

December 2024

Precipitation

December brought Kentucky its second month in a row with above normal precipitation. The month started with a light accumulation of snow across parts of central and eastern Kentucky on December 1st. The first major precipitation event occurred from the 14th through the 18th with 2" to 4" of precipitation falling across the entire state. The second major event occurred from the 27th through the 29th with 1.5" to 3" of precipitation across much of the state. Amounts in central and northeastern Kentucky were generally between 0.5" and 1".

The December 31st edition of the US Drought Monitor (USDM) depicted only a small area of Abnormally Dry (D0) in south central Kentucky. This is an improvement from the beginning of the month when a larger area Moderate Drought (D1) existed in this region. The rest of the state is free of any drought designation.

Preliminary data estimates that the average precipitation during December was 5.17" (0.89" above normal) for the state. This would make it the 34th wettest December on record. According to the Kentucky Mesonet, the highest precipitation amount was in Calloway County, 8.55", and the lowest was in Clark County, 2.79".

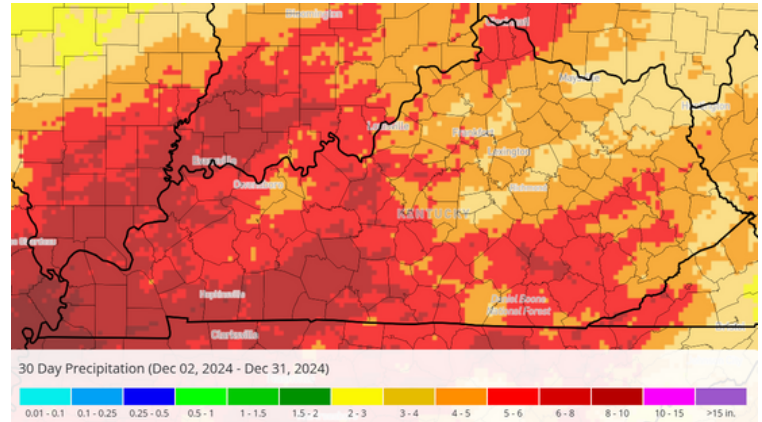


Figure 1. Monthly precipitation map.

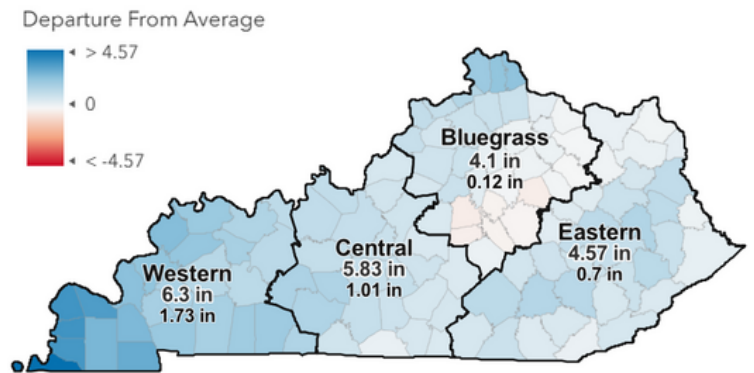


Figure 2. Departure from normal precipitation by county and climate division.

Table 1. Regional precipitation patterns

Climate Region	Departure From Normal (inches)					Palmer Drought Severity Index*
	This Month	Past 2 Mos.	Past 3 Mos	Past 6 Mos	Past 12 Mos	
Western	1.73	3.93	0.99	5.30	10.04	1.51
Central	1.01	1.64	-1.44	2.22	6.32	0.66
Bluegrass	0.12	1.64	-1.14	0.62	2.08	-1.53
Eastern	0.70	0.66	-1.93	1.49	1.93	-1.44

*4.0 and above (Extremely Moist)
3.0 to 3.9 (Very Moist Spell)
2.0 to 2.9 (Unusual Moist Spell)
-1.9 to 1.9 (Near Normal)
-2.0 to -2.9 (Moderate Drought)
-3.0 to -3.9 (Severe Drought)
-4.0 or less (Extreme Drought)

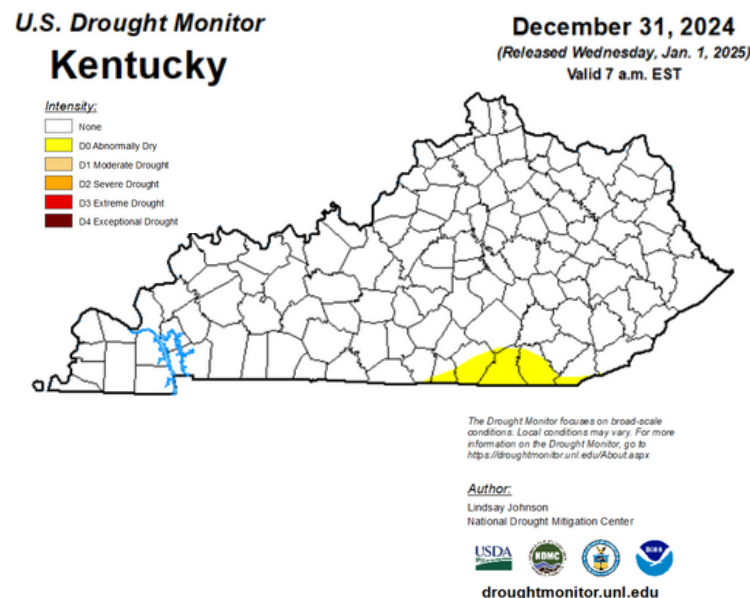


Figure 3. Current US Drought Monitor Map.

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Streamflow

December streamflow was generally at or above normal in December. The two large precipitation events helped keep flows elevated and resulted in some minor flooding, especially in western Kentucky, where precipitation amounts were higher. The precipitation also helped improve streamflows in south central Kentucky, which started the month below normal.

As the drought conditions improved in Kentucky, and the entire Ohio Valley, flow in the Ohio River has improved. With the improved conditions, combined with average flows rising this time of year, navigation concerns below Paducah are no longer a concern.

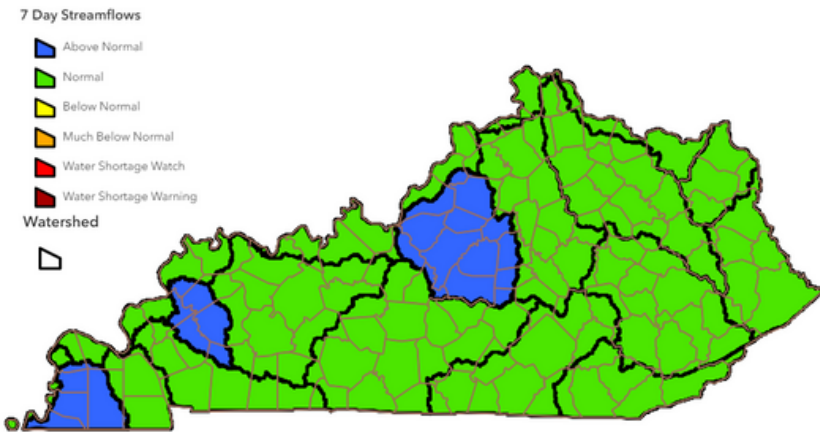


Figure 5. Average streamflow by watershed over the past 7-days (December 25-31).

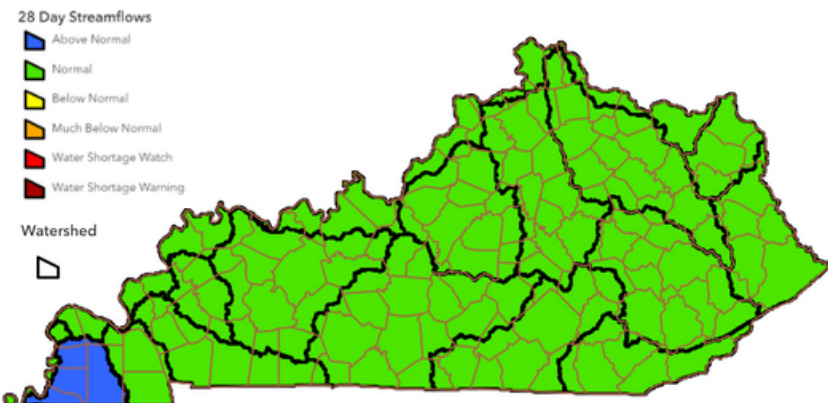


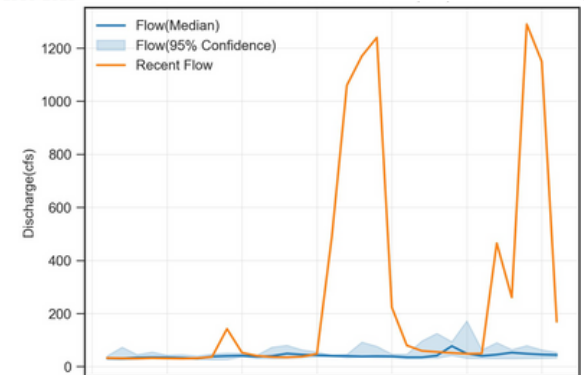
Figure 6. Average streamflow by watershed over the past 28-days (December 4-31).

Table 2. Mean Stream Discharge select stream gages.

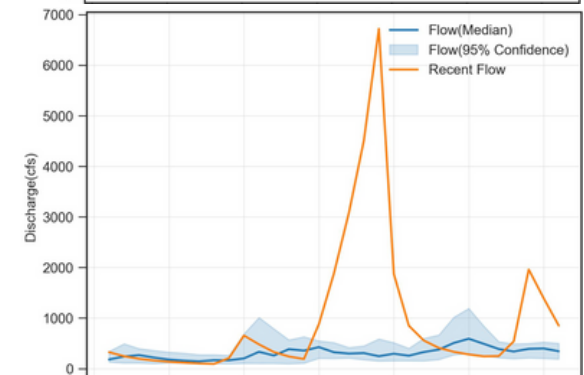
River and Location	Drainage Area (mi ²)	7 Day		28 Day	
		Average Flow (cfs)	% of Normal*	Average Flow (cfs)	% of Normal*
Levisa Fork at Pikeville	2144	1412	101	1626	127
Little Sandy River near Grayson	400	390	81	488	88
North Fork Licking River nr Mt Olivet	226	276	86	414	108
Kentucky River at Lock 14	2657	3816	97	3628	77
Kentucky River at Lock 2	6180	7938	93	8349	77
Cumberland River at Cumberland Falls	1977	4229	131	3189	70
Beaver Creek near Monticello	43	44	81	31	41
Beech Fork at Bardstown	669	1316	134	1659	120
Barren River at Bowling Green	1849	4485	176	2932	82
Green River at Calhoun	7566	20763	190	16401	103
Tradewater River at Olney	255	936	269	810	129
Clarks River at Almo	134	700	391	586	162
Bayou De Chien near Clinton	69	435	431	291	143
Ohio River at Greenup Dam	62000	60250	70	72738	70
Ohio River at Cannelton Dam	97000	120850	93	119207	75
Mississippi River @ Thebes, IL	713200	100188	41	98248	54

* Base Period 1980-2023

Bayou De Chien near Clinton, December 2024



Beech Fork at Maud, December 2024



North Fork Kentucky River at Jackson, December 2024

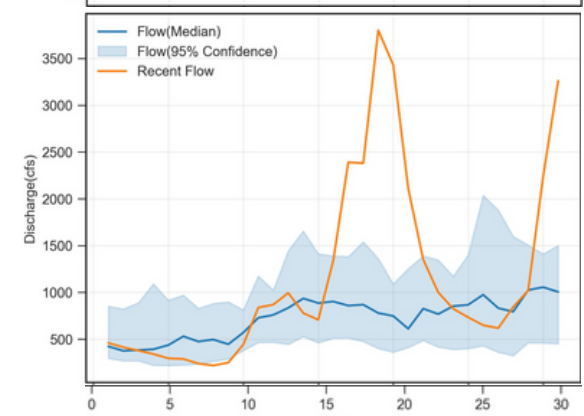


Figure 7. Streamflows compared to median flows for the month.

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Reservoir Storage

Reservoir storage for water supply lakes remain normal for the entire state.

We are currently in the time of year where reservoirs refill. With above normal precipitation the past two months, all reservoirs in the state should be refilling, if they haven't already done so. There are currently no concerns with any reservoirs in the state.

Groundwater

General Statement: Kentucky is a geologically, and hydrogeologically, diverse state. Groundwater data is limited in availability and where available may only be applicable to the immediate area given regional geologic variability. Local conditions may not be accurately reflected by the reference locations selected and local rainfall and surface water conditions may provide additional or more representative information. Current data is compared to a 30-year reference period (1980 - 2010) or the longest available period of continuous data.

Inner Bluegrass: Discharge from Royal Springs started at or below median flow for the month but responded quickly to rainfall peaking well above the median. Discharge remained above the median from the 15th of December to the end of the month. Cumulative discharge for 2024, while above the reference average is within the 95% confidence despite the late summer drought.

Jackson Purchase: Water levels at the Viola well continue to increase staying above median values for the month of December. Water levels are expected to continue to rise over the Winter months into Spring. Across the year, despite the late summer drought water levels were generally higher than the reference period. This is consistent with an observed increasing trend in water levels.

Middlesboro: Water levels in the Middlesboro well continued to rise staying close to the reference median across the month of December. For the year, water levels were generally comparable to the reference period but were below historical water levels more than 30% of the year.

Additional data can be found at:
<https://www.uky.edu/KGS/water/water-groundwater-monitoring.php>

Figure 8. Locations of reference reservoirs across the state. Status of reservoir levels indicated by color.

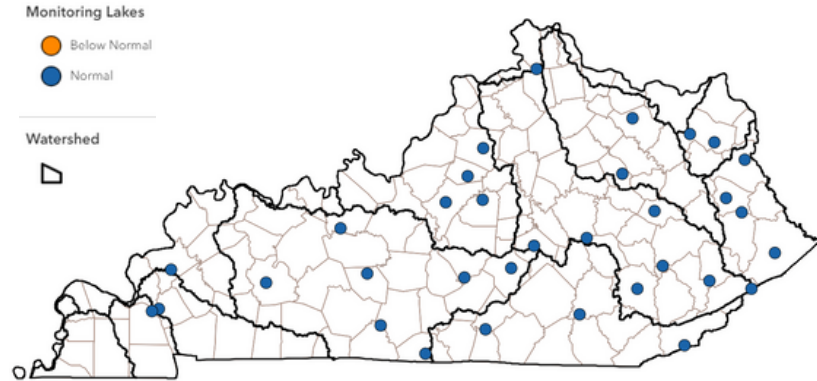
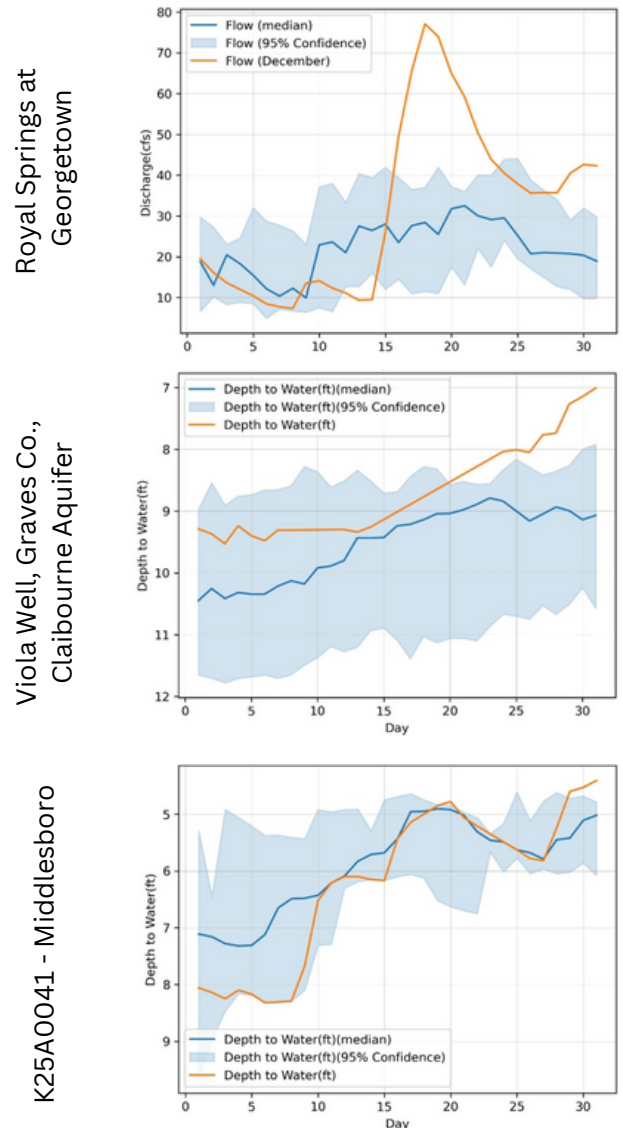


Figure 9. Groundwater observations compared to normal for the month.



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Forecast

The Climate Prediction Center (CPC) is currently predicting equal chances for above and below normal precipitation in January for Kentucky, and the entire Ohio Valley.

The outlook for January through March shows an increased chance for above normal precipitation across the Great Lakes and Ohio Valley, including all of Kentucky. La Niña typically brings above normal precipitation to the Great Lakes/Ohio Valley with below normal precipitation across the Deep South. Though the current La Niña is weak, its presence still tilts the odds in the outlook forecast.

The current U.S. Monthly Drought Outlook shows no drought is expected to develop in Kentucky during the month of January.

Note: these forecasts do not provide the quantity above or below normal, just the probability it will occur.

U.S. Monthly Drought Outlook Drought Tendency During the Valid Period

Valid for January 2025
Released December 31, 2024

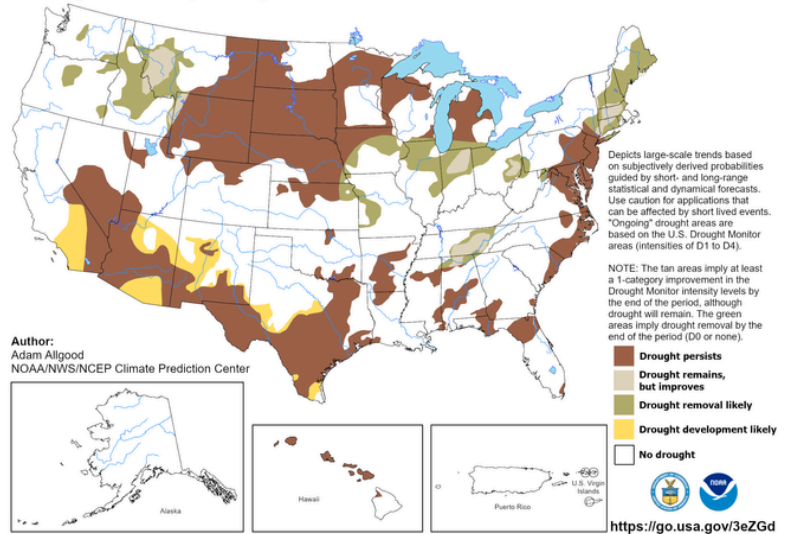


Figure 10. Monthly drought outlook.

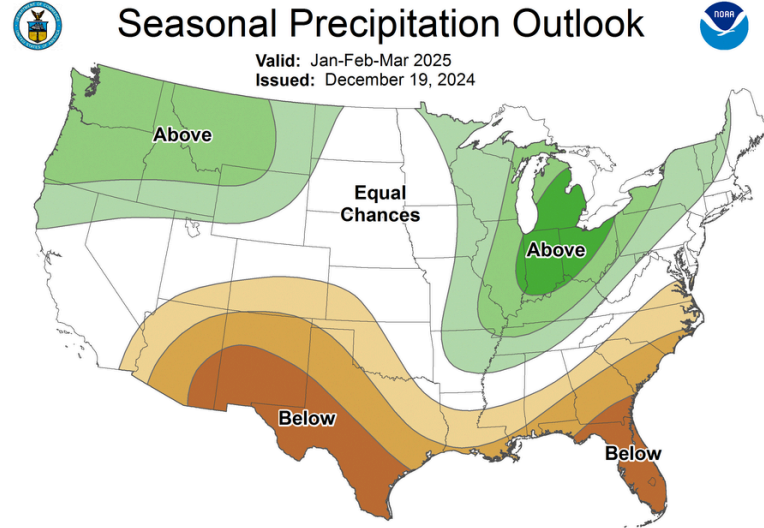
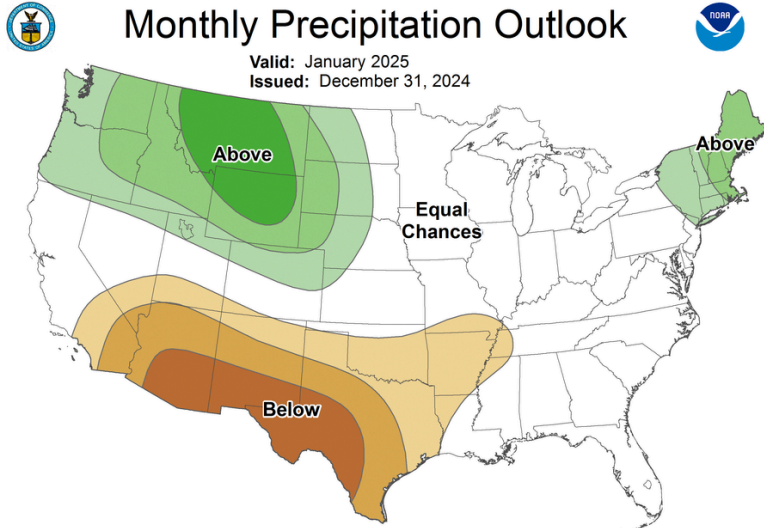


Figure 11. Monthly and seasonal precipitation outlooks.

Contact Us

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Report Drought Conditions



Acknowledgments

Precipitation Data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Centers for Environmental Information; Kentucky Mesonet; Midwest Regional Climate Center; Southern Regional Climate Center.

Streamflow Data:

U.S. Geological Survey, Water Resources Division.

Reservoir Data:

U.S. Army Corps of Engineers, Huntington, Louisville, and Nashville Districts; Kentucky Division of Water, Water Supply Section.

Forecast Data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climate Prediction Center.