

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

### Notes on the period to 31st July 2024

**At the end of July, soil moisture is within the normal range for much of the COSMOS-UK network, however was highly variable throughout the month.**

July was characterized by an unsettled mix of weather conditions. The month started with cooler and wetter conditions, particularly across England, where some areas received more than the long-term average by mid-month. The UK as a whole experienced around average rainfall for the month, although with regional variations: England recorded was wetter than average, while Scotland, Wales, and Northern Ireland were slightly drier than usual. Temperatures were generally cooler than average, though towards the end of the month temperatures reached above 30°C in some areas.

Soil moisture for many COSMOS-UK sites exhibited significant variability, reflecting the mixed weather patterns of the month. Sites across England saw very high soil moisture at the start of the month due to the high rainfall, with then a sharp decline in soil moisture towards the end of the month with the hot and dry weather (e.g. Elmsett, Fincham, Porton Down). Balruddery in southern Scotland has had low soil moisture throughout the month, reflecting the below average rainfall in this region.

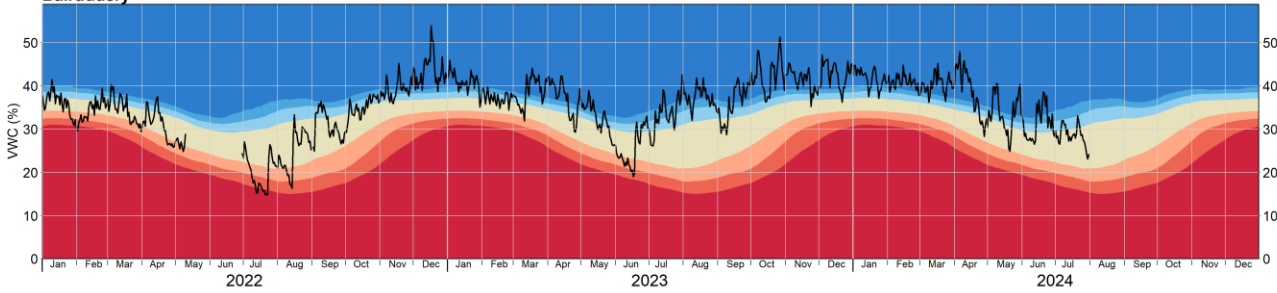
Overall, mixed weather conditions are reflected in the COSMOS-UK soil moisture levels. Most sites end the month with near-normal moisture levels for the time of year, while others, though sites in southern and eastern regions are starting to show signs of drying out.

### Network news

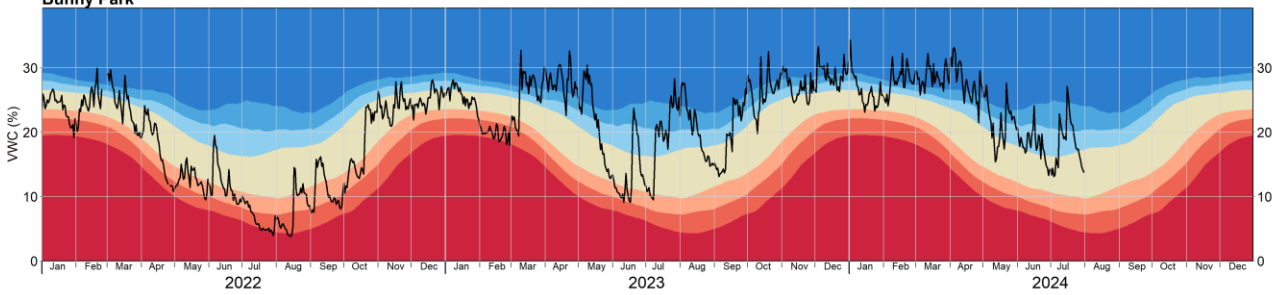
The second round of our Planned Preventative Maintenance continues. Issues with data delivery via email and the API have now been fixed.



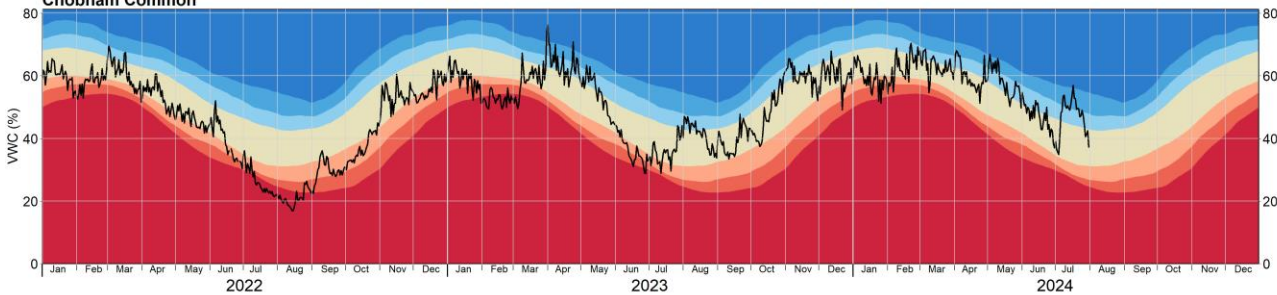
**Balruidery**



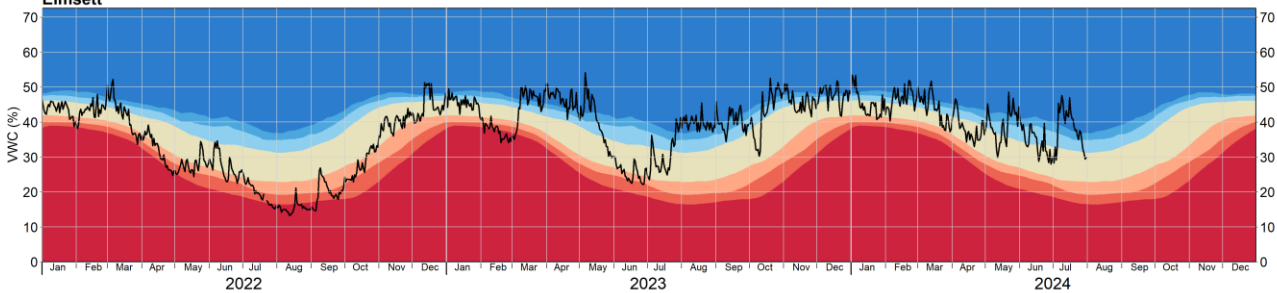
**Bunny Park**



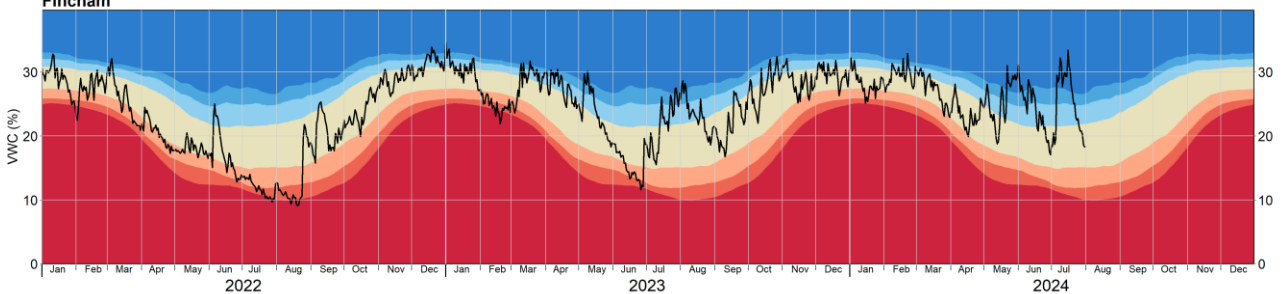
**Chobham Common**

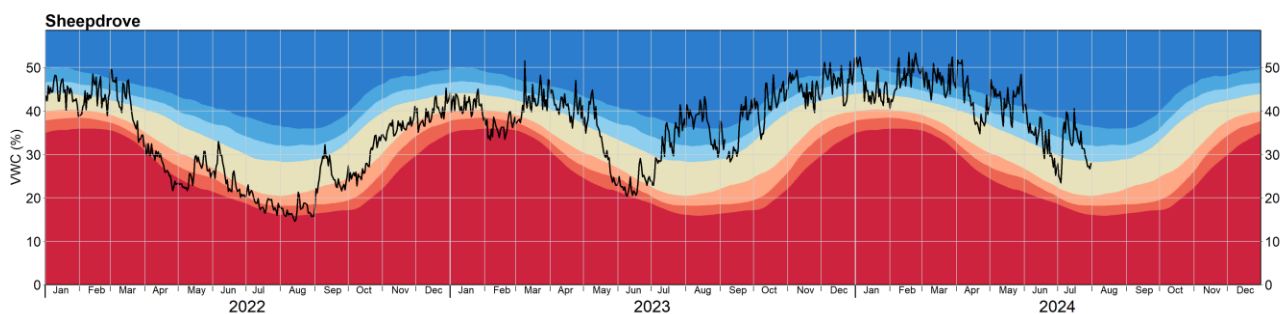
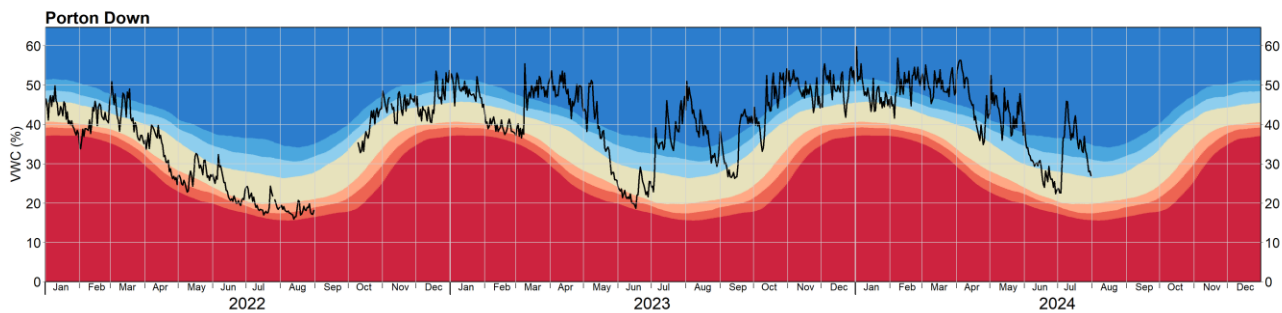
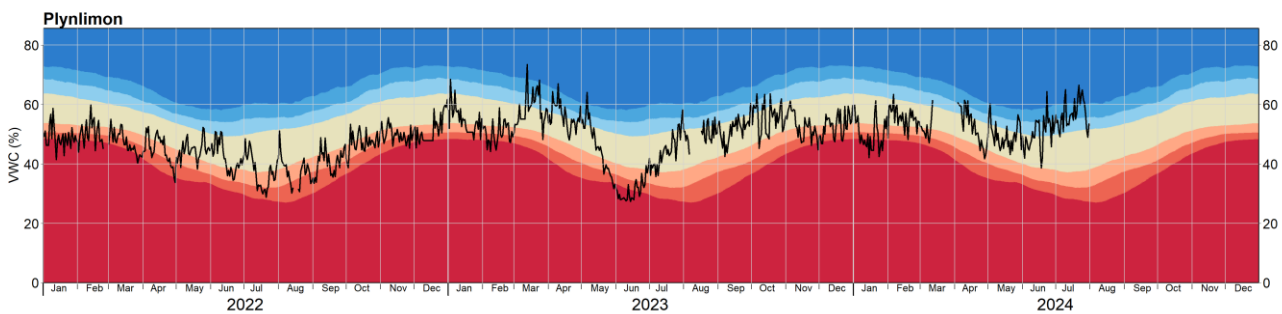
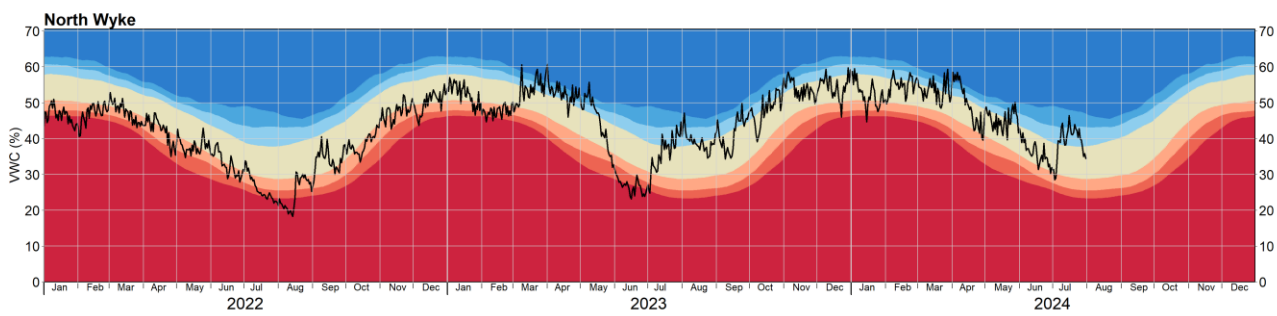
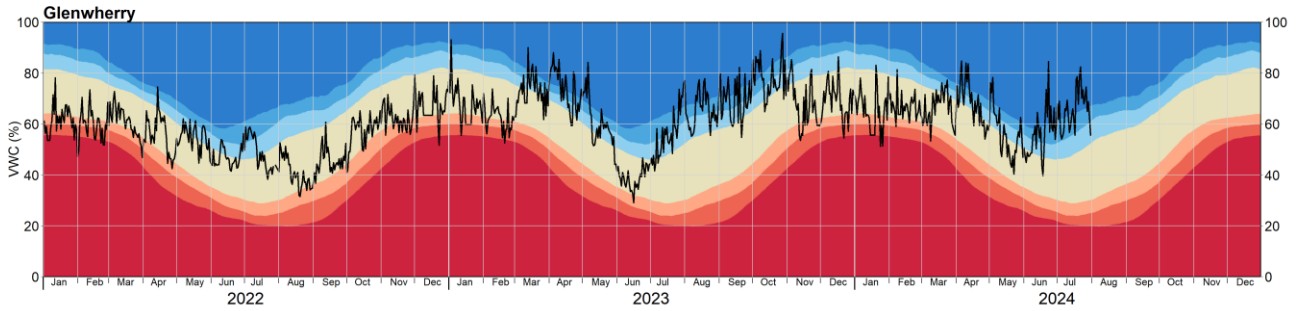


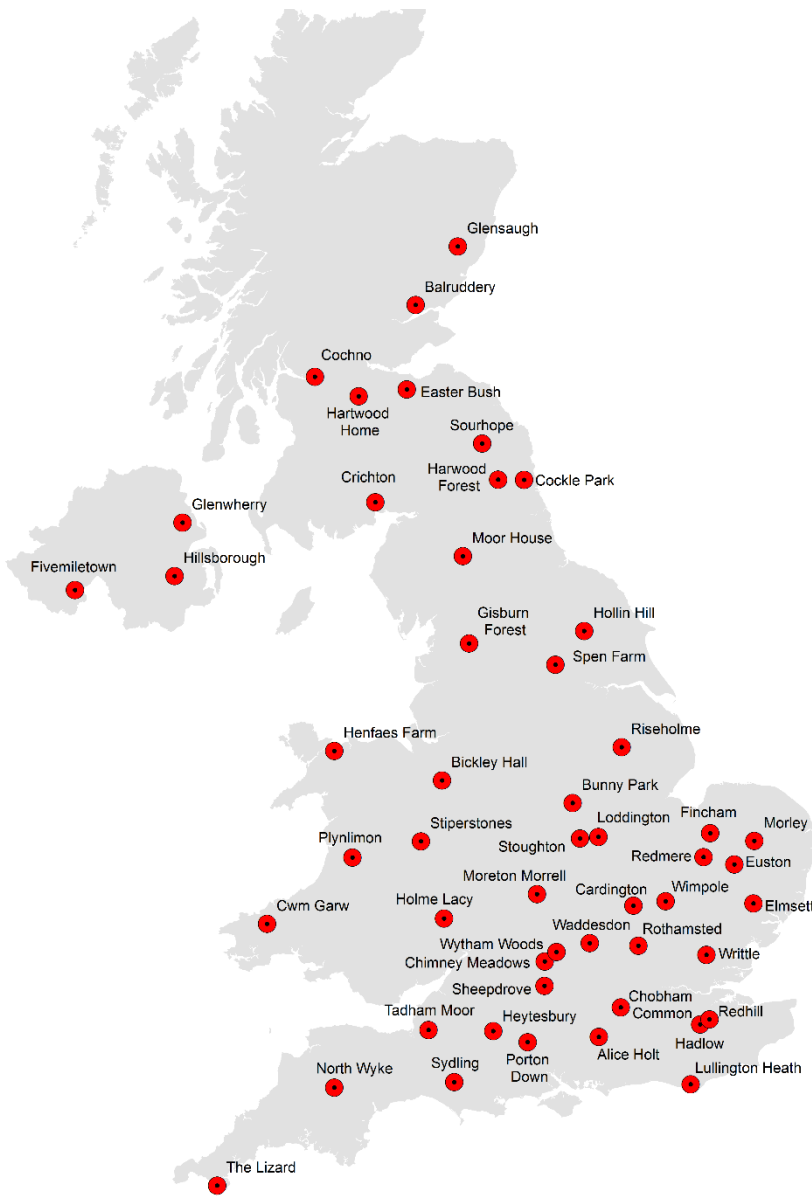
**Elmsett**



**Fincham**







**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.

