

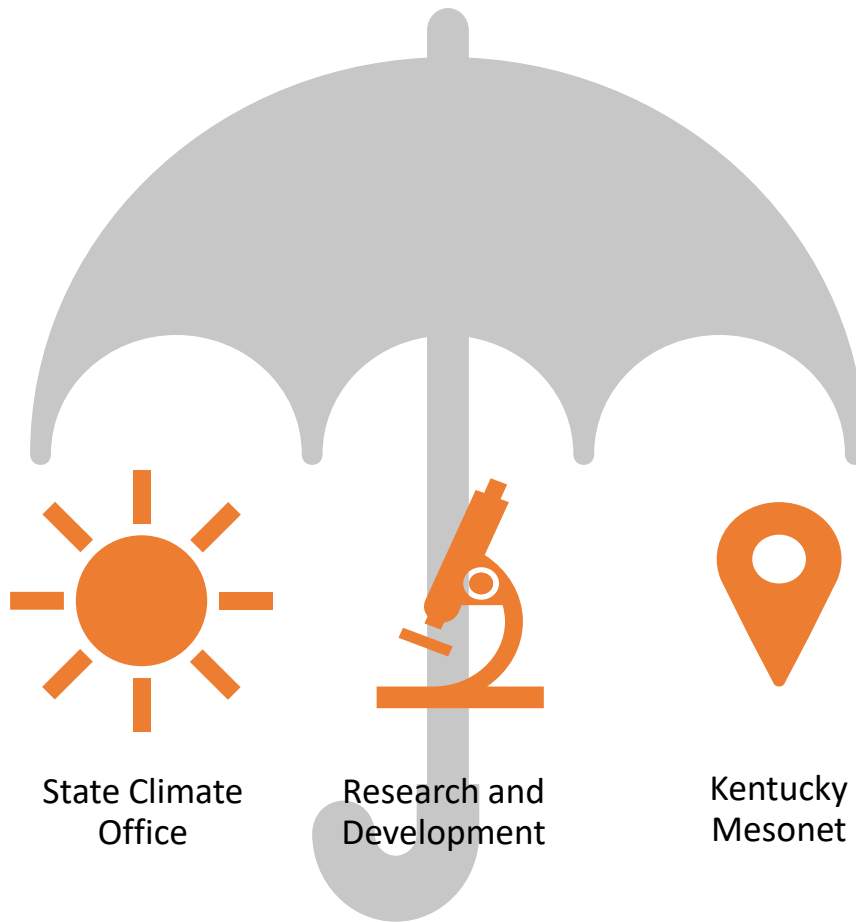
Disaster Readiness, Response & Recovery

Kentucky Mesonet Kentucky Climate Center

Jerry Brotzge, PhD
Director
Kentucky Mesonet
Kentucky Climate Center
Western Kentucky University

KENTUCKY
MESONET
AT WKU

Kentucky Climate Center

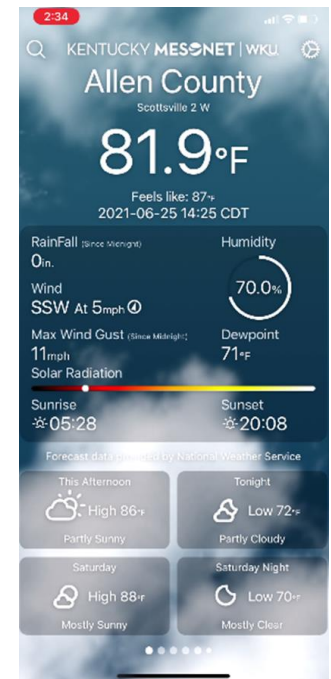


Applied Research &
Technology Program



Kentucky Mesonet Fact Sheet

- High-quality environmental network
- Real-time data from 84 sites statewide
- Web display and apps available - <https://www.kymesonet.org/>
- Over 100+ products for data interrogation
- Ready public access to 1+ billion observations
- Real-time ingest into operational forecast models by NWS



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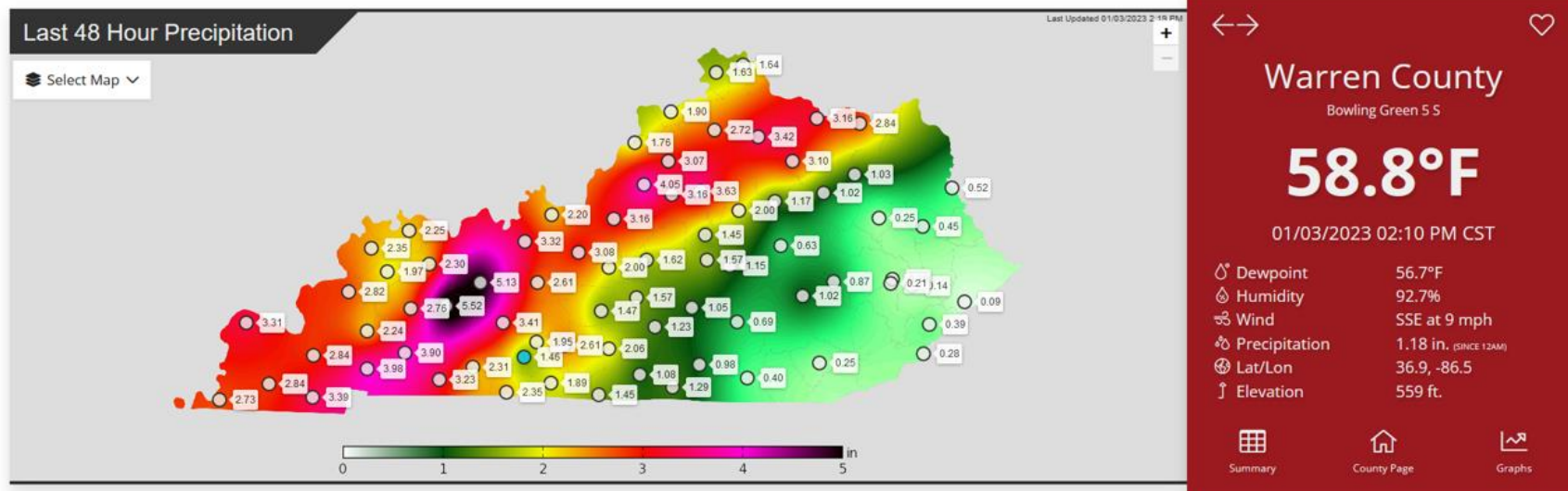
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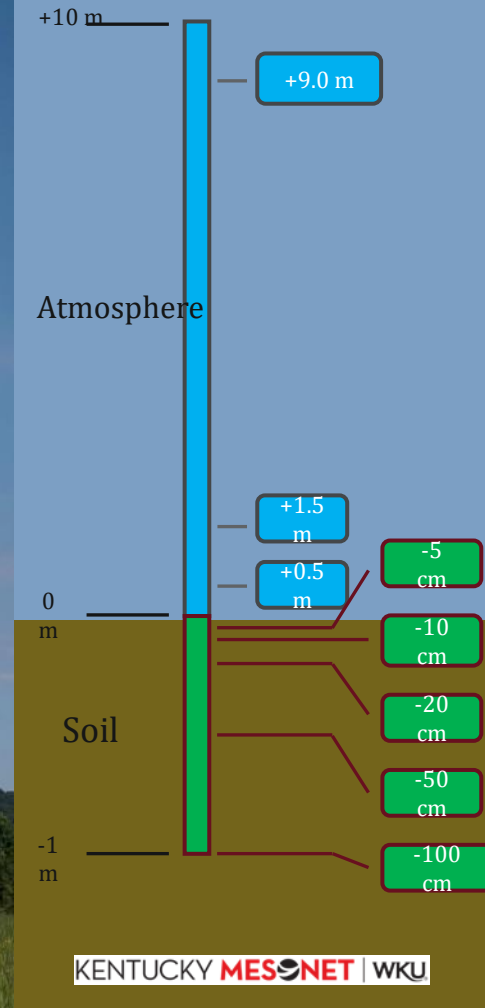
Kentucky Mesonet Instrumentation Suite

Instrumentation Measures

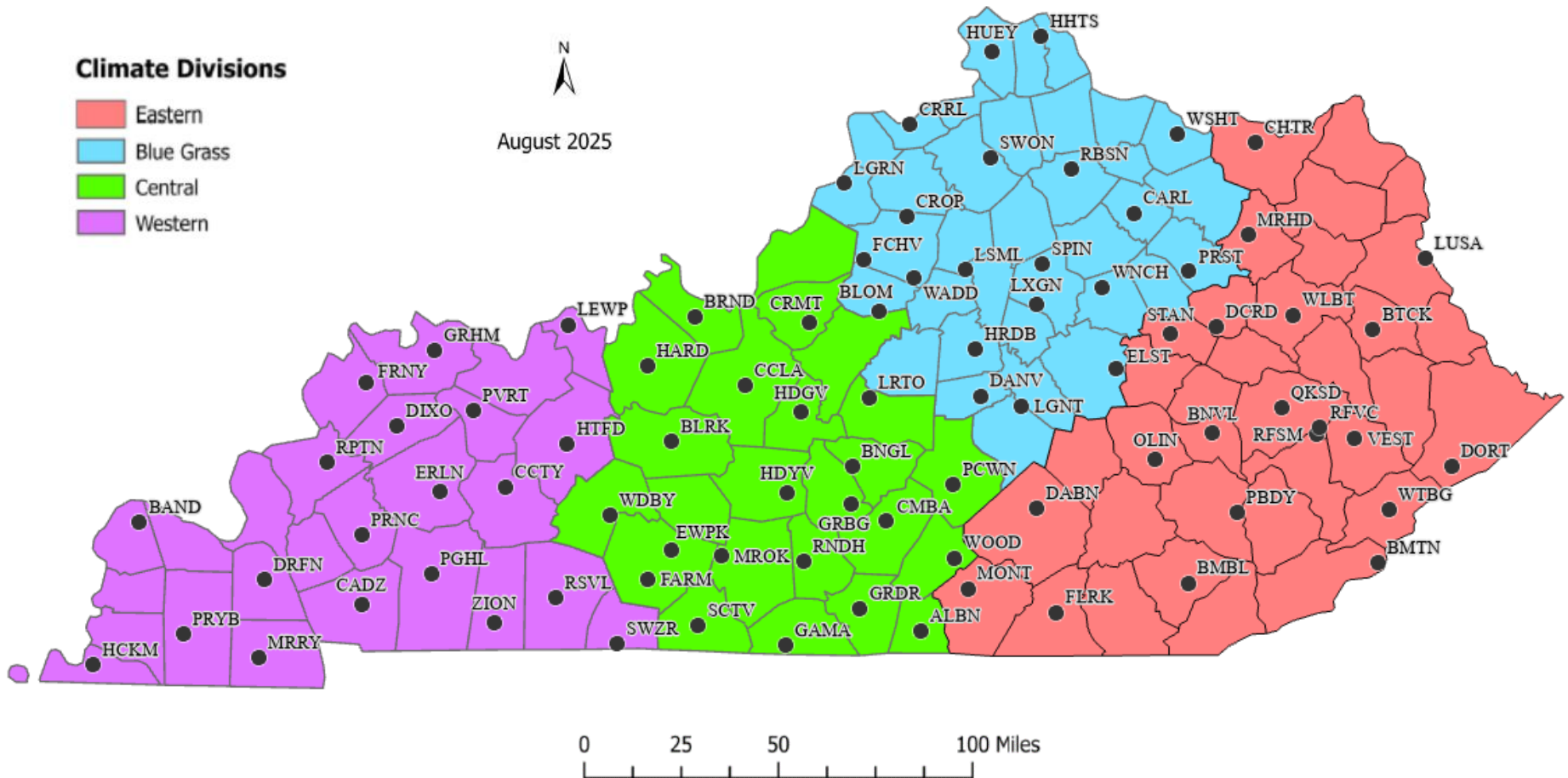
- Air temperature
- Precipitation
- Solar radiation
- Relative humidity
- Wind speed & direction
- Barometric pressure
- Soil moisture & soil temperature
- Multi-level temperature and wind speed
- Landscape/weather camera imagery

Base Infrastructure

- Datalogger
- Cellular modem
- Power System

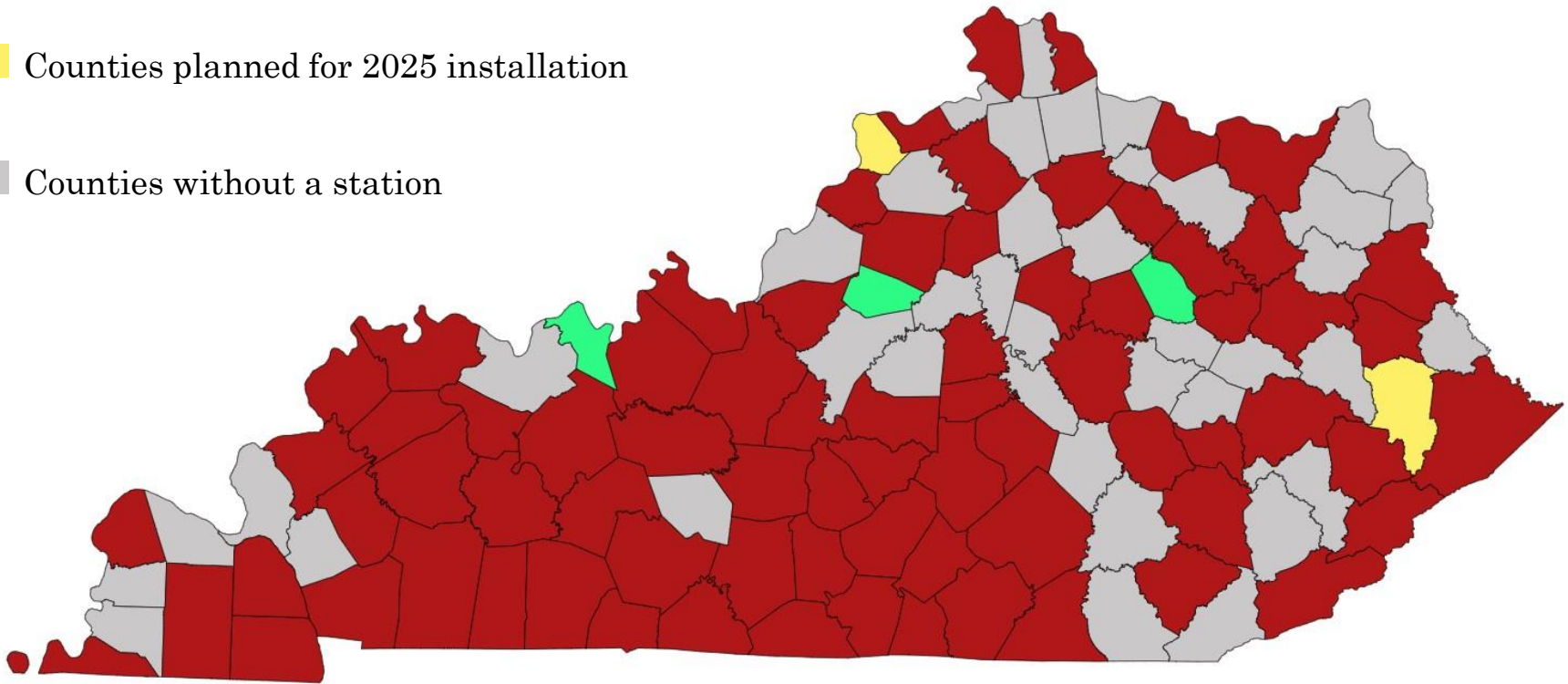


Current Network- 84 stations, 78 counties



Network Expansion – Goal is a station in every county

- Counties with a Mesonet station
- Newly installed in 2025
- Counties planned for 2025 installation
- Counties without a station

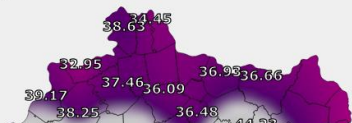


100+ Kentucky Mesonet Products

Year To Date Precipitation

Created at: Aug 28, 2025 11:22 AM

KENTUCKY MESONET | WKU



Precipitation Since Midnight

Created at: Mar 24, 2025 10:06 AM

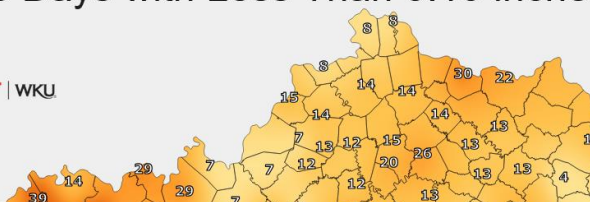
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Consecutive Days with Less Than 0.10 inches Rainfall

Created at: Aug 28, 2025 11:22 AM

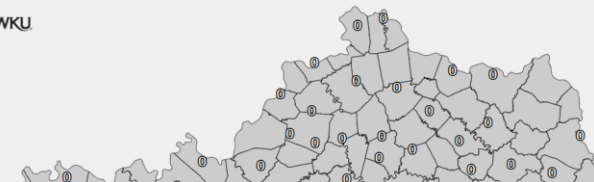
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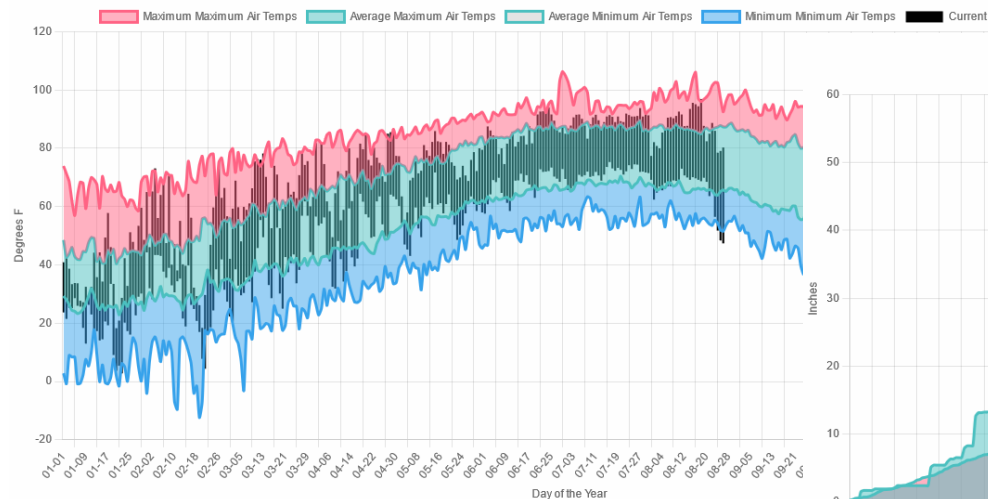
Consecutive Hours with More Than 0.25 inches Rainfall

Created at: Mar 24, 2025 12:16 PM

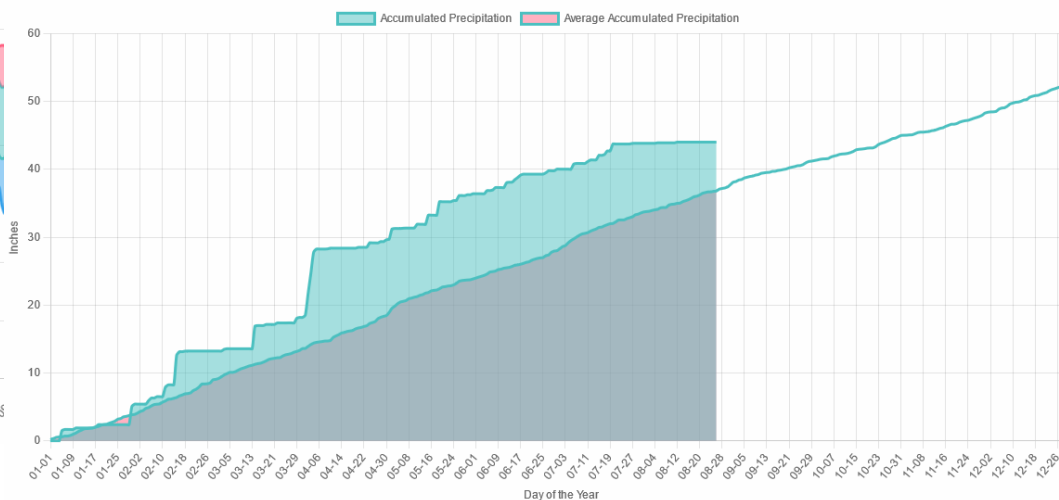
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Warren County (FARM) Climate Graph



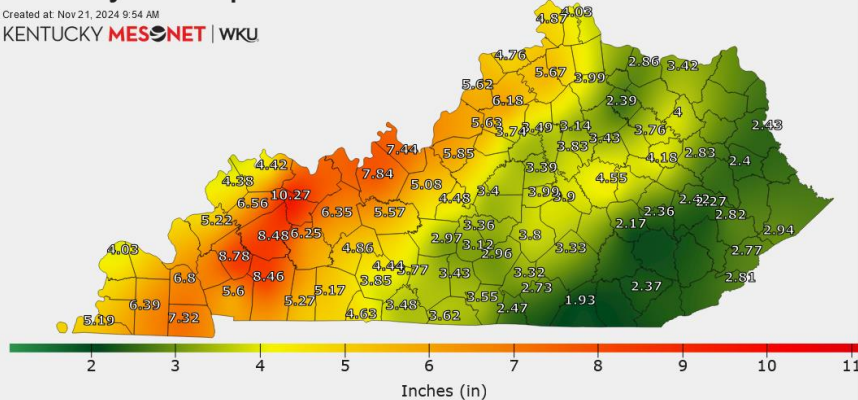
Warren County (FARM) Precipitation Graph



Summary Maps, Graphs and Tables

30 Day Precipitation

Created at: Nov 21, 2024 9:54 AM
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SITE

Warren County (FARM)

TEMPERATURE GRAPHS

✓TEMPERATURE, DEWPOINT, AND REL. HUMIDITY

TEMPERATURE AND SOLAR RADIATION

CHANGE IN TEMPERATURE

WIND GRAPHS

MOISTURE GRAPHS

PRECIPITATION GRAPHS

SOLAR RADIATION GRAPHS

TIME INTERVAL

6 HOURS

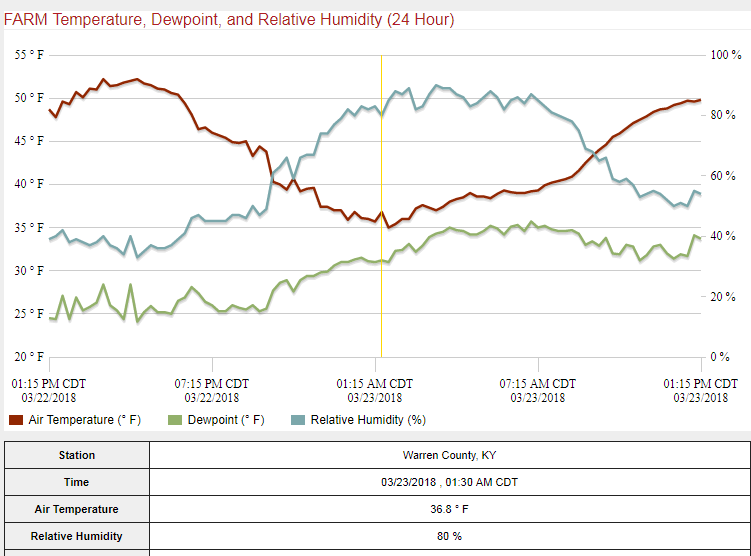
✓12 HOURS

24 HOURS

48 HOURS

72 HOURS

5 DAYS



Records successfully loaded for Warren County.

Monthly Climatological Summary (3/2018)

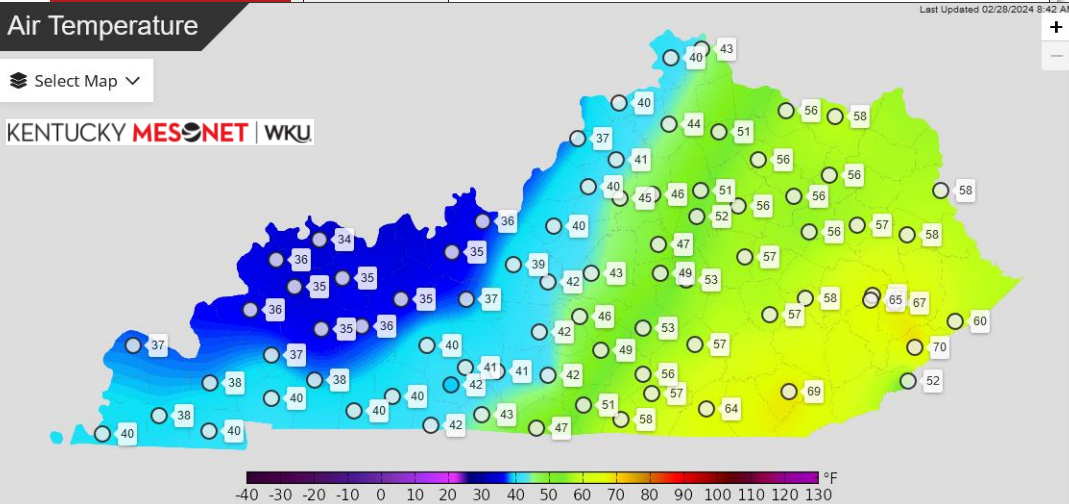
Station ID	FARM
Relative Location	Bowling Green 5 S
County	Warren County
Location *To Nearest Hundredth	Lat: 36.93°; Lon: -86.47°
Elevation	559 ft.
Observation Day	Central Standard Time

Day	Date	Temperature (°F)				Degree Days		Humidity (%)		Precip (inch)	Wind Speed (mph) and Direction			
		Max	Min	Avg	Avg Dwpt	HDD	CDD	Max	Min		Res Dir	Res Spd.	Avg Spd.	Max 3-sec
THU	1	59.8	44.6	52.2	51.2	13	0	100	71	0.52	WNW	8.7	12.7	37.7
FRI	2	53.4	33	43.2	30.5	22	0	99	30	0	N	6.1	6.9	20.8
SAT	3	54.2	29	41.6	26.2	23	0	92	30	0	ENE	5.7	6	21.6
SUN	4	57.1	33	45.1	26.7	20	0	75	29	0	ENE	6.7	6.9	15.6

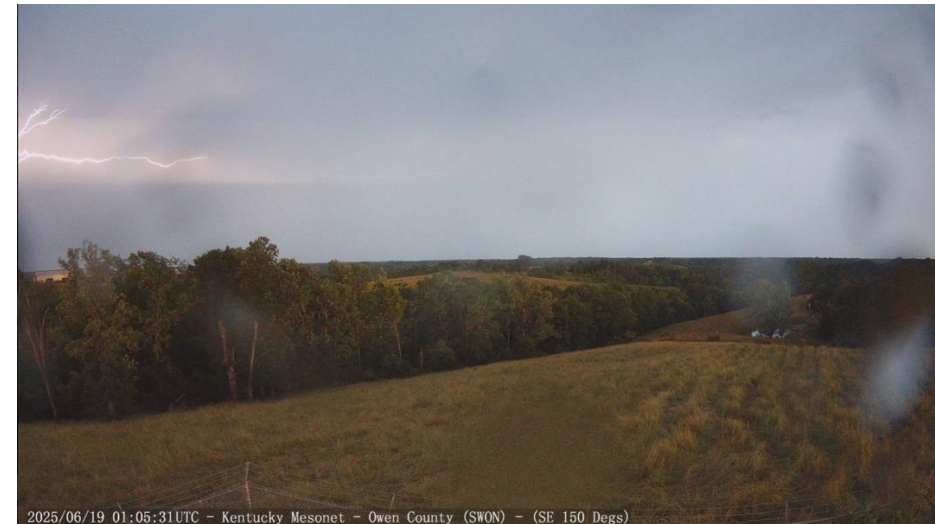
Air Temperature

Select Map

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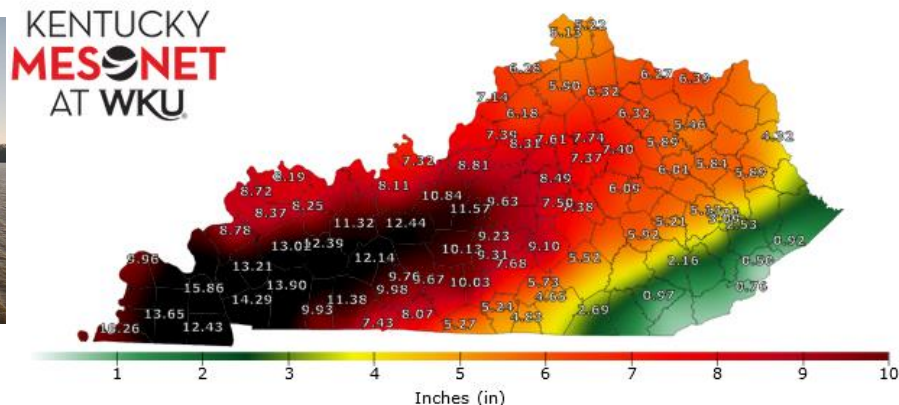
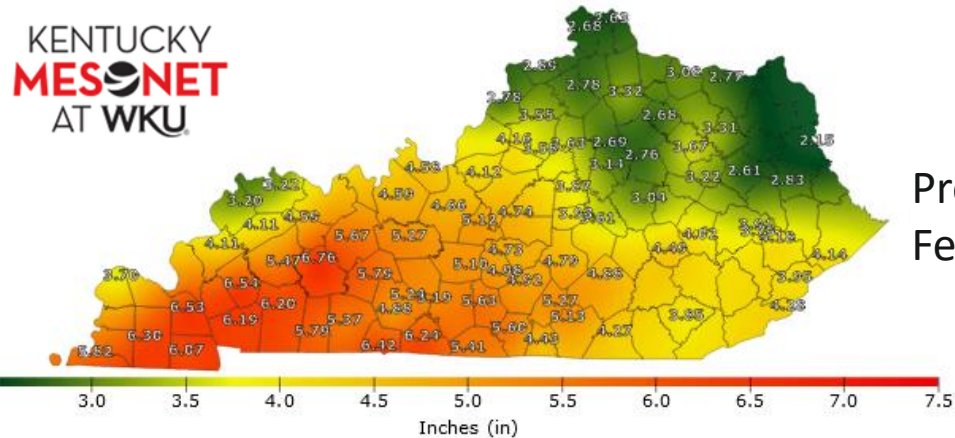


On-demand, Real-time Streaming Access



Emergency Management Applications

- Real-time situational awareness
- Assimilation of data into NWP
- Post-event disaster and monitoring
- Ground truth verification
- High intensity rainfall rate measurements
- Severe winds; icing; drought monitoring



Kentucky Climate Center Fact Sheet

- Home to the State Climate Office
- Founded by the State in 1978
- <https://www.kyclimate.org/>
- Partners include:
 - Emergency management
 - Dep. of Public Health
 - Dep. of Conservation
 - USDA/Farm Service Agency
 - NWS – Regional WFOs
 - USGS and KY Div. of Water
 - State utilities
 - Blue Grass Army Depot
 - Ft. Campbell



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Climate Library for Risk Evaluation

KENTUCKY CLIMATE CENTER

ARTP Applied Research & Technology Program

WKU

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WILDFIRE DROUGHT KY MESONET

Home / Timeline

Kentucky Timeline

External Contributors: WKU student Grant Stromquist

Filter by type

- Drought
- Earthquake
- Extreme Cold
- Extreme Cold, Drought
- Extreme Heat
- Flood
- Flood, Tornado
- Hail
- High Precipitation
- Pressure Record

Search...

Jump to 2020 2010 2000 1990 1980 1970 1960 1950 1940 >

1790

Ohio River Freezes Over
Severe winter freeze
The Ohio River froze over, with up to 9" of ice. Boats were encased in ice and unable to continue floating down river. (Source: Kentucky Weather by Jerry Hill pg. 123).
Dec 20, 1796 • Extreme Cold

1810

ARTP Applied Research & Technology Program

KENTUCKY CLIMATE CENTER

KENTUCKY MESONET AT WKU

WKU

- First comprehensive documentation of all natural hazards and impacts.
- First step in evaluating the state's risks and needs for mitigation.
- External NSF/EPSCoR grant.
- <https://www.kyclimate.org/timeline>

Climate Library for Visualization

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TRANSPORTATION

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DROUGHT

KY MESONET

Home / Severe Weather Climate

Tornado Data (1880 - 2022)

HAILTHUNDERSTORM WINDTORNADO

External Contributors: Tom Reaugh (NWS), WKU Student Kristen Ramey

EXPORT ALL DATAEXPORT FILTERED DATA

County Name

Begin Date

Begin Time

Event Type

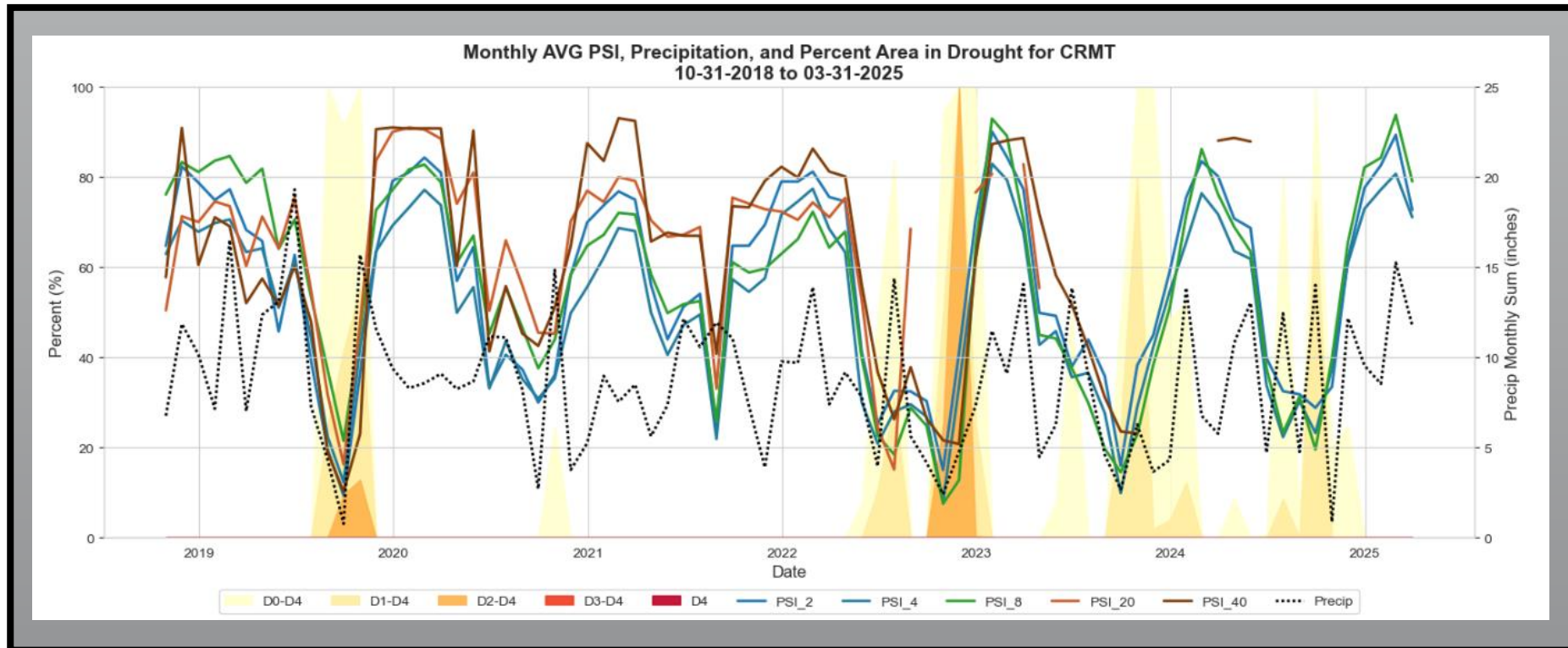
TOR F Scale

Direct Deaths

LINCOLN CO.	02/12/1880	12:30	Tornado	F2	?
HANCOCK CO.	03/27/1880	19:00	Tornado	F2	2
HENRY CO.	03/27/1880	20:15	Tornado	F2	0
HARDIN CO.	03/27/1880	20:00	Tornado	F4	7
BARREN CO.	03/27/1880	21:00	Tornado	F3	4
CHRISTIAN CO.	03/27/1880	19:00	Tornado	F2	0
ALLEN CO.	03/27/1880	21:00	Tornado	F3	4
JEFFERSON CO.	03/27/1880	19:57	Tornado	F4	76
DAVISS CO.	03/27/1880	19:00	Tornado	F2	2
BRECKINRIDGE CO.	03/27/1880	20:00	Tornado	F4	7

- First comprehensive quality-controlled database of KY hazards.
- Now creating a GIS library visualizing these data.
- External NSF/EPSCoR grant.
- <https://www.kyclimate.org/severe-weather-climate>

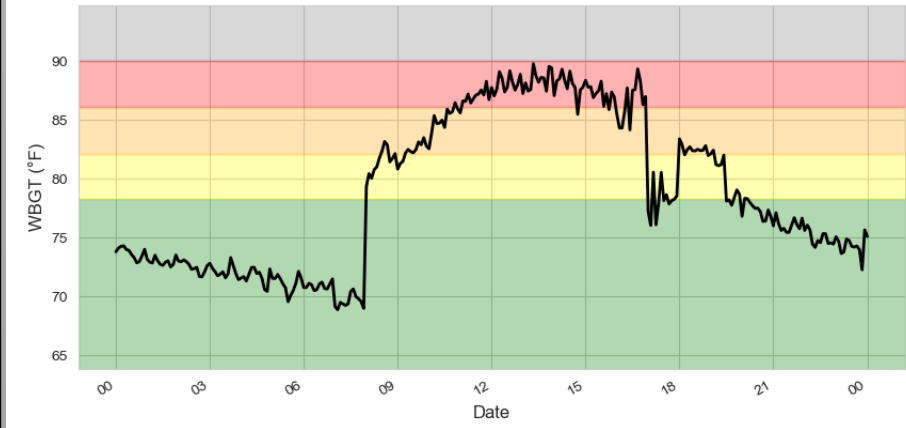
Percent Soil Saturation Index (PSSI)



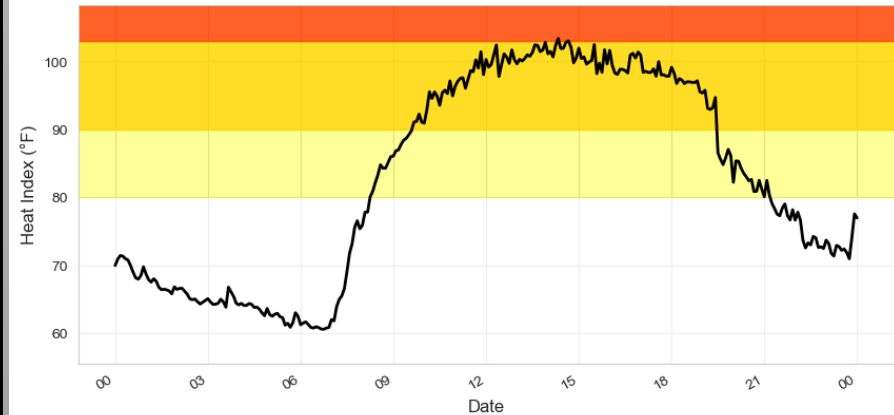
- Early indicator of “flash drought”
- Utilizes Mesonet soil moisture data
- In the process of being added to Mesonet suite of product maps

WBGT and Heat Index (HI)

Wet-Bulb Globe Temperature (WBGT) for FARM
08-29-2024 to 08-30-2024

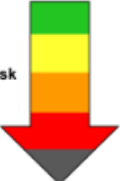


Heat Index for FARM
08-29-2024 to 08-30-2024



General Thresholds for Wet Bulb Globe Temperature (click for larger image)

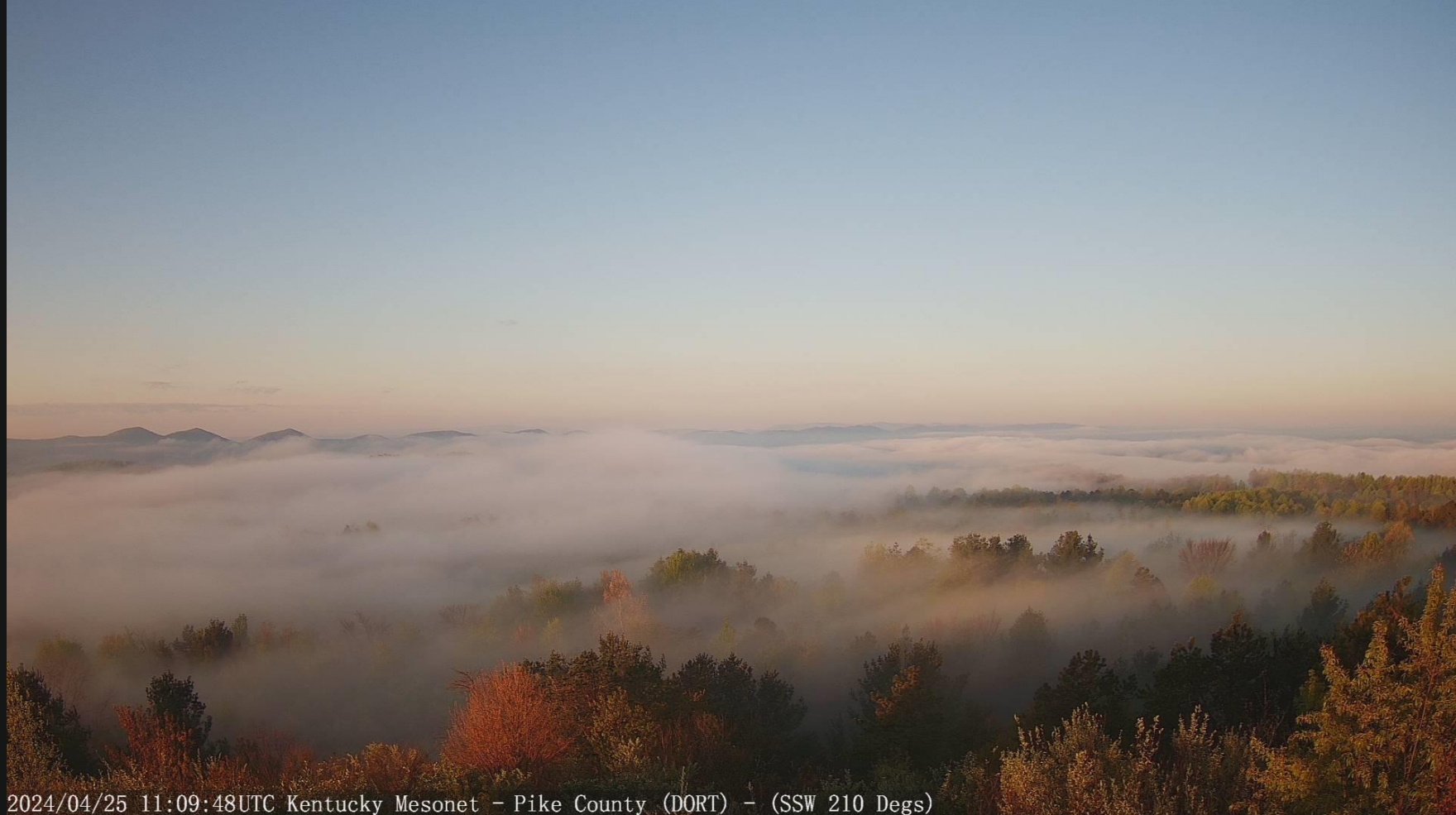
Disclaimer: Always check with local officials for appropriate actions and activity levels. Experienced heat stress will depend upon duration and intensity of activity and personal health and vulnerability.

WBGT by Region (°F)			Threat Level WBGT at these values increasing heat stress.	Risk of heat illness
Region 1	Region 2	Region 3		
< 72.3	< 75.9	< 78.3	Low Threat	
72.3 - 76.1	75.9 - 78.7	78.3 - 82.0	Elevated Threat	
76.2 - 80.1	78.8 - 83.7	82.1 - 86.0	Moderate Threat	
80.1 - 84.0	83.8 - 87.6	86.1 - 90.0	High Threat	
>84.0	>87.6	>90.0	Extreme Threat	

Regions are from Grundstein, A., Williams, C., Phan, M and Cooper, E., 2015. Regional heat safety thresholds for athletics in the contiguous United States. *Applied Geography*, 56, pp.55-60. 10.1016/j.apgeog.2014.10.014.

Classification	Heat Index
Caution	80°F - 90°F
Extreme Caution	90°F - 103°F
Danger	103°F - 124°F
Extreme Danger	125°F or higher

HI Threshold from NWS:
<https://www.weather.gov/ama/heatindex>



2024/04/25 11:09:48UTC Kentucky Mesonet - Pike County (DORT) - (SSW 210 Degs)

Questions?

gerald.brotzge@wku.edu