

Soil moisture on 29 February 2020 (see back page for explanatory comments).

## Notes on period to 29 February 2020

**Most soils across the UK are at, or close to, saturation with no, or very little, capacity to absorb further rainfall.**

Provisional data indicate that for the UK as a whole precipitation in February was 237% of the average and the fifth wettest of any calendar month in a series from 1862 (source: UK Met Office). The heaviest rainfall was associated with three named storms: Ciara (8<sup>th</sup>-9<sup>th</sup>), Dennis (13<sup>th</sup>-17<sup>th</sup>) and Jorge (25<sup>th</sup>-29<sup>th</sup>).

At the beginning of February soils in the south and east of England were wetter than normal for the time of year, whilst elsewhere soil moisture was close to normal or, in a few places, slightly below normal.

It is expected that soils will be at their wettest at the end winter. Given the extreme nature of February's precipitation it is perhaps surprising that at some sites soil wetness is close to normal for the time of year (e.g. Fincham, Hartwood Home, Hillsborough, Hollin Hill, Lizard, North Wyke).

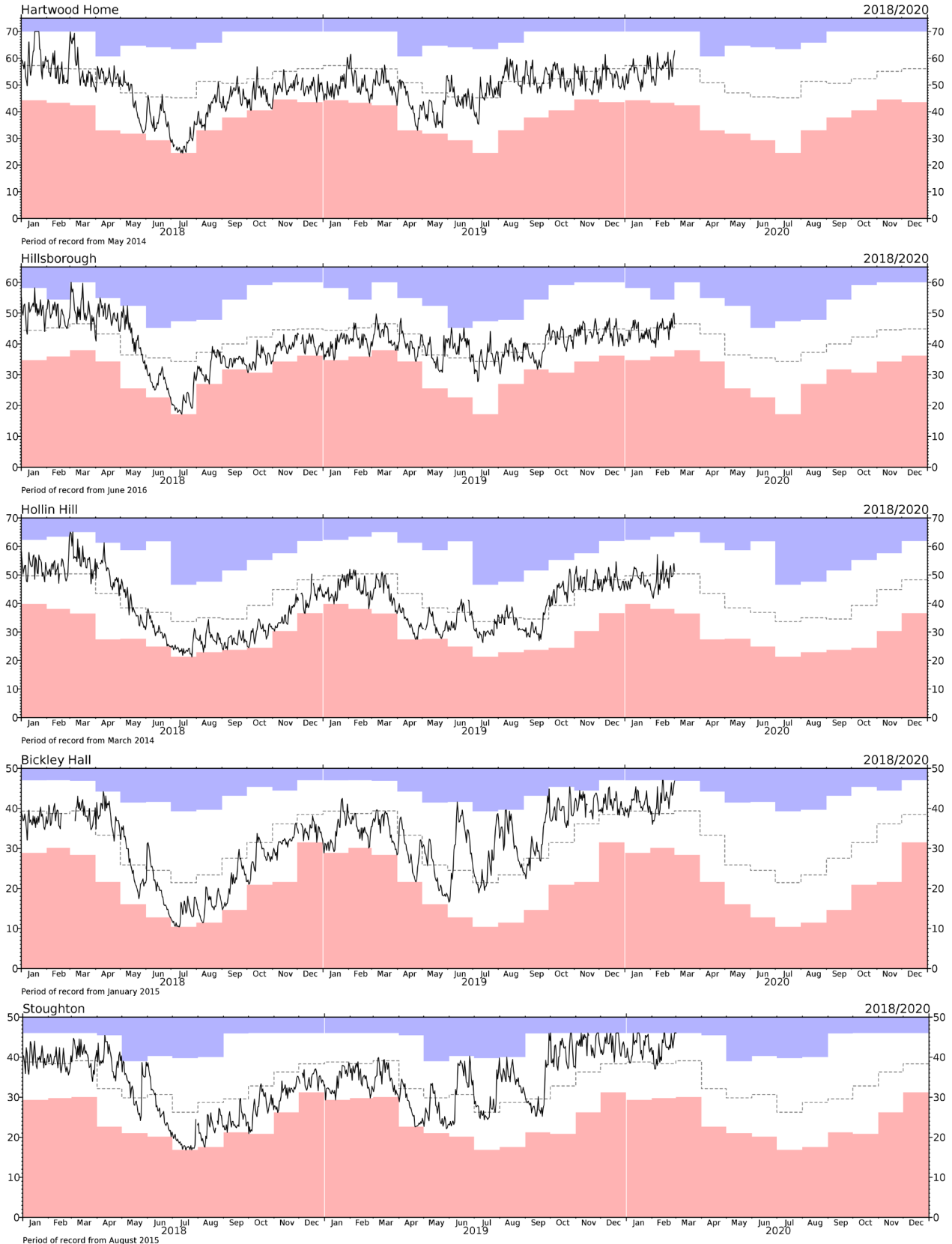
Other sites better reflect the expectation that at the end of February soils are wetter than normal for time of year (e.g. Bickley Hall, Cardington, Lullington Heath, Redhill, Stoughton, Waddesdon).

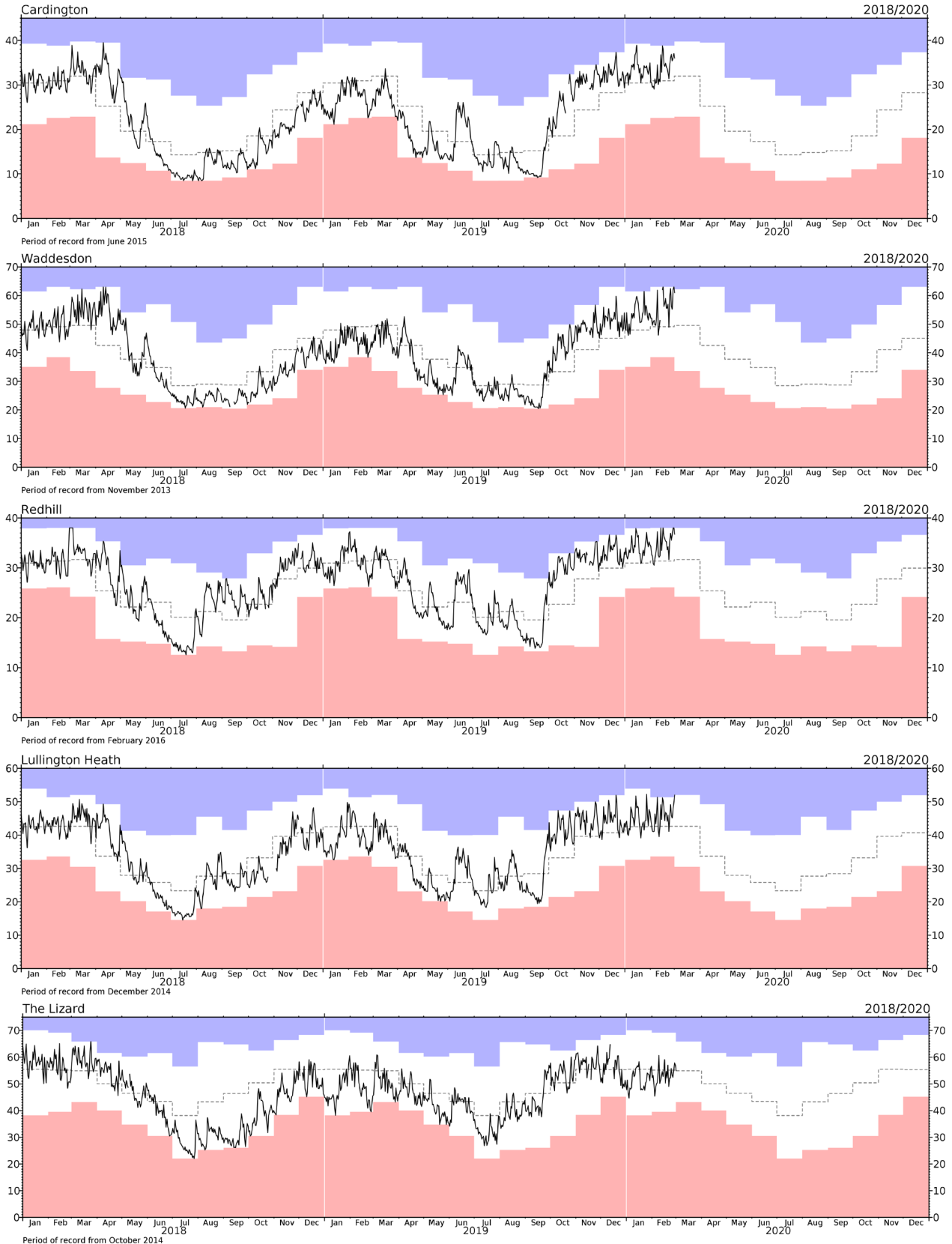
There is little doubt that across the UK soils are at, or close to, saturation with little, or no, capacity to absorb more water. Soil wetness therefore remains sensitive to further precipitation with the continuing possibility of surface water flooding and flooding from rivers.

Note that the COSMOS-UK records are too short to reliably estimate long-term monthly averages and departures from them; it is therefore only possible to give qualitative indications about averages and what is typical for the time of year.

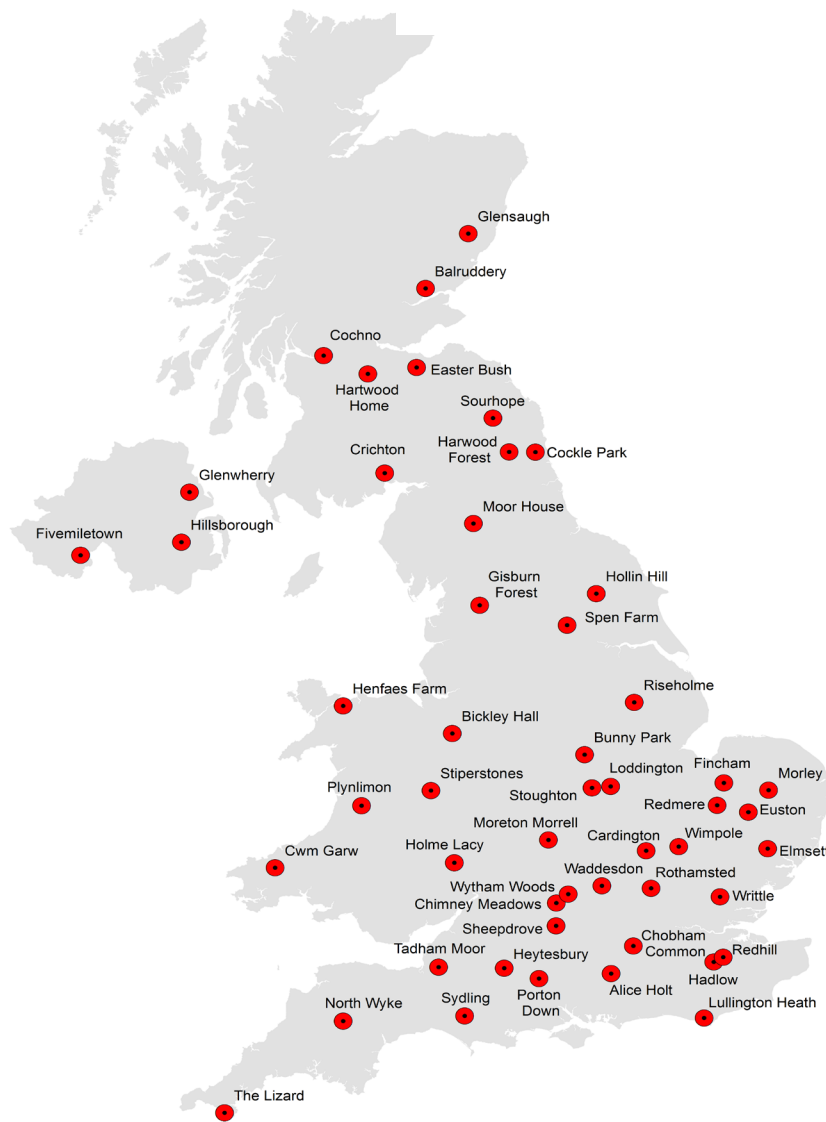
## Network News

- The earliest COSMOS-UK sites have been upgraded to our highest specification. Chimney, Sheepdrove and Waddesdon now utilise 3D sonic anemometers; an array of 10 TDTs; more accurate temperature, pressure, and relative humidity; and a secondary rain gauge.
- There were three site visits for maintenance.
- Ongoing power and sensor issues at Easter Bush, Henfaes, and Harwood Forest.
- The station at Chobham Common has now been installed for five years.





### COSMOS-UK site locations



**About the maps on page 1:** The maps of volumetric water content (VWC) and soil moisture index (SMI) show average daily soil moisture at the end of the month. Colours indicate wetness as in the keys. Grey symbols represent missing data.

The symbols represent groups of sites with similar soil maximum water content, i.e.



**VWC** – This is the percentage water content and reflects both capacity of the soil to store water as well as actual moisture content.

**SMI** – This is an index of soil moisture that is adjusted for the capacity of the soil to store water. A value of around 1.0 represents field capacity (FC) which is typical moisture content in late autumn and early spring. SMI will generally be lower than this in the summer and higher in the winter.

Nearby sites with the same symbol (i.e. similar rainfall and soils) should be in similar VWC and SMI classes; however neighbouring sites with different symbols (i.e. similar rainfall but different soils) can be in different VWC and SMI classes. Sites represented by circles with an outline are generally poorly draining and wet, and therefore often have VWC and SMI values different from their neighbours; data from these sites are less reliable than from other sites.

Grey shaded areas represent principal aquifers.

**About the graphs on pages 2 and 3:** These show the VWC over a three year period. The black line shows the daily soil moisture, the shaded areas show the monthly minima (pink) and maxima (blue) from the period of record, and the dashed grey line indicates the period of record monthly mean. These extremes and means are currently derived from very short records; they do nevertheless give some indication of the seasonal variability of the moisture content.

**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 field capacity; additional rainfall either cannot enter the already saturated soil and flows across the land surface as overland flow, or infiltrates but drains quickly through the soil.

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