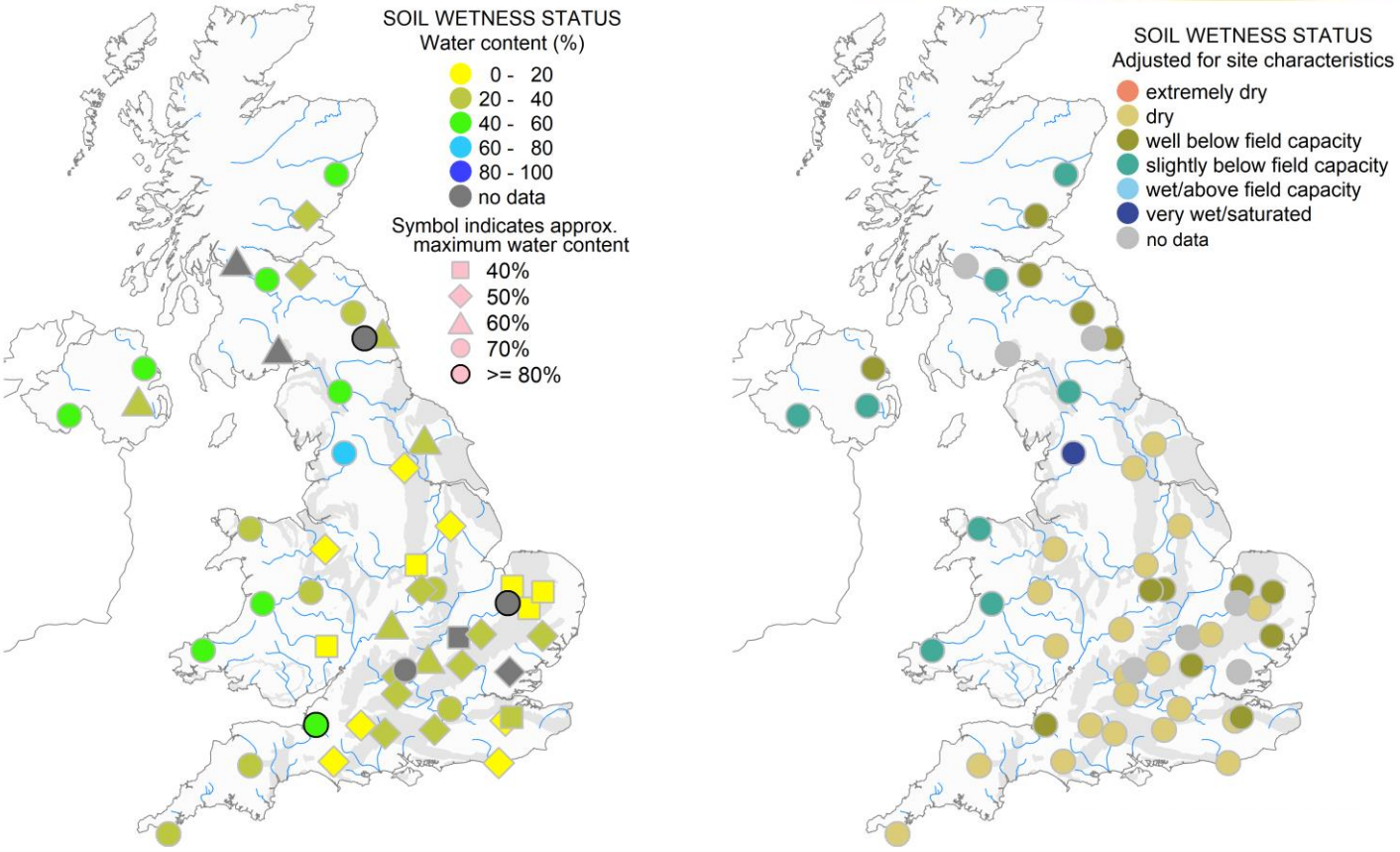
COSMOS-UK | soil moisture

Issued on 08 August 2025



Soil moisture on 31 July 2025 (see back page for explanatory comments).

Soil moisture levels across the COSMOS-UK network have experienced a partial recovery after a very dry period, but some sites, particularly in the South, remain drier than usual.

Provisional data indicate that the total monthly rainfall in July was below the long-term average for England and Wales as a whole, as well as for Scotland, but slightly above average for Northern Ireland. However, there were significant regional variations as frontal weather systems brought rain to many regions. The Southeast was the wettest region, recording 114% of the long-term average rainfall, whereas the Southwest only recorded 54% of the long-term average. Despite cooler periods, the mean temperature for the UK was 16.8 °C, 1.5 °C above the long-term average, making it the fifth warmest July on record.

In contrast to May and June, just five COSMOS-UK sites experienced their driest soil moisture levels for July on record. By the end of the month, soil moisture levels remained below field capacity for most of the UK, except in some western regions. Several sites returned within their normal range for the time of year (e.g., Euston, Hadlow, Rothamsted, Sourhope), indicating a partial recovery. However, other sites, particularly in the South, remained drier than usual (e.g., Chimney Meadows, Chobham Common, Heytesbury, Sheepdrove, The Lizard).

Overall, the unsettled weather brought rain to many regions during July. Whilst this resulted in a partial recovery in soil moisture levels in some areas, other areas - particularly in the South - remain persistently dry. These contrasts underscore the importance of ongoing monitoring as we move into late summer, when rainfall deficits may have lasting impacts on vegetation, agriculture, and water resources.

Network news

The second round of planned preventative maintenance continues with site visits to Waddesdon, Chimney Meadows and Sheepdrove this week. Additional soil calibrations are planned for the remainder of the summer to enhance the precision of the cosmic ray neutron sensors.

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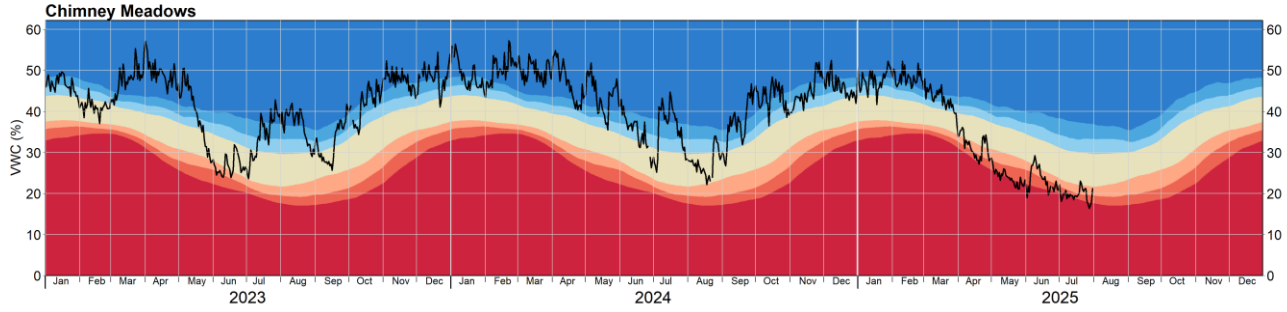

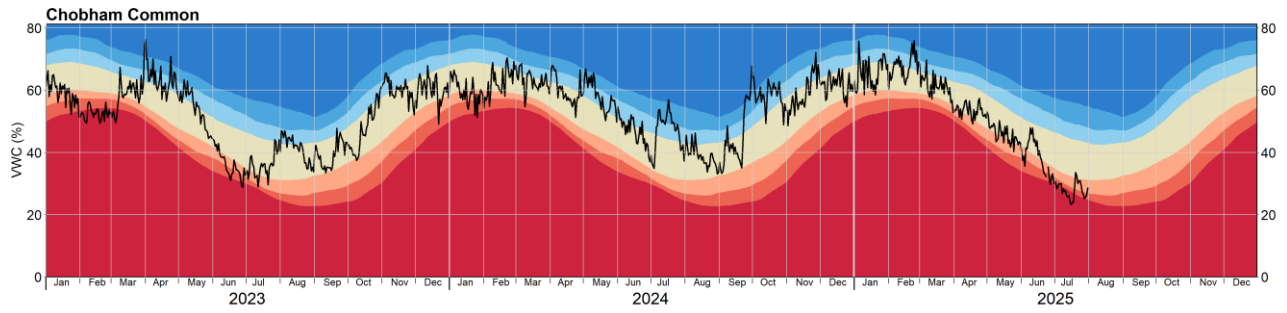

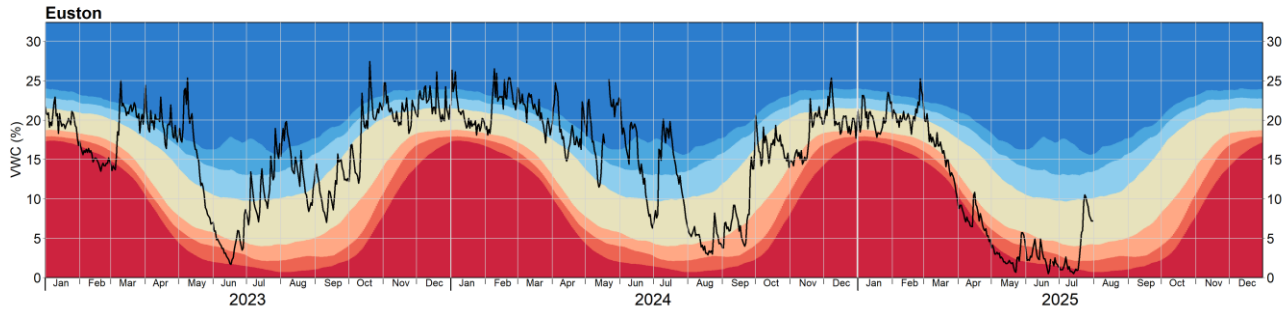

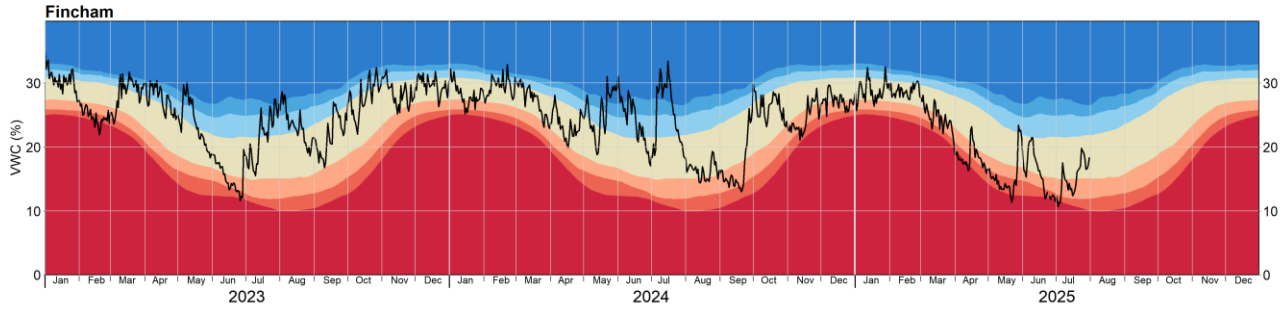

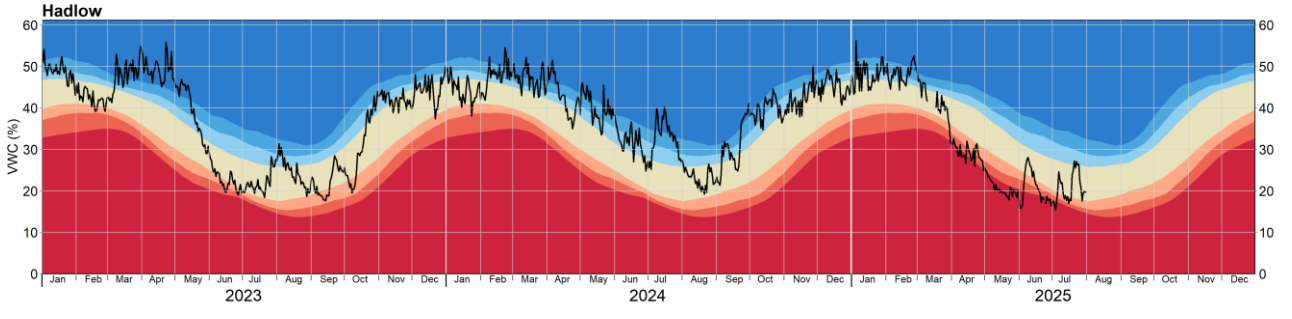

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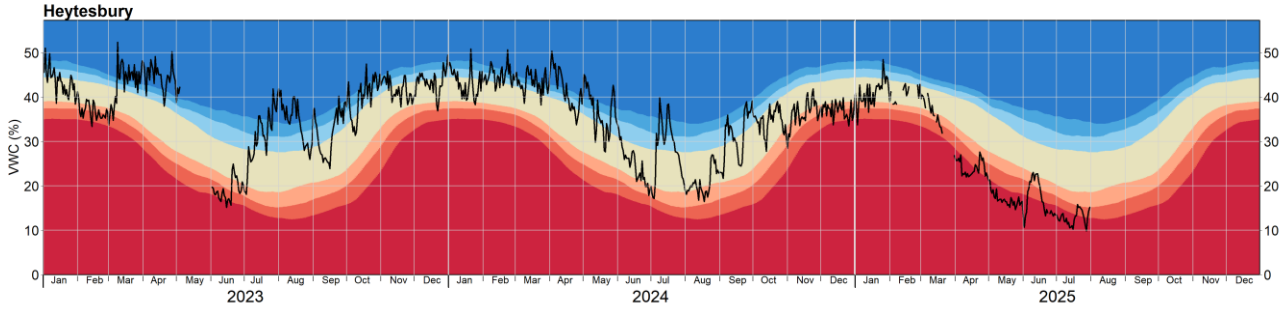

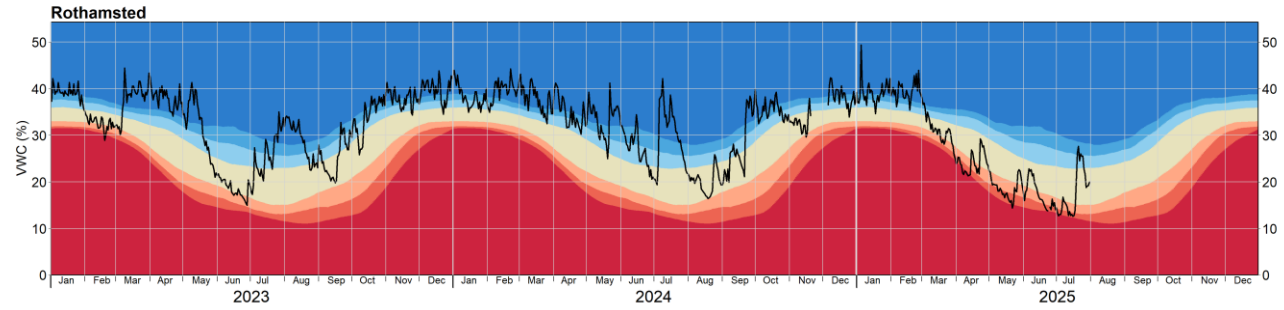

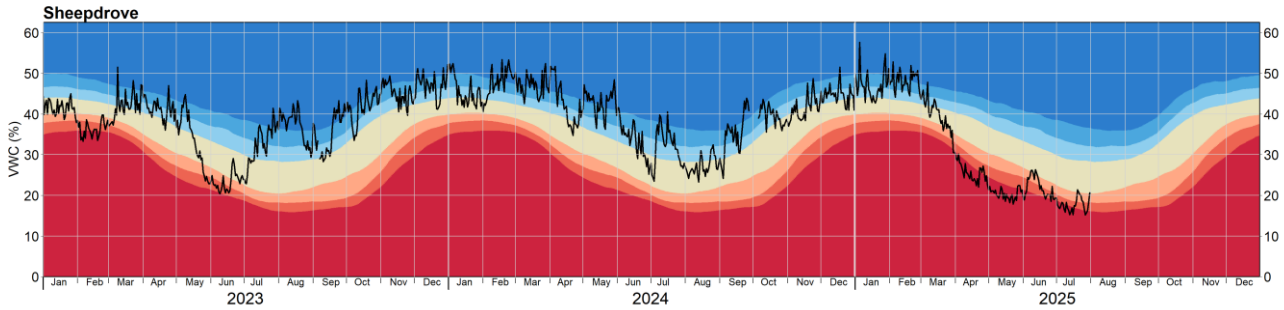

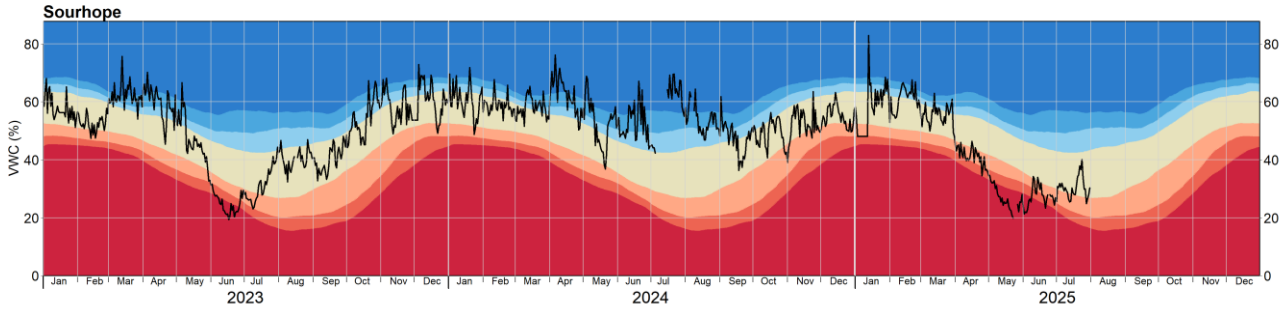

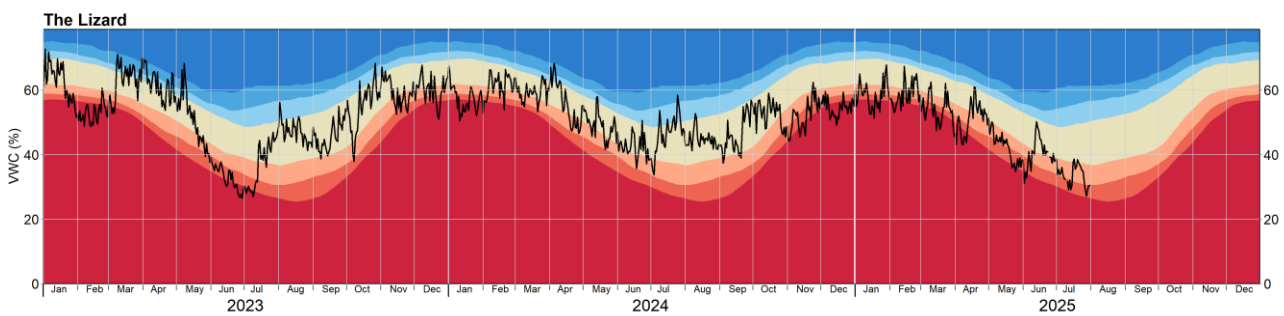

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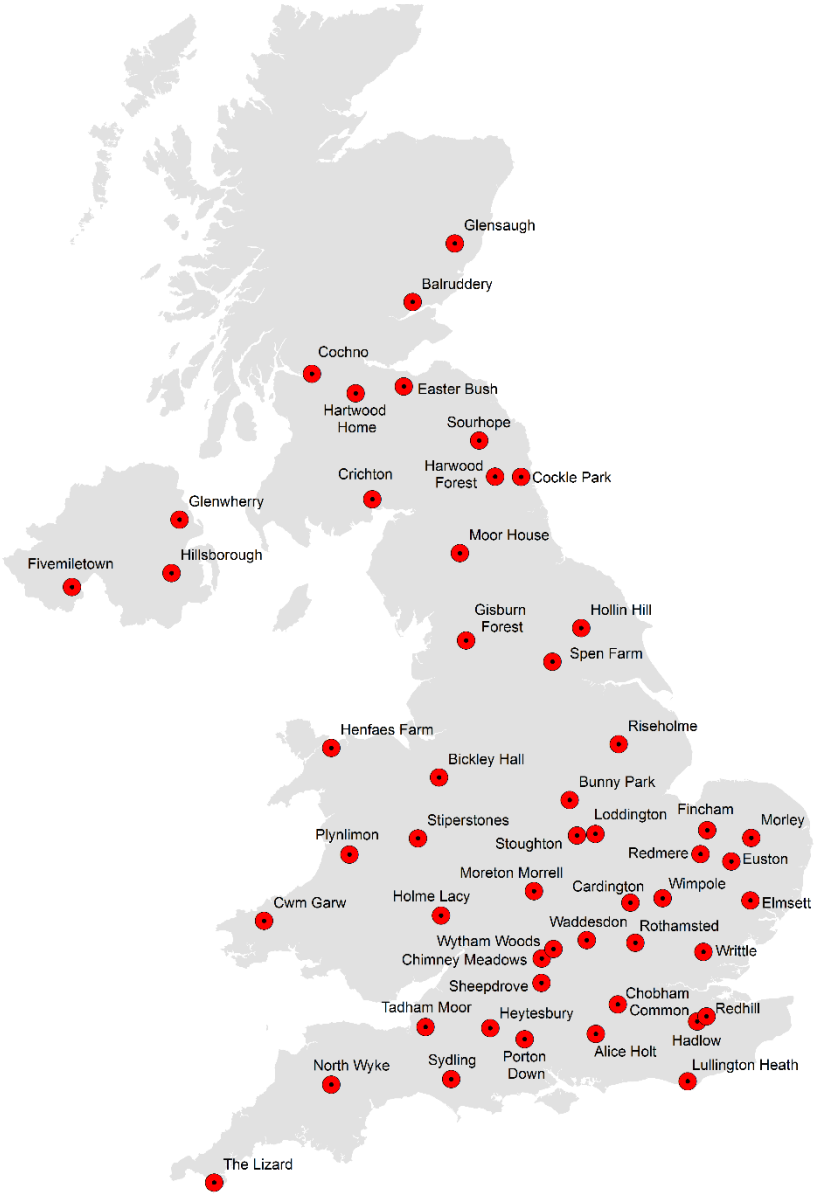

About the maps on page 1: The maps show daily mean soil moisture on the last day of the month. Colours indicate wetness as in the legends.

The map on the left shows wetness as the volumetric water content (VWC) of the soil which is constrained by soil type, i.e. some soils are able to hold more water than others as indicated by the shape of the symbol.

The map on the right presents soil wetness adjusted for site specific characteristics, i.e. taking account of the possible range of soil wetness at each site. Field capacity (FC) is a key point in this range. When soil moisture is below FC soil moisture is said to be in deficit, i.e. there is a (positive) soil moisture deficit (SMD).

Grey shaded areas on these two maps represent principal aquifers.

About the graphs on pages 2 and 3: The black line shows VWC. The coloured bands indicate how VWC compares to historical variability for the site and time of year.

- exceptionally dry
- notably dry
- drier than normal
- normal
- wetter than normal
- notably wet
- exceptionally wet

About soil moisture: Soil moisture varies in the short term (hours to days) with rainfall and as water drains through the soil. Longer term variation is driven by the seasonal difference between rainfall and evaporation. Thus soil moisture decreases in the summer when evaporation exceeds rainfall but increases when this is reversed. In most winters under UK conditions, soil moisture reaches a relatively constant value, known as the field capacity. Field capacity is a measure of how much water the soil can hold against gravity and is strongly dependent on the soil type. Soils are expected to be around field capacity after being wetted to above field capacity and the excess water (e.g. from macropores) has drained away under gravity, which can take several days after heavy rain, to reach a near steady state. Differences in soil type and weather patterns cause variations in soil moisture between sites including when the soil returns to field capacity in autumn/winter and when soil moisture decreases in the spring/summer.

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