

Soil moisture on 31 March 2024 (see back page for explanatory comments).

Notes on the period to 31st March 2024

At the end of March, soil moisture remains high across most of the COSMOS-UK network.

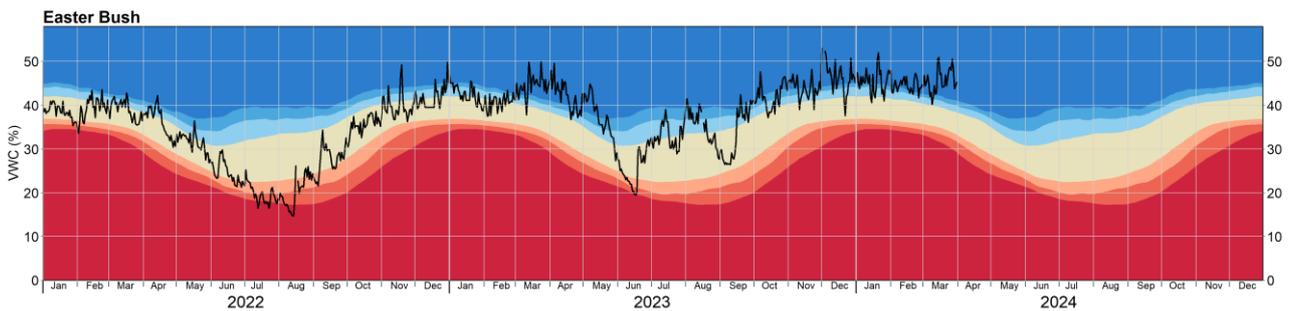
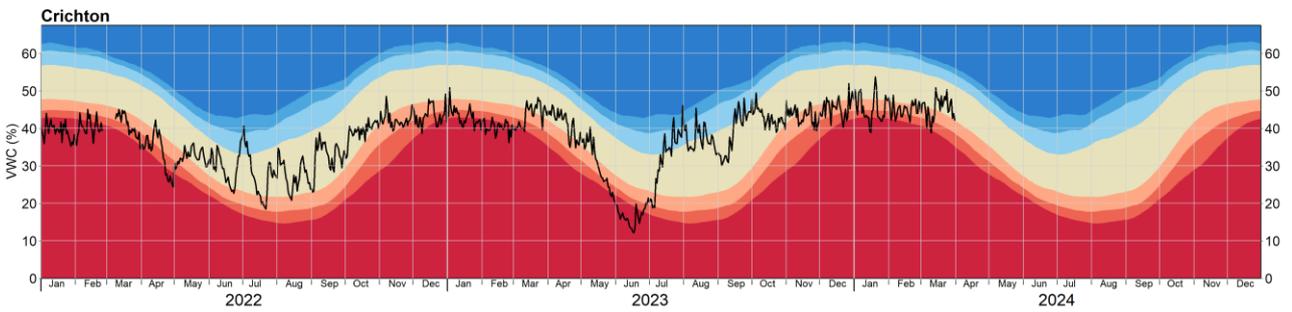
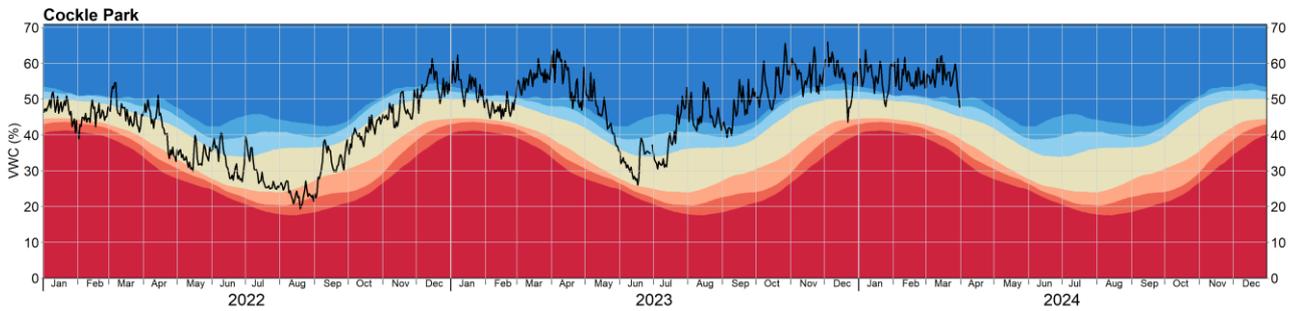
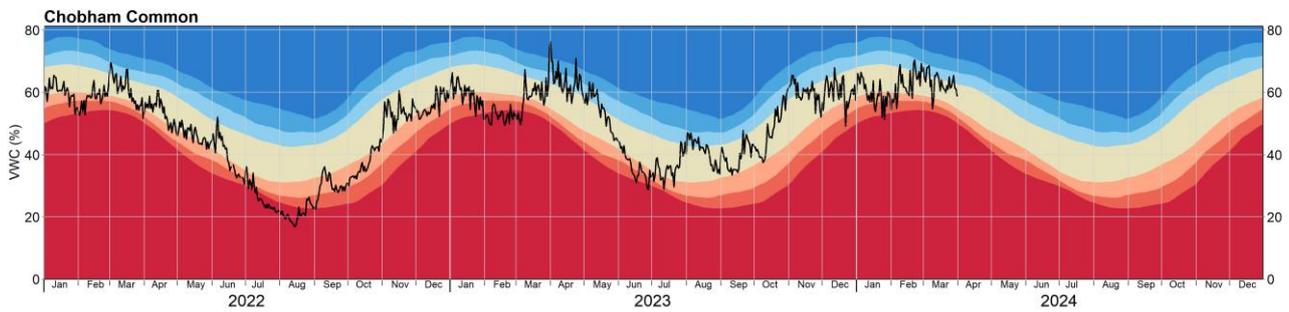
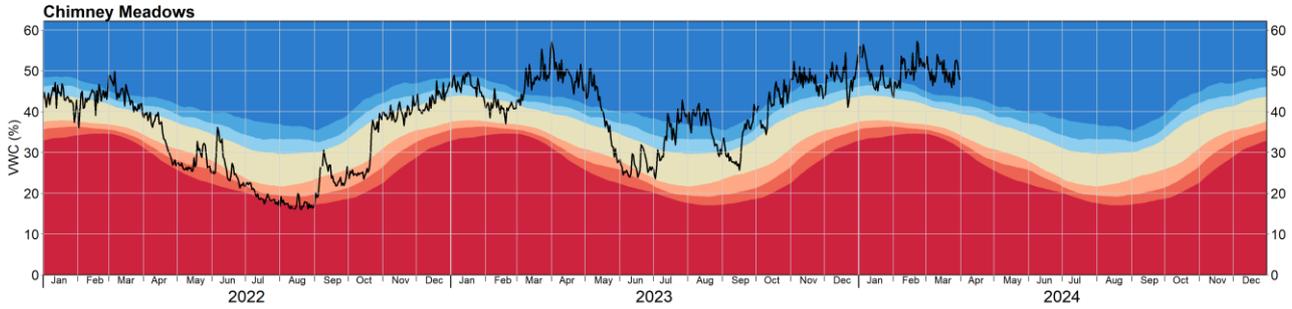
Provisional data indicate that March monthly rainfall totals were above average for England and Wales. Scotland and Northern Ireland were slightly drier than average at the beginning of the month, becoming wetter than average towards the end. Overall, the UK experienced 27% more rainfall than usual in March. Southwest England was the wettest region, 95% wetter than average, whereas Northern Scotland was 20% drier. Overall, UK temperatures were 1.0 °C higher than usual for this time of year.

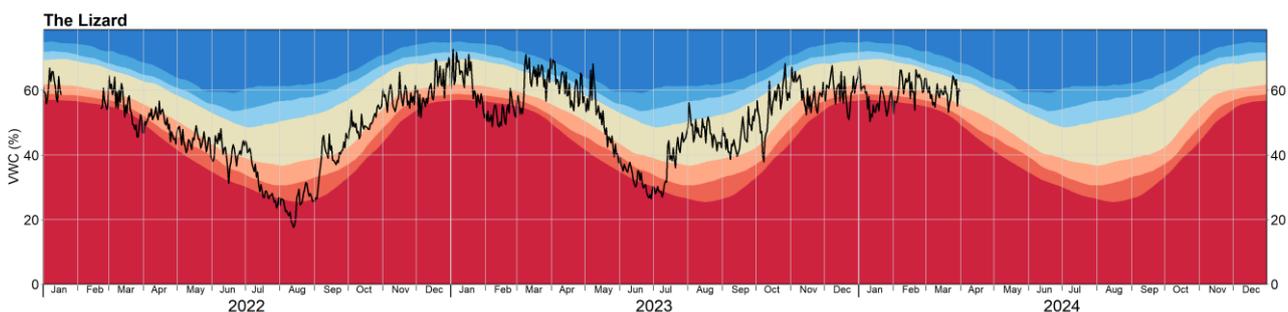
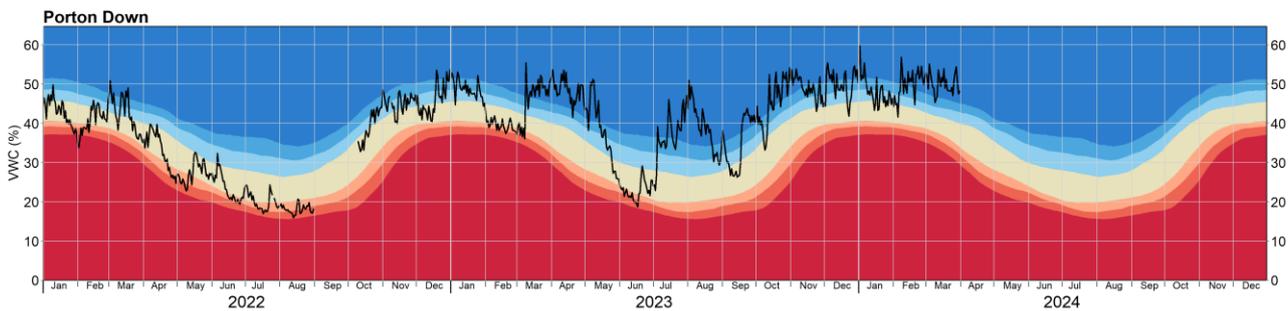
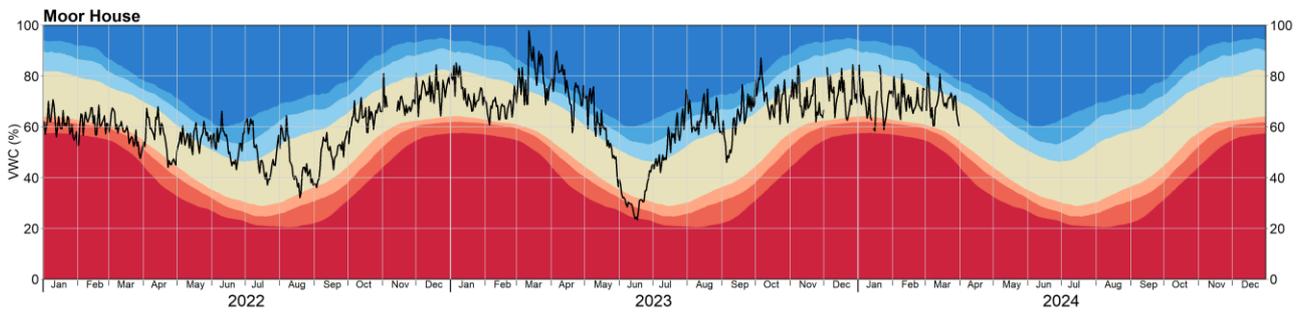
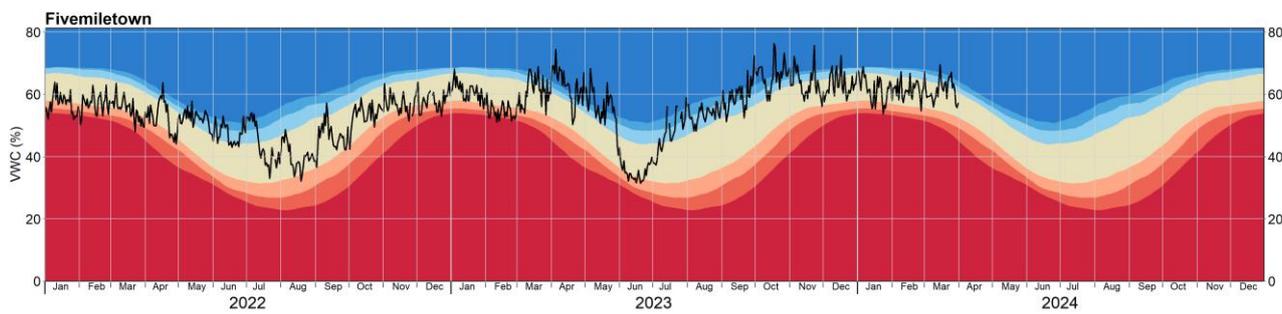
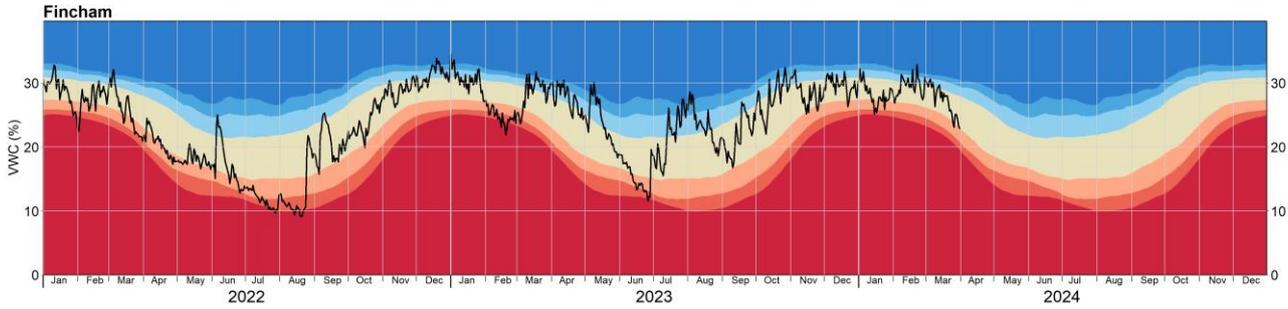
Unsettled weather brought more rain to many regions, maintaining reasonably high soil moisture at most COSMOS-UK sites. Wetter than usual sites existed in Southern England (e.g., Chimney Meadows, Porton Down), Northern England (e.g., Cockle Park), and Eastern Scotland (e.g., Easter Bush). Several sites were within their normal range for most of the month, e.g., Chobham Common, Fincham, Fivemiletown. Crichton and The Lizard fluctuated between drier than usual and within their normal range throughout the month.

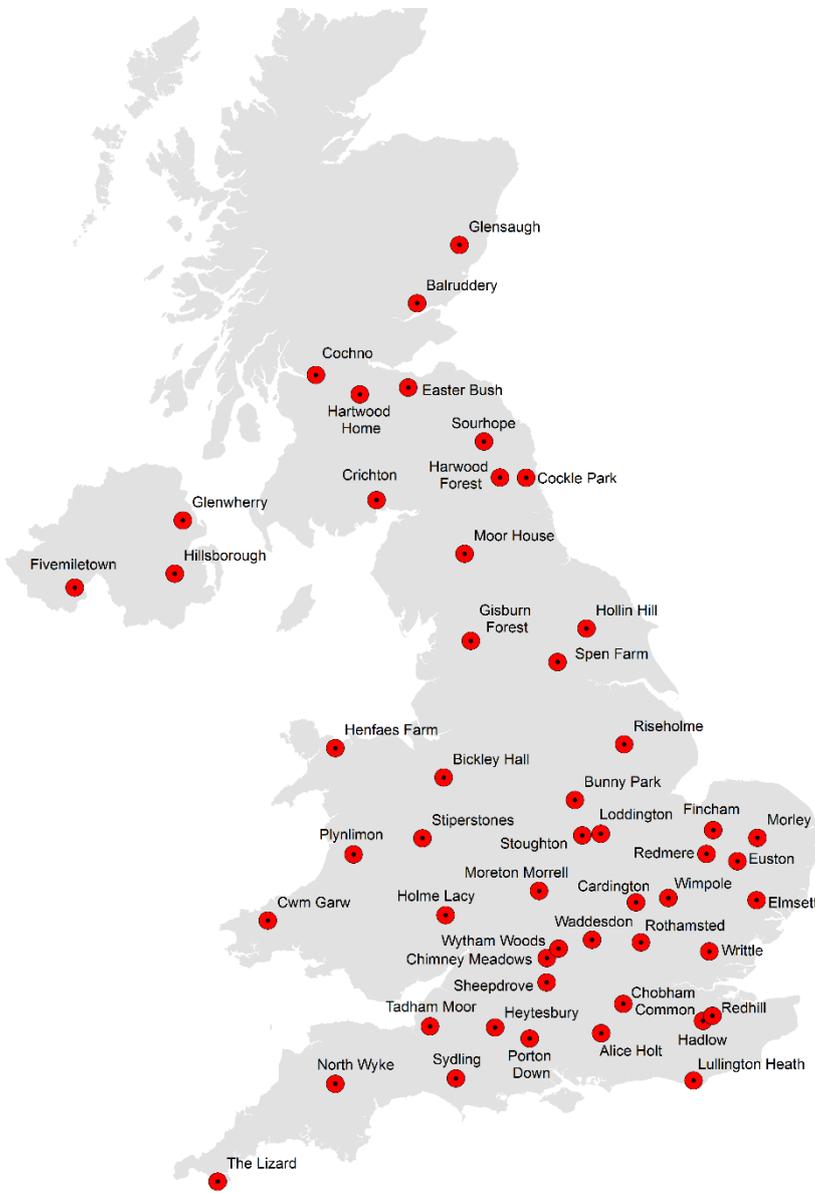
Overall, soil moisture remains high for much of the COSMOS-UK network, following a wetter-than-average March and mild temperatures.

Network news

Changes have been implemented based on a review of the neutron intensity corrections that are applied as part of the calculation of Volumetric Water Content (VWC) from the cosmic ray soil moisture sensors; historic VWC has been re-calculated at each site. Our annual preventative maintenance programme has started to ensure all sensors function correctly. The loss of CRNS and point-scale VWC measurements at Plynlimon have been fixed. The annual COSMOS-UK data ingestion to the EIDC is now available: <https://doi.org/10.5285/399ed9b1-bf59-4d85-9832-ee4d29f49bfb>







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.

About COSMOS-UK: COSMOS-UK is supported by the Natural Environment Research Council award number NE/R016429/1 as part of the UK-SCAPE programme delivering National Capability.

