

Soil moisture on 30 September 2023 (see back page for explanatory comments).

Notes on period to 01 October 2023

Following a dry start to September, above average rainfall in most of the UK in the second half of the month saw soil moisture levels rise throughout the country except in the Southeast.

Provisional data indicate below average rainfall across the UK for the first half of the month. From mid-September onwards, however, rainfall was well above average for northwest and central England, Northern Ireland and Scotland, with southern Scotland experiencing the wettest conditions at 170% above the long-term average. Temperatures in September were unusually high for this time of year, with temperatures of more than 3°C above average in the southeast of England.

By the end of the month, soil moisture levels increased to near or above field capacity at all COSMOS-UK sites except those in southeast England. Several western sites, such as Hartwood Home in central Scotland, Glenwherry and Fivemiletown in Northern Ireland, Henfaes in north Wales, and Gisburn Forest in northwest England are at or close to saturation (some of these sites are much wetter than the expected range, and the data are subject to further review). By contrast, Hadlow, Redhill and Writtle in the Southeast returned to average soil moisture levels from below-average dryness in the first half of the month. Some sites, such as the Lizard in southwest England or Sourhope in the Scottish borders, remained within their normal range for this time of year.

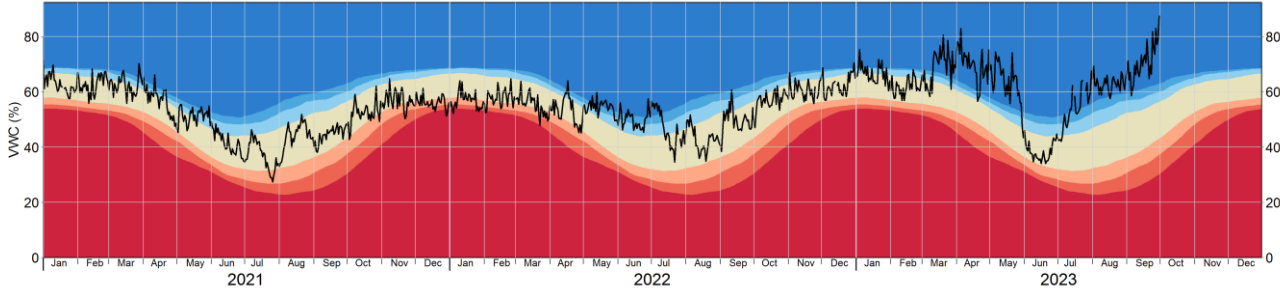
Overall, soil moisture levels rose in most parts of the country following above-average rainfall in the second half of September.

Network news

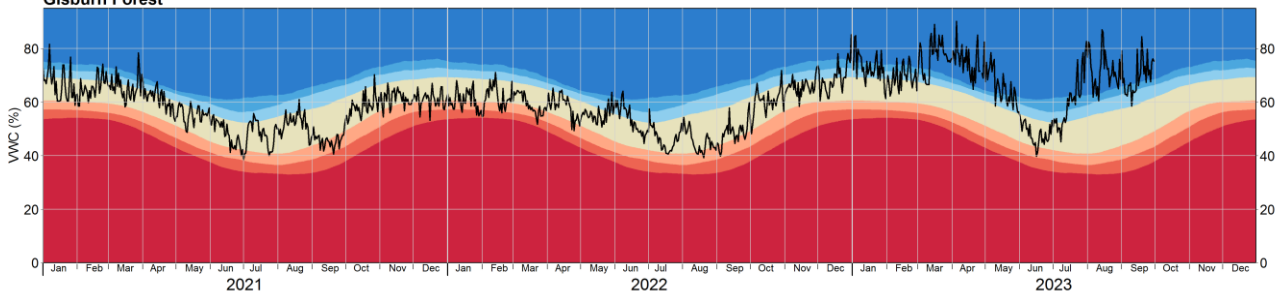
The COSMOS-UK network celebrates its 10-year anniversary on the 2nd of October.



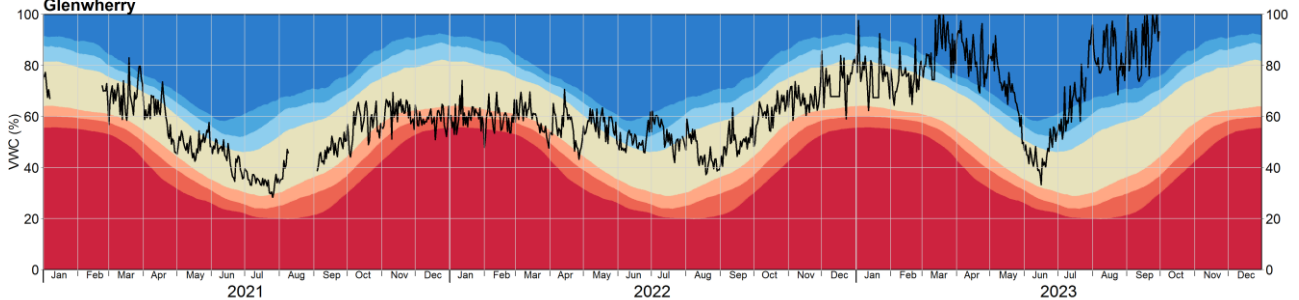
Fivemiletown



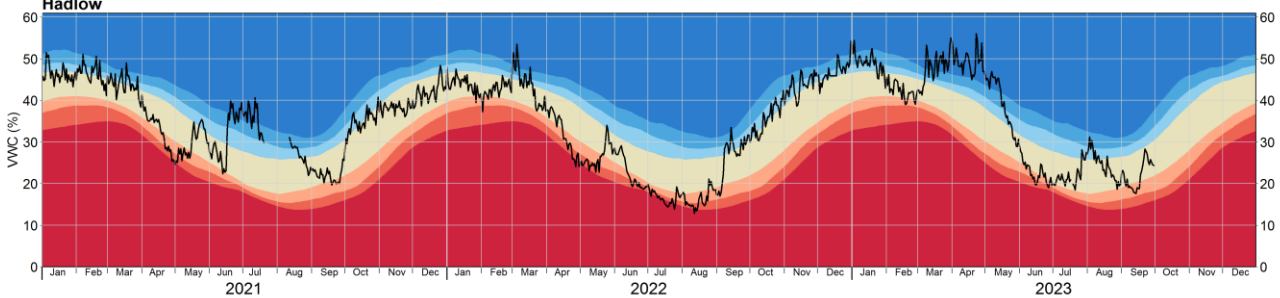
Gisburn Forest



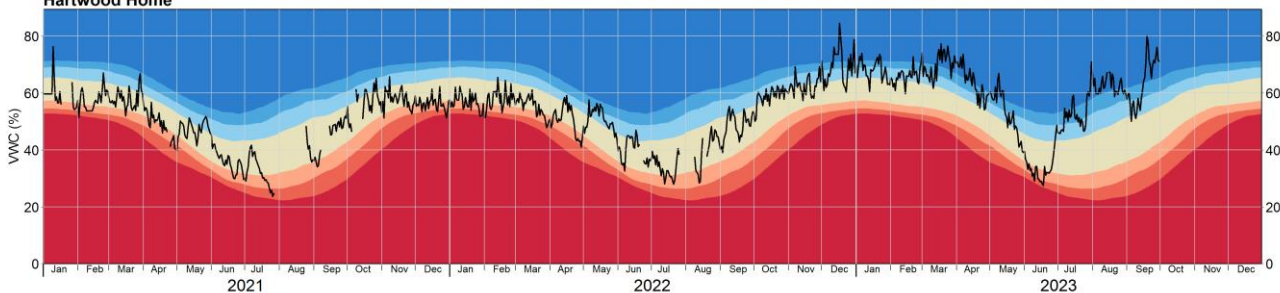
Glenwherry

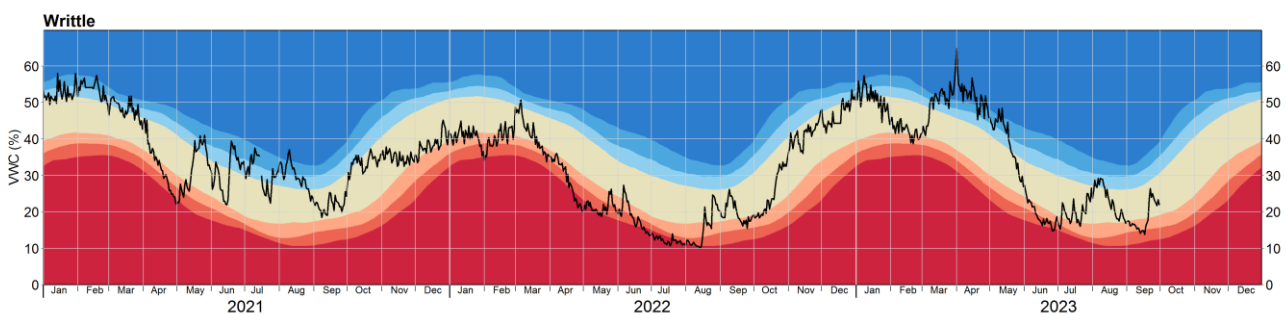
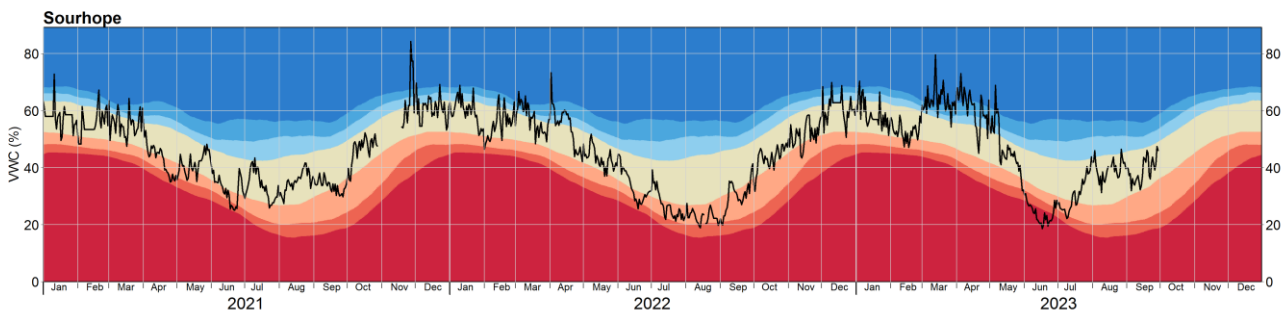
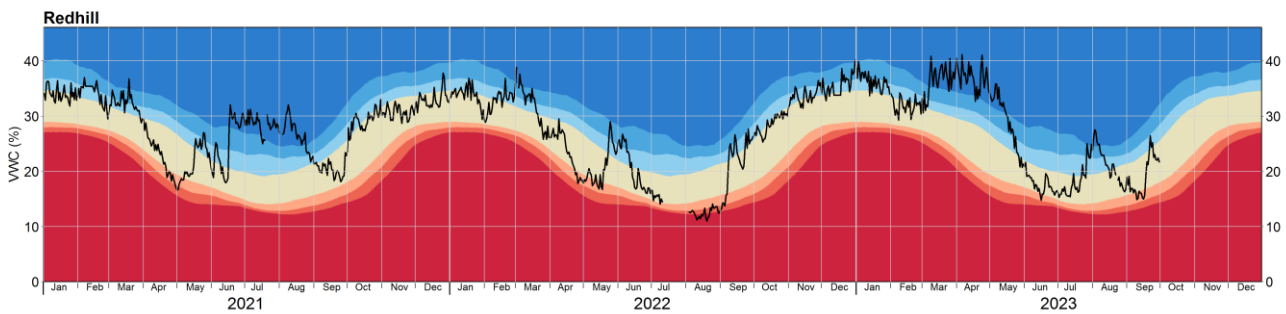
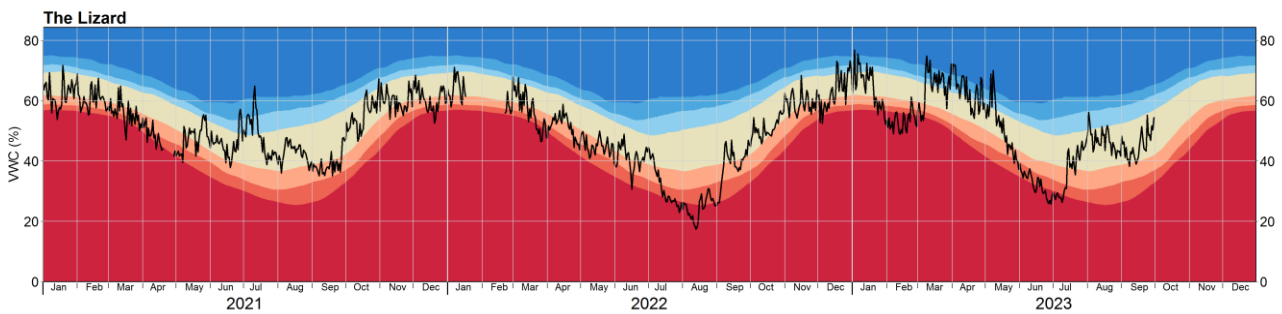
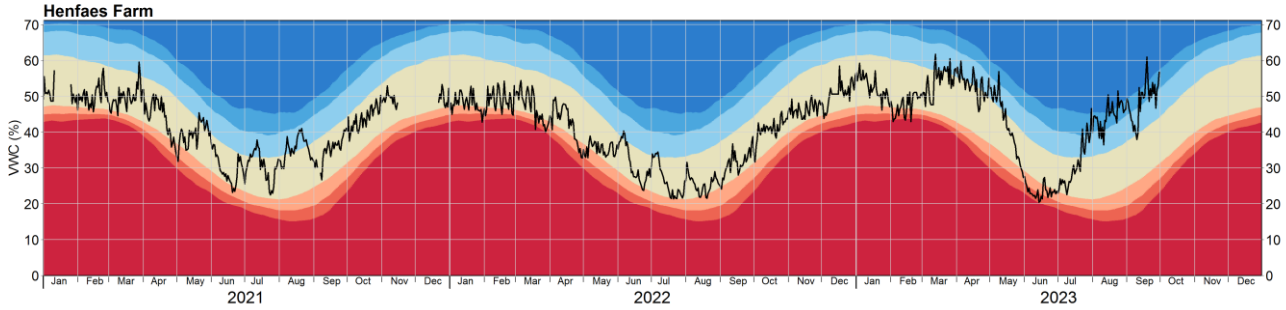


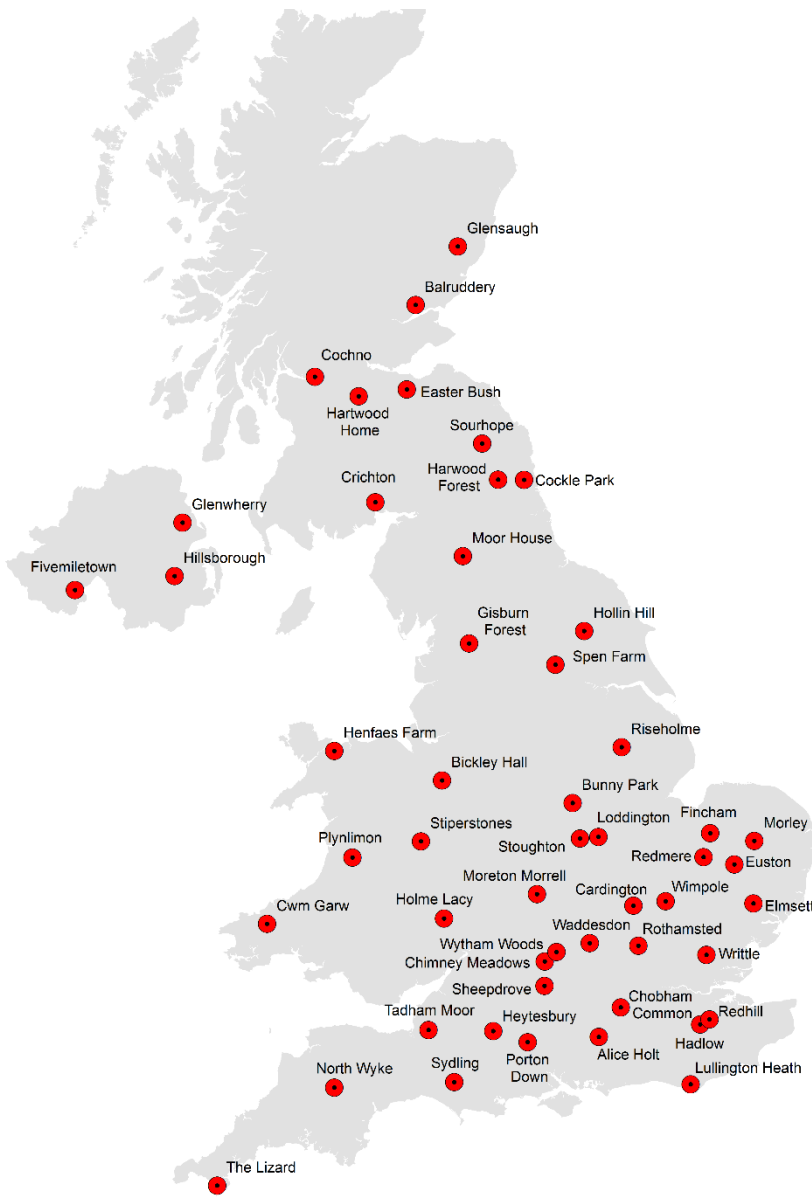
Hadlow



Hartwood Home







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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