

SUMMARY The outlook for the May-July as a whole is for river flows and groundwater levels to be normal to above normal across the majority of the UK. For May, normal to below normal flows are likely in northern Scotland. River flows and groundwater levels in southern England are likely to be above normal for May.

Rainfall:

Rainfall for April was below average in north-western parts of the UK and Wales and above average in south-eastern England and northern Ireland. More than 170 percent of average rainfall fell over Kent, whilst the majority of Scotland saw less than 90 percent of average.

The forecast (issued by the Met Office on 1.5.2023) shows an increase in the likelihood of wet conditions (1.5 times the normal chance) for the May, June, July period compared to normal, with a decreased likelihood (0.5 times the normal chance) that May-June will be drier than normal.

River flows:

River flows in April broadly followed the precipitation pattern. Below normal and notably low flows were recorded in northern Scotland. Normal flows were seen across the majority of southern Scotland and northern England. Above normal, notably high and exceptionally high flows were recorded across southern England and Wales, with record breaking high flows seen on the Medway and Ouse.

The forecast for May is for this pattern to continue, with normal to below normal flows expected in northern Scotland, and above normal flows being likely in southern England. For the rest of the UK normal to above normal flows are expected over the next three months.

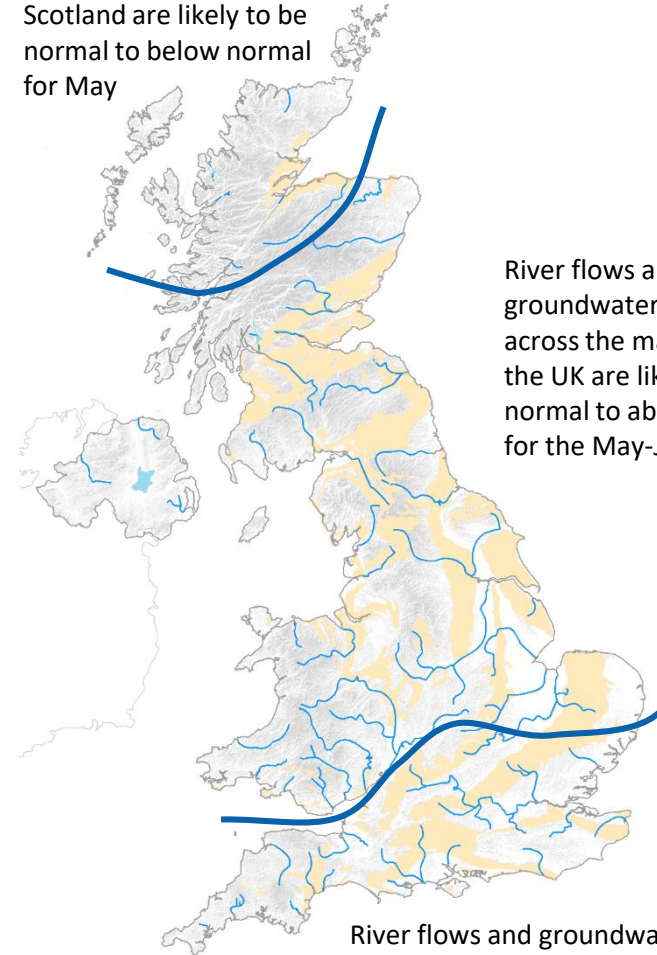
Groundwater:

Groundwater levels in April were generally normal to above normal, with some below normal levels recorded in eastern Scotland and at Dalton Holme on the Humber Estuary. Levels in central southern England were notably to exceptionally high in several boreholes in the chalk and Jurassic limestone aquifers.

The forecast for May, and the May-June-July period is for normal to above normal levels to persist across the majority of boreholes, with a few localised exceptions where levels could drop to slightly below normal.

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

River flows in northern Scotland are likely to be normal to below normal for May



River flows and groundwater levels across the majority of the UK are likely to be normal to above normal for the May-July period

River flows and groundwater levels in southern England are likely to be above normal for May

Shaded areas show principal aquifers

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 UK Centre for Ecology and Hydrology (UKCEH), British Geological Survey (BGS), the Met Office, the Environment Agency (EA), Natural Resources Wales (NRW), the Scottish Environment Protection Agency (SEPA), and for Northern Ireland, the Department for Infrastructure – Rivers (DfIR).

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 DfIR. 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 UKCEH 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: <https://www.hydoutuk.net/about/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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From April 2018 the Hydrological Outlook is supported by the Natural Environment Research Council funded [UK-SCAPE](#) and [Hydro-JULES](#) Programmes.

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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.

Contact:

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t: 01491 692371 e: enquiries@hydoutuk.net

Reference for the Hydrological Outlook:

Hydrological Outlook UK, 2023, February, UK Centre for Ecology and Hydrology, Oxfordshire UK, Online, <https://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.

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>

Natural Resources Wales: <https://flood-warning.naturalresources.wales/>

Scottish Environment Protection Agency: <https://www.sepa.org.uk/flooding.aspx>

Hydrological Summary for the UK: provides summary of current water resources status for the UK: <https://nfa.ceh.ac.uk/monthly-hydrological-summary-uk>

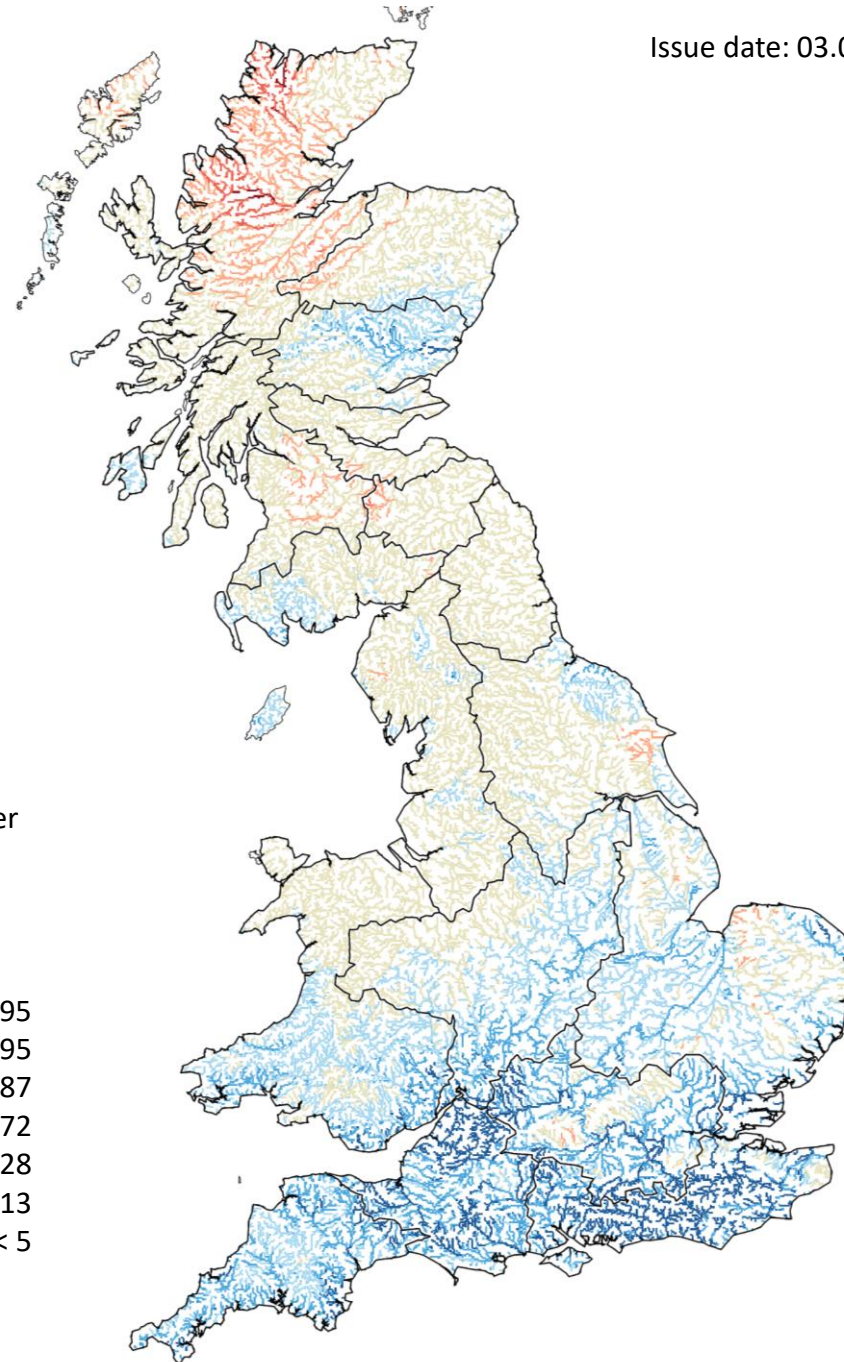
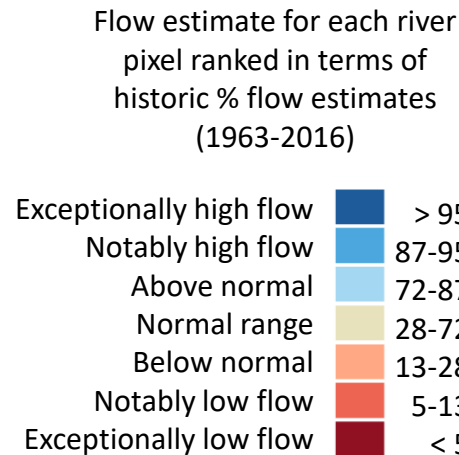
UK Met Office forecasts for the UK: <https://www.metoffice.gov.uk/#?tab=regionalForecast>

UK Water Resources Portal: monitor the UK hydrological situation in near real-time including rainfall, river flow, groundwater and soil moisture from COSMOS-UK: <https://eip.ceh.ac.uk/hydrology/water-resources/>

This map shows the simulated monthly mean flow across Great Britain for last month, ranked in terms of 54 years of historical flow estimates (1963 – 2016).

These flows are produced by the 1km resolution Grid-to-Grid (G2G) hydrological model, which is run up to the end of each calendar month using observed rainfall and MORECS potential evaporation as input.

Note that the G2G model provides estimates of natural flows.



Current Daily Simulated Subsurface Water Storage Conditions

Based on subsurface water storage estimated for 30 April 2023

Issue date: 03.05.2023

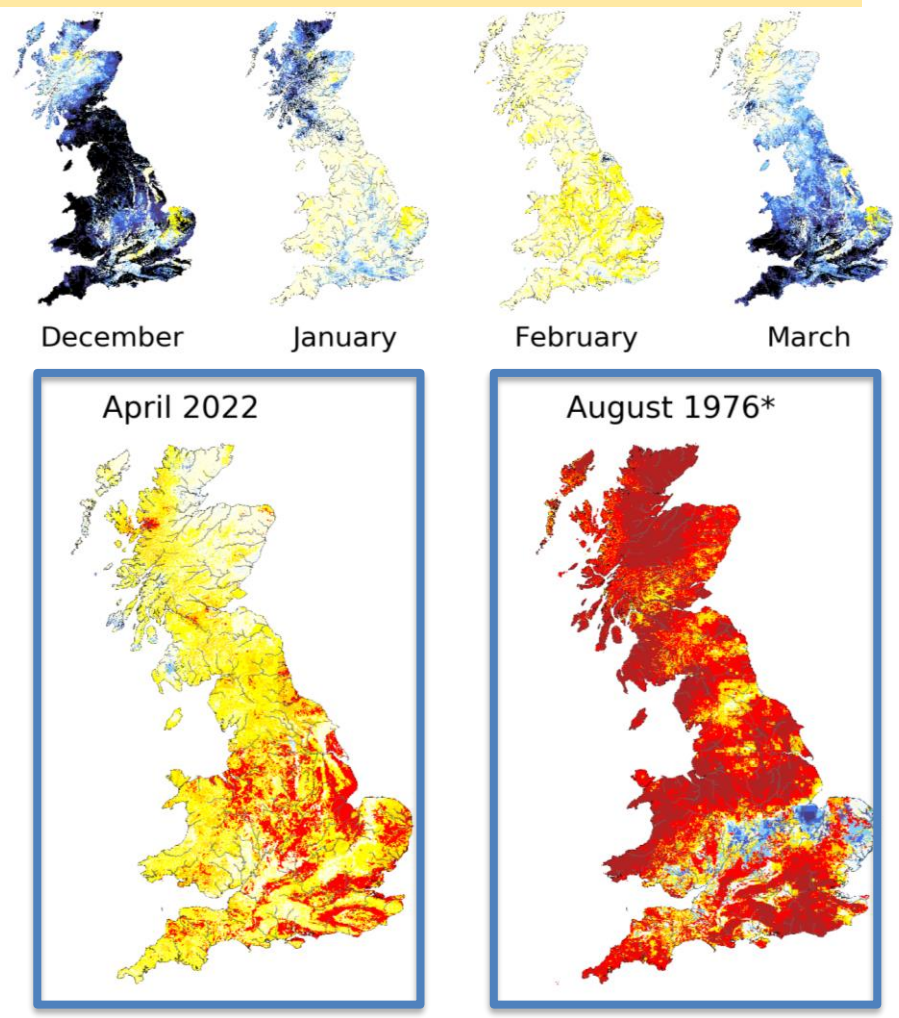
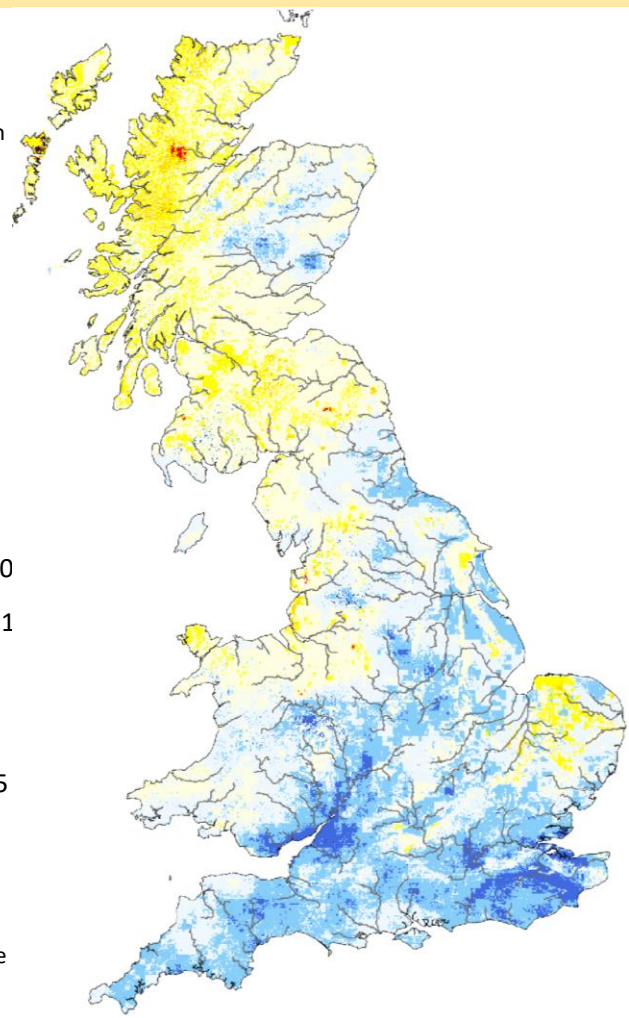
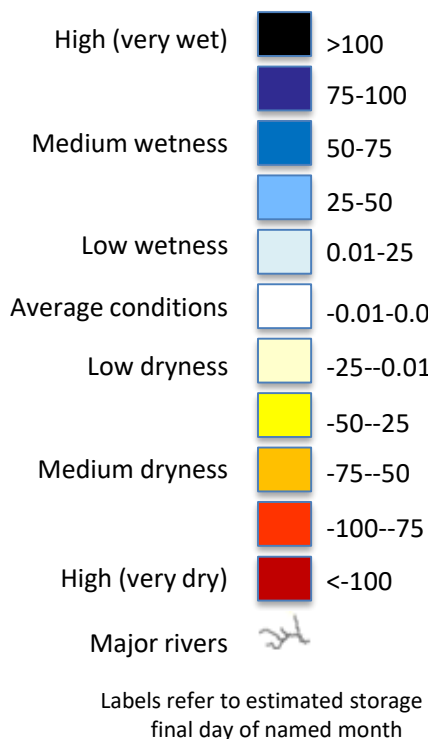
These maps are based on Grid-to-Grid (G2G) hydrological model simulated subsurface water storage, expressed as an anomaly from the historical monthly mean. To highlight areas that are particularly wet or dry, the storage anomaly is presented here using a colour scale highlighting water storage relative to historical extremes. The maps below show the “relative wetness” which combines maps previously shown separately as the “relative wetness” and “relative dryness”.

These maps do not provide a forecast and are not maps of soil moisture. Instead they indicate areas which are particularly wet or dry. Rainfall in areas with high positive relative wetness could result in flooding in the coming days/weeks. Areas of negative relative wetness provide an indication of locations which are particularly dry, and little or no rain in these areas could potentially lead to (or prolong) a drought.

SUMMARY: Subsurface stores across Great Britain have reduced over April, but remain higher (wetter) than is typical for the time of year in much of England. In Scotland, stores in most areas continue to be lower (drier) than normal.

Relative wetness

Water storage anomaly as a % of maximum (positive wetness) or minimum (negative wetness) storage anomaly (zero indicates average value)



*Example month displaying extreme negative wetness

May 2023

Based on soil moisture estimated for 30 April 2023

These maps are based on Grid-to-Grid (G2G) hydrological model simulated soil moisture, expressed as an anomaly from the historical monthly mean. To highlight areas that are particularly wet or dry, the soil moisture anomaly is presented here using a colour scale highlighting soil moisture relative to historical extremes. The maps below show the "relative wetness" which combines maps previously shown separately as the "relative wetness" and "relative dryness".

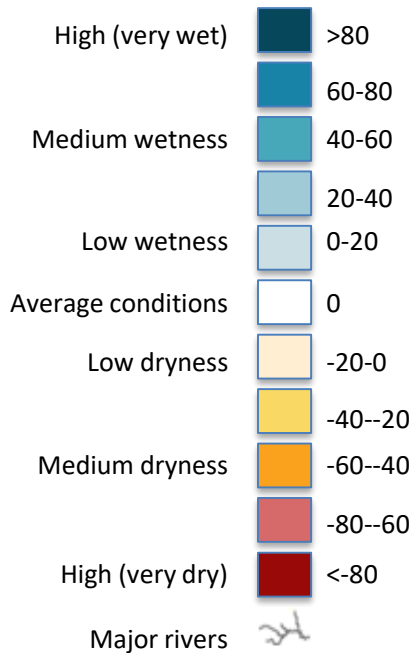
These maps do not provide a forecast. These maps are prototype representations of model estimates of soil moisture, which are currently under development.

Soil moisture will often look similar to total storage (shown on the previous slide), since total storage comprises both soil moisture and storage in the saturated zone.

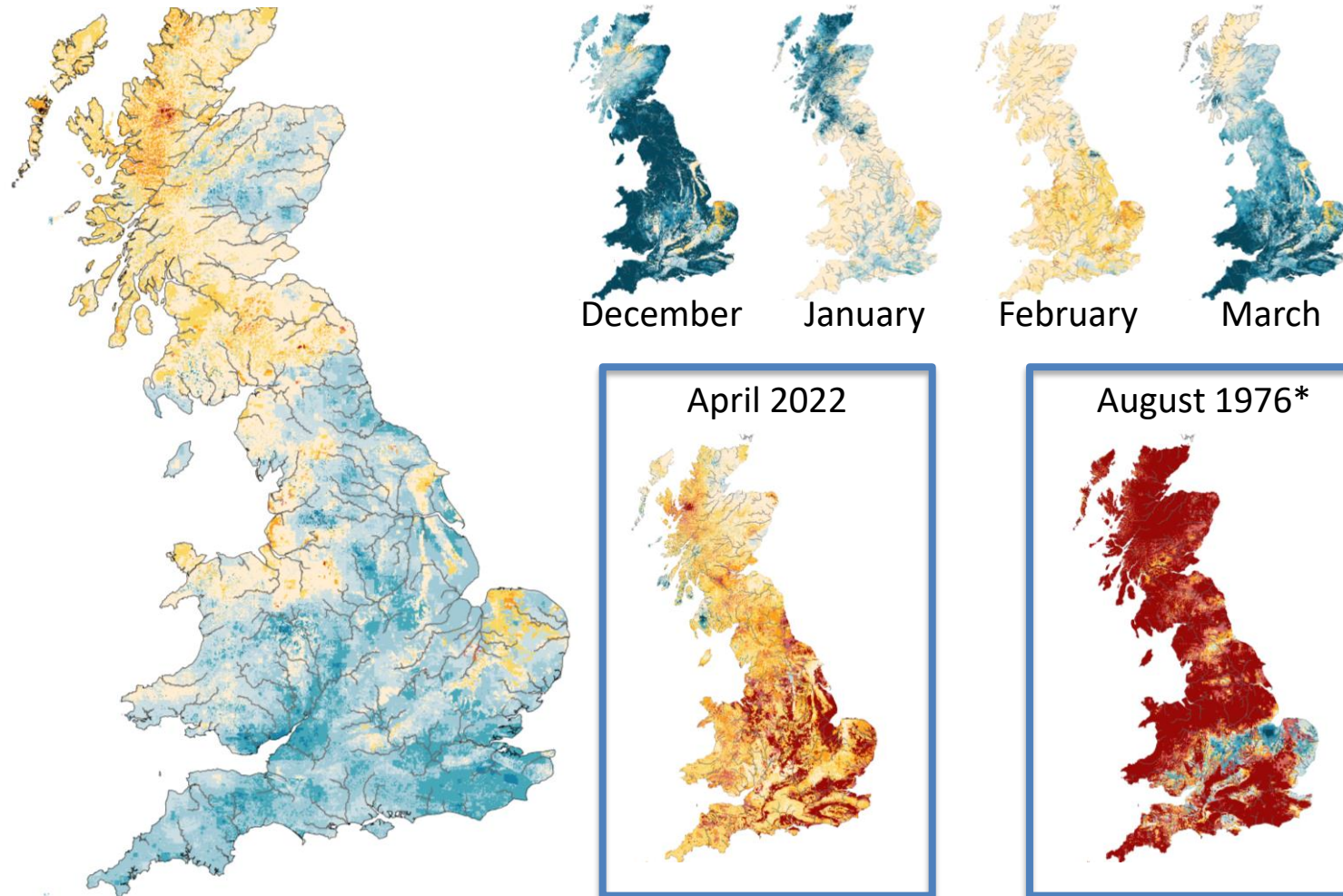
SUMMARY: Soil moisture stores across Great Britain have reduced over April, but remain higher (wetter) than is typical for the time of year in much of England. In Scotland, stores in most areas continue to be lower (drier) than normal.

Relative soil wetness

Soil moisture anomaly as a % of maximum (positive wetness) or minimum (negative wetness) moisture anomaly (zero indicates average value)



Labels refer to estimated soil moisture on final day of named month



*Example month displaying extreme negative wetness

May 2023

Return Period of Rainfall Required to Overcome Dry Conditions

Period: May 2023 - October 2023

Issue date: 03.05.2023

These maps show the return period of the rainfall required to overcome dry conditions simulated using the Grid-to-Grid (G2G) hydrological model. The maps are coloured according to the return period of accumulated rainfall required to overcome the estimated current subsurface water storage deficit over the next few months.

These maps do not provide a drought forecast. Instead they indicate the return period of rainfall required to overcome the dry conditions for the following 6 months based on current conditions.

SUMMARY: No areas of Great Britain will require particularly unusual (>5 years return period) rainfall over the next six months to replenish current storage deficits.

SCOTLAND

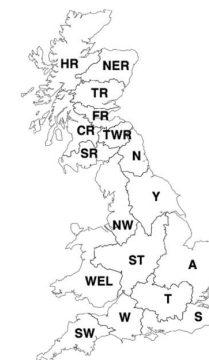
- HR Highlands Region
- NER North East Region
- TR Tay Region
- FR Forth Region
- CR Clyde Region
- TWR Tweed Region
- SR Solway Region

ENGLAND

- N Northumbria
- NW North West
- Y Yorkshire
- ST Severn Trent
- A Anglian
- T Thames
- S Southern
- W Wessex
- SW South West

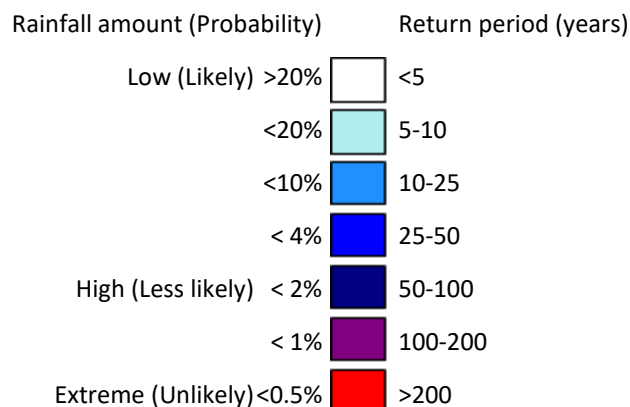
WALES

- WEL Welsh



NORTHERN IRELAND

This method cannot currently be used in Northern Ireland



Estimate of Additional Rainfall Required to Overcome Dry Conditions

Based on subsurface water storage estimated for 30 April 2023

Issue date: 03.05.2023

These maps show the Grid-to-Grid (G2G) hydrological model simulated subsurface water storage, expressed as an anomaly from the historical monthly mean (1981-2010), presented on a 1km grid and as regional means.

Subsurface storage deficits, i.e. where the subsurface water storage anomaly is less than zero, are highlighted by the red/pink colours.

The subsurface storage deficit (mm) can be interpreted as an estimate of additional rainfall that would be required in future months to overcome dry conditions (i.e. rainfall in addition to what is expected on average). Regional mean values of additional rainfall required are provided in the table below.

Regional estimate of additional rainfall required (mm)

SCOTLAND

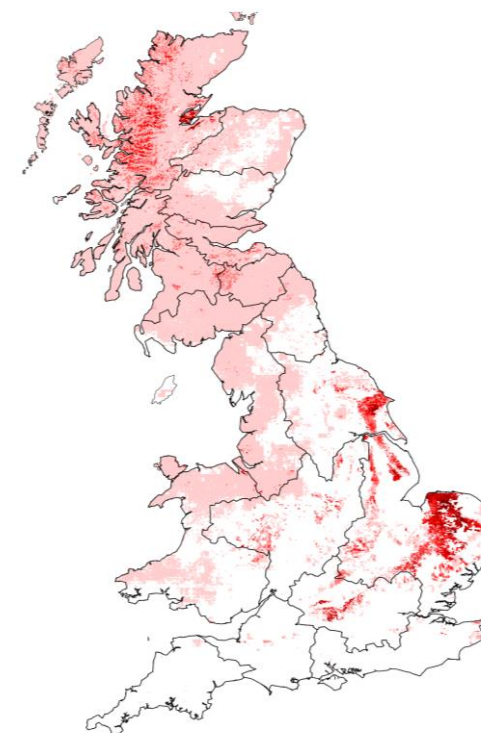
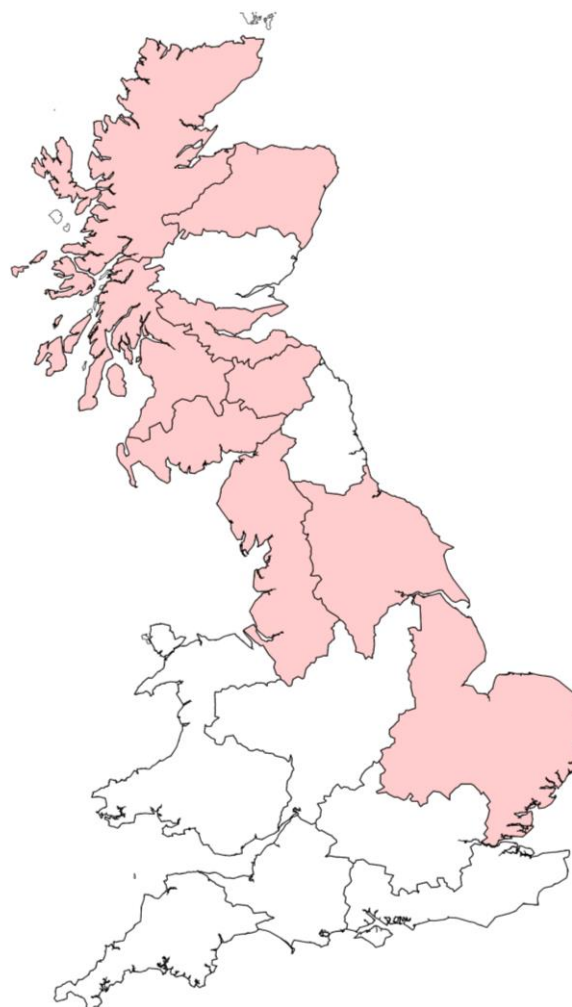
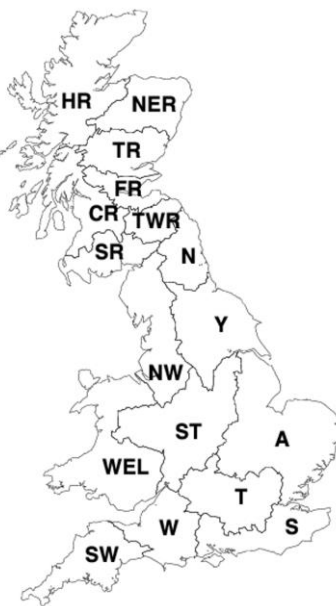
18	HR	Highlands Region
1	NER	North East Region
0	TR	Tay Region
10	FR	Forth Region
13	CR	Clyde Region
12	TWR	Tweed Region
7	SR	Solway Region

ENGLAND

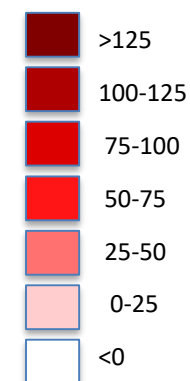
0	N	Northumbria
3	NW	North West
0	Y	Yorkshire
0	ST	Severn Trent
4	A	Anglian
0	T	Thames
0	W	Wessex
0	S	Southern
0	SW	South West

WALES

0	WEL	Welsh
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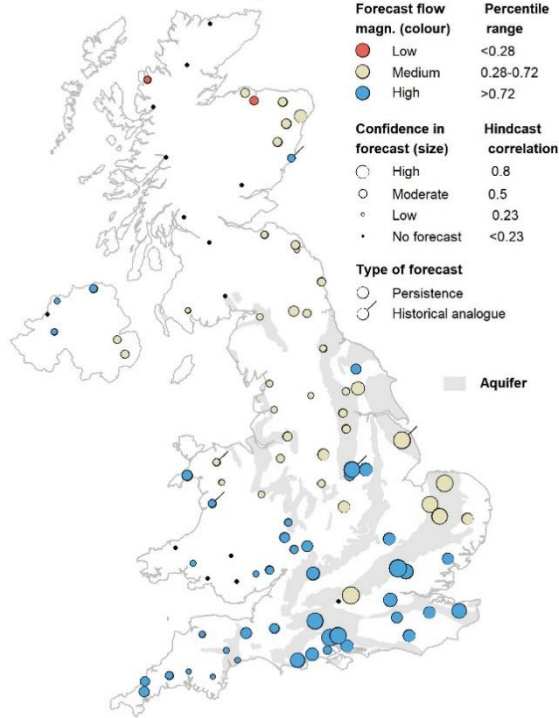
Water storage deficit
(anomaly; mm)



SUMMARY:

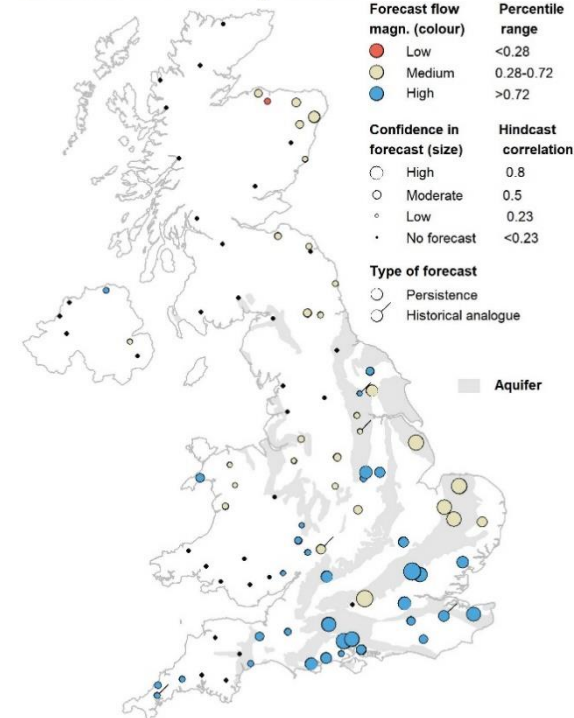
The outlook for May and for May – July is for mainly normal to above normal flows in southern and central England, Wales and Northern Ireland and elsewhere flows tend towards normal.

River flow outlook for May 2023



1-month flow outlook

River flow outlook for May - Jul 2023



3-month flow outlook

Outlooks from hydrological analogues are based on a comparison of river flow during recent months with flows during the same months in previous years at a set of approximately 90 sites from across the UK. These sites are depicted on the two maps. Years with observed flows that most closely resemble current conditions are identified as the best analogues and the outlook is based on extrapolating from current conditions based on these analogues.

It is, however, often the case that a simpler forecast based on the persistence of river flow provides a better forecast than provided by analogy. This is particularly true for slowly responding catchments associated with aquifer outcrops.

Both methods are considered at each site and the forecast from the method with the higher confidence is presented. A simple classification of flows is used (high, medium and low) as indicated by the colours of the dots, with the confidence

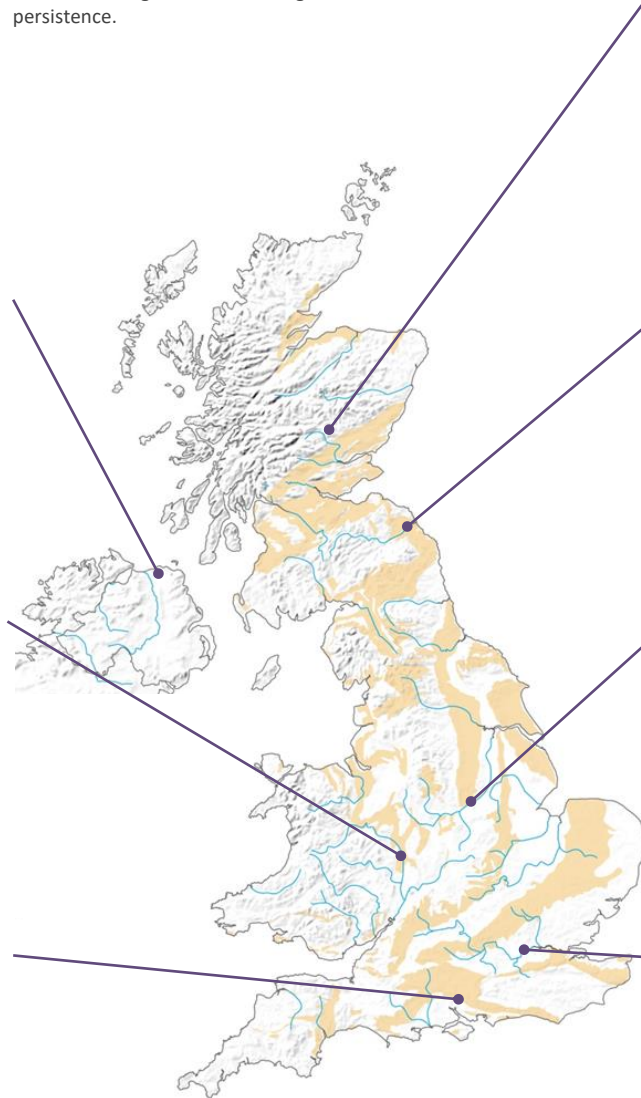
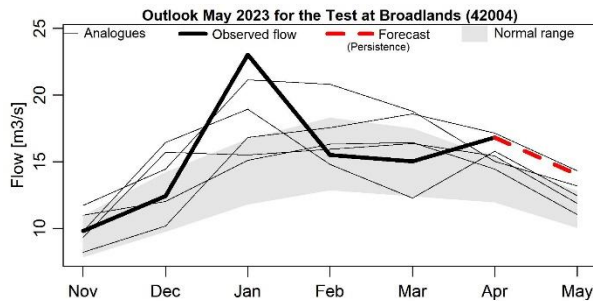
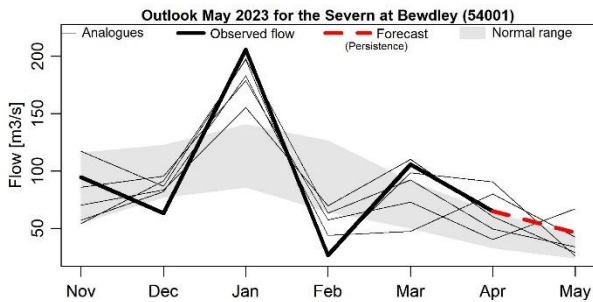
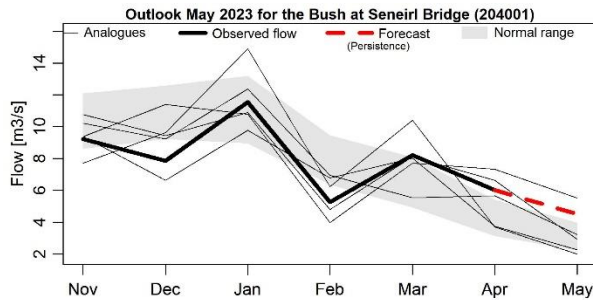
of the forecast being represented by the size of the dot. A tag on the dot indicates which method has been used in each instance.

Period: May 2023

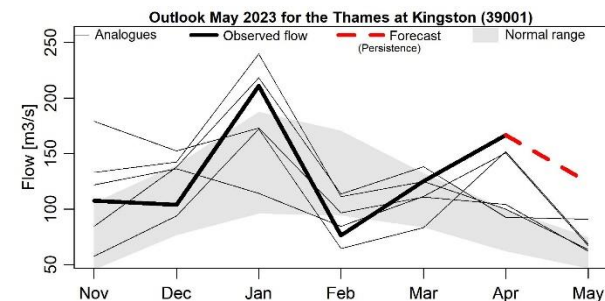
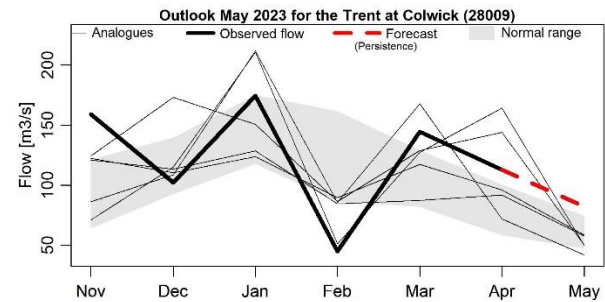
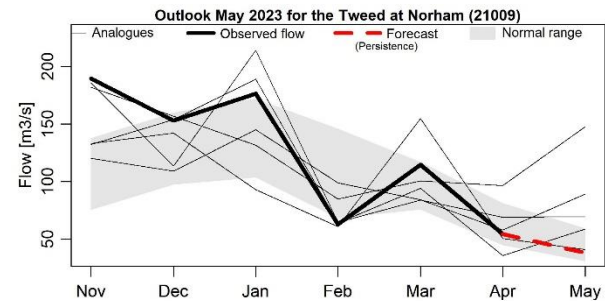
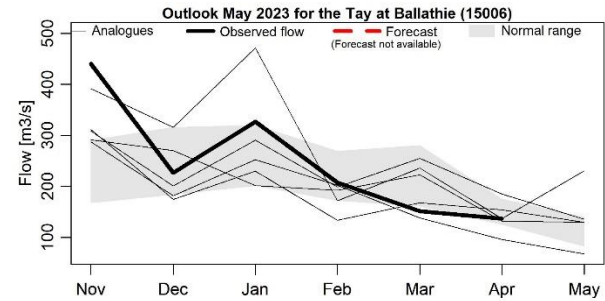
These figures provide insight into the hydrological analogue methodology for a set of sites from across the UK.

In each of the time series graphs the bold black line represents the observed flow during the past six months. The grey band indicates the normal flow range (the normal band includes 44%

of observed flows in each month). The selected analogues are shown as thin lines and the trajectories that flows took in the following month are also shown. The forecast is shown as the dashed red line, and in each plot it states whether this has come from the analogues or has been generated on the basis of persistence.



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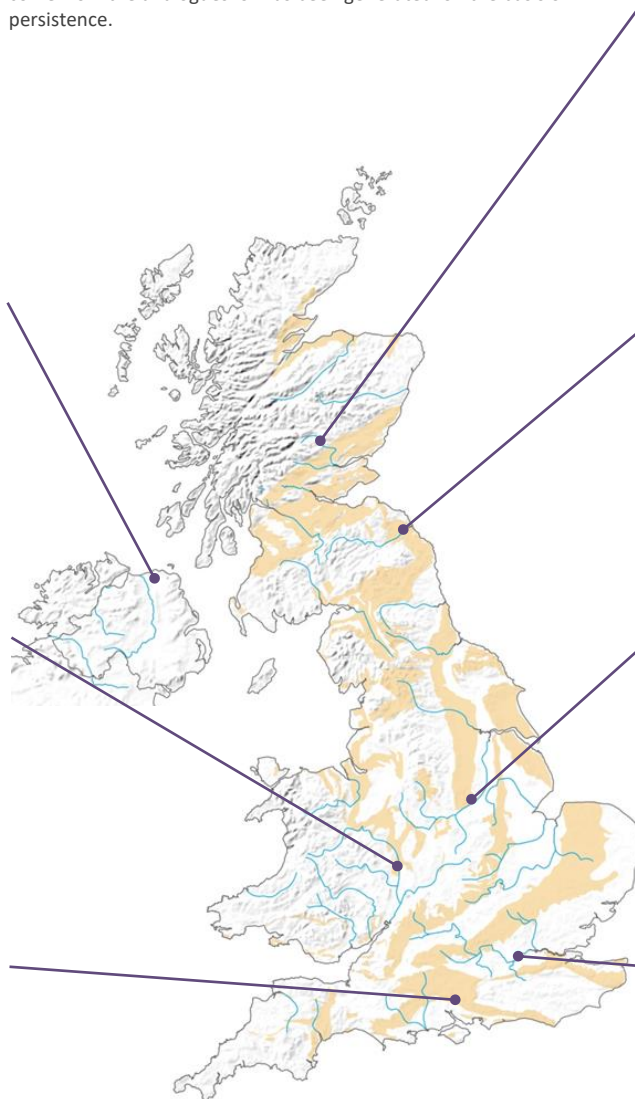
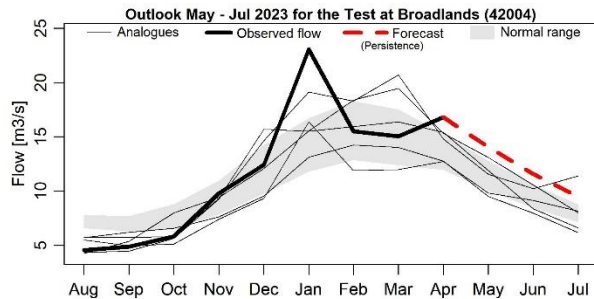
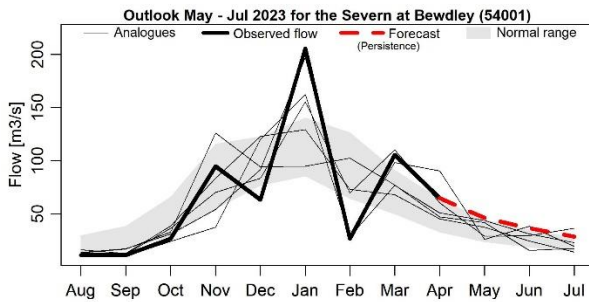
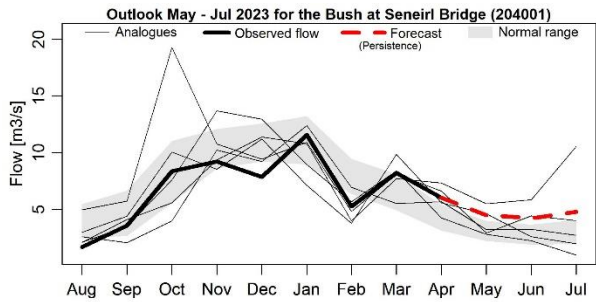


Period: May 2023 – July 2023

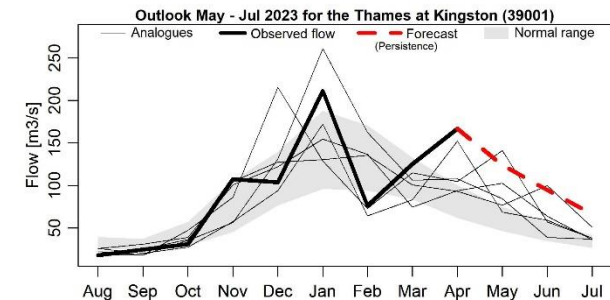
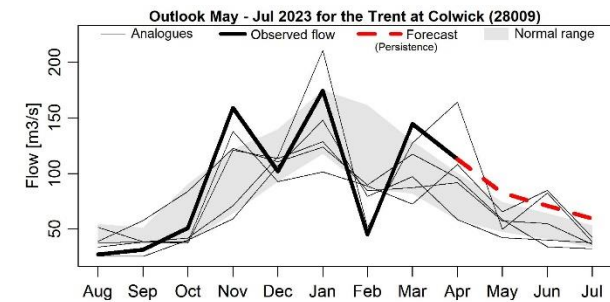
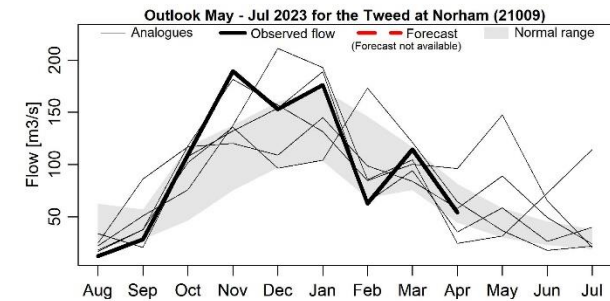
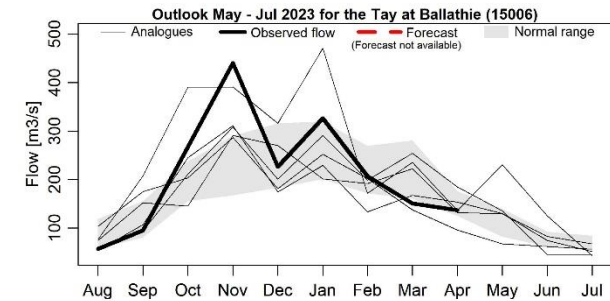
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Issued on 09.05.2023 using data to the end of April 2023

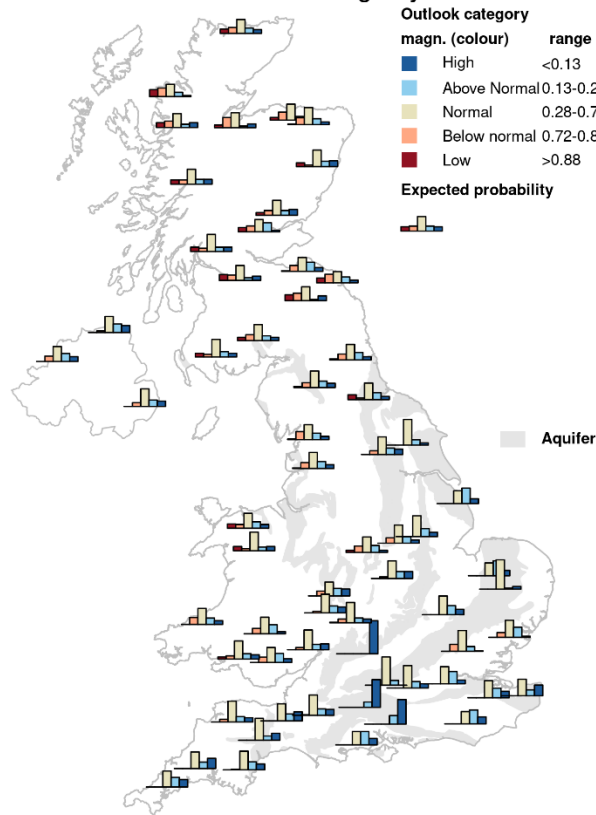


Period: May 2023 – October 2023

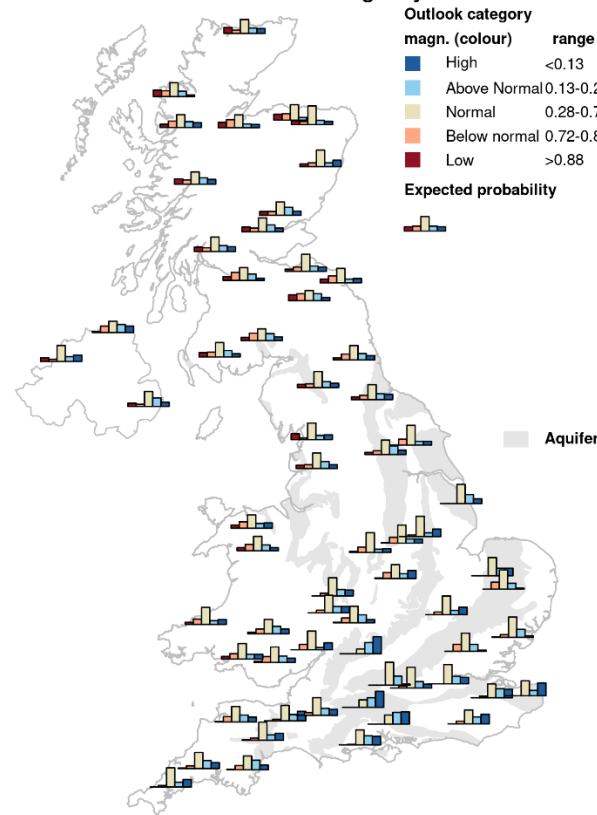
Issued on 04.05.2023 using data to the end of April 2022

The outlook for May indicates that flows are most likely to be normal to above normal in the south of England, and normal for the rest of the UK. The May-June-July outlook indicates the same pattern is expected to persist over the coming three months.

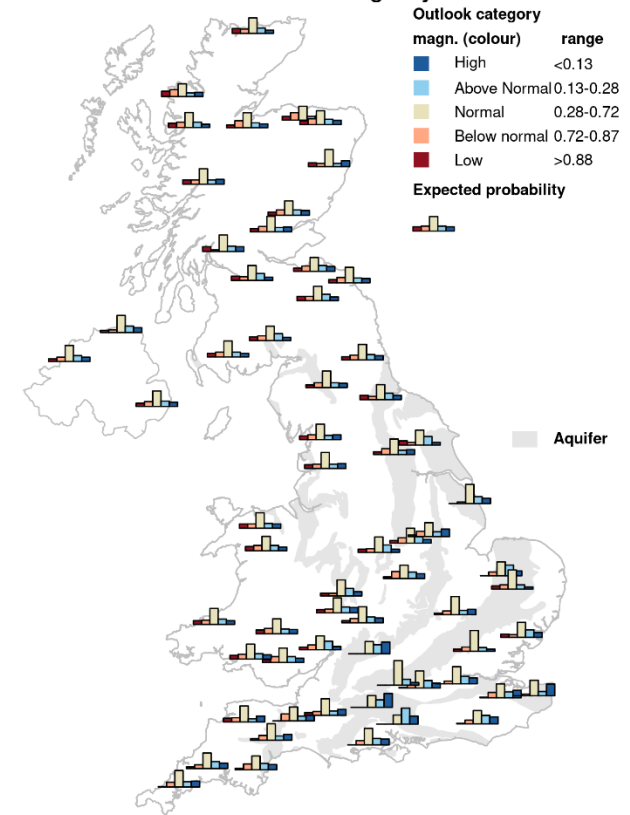
1-month river flow outlook starting May 2023



3-month river flow outlook starting May 2023



6-month river flow outlook starting May 2023



This outlook is based on monthly ensembles of historical sequences of observed climate (rainfall and potential evapotranspiration) that form input to a hydrological model. The outputs are probabilistic simulations of the average river flow over the forecast period (1 to 12 months ahead), at each location. The simulations are generated by the GR4J conceptual rainfall-runoff model from IRSTEA (France) calibrated on observed or naturalised flows.

The bar plot maps show the outlook distribution for 1, 3 and 6-month period for 64 catchments across England and Wales. Each bar plot represents the probabilistic distribution of the simulated river flow compared to the historical river flow, for the same n-month period. The probabilities fall within five categories, classified as: low, below normal, normal, above normal and high.

This outlook is based entirely on historical sequences and therefore does not contain any knowledge of the state of the atmosphere and ocean. It is hence possible that some of the historical sequences used might be inconsistent with current large-scale atmospheric conditions and would therefore be unlikely to occur in the next few months.



This outlook is based on monthly ensembles of historical sequences of observed climate (rainfall and potential evapotranspiration) that form input to a hydrological model. The outputs are probabilistic simulations of the average river flow over the forecast period (1 to 12 months ahead), at each location. The simulations are generated by the GR4J conceptual rainfall-runoff model from IRSTEA (France) calibrated on observed or naturalised flows.

The stack diagrams show the variation over time of the outlook distribution for a number of individual catchments. Each graph represents variation over time of the number of simulated river flows, in each month ensemble, that fall within each of seven categories: exceptionally low, notably low, below normal, normal, above normal, notably high and exceptionally high. The categories represent cumulative flow conditions, e.g. For 3-month, the simulated total 3-month flow compared to the historical 3-month flow distribution. The monthly variations can be compared to the long-term average distribution of river flows (shown as columns on

the right of each timeline graph). This outlook is based entirely on historical sequences and therefore does not contain any knowledge of the state of the atmosphere and ocean. It is hence possible that some of the historical sequences used might be inconsistent with current large-scale atmospheric conditions and would therefore be unlikely to occur in the next few months.

SUMMARY: During May, river flows are likely to be in the *Normal range* or *Above normal* in much of Great Britain. Southern England may experience *Notably high* flows, while Northern Scotland and the Clyde region may experience *Below normal* flows.

Over the next 3 months river flows will likely be in the *Normal range* in much of the country. The north of Scotland, Wales, and the north-west of England may experience *Below normal* flows, while southern and central England may experience *Above normal* flows.

These forecasts are produced by using five members of the Met Office rainfall forecast ensemble as input to a water balance hydrological model to provide the five estimates of river flows shown on the left for one month and three months ahead.

Regional forecast monthly-mean river flows are derived from the average of 1km river flow estimates within each region and ranked in terms of 54 years of historical flow estimates (1963 – 2016).

The five maps illustrate the wide range of possible flows and while there is a 50% chance of flows between the 1st and 3rd quartiles, actual flows may be more extreme than the flows derived using the highest or lowest rainfall forecasts.

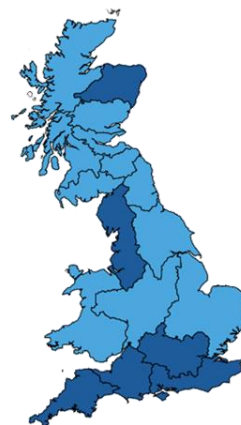
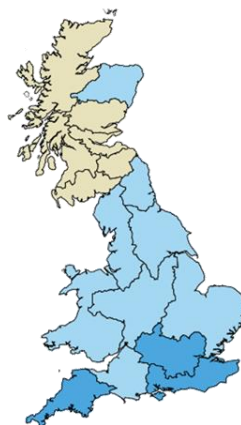
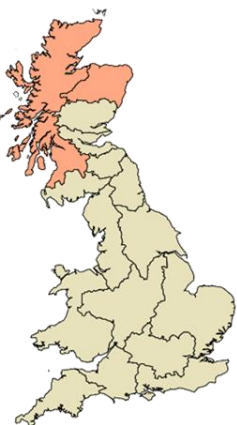
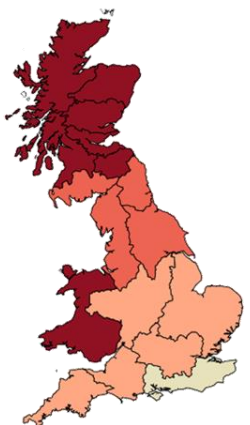
Lowest rainfall forecast

1st quartile

Median

3rd quartile

Highest rainfall forecast



Key

- Exceptionally high flow
- Notably high flow
- Above normal
- Normal range
- Below normal
- Notably low flow
- Exceptionally low flow

Percentile range of historic values for relevant month	
Dark Blue	> 95
Medium Blue	87-95
Light Blue	72-87
Yellow	28-72
Orange	13-28
Red	5-13
Dark Red	< 5

SCOTLAND

- HR Highlands Region
- NER North East Region
- TR Tay Region
- FR Forth Region
- CR Clyde Region
- TWR Tweed Region
- SR Solway Region

ENGLAND

- N Northumbria
- NW North West
- Y Yorkshire
- ST Severn Trent
- A Anglian
- T Thames
- S Southern
- W Wessex
- SW South West
- WALES**
- WEL Welsh



NORTHERN IRELAND

This method cannot currently be used in Northern Ireland

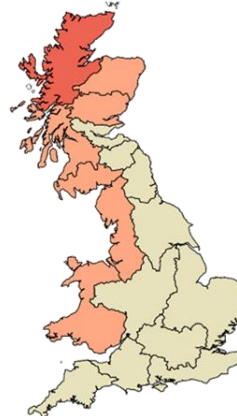
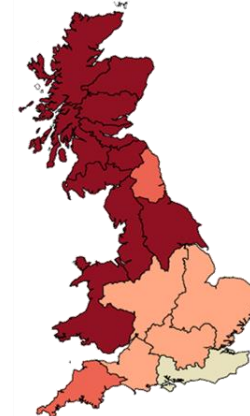
Lowest rainfall forecast

1st quartile

Median

3rd quartile

Highest rainfall forecast



The regional maps illustrating the regional river flows for five members of the Met Office ensemble of rainfall forecasts give some indication of the range of possible river flows in the coming months. As noted previously, the actual flows could be more extreme than the flows generated by either the lowest or highest members of the rainfall ensemble.

The bar charts (below) give further insight into the range of river flow forecasts by considering all members of the forecast rainfall ensemble. The regional bar charts show the percentage of ensemble forecasts falling in each of the flow categories as generated by the monthly-resolution water-balance model. As before results are averaged by region then ranked in terms of 54 years of historical regional flow estimates (1963 – 2016).

SUMMARY: During May, river flows are likely to be in the *Normal range or Above normal* in much of Great Britain. Southern England may experience *Notably high* flows, while Northern Scotland and the Clyde region may experience *Below normal* flows.

Over the next 3 months river flows will likely be in the *Normal range to Below normal* in much of the country, with some western regions likely to experience *Notably low* flows.

SCOTLAND

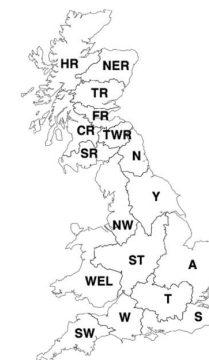
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- TR Tay Region
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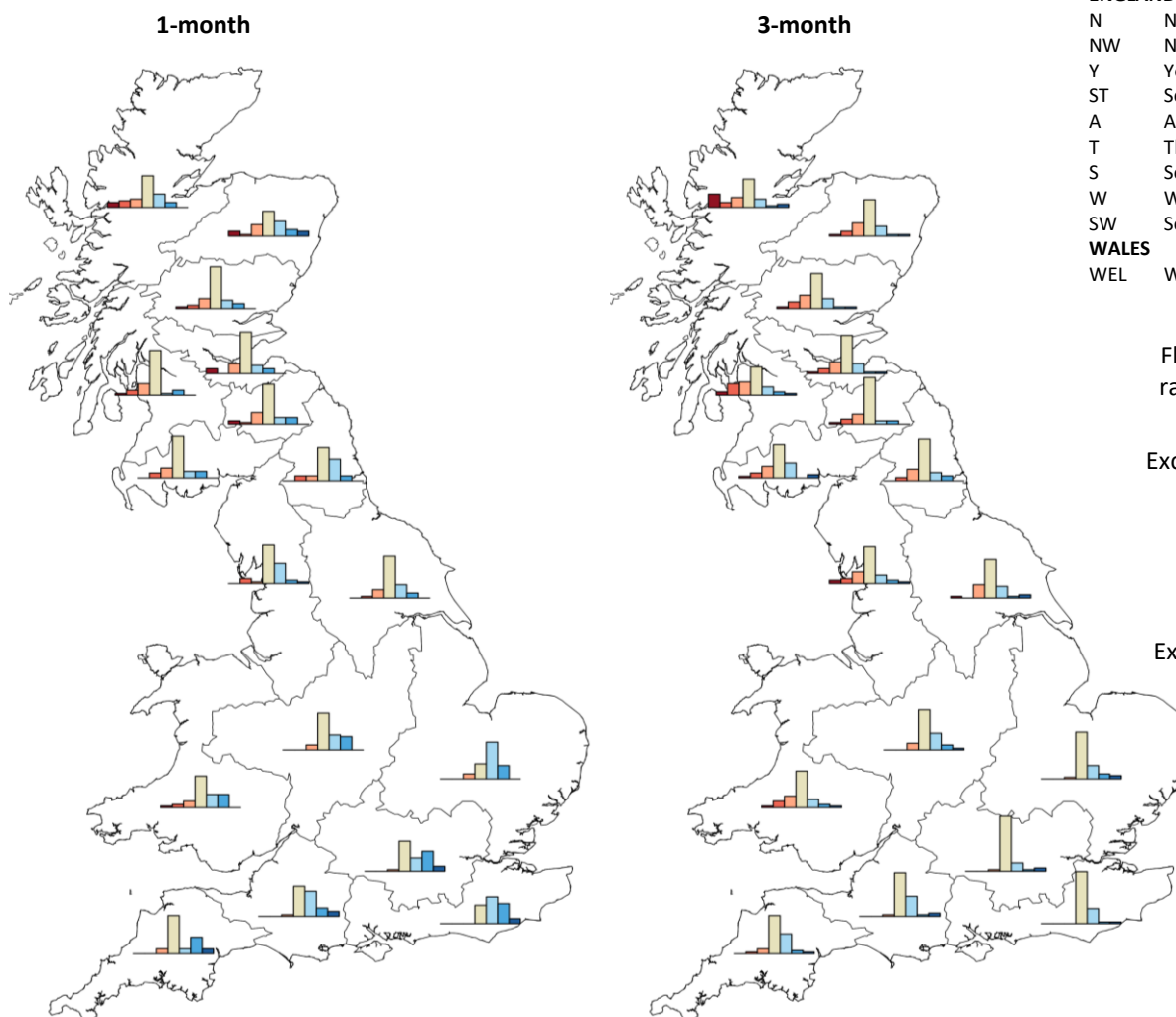
WALES

- WEL Welsh

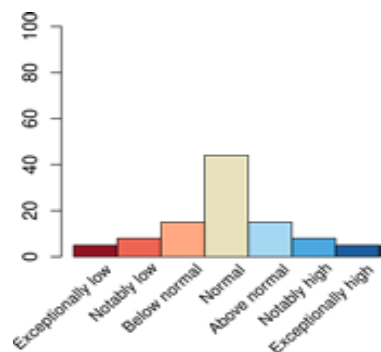
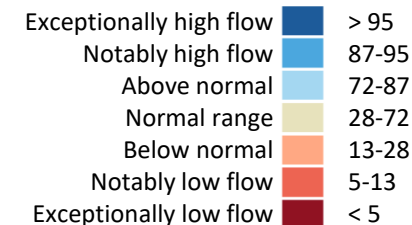


NORTHERN IRELAND

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Flow estimate for each river pixel ranked in terms of historic % flow estimates (1963-2016)



The maps illustrating the regional river flows for five members of the Met Office ensemble of rainfall forecasts give some indication of the range of possible river flows in the coming months. As noted previously, the actual flows could be more extreme than the flows generated by either the lowest or highest members of the rainfall ensemble.

The tables below give further insight into the range of river flow forecasts by considering all members of the forecast rainfall ensemble. The numbers in the tables are the percentage of ensemble forecasts falling in each of the flow categories as generated by the monthly-resolution water-balance model. As before results are averaged by region then ranked in terms of 54 years of historical regional flow estimates (1963 – 2016).

SUMMARY: During May, river flows are likely to be in the *Normal range* or *Above normal* in much of Great Britain. Southern England may experience *Notably high* flows, while Northern Scotland and the Clyde region may experience *Below normal* flows.

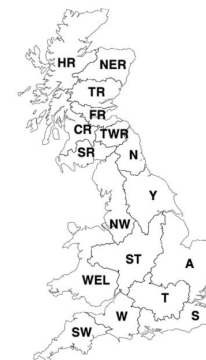
Over the next 3 months river flows will likely be in the *Normal range* to *Below normal* in much of the country, with some western regions likely to experience *Notably low* flows.

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NORTHERN IRELAND

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1-month ahead	A	NW	N	ST	SW	S	T	WEL	W	Y	CR	FR	HR	NER	SR	TR	TWR
Exceptionally high flow	0	2	0	0	7	7	7	0	7	0	0	0	0	7	0	0	0
Notably high	19	5	7	19	24	29	29	19	12	7	7	7	7	10	10	7	10
Above normal	52	29	31	21	7	38	19	19	36	19	2	12	19	21	10	12	10
Normal range	21	55	48	52	55	26	43	45	43	60	64	60	45	36	60	60	57
Below normal	7	2	7	7	7	0	2	10	2	12	17	14	12	17	14	14	17
Notably low	0	7	7	0	0	0	0	5	0	2	7	0	10	2	7	5	2
Exceptionally low flow	0	0	0	0	0	0	0	2	0	0	2	7	7	7	0	2	5

3-month ahead	A	NW	N	ST	SW	S	T	WEL	W	Y	CR	FR	HR	NER	SR	TR	TWR
Exceptionally high flow	5	2	0	2	2	2	5	2	5	5	2	2	5	2	5	2	0
Notably high	7	5	7	7	5	2	2	5	2	2	5	2	2	2	0	2	5
Above normal	19	12	12	24	29	21	12	12	29	17	12	14	12	14	21	14	5
Normal range	67	52	60	57	55	74	79	52	62	55	40	55	40	52	48	50	67
Below normal	2	17	17	10	7	0	2	17	2	19	19	17	14	19	17	19	14
Notably low	0	7	5	0	2	0	0	10	0	0	17	7	7	7	7	10	7
Exceptionally low flow	0	5	0	0	0	0	0	2	0	2	5	2	19	2	2	2	2

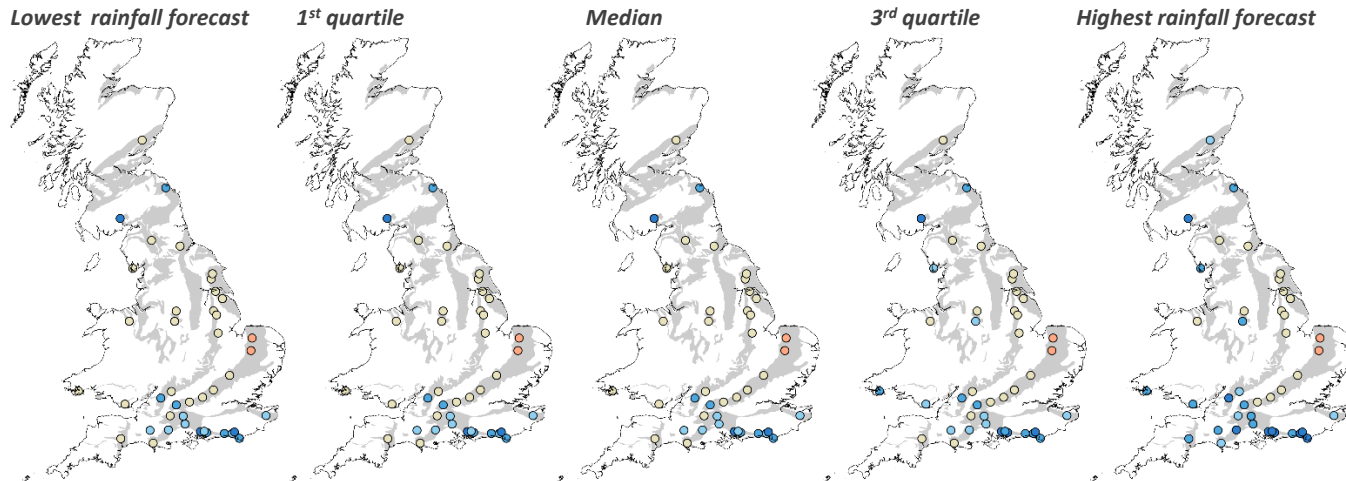
Period: May 2023 – July 2023

Groundwater levels are still responding to a high volume of recent rainfall over much of the UK meaning that there is more uncertainty in the groundwater level forecasts than usual. Under median rainfall conditions, levels are expected to be normal to above normal at most sites in the next month. Above normal levels continue to be forecast in the eastern South Downs Chalk and the Devonian sandstones of Scotland and north-east England. The 3 month forecasts are similar to the 1 month forecast, and have a similar regional distributions for all rainfall scenarios, with levels expected to be predominantly normal.

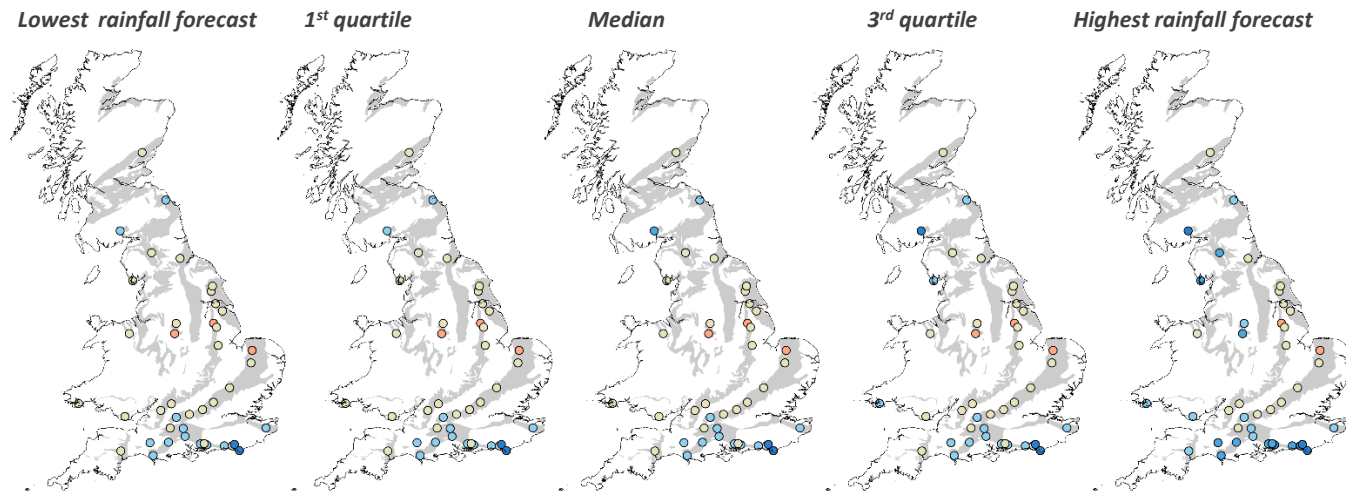
Issued on 10.05.2023 using data to the end of April

These forecasts are produced by running five members of the Met Office ensemble climate forecast through groundwater models of observation borehole hydrographs at 42 sites across the country. The sites are distributed across the principal aquifers.

Based on the distribution of observed historical groundwater levels in a given month, seven categories have been derived for each site: very low, low, below normal, normal, above normal, high, and very high. The forecast groundwater level is assigned to one of these seven categories depending on where it falls within the distribution of the historically observed values.

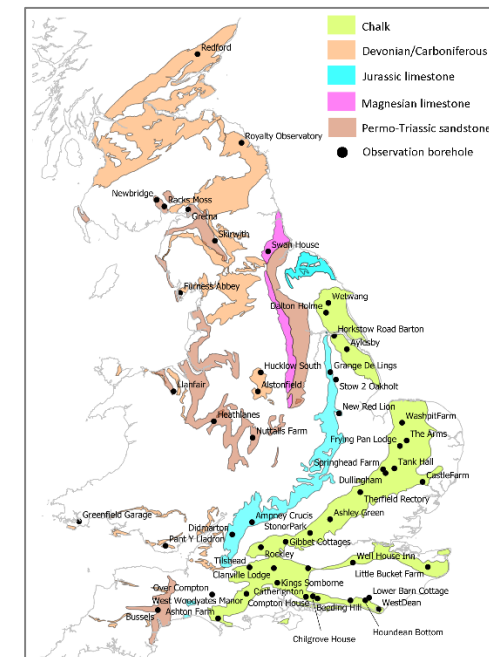


1-month outlook



3-month outlook

Key	Percentile range of historic observed values for relevant month
Exceptionally high levels	> 95
Notably high levels	87-95
Above normal	72-87
Normal	28-72
Below normal	12-28
Notably low levels	5-13
Exceptionally low levels	< 5



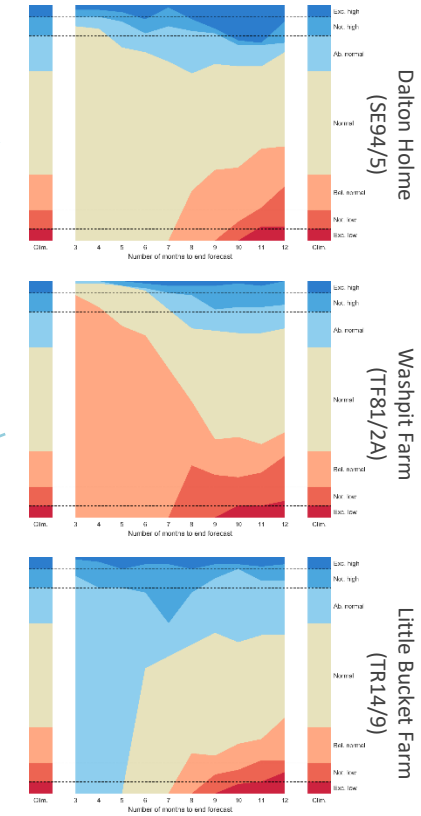
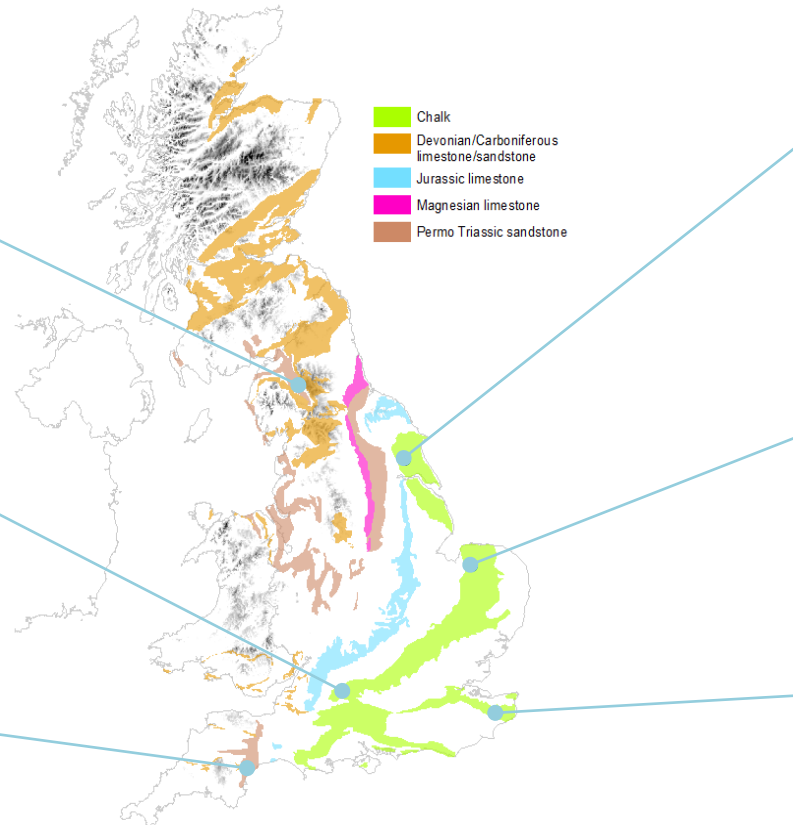
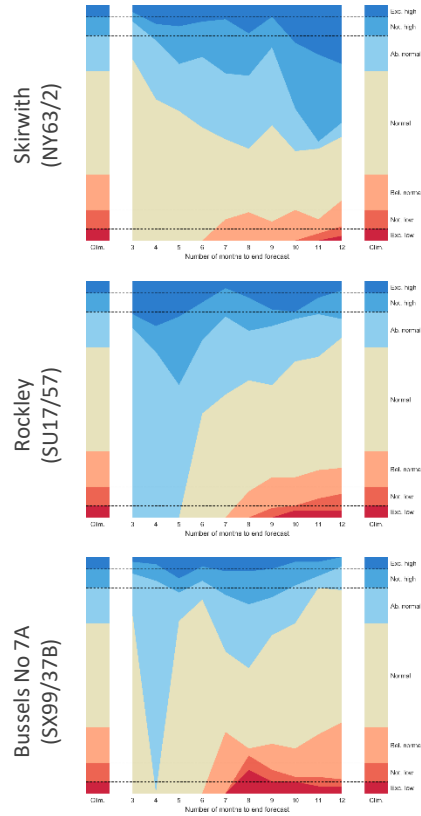
The Hydrological Outlook UK provides an outlook for the water situation for the UK over the next three months and beyond. For guidance on how to interpret the outlook, a wider range of information, and a full description of underpinning methods, please visit the website: www.hyoutuk.net

Outlook based on modelled groundwater from historical climate

Period: May 2023 – April 2024

Issued on 10.05.2023 using data to the end of April

Groundwater levels at Washpit Farm are expected to be below normal to normal for much of the next year. Predominantly normal levels are forecast for Bussels No 7A and Dalton Holme over the next 3 to 12 months. Over the next 6 months, levels at Skirwith are likely to be normal to above normal and at Rockley and Little Bucket Farm levels are expected to be above normal.



This outlook is based on monthly ensembles of historical sequences of observed climate (rainfall and potential evapotranspiration) that form input to hydrological models. The outputs are probabilistic simulations of the average groundwater level over the forecast horizon (3 to 12 months ahead), at each location.

The graphs show variation over time of the number of simulated groundwater levels in each monthly ensemble,

that fall within each the seven categories: exceptionally low, notably low, below normal, normal, above normal, notably high and exceptionally high. The monthly variations can be compared to the long-term average distribution of levels, which are shown as columns on the left and right of each graph.

This outlook is based entirely on historical sequences and therefore does not contain any knowledge of the state of

the atmosphere and ocean. It is hence possible that some of the historical sequences used might be inconsistent with current large-scale atmospheric conditions and would therefore be unlikely to occur in the next few months.