# Hydrological Outlook UK

Period: From December 2016

Issued on 09.12.2016 using data to the end of November 2016


**SUMMARY**

**The outlook for both December and the next three months is for normal to below normal groundwater levels in most of the major aquifers, although the signal for below normal is weaker over the longer timeframe. Away from southern England, groundwater levels are likely to show regional differences over both one and three months. The December-February outlook for river flows indicates that flows are likely to be normal to below normal for the south-east of the UK and within the normal range elsewhere. The one month outlook for river flows is less certain, particularly in western parts of the UK, although flows within the normal range are most likely in southern and eastern areas.**


**Rainfall:**

Although most of England received above average rainfall in November, the majority of this fell over a few days mid-month and the rest of the month was relatively dry. Rainfall totals were below average for Scotland, Wales and Northern Ireland. Persistent high pressure over the last 10 days of the month meant very little rainfall was registered over this timeframe.

The rainfall outlook for December (released by the Met Office on 24th November 2016) is that below-average precipitation is more likely than above-average. For December-January-February as a whole there is only a slight shift from the normal range of expected conditions, with below-average precipitation slightly more probable than above-average. The probability that UK-average precipitation for December-January-February will fall into the driest of five equal categories is between 20% and 25% and the probability that it will fall into the wettest of the five categories is around 15% (the 1981-2010 probability for each of these categories is 20%).

**River flows:**

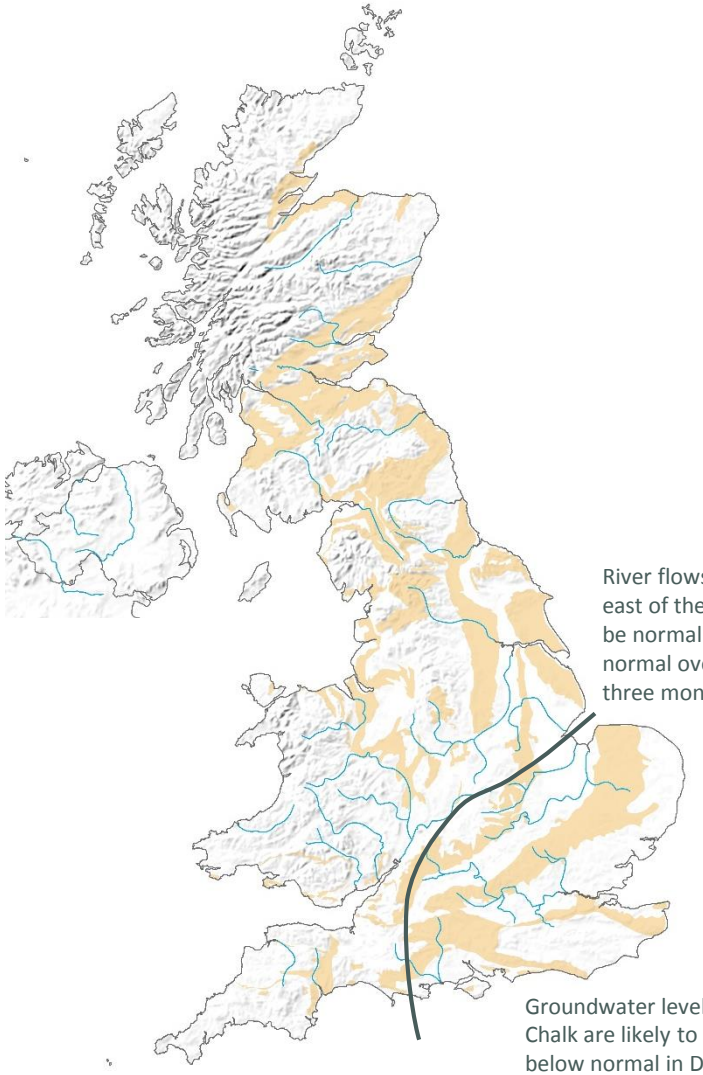
Average river flows for November were below normal across northern and western parts of the UK, notably so in south Wales and parts of Scotland. Further south and east, river flows were generally within the normal range.

The outlook for December is for river flows to be in the normal range across most of the UK. However, there is considerable uncertainty in the outlook for western parts of the country. Despite recent low rainfall, some notably low river flows and a below average rainfall forecast, there is not a strong signal for continued below normal flows in this generally wetter and more responsive region. Over the next three months, the outlook is for normal to below normal river flows across the south-east of the UK and for flows to be predominantly in the normal range elsewhere. The same normal to below normal signal for river flows in the south-east is also apparent in the outlook for the next six months.

**Groundwater:**

Groundwater levels in the Chalk were predominantly in the normal range or below in November, with below normal levels in Yorkshire and the responsive aquifers of Northern Ireland and central southern England. In the other major aquifers of the UK, groundwater levels were mostly in the normal range with some localised above normal exceptions.

The outlook for December is for a continuation of normal to below normal groundwater levels in the Chalk of southern and eastern England. Below normal levels are particularly likely in responsive aquifer units in central southern England. For the Permo-Triassic sandstones of the West Midlands, the outlook is for above normal levels over the next month. Similar to the December outlook, the three-month outlook for the Chalk is also for normal to below normal levels, although the below normal signal is slightly weaker over December-February. Groundwater levels in southern Scotland and north-west England are likely to be normal to above normal over the next three months.



River flows in the south-east of the UK are likely to be normal to below normal over the next three months

Groundwater levels in the Chalk are likely to be normal to below normal in December and over the next three months

Shaded areas show principal aquifers

The Hydrological Outlook UK provides an outlook for the water situation for the UK over the next three months and beyond. For guidance on how to interpret the outlook, a wider range of information, and a full description of underpinning methods, please visit the website: www.hydoutuk.net

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## About the Hydrological Outlook:

This document presents an outlook for the UK water situation for the next 1 – 3 months and beyond, using observational datasets, meteorological forecasts and a suite of hydrological modelling tools. The outlook is produced in a collaboration between the Centre for Ecology and Hydrology (CEH), British Geological Survey (BGS), the Met Office, the Environment Agency (EA), Natural Resources Wales (NRW), the Scottish Environment Protection Agency (SEPA), and the Northern Ireland Rivers Agency (RA).

## Data and Models:

The Hydrological Outlook depends on the active cooperation of many data suppliers. This cooperation is gratefully acknowledged. Historic river flow and groundwater data are sourced from the UK National River Flow Archive and the National Groundwater Level Archive. Contemporary data are provided by the EA, SEPA, NRW and RA. These data are used to initialise hydrological models, and to provide outlook information based on statistical analysis of historical analogues.

Climate forecasts are produced by the Met Office. Hydrological modelling is undertaken by CEH using the Grid-to-Grid, PDM and CLASSIC hydrological models and by the EA using CATCHMOD. Hydrogeological modelling uses the R-groundwater model run by BGS and CATCHMOD run by the EA. Supporting documentation is available from the Outlooks website:
http://www.hydoutuk.net/methods

## Presentation:

The language used in the summary presented overleaf generally places flows and groundwater levels into just three classes, i.e. below normal, normal, and above normal. However, the underpinning methods use as many as seven classes as defined in the graphic to the right, i.e. the summary uses a simpler classification than some of the methods. On those occasions when it is appropriate to provide greater discrimination at the extremes the terminology and definitions of the seven class scheme will be adopted.

| | Percentile range of historic values for relevant month |
|---|---|
| Exceptionally high flow | > 95 |
| Notably high flow | 87-95 |
| Above normal | 72-87 |
| Normal range | 28-72 |
| Below normal | 13-28 |
| Notably low flow | 5-13 |
| Exceptionally low flow | < 5 |

## Disclaimer and liability:

The Hydrological Outlook partnership aims to ensure that all Content provided is accurate and consistent with its current scientific understanding. However, the science which underlies hydrological and hydrogeological forecasts and climate projections is constantly evolving. Therefore any element of the Content which involves a forecast or a prediction should not be relied upon as though it were a statement of fact. To the fullest extent permitted by applicable law, the Hydrological Outlook Partnership excludes all warranties or representations (express or implied) in respect of the Content.

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## Further information:

For more detailed information about the Hydrological Outlook, and the derivation of the maps, plots and interpretation provided in this outlook, please visit the Hydrological Outlook UK website.

The website features a host of other background information, including a wider range of sources of information which are used in the preparation of this Outlook.

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## Reference for the Hydrological Outlook:

Hydrological Outlook UK, 2016, July, Centre for Ecology and Hydrology, Oxfordshire UK, Online,
http://www.hydoutuk.net/latest-outlook/

## Other Sources of Information:

The Hydrological Outlook should be used alongside other sources of up-to-date information on the current water resources status and flood risk.

Hydrological Summary for the UK: provides summary of current water resources status for the UK:
http://www.ceh.ac.uk/data/nrfa/nhmp/monthly_hs.html

Environment Agency Water Situation Reports: provides summary of water resources status on a monthly and weekly basis for England:
https://www.gov.uk/government/collections/water-situation-reports-for-england

Flood warnings are continually updated, and should be consulted for an up-to-date and localised assessment of flood risk:
Environment Agency: https://flood-warning-information.service.gov.uk/map
Scottish Environment Protection Agency: http://www.sepa.org.uk/flooding.aspx

UK Met Office forecasts for the UK:
www.metoffice.gov.uk/public/weather/forecast/#?tab=regionalForecast

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