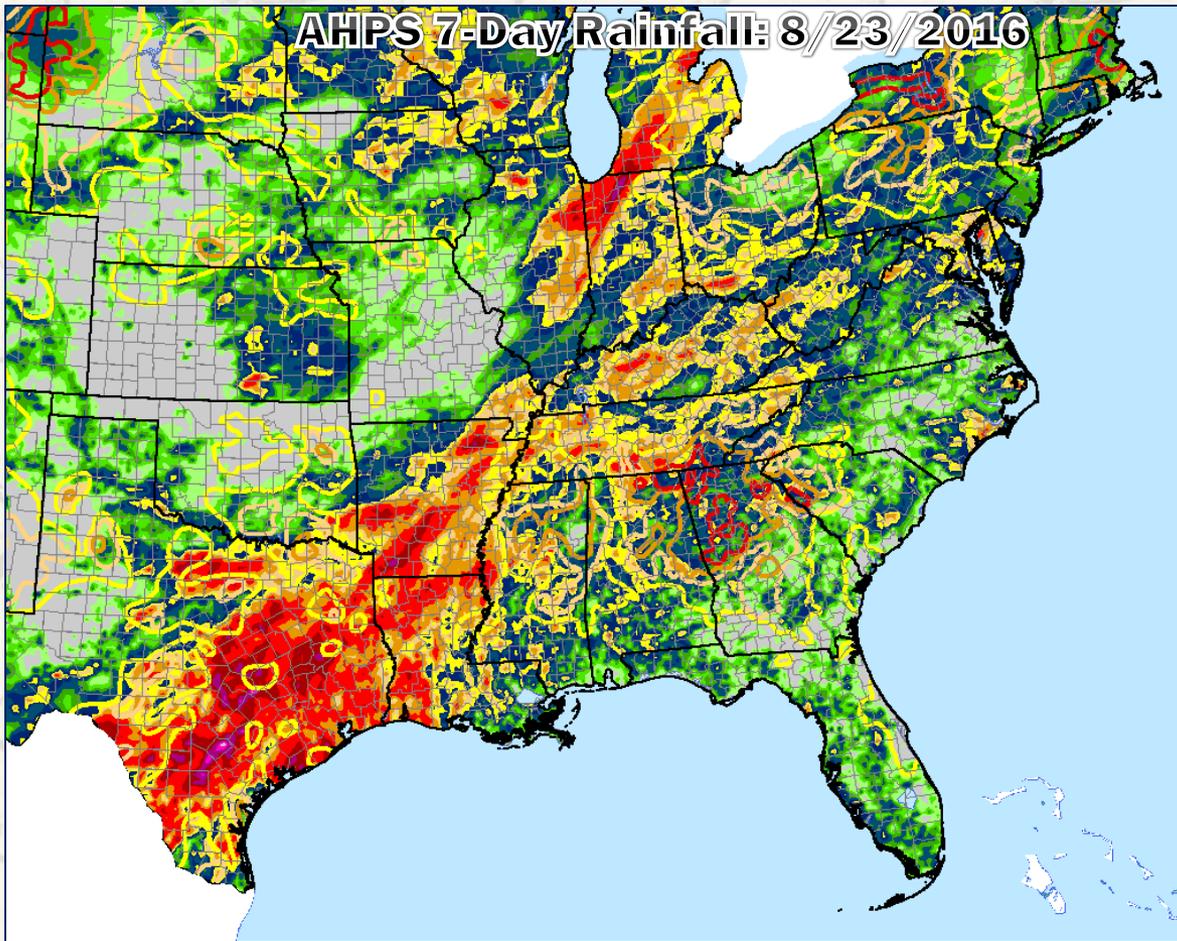


# GIS allows us to turn layers on & off



**Allows us to overlay drought areas with hydroclimate data**

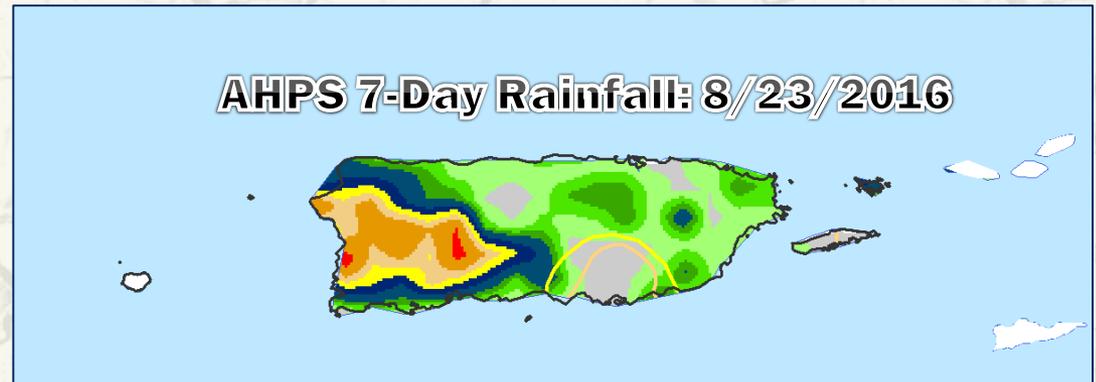




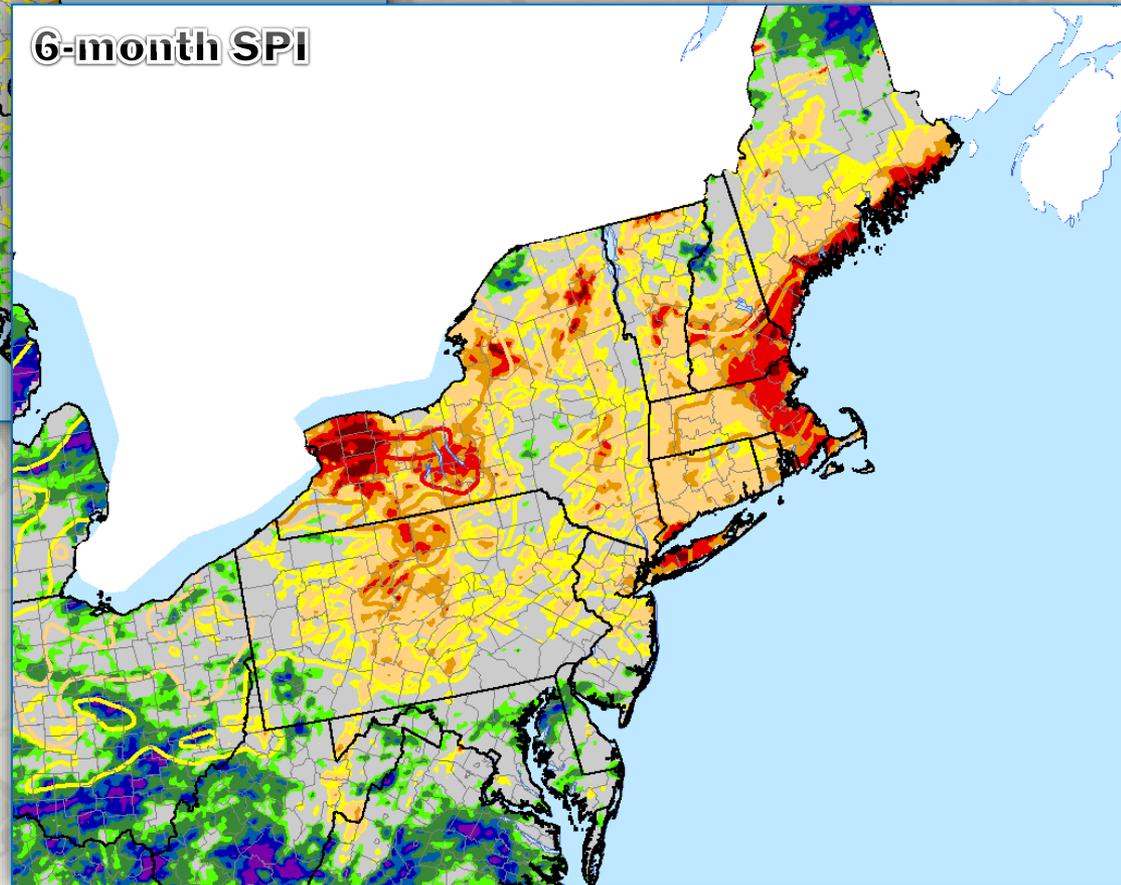
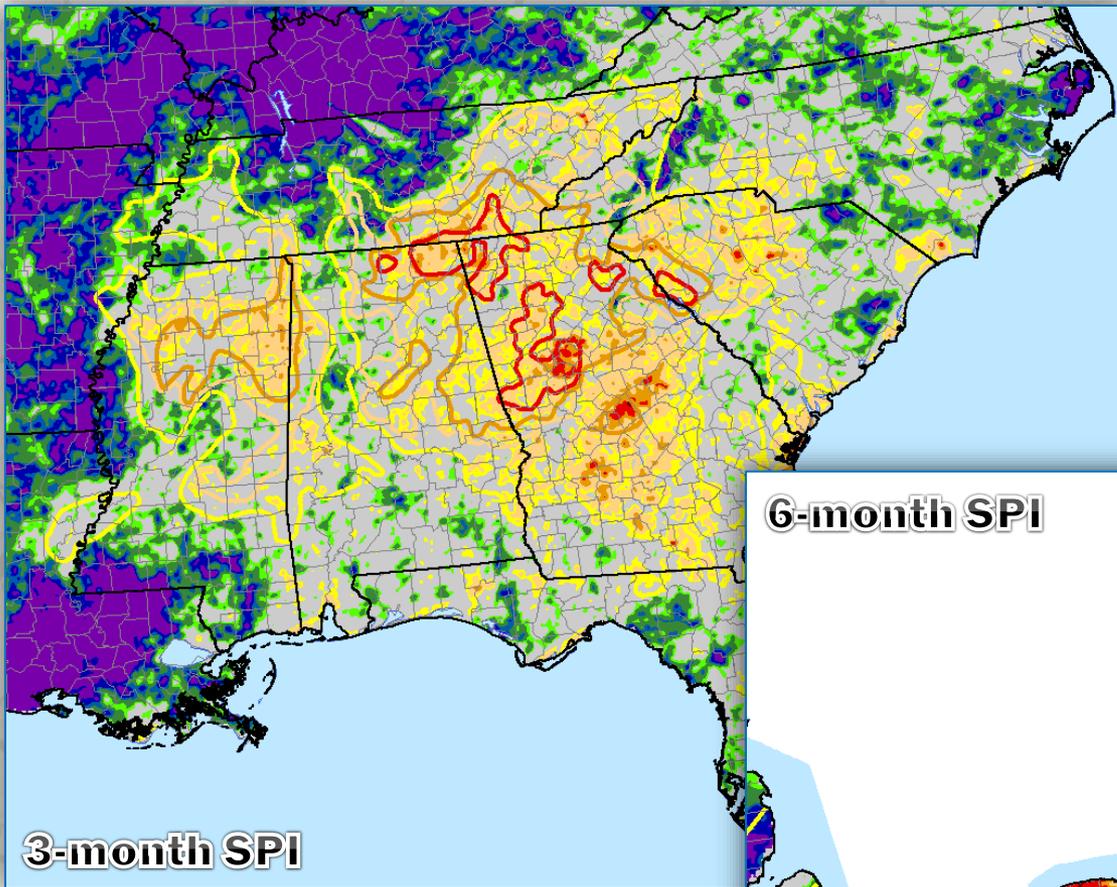
# AHPS Gridded Precipitation

Using PRISM Data

- Departure from Normal
- Percent of Normal

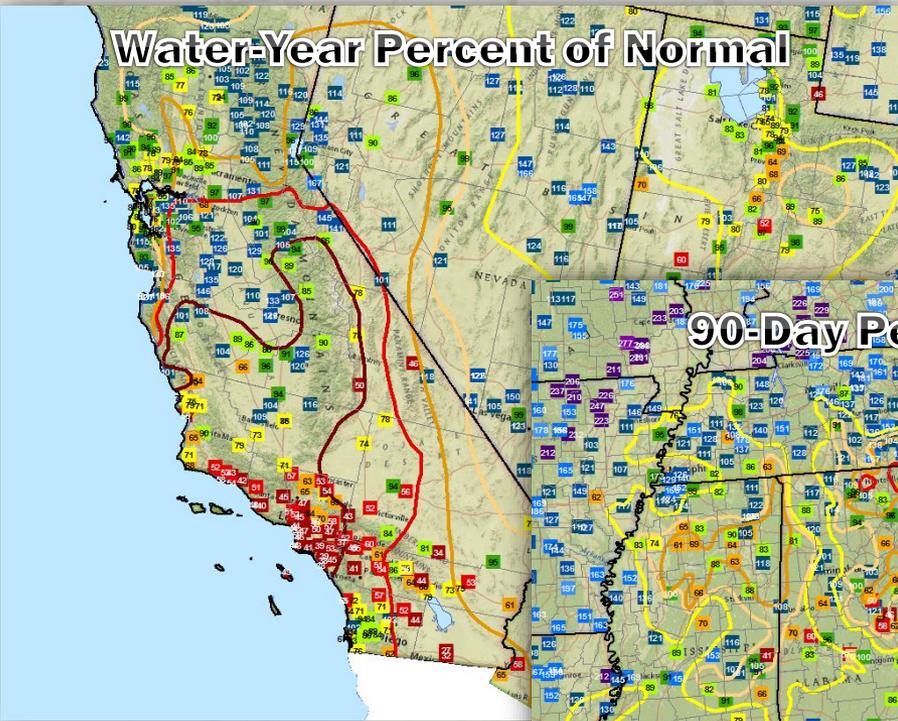


# AHPS/NC State Gridded Standardized Precipitation Index (SPI)

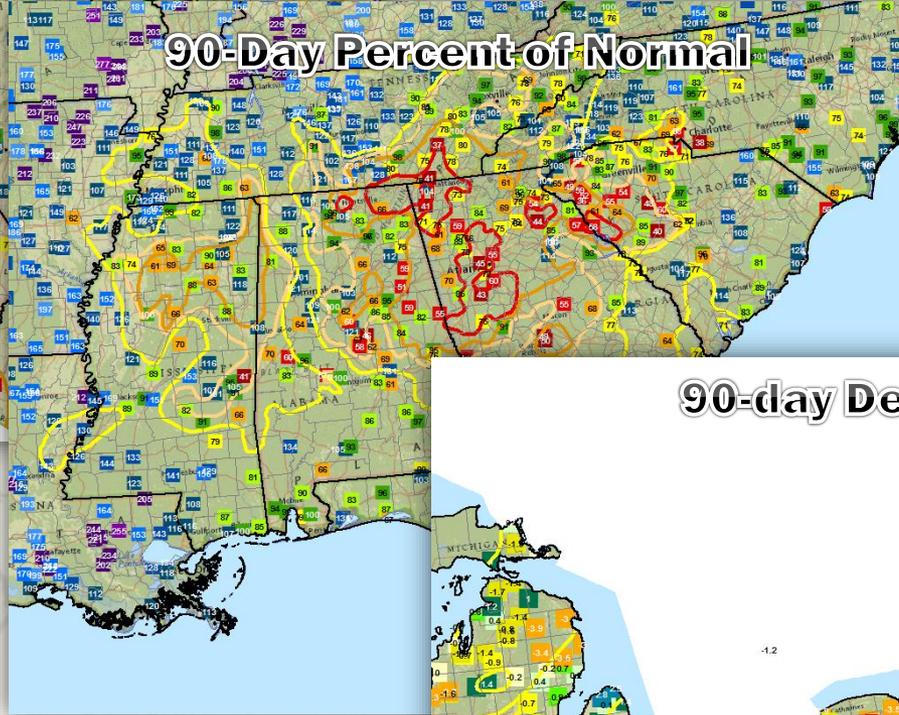


# Station Precipitation Data

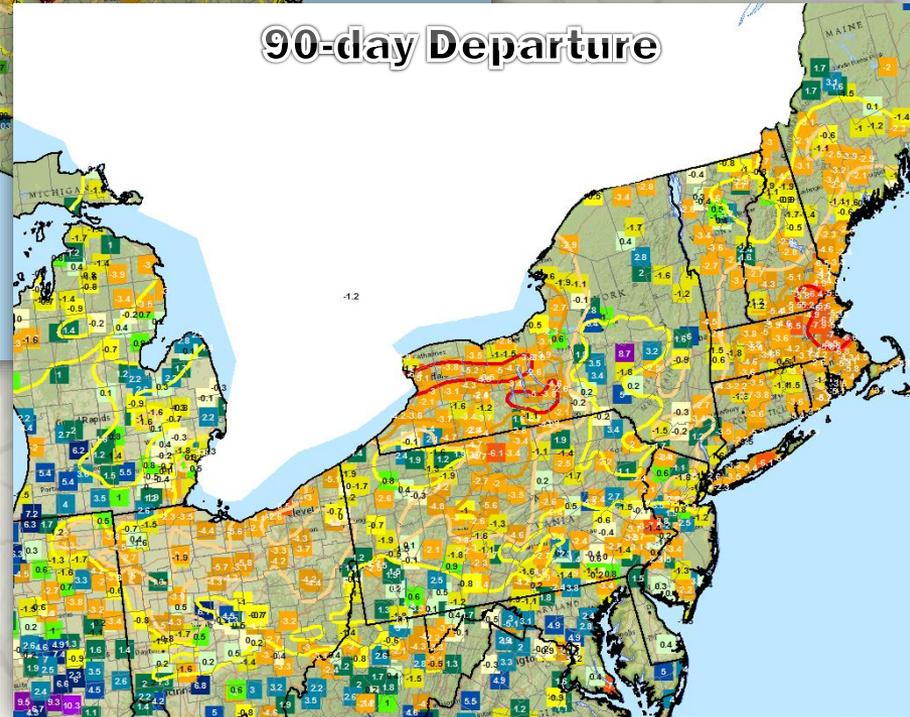
Water-Year Percent of Normal



90-Day Percent of Normal

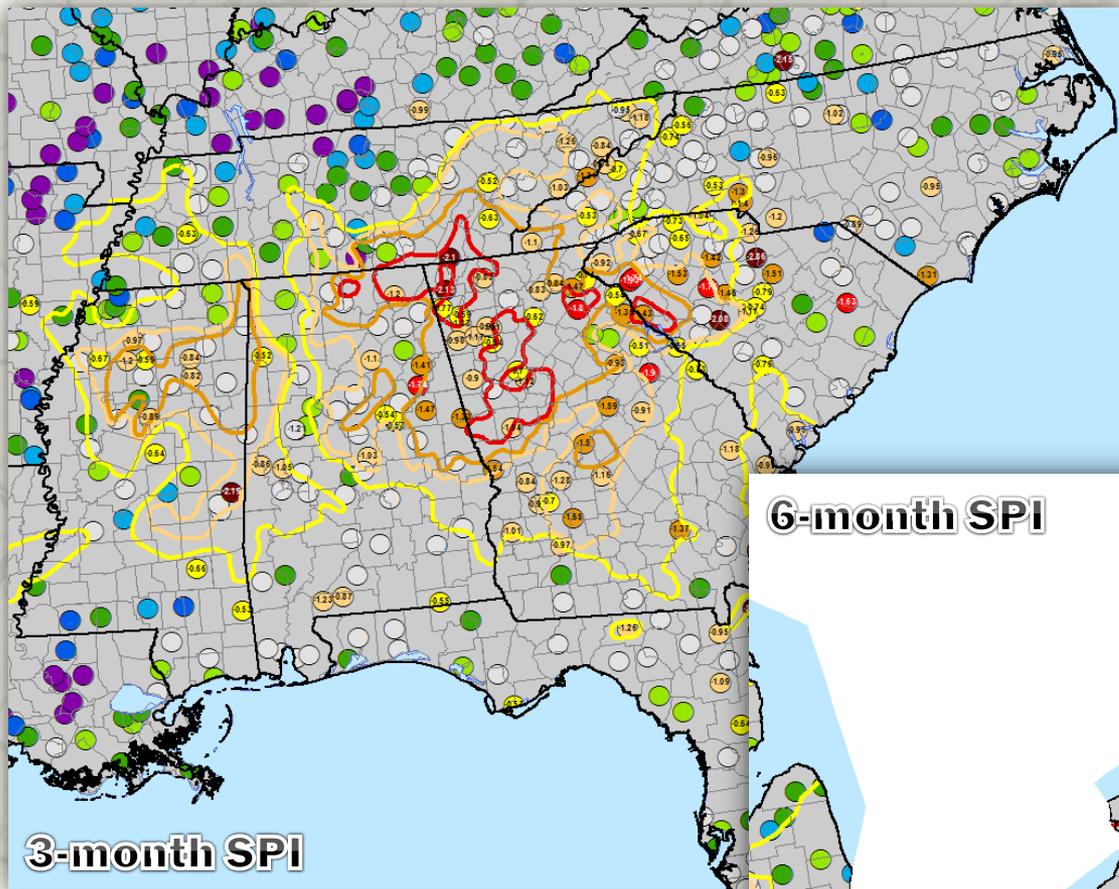


90-day Departure

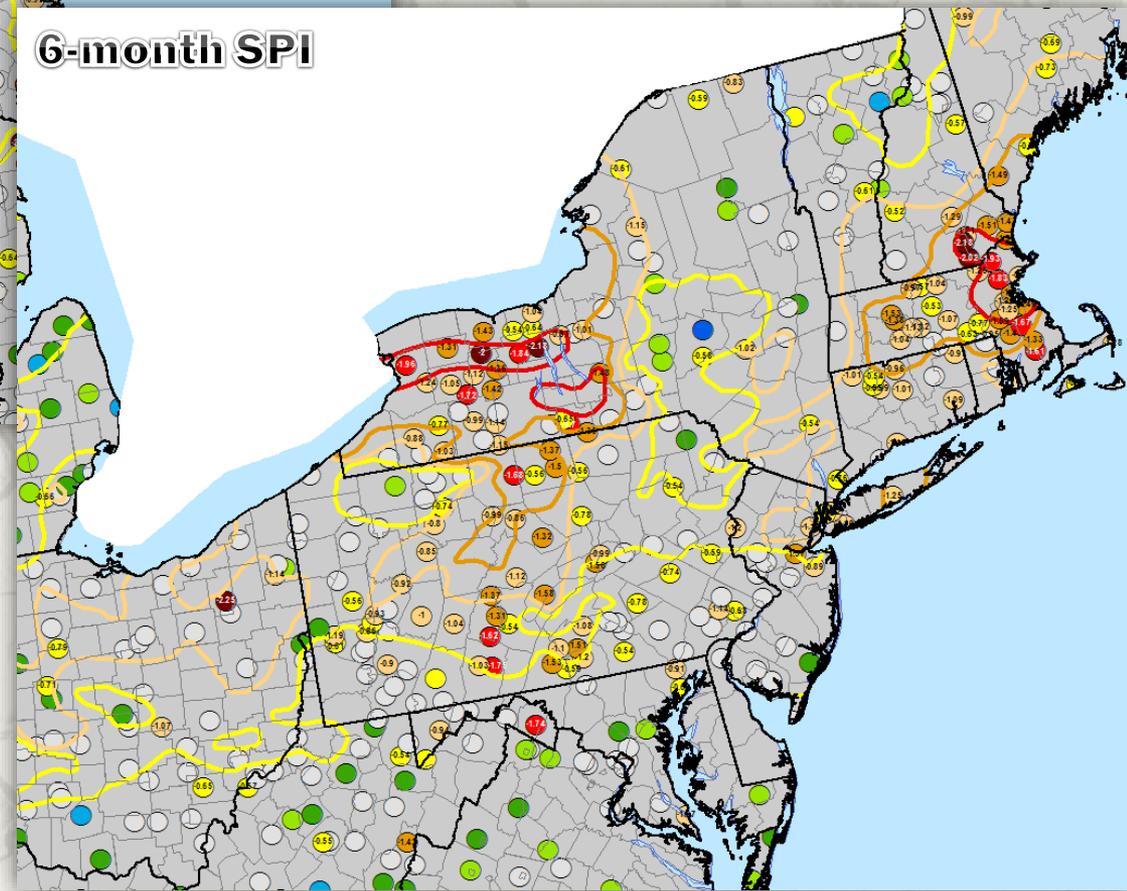


Northeast Regional  
Climate Center

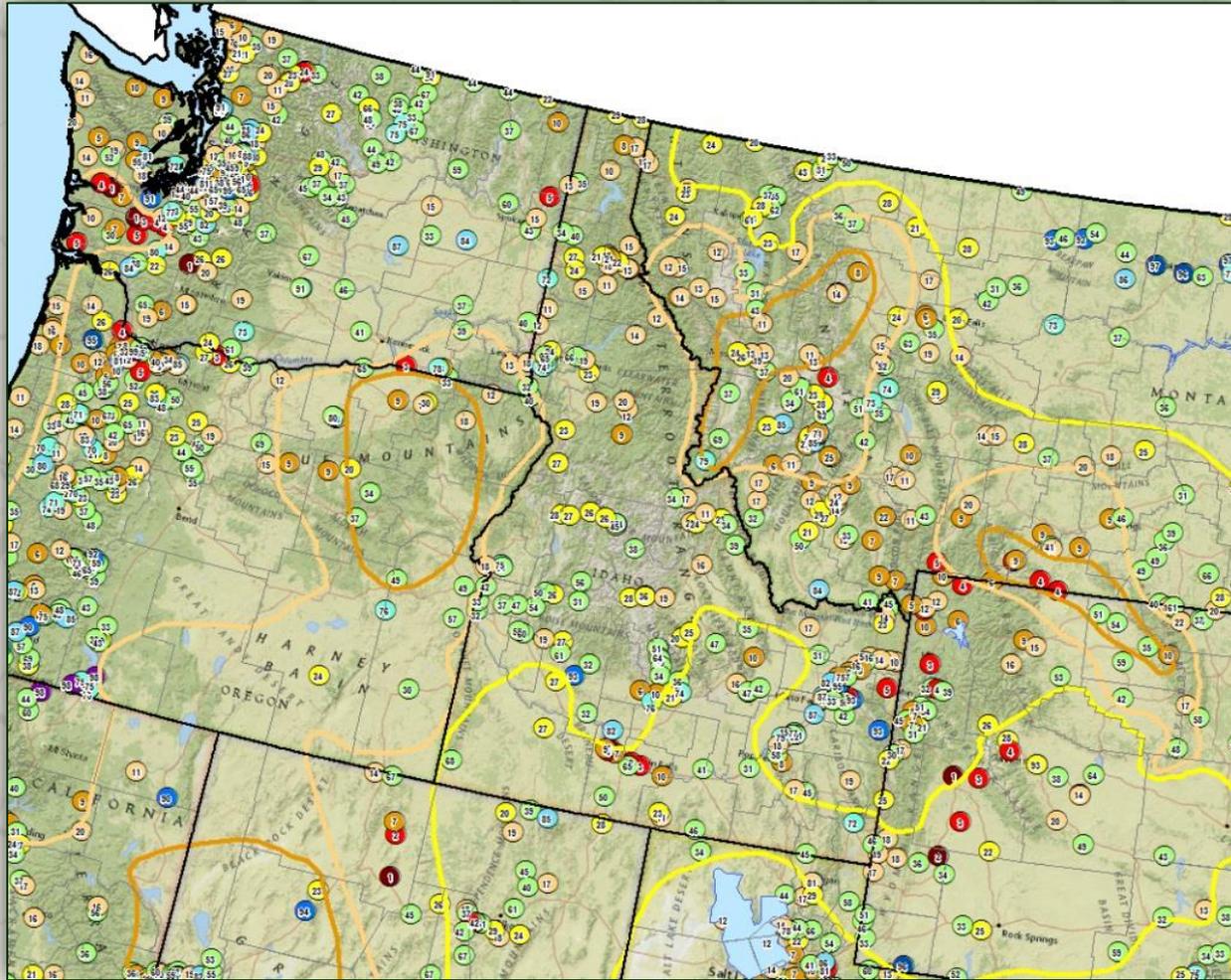
# Station-based Standardized Precipitation Index (SPI)



6-month SPI



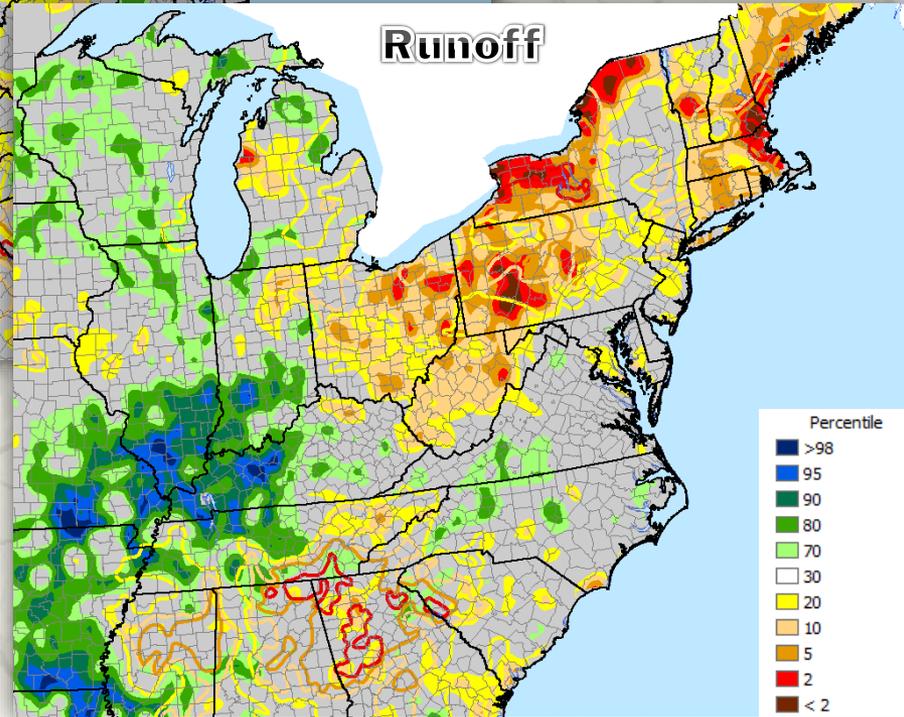
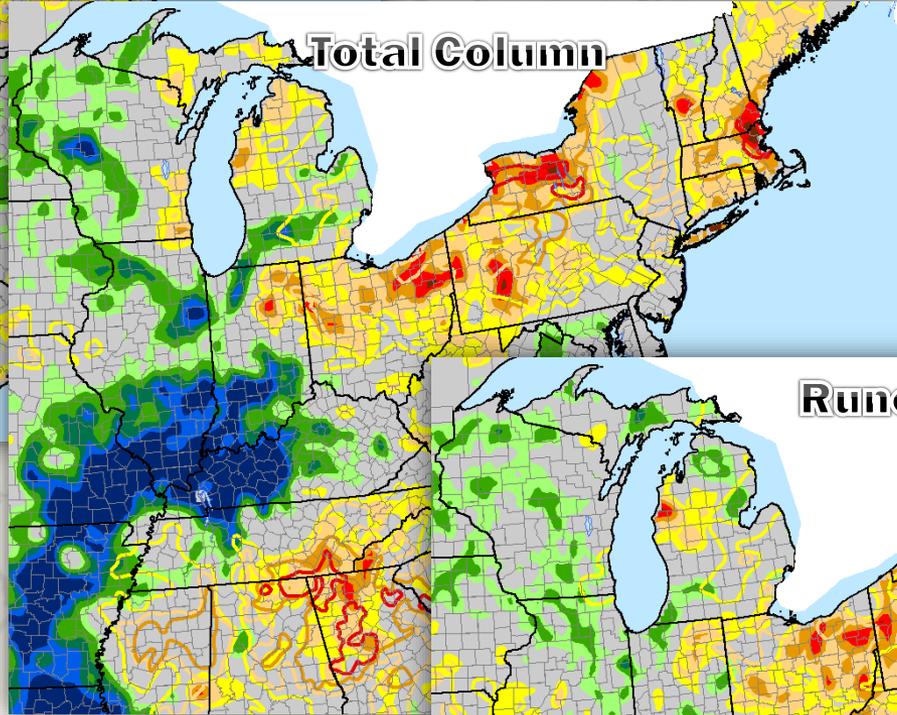
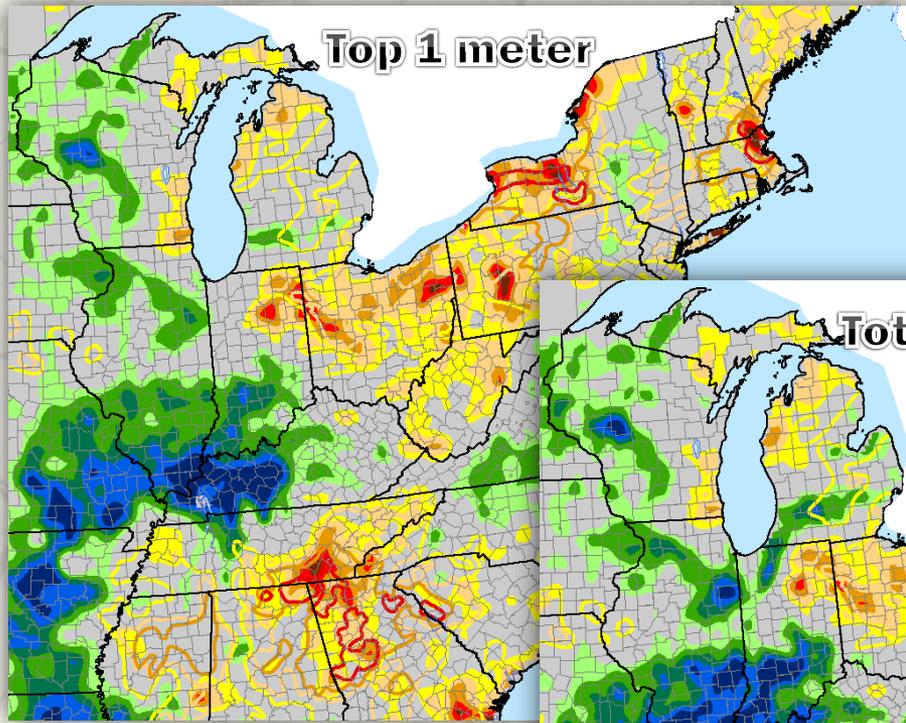
# USGS Streamflow



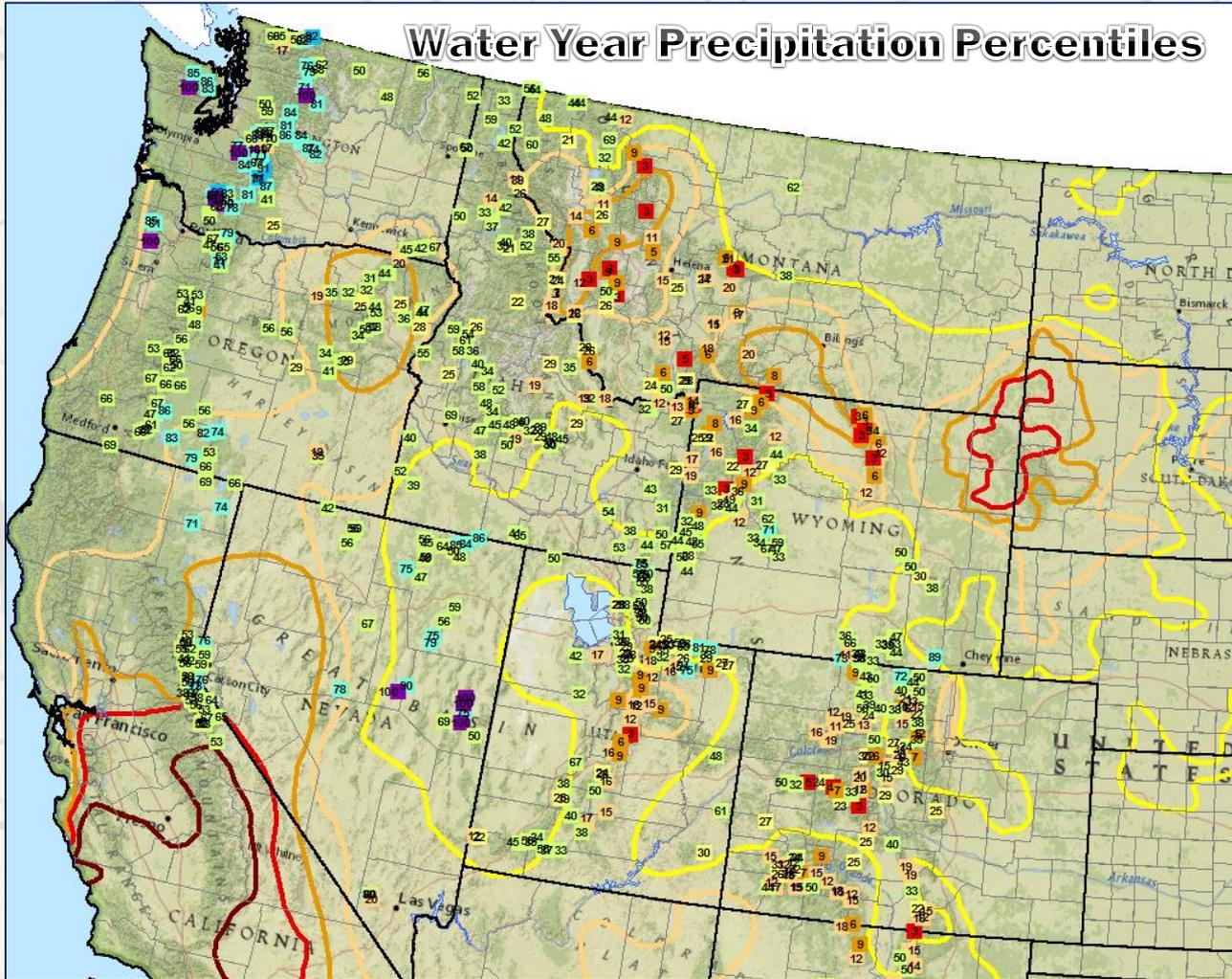
- Real-time
- 7-day
- 14-day
- 28 day



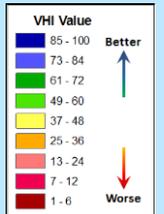
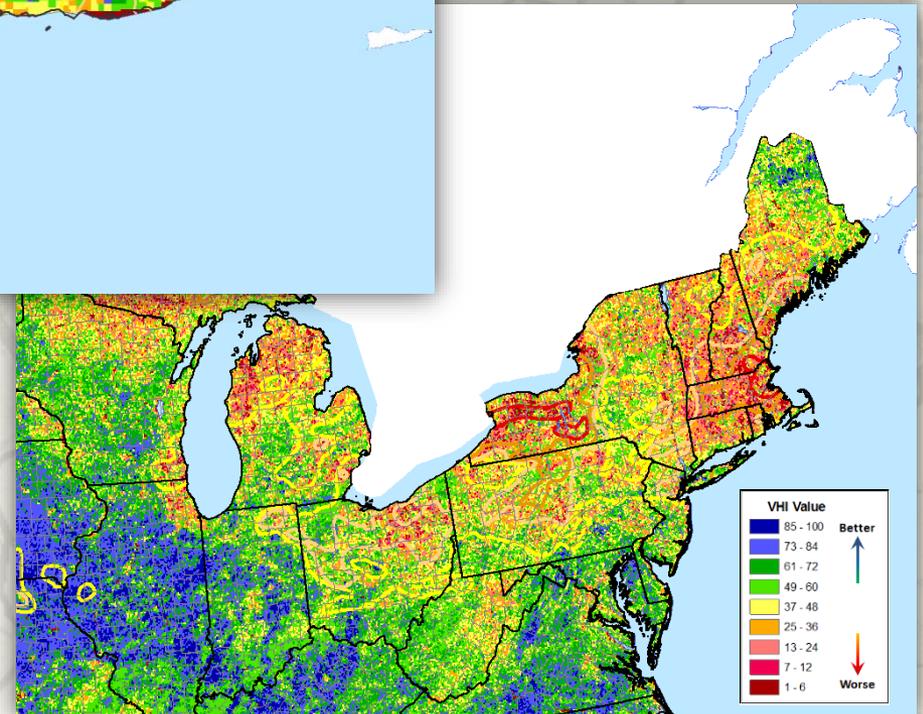
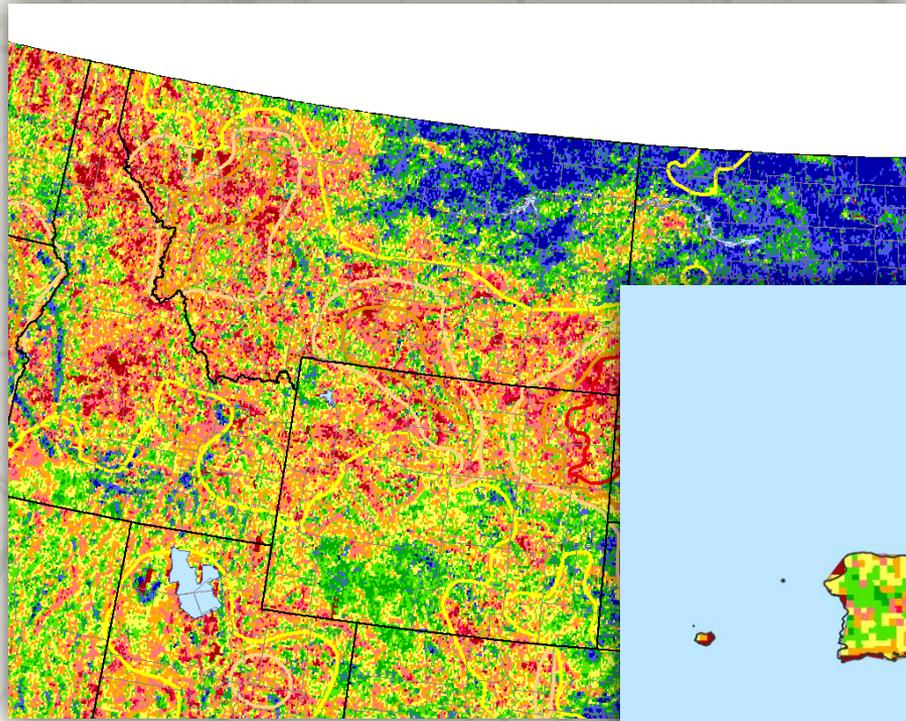
# NLDAS Soil Moisture



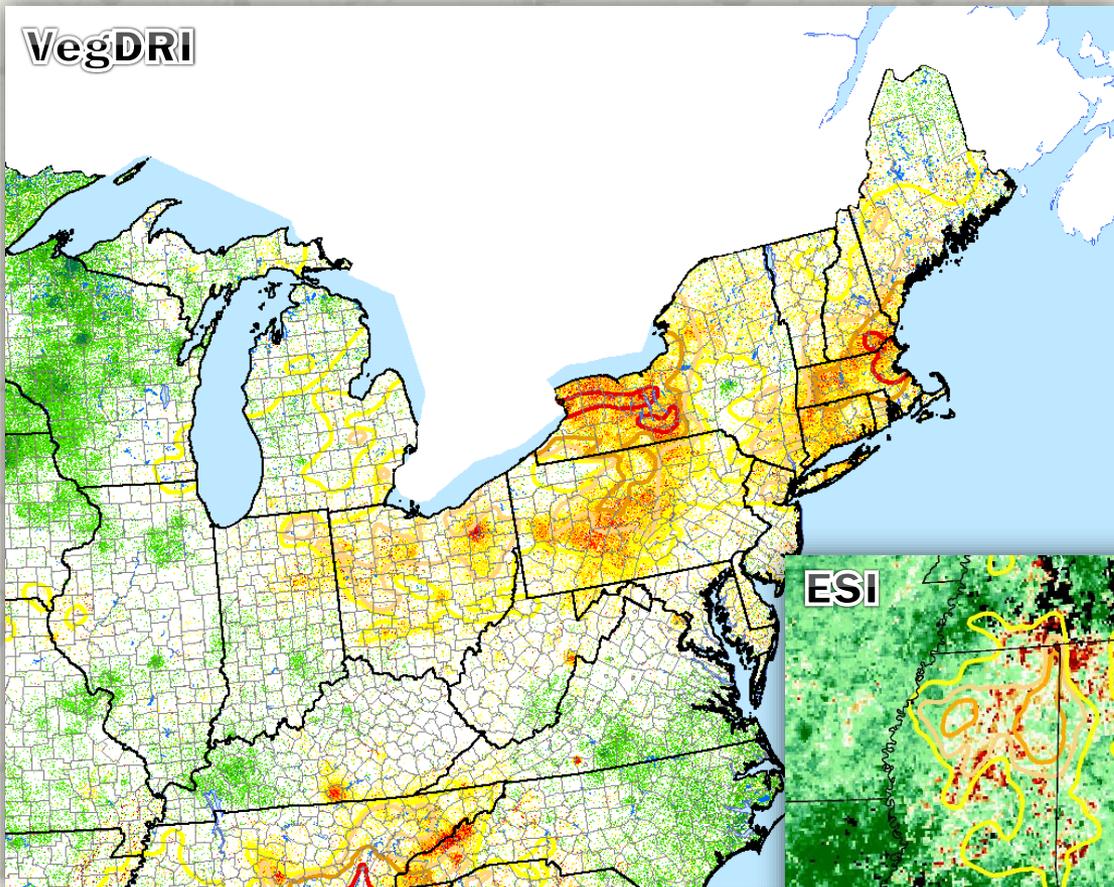
# USDA/NRCS SNOTEL



# NESDIS Vegetation Health Index

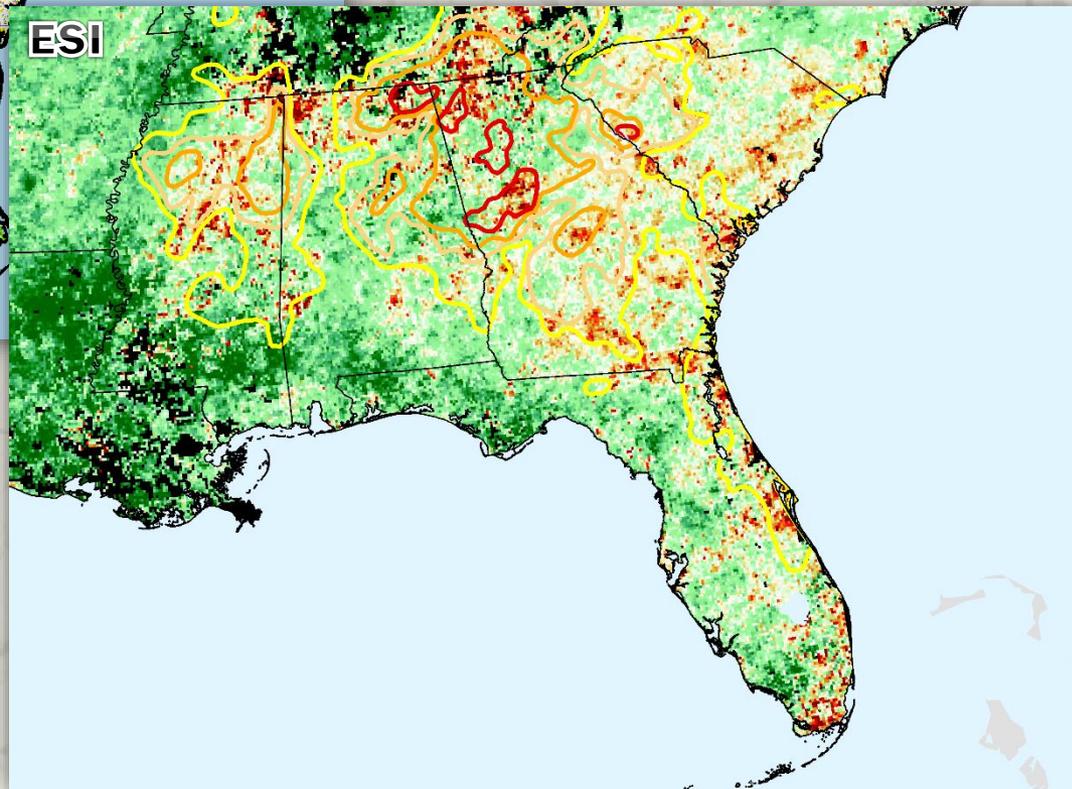


**VegDRI**



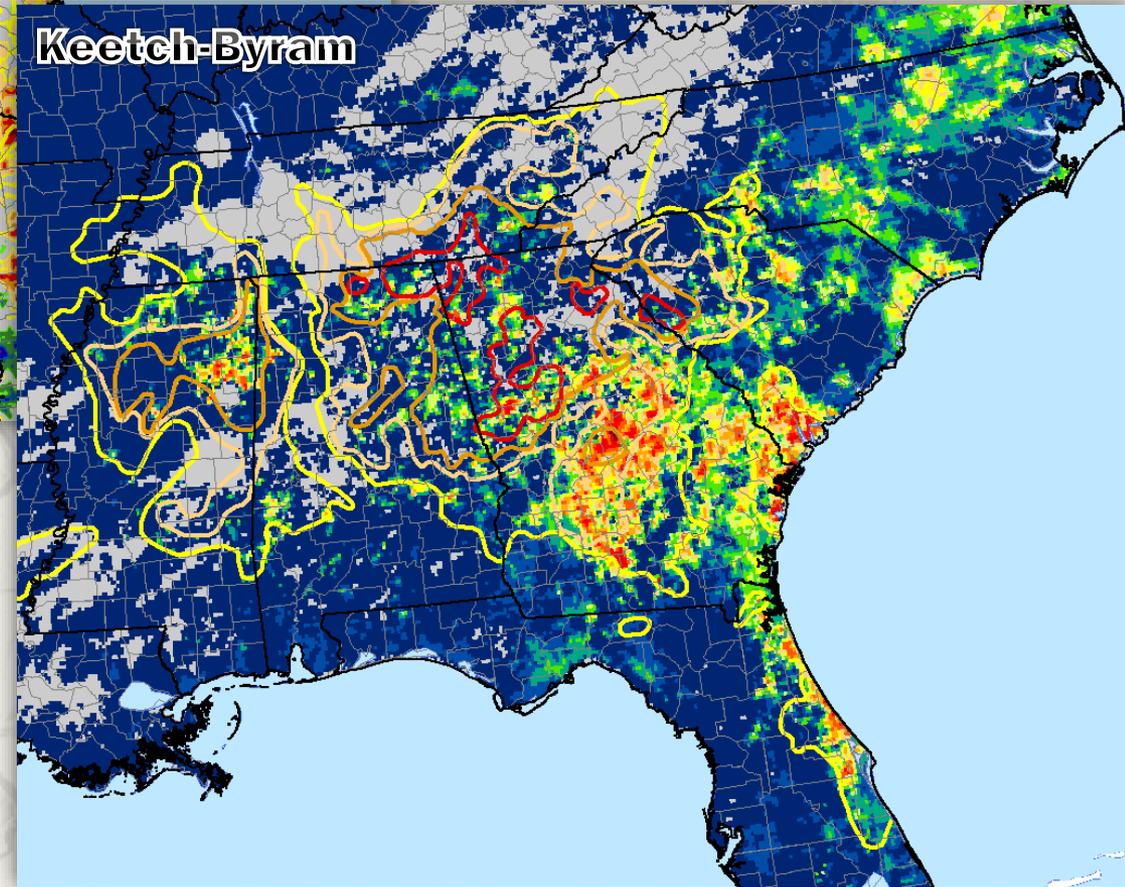
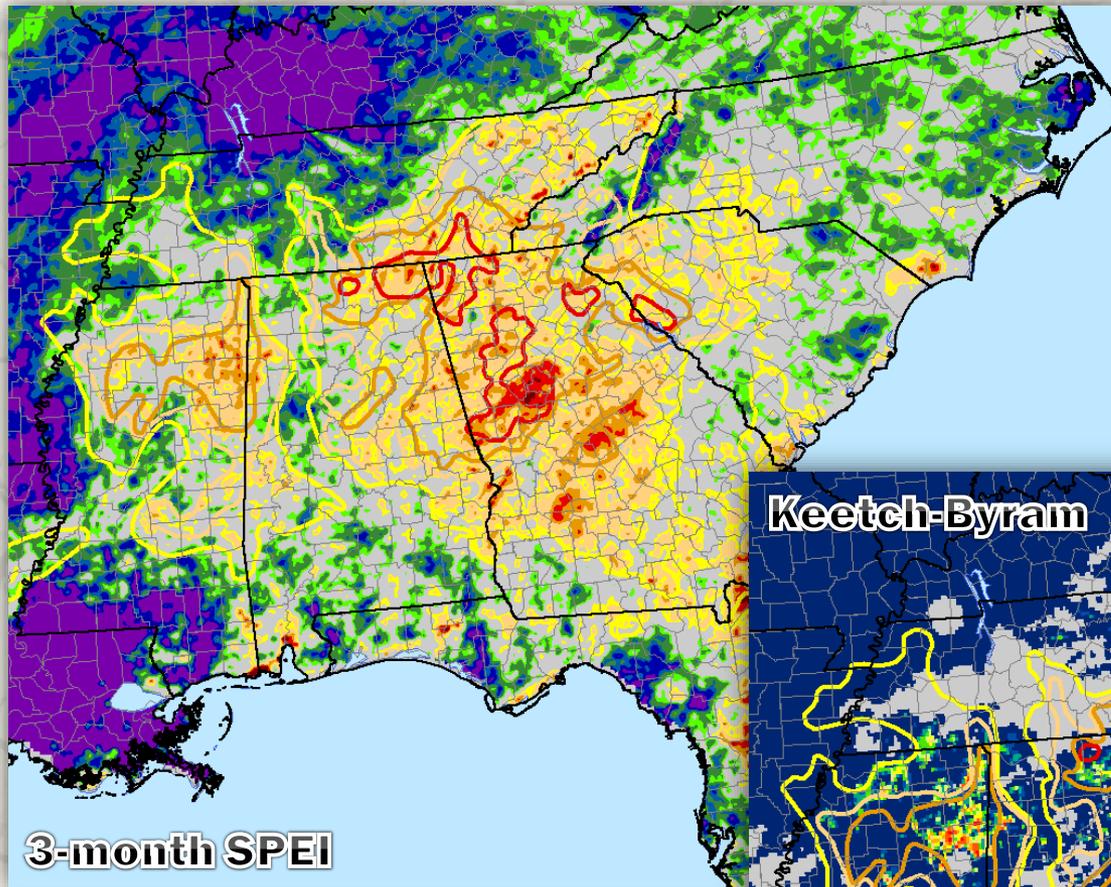
# **VegDRI & Evaporative Stress Index (ESI)**

**ESI**

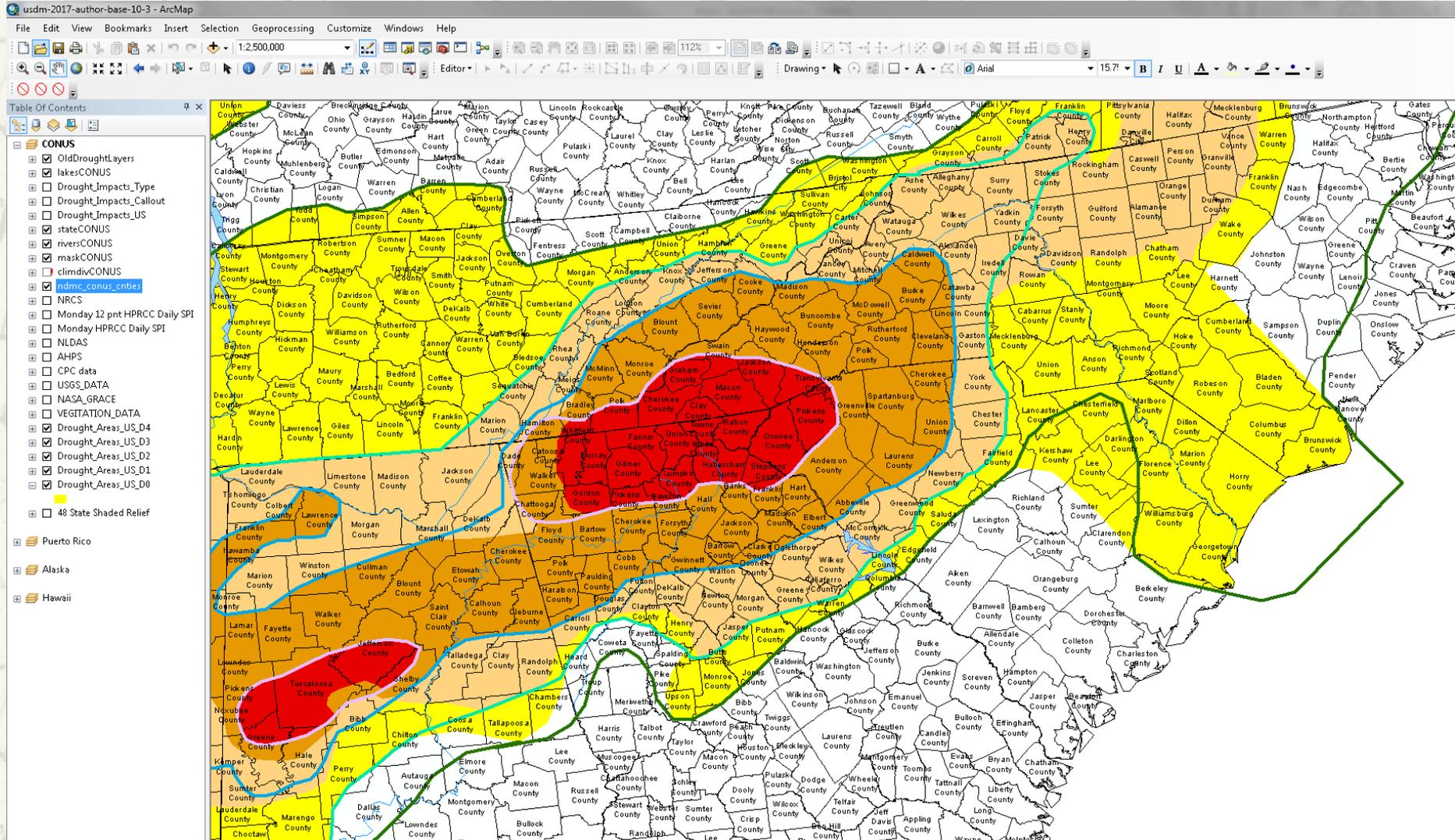


# AHPS/NC State

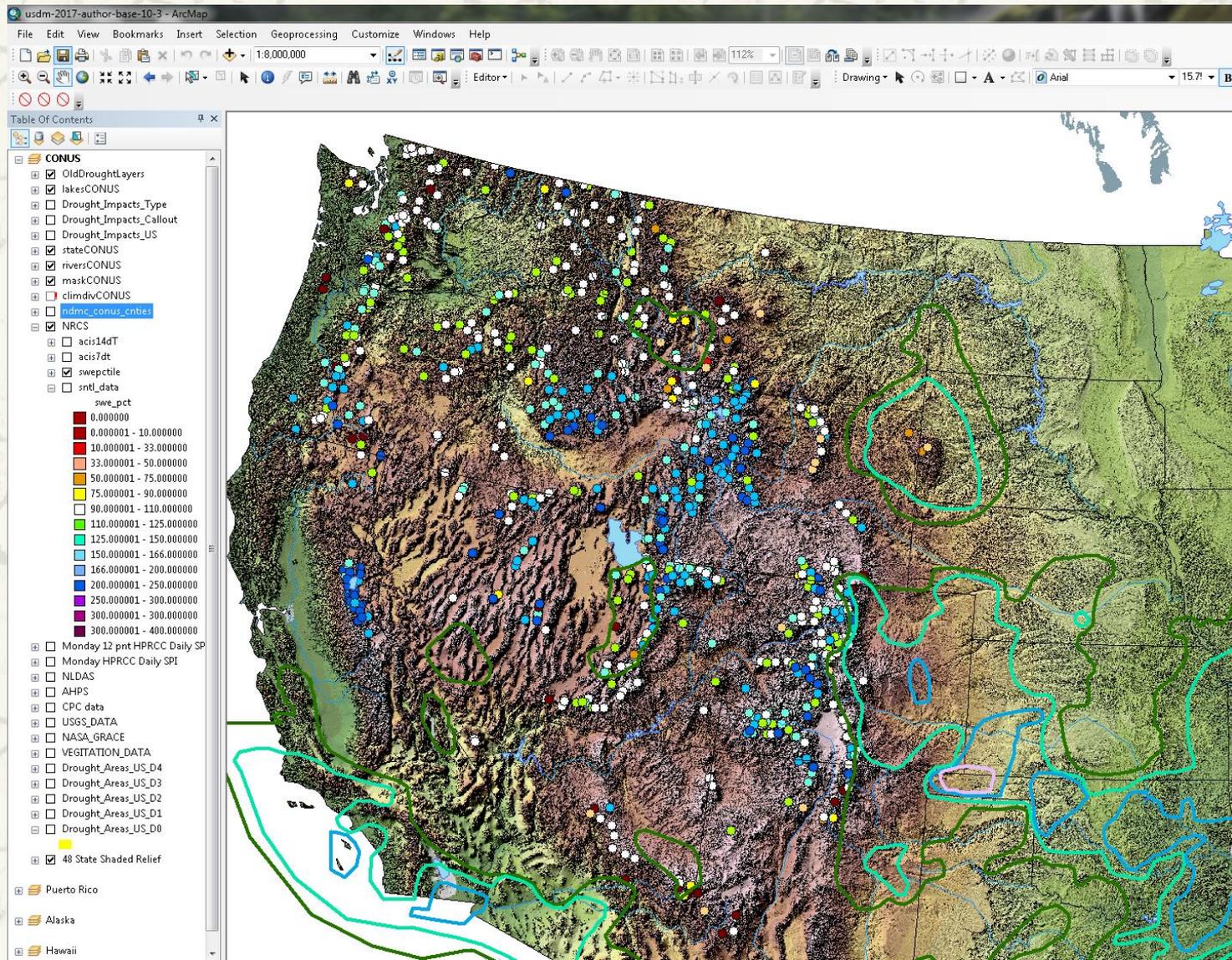
## SPEI & KBDI



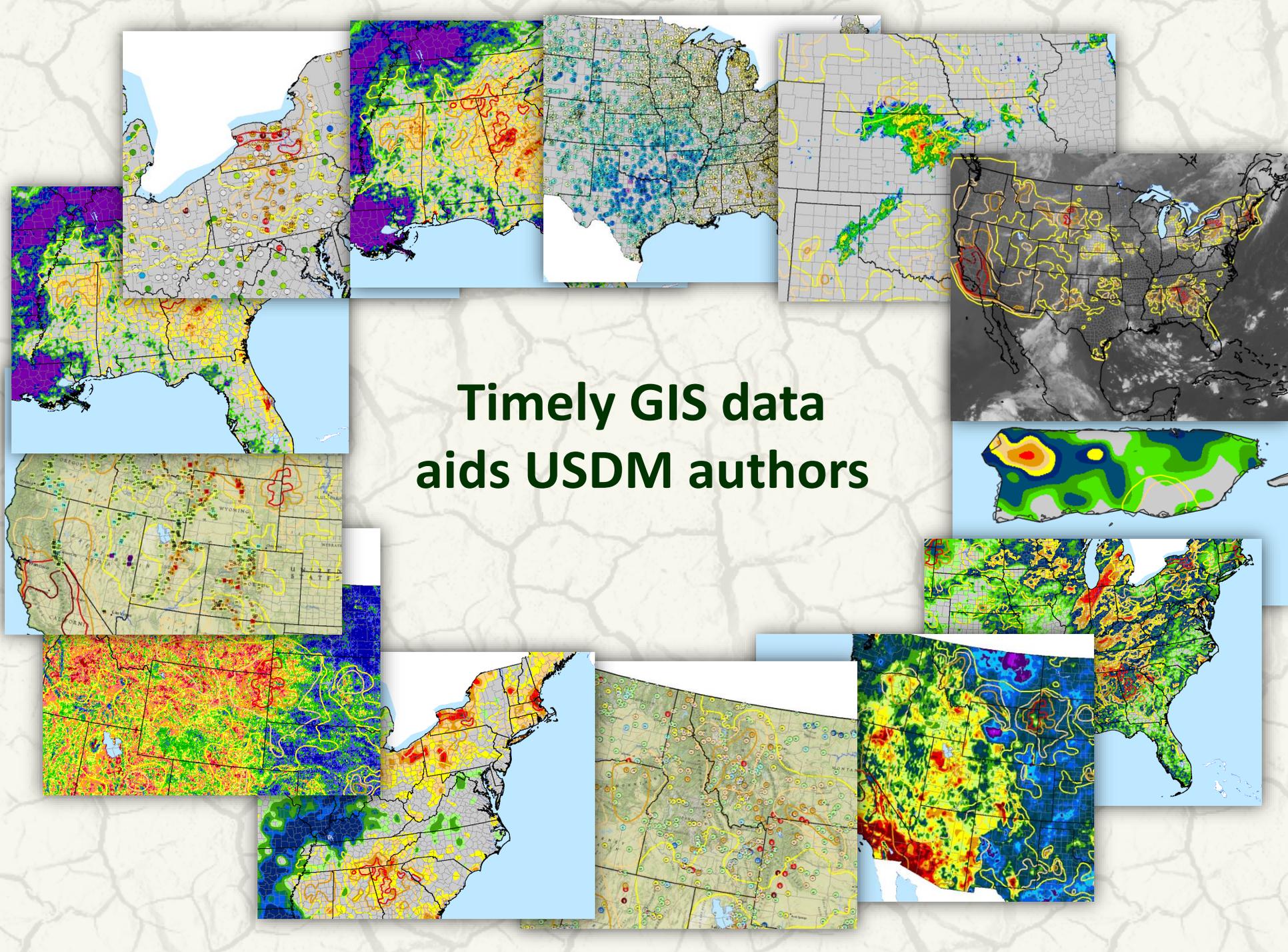
# Previous week's drought layers



# Topographic Data



# Timely GIS data aids USDM authors



**Questions?**

**Deborah Bathke**  
[dbathke2@unl.edu](mailto:dbathke2@unl.edu)  
**402-472-6199**



**There's no crying  
during a  
USDM shift**

