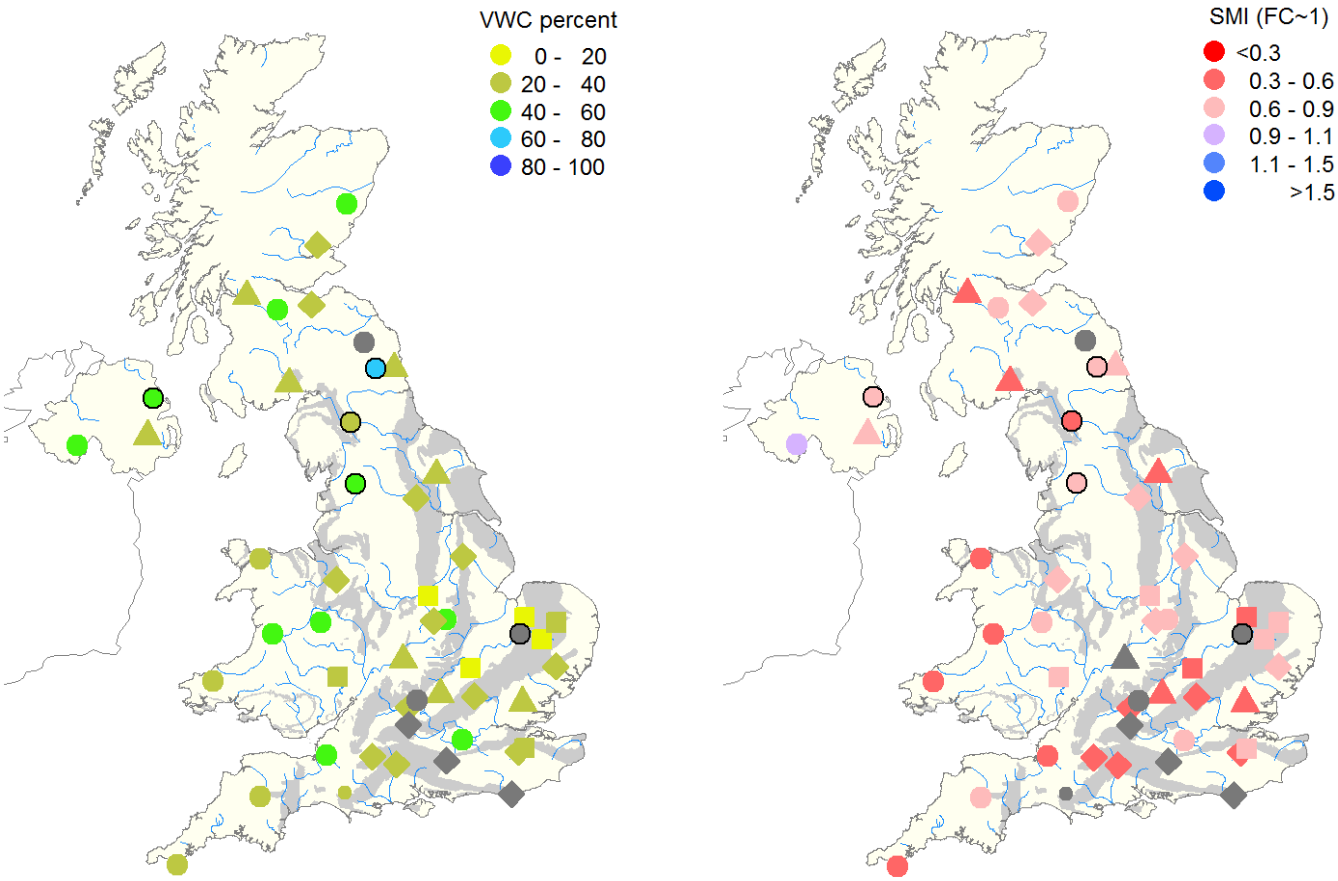
# COSMOS-UK | soil moisture

UK Soil Moisture Monitoring Network

Issued on 1 July 2019




**Soil moisture on 30 June 2019** (see back page for explanatory comments).

**Notes on period to 30 June 2019**

**At the end of June soil moisture is at typical levels for the time of year throughout the UK.**

Provisional data for June indicate that rainfall was very much above average across most of the UK. In central and eastern parts of England rainfall was up to twice the monthly average, and generally the rainfall occurred in the first half of the month. Only in Scotland was rainfall close to average and here it was more evenly distributed throughout the month.

At the start of June soils had been wetter than normal in Scotland and Northern Ireland, and below normal elsewhere, notably so in the south-east quarter of the UK. It was, therefore, the regions with the driest soils that had most rainfall and at the end of the month soil moisture was close to normal for the time of year across the whole of the UK.

The differences in soil moisture at the start of June and the distribution of rainfall through the month led to considerable differences in how soil moisture changed as the month progressed. Many sites in England started the month with below normal soil moisture which increased rapidly in response to the heavy rainfall to above normal levels of soil moisture. In the second half of the month soil moisture then decreased back to normal levels for the time of year. Sites demonstrating this response include Stoughton, Cardington and Porton Down.

In Scotland soil moisture had started the month at above average levels for the time of year and during June soil moisture decreased towards levels typical for the time of year (e.g. Balruddery, Easter Bush, Hartwood Home).

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 Cardington site has now been running for four years.

In June there were ten site visits to repair and maintain instruments.

There are missing soil moisture data during June from the CRNS at Riseholme, Hadlow and Euston.

At several sites there are problems with the raingauges.

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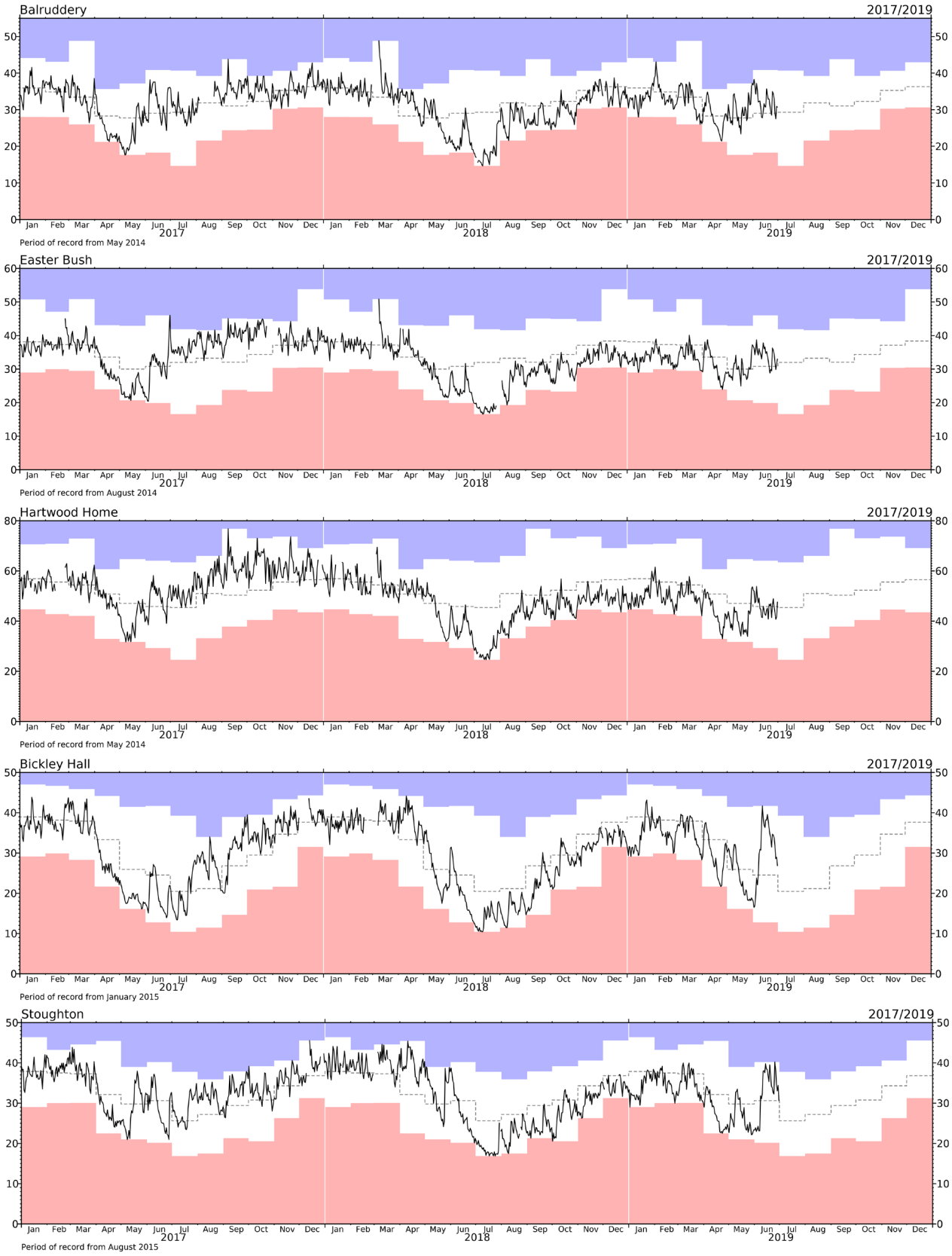

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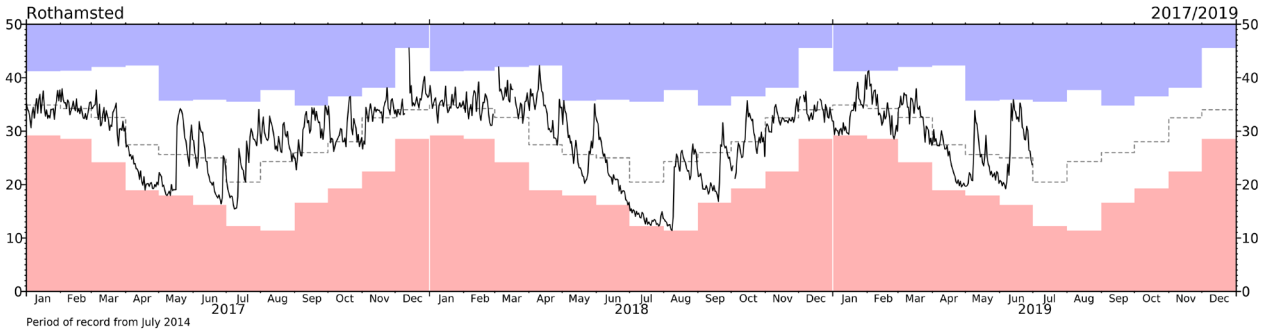
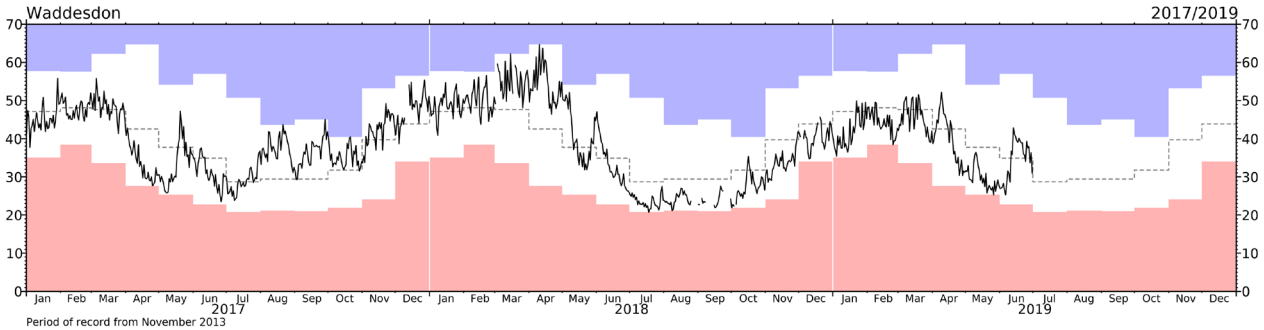
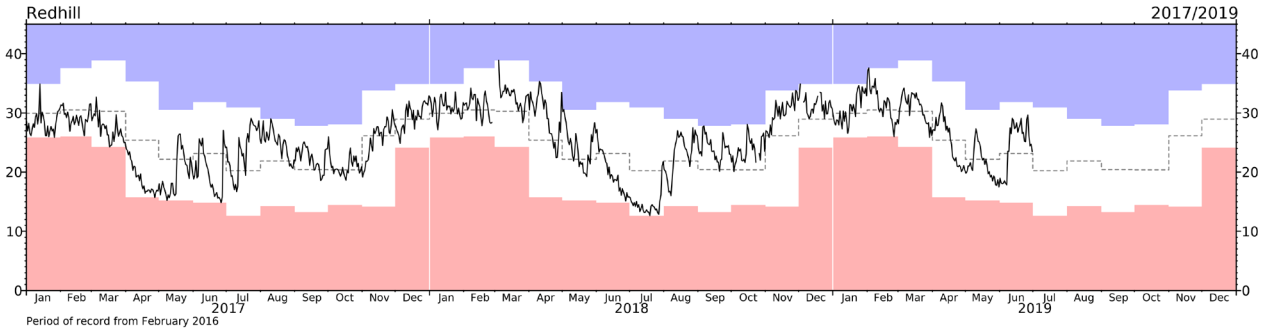


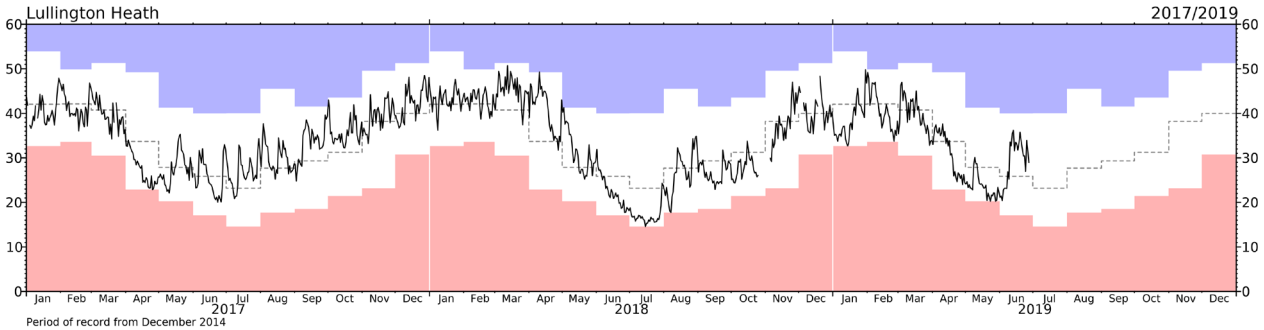

Period of record from July 2014



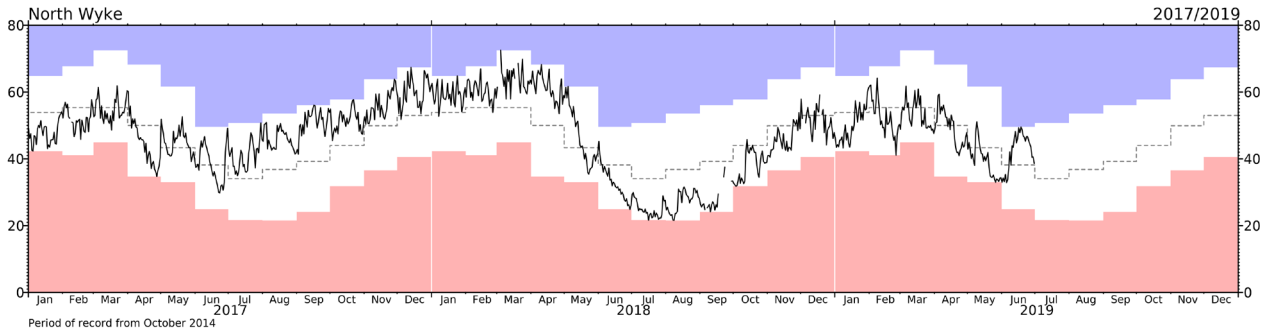

Period of record from November 2013




Period of record from February 2016




Period of record from December 2014




Period of record from October 2014

# COSMOS-UK

## UK Soil Moisture Monitoring Network

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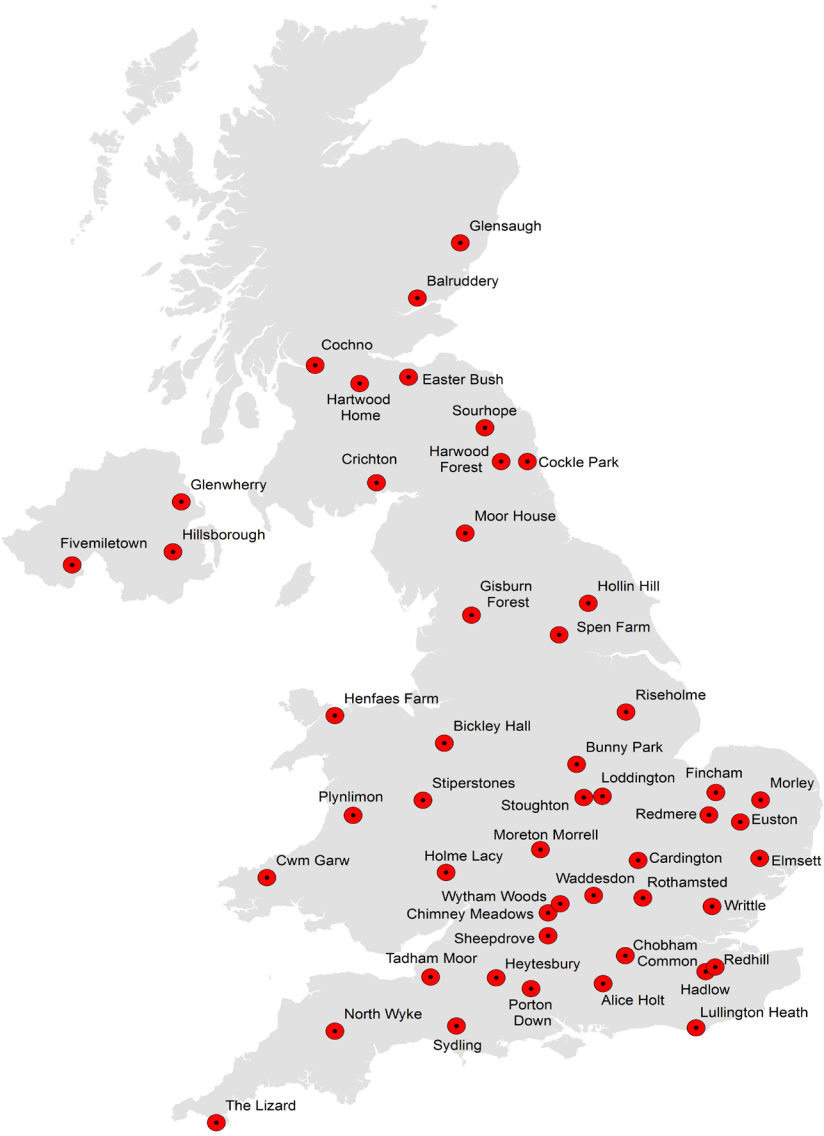
### COSMOS-UK site locations




***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 funded as part of the NERC's National Capability.

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Centre for Ecology & Hydrology
NATURAL ENVIRONMENT RESEARCH COUNCIL

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