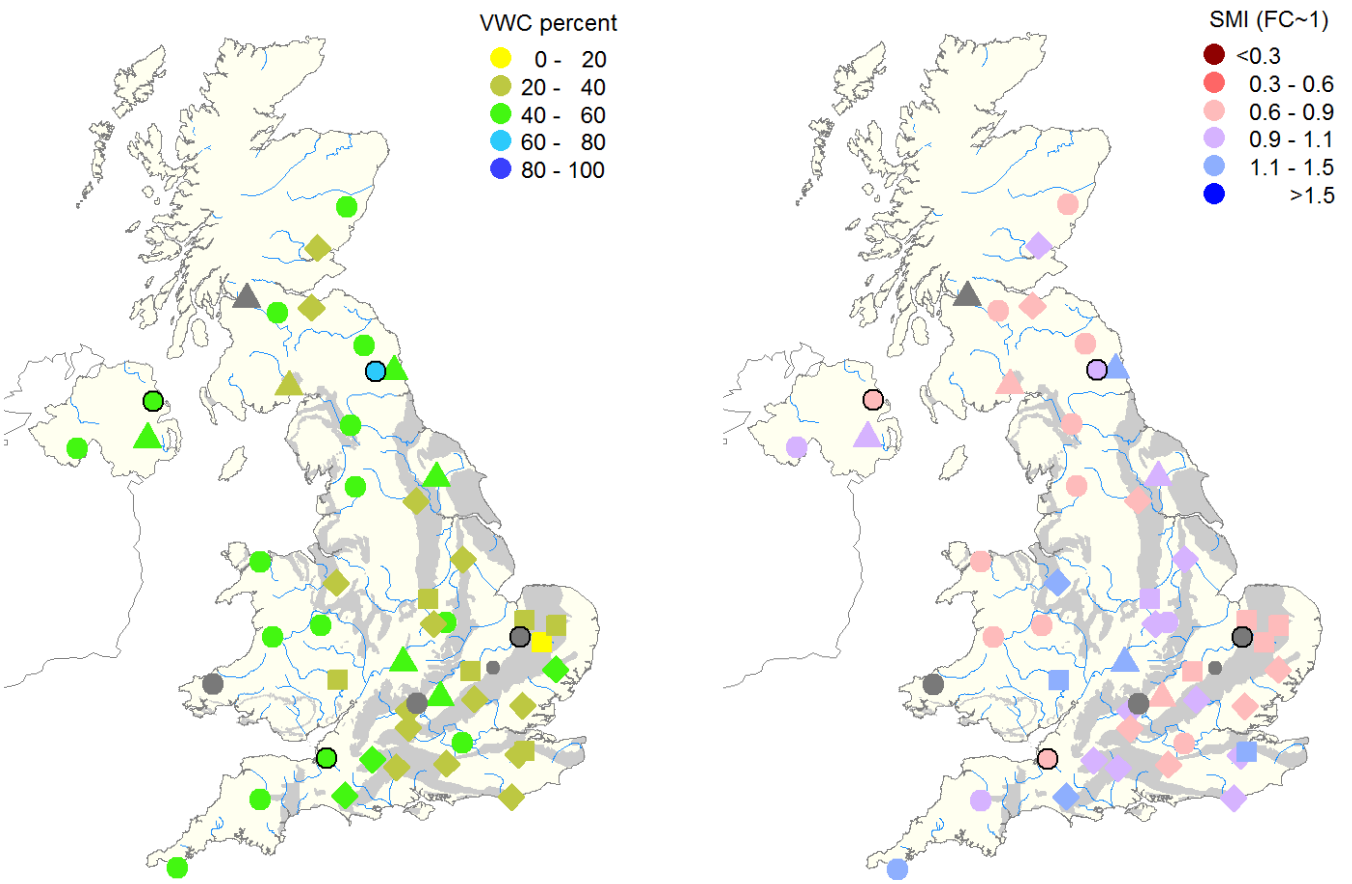
COSMOS-UK | soil moisture

UK Soil Moisture Monitoring Network

Issued on 1 November 2019



Soil moisture on 31 October 2019 (see back page for explanatory comments).

Notes on period to 31 October 2019

Soil moisture across the UK is generally above normal for the time of year. Soils in northern and western areas of the UK are now close to normal for the time of year.

Provisional data indicate that rainfall in October was well above average across England and Wales. In southern Scotland rainfall was closer to average and further north and west possibly slightly below average.

At the start of October southern areas of the UK were wetter than usual for the time of year, whereas northern areas were close to normal for the time of year. Soil moisture during the month has in most places been higher than normal for the time of year albeit with considerable variability as soil moisture has responded to rainfall. A drier end to the month has seen soil moisture fall somewhat towards the end of the month.

Sites with noticeably wet soils stretch from the south coast through central England to the north-east (e.g. Lullington Heath, Redhill, Waddesdon, Elmsett and Cockle Park).

In the south-west soil moisture has increased but is very much normal for the time of year (e.g. North Wyke). Further north some sites soil moisture has been close to normal throughout the month or even fallen slightly although levels remain in the normal range for the time of year (Plynlimon, Hillsborough, Hartwood Home, Glensaugh).

Soil moisture is now likely to remain close to normal throughout the winter months with little capacity to absorb further heavy rainfall.

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 Chimney Meadows and Sheepdrove sites have now been running for six years.
- There were 18 site visits in September: 10 for planned maintenance, 7 for fault fixing and 1 for soil calibration at the newest COSMOS-UK site at Wimpole.
- There are ongoing issues with telemetry at Cochno and Cwm Garw, and with several rain gauges.

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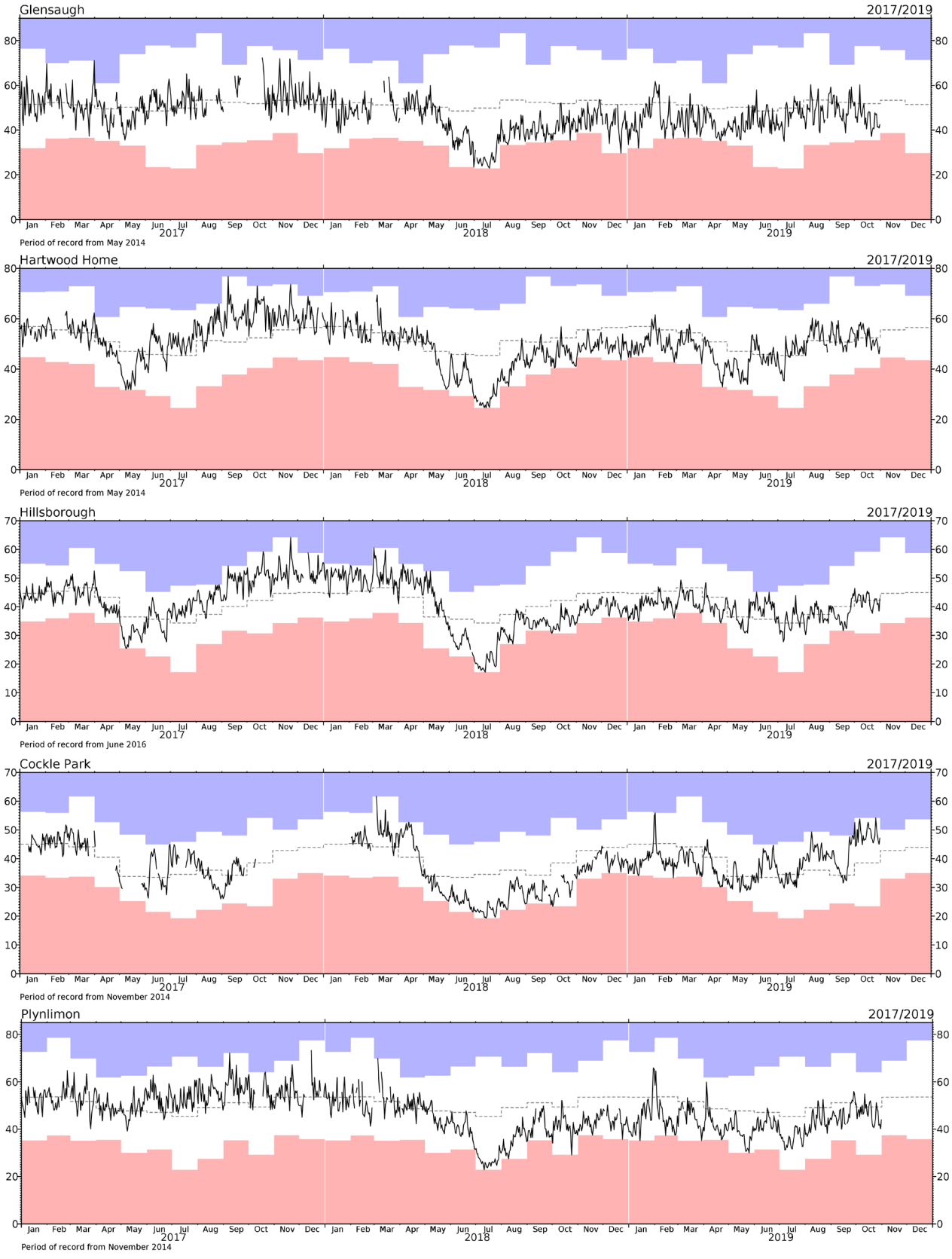

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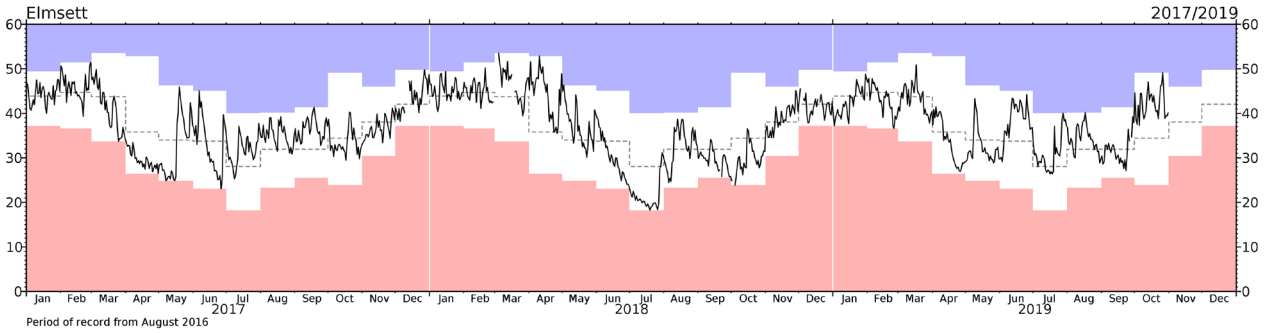
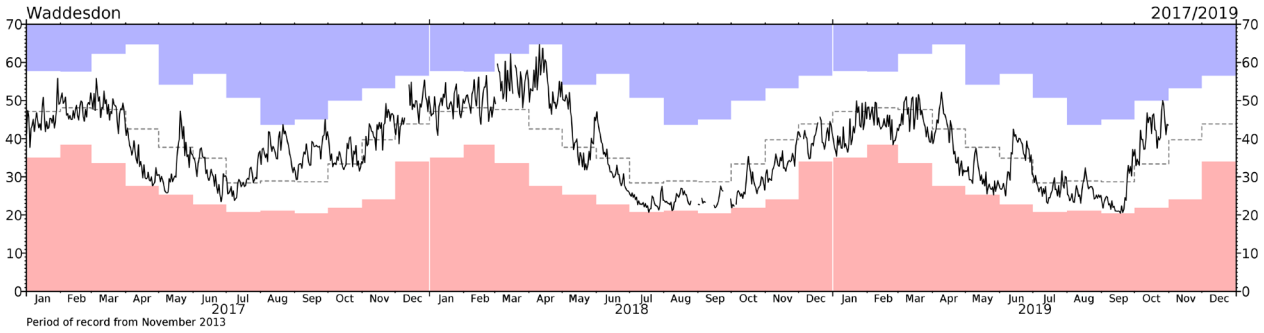
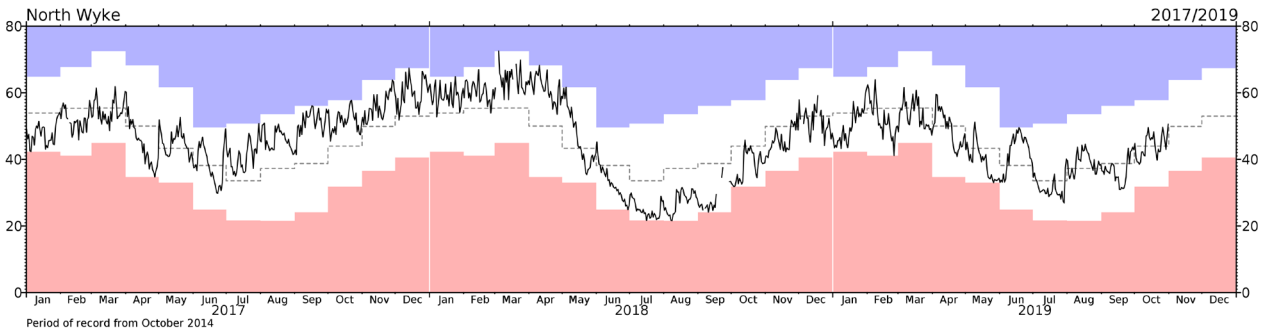


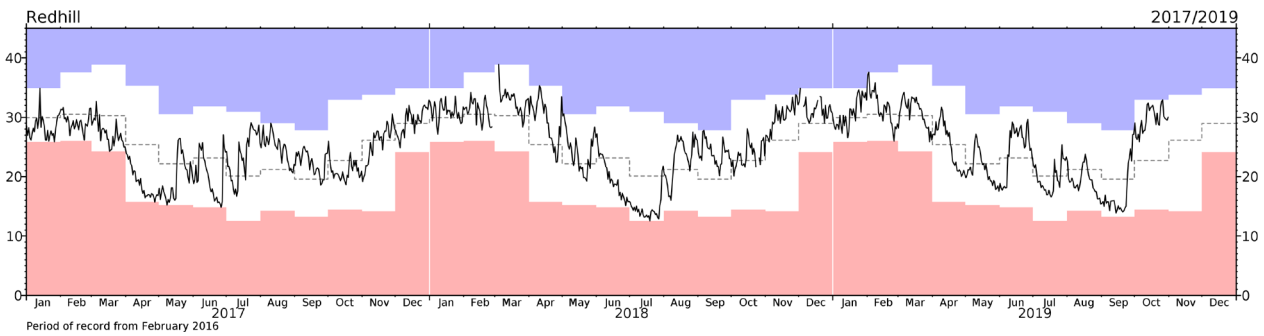
Period of record from August 2016



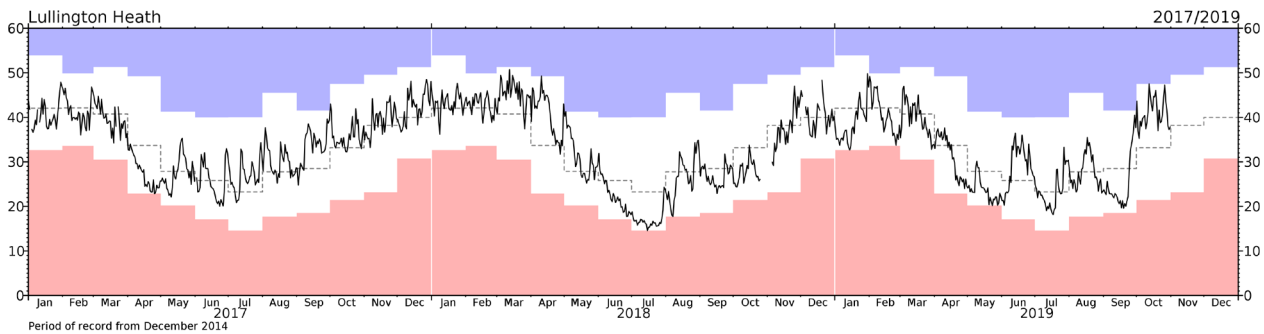
Period of record from November 2013



Period of record from October 2014



Period of record from February 2016



Period of record from December 2014

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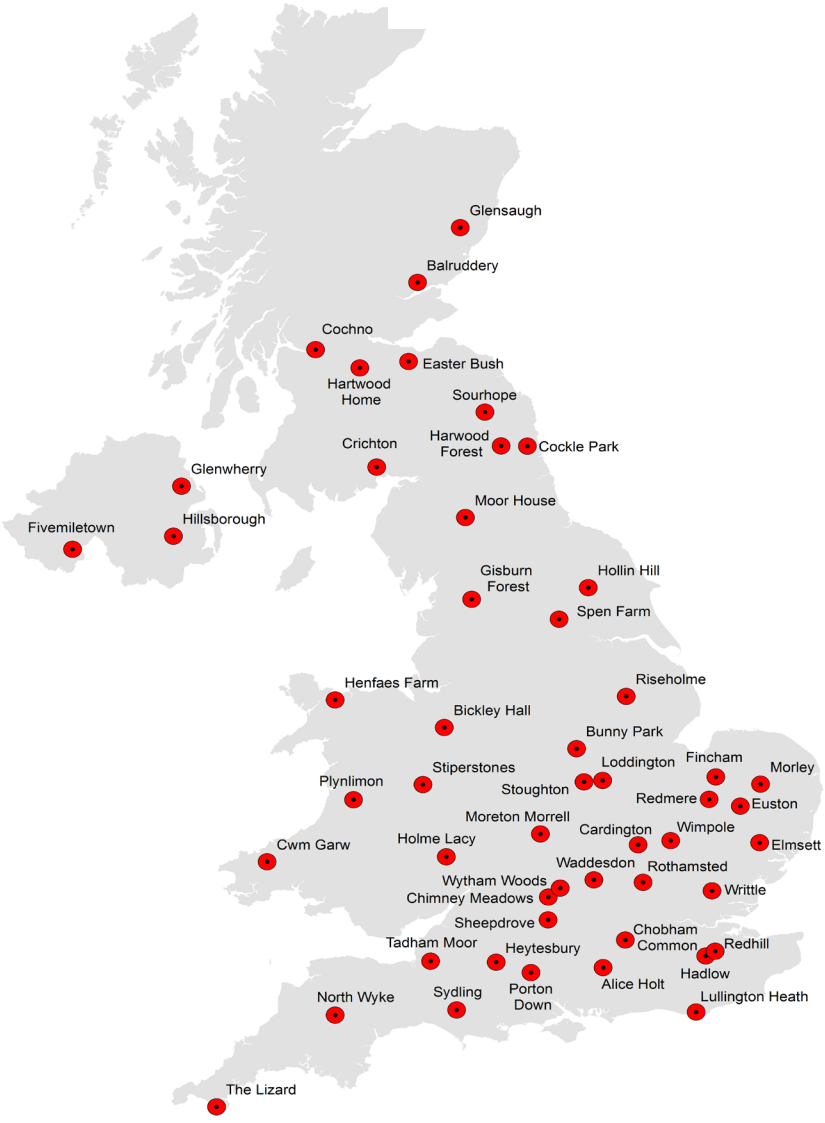
COSMOS-UK site locations



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.

~ 30%	■
~ 40%	◆
~ 50%	▲
~ 60%	●
>=~ 70%	●

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

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NATURAL ENVIRONMENT RESEARCH COUNCIL

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