

**Soil moisture on 30 April 2024** (see back page for explanatory comments).

### Notes on the period to 30th April 2024

**At the end of April, soil moisture is declining but remains wetter than normal to exceptionally wet for the time of year across most of the COSMOS-UK network.**

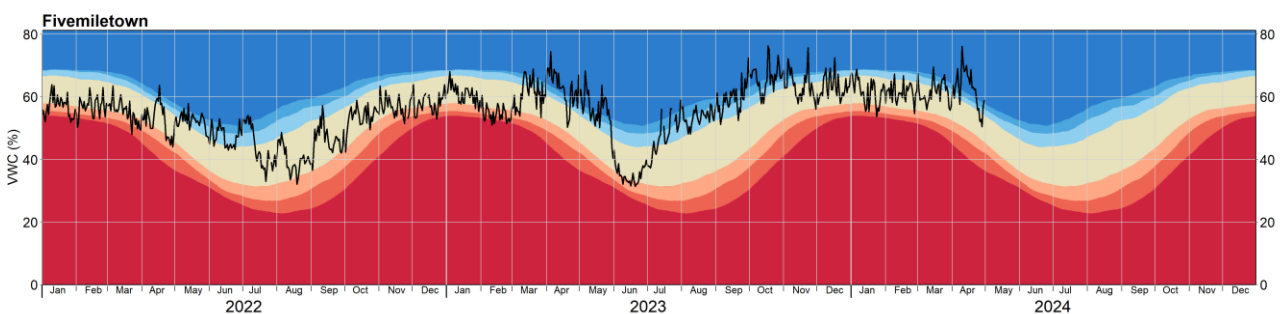
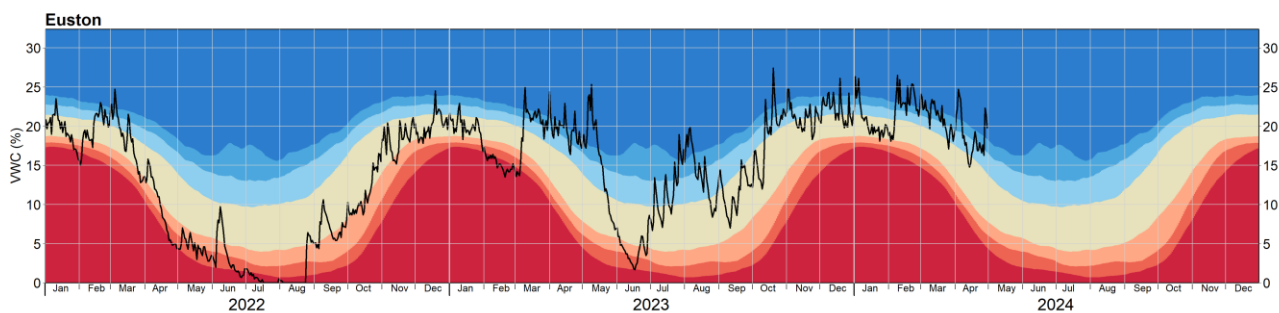
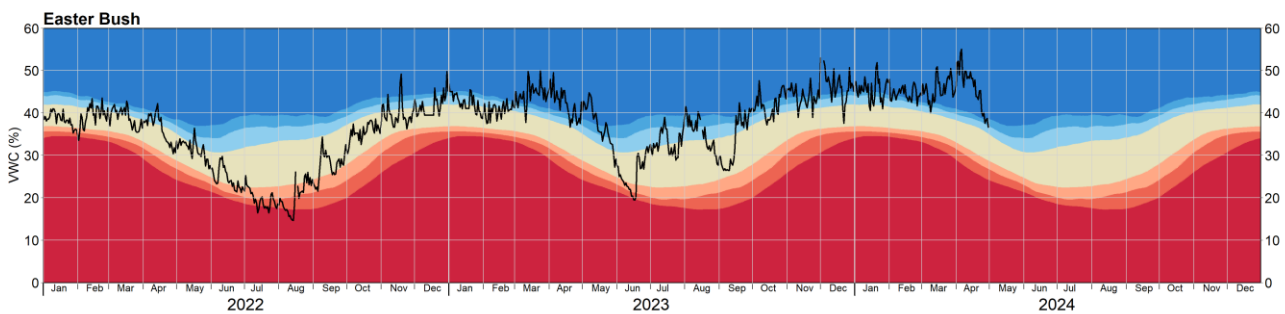
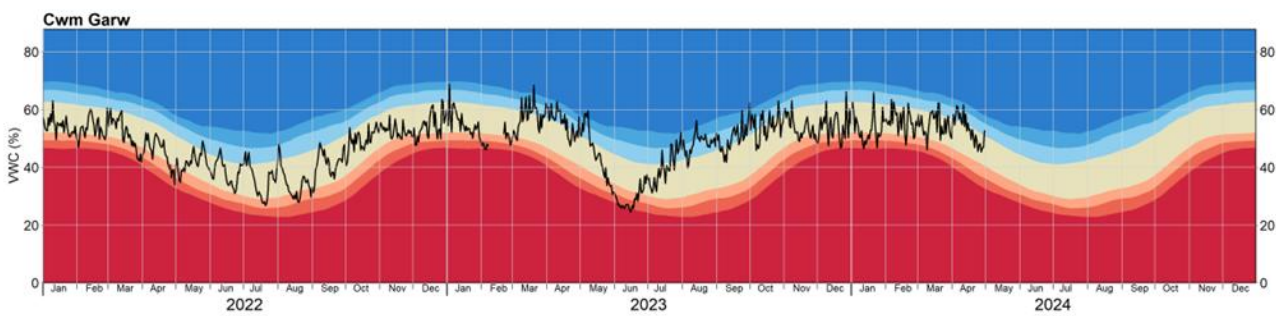
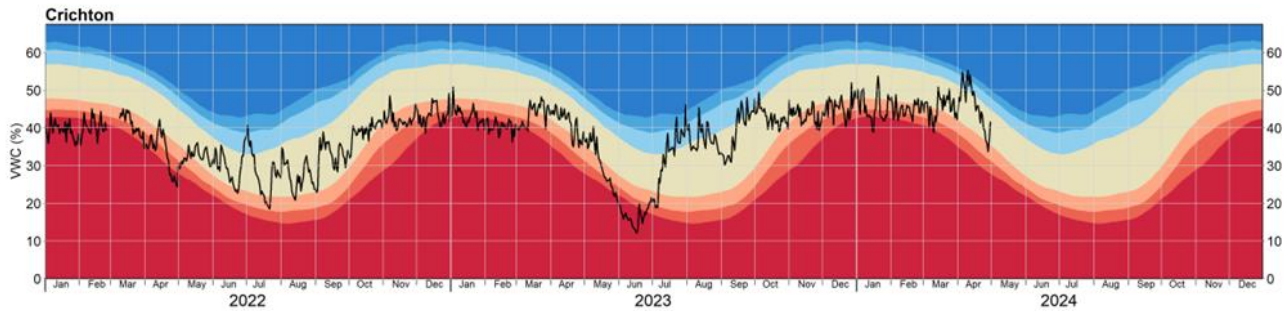
Provisional data indicate that April monthly rainfall totals were above average for England, Wales, and Scotland. Northern Ireland was slightly drier than average at the very beginning of the month but was wetter than average thereafter. Overall, the UK experienced 55% more rainfall than the long-term average with Scotland recording the wettest April since 1947. The start of April was generally warm, but temperatures dropped to slightly below average in the last two weeks of the month.

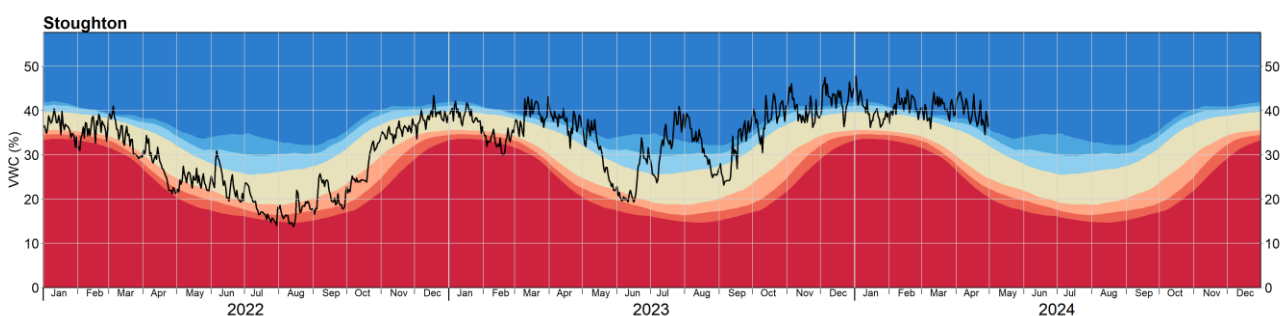
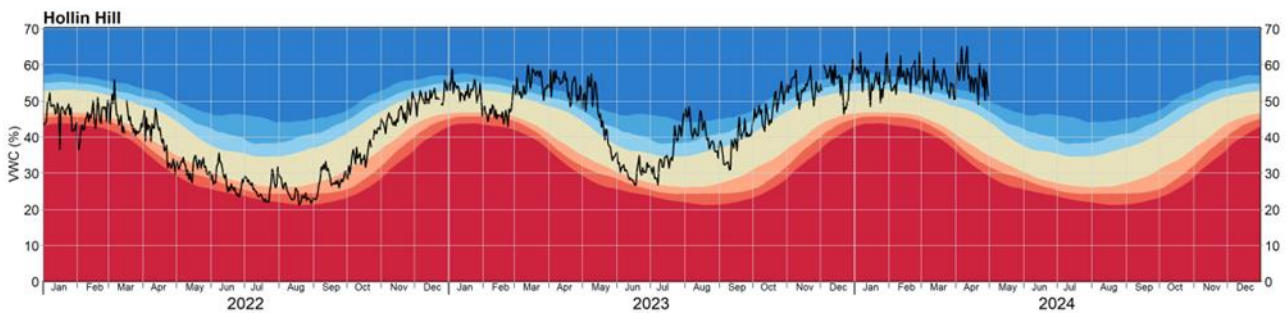
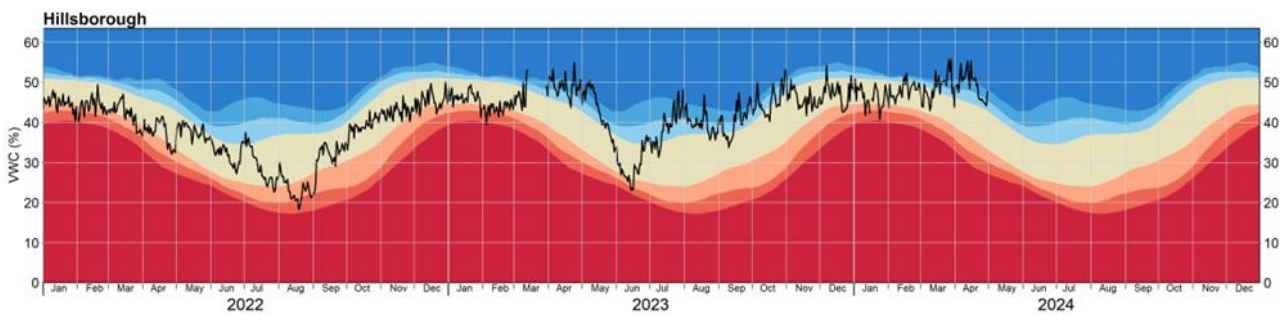
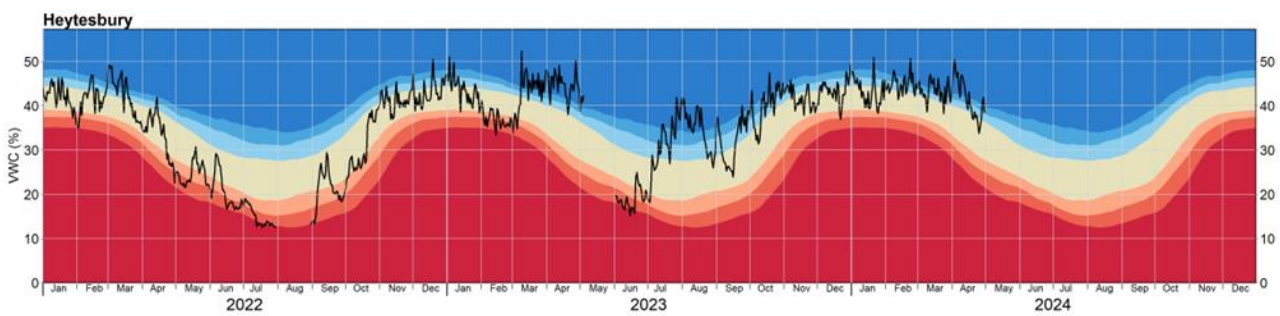
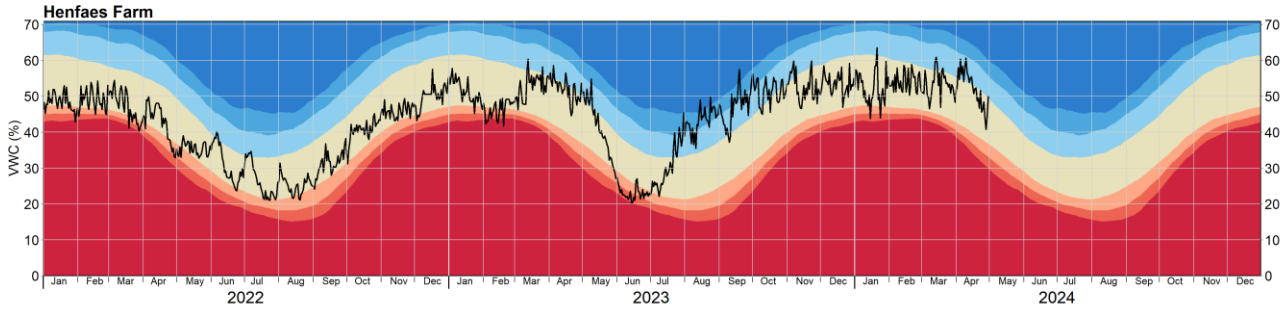
Low pressure weather and storm Kathleen early in April brought rain to Scotland, Wales and Northern Ireland raising soil moisture. COSMOS-UK sites affected were Easter Bush, Crichton, Hillsborough, Filemiletown and Cwm Garw. Early in the month many sites were exceptionally wet for the time of year, although a downward soil moisture trend was then seen through to later parts of April. Central and Eastern England had rainfall late in April elevating soil moisture, at locations including Euston and Heytesbury.

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

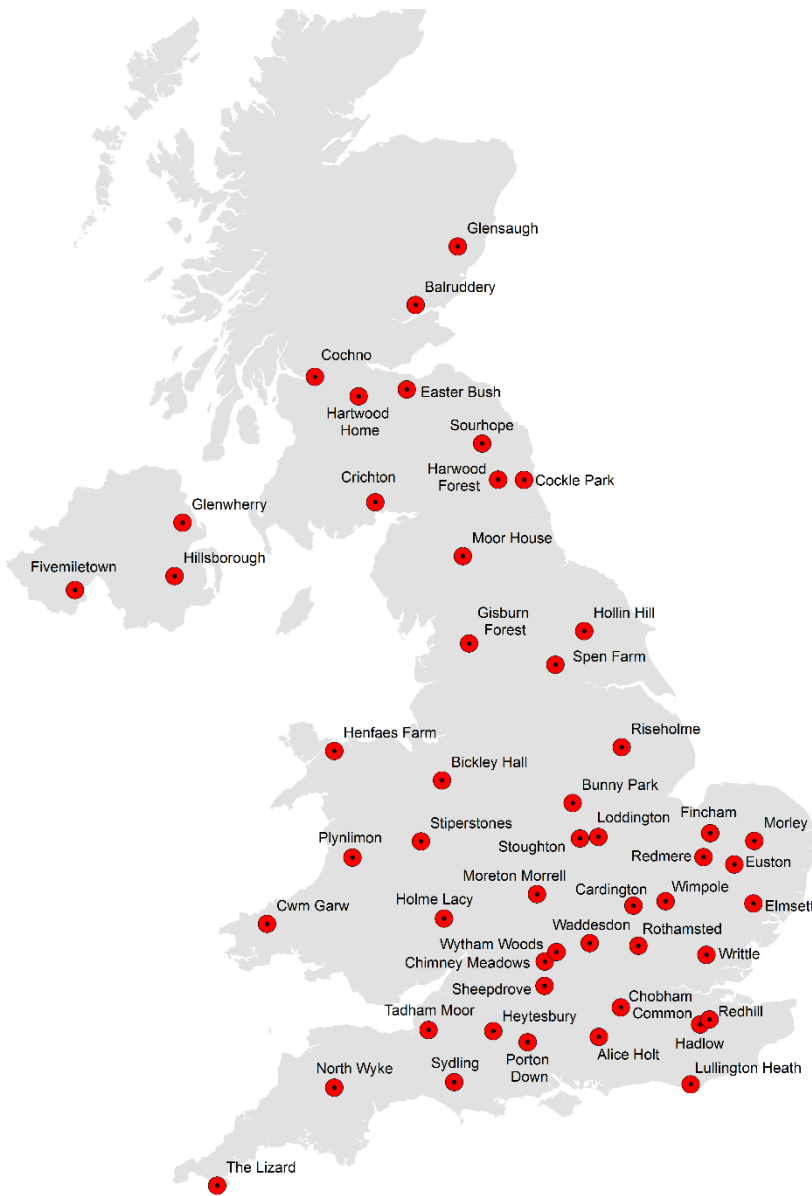
### Network news

The data connections at Sydling and Loddington have now been restored. Our annual planned preventative maintenance (PPM) programme has been completed at 13 sites and continues to all sites throughout the summer. This is an important part of data quality assurance, with recalibrated sensors deployed as required, and repairs made as necessary.









**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.

