Kentucky Drought Early Warning System and Kentucky Mesonet Update

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Kentucky Farm Bureau
Water Management Working Group

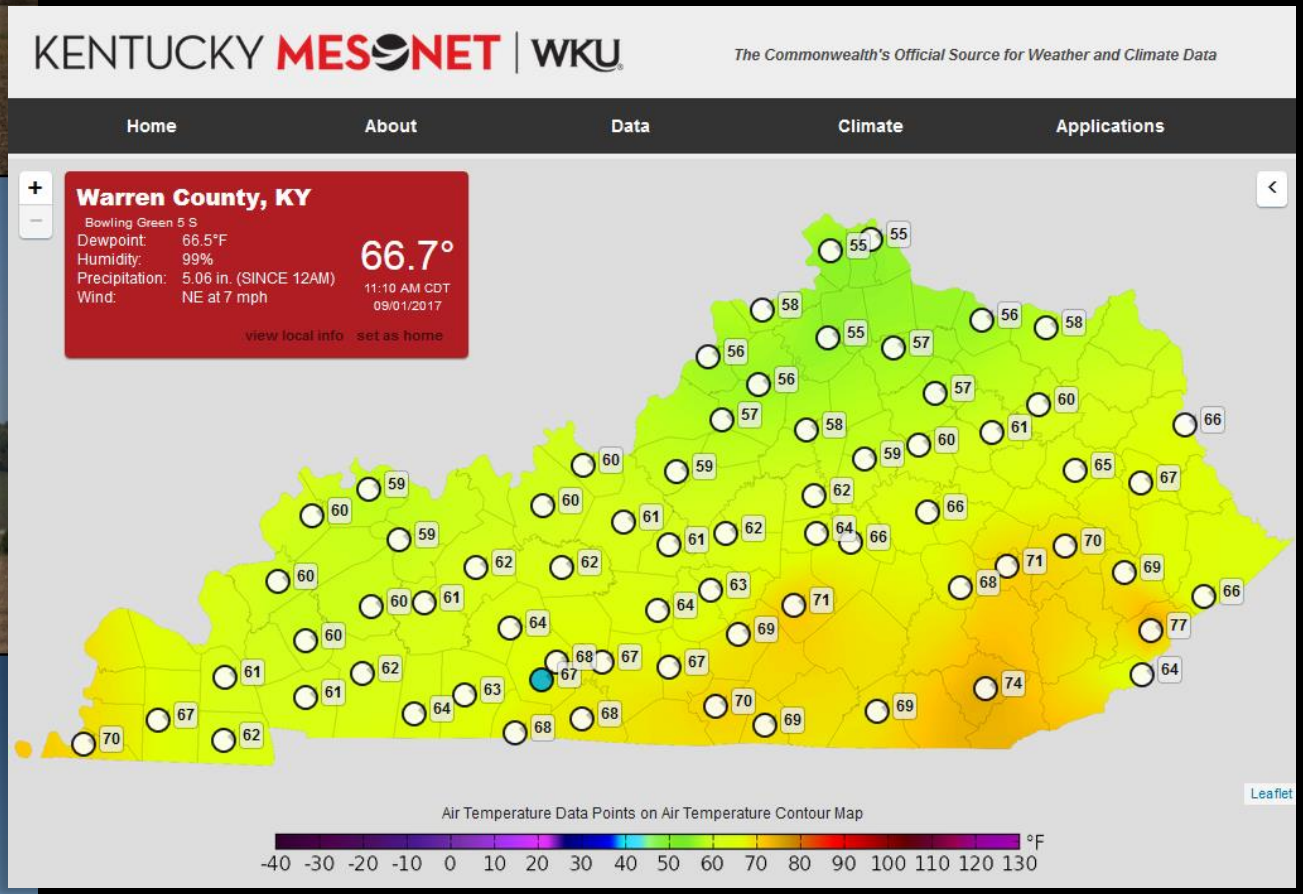
Princeton, Kentucky

August 28, 2019

Topics

- Kentucky Mesonet Update
  - Network Expansion
  - Instrumentation Suite
  - KADF-supported Instrumentation Upgrades
- Kentucky Drought Early Warning System
  - Dashboard for Data Visualization and Analysis
  - Kentucky Monthly Climate Perspective Webinar
- Biennial US Drought Monitor Forum

KENTUCKY MESONET | WKU



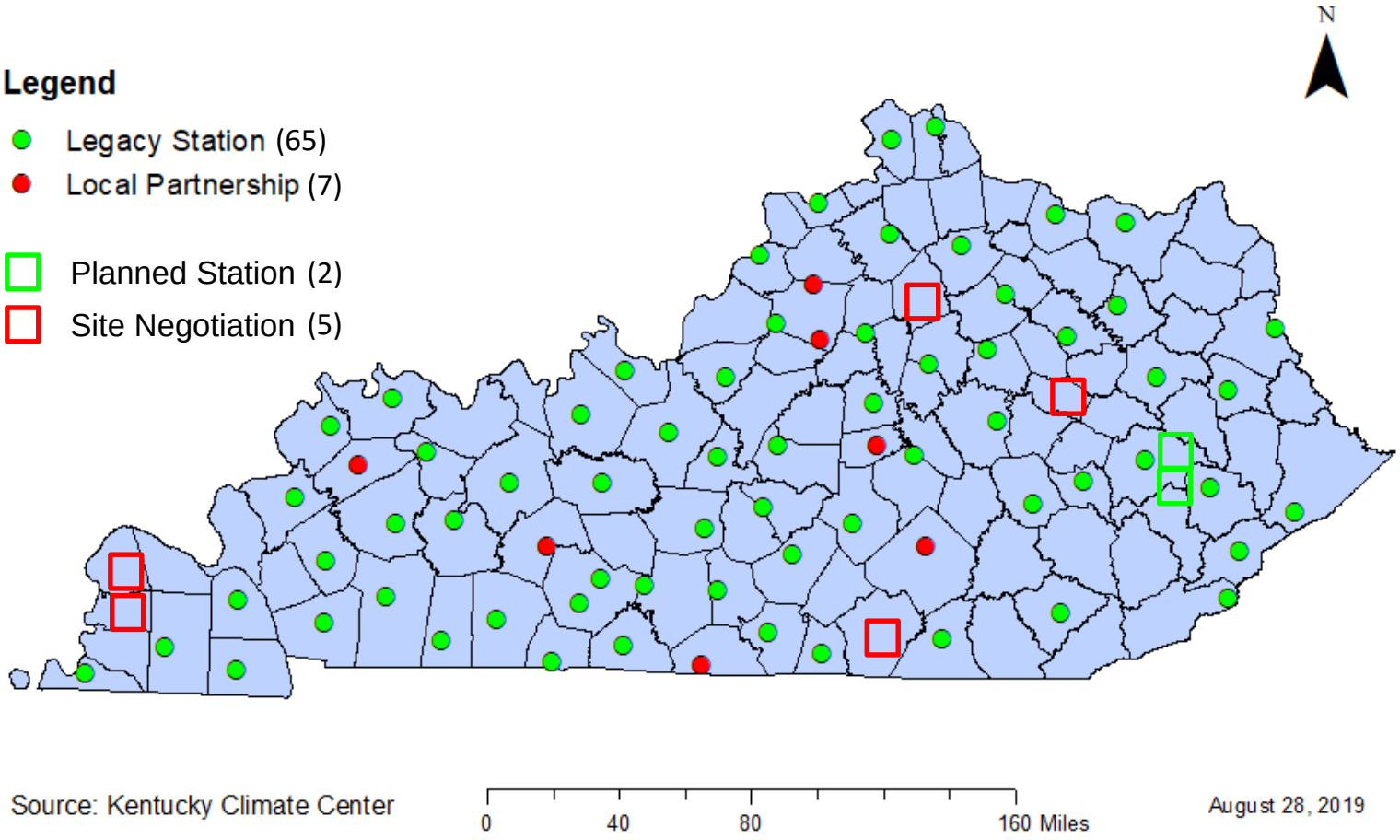
Mapping Each Moment

KENTUCKY MESONET | WKU

We collect a comprehensive suite of high-quality, community-focused, near real-time weather data from our statewide infrastructure.

Using those data, we help make introductions, start conversations, build engagement, inform decisions, and solve problems.

KENTUCKY MESONET | WKU



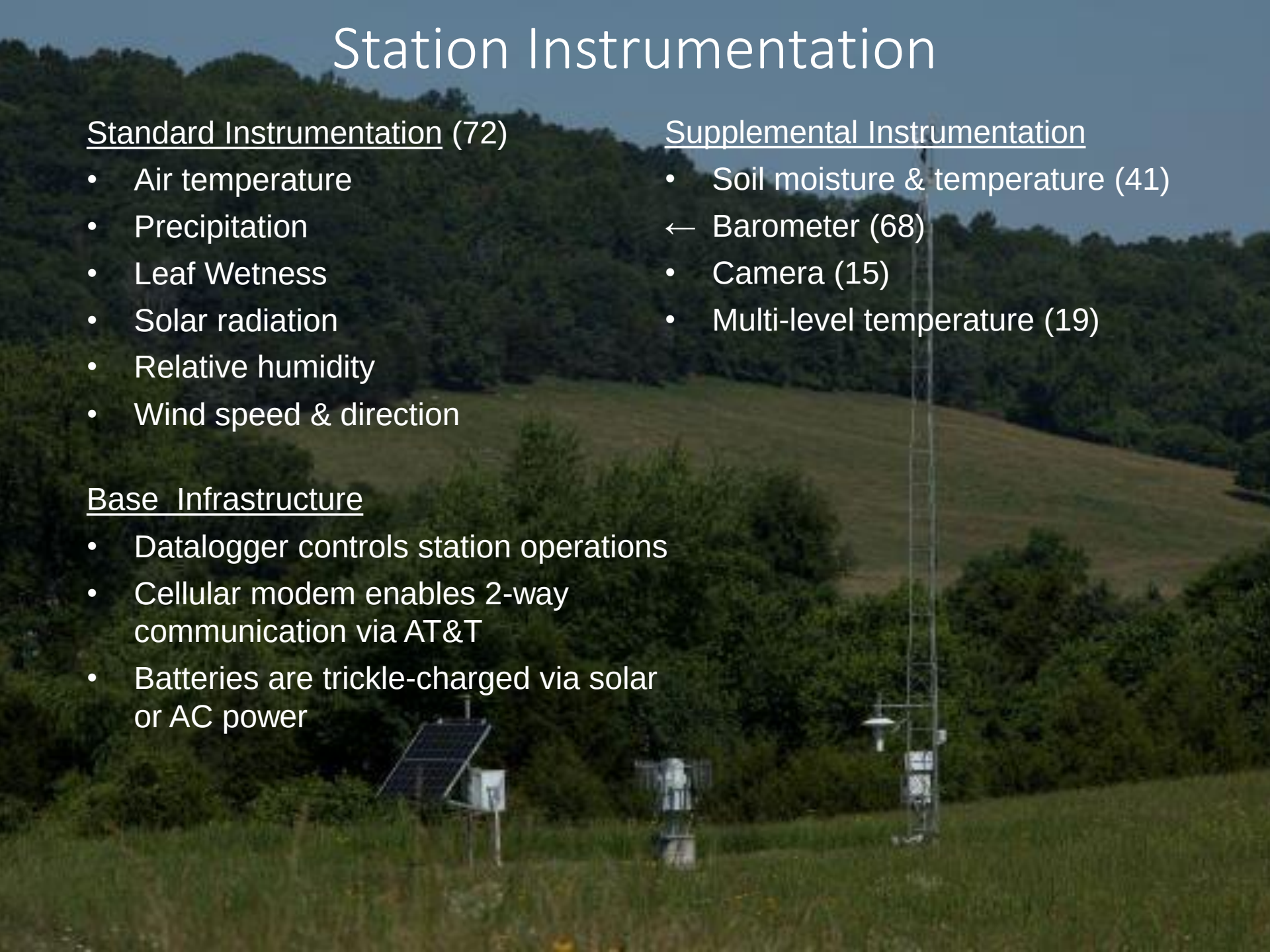
DIXO - Webster County – 01/08/2019

WADD - Shelby County – 02/05/2019

EWPK - Warren County – 04/17/2019

Kentucky Mesonet
New Station Installations
2019

Station Instrumentation



Standard Instrumentation (72)

- Air temperature
- Precipitation
- Leaf Wetness
- Solar radiation
- Relative humidity
- Wind speed & direction

Base Infrastructure

- Datalogger controls station operations
- Cellular modem enables 2-way communication via AT&T
- Batteries are trickle-charged via solar or AC power

Supplemental Instrumentation

- Soil moisture & temperature (41)
- ← Barometer (68)
- Camera (15)
- Multi-level temperature (19)

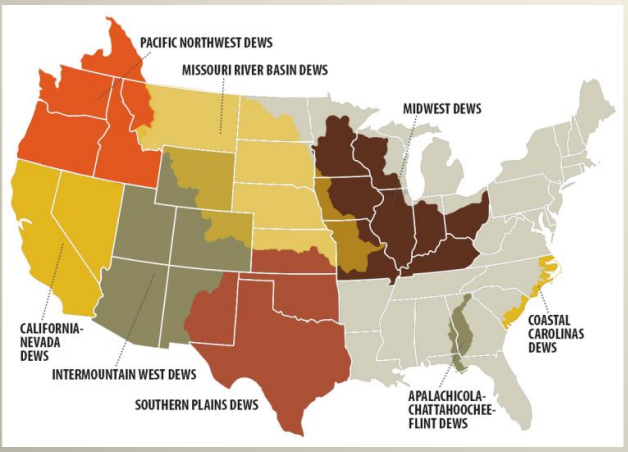
KADF Instrumentation Upgrades

- Precipitation Gauge (8)
  - Grayson, Hart, Lewis, Lincoln, Mercer, Morgan, Muhlenberg, Todd
- Field Camera (3)
  - Lewis, Lincoln, Todd

NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM

NIDIS

Building the Kentucky Drought Early Warning System

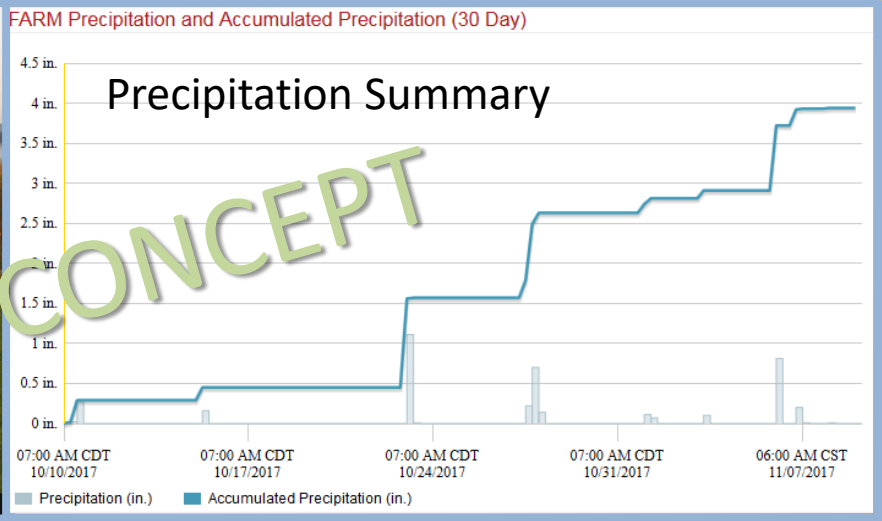


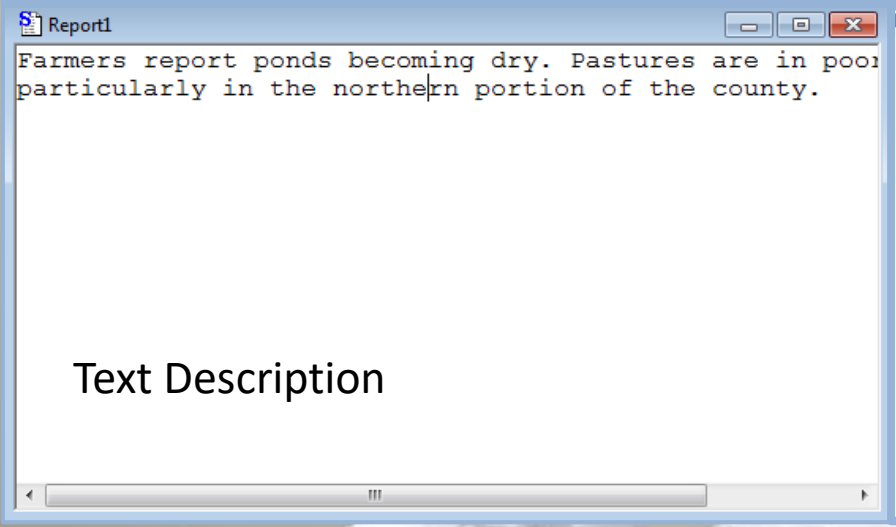
Proposed scope of work integrates four key themes:

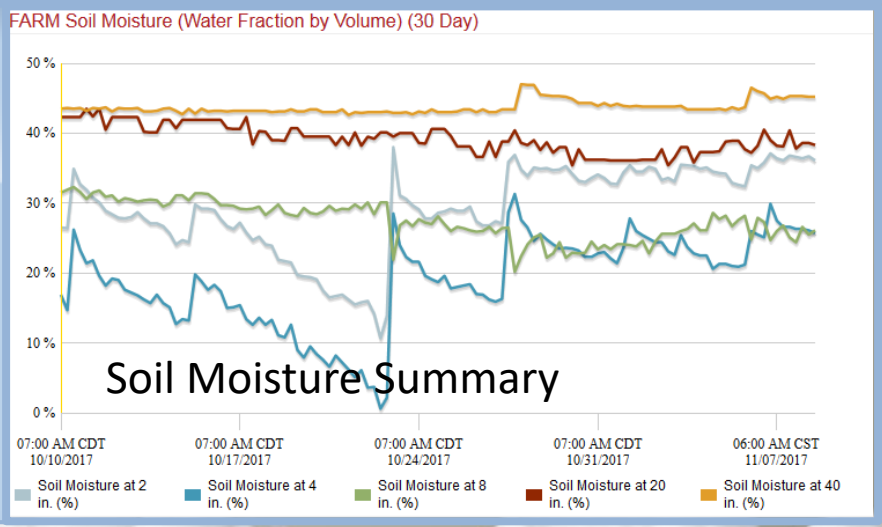
- Data Collection
- Information Extraction
- Messaging
- Communication

Projected timeline:
Two-year project beginning in Summer of 2018.

Drought Analysis and Reporting Tool







Dashboard Functional Requirements

- Interactive platform to create time-series graphs that can be integrated with images, maps, and tables
- Provide users with flexibility to customize graphs and other dashboard content
- Enable users to access multiple, complementary data sources, including Kentucky Mesonet and USGS stream and reservoir data

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Graphs

Images

Maps

Tables

Coming soon...

Obj ceca10cd-a2cf-5ee-4916-38ed6376fc64

← Go Back

Mesonet Camera

Upload

US Drought Monitor

Site Camera Image

Mesonet Camera

Site | FARM (NW 320 Degs)

Timezone: UTC Time

< Previous Forward >

2019-08-20

Sort: Ascend


2019/08/20 11:00 UTC


2019/08/20 11:30 UTC


2019/08/20 12:00 UTC


2019/08/20 12:30 UTC


2019/08/20 13:00 UTC


2019/08/20 13:30 UTC


2019/08/20 14:00 UTC


2019/08/20 14:30 UTC


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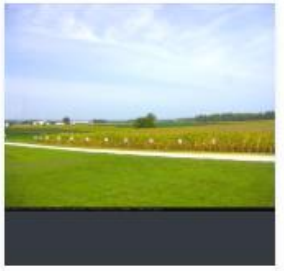
2019/08/20 15:30 UTC


2019/08/20 16:00 UTC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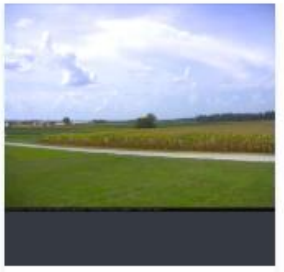
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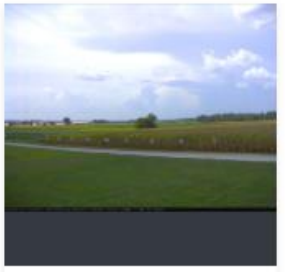
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Obj ceca10cd-a2cf-5ee-4916-38ed6376fc64

Graphs

Images

Maps

Tables

Coming soon...

Obj ceca10cd-a2cf-5ee-4916-38ed6376fc64

← Go Back

Advanced Mode

Source

Kentucky Mesonet

United States Geological Survey

Group

Location Group Selection

Variable Group Selection

Location

User allows to select one or more than one locations.

× Caldwell County (PRNC)

Location

User allows to select one or more than one locations.

Data Interval

Data interval affects the sample size of the graph.

1 Day

Data Interval

Data interval affects the sample size of the graph.

1 Day

Variables

User allows to select one or more than one variables.

× Accumulated Precipitation - Daily Sum

Variables

User allows to select one or more than one variables.

Time Range

Time range affects the range of the graph.

06/01/2019 12:00 AM - 08/19/2019 4:22 PM

Yearly Comparison (Optional)

This is an optional option, once a year is selected. The system will generate a yearly comparison graph.

× 2017 × 2018

Submit

Dashboard

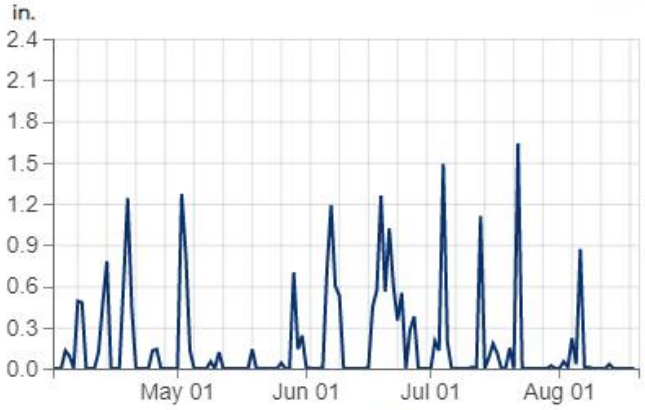
Taskbar

Site Camera Image

Site Camera Image

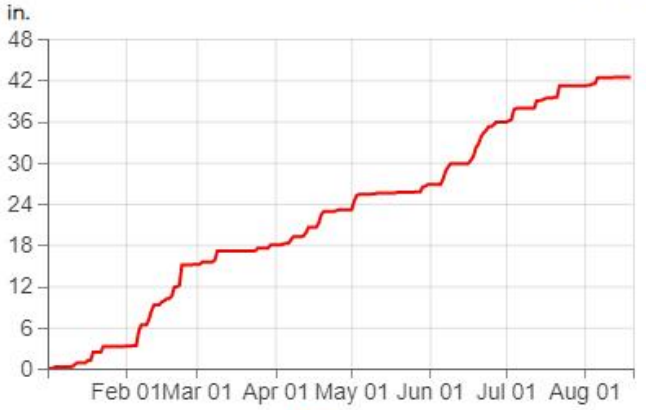
Precipitation

Grid: On



Accumulated Precipitation

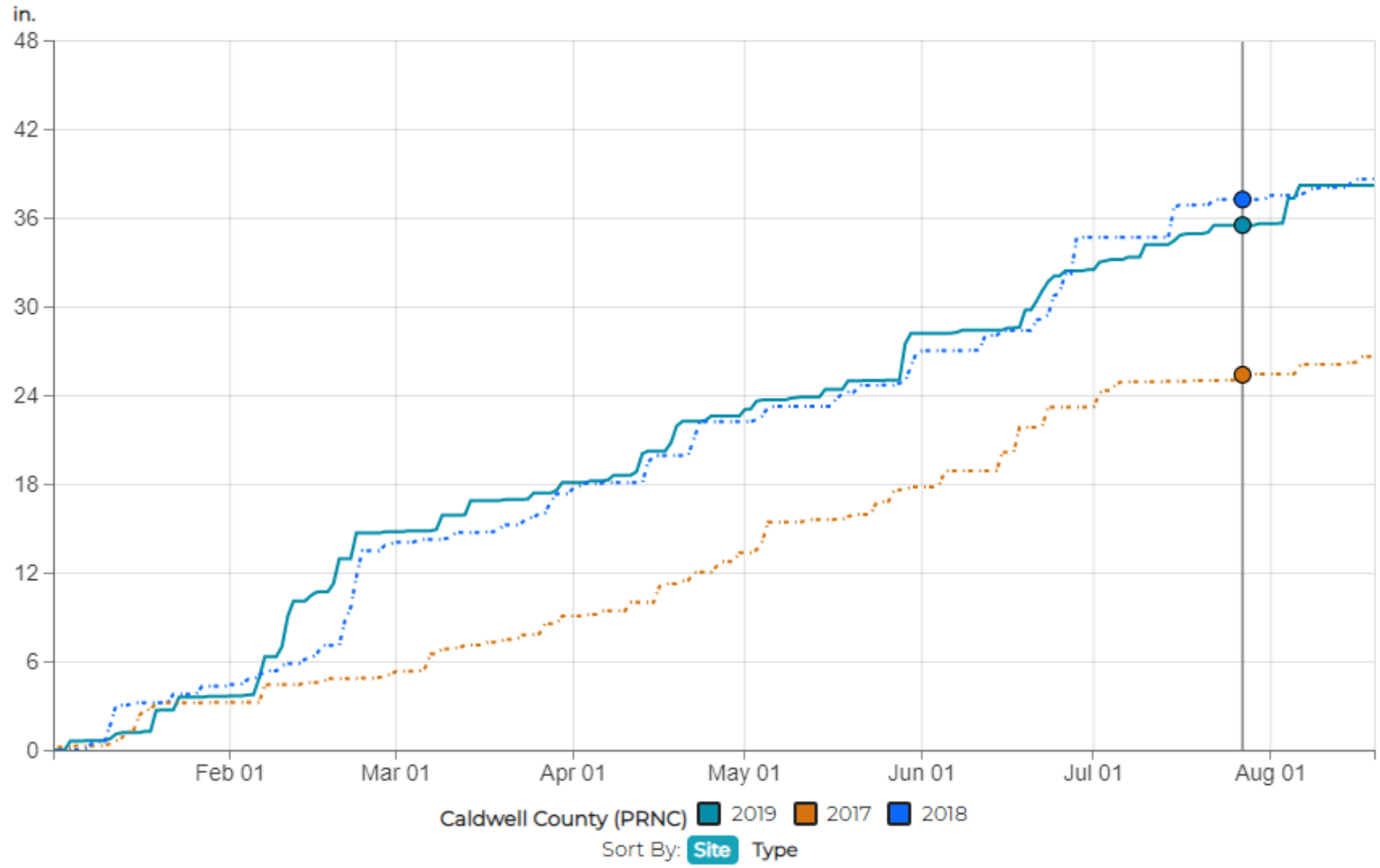
Grid: On



Accumulated Precipitation

Grid: On

Tooltip | Summary



07-27 05:00

Caldwell County (PRNC-20
Accumulated Precipitatio
35.49 in.
Caldwell County (PRNC-20
Accumulated Precipitatio
25.37 in.
Caldwell County (PRNC-20
Accumulated Precipitatio
37.22 in.

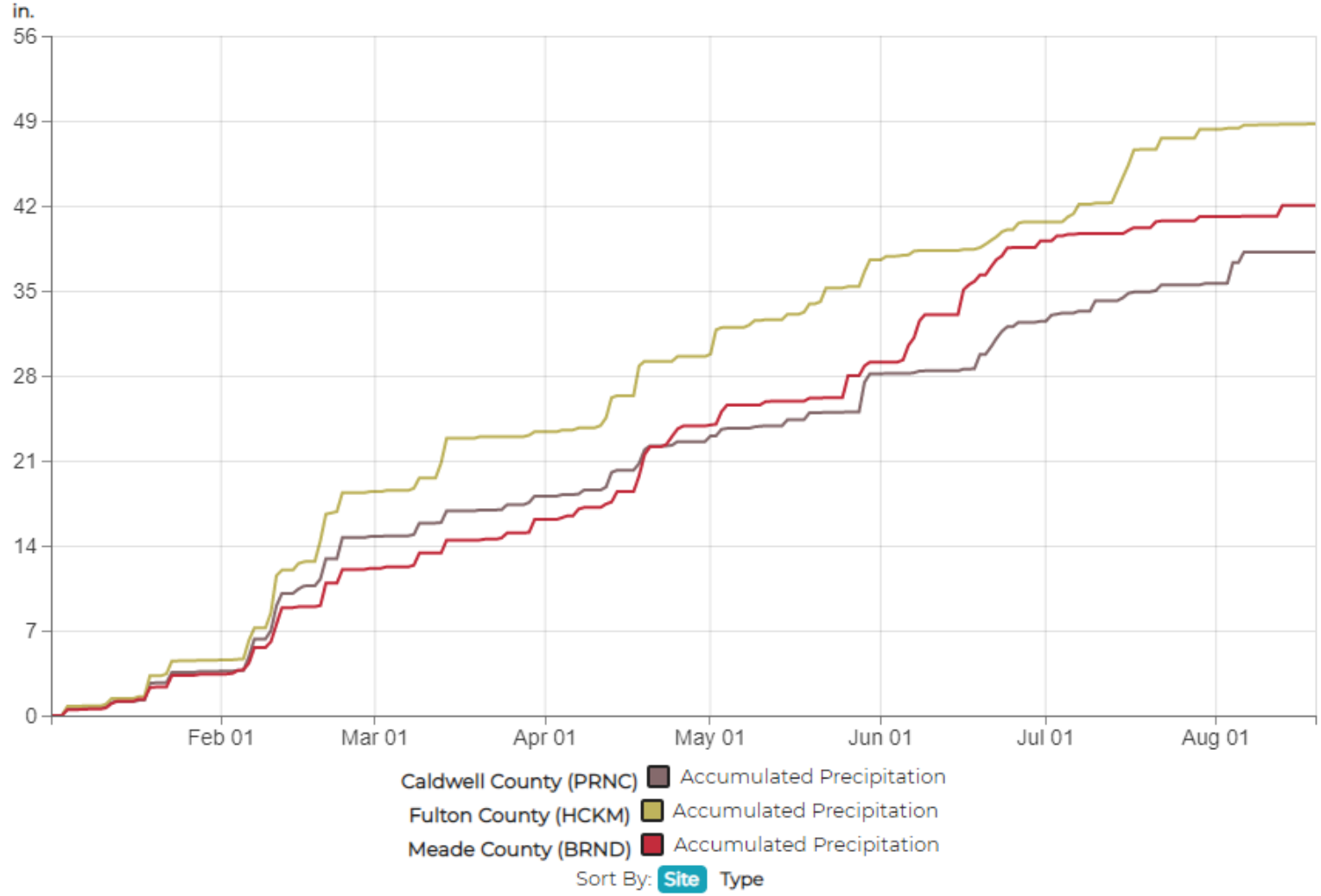
Focus

O:O:O:O

Accumulated Precipitation

Grid: On

Tooltip | Summary



Focus

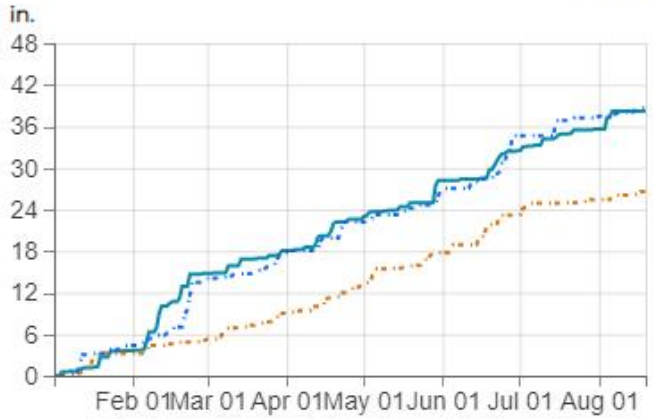
O:O:O:O

Dashboard

Taskbar

Accumulated Precipitation

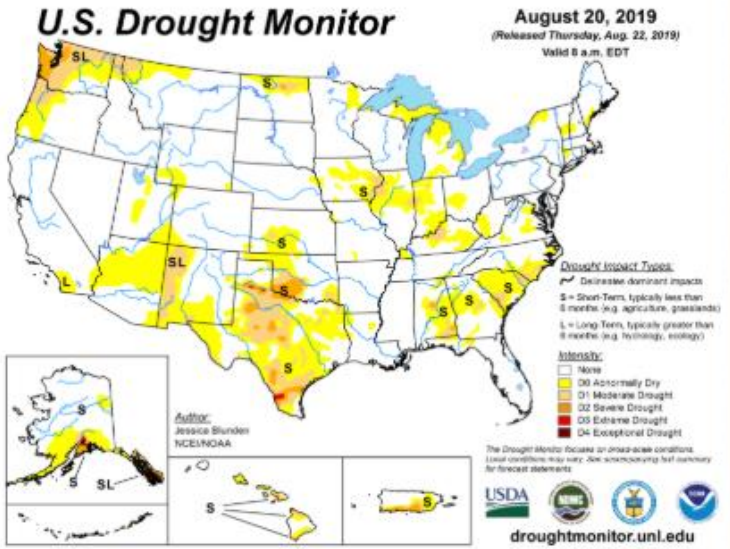
Grid: On



Caldwell County (PRNC) 2019 2017 2018

Sort By: Site Type

20190820 - US Drought Monitor National



Accumulated Precipitation

Grid: On

Obj 44a4da45-7fb7-73d-505f-659baabe5eda

← Go Back

Advanced Mode

Source

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United States Geological Survey

Group

Location Group Selection

Variable Group Selection

Location

User allows to select one or more than one locations.

Location

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Data Interval

Data interval affects the

1 Day

Combine data from different sources

Variables

User allows to select one or more than one variables.

Variables

User allows to select one or more than one variables.

Time Range

Time range affects the range of the graph.

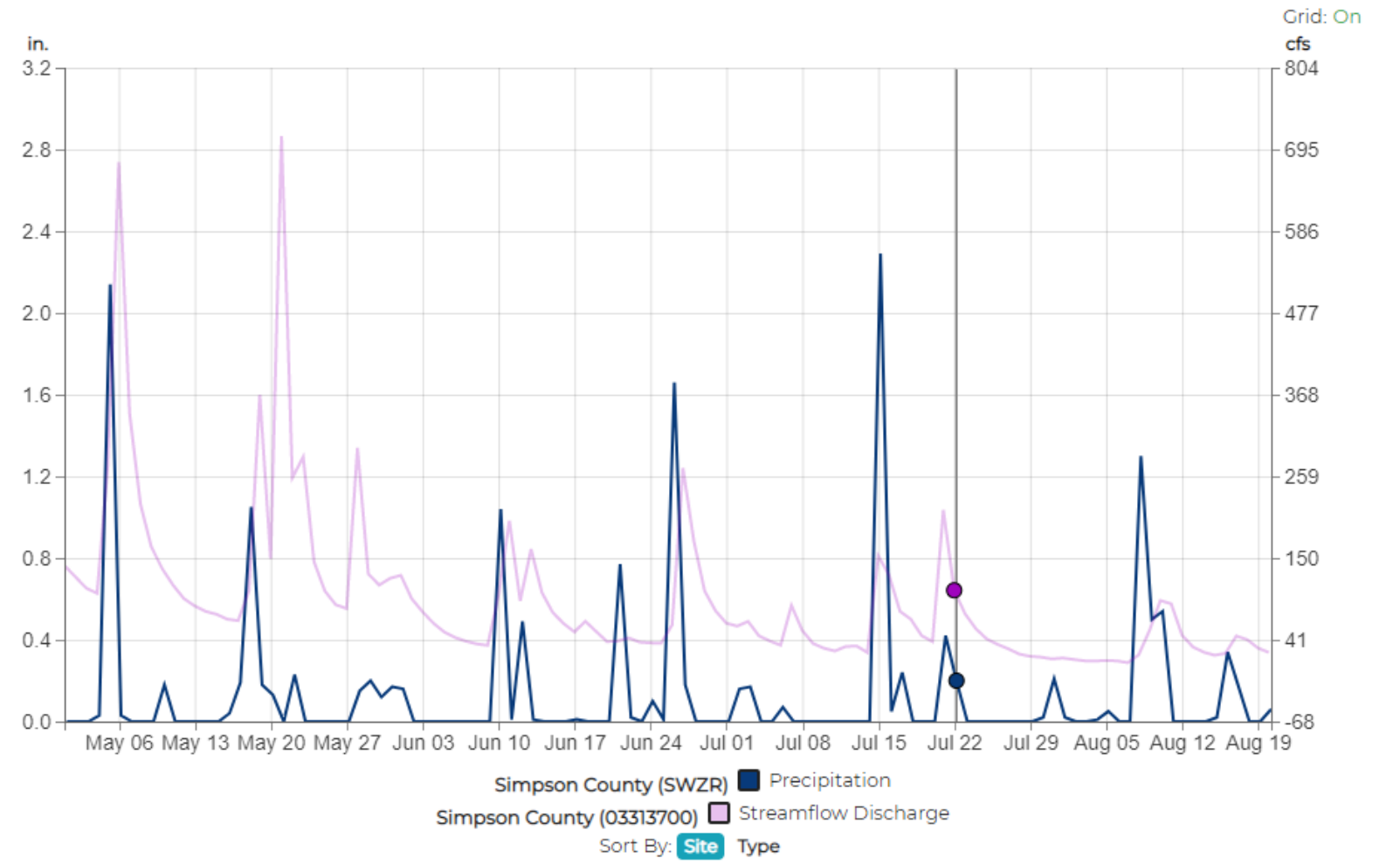
08/13/2019 11:25 AM - 08/20/2019 11:25 AM

Yearly Comparison (Optional)

This is an optional option, once a year is selected. The system will generate a yearly comparison graph.

Submit

Precipitation&Streamflow Discharge



Tooltip | Summary

07-22 00:00

Simpson County (SWZR)
Precipitation: 0.2 in.
Simpson County (03313700)
Streamflow Discharge: 107 cfs

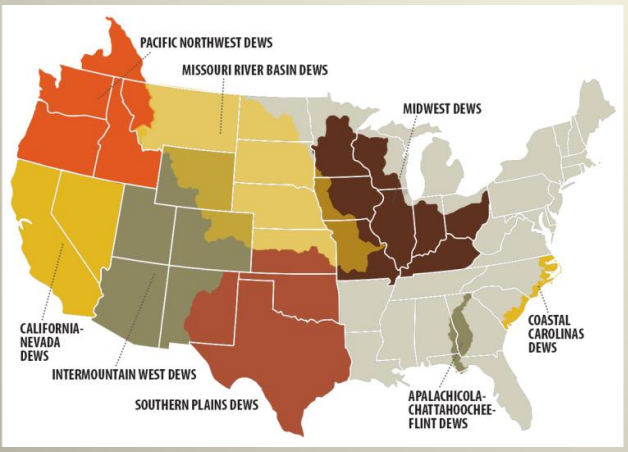
Focus

O:O:O:O

NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM

NIDIS

Building the Kentucky Drought Early Warning System



Proposed scope of work integrates four key themes:

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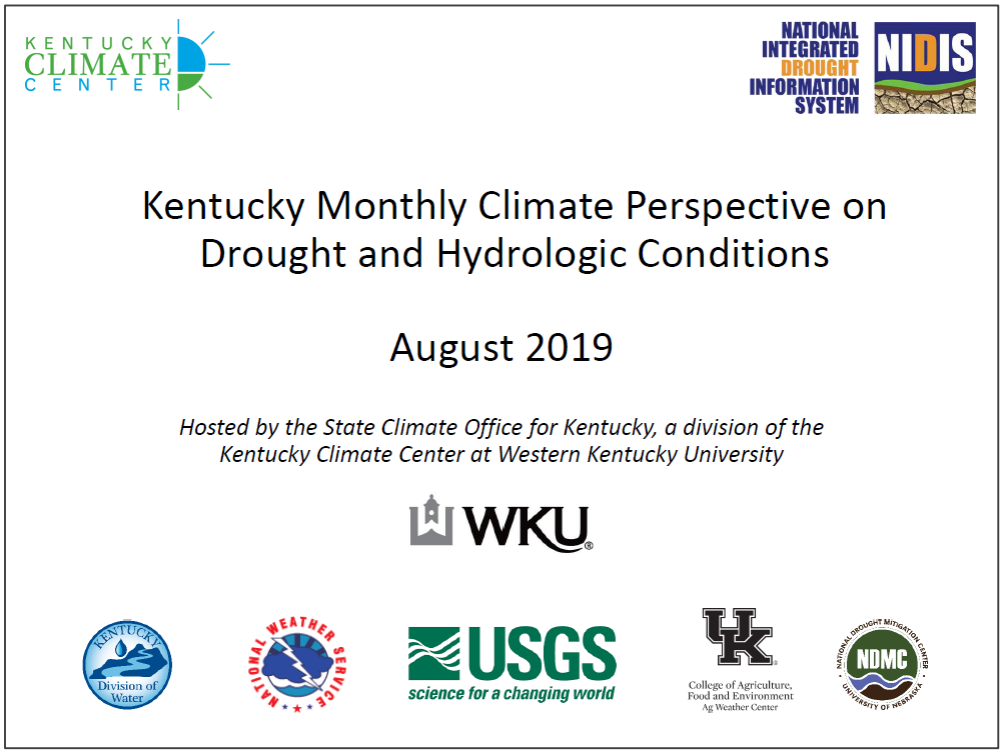
Two-year project beginning in Summer of 2018.

Webinar Series in Conjunction with Kentucky Drought Early Warning System



- Series presented in partnership with NIDIS and in coordination with the Midwest DEWS
- Summarizes current climatic conditions, highlights impacts, and provides climate outlooks
- Integrates data from multiple sources

Warren County
July 26, 2019

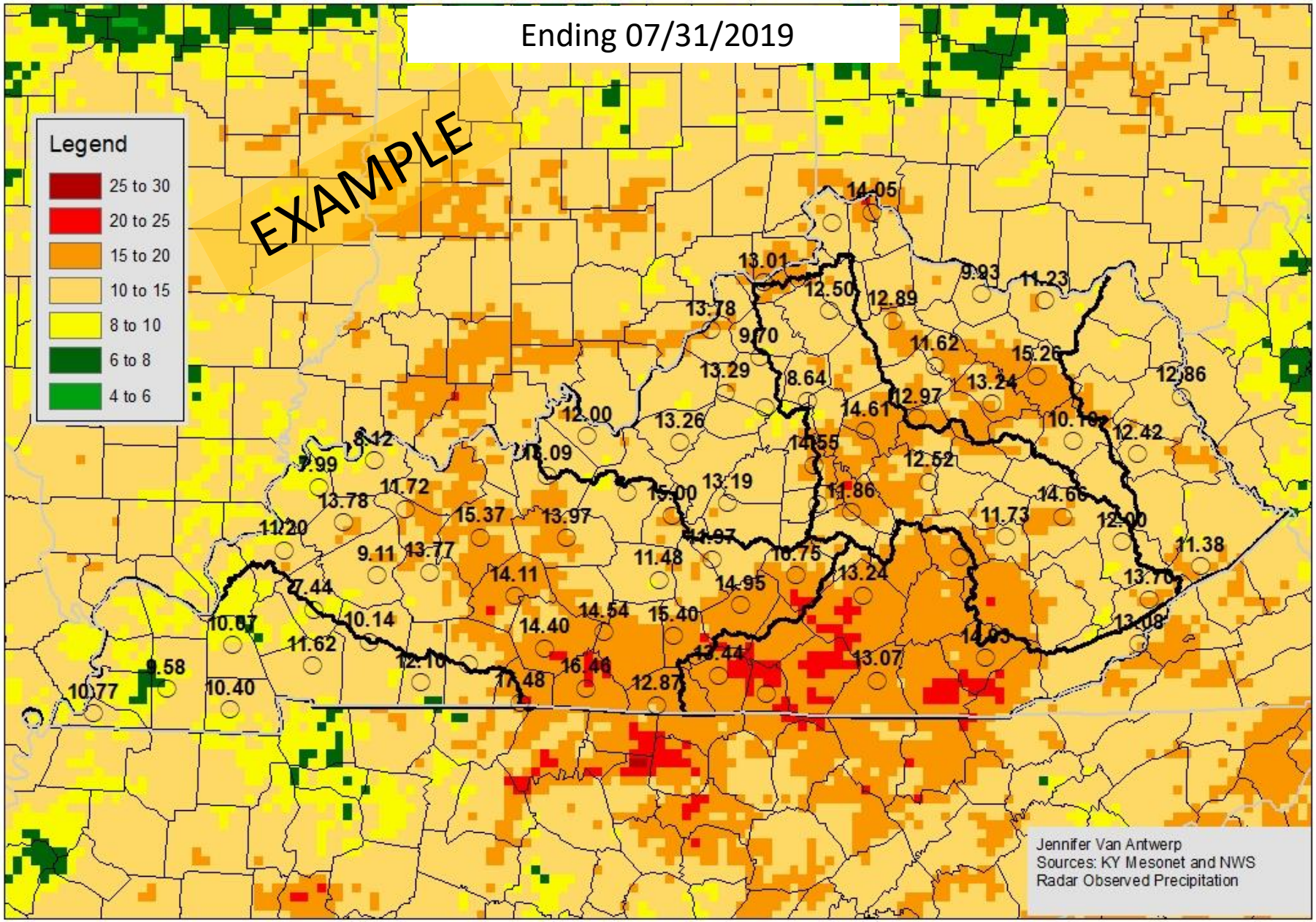
Shelby County
July 1, 2019

Outline

- Recent Conditions
  - Temperature and precipitation
  - Soil moisture
  - Stream flow
  - Drought
- Impacts
- Outlooks
  - Sub-monthly
  - Monthly
  - Seasonal
- Summary
- Questions and Discussion

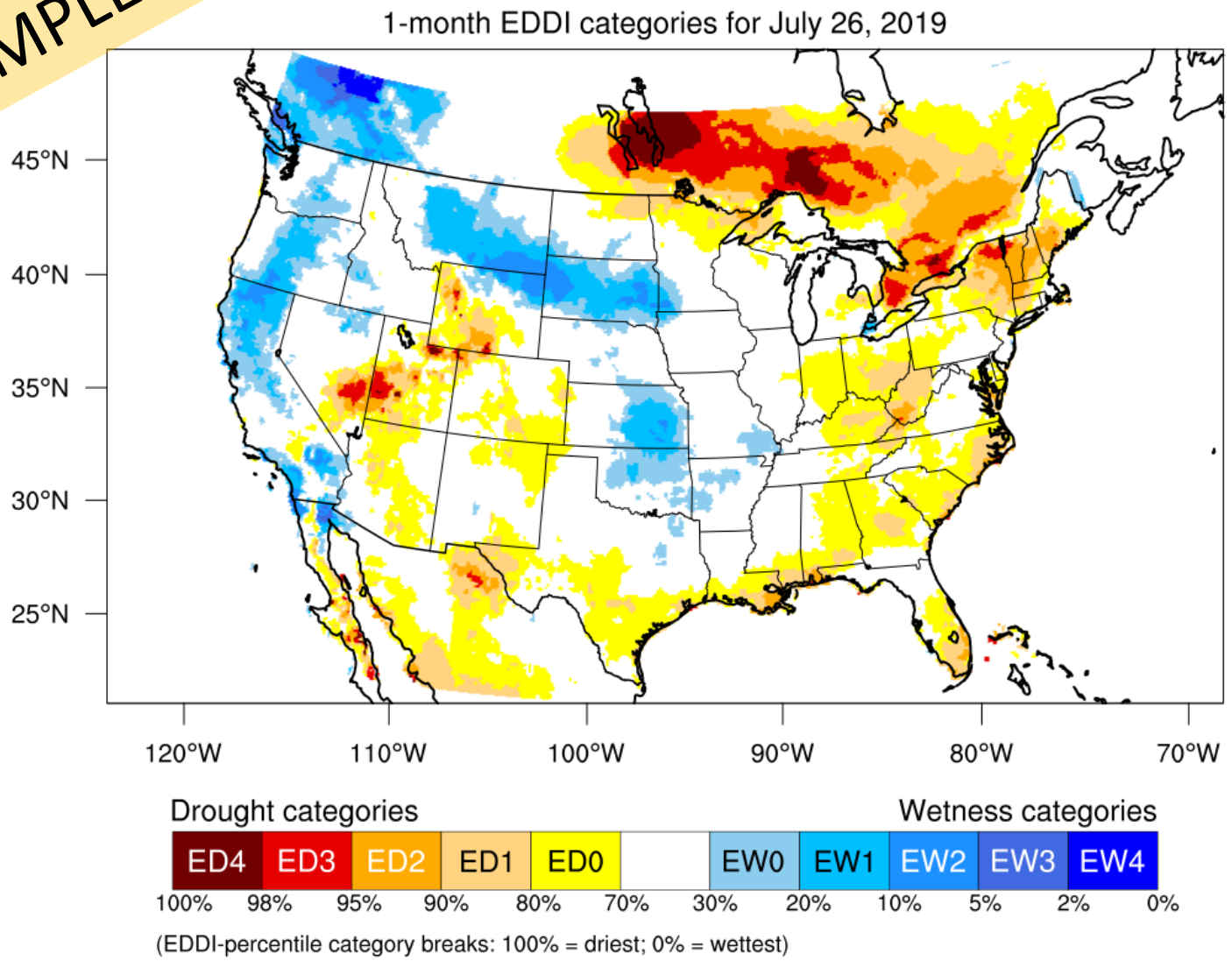
EXAMPLE

60-Day Radar-Estimated Precipitation and Observed Amounts at KY Mesonet Stations (Inches)



Evaporative Demand Drought Index

EXAMPLE

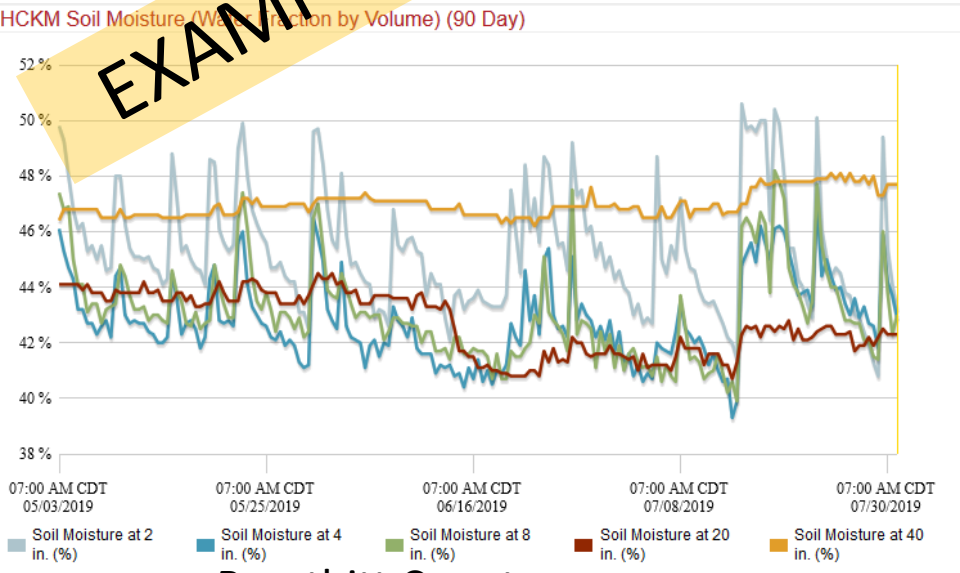


3-Month Soil Moisture Graphs

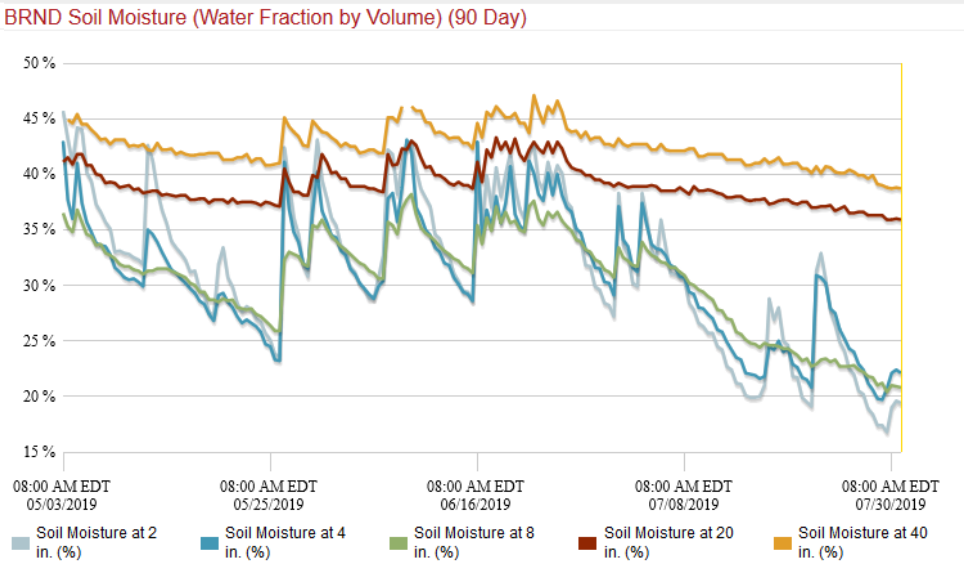
Selected Kentucky Mesonet Stations

EXAMPLE

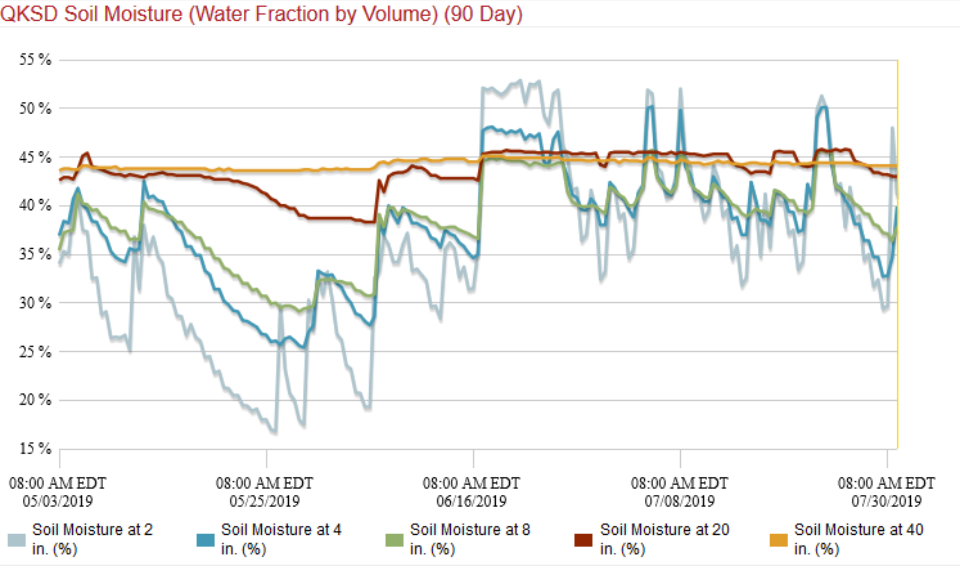
Fulton County



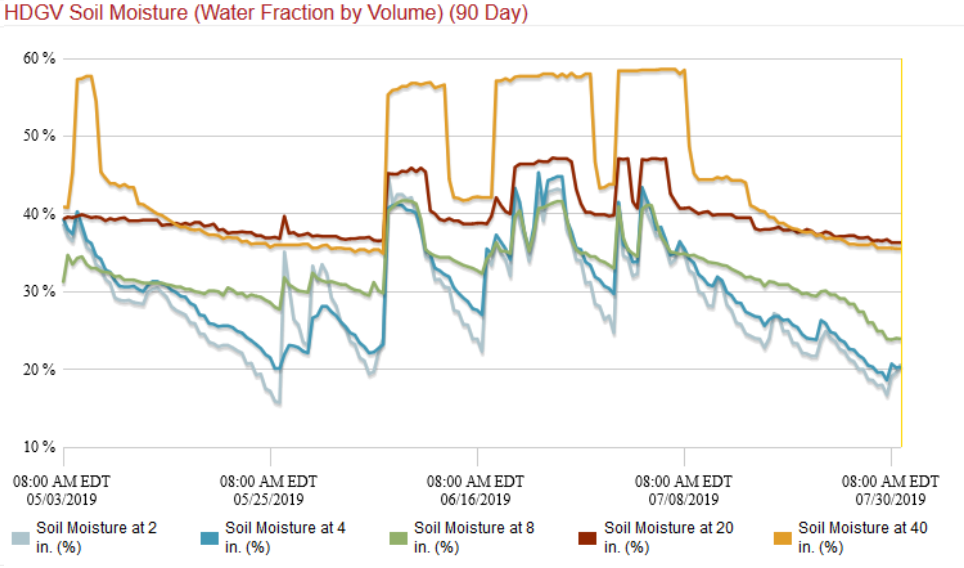
Meade County



Breathitt County

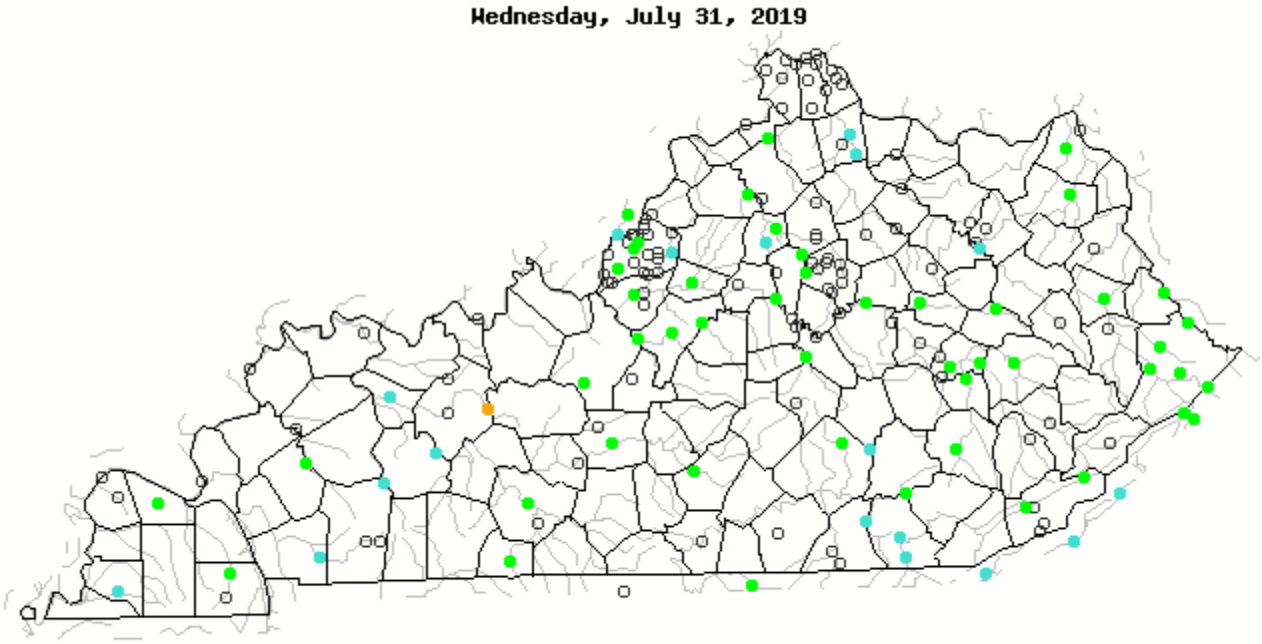


LaRue County



EXAMPLE

Stream Flow
7-day average



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

Agricultural Impacts

EXAMPLE

Highlights

- Wet conditions in early July led to prevented-planting claims and stunting of crop root-system development in low-lying fields
- The transition from harvesting winter wheat to planting double-crop soybeans is essentially complete
- Excessive heat in mid July followed by dry weather with lower humidity has contributed to rapid drying, particularly in areas that missed pop-up thunderstorms. This has raised concerns in areas where crops have poorly developed root systems and has also impacted pastureland.

Clark County, July 31, 2019
Source: Kentucky Mesonet Field Camera

CROP PROGRESS for week ending 07/28/19

Crop Stage	This Week	Last Week	Last Year	5-Yr Avg
	%	%	%	%
Corn Silking	79	69	90	88
Corn Milked	50	38	65	58
Corn Dough	34	19	43	37
Corn Dent	10	2	14	12
Soybeans Blooming	51	34	62	57
Soybeans Setting Pods	25	11	39	33
Tobacco Blooming	52	37	55	52
Tobacco Topped	26	15	31	28

CROP CONDITIONS for week ending 07/28/19

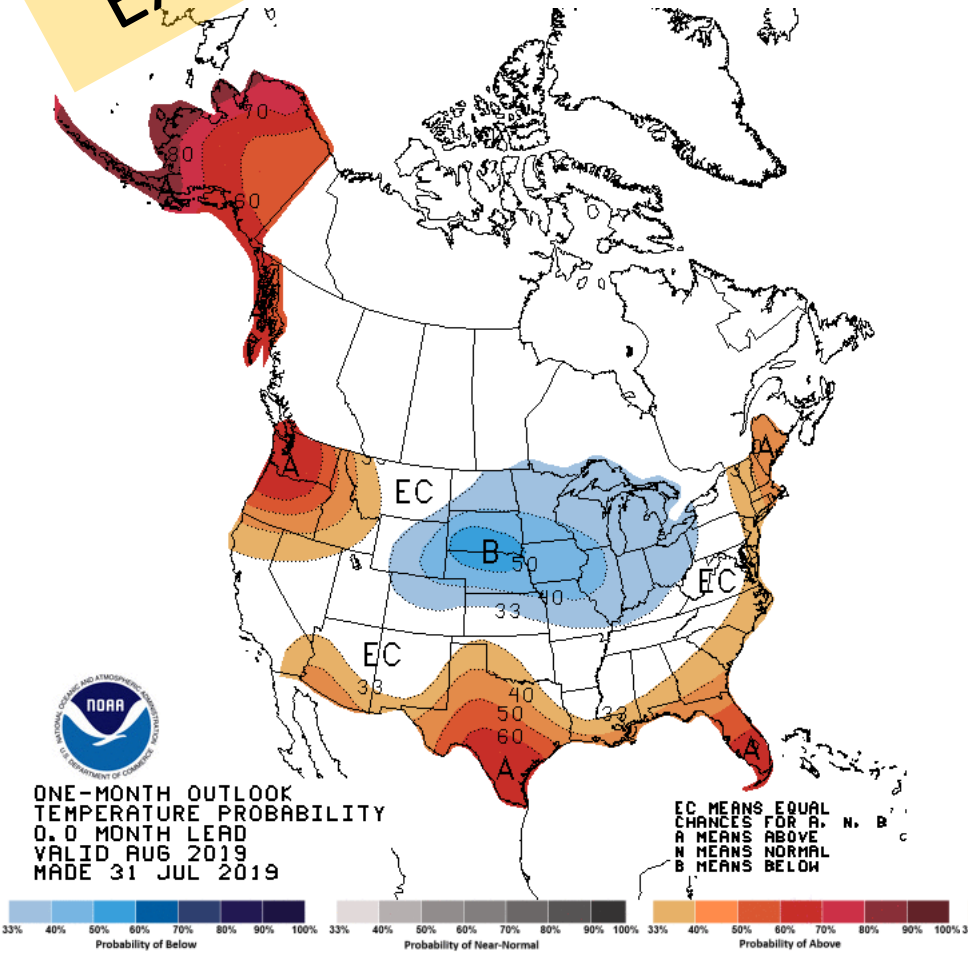
Crop	Very Poor	Poor	Fair	Good	Excellent
	%	%	%	%	%
Corn	3	7	21	47	22
Hay	3	11	24	53	9
Livestock	1	6	20	62	11
Pasture	1	7	25	59	8
Soybeans	2	5	23	54	16
Tobacco Set	3	10	28	51	8

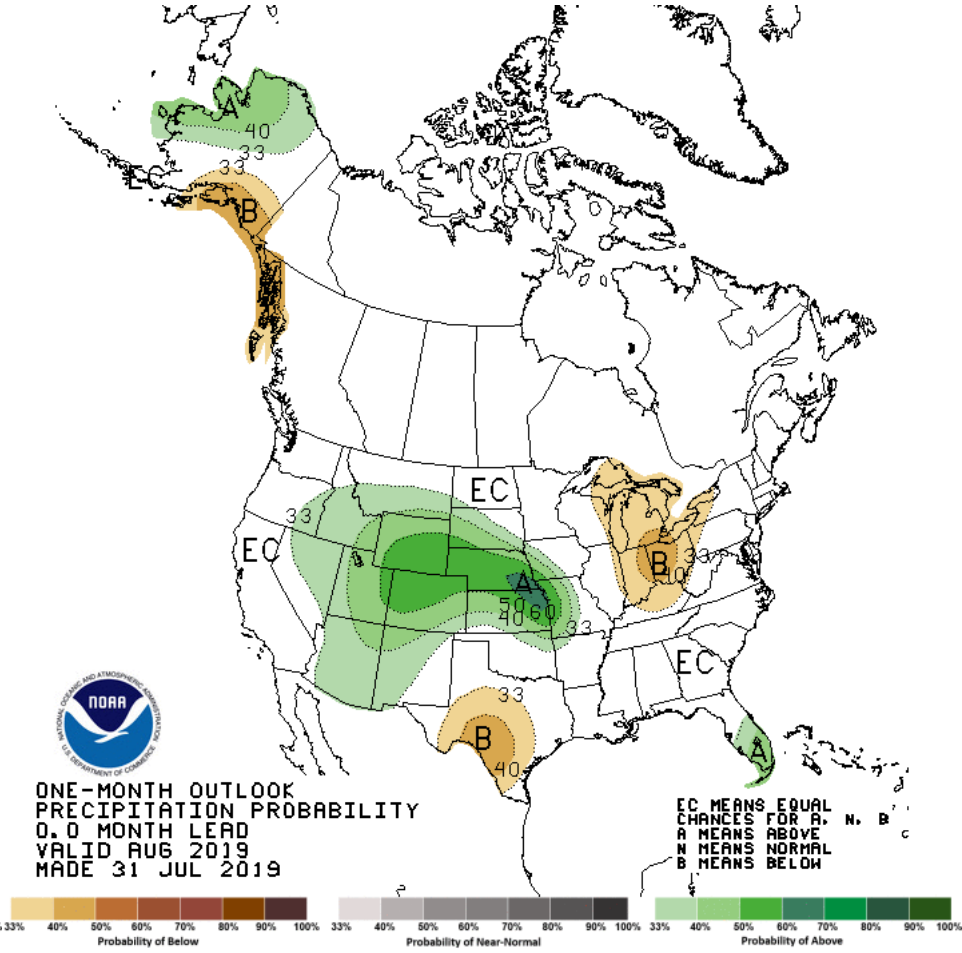
College of Agriculture, Food and Environment
Ag Weather Center

Monthly Outlook for August

NWS Climate Prediction Center

EXAMPLE





https://www.cpc.ncep.noaa.gov/products/predictions/30day/

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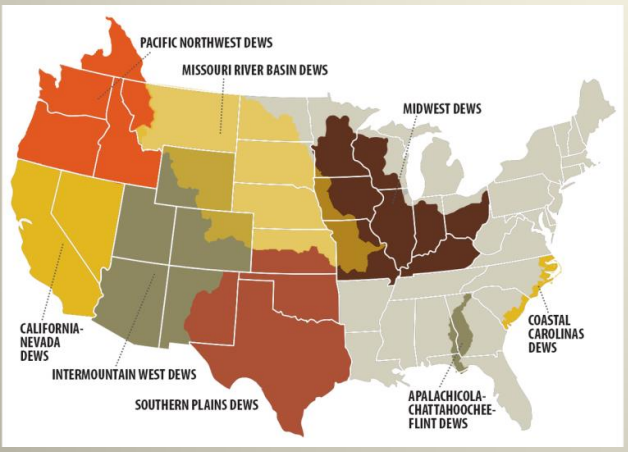

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Schedule

- Webinars are scheduled on the first Thursday of the month (except for holidays) and start at 2 pm Eastern / 1 pm Central time.

- Upcoming webinars
  - September 5th
  - October 3rd
  - November 7th
  - December 5th

Eleventh Biennial U.S. Drought Monitor Forum
Western Kentucky University
Bowling Green, KY
September 17-19, 2019

Organized by National Centers for Environmental Information (NCEI), National Climate Prediction Center, Kentucky Division of Water, and Kentucky Climate Center

Event registration

https://drought.unl.edu/eventinfo.aspx?id=963