Hydrological Summary

for the United Kingdom

March 2025

General

March saw a continuation of February's high pressure, resulting in settled and warmer than average conditions for most of the month. All regions received below average rainfall, with the UK as a whole recording less than half the average for March. Correspondingly, river flows were below normal or lower across much of the country. Many rivers in northern and western areas registered exceptionally low flows, some of which were the lowest average March flows on record. Groundwater levels generally declined, with record March lows in Northern Ireland, Scotland and Wales. At month-end, reservoir stocks for England & Wales were at 90% of capacity, just below average, but almost all impoundments recorded reductions relative to average (e.g. Northern Command Zone and Celyn & Brenig were 12% and 11% below average, respectively). Soils were drier than average in all areas apart from the Western Isles & Shetland. The prolonged dry spell and above average temperatures have led to a higher-than-usual frequency of wildfires for the time of year and concerns for agriculture at the start of the growing season. With settled weather continuing into early April and little appreciable rainfall, the Outlook is for below normal river flows for most areas over the next three months, except for groundwater-dominated catchments in south-east England, which are likely to be in the normal range or above. A continuation of the dry conditions in the north and west, particularly this early in the year, would cause concern regarding water resources over coming months.

Rainfall

March saw persistent high pressure bringing settled conditions for most of the month. It began with continuing high pressure over southern England, resulting in mild temperatures and dry conditions. The dry weather increased wildfire risk, leading to fires at Bwlch Mountain (Rhondda Cynon Taff) on the 5th. On the 10th, a cold front moved across northern Scotland, bringing snow over high ground; however, high pressure from the south-west rapidly returned, bringing warm and settled conditions. Further notable wildfires were reported between the 16th and 21st in Wales – including at Blaenau Ffestiniog (Gwynedd) – and smaller fires in western Scotland and Northern Ireland. From the 22nd, a low pressure system arrived, resulting in rainfall across the UK with some notable daily totals (e.g. 60mm were recorded on the 27th at Tyndrum No.3, Perthshire) and disruption on major roads due to surface water flooding in the Midlands and South Yorkshire. High pressure soon returned, ending the month with warm and dry conditions. Nationally, rainfall was 43% of average, buoyed by Scottish rainfall (64%), whereas Northern Ireland, England and Wales all recorded around a third of average or less (31%, 25%, and 23%, respectively). Wales recorded its second driest March (after 1944), while England recorded its fourth driest March, both in records since 1890. The winter half-year (October-March) registered 79% of average for the UK, and less than two-thirds for Northern Ireland, which recorded its third driest October-March in records since 1890. In southern Britain, despite the dry March, rainfall in this period was dominated by wet conditions over the winter. Over the past twelve months, rainfall was below average in northern and western Britain.

River Flows

Recessions established in February continued into March and were interrupted in catchments in northern Scotland on the 10th following unsettled weather. There were further interruptions to recessions around the 22nd as more widespread unsettled weather led to increases in flows in most catchments in the north and west of the UK. Further south, due to little appreciable rainfall, recessions persisted throughout the month with only very minor interruptions from isolated showers. The Lagan recorded new March daily minima from the 11th to 31st (in a series from 1973), as did many other catchments across the UK from mid-month onwards (albeit not for such a sustained period). Flows in most catchments ended the month below normal, and exceptionally low in eastern Scotland, Northern Ireland, and south-west England. March monthly mean flows were below normal with exceptionally low flows across large areas of northern and western UK. Flows for many catchments in eastern Scotland, northern England and Wales were around a third of average (or less) and record low March mean flows were registered on the Mourne, Eden, English Tyne, Conwy, and Welsh Dee (all in series of at least 40 years). In contrast, flows in groundwater-fed catchments of southern England were in the normal range or above. UK Outflows for March were the second lowest on record (in a series since 1980). Over the winter half-year, flows in the northern half of the UK were below normal to notably low, with flows on the Mourne, Derwent, and Clyde exceptionally low – the latter recording its third lowest October-March flows in a series from 1958. Conversely, flows in central and southern Britain were in the normal range to above normal, with many catchments recording notably high flows over this period.

Soil Moisture and Groundwater

Soil moisture deficits began to appear in England, Wales, and Northern Ireland, with the Wessex and Southern regions recording the driest March soils in records since 1961 (Southern joint driest with 1990). Groundwater levels throughout most of the Chalk across England remained normal to above normal. In the southern Chalk, Redlands Hall fell from exceptionally high to above normal, whilst at Westdean No.3, levels moved from above normal to exceptionally high. In the Yorkshire Chalk, groundwater levels remained in the normal range, except for Wetwang which moved from the normal range to below normal. At Killyglen, levels fell, resulting in a record low for March. Levels in the Jurassic Limestone fell from above normal and notably high to the normal range at New Red Lion and Ampney Crucis, respectively. In the Magnesian Limestone, Aycliffe maintained above normal levels, whereas Brick House Farm transitioned from notably high to above normal levels. Groundwater levels decreased in the Carboniferous Limestone, with Pant y Lladron falling to record lows for March. At Alstonfield and Greenfield Garage, levels fell from above normal and the normal range to notably low, respectively. In the Permo-Triassic Sandstones, levels were generally stable, remaining notably high to exceptionally high at Llanfair D.C. and Weir Farm, respectively. At Bussels No.7a and Skirwith, levels fell from above normal to the normal range. In the Upper Greensand, levels at Lime Kiln Way, fell from exceptionally to notably high whilst in the Fell Sandstone at Royal Observatory, levels decreased slightly but remained within the normal range. At Easter Lathrisk in the Devonian Sandstone, levels fell to a record low for March.

National Hydrological Monitoring Programme | UK Centre for Ecology & Hydrology | BGS British Geological Survey

Rainfall . . . Rainfall . . .

Met Office

Rainfall accumulations and return period estimates

Percentages are from the 1991-2020 average.

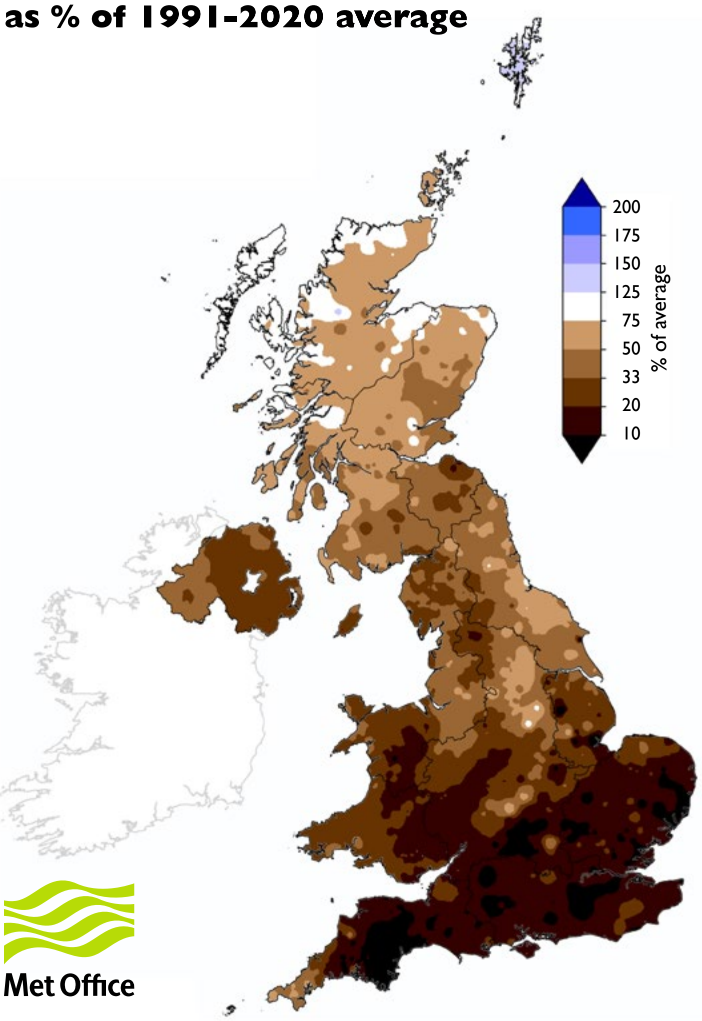
Region	Rainfall	Mar 2025	Jan25 – Mar25	RP	Oct24 – Mar25	RP	Jul24 – Mar25	RP	Apr24 – Mar25	RP
United	mm	**37**	205		532		832		1081	
Kingdom	%	**43**	68	5-10	79	5-10	89	2-5	93	2-5
England	mm	**15**	160		409		667		871	
	%	**25**	77	2-5	86	2-5	97	2-5	101	2-5
Scotland	mm	**79**	272		710		1070		1393	
	%	**64**	61	5-10	75	5-10	83	2-5	89	2-5
Wales	mm	**24**	261		709		1056		1335	
	%	**23**	69	5-10	81	2-5	89	2-5	92	2-5
Northern	mm	**27**	174		425		702		914	
Ireland	%	**31**	59	20-30	65	40-60	76	20-35	79	20-35
England &	mm	**16**	174		450		720		934	
Wales	%	**25**	75	2-5	85	2-5	96	2-5	99	2-5
North West	mm	**31**	193		578		940		1272	
	%	**34**	60	10-15	79	2-5	90	2-5	100	2-5
Northumbria	mm	**28**	127		366		596		838	
	%	**44**	59	10-20	75	5-10	83	5-10	92	2-5
Severn-Trent	mm	**14**	136		384		637		826	
	%	**26**	74	5-10	91	2-5	103	2-5	103	2-5
Yorkshire	mm	**26**	144		375		597		822	
	%	**43**	69	5-10	80	2-5	88	2-5	95	2-5
Anglian	mm	**7**	99		263		455		610	
	%	**18**	74	5-10	83	2-5	95	2-5	97	2-5
Thames	mm	**6**	155		360		640		807	
	%	**13**	90	2-5	91	2-5	113	2-5	112	2-5
Southern	mm	**7**	189		422		676		838	
	%	**14**	93	2-5	87	2-5	103	2-5	103	2-5
Wessex	mm	**8**	212		494		800		990	
	%	**13**	94	2-5	94	2-5	111	2-5	110	5-10
South West	mm	**14**	302		674		975		1207	
	%	**15**	90	2-5	88	2-5	95	2-5	96	2-5
Welsh	mm	**23**	255		689		1031		1302	
	%	**23**	71	5-10	83	2-5	91	2-5	93	2-5
Highland	mm	**109**	337		952		1360		1697	
	%	**71**	61	2-5	83	2-5	88	2-5	91	2-5
North East	mm	**48**	168		464		722		996	
	%	**65**	67	10-15	79	5-10	86	5-10	94	2-5
Tay	mm	**60**	239		565		830		1129	
	%	**56**	61	5-10	68	10-20	73	15-25	81	5-10
Forth	mm	**53**	196		460		733		1062	
	%	**55**	58	5-10	64	15-25	73	10-20	86	2-5
Tweed	mm	**29**	154		394		646		953	
	%	**37**	56	10-20	64	15-25	74	10-20	88	2-5
Solway	mm	**50**	255		608		1010		1379	
	%	**42**	60	5-10	65	15-25	78	5-10	88	2-5
Clyde	mm	**90**	312		771		1223		1585	
	%	**59**	58	5-10	67	8-12	78	5-10	84	2-5

% = percentage of 1991-2020 average *RP = Return period*

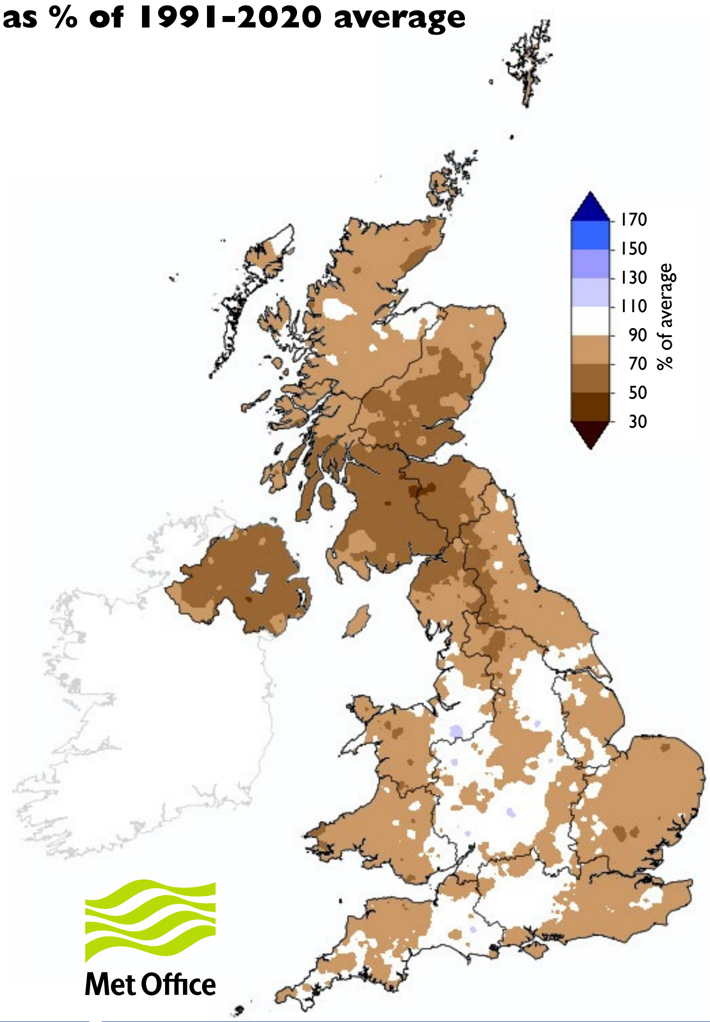
Important note: Figures in the above table may be quoted provided their source is acknowledged. Where appropriate, specific mention must be made of the uncertainties associated with the return period estimates. The RP estimates are based on data provided by the Met Office and reflect climatic variability since 1890; they also assume a stable climate. The quoted RPs relate to the specific timespans only; for the same timespans, but beginning in any month the RPs would be substantially shorter. The timespans featured do not purport to represent the critical periods for any particular water resource management zone. For hydrological or water resources assessments of drought severity, river flows and/or groundwater levels normally provide a better guide than return periods based on regional rainfall totals. Note that precipitation totals in winter months may be underestimated due to snowfall undercatch. All monthly rainfall totals since January 2023 are provisional. Source: Data from HadUK-Grid dataset at 1km resolution v1.2.0.0.

Rainfall . . . Rainfall . . .

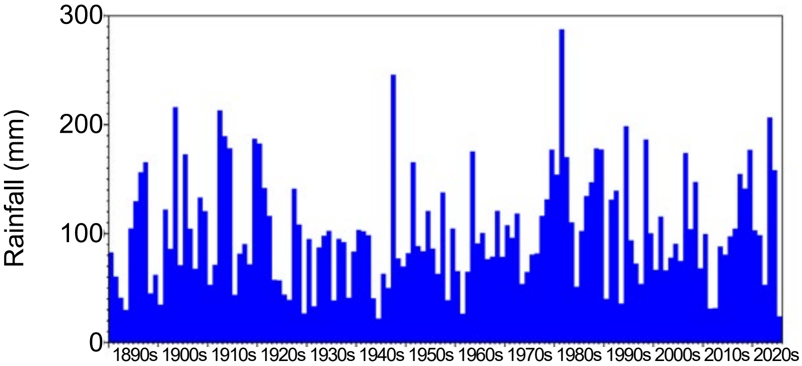
March 2025 rainfall as % of 1991-2020 average



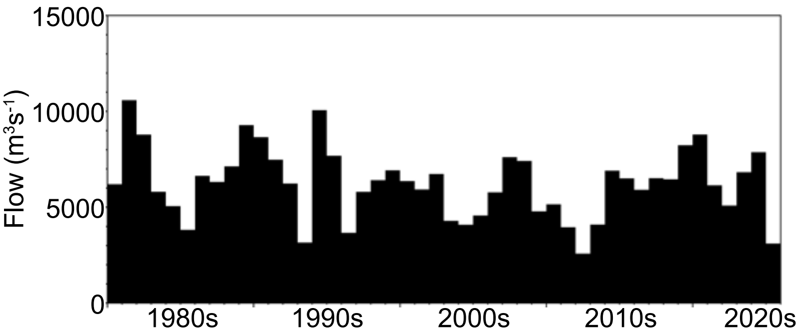
October 2024 - March 2025 rainfall as % of 1991-2020 average



March rainfall for Wales



March average outflows for the United Kingdom



UK Hydrological Outlook

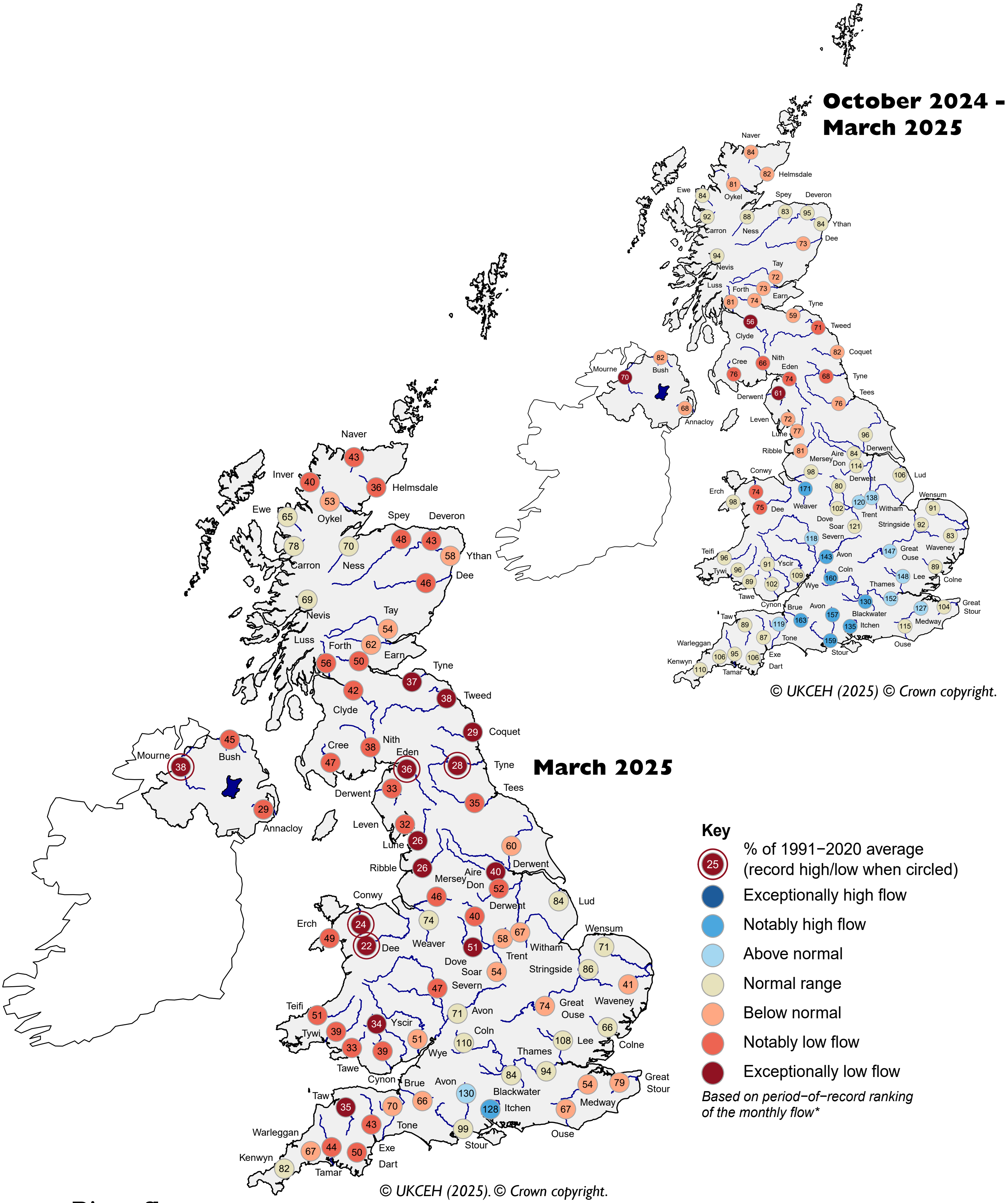
The Hydrological Outlook provides an insight into future hydrological conditions across the UK. Specifically it describes likely trajectories for river flows and groundwater levels on a monthly basis, with particular focus on the next three months.

The complete version of the Hydrological Outlook UK can be found at: www.hydoutuk.net/latest-outlook/

Period: **from April 2025**
Issued: **10.04.2025**
using data to the end of March 2025

The outlook for April is for river flows to be below normal or lower in most areas, with the exception of normal to above normal river flows in groundwater-dominated chalk catchments in southern England. The April-June outlook for river flows is similar, with a shift towards normal for western Scotland and below normal elsewhere. Groundwater levels in the sandstone and in parts of the southern chalk are likely to be normal to above normal, and elsewhere groundwater levels are likely to be normal to below normal across the April to June period.

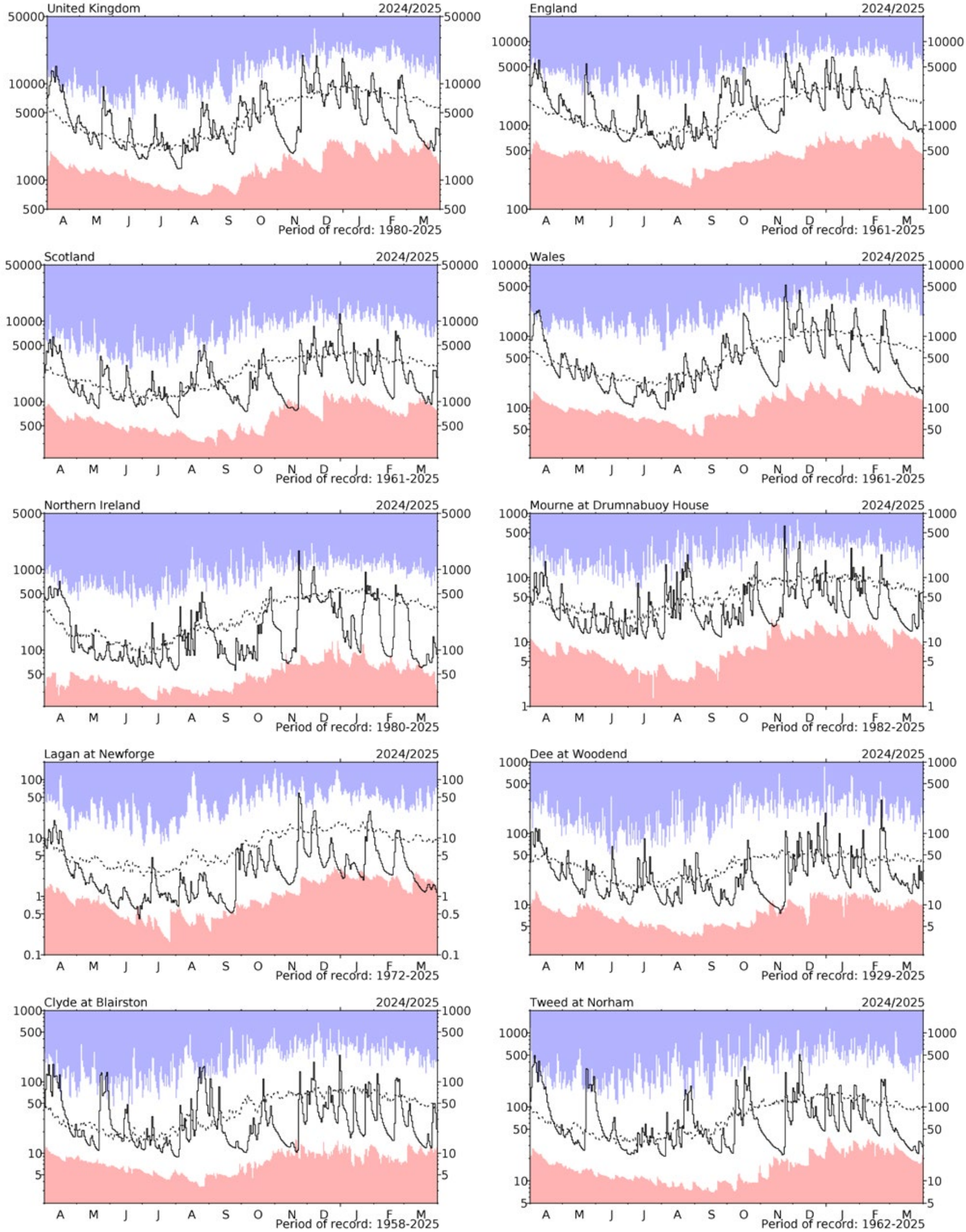
River flow . . . River flow . . .



River flows

*Comparisons based on percentage flows alone can be misleading. A given percentage flow can represent extreme drought conditions in permeable catchments where flow patterns are relatively stable but be well within the normal range in impermeable catchments where the natural variation in flows is much greater. The categories of the spots are based on the full period-of-record data whereas the percentages are based on the 1991-2020 averaging period for consistency between rainfall and river flows. Percentages may be omitted where flows are under review.

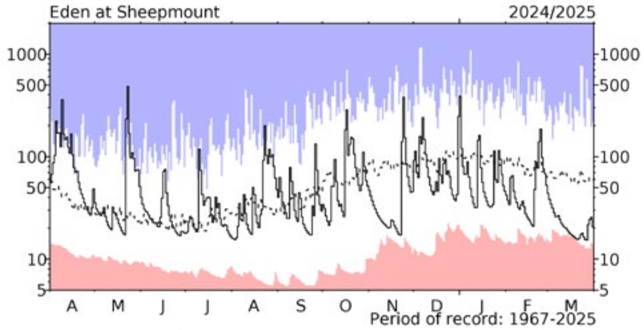
River flow . . . River flow . . .

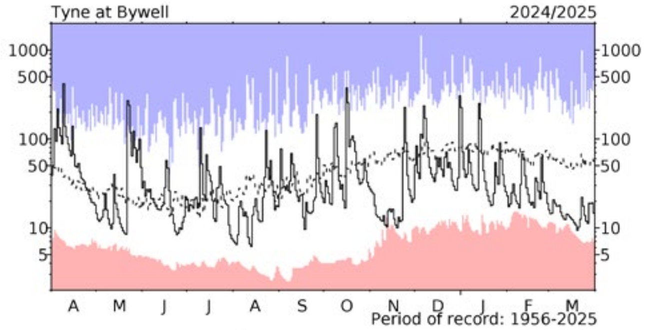


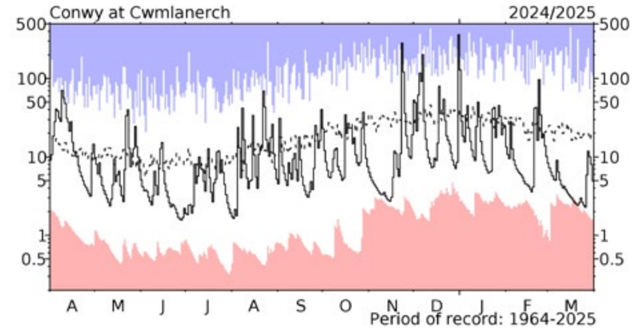
River flow hydrographs

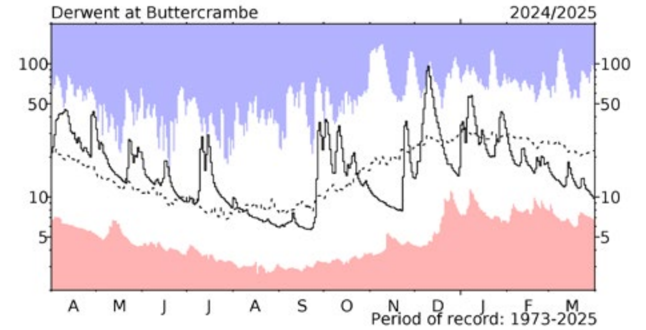
*The river flow hydrographs show the daily mean flows (measured in m^3s^{-1}) together with the maximum and minimum daily flows prior to January 2024 shown by the shaded areas). Daily flows falling outside the maximum/minimum range are indicated where the bold trace enters the shaded areas. The dashed line represents the period-of-record average daily flow.

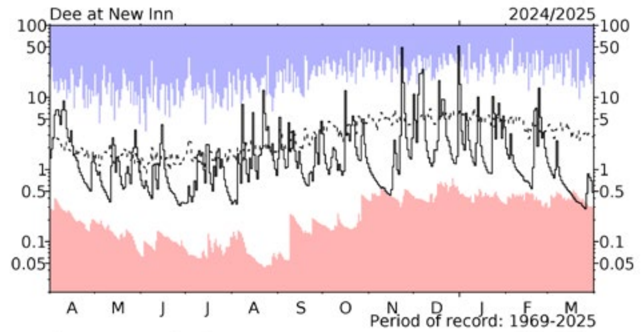
River flow . . . River flow . . .

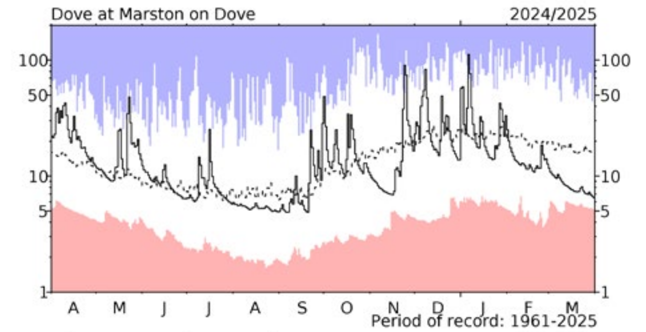


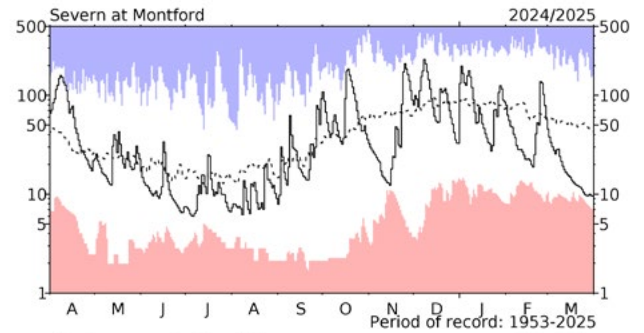


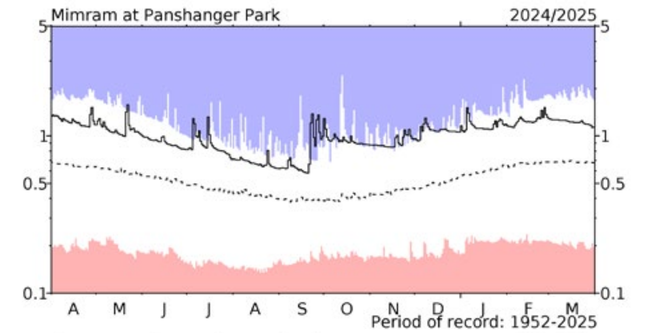


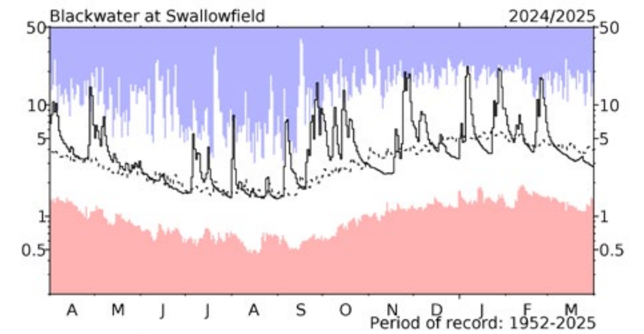


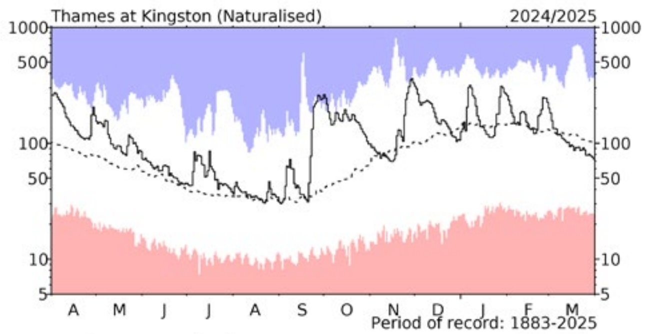


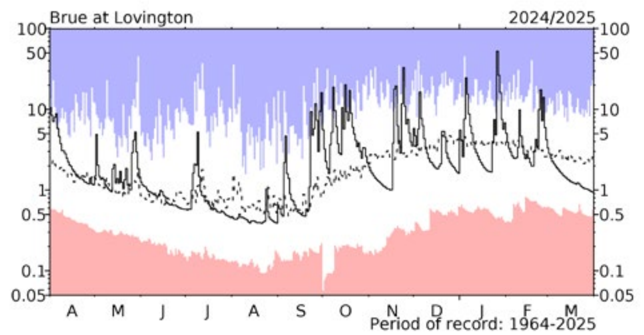


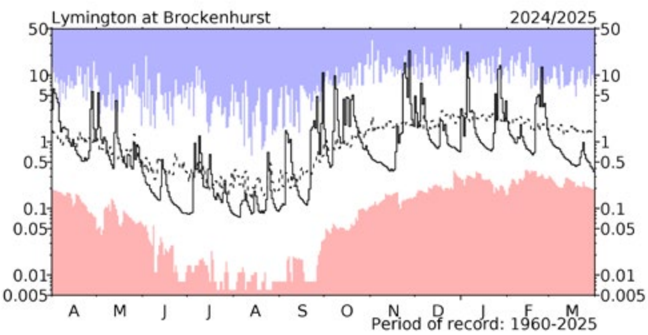




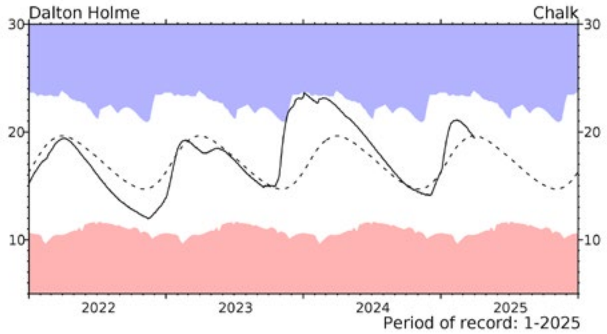


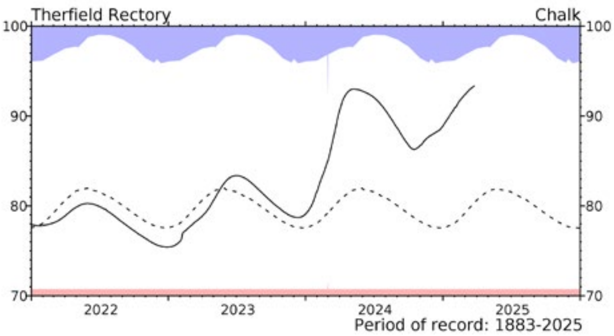


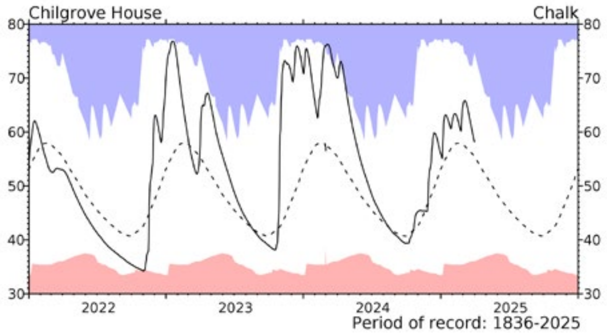


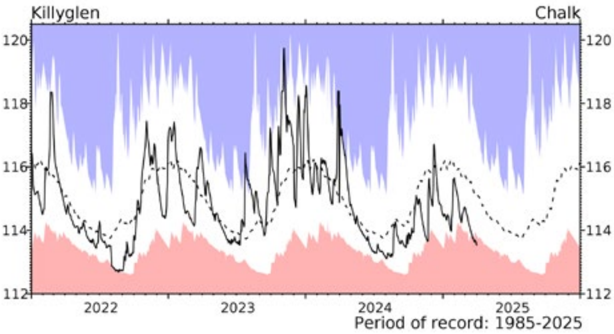


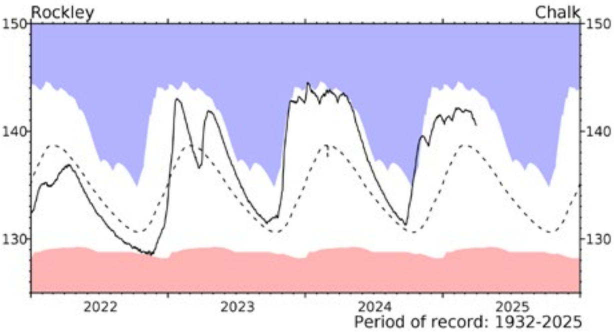
Groundwater . . . Groundwater

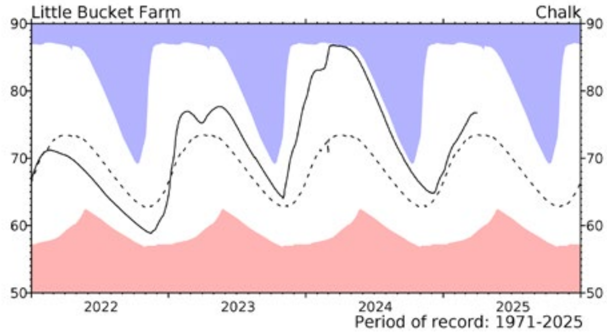


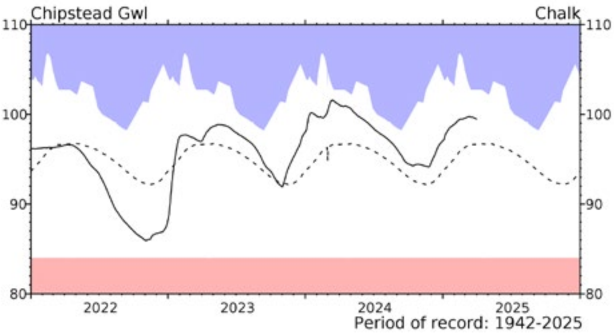


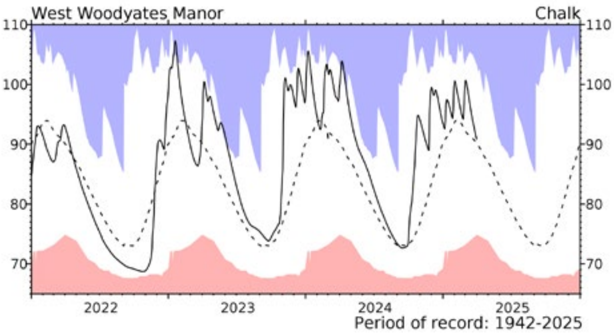


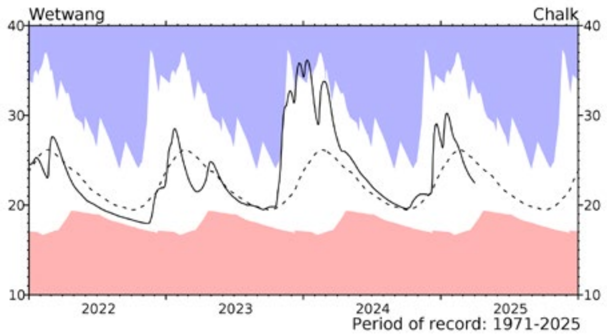


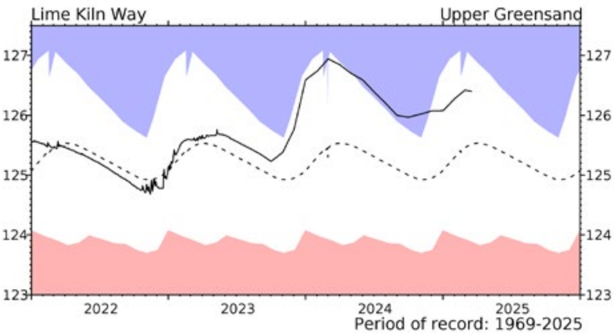




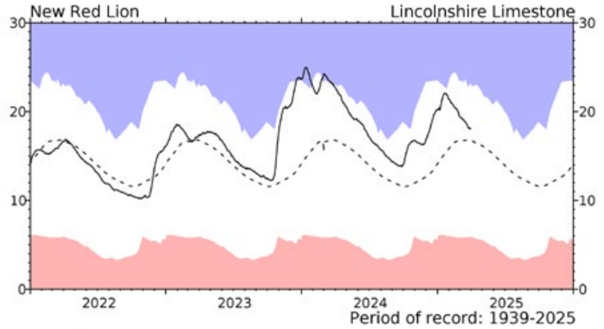


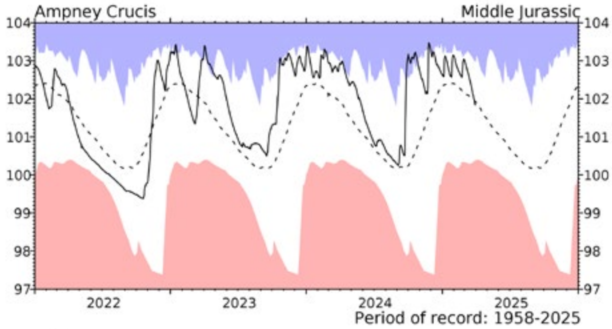


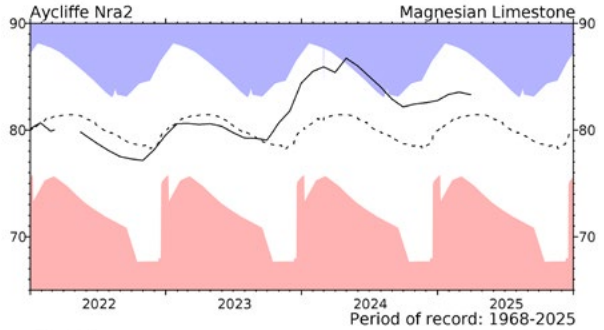


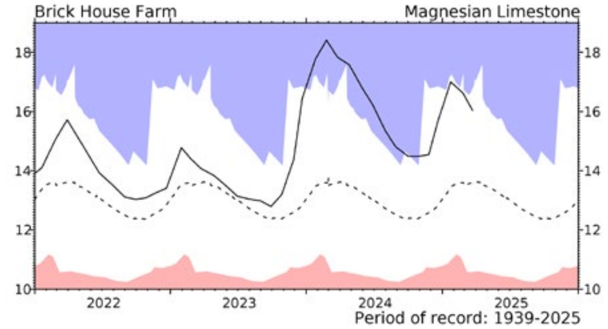


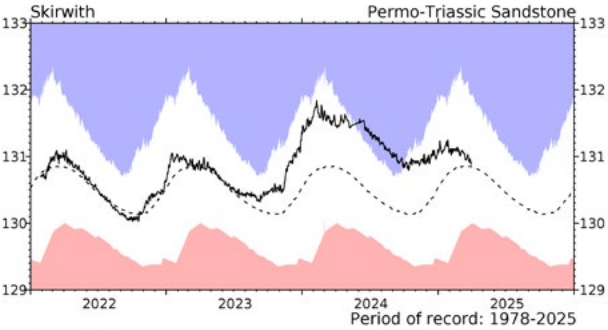
Groundwater levels (measured in metres above ordnance datum) normally rise and fall with the seasons, reaching a peak in the spring following replenishment through the winter (when evaporation losses are low and soil moist). They decline through the summer and early autumn. This seasonal variation is much reduced when the aquifer is confined below overlying impermeable strata. The monthly mean and the highest and lowest levels recorded for each month are calculated with data from the start of the record to the end of 2021. Note that most groundwater levels are not measured continuously and, for some index wells, the greater frequency of contemporary measurements may, in itself, contribute to an increased range of variation.

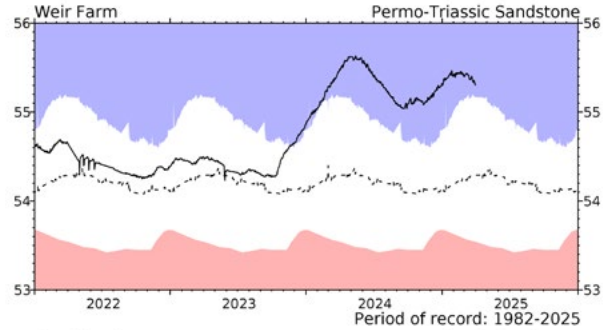

New Red Lion
Lincolnshire Limestone
Period of record: 1939-2025

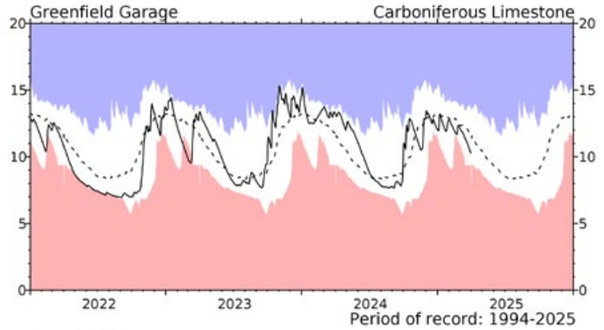

Ampney Crucis
Middle Jurassic
Period of record: 1958-2025

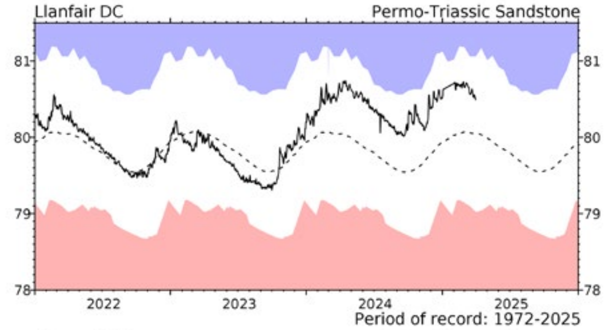

Aycliffe Nra2
Magnesian Limestone
Period of record: 1968-2025

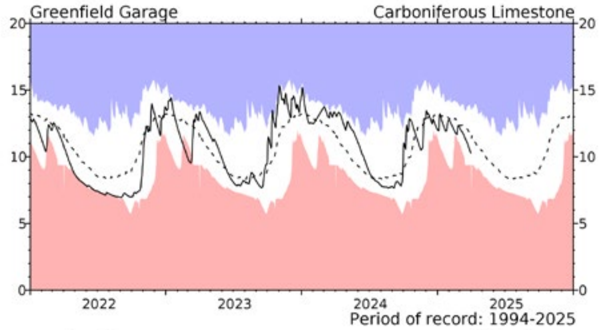

Brick House Farm
Magnesian Limestone
Period of record: 1939-2025

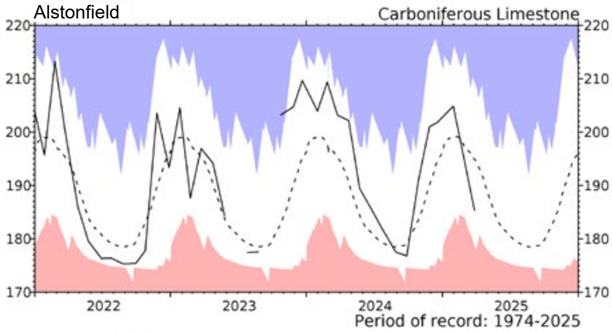

Skirwith
Permo-Triassic Sandstone
Period of record: 1978-2025

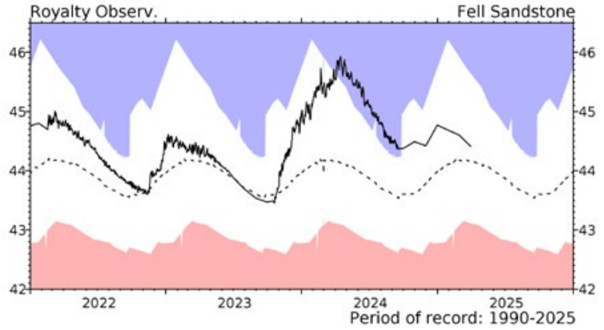

Weir Farm
Permo-Triassic Sandstone
Period of record: 1982-2025

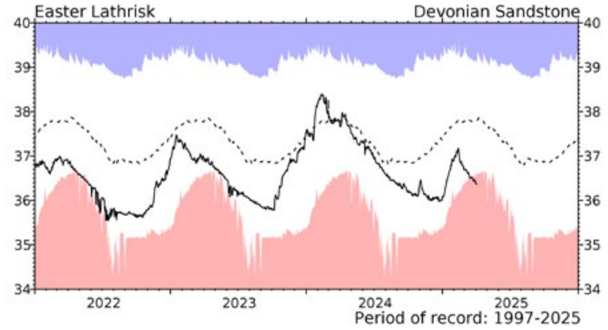

Greenfield Garage
Carboniferous Limestone
Period of record: 1994-2025

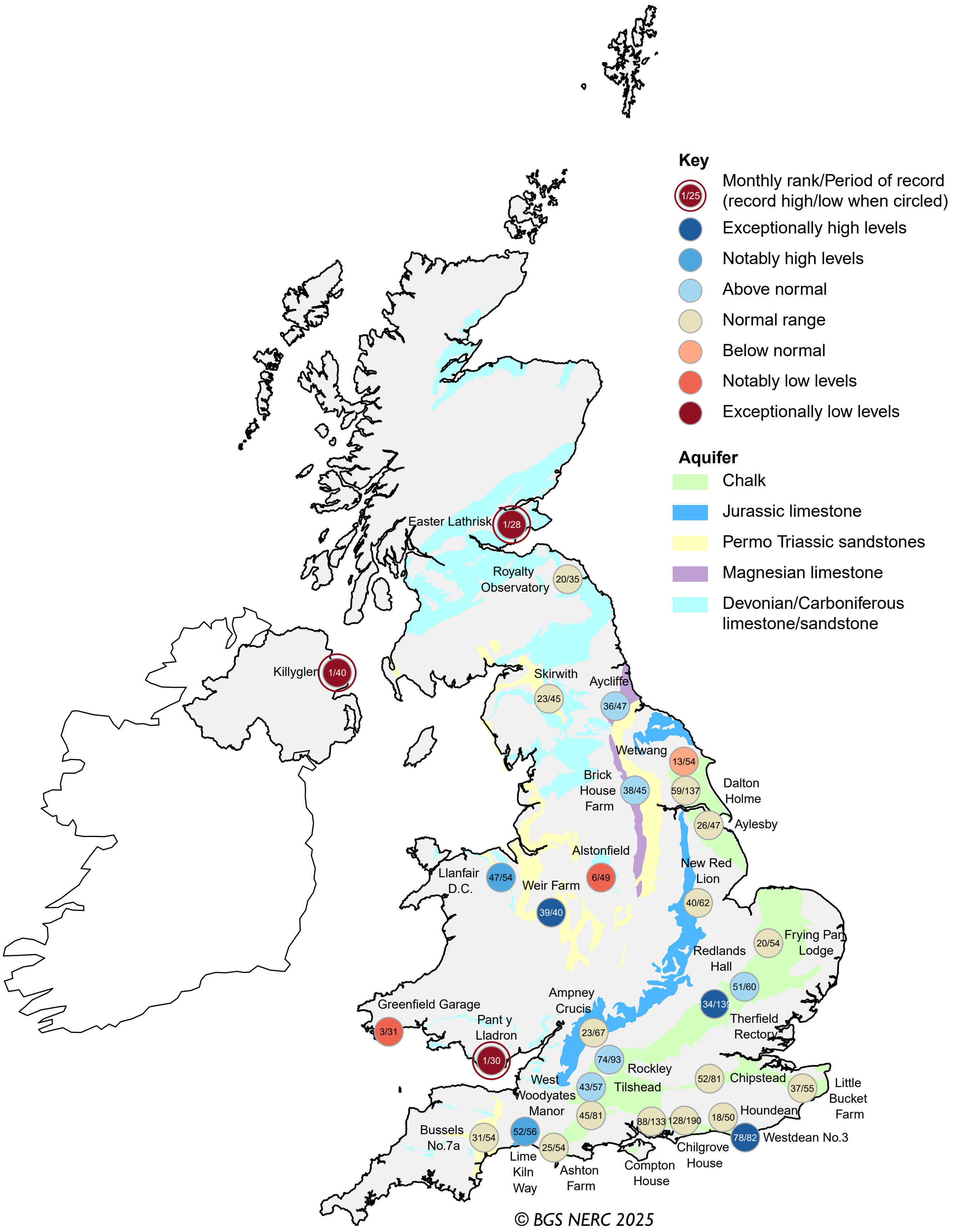

Llanfair DC
Permo-Triassic Sandstone
Period of record: 1972-2025


Greenfield Garage
Carboniferous Limestone
Period of record: 1994-2025


Alstonfield
Carboniferous Limestone
Period of record: 1974-2025


Royalty Observ.
Fell Sandstone
Period of record: 1990-2025


Easter Lathrisk
Devonian Sandstone
Period of record: 1997-2025

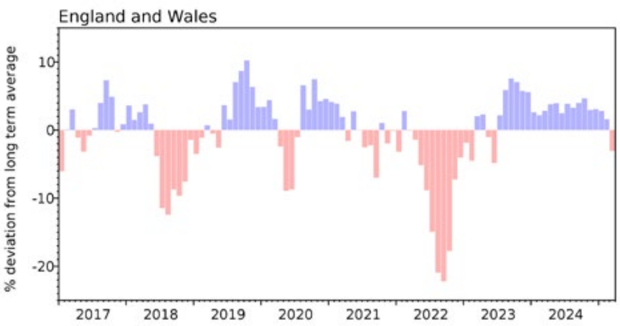


Groundwater levels - March 2025

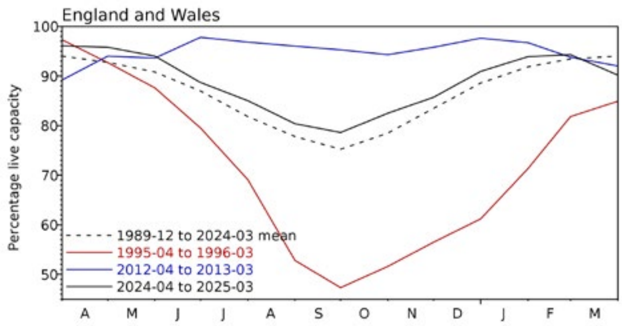
The calculation of ranking has been modified from that used in summaries published prior to October 2012. It is now based on a comparison between the most recent level and levels for the same date during previous years of record. Where appropriate, levels for earlier years may have been interpolated. The rankings are designed as a qualitative indicator, and ranks at extreme levels, and when levels are changing rapidly, need to be interpreted with caution.

Reservoirs . . . Reservoirs . . .

Guide to the variation in overall reservoir stocks for England and Wales



Comparison between overall reservoir stocks for England and Wales in recent years



Percentage live capacity of selected reservoirs at end of month

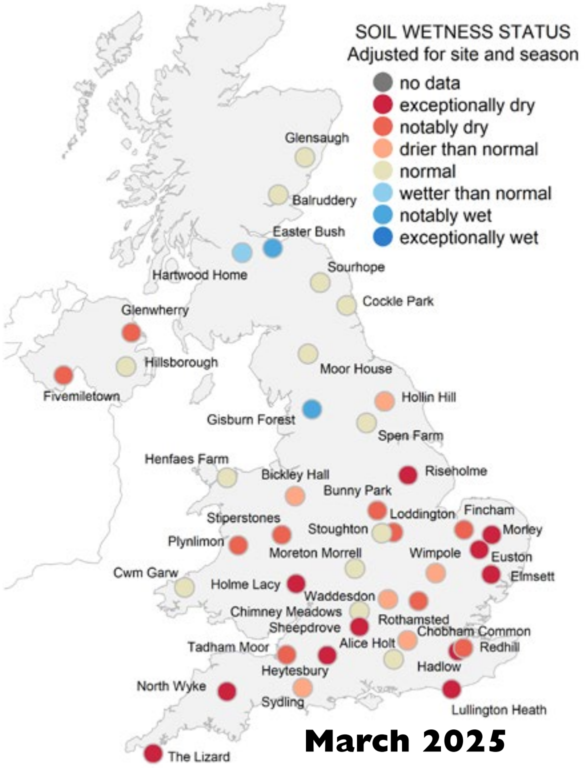
Area	Reservoir		Capacity (Ml)	2025 Jan	2025 Feb	2025 Mar	Mar Anom.	Min Mar	Year* of min	2024 Mar	Diff 25-24
North West	N Command Zone	•	124929	88	93	80	-12	77	1993	98	-18
	Vyrnwy		55146	97	100	96	0	64	1996	100	-4
Northumbrian	Teesdale	•	87936	98	96	87	-6	77	2003	99	-12
	Kielder		(199175)	88	89	87	-5	81	1993	95	-8
Severn-Trent	Clywedog		49936	93	95	93	-3	86	1996	98	-4
	Derwent Valley	•	46692	99	94	86	-10	54	1996	99	-14
Yorkshire	Washburn	•	23373	97	95	87	-6	70	1996	97	-10
	Bradford Supply	•	40942	100	98	86	-8	59	1996	100	-14
Anglian	Grafham		(55490)	94	95	95	4	77	1997	85	11
	Rutland		(116580)	100	93	95	4	73	2012	93	2
Thames	London	•	202828	95	94	94	0	88	1990	96	-2
	Farmoor	•	13822	92	88	99	5	80	2013	88	12
Southern	Bewl		31000	88	91	94	3	49	2012	100	-6
	Ardingly		4685	100	100	100	2	51	2012	100	0
Wessex	Clatworthy		5662	100	100	93	-5	82	1992	100	-7
	Bristol	•	(38666)	99	100	97	2	71	1992	97	0
South West	Colliford		28540	85	89	87	-1	58	1997	98	-11
	Roadford		34500	100	100	97	11	37	1996	100	-3
	Wimbleball		21320	96	100	97	0	78	1996	100	-3
	Stithians		4967	91	100	98	3	52	1992	100	-2
Welsh	Celyn & Brenig	•	131155	84	87	86	-11	72	1996	88	-2
	Brianne		62140	100	100	95	-3	90	1993	100	-5
	Big Five	•	69762	98	100	94	-2	78	1993	100	-6
	Elan Valley	•	99106	100	100	92	-5	89	1993	100	-8
Scotland(E)	Edinburgh/Mid-Lothian	•	97223	93	95	91	-5	71	1998	99	-8
	East Lothian	•	9317	100	100	95	-4	95	2025	100	-5
Scotland(W)	Loch Katrine	•	110326	100	100	91	-3	74	2010	100	-9
	Daer		22494	92	92	86	-10	77	2013	88	-2
	Loch Thom		10721	100	100	93	-4	83	2020	100	-7
Northern Ireland	Total+	•	56800	92	93	87	-5	83	2002	98	-11
	Silent Valley	•	20634	95	99	91	1	57	2000	100	-10

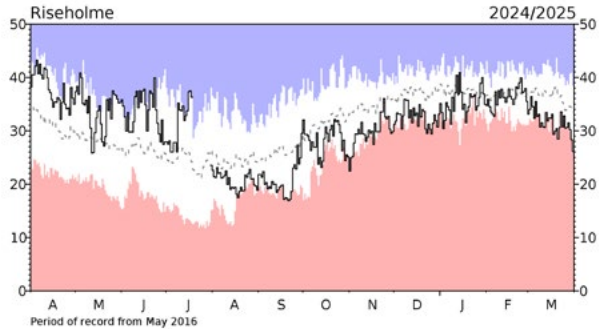
( ) figures in parentheses relate to gross storage   • denotes reservoir groups   *last occurrence

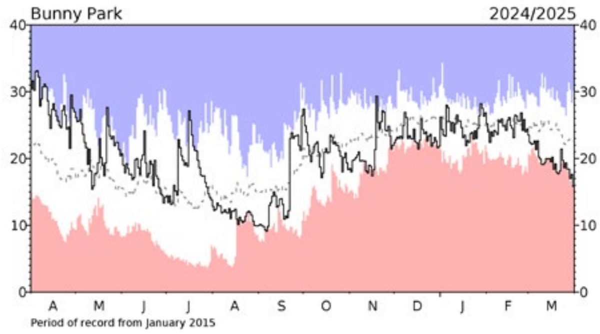
+ excludes Lough Neagh

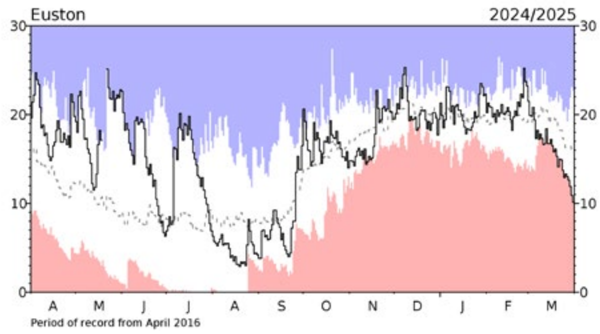
Details of the individual reservoirs in each of the groupings listed above are available on request. The percentages given in the Average and Minimum storage columns relate to the 1988-2012 period except for West of Scotland and Northern Ireland where data commence in the mid-1990s. In some gravity-fed reservoirs (e.g. Clywedog) stocks are kept below capacity during the winter to provide scope for flood attenuation purposes. Monthly figures may be artificially low due to routine maintenance or turbidity effects in feeder rivers.

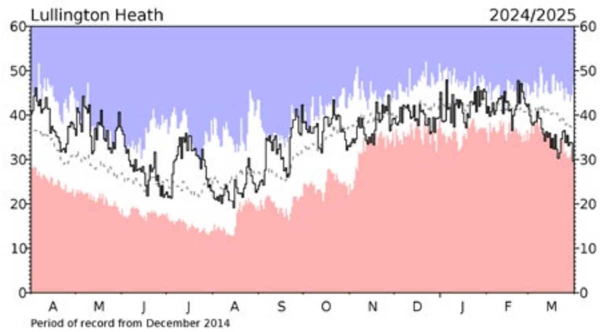
Soil Moisture . . . Soil Moisture

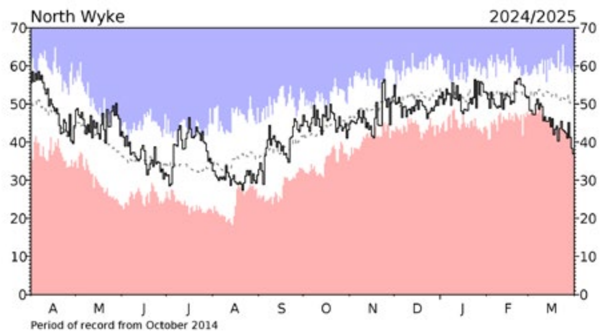












Soil moisture conditions across much of the COSMOS-UK network were noticeably drier than the previous month. Although some sites remained within their normal range, there was a notable drying trend through the month at most sites (e.g. Chimney Meadows, Fincham, Fivemiletown). Nine sites, predominantly across central and southern England, recorded their lowest average March soil moisture on record: Bunny Park, Elmsett, Euston, Glenwherry, Heytesbury, Holme Lacy, Lullington Heath, North Wyke, and Riseholme. A few sites, such as those in southern Scotland (e.g. Easter Bush, Hartwood Home), maintained higher soil moisture levels due to some localised rainfall events.

Overall, soil moisture levels dropped from the previous month to within the normal to dry range at most COSMOS-UK sites, in line with the warmer, drier weather conditions. March has been a turning point in the retention of winter soil moisture.

Soil moisture data

These data are from UKCEH's COSMOS-UK network. The time series graphs show volumetric water content as a percentage in black together with the maximum and minimum daily values for the period-of-record of the sites. The dashed line represents the period-of-record mean VWC. For more information visit cosmos.ceh.ac.uk.

NHMP

The National Hydrological Monitoring Programme (NHMP) was started in 1988 and is undertaken jointly by the UK Centre for Ecology & Hydrology (UKCEH) and the British Geological Survey (BGS). The NHMP aims to provide an authoritative voice on hydrological conditions throughout the UK, to place them in a historical context and, over time, identify and interpret any emerging hydrological trends. Hydrological analysis and interpretation within the Programme is based on the data holdings of the National River Flow Archive (NRFA; maintained by UKCEH) and National Groundwater Level Archive (NGLA; maintained by BGS), including rainfall, river flows, borehole levels, and reservoir stocks.

The Hydrological Summary is supported by the Natural Environment Research Council award number NE/Y006208/1 as part of the NC-UK programme delivering National Capability.

Data Sources

The NHMP depends on the active cooperation of many data suppliers. This cooperation is gratefully acknowledged. A location map of all sites used in the Hydrological Summary can be found on the NHMP website. River flow and groundwater level data are provided by the Environment Agency (EA), Natural Resources Wales - Cyfoeth Naturiol Cymru (NRW), the Scottish Environment Protection Agency (SEPA) and, for Northern Ireland, the Department for Infrastructure - Rivers and the Northern Ireland Environment Agency. In all cases the data are subject to revision following validation (high flow and low flow data in particular may be subject to significant revision).

Details of reservoir stocks are provided by the Water Service Companies, the EA, Scottish Water and Northern Ireland Water.

The Hydrological Summary and other NHMP outputs may also refer to and/or map soil moisture data for the UK. These data are provided by the Meteorological Office Rainfall and Evaporation Calculation System (MORECS). MORECS provides estimates of monthly soil moisture deficit in the form of averages over 40 x 40 km grid squares over Great Britain and Northern Ireland. The monthly time series of data extends back to 1961.

Rainfall data are provided by the Met Office. To allow better spatial differentiation the rainfall data for Britain are presented for the regional divisions of the precursor organisations of the EA, NRW and SEPA. The areal rainfall figures have been produced by the Met Office National Climate Information Centre (NCIC), and are based on the HadUK-Grid 1km resolution gridded data from rain gauges. The majority of the full rain gauge network across the UK is operated by the EA, NRW, SEPA and Northern Ireland Water; supplementary rain gauges are operated by the Met Office. The Met Office NCIC monthly rainfall series extend back to 1836 and form the official source of UK areal rainfall statistics which have been adopted by the NHMP. The gridding technique used is described in Hollis, 2019 available at https://doi.org/10.1002/gdj3.78

Long-term averages are based on the period 1991-2020 and are derived from the monthly areal series.

The regional figures for the current month in the hydrological summaries are based on a limited rain gauge network so these (and the associated return periods) should be regarded as a guide only.

The monthly rainfall figures are provided by the Met Office NCIC and are Crown Copyright and may not be passed on to, or published by, any unauthorised person or organisation. These are provisional totals calculated from a sub set of Met Office registered gauges and will be subject to change once data from the complete network of Met Office registered gauges has been quality assured and gridded within the annual process of updating the HadUK-Grid dataset.

For further details on rainfall or MORECS data, please contact the Met Office:

Tel: 0370 900 0100
Email: enquiries@metoffice.gov.uk

Enquiries

Enquiries should be directed to the NHMP:

Tel: 01491 692599
Email: nhmp@ceh.ac.uk

A full catalogue of past Hydrological Summaries can be accessed and downloaded at:

http://nrfa.ceh.ac.uk/monthly-hydrological-summary-uk