

Soil moisture on 31 July 2023 (see back page for explanatory comments).

Notes on period to 01 August 2023

High levels of rainfall throughout July led to a steep rise in soil moisture across the UK, with the soil moisture index rising above field capacity in most of the country except parts of Southern England.

Provisional data indicate a very wet month with cooler than average temperatures across the UK, in marked contrast to the sub-average rainfall and record high temperatures of the month before. It is provisionally the wettest July for the UK since 2009, with all regions of the UK recording rainfall levels above their long-term average. It was the wettest July on record in Northern Ireland, which saw more than double its average rainfall for the month. Throughout the country, temperatures dropped 0.3 - 0.4°C below the July long-term average.

The high levels of rainfall in July led to soil moisture levels rising throughout the month at all COSMOS-UK sites. At the end of the month, soils at some sites are nearing saturation, particularly in Northern Ireland (e.g. Fivemiletown), Scotland (e.g. Balruddery) and Northwest England (e.g. Gisburn Forest). At other sites however, the increase in precipitation restored soil moisture from June's exceptionally dry levels to near normal levels for this time of year, particularly for sites in the South of England (e.g. Chobham Common and The Lizard) and at Sourhope in the Scottish Borders.

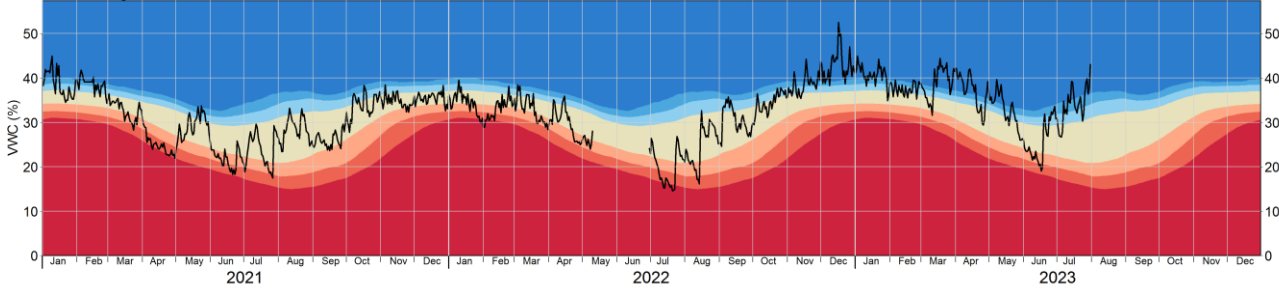
Overall, soil moisture levels rose throughout July due to high amounts of precipitation and mild temperatures.

Network News

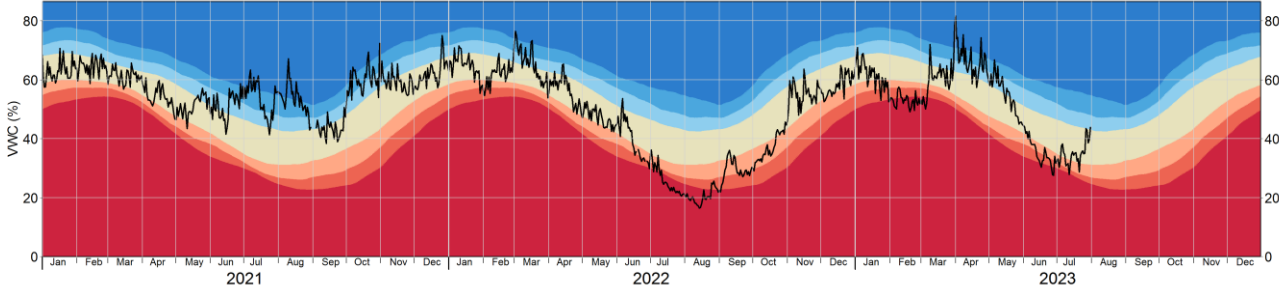
A soil moisture calibration has been carried out at the Waddesdon COSMOS-UK site. A number of new high gain antennas have been installed during the second round of annual planned preventative maintenance visits, including at Fivemiletown and Hillsborough.



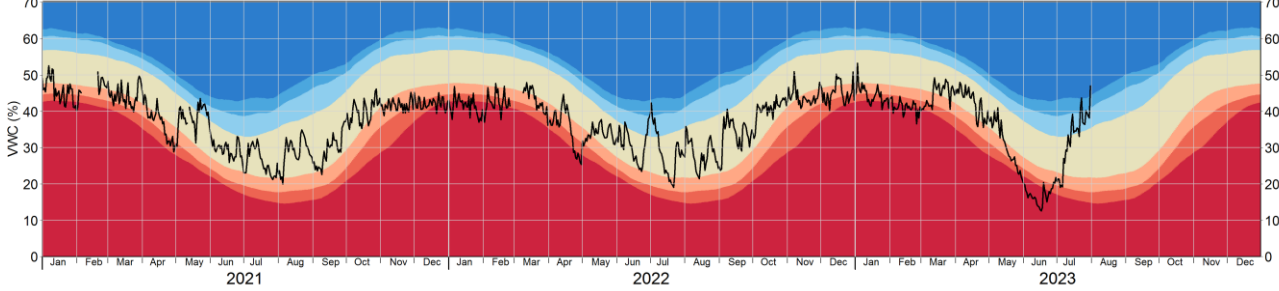
Balruidery



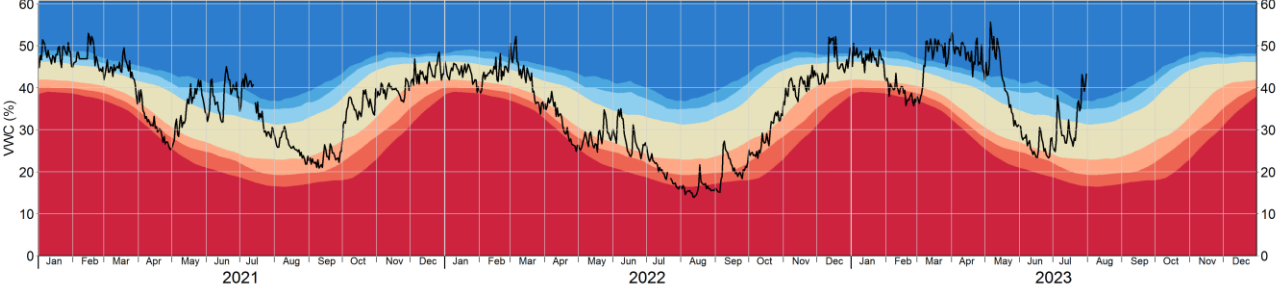
Chobham Common



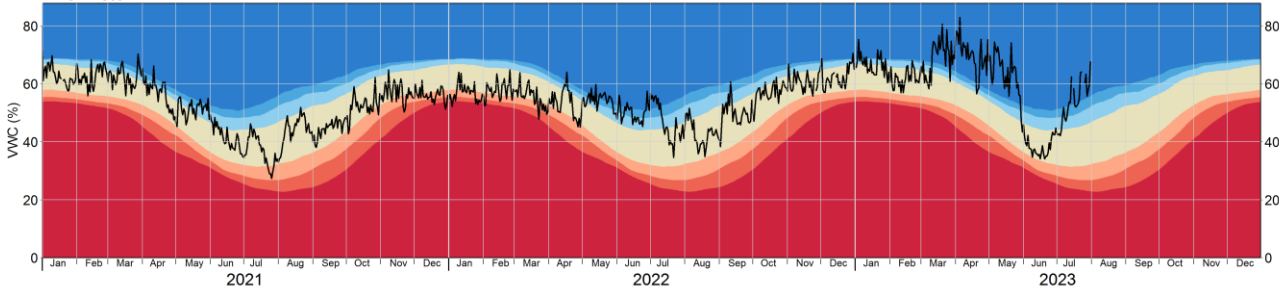
Crichton



Elmsett

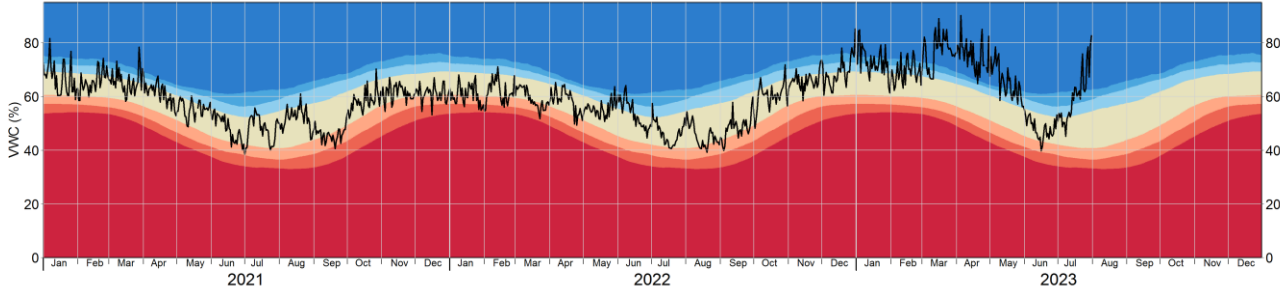


Fivemiletown

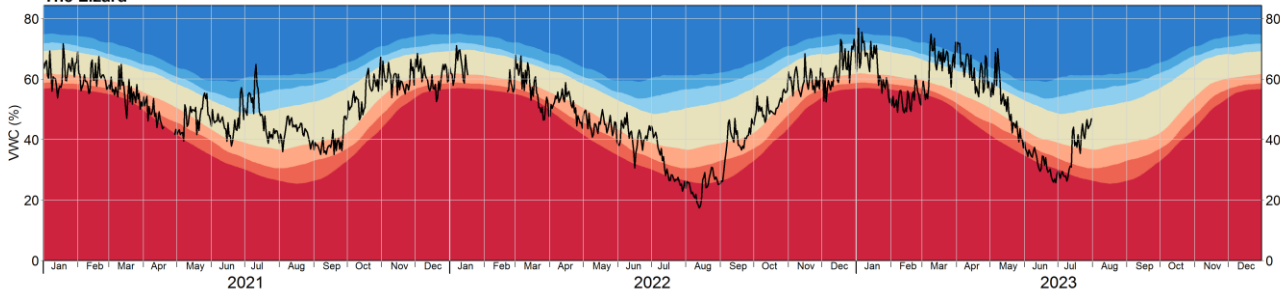




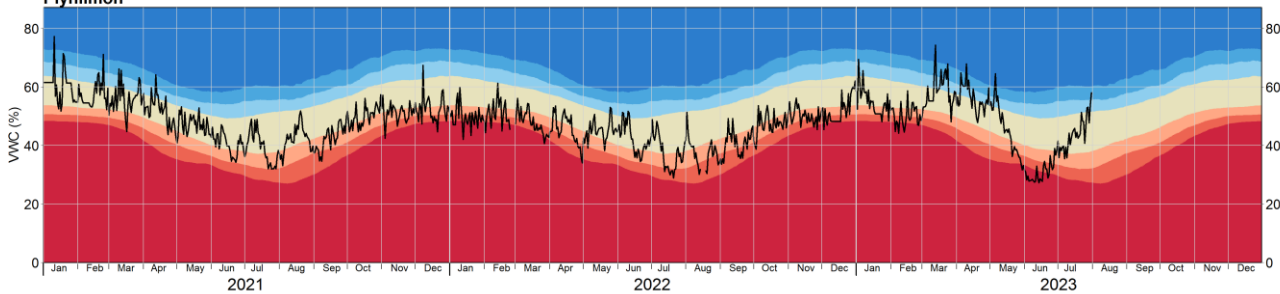
Gisburn Forest



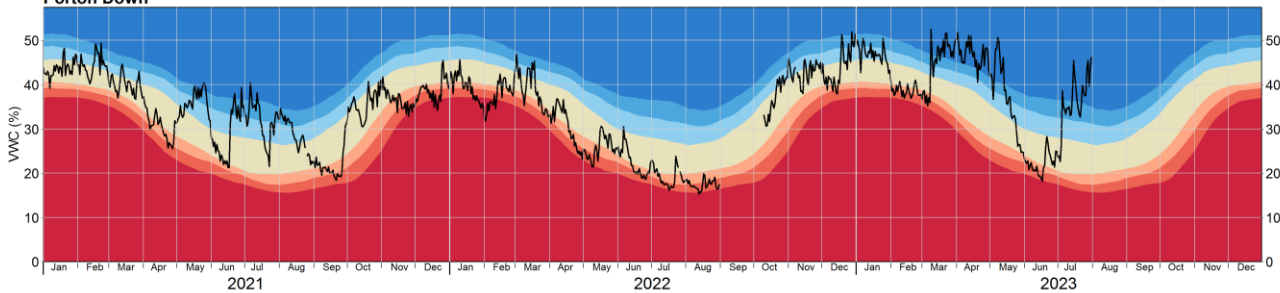
The Lizard



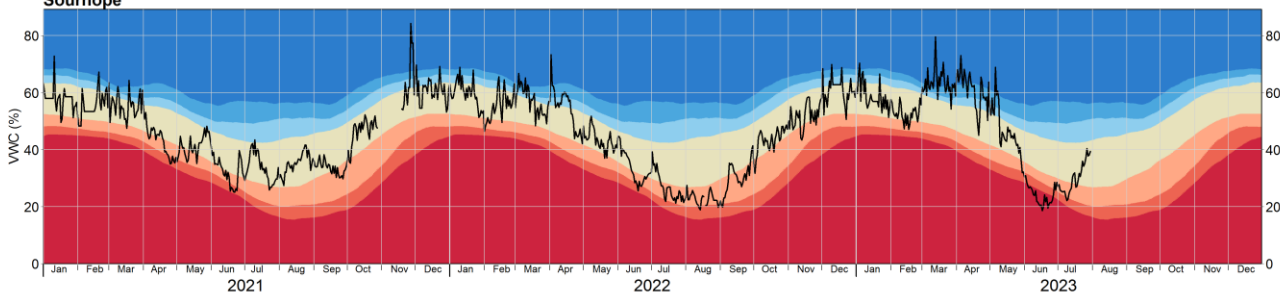
Plynlimon

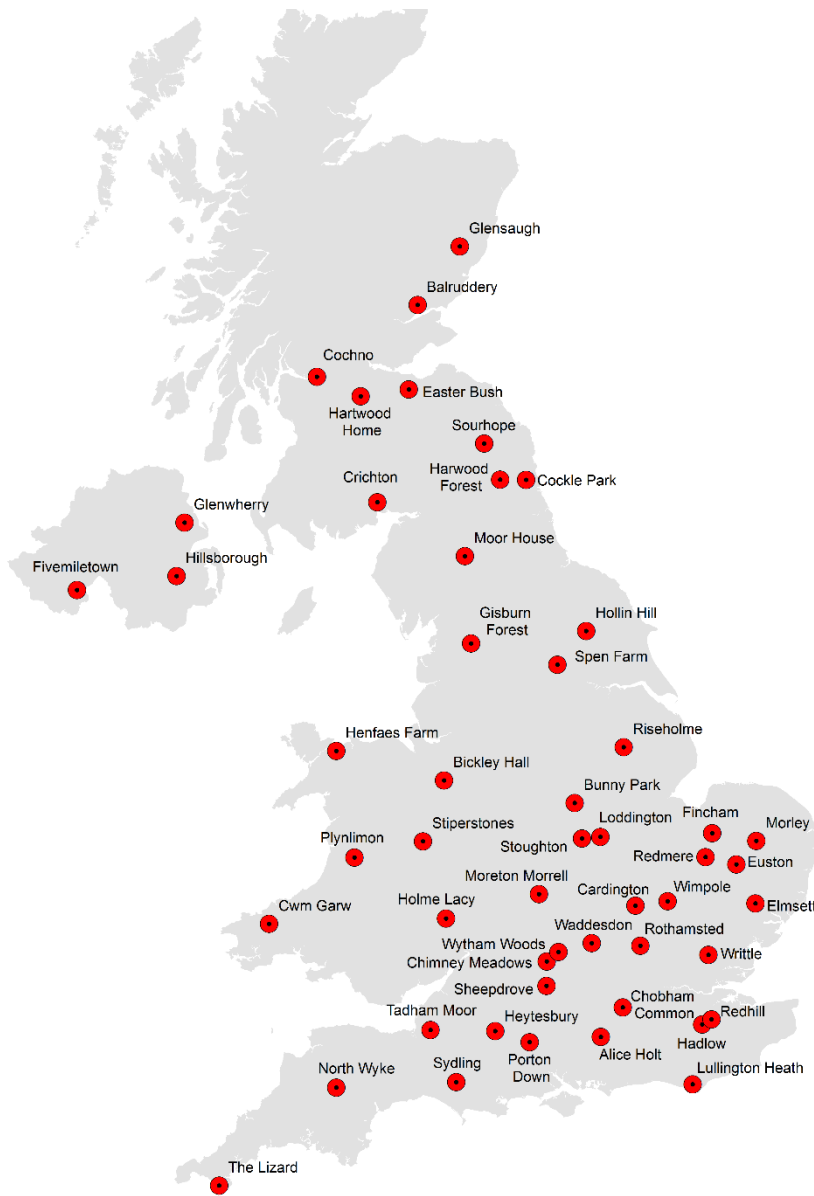


Porton Down



Sourhope





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.

