



Kentucky Climate Summary and Outlook

March 28, 2018

Stuart Foster

State Climatologist for Kentucky

Department of Geography and Geology

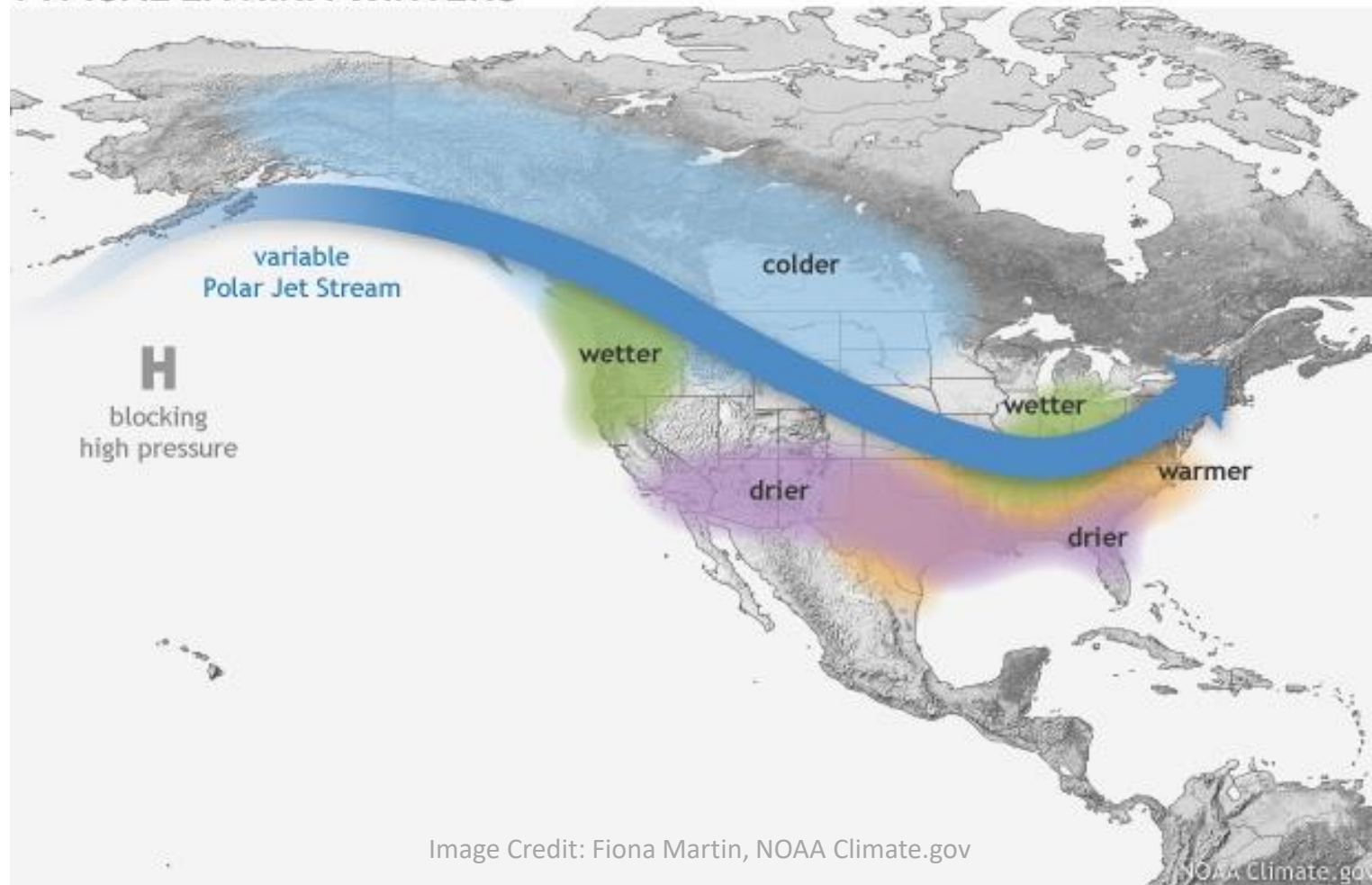
Western Kentucky University

Stuart.foster@wku.edu

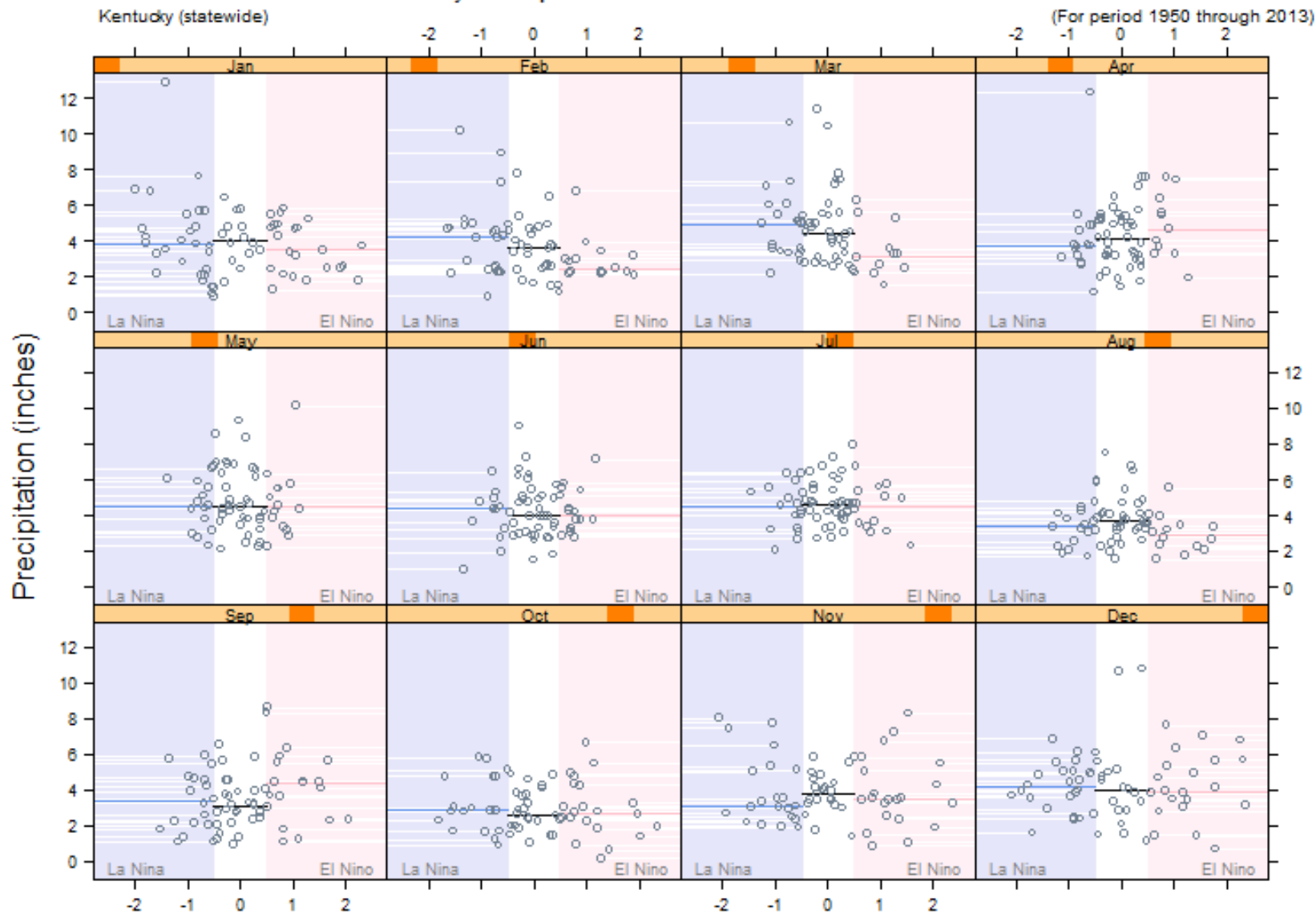
270.745.5983



TYPICAL LA NIÑA WINTERS



Monthly Precipitation in Relation to ENSO Status



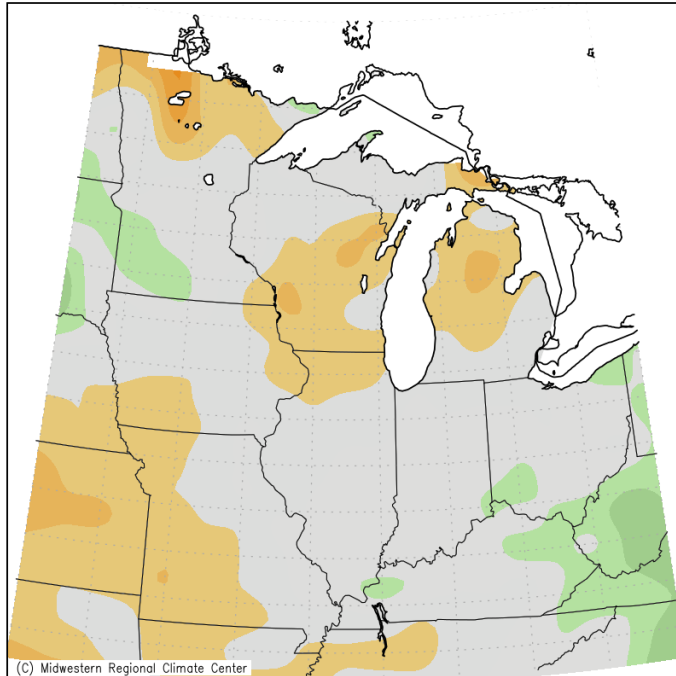
Oceanic Niño Index

Kentucky Climate Center, Department of Geography and Geology, Western Kentucky University



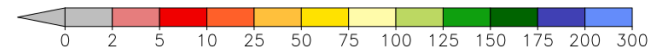
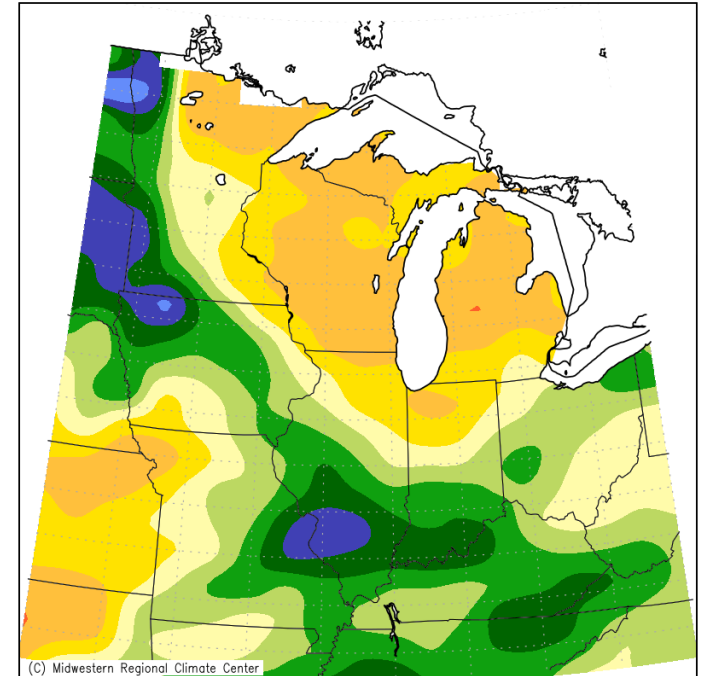
Regional 30-day Climate Summary

Average Temperature (°F): Departure from Mean
February 24, 2018 to March 25, 2018



Midwestern Regional Climate Center
Illinois State Water Survey, Prairie Research Institute
University of Illinois at Urbana–Champaign

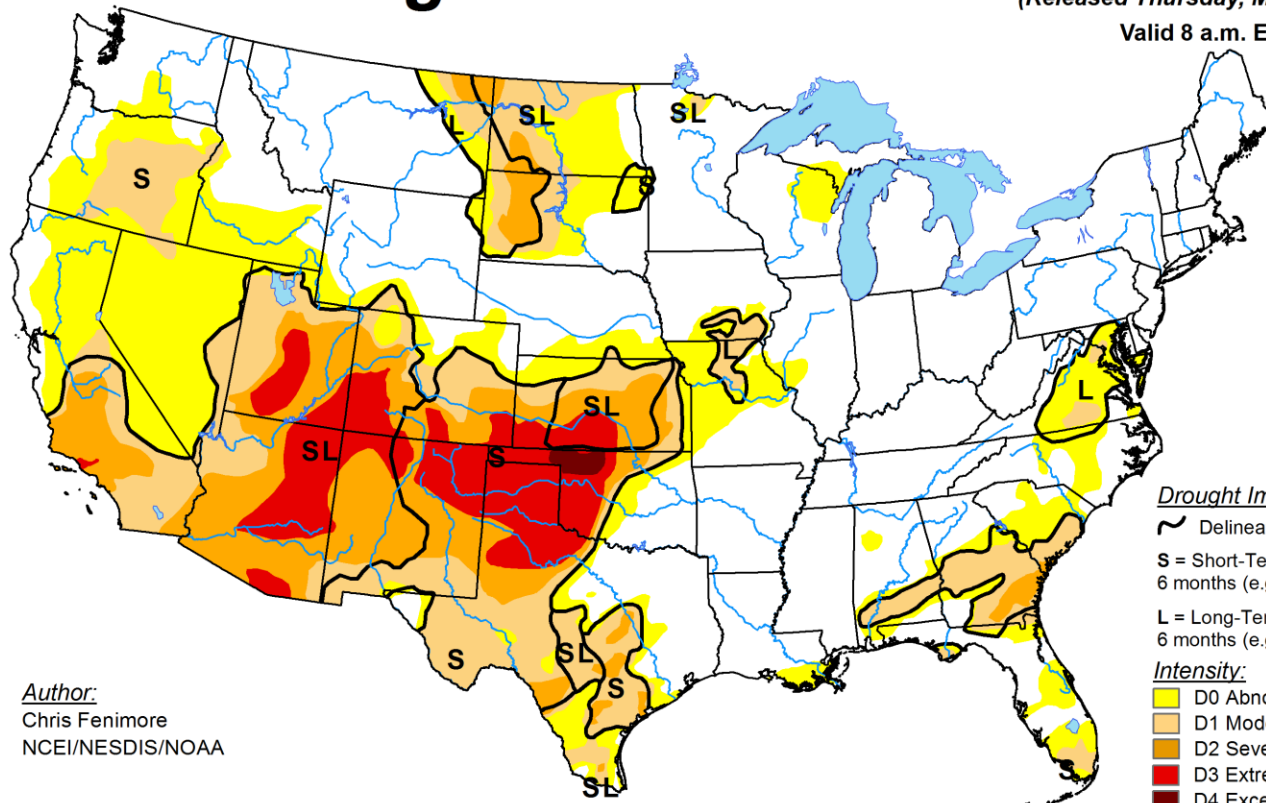
Accumulated Precipitation: Percent of Mean
February 24, 2018 to March 25, 2018



Midwestern Regional Climate Center
Illinois State Water Survey, Prairie Research Institute
University of Illinois at Urbana–Champaign

U.S. Drought Monitor

March 20, 2018
 (Released Thursday, Mar. 22, 2018)
 Valid 8 a.m. EDT



Author:
 Chris Fenimore
 NCEI/NESDIS/NOAA

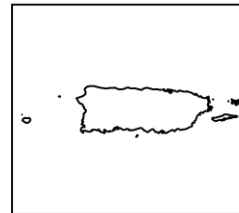
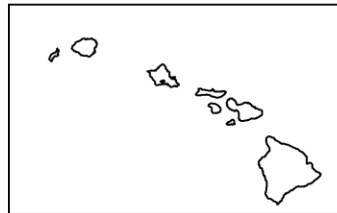
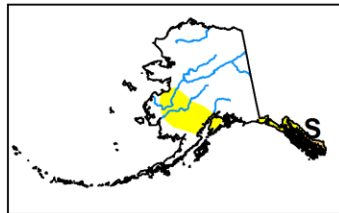
Drought Impact Types:

- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

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

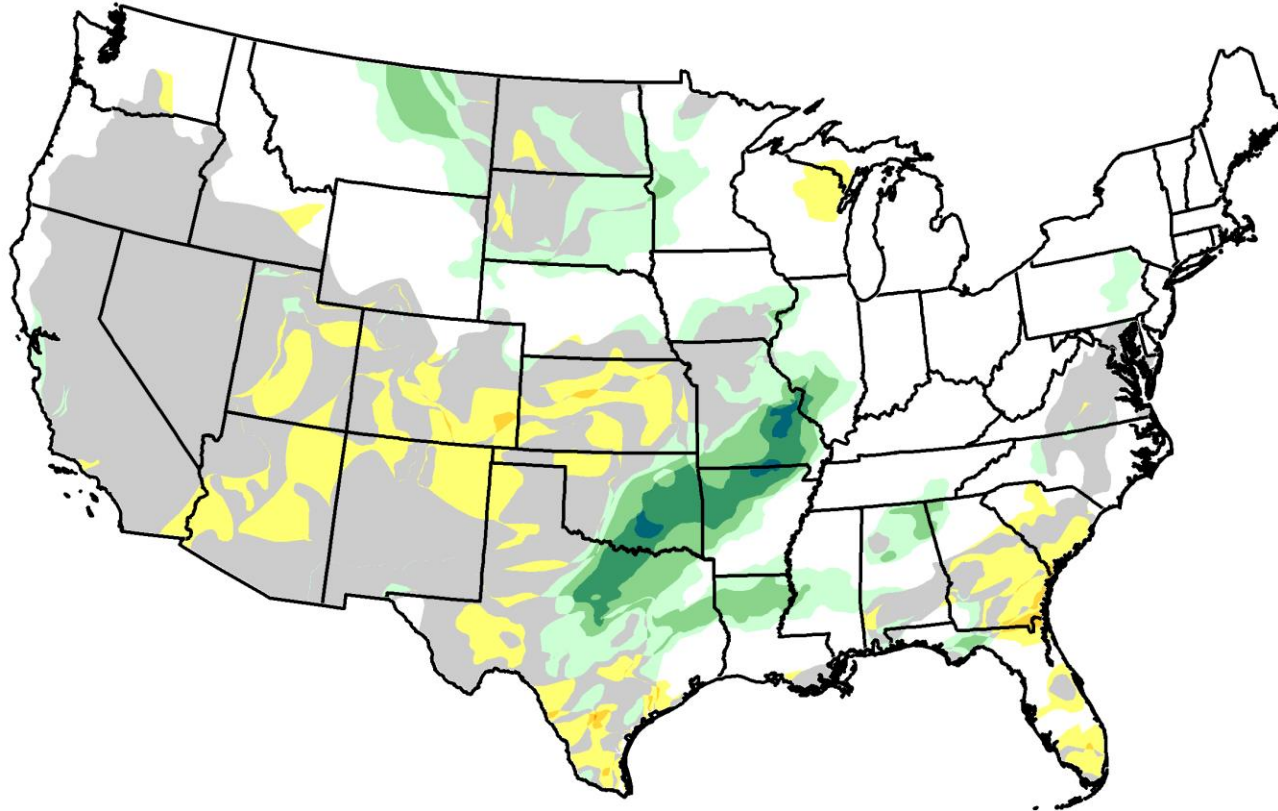
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



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

U.S. Drought Monitor Class Change - CONUS

1 Month



March 20, 2018
compared to
February 20, 2018

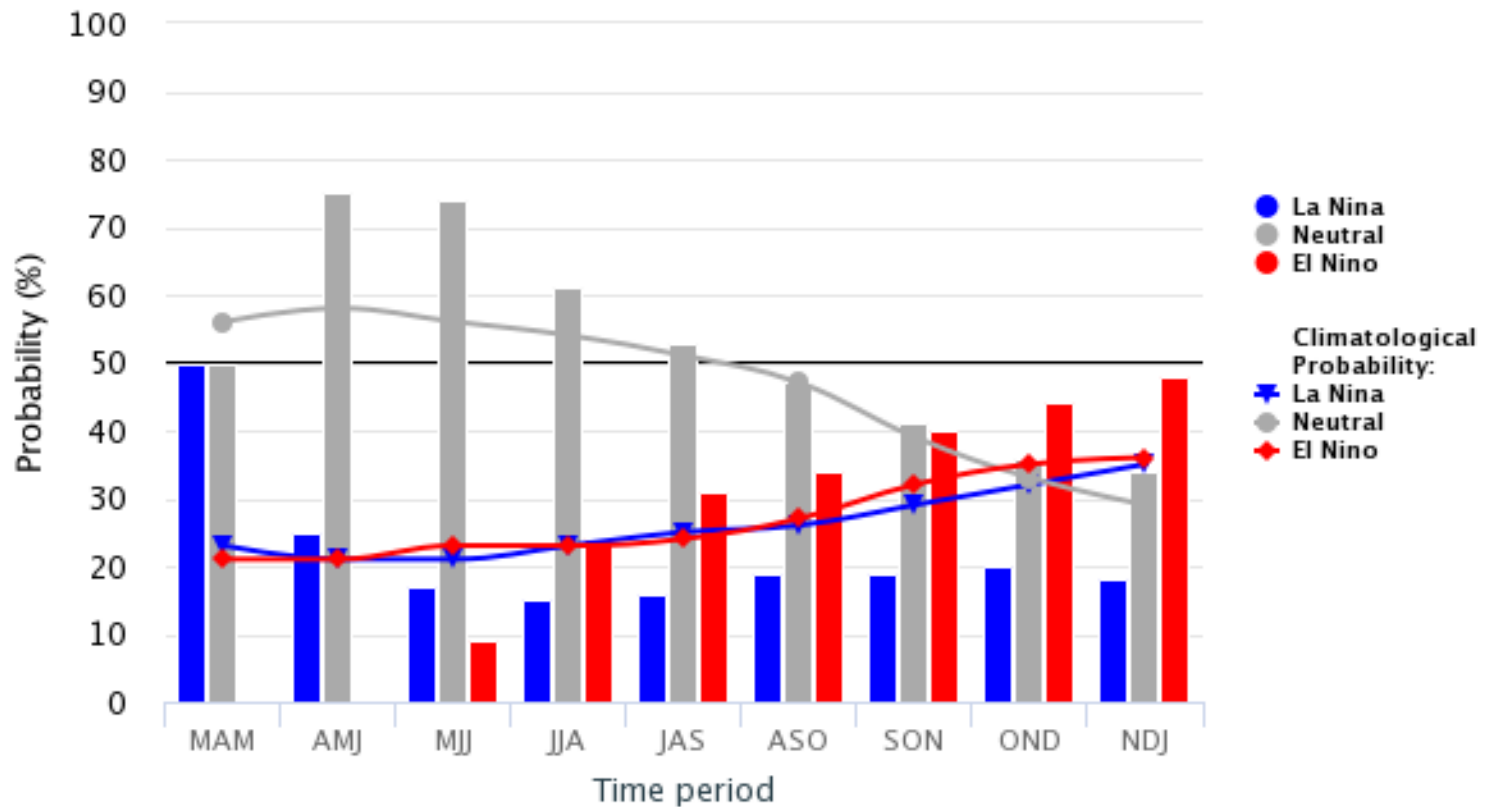
<http://droughtmonitor.unl.edu>

- 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

ENSO Forecast

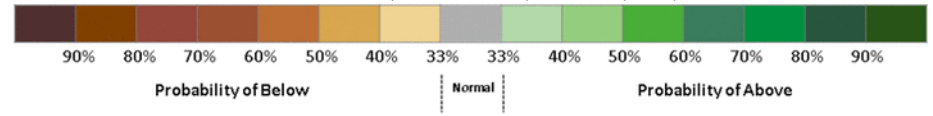
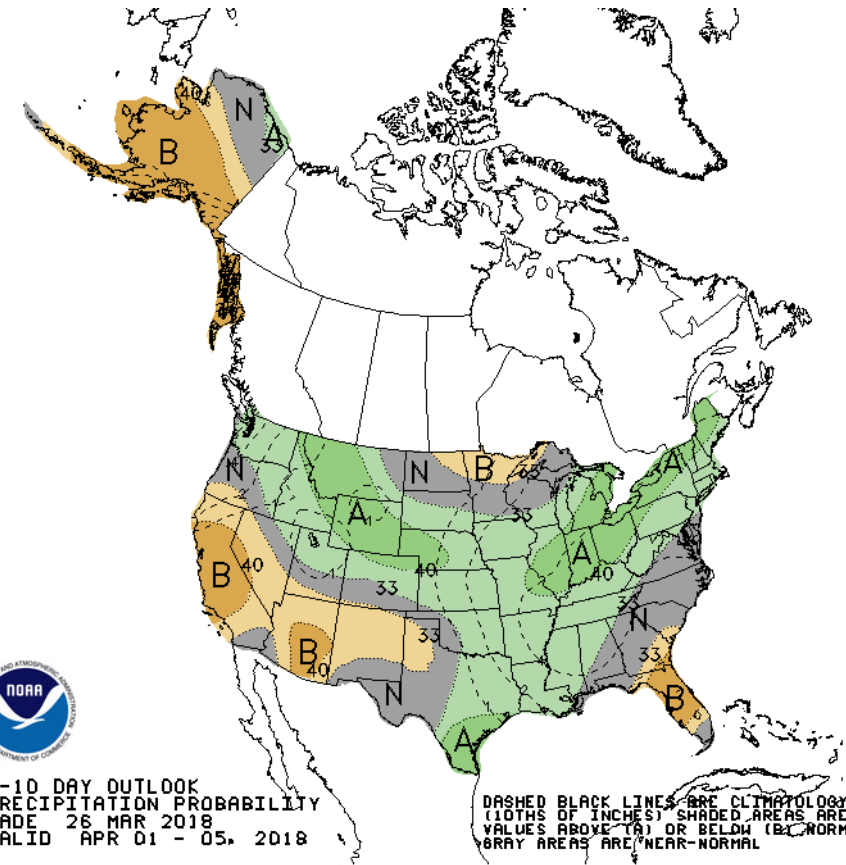
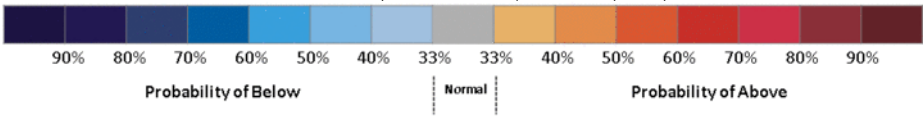
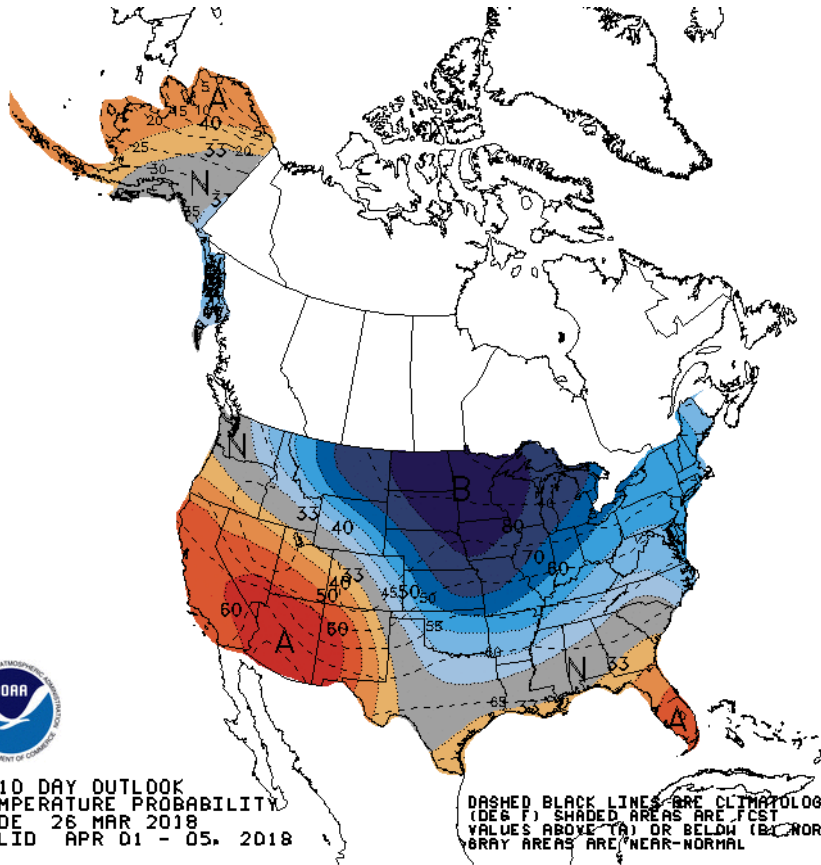
Mid-Mar IRI/CPC Model-Based Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly
Neutral ENSO: $-0.5\text{ }^{\circ}\text{C}$ to $0.5\text{ }^{\circ}\text{C}$



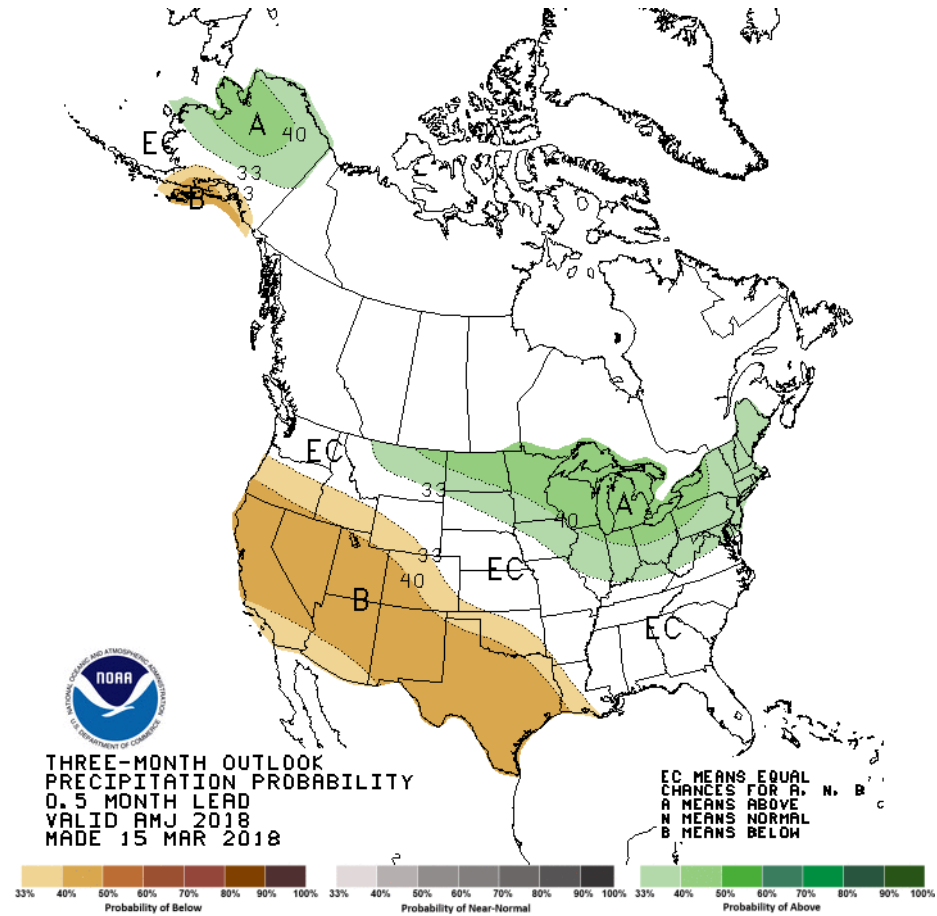
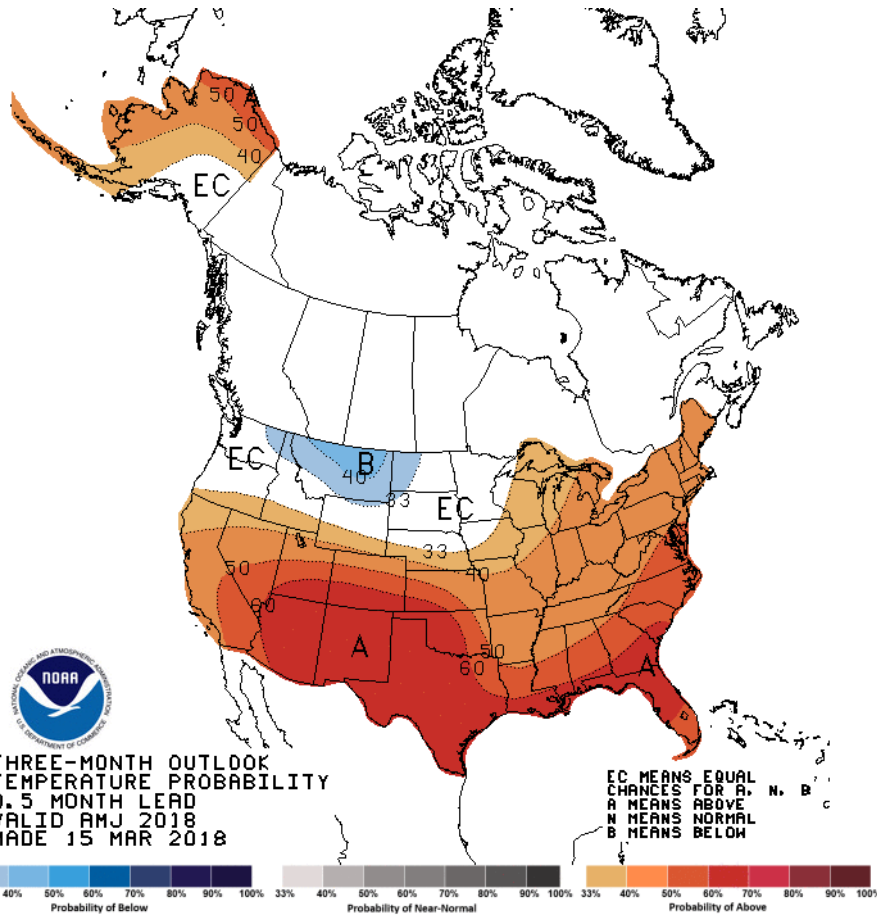
6-10 Day Outlook

NWS Climate Prediction Center

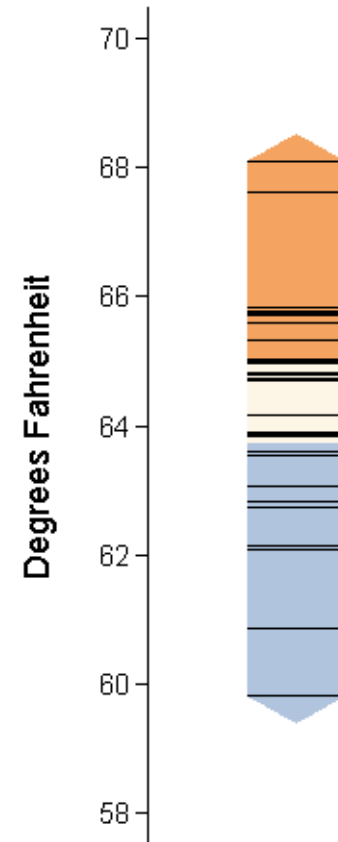
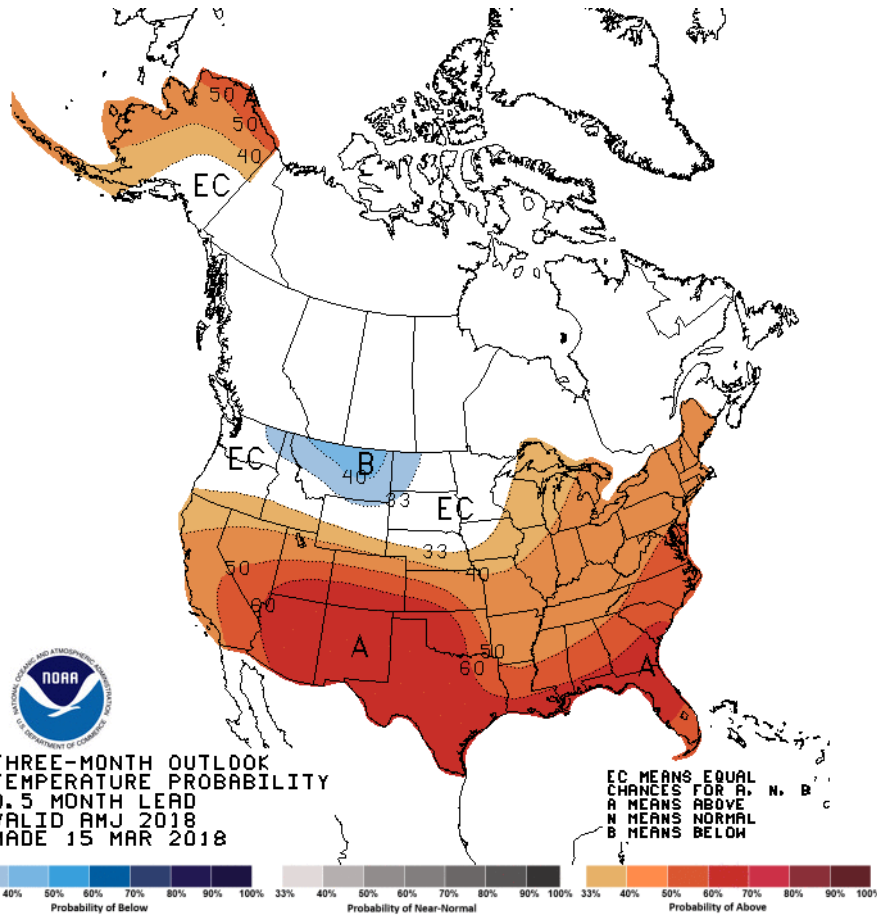


Seasonal Outlook: Apr-May-Jun

NWS Climate Prediction Center

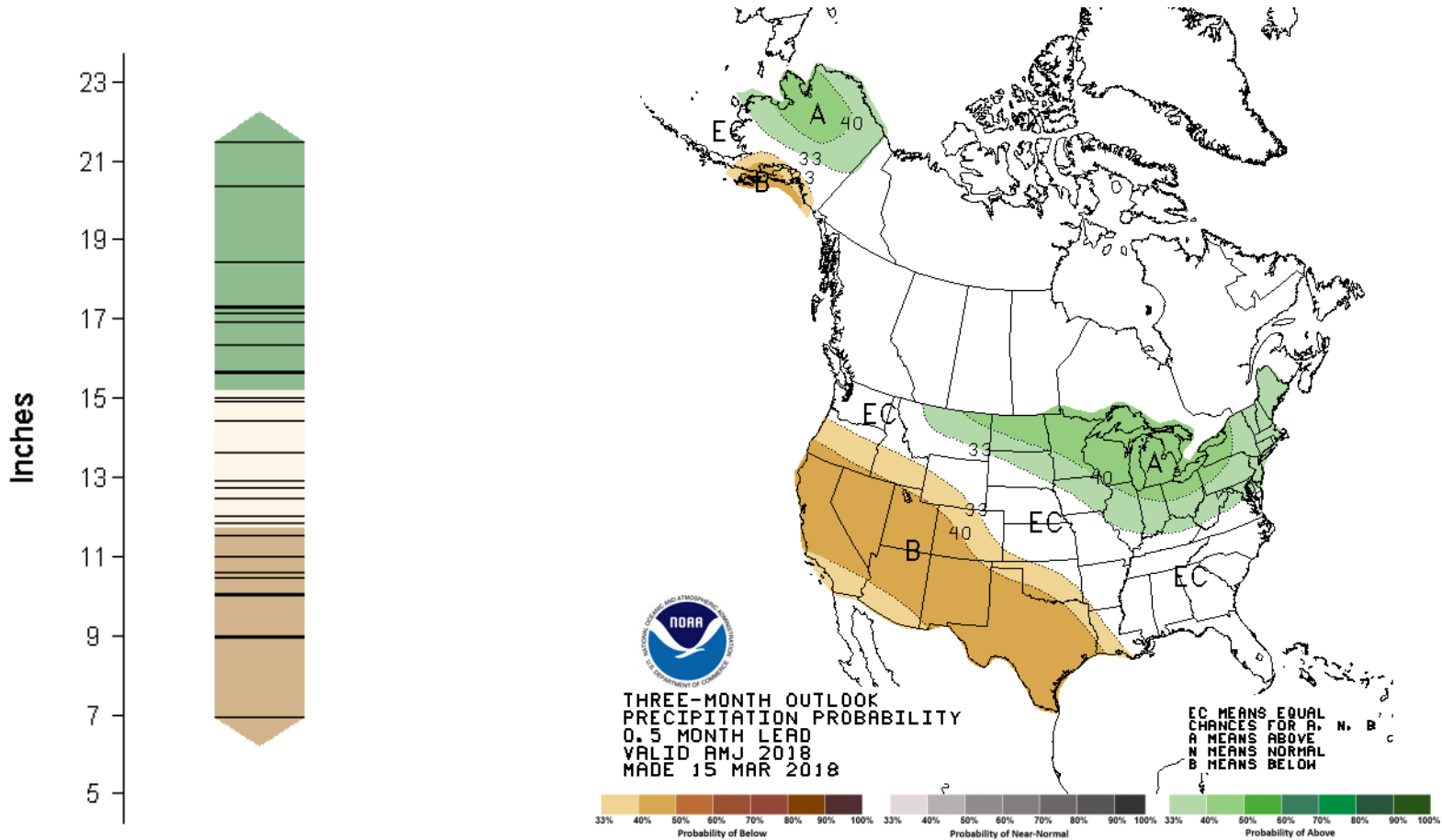


Temperature Outlook With 1981-2010 Kentucky Reference Distribution



Precipitation Outlook

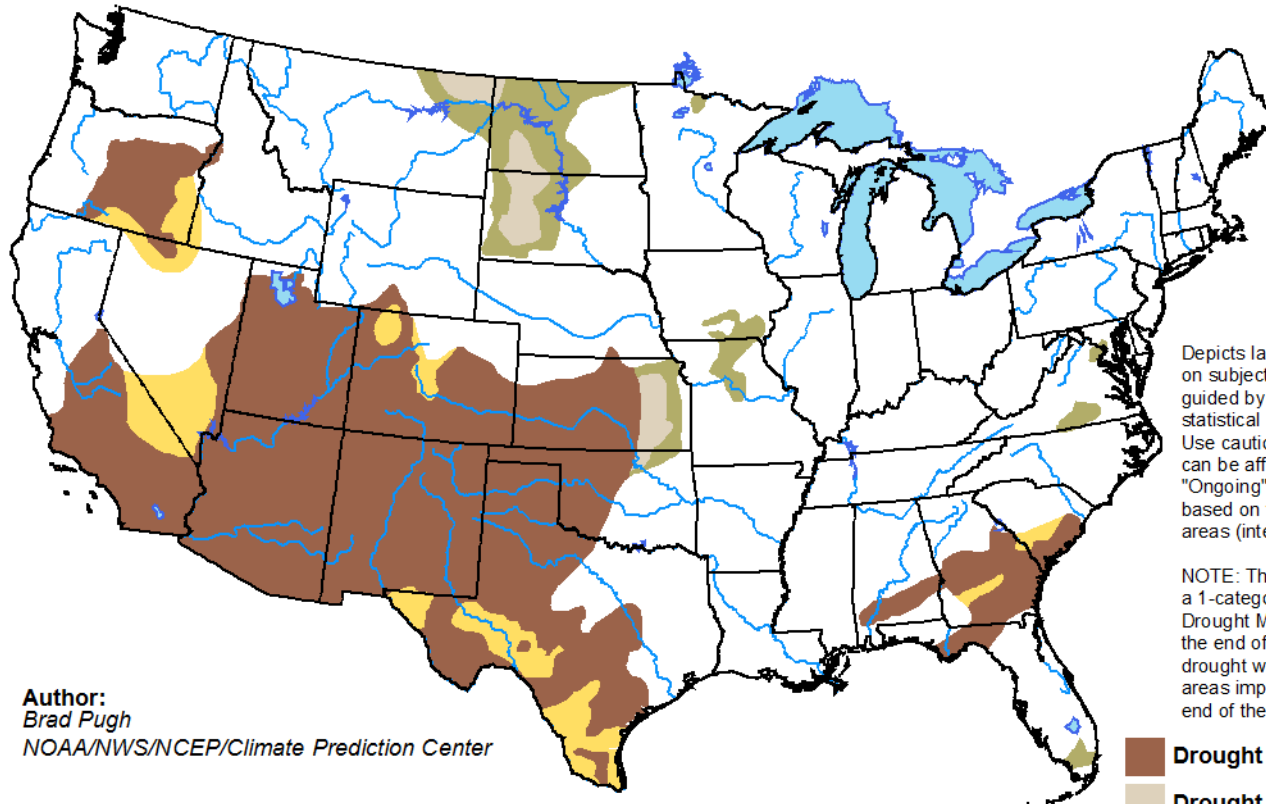
With 1981-2010 Kentucky Reference Distribution



U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period





Valid for March 15 - June 30, 2018
Released March 15, 2018

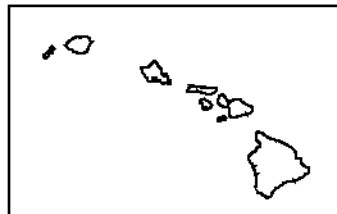
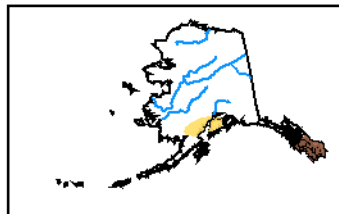


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

Author:
Brad Pugh
NOAA/NWS/NCEP/Climate Prediction Center

-  Drought persists
-  Drought remains but improves
-  Drought removal likely
-  Drought development likely



<http://go.usa.gov/3eZ73>



Kentucky Mesonet Update: TIM & DEWS

Stuart A. Foster
State Climatologist for Kentucky
Kentucky Climate Center
Western Kentucky University

Kentucky Farm Bureau
Water Management Working Group

Louisville, Kentucky

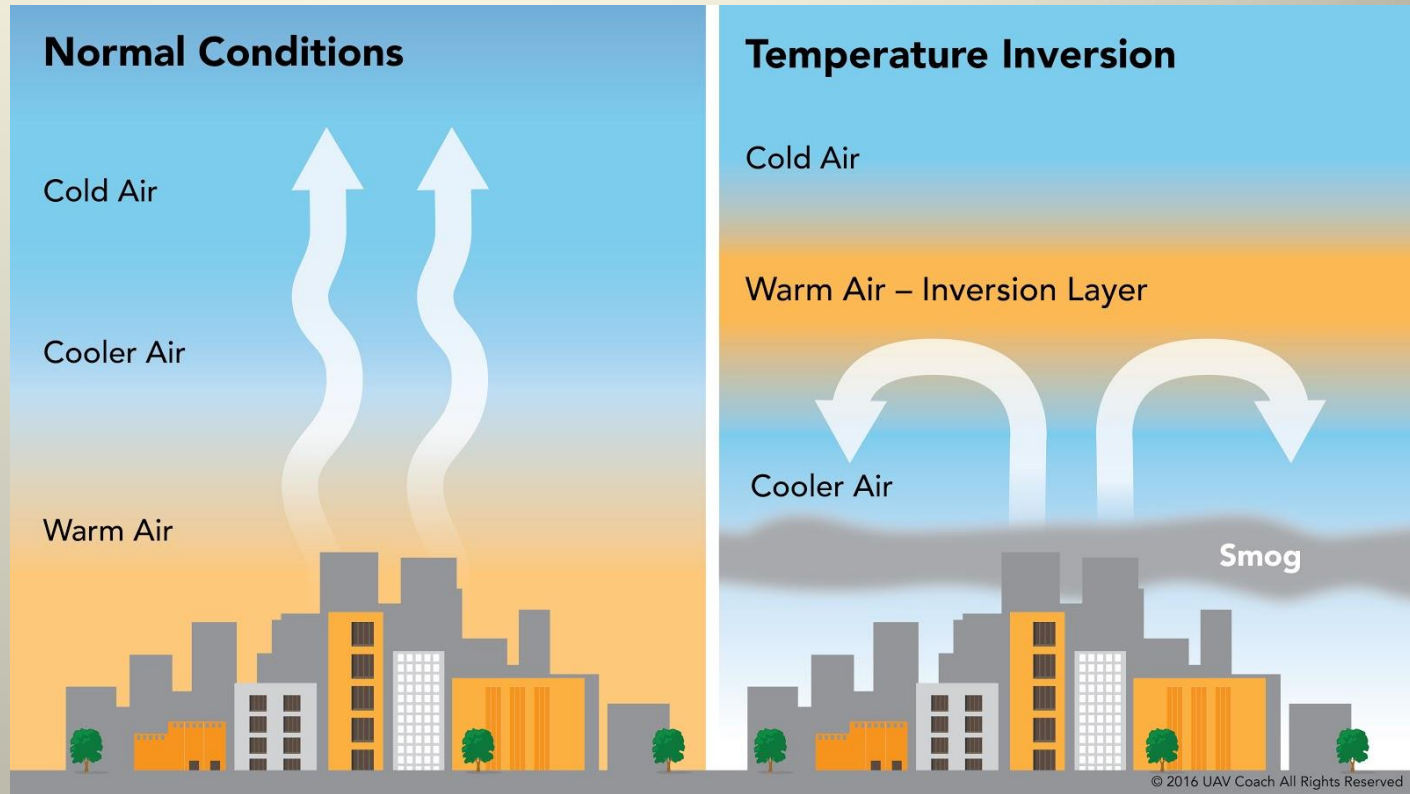
March 28, 2018



Temperature Inversions

Under normal conditions, air temperatures decrease with height.

May be occasions where the air temperature remains the same or increases with height.



Surface Temperature Inversions

A surface temperature inversion is likely to be present if:

- mist, fog, dew or a frost has occurred;
- smoke or dust hangs in the air and moves sideways just above the ground;
- wind speed is consistently less than 6 miles per hour in the evening and overnight



Spraying and Temperature Inversions

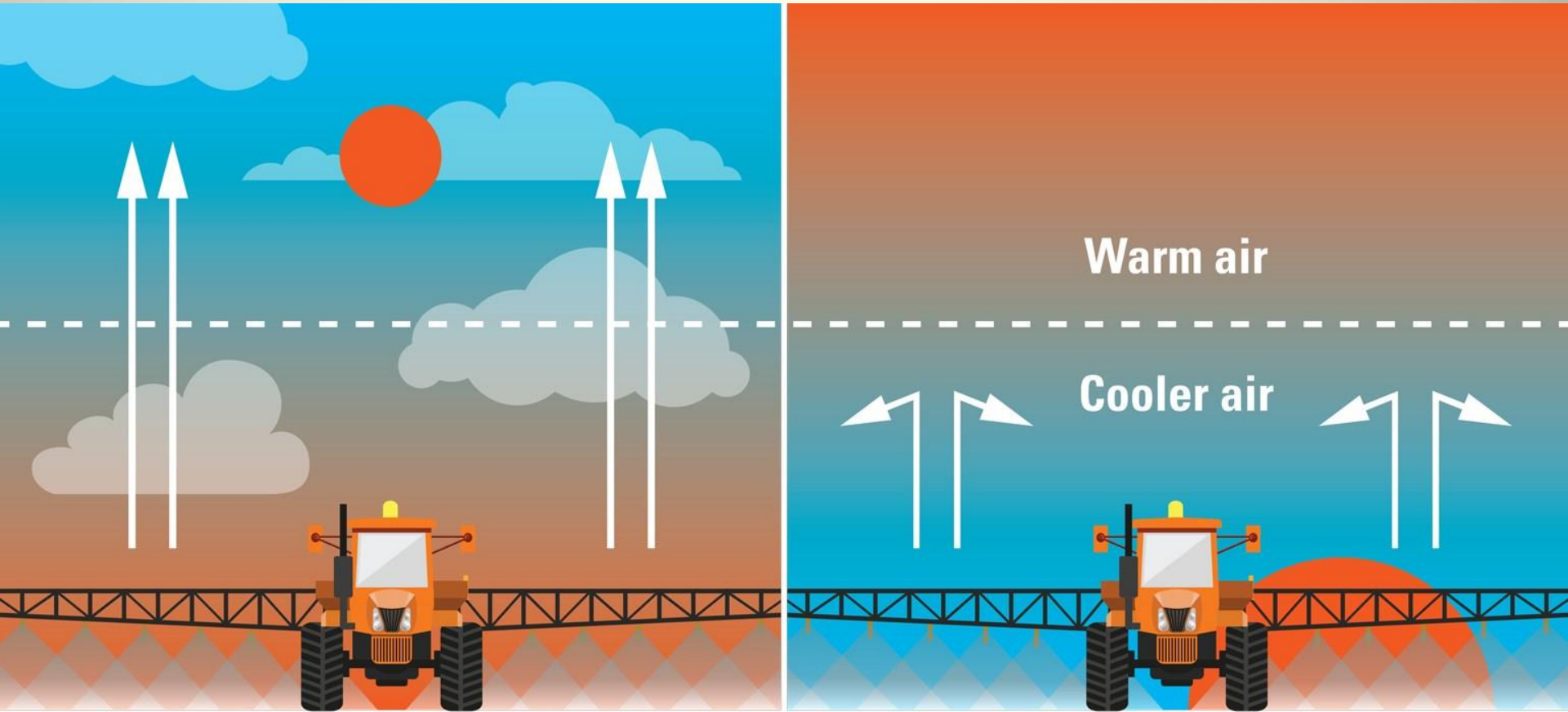
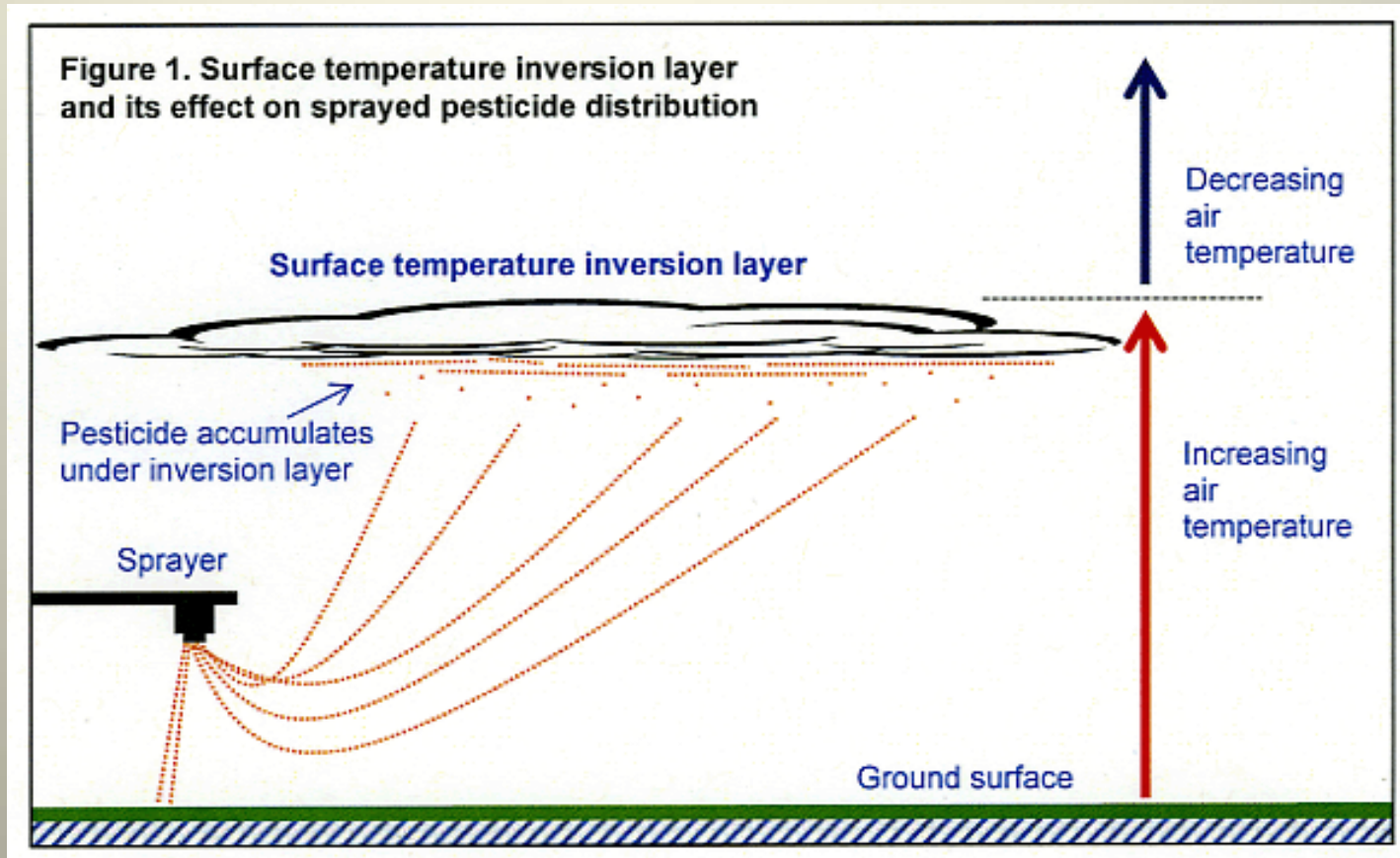


ILLUSTRATION BY LISA LYND, HENNADII AND COLORCOCKTAIL/ISTOCK/THINKSTOCK



Spraying and Temperature Inversions



Temperature Inversion Monitoring System

Experimental Project Supported by USDA Midwest Climate Hub



- Multi-level temperature measurements (1.5', 6', and 10') help to determine when the potential for a temperature inversion is high.
- Farmers can determine when conditions are right for applying chemical treatments to crops.
- The monitoring system is being installed at 6 sites.
- Results will be evaluated to determine whether to invest in monitoring at additional sites.



Building the Kentucky Drought Early Warning System

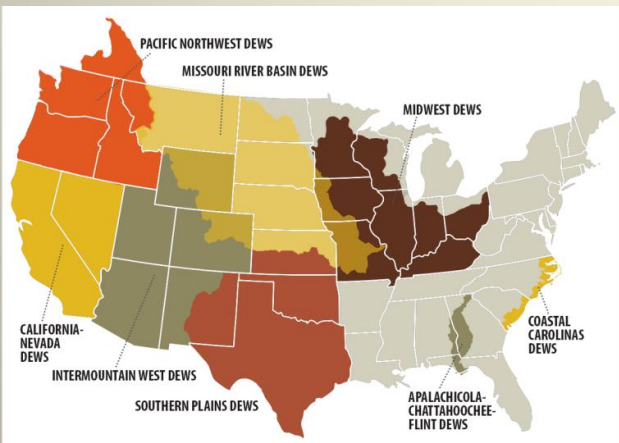
Proposed scope of work integrates four key themes:

Data Collection

Information Extraction

Messaging

Communication



Projected timeline:

Two-year project beginning in Summer of 2018.

Building the Kentucky Drought Early Warning System

Data Collection

- Expand soil monitoring
- Expand landscape imagery
- Develop impact reporting

Information Extraction

Messaging

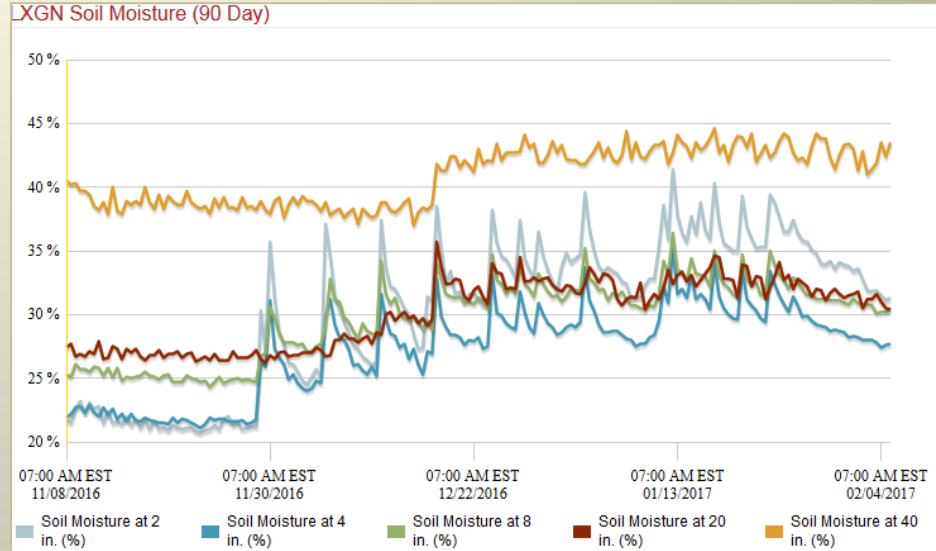
Communication



Precipitation and Soil Moisture Data for Drought Monitoring



Soil Probe
Installation

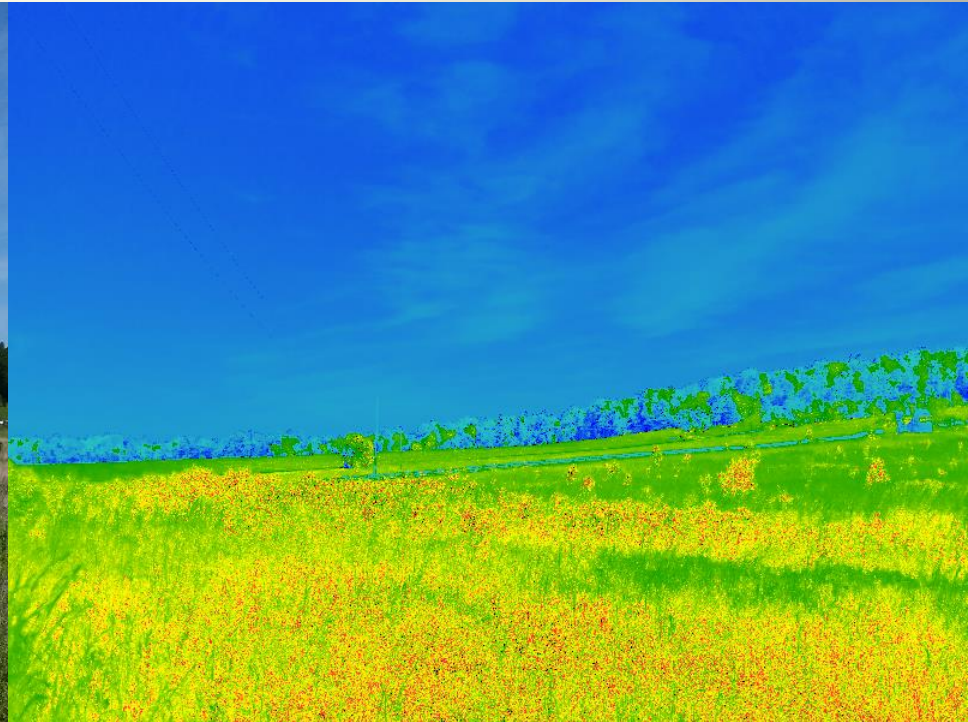


Vegetation Health Indicator

Experimental Project for Drought Impact Monitoring



Visual imagery to document landscape condition



Infrared imagery to document vegetation health through NDVI



Building the Kentucky Drought Early Warning System

Data Collection

Information Extraction

- Develop data visualization and analysis dashboard
 - Integrate precipitation, soil moisture, potential evapotranspiration, landscape imagery, NDVI imagery
 - Integrate streamflow and reservoir level data

Messaging

Communication



Drought Analysis and Reporting Tool

Landscape Photo



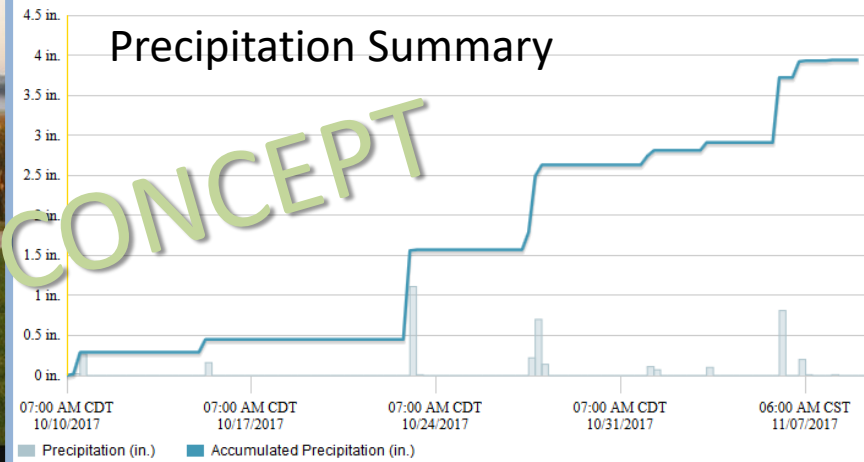
2017/09/24 12:00:00 UTC Kentucky Mesonet - Warren County (FARM) - (NW 320 Degs)

Report1

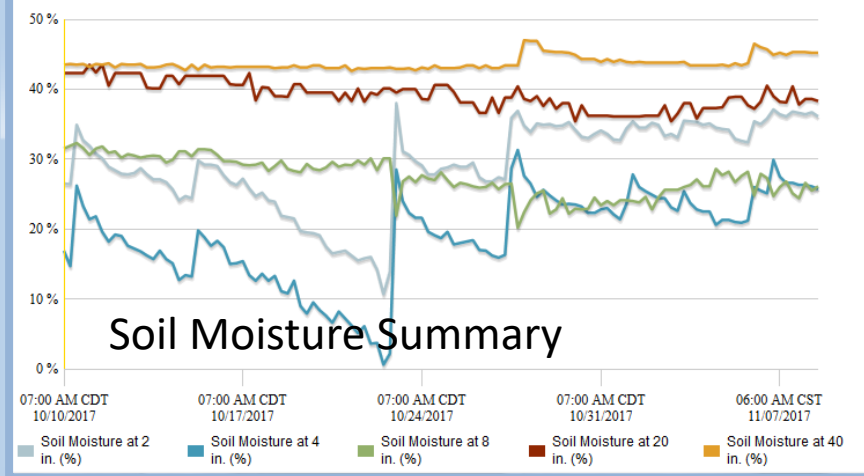
Farmers report ponds becoming dry. Pastures are in poor condition particularly in the northern portion of the county.

Text Description

FARM Precipitation and Accumulated Precipitation (30 Day)



FARM Soil Moisture (Water Fraction by Volume) (30 Day)



Building the Kentucky Drought Early Warning System

Data Collection

Information Extraction

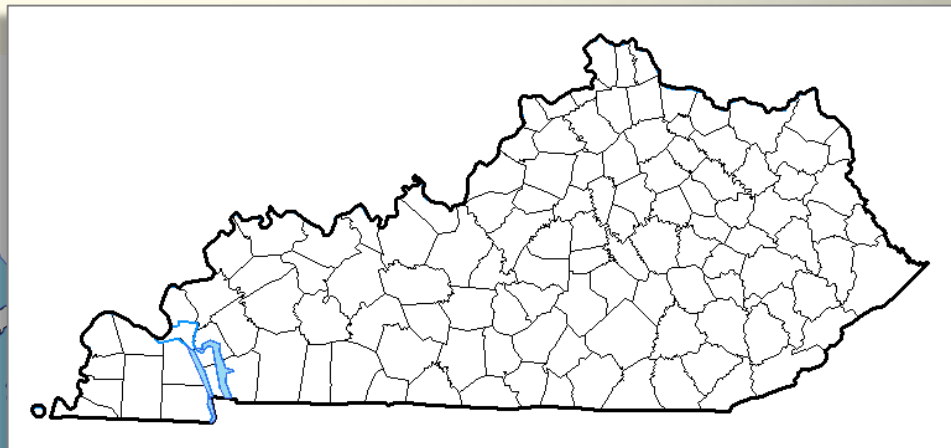
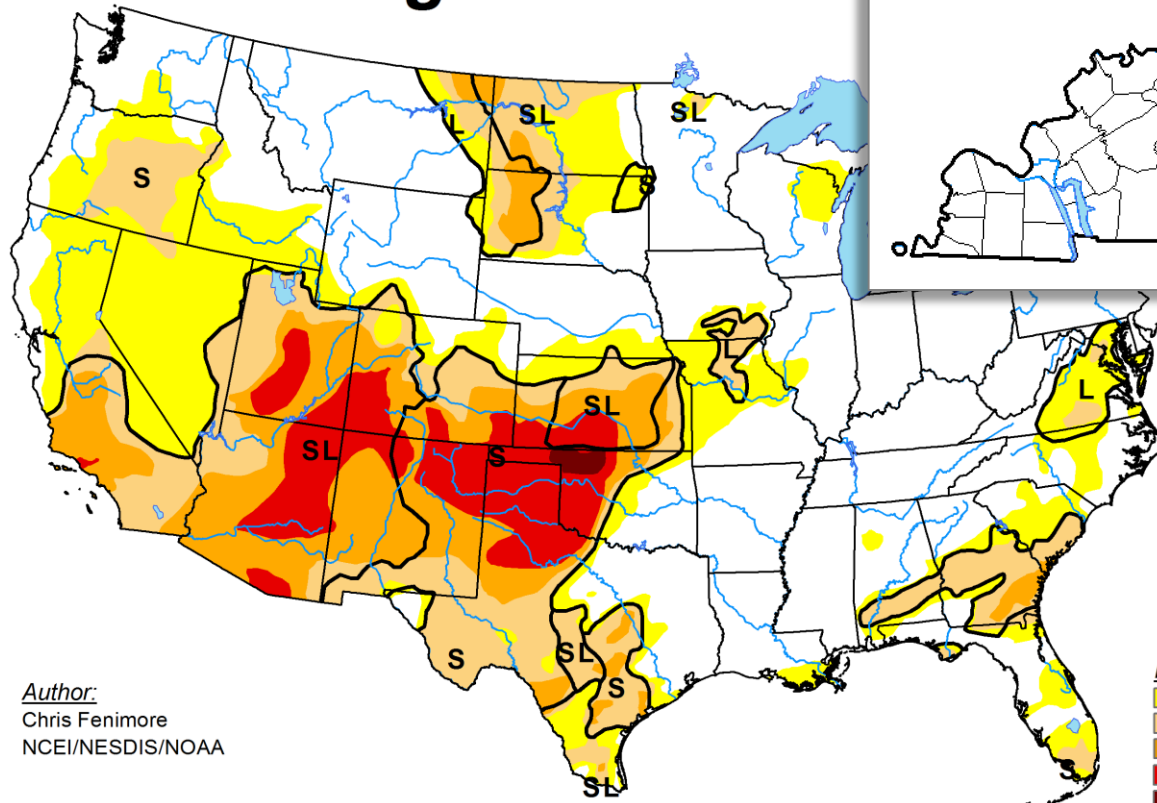
Messaging

- Develop infographics based on US Drought Monitor
- Develop ESRI Story Maps to document historical droughts and provide details of evolving droughts

Communication



U.S. Drought Monitor



Author:
Chris Fenimore
NCEI/NESDIS/NOAA

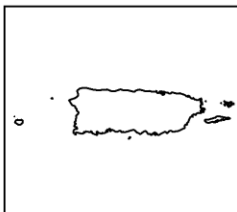
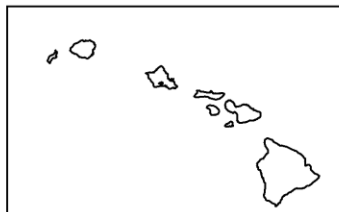
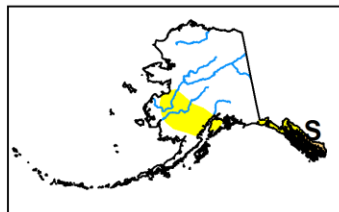
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Building the Kentucky Drought Early Warning System

Data Collection

Information Extraction

Messaging

Communication

- Develop webinar series targeting user communities, including agriculture, water management, public health, etc.
- Partner with KY DOW, KYFB WMWG, UK Cooperative Extension, Kentucky Rural Water Association, USGS, KGS, KY DPH, KY DEM, and other organizations



