

Monitoring Drought in Kentucky

Chip Zimmer

Kentucky Division of Water

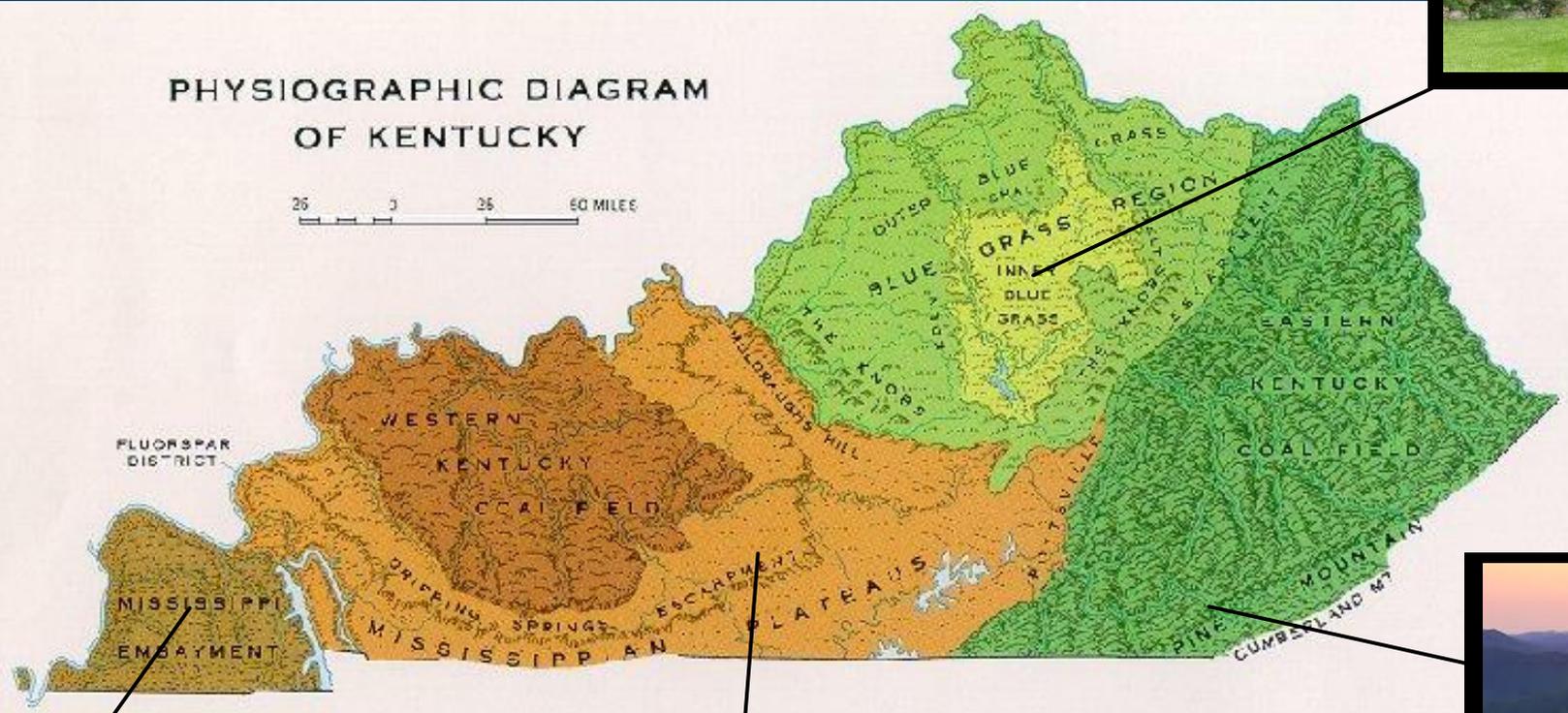


PRESENTED TO THE USDM FORUM

APRIL 4, 2017

KEYSTONE, SD

Diversity of the Commonwealth



Agricultural Production

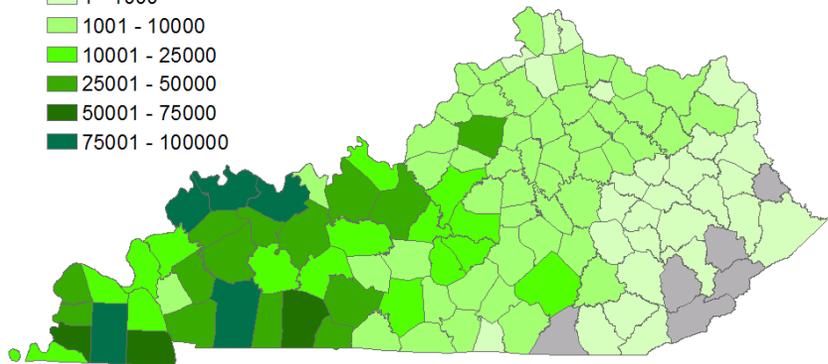
Product	US Rank	Production	Cash Receipts
Beef Cattle	8 th	1 million head	\$3 Billion
Broilers	7 th	307 million head	\$960 million
Soybeans	15 th	88 million head	\$788 million
Corn, for grain	14 th	225 million bu	\$782 million
Tobacco	2 nd	149 million lbs	\$371 million
Hay	8 th	5.6 million tons	\$215 million
Horses	1 st	242,000	\$523 million ¹
Bourbon	1 st	4.7 million barrels	95% world production

-Stats from Kentucky Agricultural Statistics 2016 Annual Bulletin produced by USDA NASS

¹ 2016 Keeneland Thoroughbred Sales

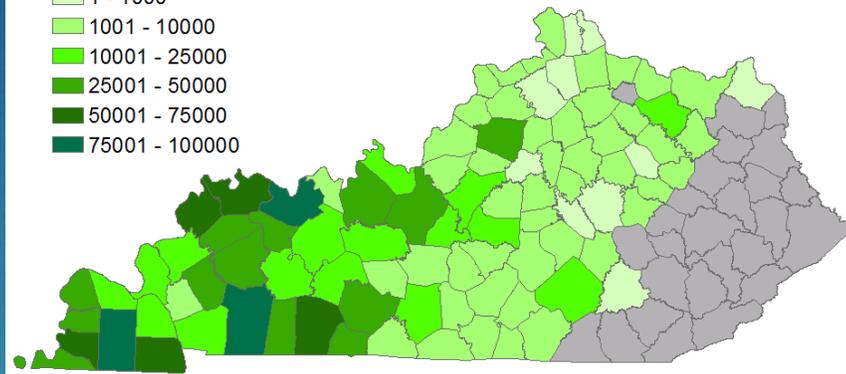
Acres of Corn Harvested

- 0 / No Data
- 1 - 1000
- 1001 - 10000
- 10001 - 25000
- 25001 - 50000
- 50001 - 75000
- 75001 - 100000



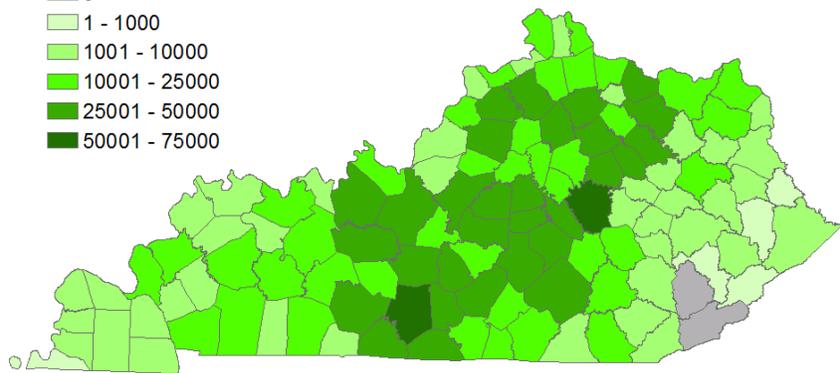
Acres of Soybean Harvested

- 0
- 1 - 1000
- 1001 - 10000
- 10001 - 25000
- 25001 - 50000
- 50001 - 75000
- 75001 - 100000



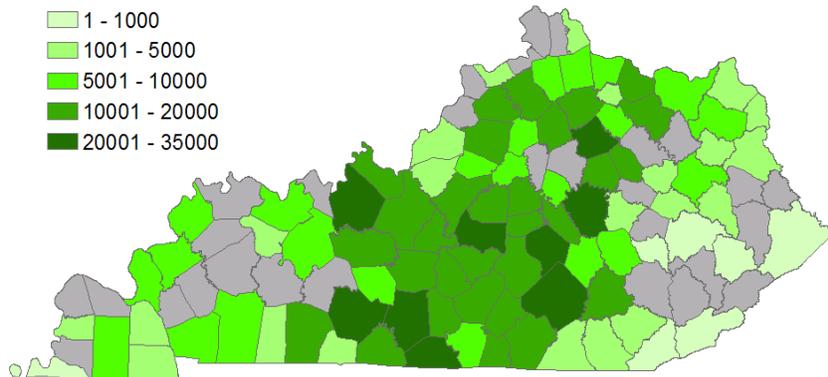
Acres of Hay Harvested

- 0
- 1 - 1000
- 1001 - 10000
- 10001 - 25000
- 25001 - 50000
- 50001 - 75000



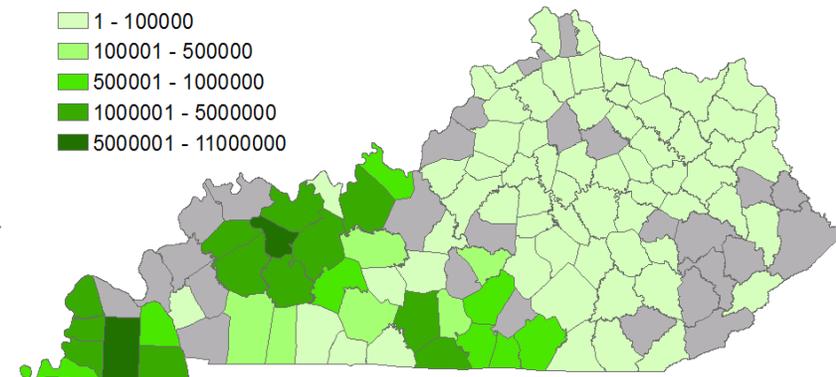
Beef Cattle

- 0
- 1 - 1000
- 1001 - 5000
- 5001 - 10000
- 10001 - 20000
- 20001 - 35000



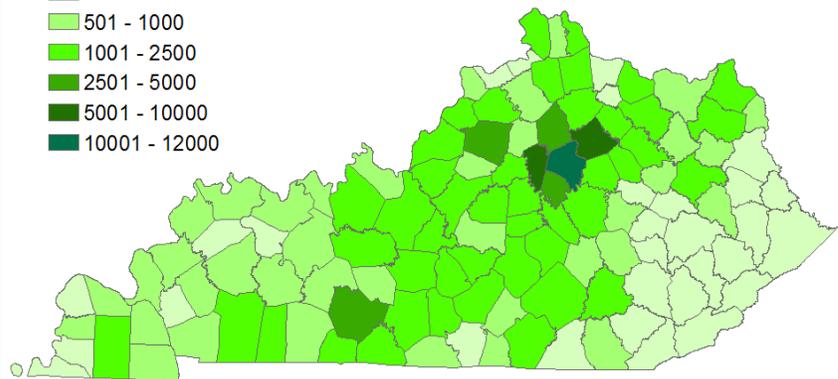
Chickens (Broilers)

- 0
- 1 - 100000
- 100001 - 500000
- 500001 - 1000000
- 1000001 - 5000000
- 5000001 - 11000000



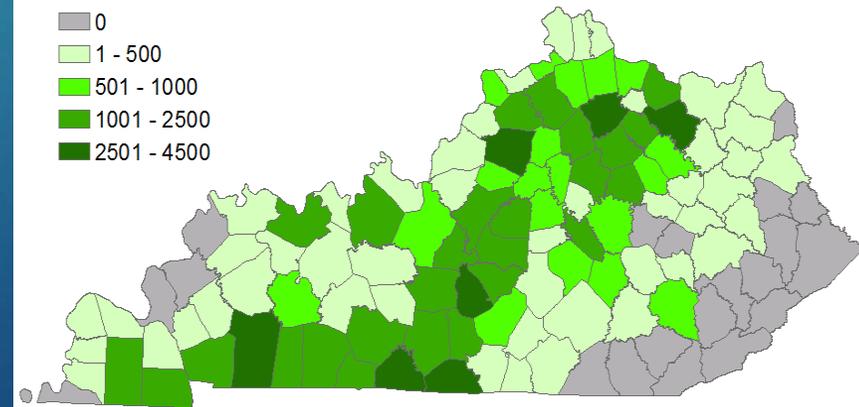
Equine (Horse and Pony)

- 34 - 500
- 501 - 1000
- 1001 - 2500
- 2501 - 5000
- 5001 - 10000
- 10001 - 12000



Acres of Tobacco Harvested

- 0
- 1 - 500
- 501 - 1000
- 1001 - 2500
- 2501 - 4500

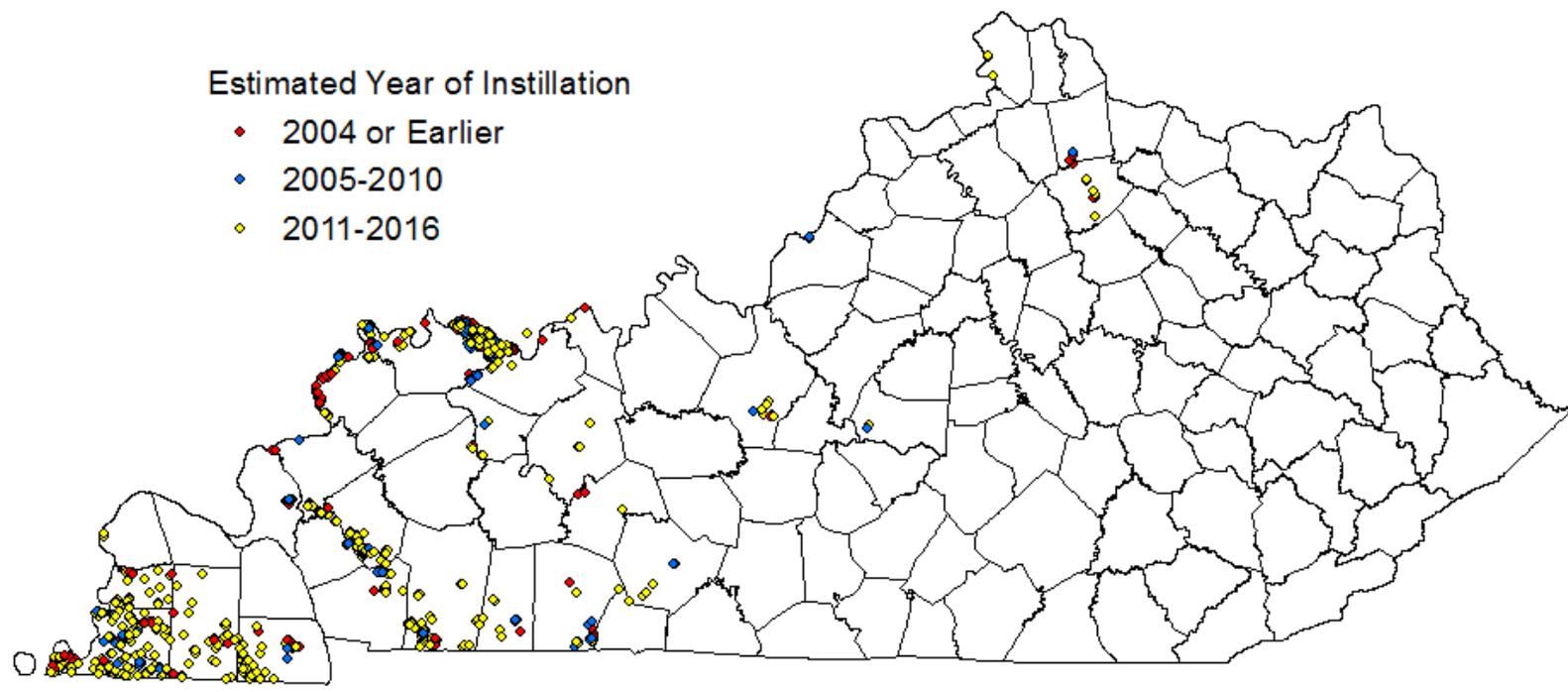


Source: USDA NASS 2012
Census of Agriculture

Emergence of Center Pivot Irrigation

Estimated Year of Instillation

- ◆ 2004 or Earlier
- ◆ 2005-2010
- ◆ 2011-2016

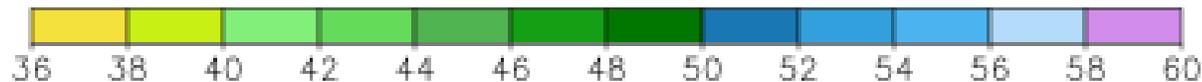
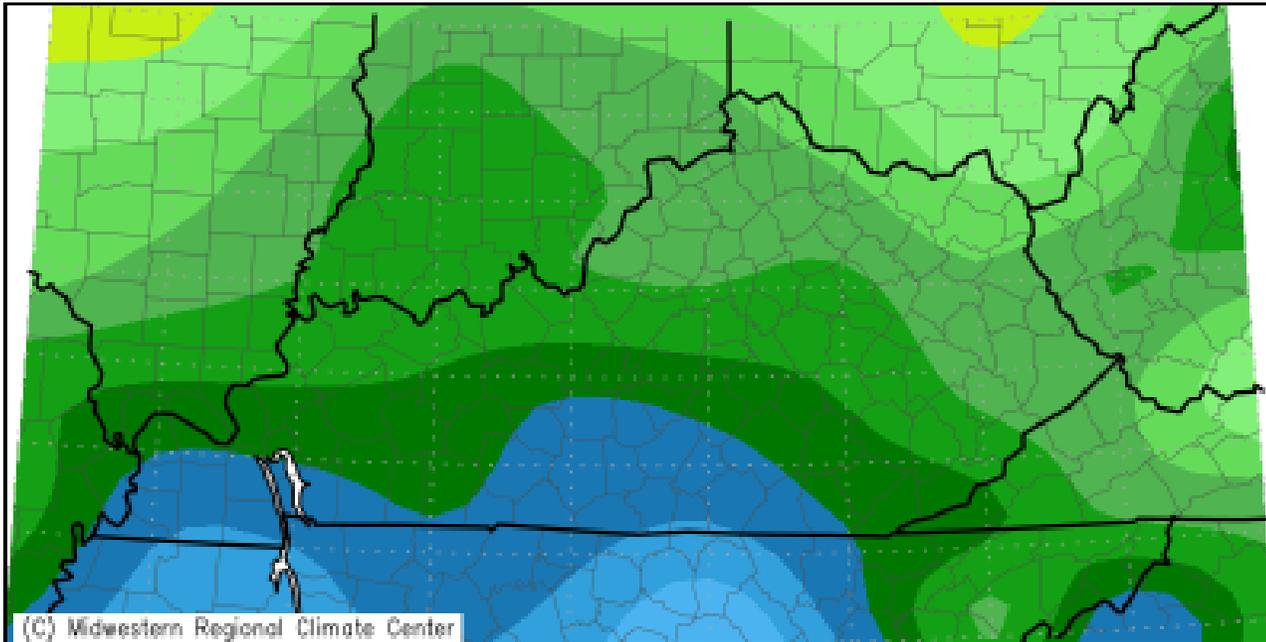


▶ Estimated Year of Instillation

- ▶ 2004 or earlier: 162
- ▶ 2005-2010: 113
- ▶ 2011-2016: 434

Accumulated Precipitation (in): January 1 to December 31

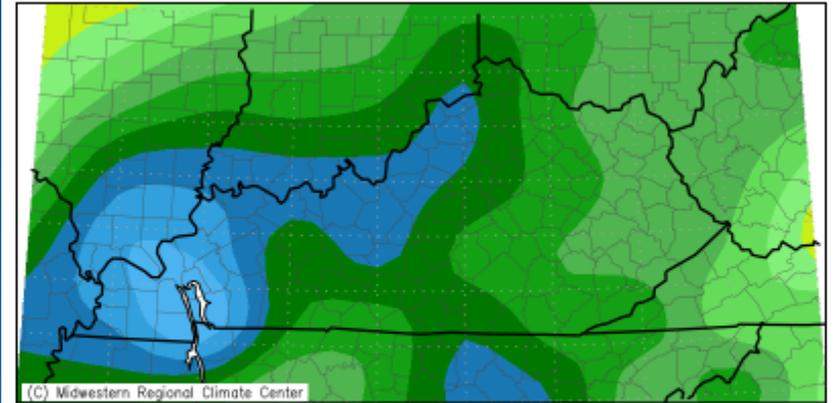
Averaged over 30 years: 1981 to 2010



Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment

Accumulated Precipitation (in): January 1 to December 31

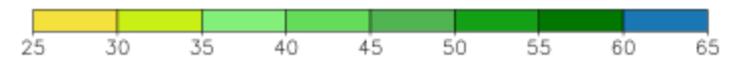
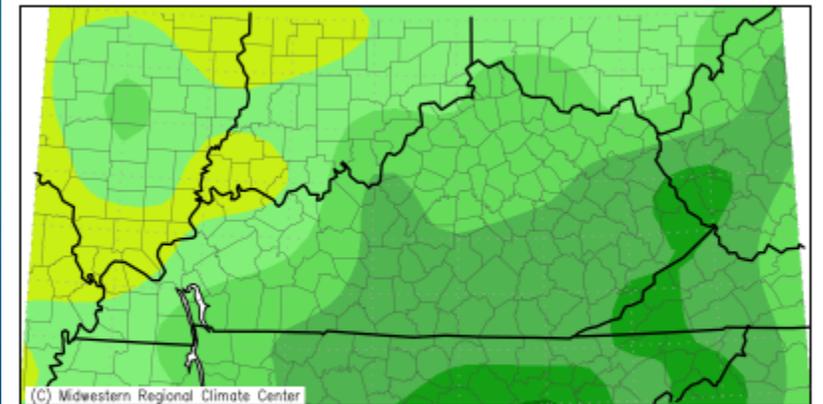
For 1 year: 2011



Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment

Accumulated Precipitation (in): January 1 to December 31

For 1 year: 2012



Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment

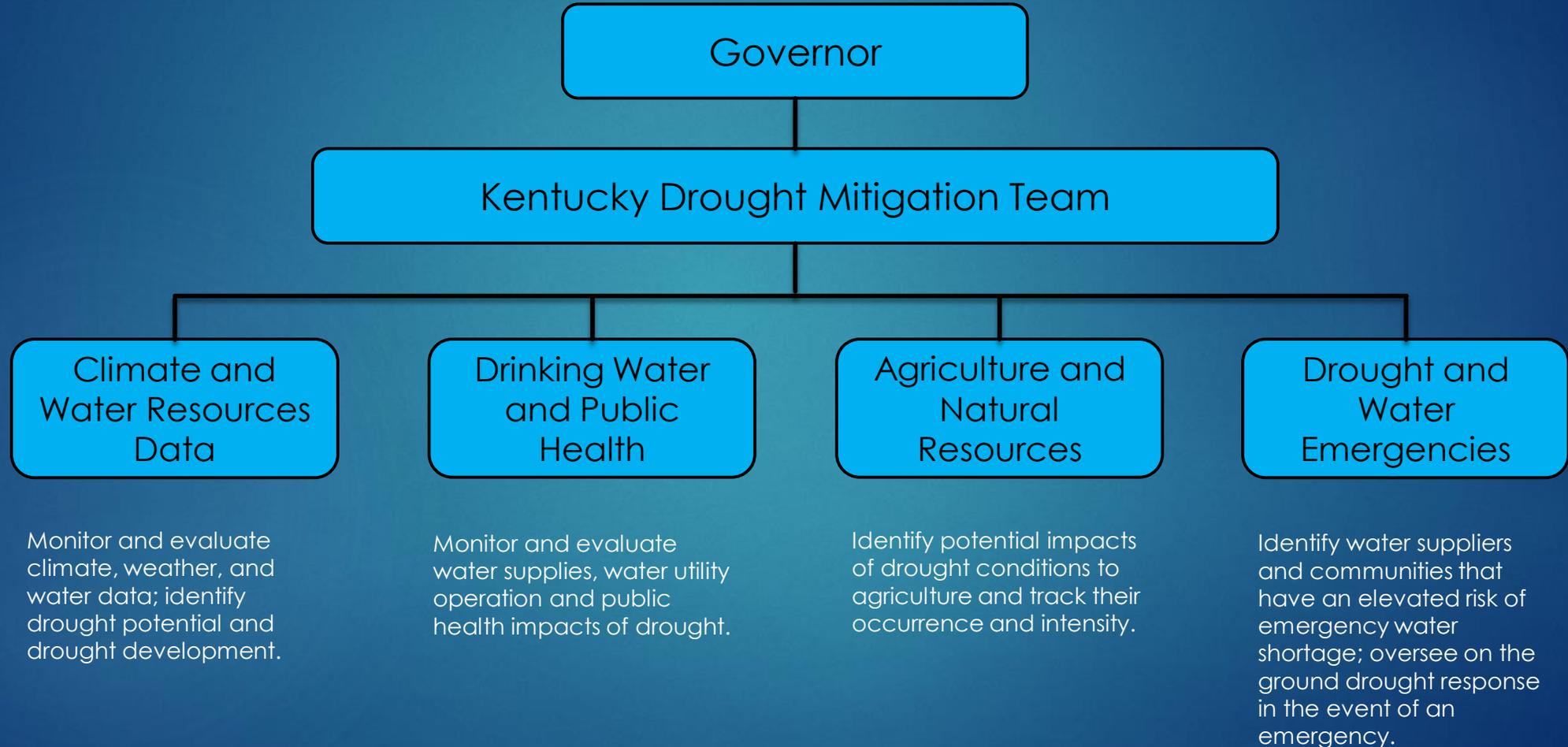
State Drought Plan

Background

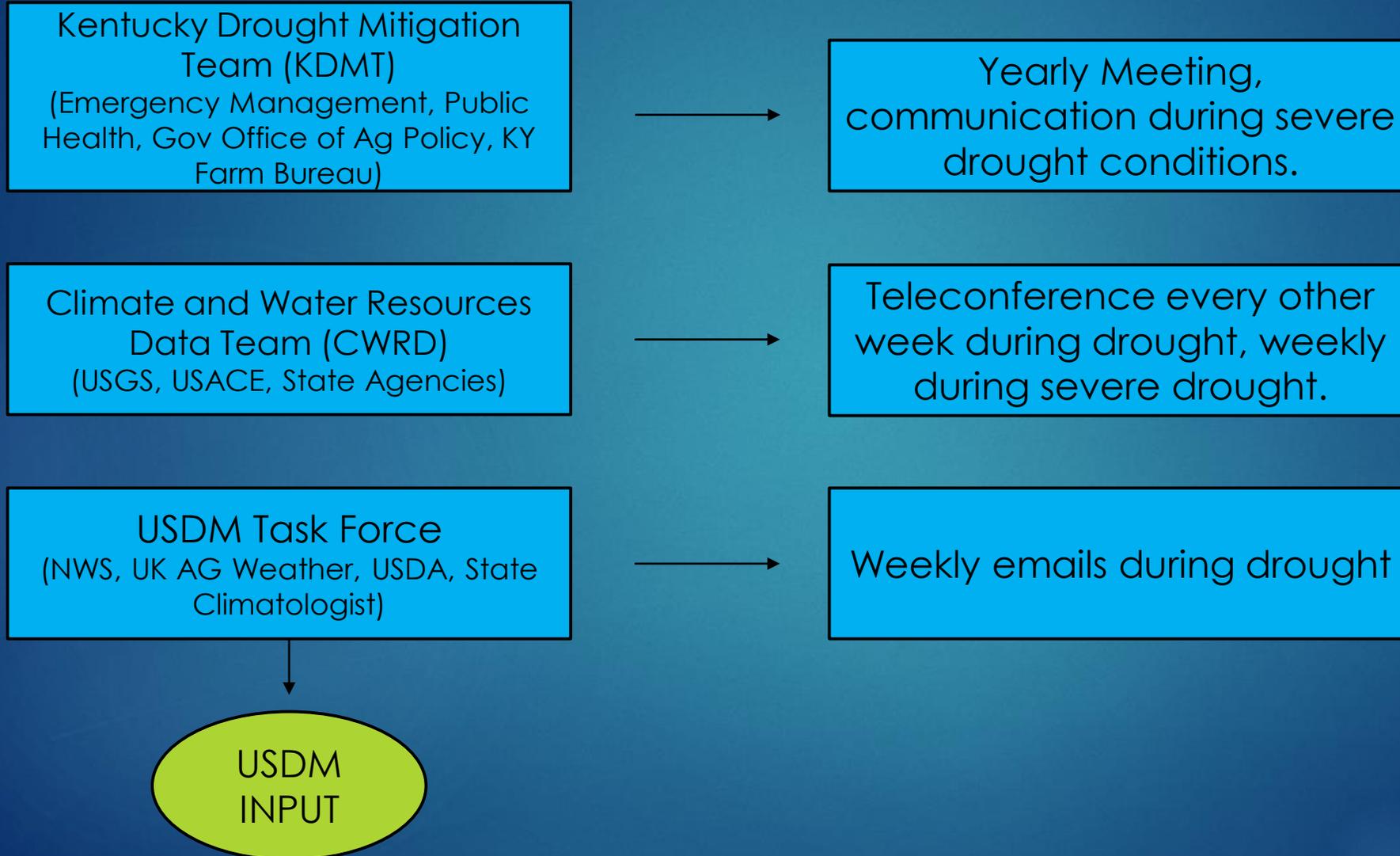
- ▶ Kentucky Drought Mitigation and Response Plan completed on December 31, 2008
- ▶ Established the Kentucky Drought Mitigation Team, designated membership, and drought assessment teams.
- ▶ Drought indicators: Precipitation, streamflows, USDM, Reservoir Storage and Soil Moisture (CMI).
- ▶ Three Drought Declaration Levels
- ▶ Input to USDM began in 2011
- ▶ State Water Management Working Group and State Water Management Board

State Drought Plan

Drought Management Organizational Structure



State Drought Plan



State Drought Declarations

Drought Level I

- “Official” recognition of drought
- Streamflows below a normal range
- Drought Monitor: D1 to D2
- Precipitation indicators: 60 to 75% of normal
- Drought Impact(s) reported (Agriculture, fire)

Drought Level II

- Streamflows well below normal: 6:10% duration
- Soil moisture deficits
- Drought Monitor: D2 to D3
- Observed drought impacts to some water supplies
- Local PWS water shortage advisors

Drought Level III

- Streamflows less than a 5% duration
- Drought Monitor: D3 to D4
- Severe Drought Impacts and water shortages

Future of Kentucky Drought Monitoring

- ▶ Midwest DEWS
- ▶ Websites
 - ▶ Kentucky Drought Viewer
 - ▶ <http://watermaps.ky.gov/drought>
- ▶ Water Shortage Response Plan program
- ▶ Updating the Drought Plan
- ▶ Drought Impact Collector Ap

Fall of 2016 Drought

U.S. Drought Monitor Kentucky

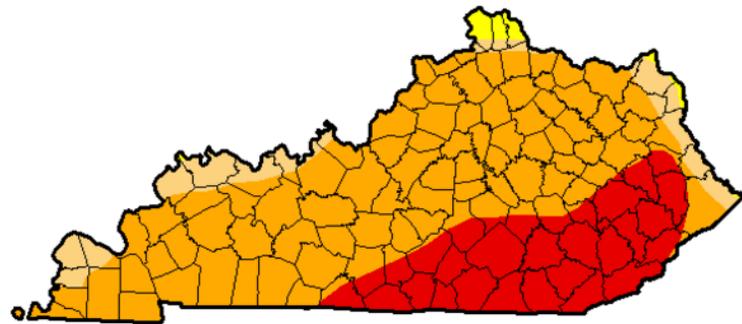
November 29, 2016

(Released Thursday, Dec. 1, 2016)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	98.49	89.71	24.76	0.00
Last Week <i>11/22/2016</i>	0.00	100.00	98.56	91.46	18.01	0.00
3 Months Ago <i>8/30/2016</i>	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year <i>12/29/2015</i>	100.00	0.00	0.00	0.00	0.00	0.00
Start of Water Year <i>9/27/2016</i>	66.86	33.14	0.00	0.00	0.00	0.00
One Year Ago <i>12/1/2015</i>	100.00	0.00	0.00	0.00	0.00	0.00



Intensity:

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

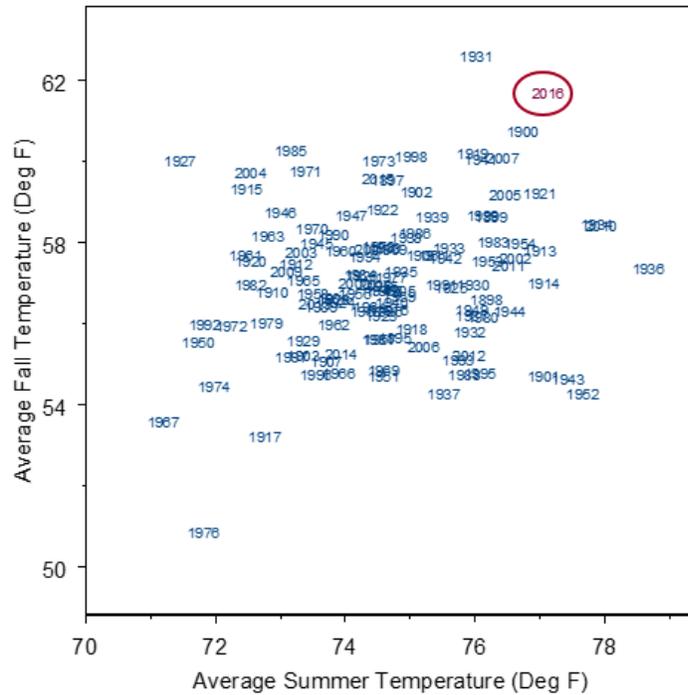
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Richard Heim
NCEI/NOAA

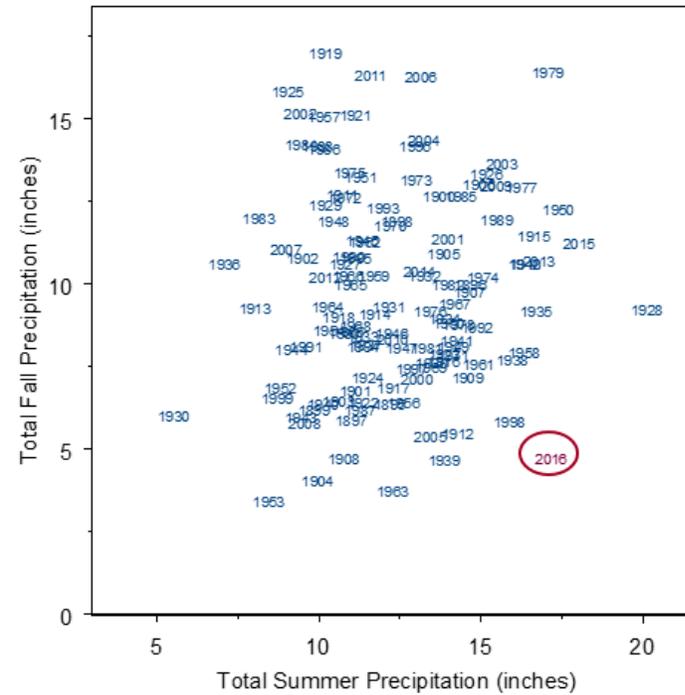
Summer-Fall Climate Comparison

Kentucky, Statewide

Kentucky Temperature Summer-Fall Scatter Plot



Kentucky Precipitation Summer-Fall Scatter Plot



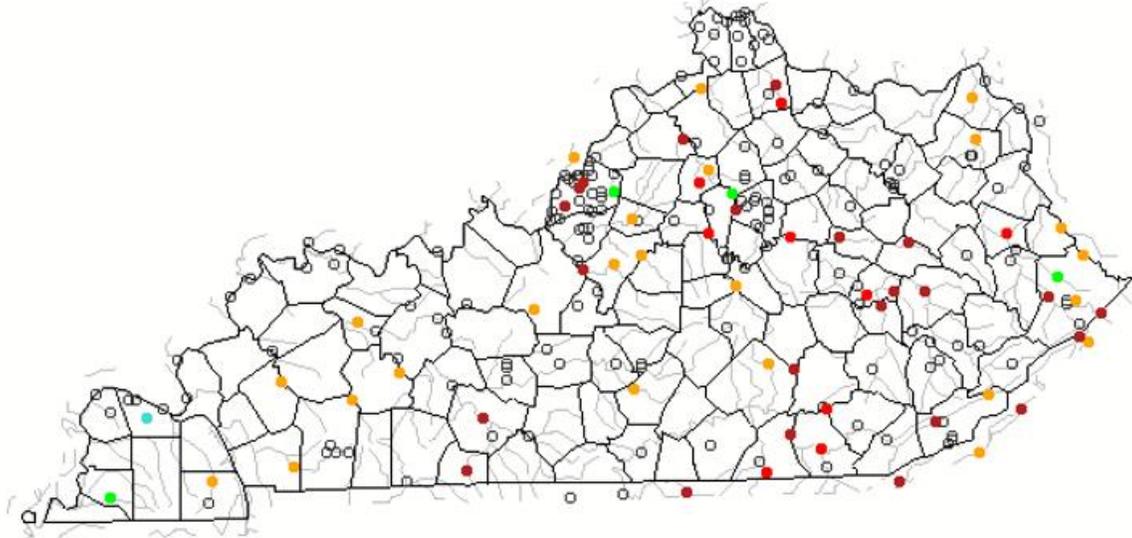
○ Projection as of Nov 21, 2016

Agriculture

- ▶ Agriculture impacts were seen state wide.
- ▶ Drought conditions developed late enough that impacts to row crops were minimal.
- ▶ Livestock producers were forced to feed hay early sparking concerns of shortages later in the winter.
 - ▶ These concerns were not realized in part due to an unseasonably warm winter
- ▶ Low to dry stock ponds forced some farmers to purchase or haul water, though this seemed to be fairly limited.
- ▶ Winter wheat planting and germination concerns.

Streamflows and Water Shortage Issues

Monday, November 28, 2016 13:30ET



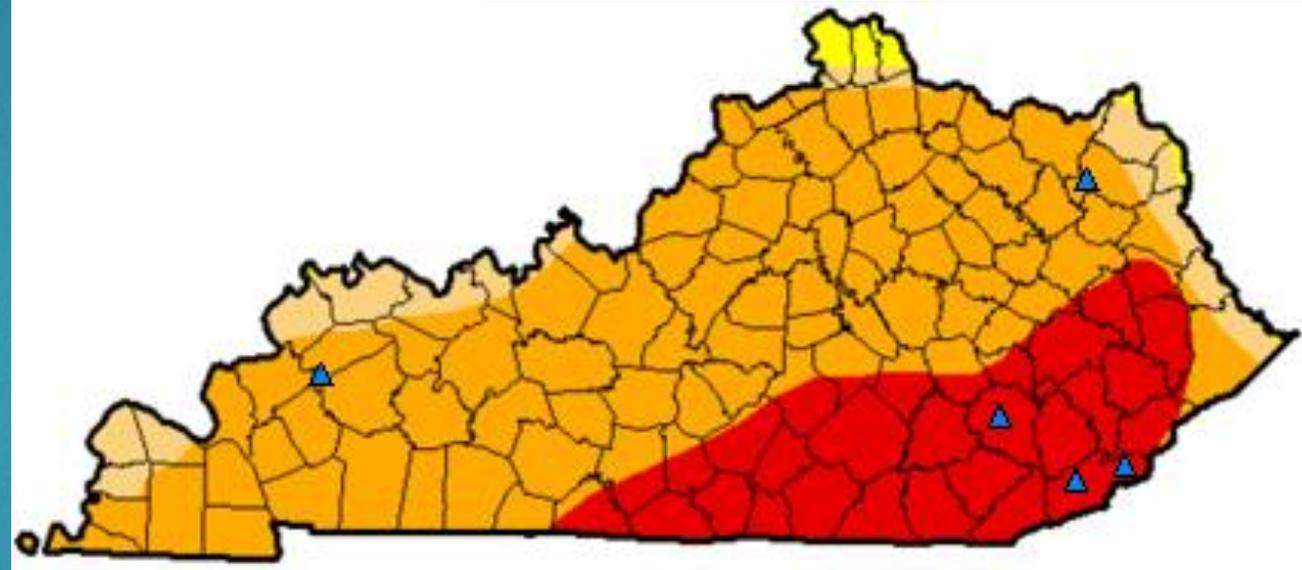
Search USGS streamgage

Choose a data retrieval option and select a location on the map

- List of all stations
 Single station
 Nearest stations
 Peak flow

Explanation - Percentile classes

Low	<10 Much below normal	10-24 Below normal	25-75 Normal	76-90 Above normal	>90 Much above normal	High	Not-ranked



Questions?

- ▶ For more information contact:
Chip Zimmer: Edward.zimmer@ky.gov

- ▶ Special Thanks to:
Stu Foster- Kentucky State Climatologist
Steve Kull- Kentucky Division of Forestry
Bill Caldwell- Kentucky Division of Water

