Data Resources and Application Development

Kentucky Drought Dashboard

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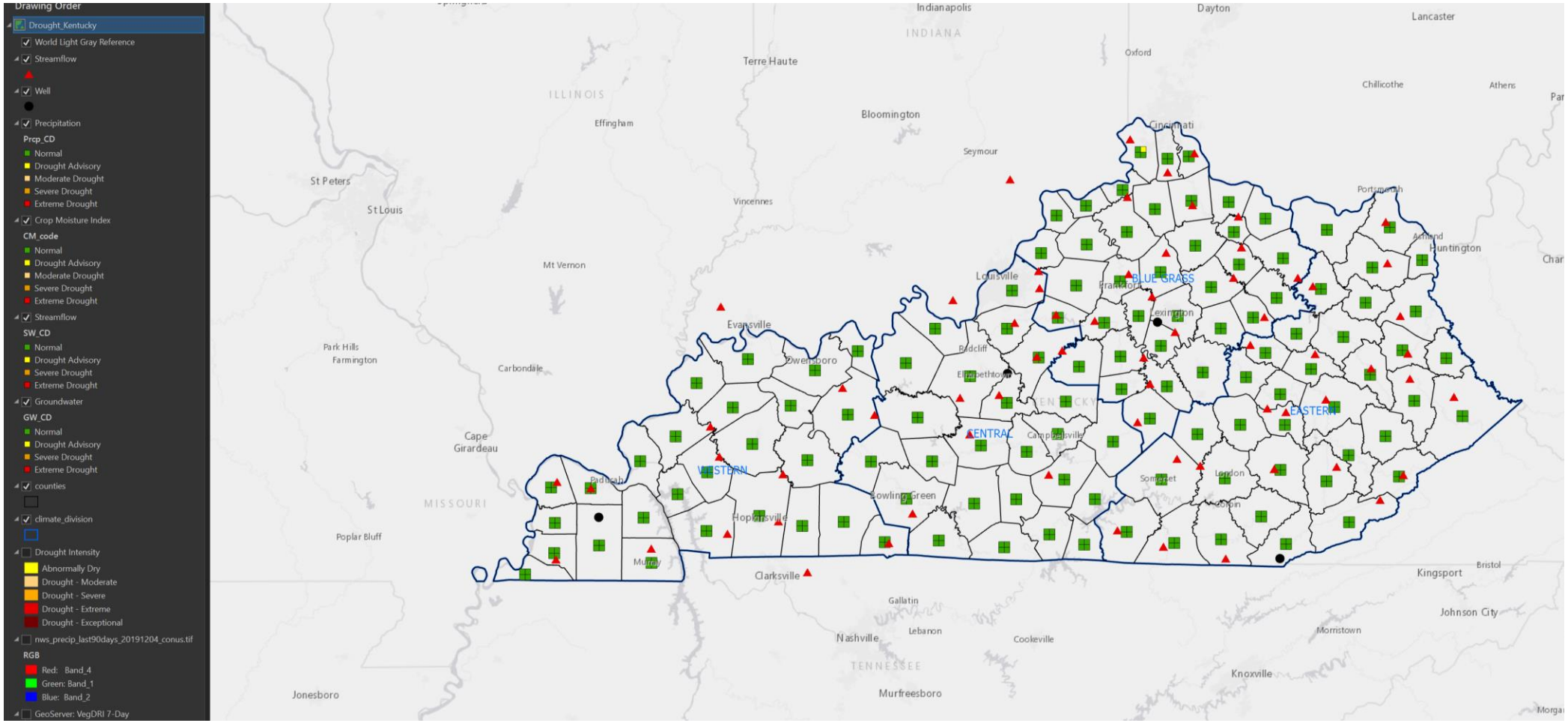
USGS Virginia and West Virginia Water Science Center

Kentucky Drought Dashboard



Preliminary information subject to revision.
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Required Data

The web application utilizes the following hydrologic and soils data:

Streamflow

- USGS data retrieval each day
- Accumulated for previous 28 days

Groundwater

- USGS data retrieval each day
- Accumulated for previous 30 days

Crop Moisture Index

- Reported by climate region each week

USGS National Water Information System (NWIS) and USGS Water Watch:

https://waterdata.usgs.gov/nwis/gw

https://waterwatch.usgs.gov/webservices/flows28d?region=08&format=csv

Palmer Drought Index and Crop Moisture variables download:
https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/cdus/palmer_drought/wpdcentr.txt

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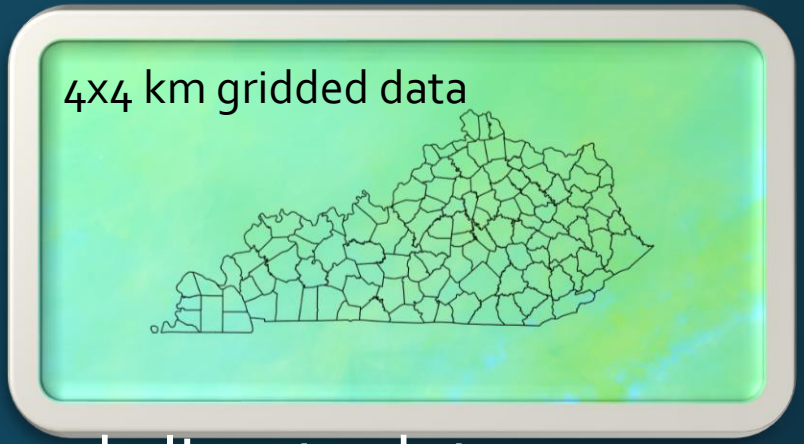
Required Data



The web application utilizes the following weather and climate data:

Precipitation

- Summarized by county each day
- Accumulated by 30, 90, 120, 365 days

Departures

- Summarized by county each day
- Accumulated by 30, 90, 120, 365 days

Normals

- Summarized by county
- Most-recent 30-year period finishing a year ending with zero*
  - Current normal: 1981-2010

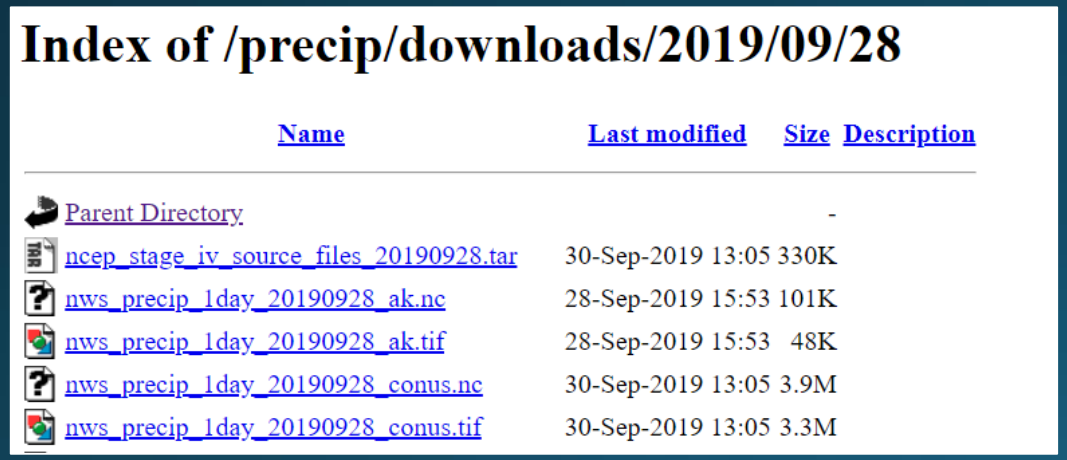
National Weather Service Advanced Hydrologic Prediction Service: 4x4 km gridded data:

https://water.weather.gov/precip/downloads

* WHO guidelines for calculation of climate normals: https://library.wmo.int/doc_num.php?explnum_id=4166

National Weather Service Advanced Hydrologic Precipitation Service

Hosts 4x4 km precipitation grids generated by each River Forecast Center (RFC). Data available for download as .tif or NETCDF files.



Index of /precip/downloads/2019/09/28

Name	Last modified	Size	Description
Parent Directory		-	
ncep_stage_iv_source_files_20190928.tar	30-Sep-2019 13:05	330K	
nws_precip_1day_20190928_ak.nc	28-Sep-2019 15:53	101K	
nws_precip_1day_20190928_ak.tif	28-Sep-2019 15:53	48K	
nws_precip_1day_20190928_conus.nc	30-Sep-2019 13:05	3.9M	
nws_precip_1day_20190928_conus.tif	30-Sep-2019 13:05	3.3M	

https://water.weather.gov/precip/download.php

PROS

- Easy retrieval of data files from FTP
- Provides all required data components at highest available resolution
- Developed R code to automate processes of summarizing gridded data by county

CONS

- None

Summary

- ✓ Daily observed precipitation
- ✓ Daily departures
- ✓ Normals
- ✓ Data summarized by county with scripts
- ✓ PRISM standard normals
- ✓ Script to automate data acquisition
- ✓ High resolution

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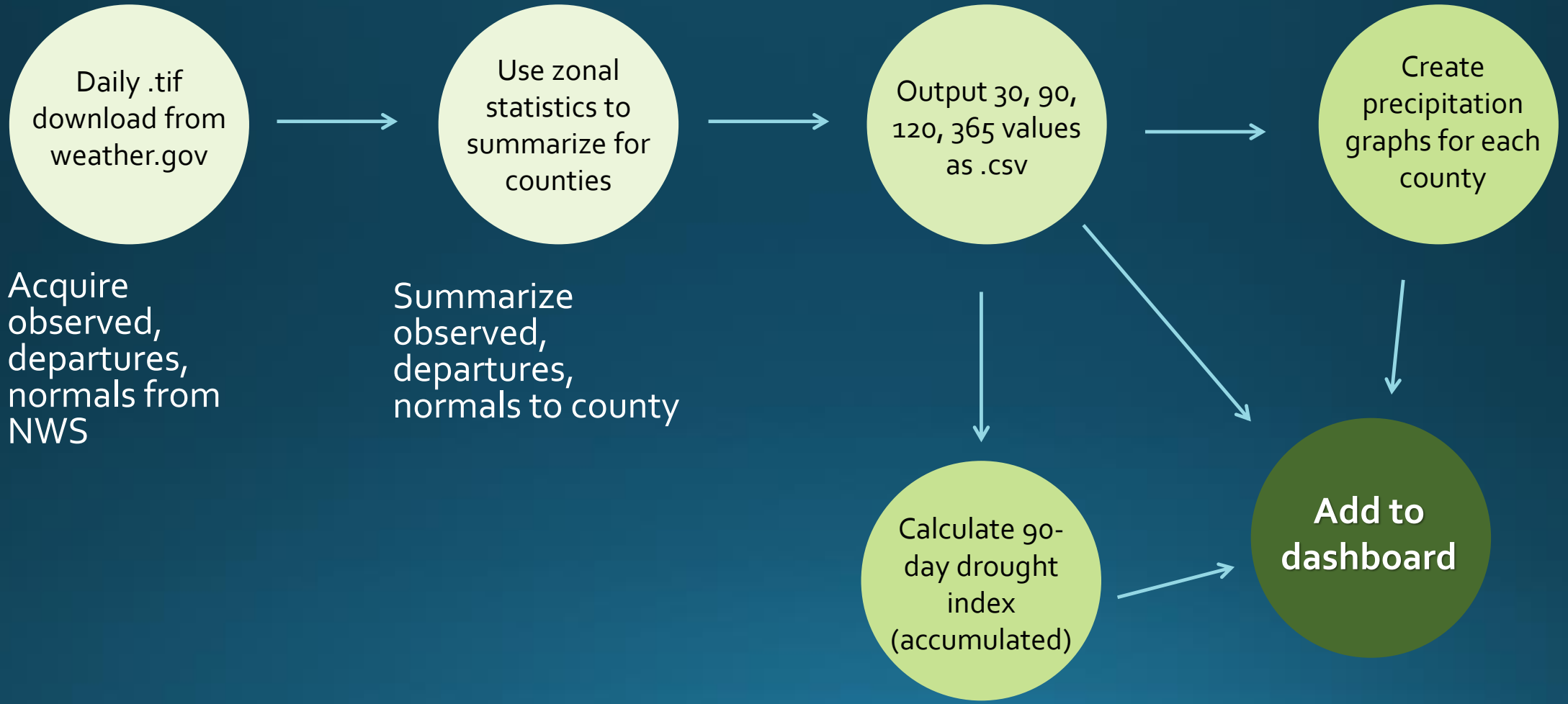
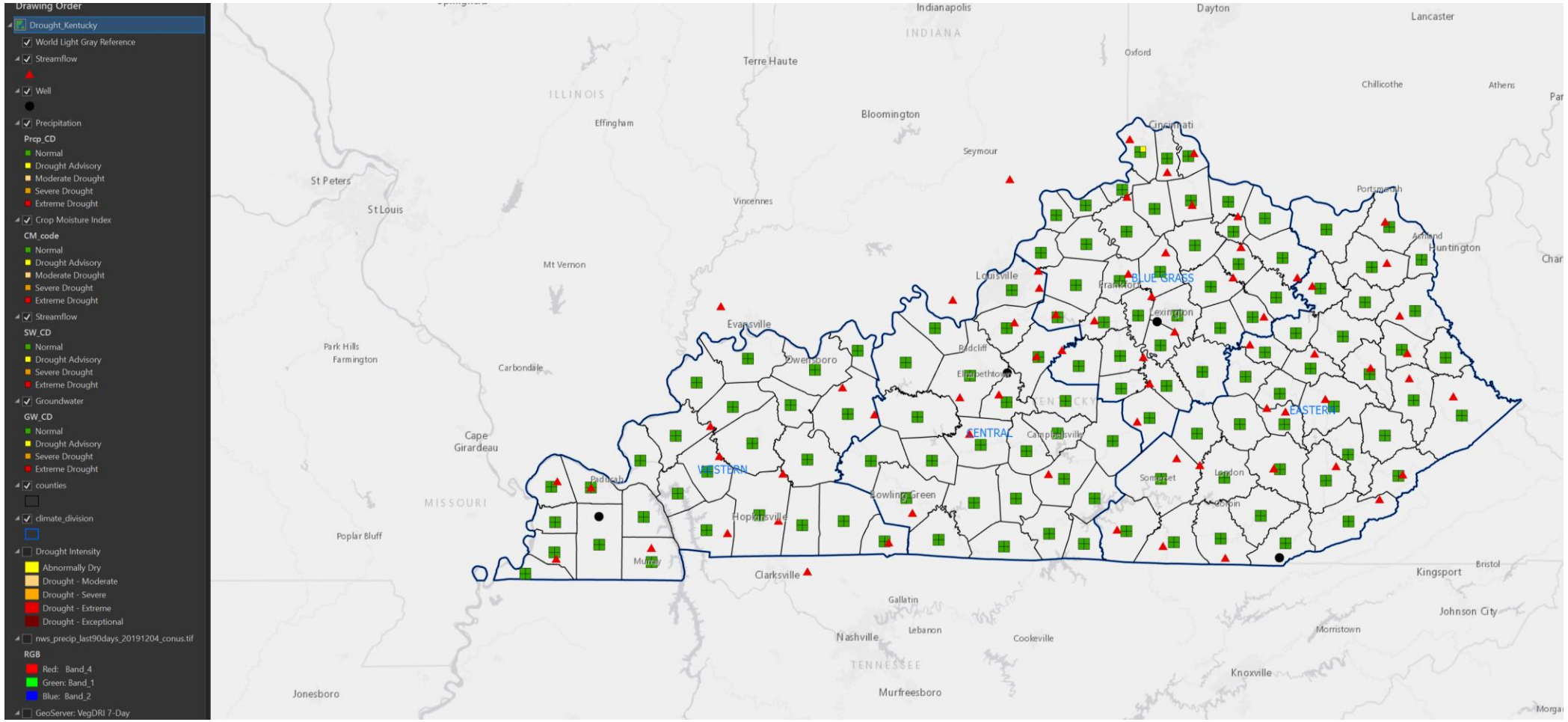
Precipitation workflow



Kentucky Drought Dashboard



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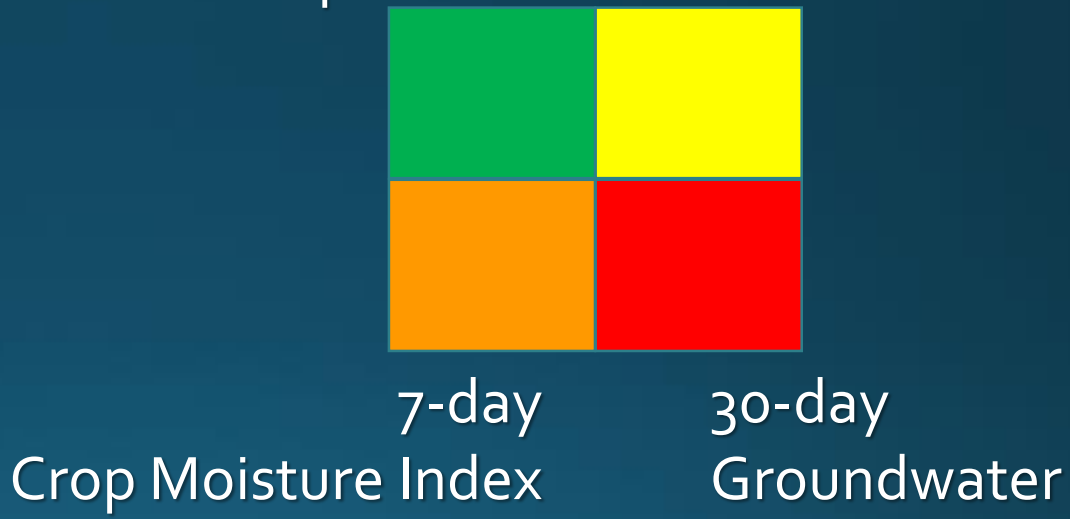
Drought Indicator Quick Reference Box

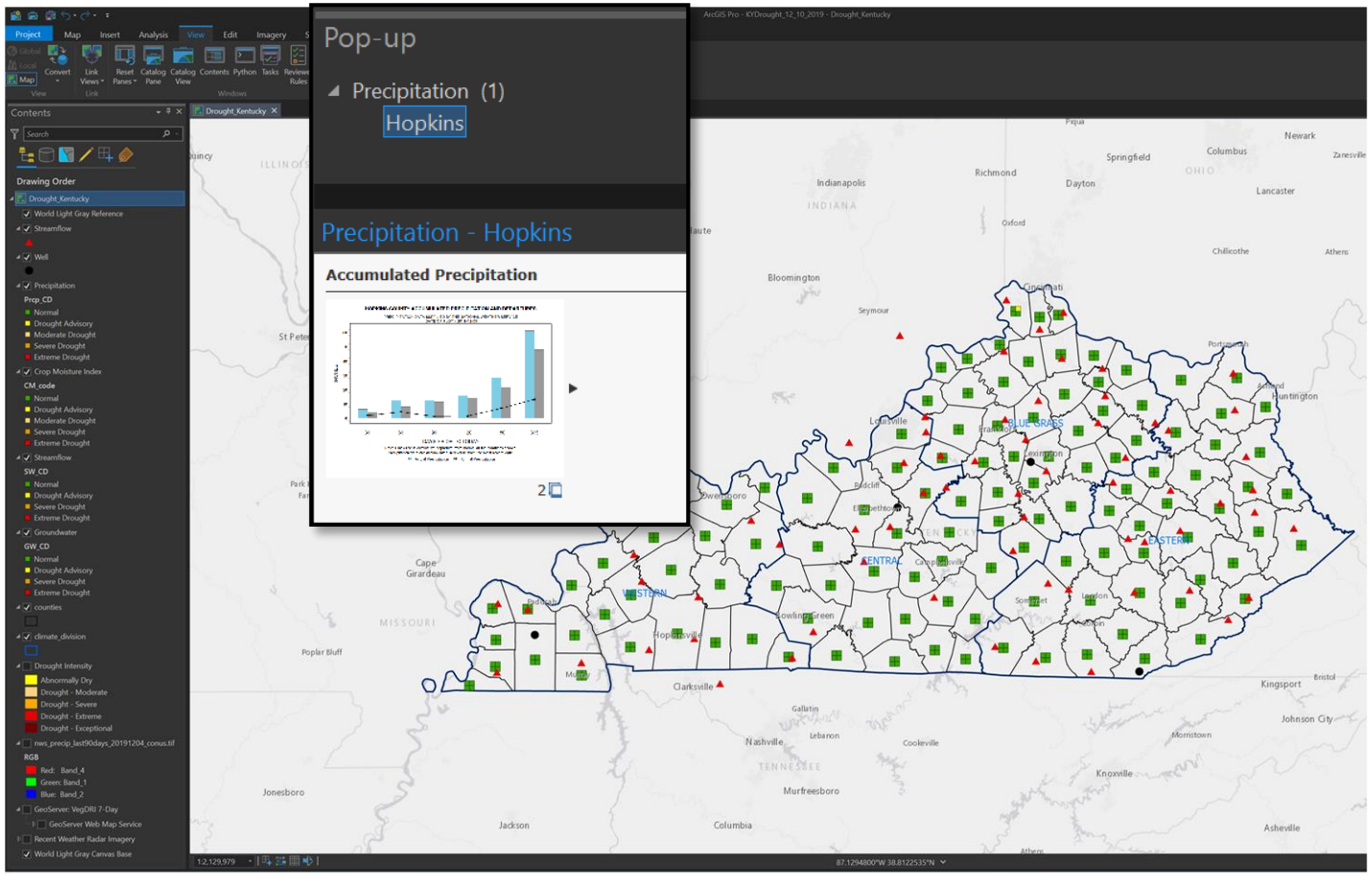
Each county has a 4-quadrant box colored to reflect drought status.

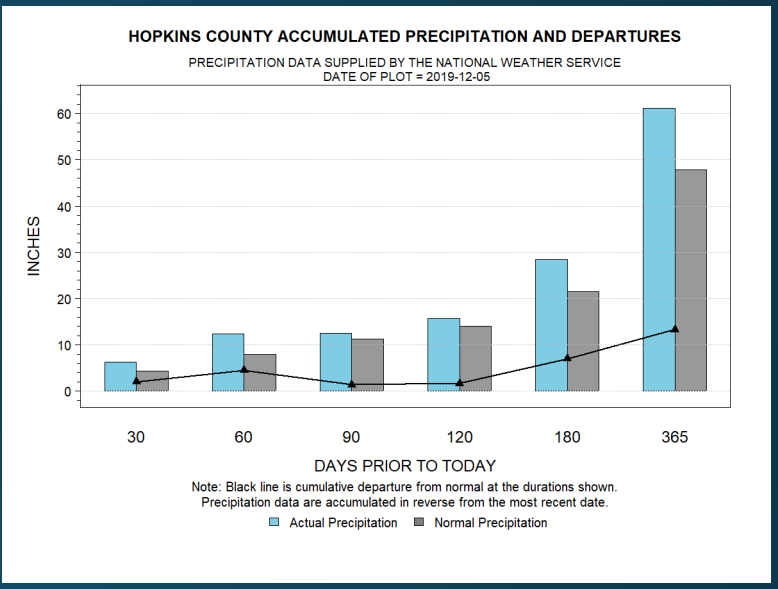
- Normal
- Drought Advisory
- Moderate Drought
- Severe Drought
- Extreme Drought

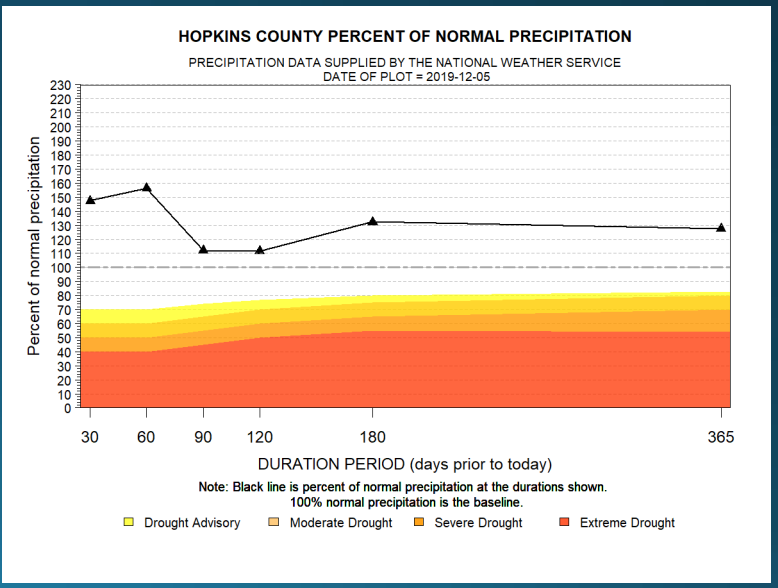


Drought categories are set to reflect values used in the Kentucky Drought Mitigation and Response Plan (2008).

Precipitation Pop-up







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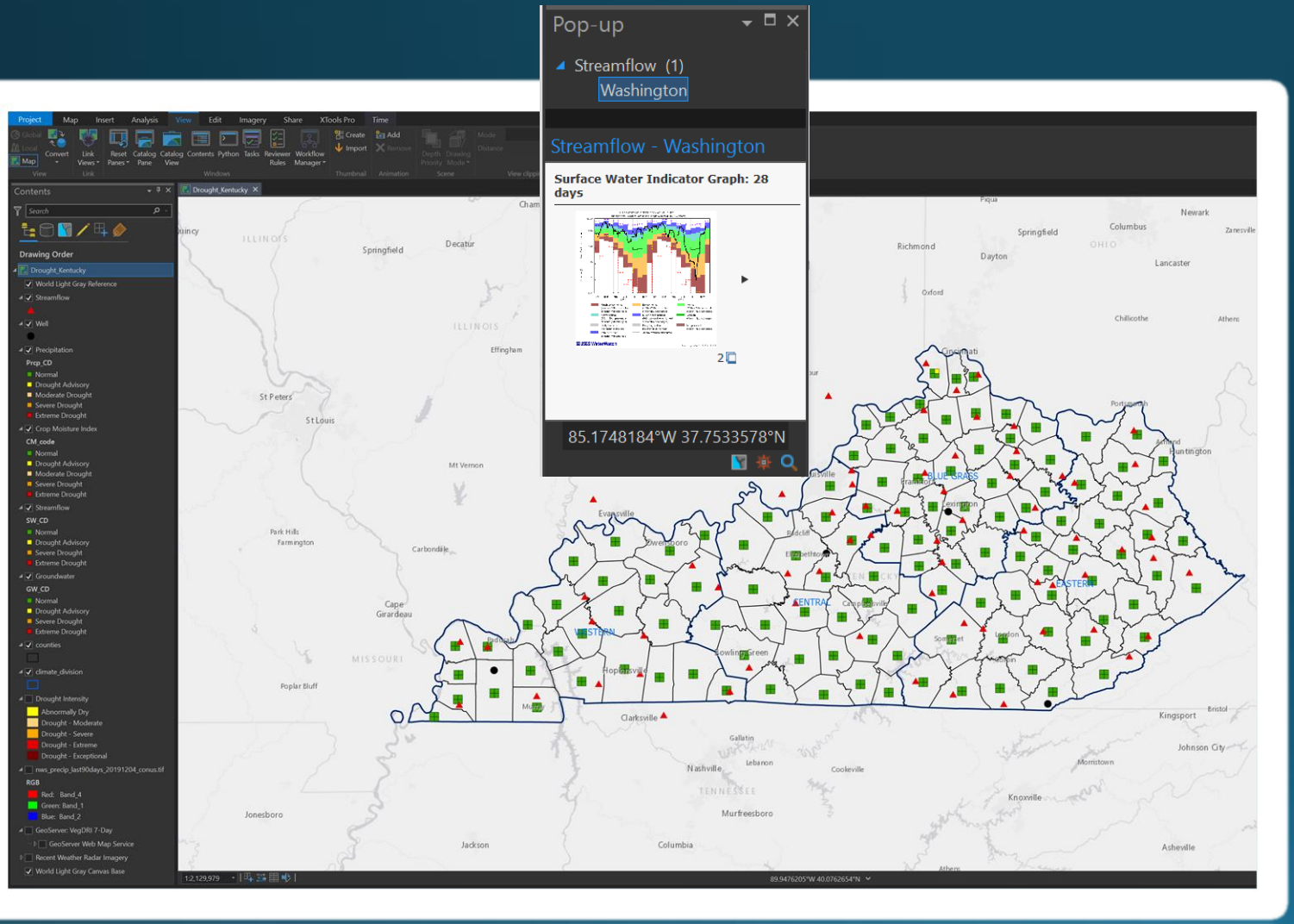
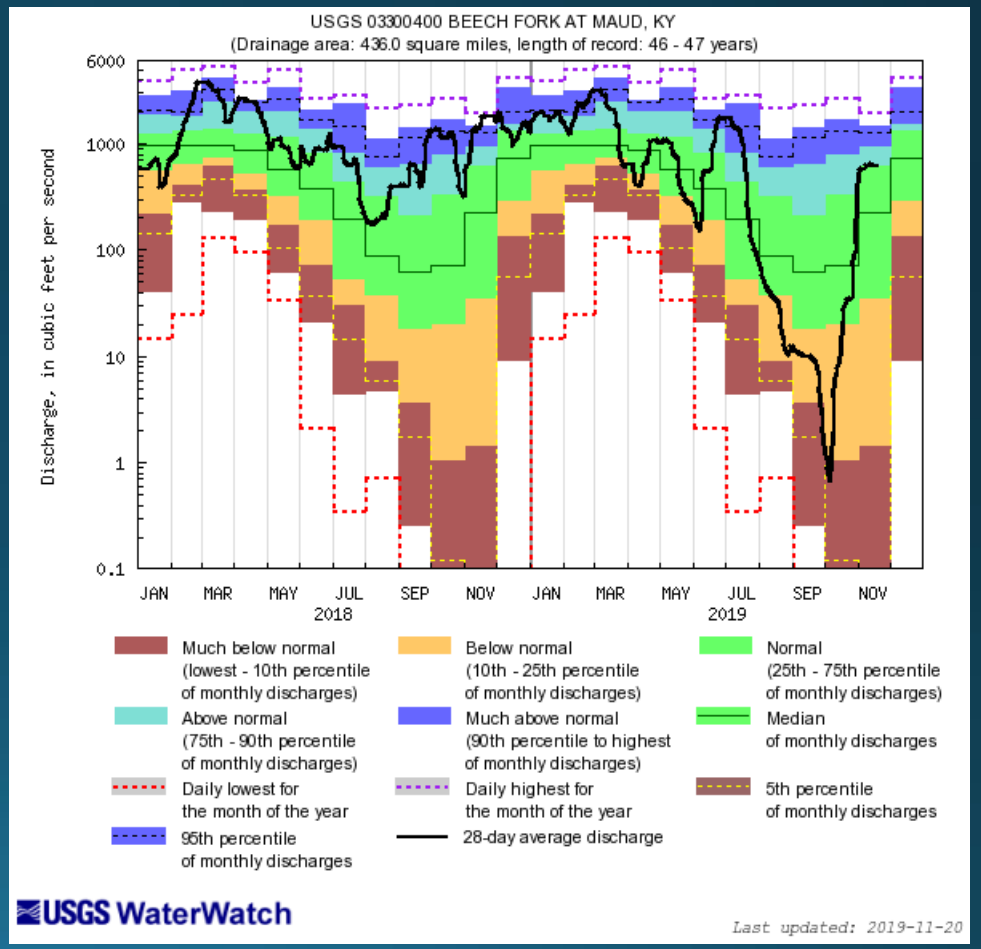
Streamflow Pop-up



USGS WaterWatch 28-day duration with Monthly Statistics as background



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https://waterwatch.usgs.gov/?id=wwchart_sitedur

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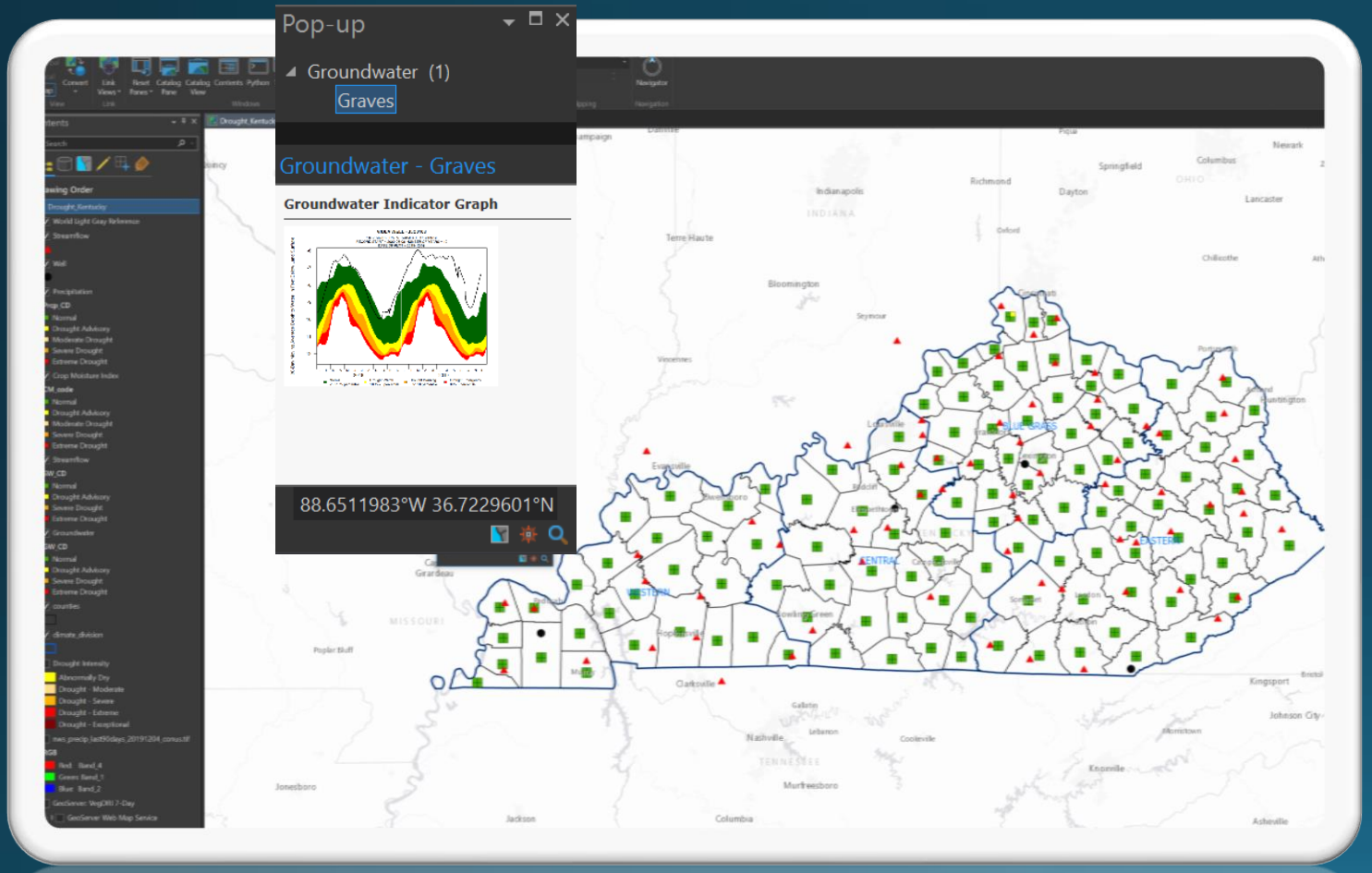
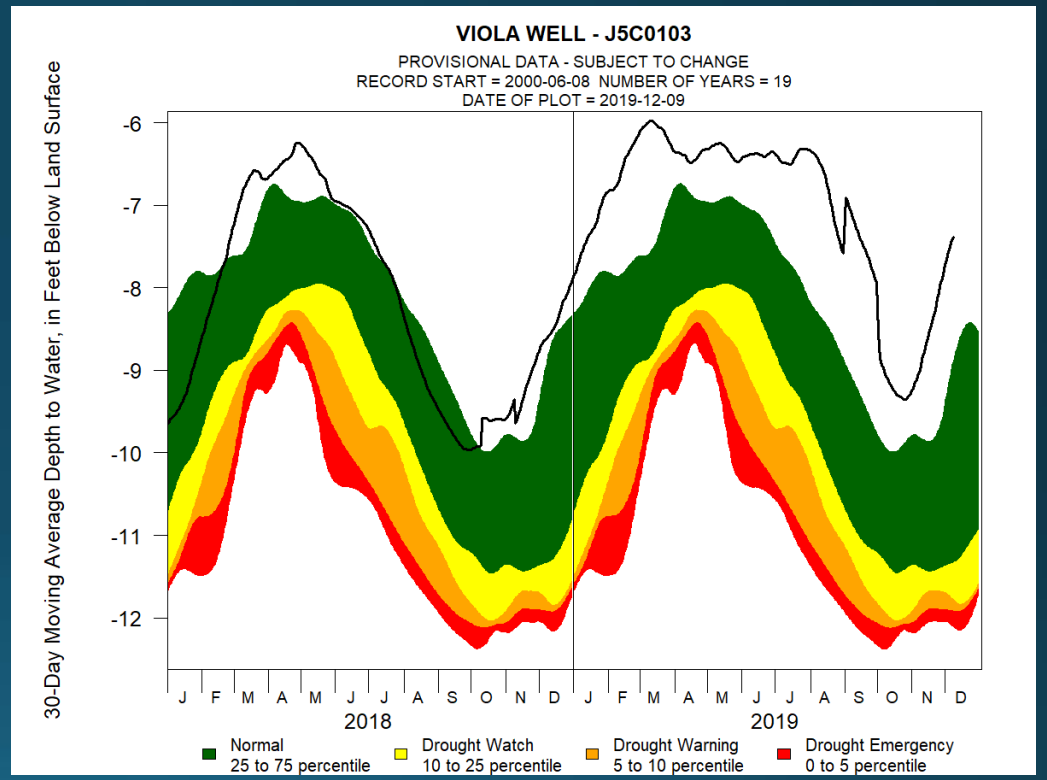
Groundwater Pop-up





Four real-time wells represent the Climate Divisions of Kentucky
Viola, Elizabethtown, Middlesboro, Lexington

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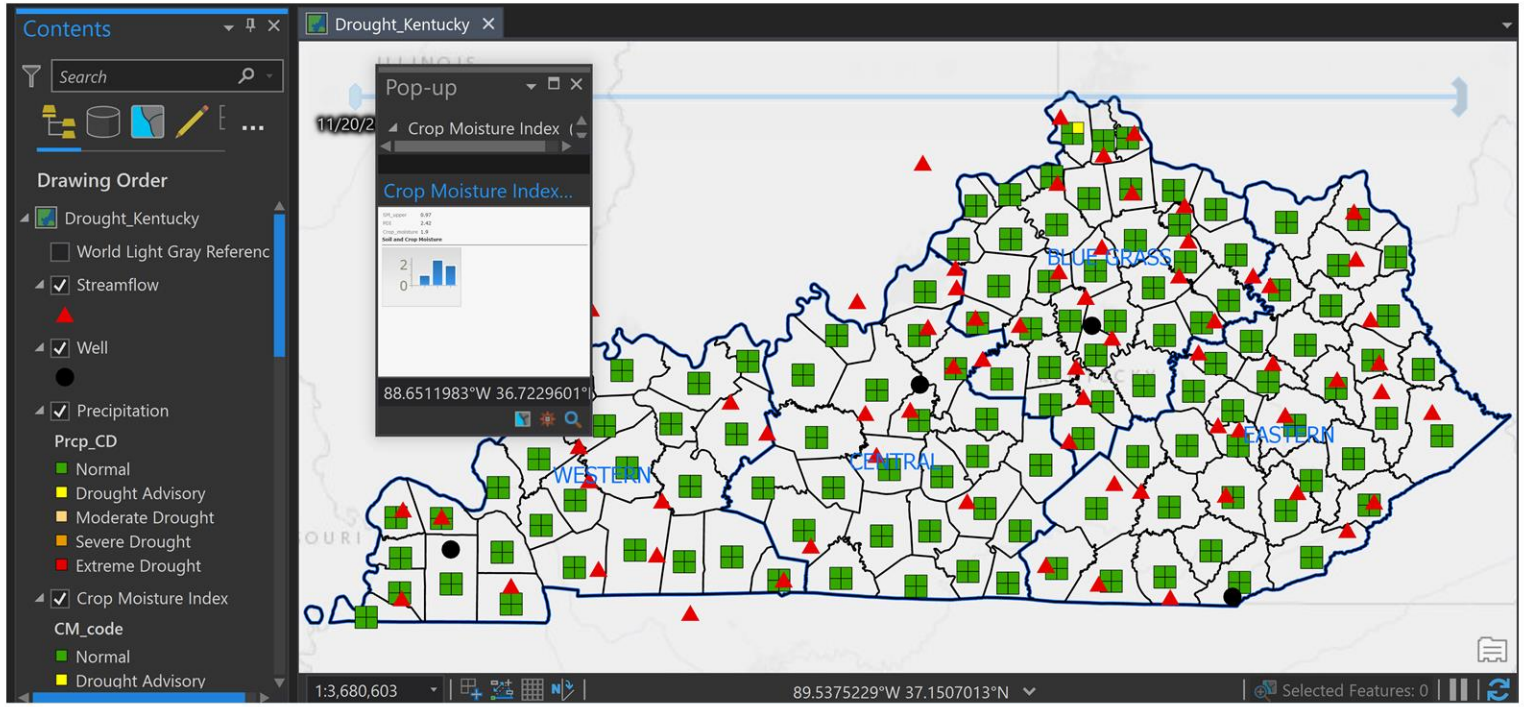
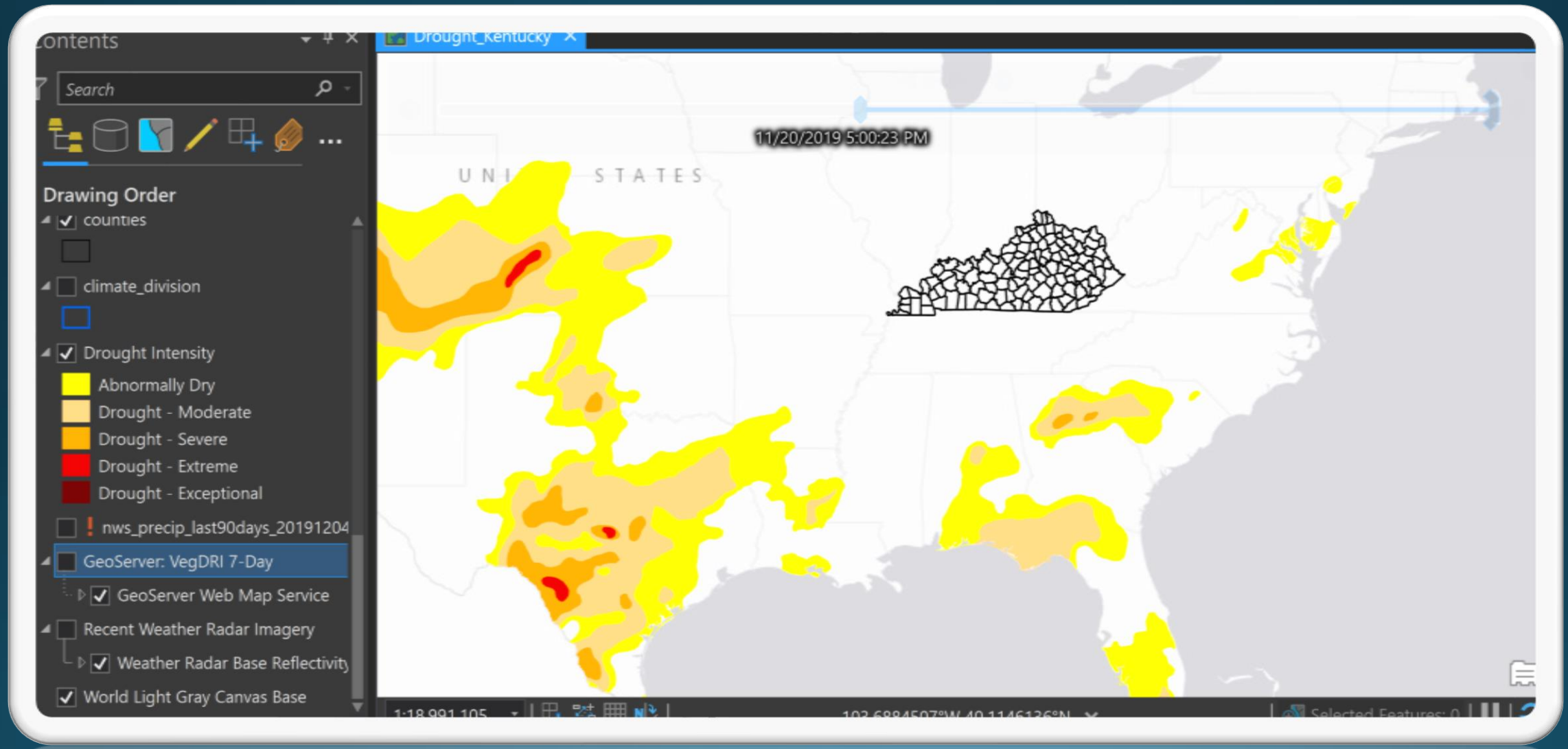
Crop Moisture Index



Reports out:
Soil moisture (upper layer) = 0.97
Palmer Drought Index (PDI) = 2.42
Crop moisture Index = 1.9

Crop Moisture Index
> -0.5 = 0 green (normal)
-0.5 to -0.9 = 1 yellow (draught advisory)
-1.0 to -1.9 = 2 = peach (moderate drought)
-2.0 to -2.9 = 3 = orange (severe drought)
< -3.0 = 4 = red (extreme drought)

National Drought Monitor



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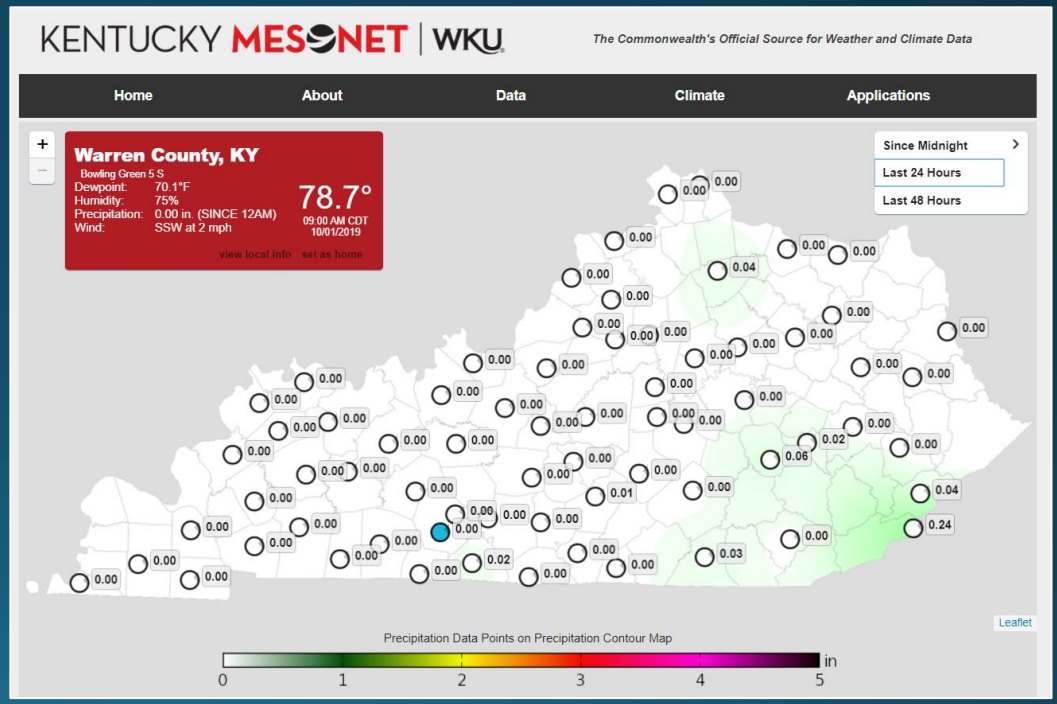
Additional Layers

Additional layers can be viewed:
Recent weather radar imagery
Vegdry 7-day map service
Climate divisions (4)
County boundaries (120)
Stream Gages (67)
Wells (4)

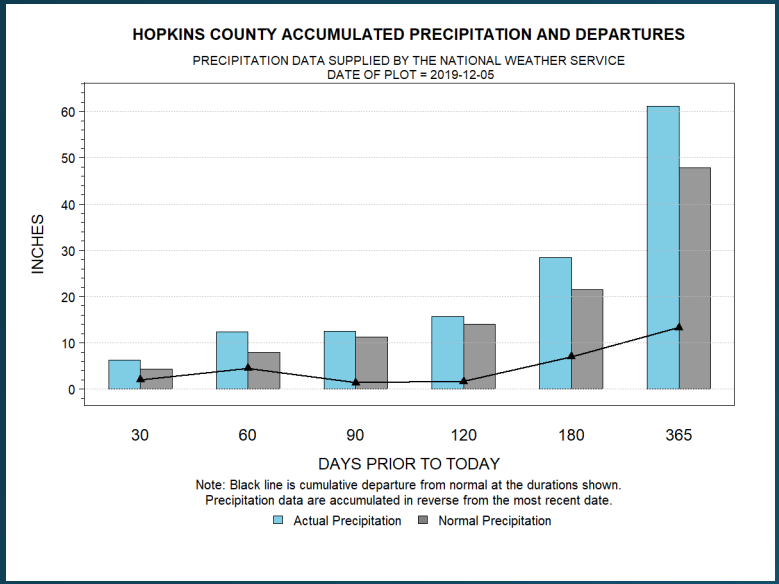
Future enhancements:
Mesonet stations and live feed of accumulated precipitation.



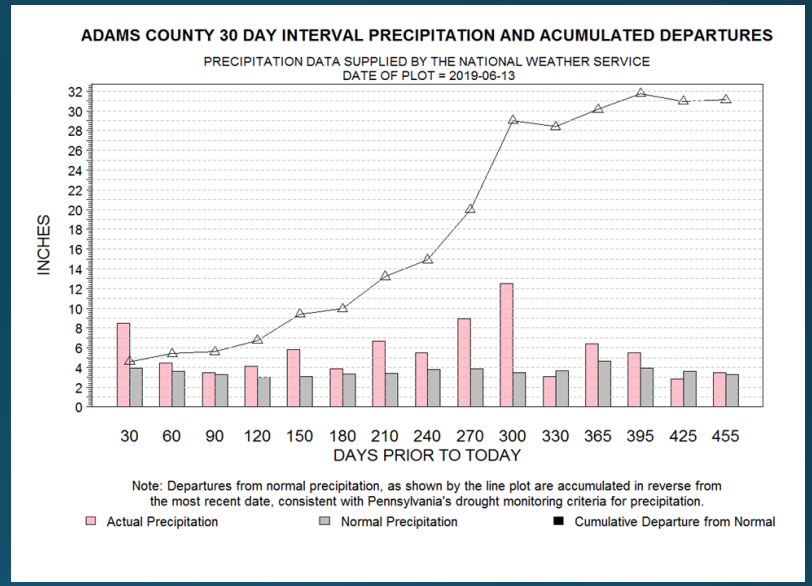
Kentucky Climate Center at Western Kentucky University
http://www.kymesonet.org/

Alternate Precipitation Graph

A



B



Graph A on the left has cumulative actual and normal precipitation in inches for the total time period.

Graph B on the right has total precipitation during each 30-day period and cumulative departures from normal shown in the black line.

Questions?

Thanks to the Kentucky USGS Water Science Center for support of the development of the Kentucky Drought Dashboard.

Thanks to James Ulrich of the Pennsylvania USGS Water Science Center for assistance in the development of scripts for the design and figure creation.

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