Hydrological Summary

for the United Kingdom

General

February provided some respite to the recent wet weather, with settled dry conditions dominating the month. All regions received below average rainfall except for those in southern England. Correspondingly, river flows were generally in the normal range to exceptionally low. Although soils dried slightly in February, they were still wetter than average in most regions. Groundwater levels were generally in the normal range to above normal, with exceptionally high levels across multiple aquifers in England and Wales. Reservoir stocks for England & Wales were 94% of capacity. Stocks at the majority of reservoirs rose relative to average (most only marginally), with substantial rises at Roadford (by 19%) and Silent Valley (14%). High pressure persisted for much of early March. There is a higher likelihood of below normal flows across north-east Britain over the next three months. In regions where winter rainfall was below average, the continuation of dry conditions may start to cause some concern for spring water resources.

February 2025

Rainfall

A slow-moving cold front brought heavy rain on the 4th which caused surface water flooding and travel disruption around Glasgow. Thereafter a blocking high to the east of the UK led to cold but settled conditions. Despite this, occasional frontal incursions brought rainfall, which was wintry over high ground (e.g. 4cm at Fettercairn, Kincardineshire, on the 18th). The dry weather raised the wildfire risk and fires broke out in Wales on the 18/19th (e.g. at Cwn Mountain near Llandudno, Conwy). By the 19th, the high-pressure system started to weaken. Frontal systems brought heavy rainfall to the UK – in particular to western areas (e.g. on the 19th in Cumbria and the 21st in Northern Ireland in combination with strong winds which led to 1,500 customers losing power). The 23rd was the wettest and windiest day of the year so far (e.g. 111mm at White Barrow, Devon) and strong winds closed the M48 Severn Crossing and diverted planes at Edinburgh and Dublin airports. High pressure returned from the 26th to month-end. Despite some notable totals, total UK February rainfall was 76% of average. Northern England was especially dry (although with no notable rankings), with less than 60% of average recorded in Northumbrian, North West England and Yorkshire regions, and less than 70% of average in Highland, North East Scotland, Tweed and Severn Trent regions. Only Thames and Wessex regions registered above average February rainfall. Winter (December-February) rainfall was 90% of average at the national scale, with some areas of southern Scotland, Northern Ireland and northern England recording less than 70% of average with deficits in these areas extending back at least 12 months. In contrast, the Thames and Wessex regions received almost 125% of average rainfall over the last year.

River Flows

Following high flows at the end of January, recessions rapidly established across the UK in February. In north-east and south-east England, a peak in response to rainfall in the first week interrupted recessions, but in most catchments, recessions continued right through to the last week of February. New daily flow minima were established on the Bervie and Inver between the 13th and 20th. Catchments in south-west Scotland and Northern Ireland (21st), south Wales and south-west England (23rd), and southern England (24th) recorded new daily flow maxima. Responses to rainfall during this period were also evident in more slowly responding groundwater-dominated catchments in East Anglia. Following peaks, recessions recommenced to month-end, with many catchments ending February with flows at or below average. February monthly mean flows were generally in the normal range with exceptionally low to below normal flows across northern areas. Flows in the far north of Scotland were around a third of average, with exceptionally low flows on the Inver, Helmsdale and Oykel all the second lowest February mean flows in records of at least 47 years. Below normal and notably low flows in northern England were less than half the average, with the fifth lowest February flows in the long record on English Tyne (from 1957). In contrast, flows in southern England were above average, with above normal and notably high flows in some catchments. Over the winter, low flows were less prevalent and extreme, with below normal flows constrained to southern Scotland, Northern Ireland (including notably low flows on the Annacloy) and northern England, whilst above normal and notably high flows were recorded in more catchments across central and southern England.

Soil Moisture and Groundwater

Despite the drier conditions, soils at COSMOS-UK sites were generally wetter than normal to notably wet in February, with soil wetness in the west in the normal range and drier than normal at Glenwherry and The Lizard. Groundwater levels in the Chalk varied spatially during February, although generally remained in the normal range to above normal. In the south and south-west, levels fluctuated or remained steady, while in the south-east, levels continued to rise, with those in Essex reaching notably high conditions. In Yorkshire, levels steadily decreased from above normal to the normal range. At Killyglen, levels receded following a late January recharge event, transitioning from the normal range to below normal. In the Jurassic Limestones at Ampney Crucis, levels fluctuated although decreased overall, while at New Red Lion, they steadily decreased. Both sites shifted to lower categories but remained above normal for February. Levels in the Magnesian Limestone were steady or slightly decreased although remained above normal. In the Carboniferous Limestone, levels typically rose, transitioning from below normal to the normal range at Pant y Lladron following rainfall in late February. Levels in the Permo-Triassic Sandstones were generally steady, with conditions remaining above normal to exceptionally high. At Weir Farm, levels remained exceptionally high, reaching a new February maximum level. In the Upper Greensand at Lime Kiln Way, levels continued to rise, maintaining exceptionally high conditions. In the Fell Sandstone at Royalty Observatory, levels decreased slightly but remained within normal range. At Easter Lathrisk in the Devonian Sandstone, levels fell to notably low, following the drier than average conditions.

Rainfall . . . Rainfall . . .

Met Office

Rainfall accumulations and return period estimates

Percentages are from the 1991-2020 average.

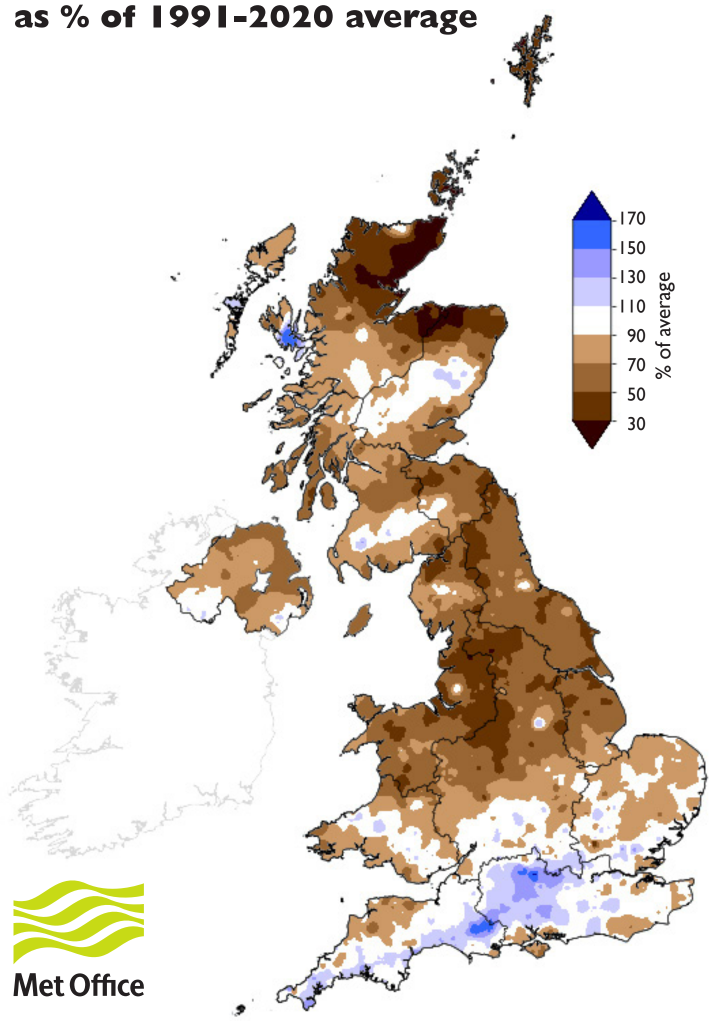
Region	Rainfall	Feb 2025	Dec24 – Feb25		Sep24 – Feb25		Jun24 – Feb25		Mar24 – Feb25	
				RP		*RP*		*RP*		*RP*
United	mm	**73**	308		609		850		1152	
Kingdom	%	**76**	90	2-5	90	2-5	92	2-5	99	2-5
England	mm	**52**	227		527		687		950	
	%	**79**	95	2-5	108	2-5	99	2-5	110	5-10
Scotland	mm	**103**	425		709		1082		1427	
	%	**73**	86	2-5	75	5-10	86	2-5	91	2-5
Wales	mm	**90**	425		840		1080		1469	
	%	**75**	95	2-5	96	2-5	92	2-5	101	2-5
Northern	mm	**71**	231		470		735		1016	
Ireland	%	**78**	71	5-10	72	15-25	80	10-15	88	2-5
England &	mm	**57**	254		570		740		1021	
Wales	%	**78**	95	2-5	105	2-5	98	2-5	108	5-10
North West	mm	**61**	334		675		979		1367	
	%	**58**	89	2-5	90	2-5	94	2-5	107	5-10
Northumbria	mm	**39**	189		424		607		889	
	%	**54**	77	2-5	85	2-5	84	2-5	98	2-5
Severn-Trent	mm	**39**	213		521		657		908	
	%	**67**	101	2-5	120	5-10	104	2-5	114	5-10
Yorkshire	mm	**37**	226		467		620		875	
	%	**53**	95	2-5	97	2-5	89	2-5	101	2-5
Anglian	mm	**35**	148		357		475		650	
	%	**83**	98	2-5	109	2-5	96	2-5	104	2-5
Thames	mm	**57**	198		519		653		892	
	%	**108**	100	2-5	128	10-15	114	5-10	124	10-20
Southern	mm	**63**	237		560		688		927	
	%	**100**	98	2-5	113	5-10	104	2-5	114	5-10
Wessex	mm	**75**	257		662		812		1110	
	%	**110**	98	2-5	125	8-12	113	5-10	123	15-25
South West	mm	**106**	369		802		995		1364	
	%	**100**	94	2-5	105	2-5	98	2-5	109	5-10
Welsh	mm	**88**	408		824		1053		1435	
	%	**77**	96	2-5	98	2-5	93	2-5	103	2-5
Highland	mm	**119**	581		943		1384		1690	
	%	**67**	96	2-5	83	2-5	93	2-5	91	2-5
North East	mm	**51**	285		498		747		1044	
	%	**65**	102	2-5	83	2-5	88	2-5	98	2-5
Tay	mm	**109**	346		553		835		1188	
	%	**91**	80	2-5	67	10-20	75	10-15	85	2-5
Forth	mm	**77**	273		466		733		1127	
	%	**71**	73	2-5	64	10-20	73	8-12	91	2-5
Tweed	mm	**62**	219		420		663		1036	
	%	**69**	70	2-5	68	10-15	76	5-10	96	2-5
Solway	mm	**113**	362		623		1032		1481	
	%	**84**	75	2-5	66	10-20	82	2-5	94	2-5
Clyde	mm	**127**	462		752		1221		1620	
	%	**74**	77	2-5	65	10-20	80	2-5	86	2-5

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

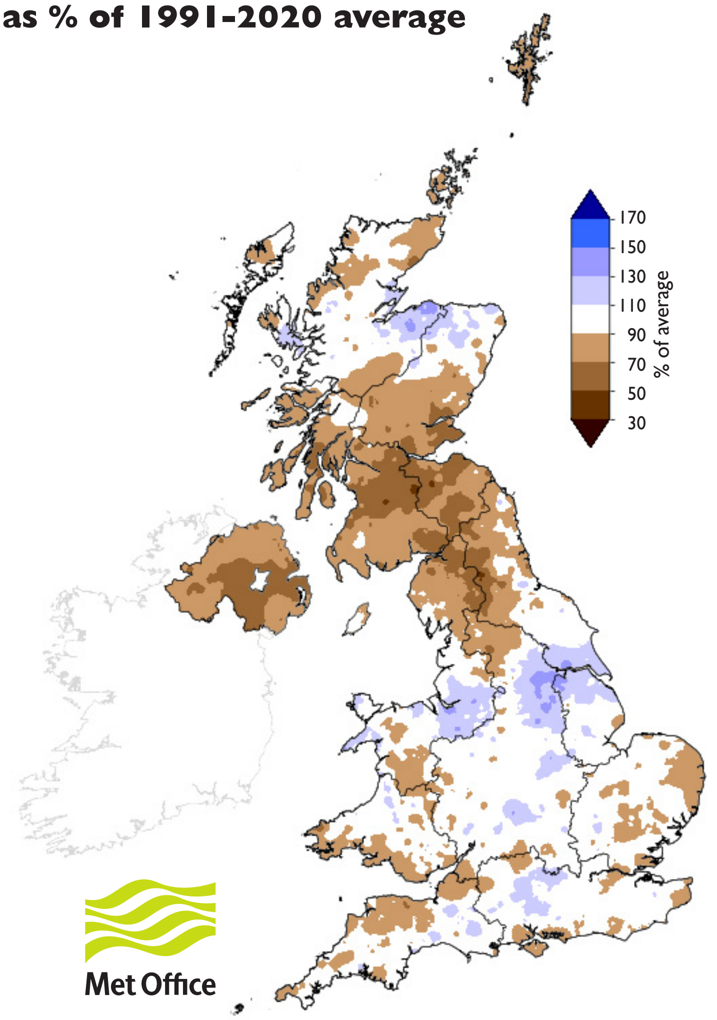
Important note: Figures in the above table may be quoted provided their source is acknowledged. Where appropriate, specific mention must be made of the uncertainties associated with the return period estimates. The RP estimates are based on data provided by the Met Office and reflect climatic variability 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 . . .

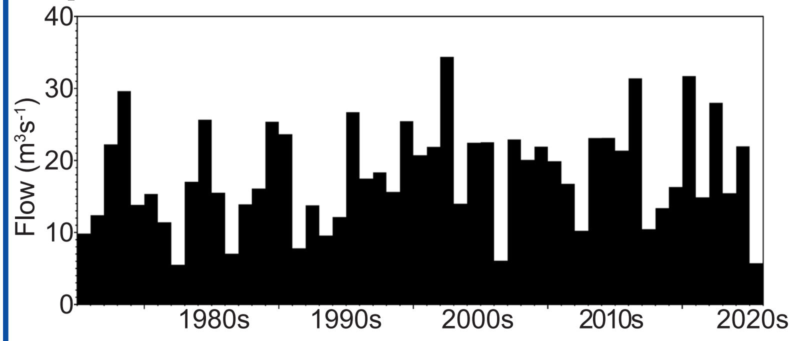
February 2025 rainfall as % of 1991-2020 average



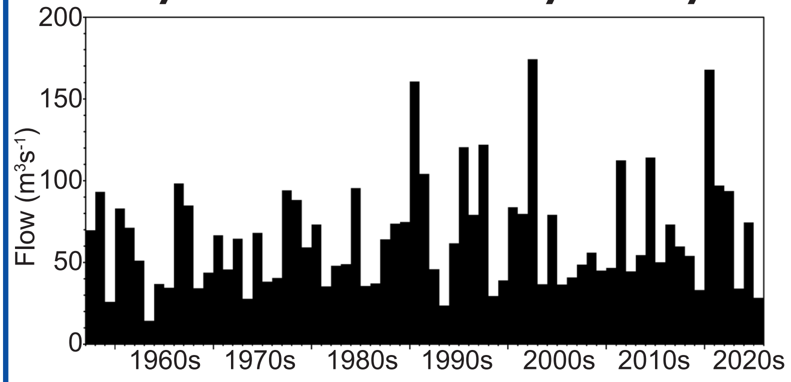
December 2024 - February 2025 rainfall as % of 1991-2020 average



February Mean Flows for the Helmsdale at Kilphedir



February Mean Flows for the Tyne at Bywell



UK Hydrological Outlook

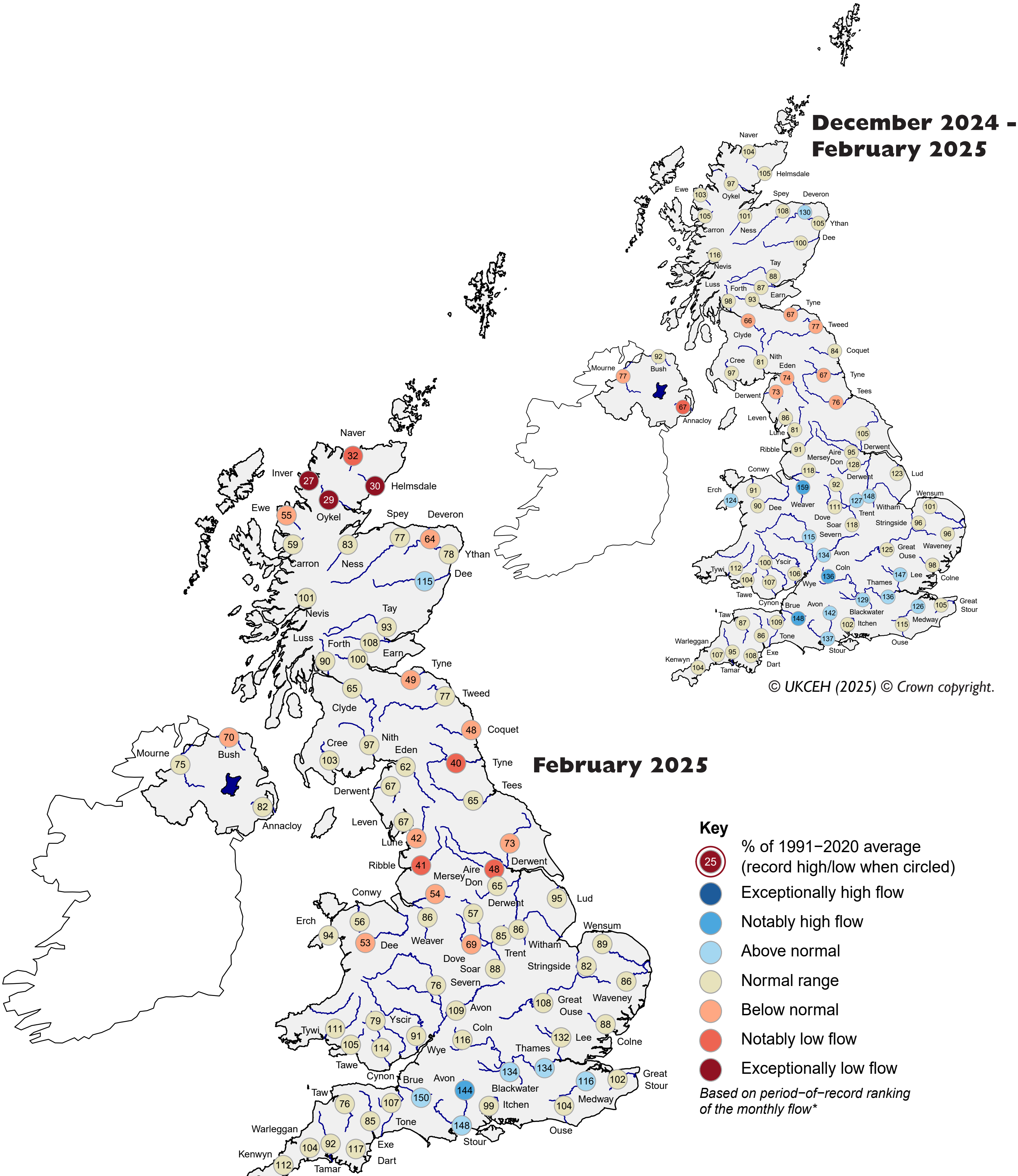
The Hydrological Outlook provides an insight into future hydrological conditions across the UK. Specifically it describes likely trajectories for river flows and groundwater levels on a monthly basis, with particular focus on the next three months.

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

Period: **from March 2025**
Issued: **13.03.2025**
using data to the end of February 2025

The outlook for March is for above normal flows in southeast England, which is likely to persist over the March-May period. In the northwest, normal to above normal flows are likely in March and for March-May. River flows in northeast Britain are likely to be below normal in March and normal to below normal for March-May. Normal to above normal groundwater levels are likely to persist through the March-May period but parts of south Wales and Scotland could see below normal levels in March.

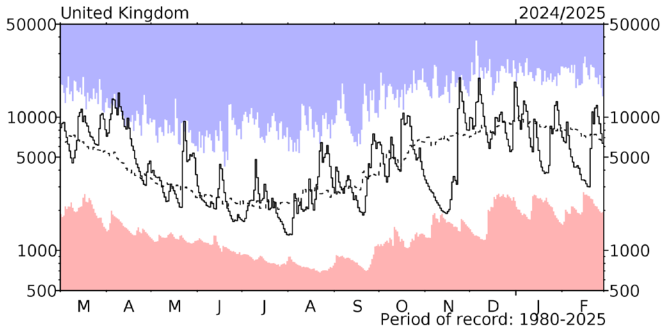
River flow . . . River flow . . .

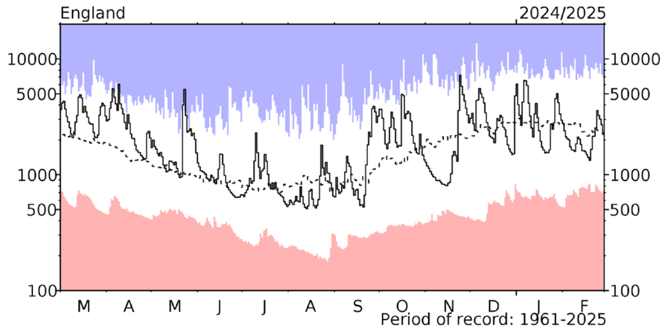


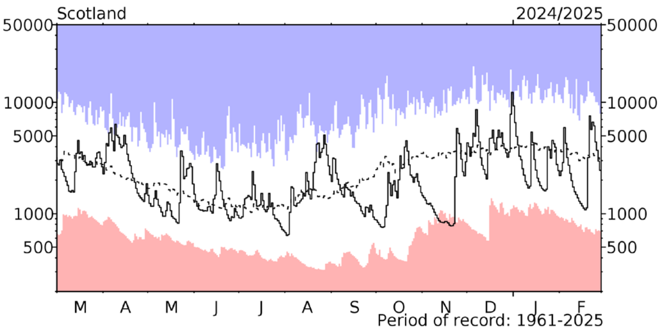
River flows

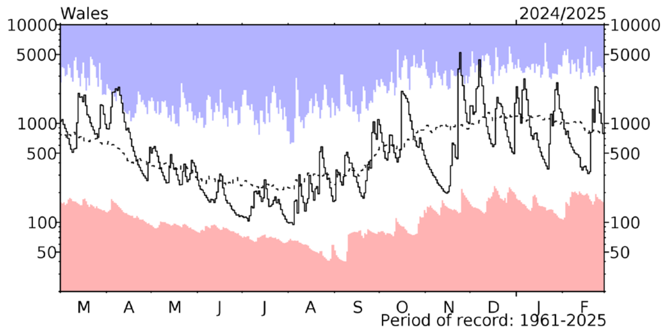
*Comparisons based on percentage flows alone can be misleading. A given percentage flow can represent extreme drought conditions in permeable catchments where flow patterns are relatively stable but be well within the normal range in impermeable catchments where the natural variation in flows is much 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.

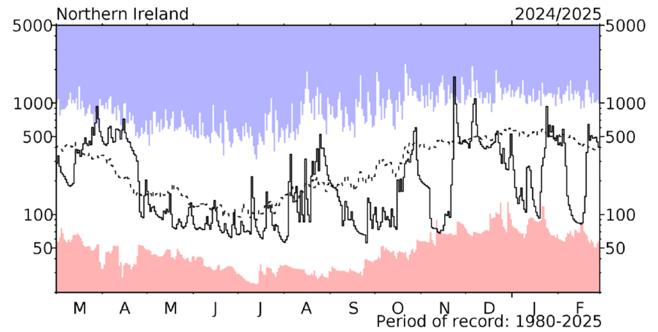
River flow . . . River flow . . .

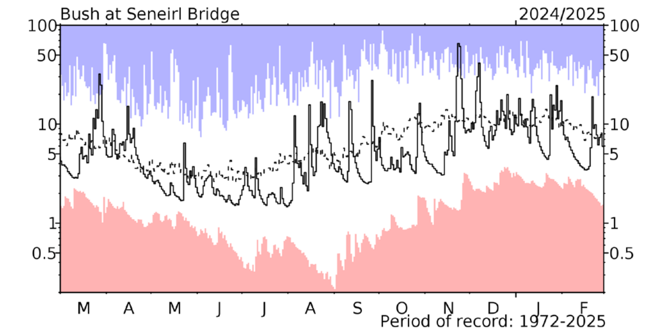


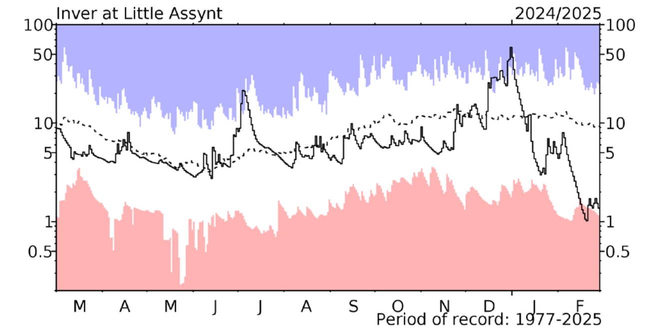


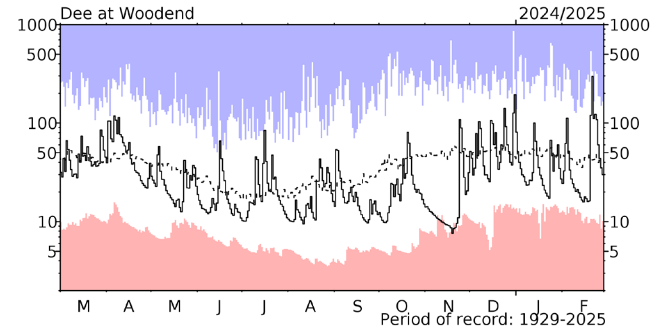


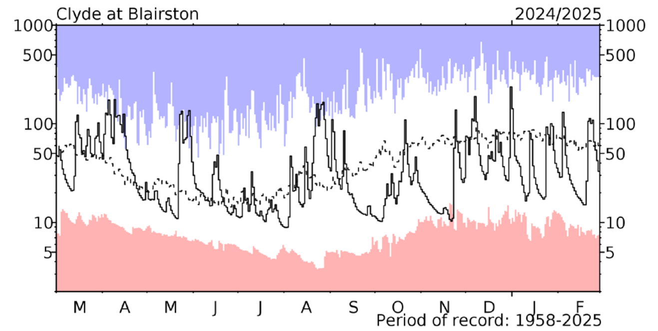


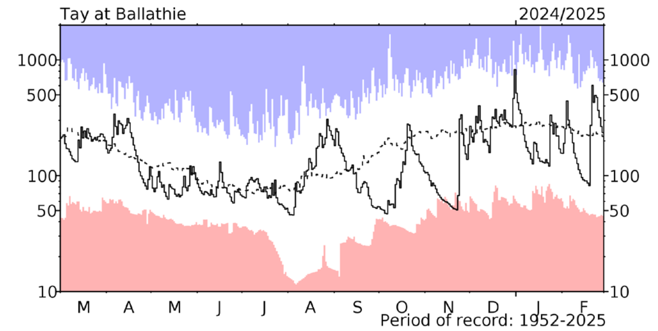






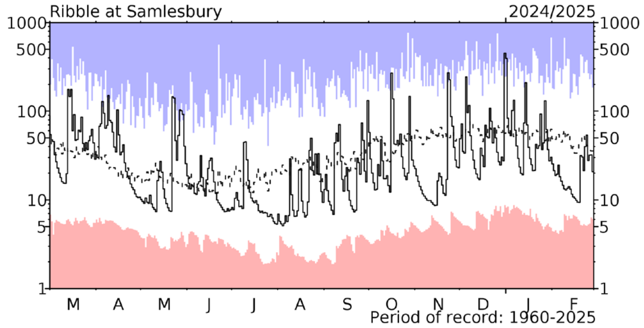


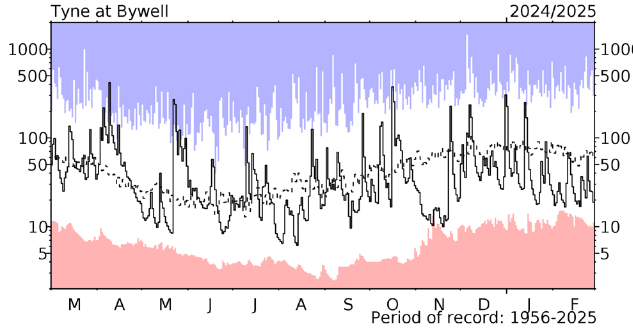


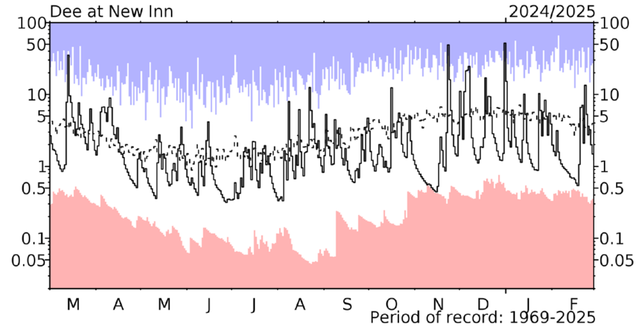


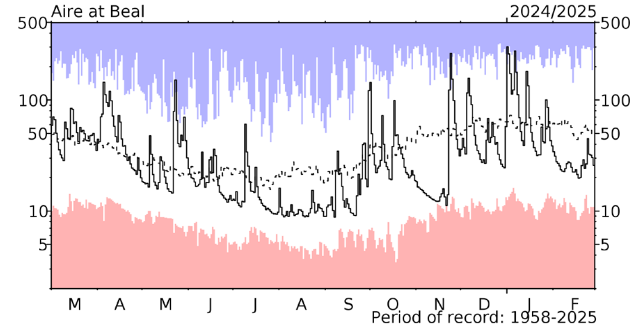
River flow hydrographs

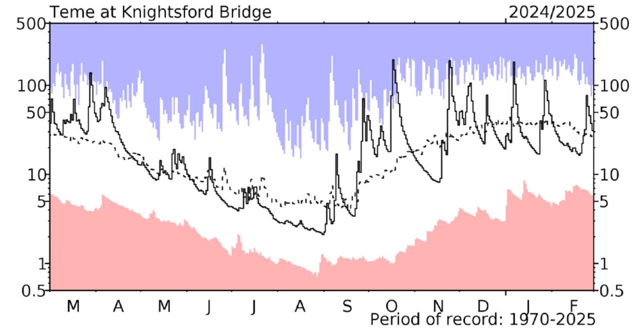
*The river flow hydrographs show the daily mean flows (measured in m^3s^{-1}) together with the maximum and minimum daily flows prior to January 2024 (shown by the shaded areas). Daily flows falling outside the maximum/minimum range are indicated where the bold trace enters the shaded areas. The dashed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

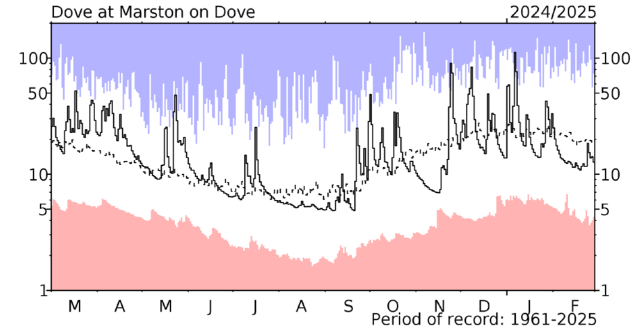

Ribble at Samlesbury
2024/2025
M A M J J A S O N D J F
Period of record: 1960-2025

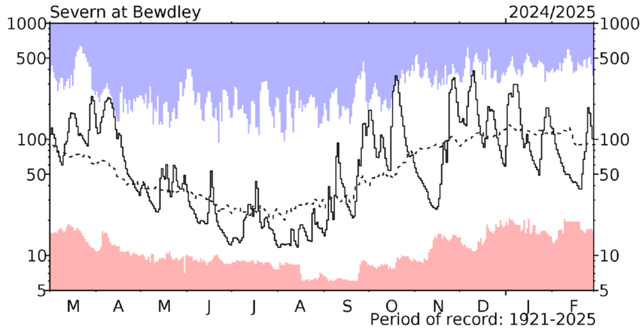

Tyne at Bywell
2024/2025
M A M J J A S O N D J F
Period of record: 1956-2025

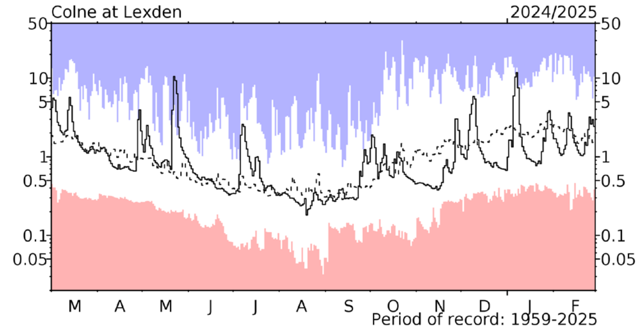

Dee at New Inn
2024/2025
M A M J J A S O N D J F
Period of record: 1969-2025

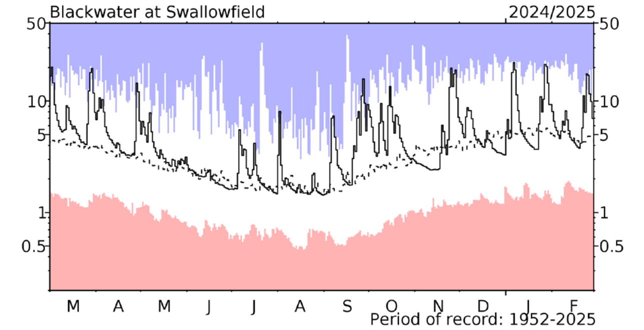

Aire at Beal
2024/2025
M A M J J A S O N D J F
Period of record: 1958-2025

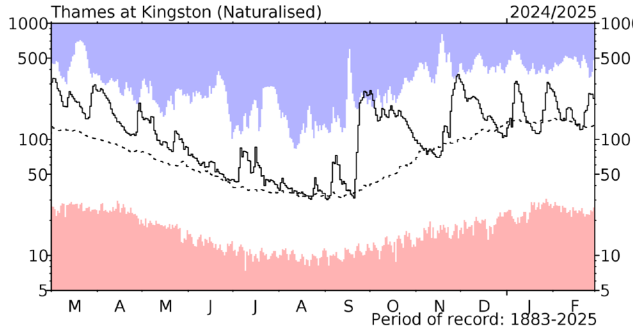

Teme at Knightsford Bridge
2024/2025
M A M J J A S O N D J F
Period of record: 1970-2025

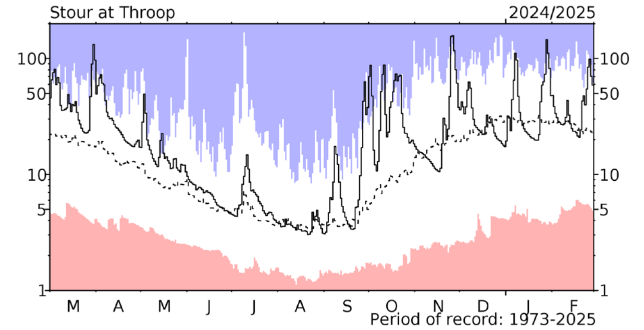

Dove at Marston on Dove
2024/2025
M A M J J A S O N D J F
Period of record: 1961-2025

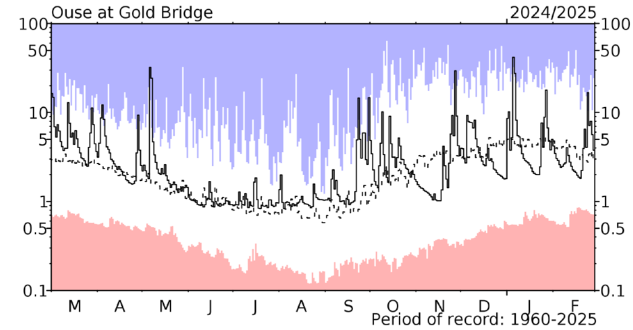

Severn at Bewdley
2024/2025
M A M J J A S O N D J F
Period of record: 1921-2025

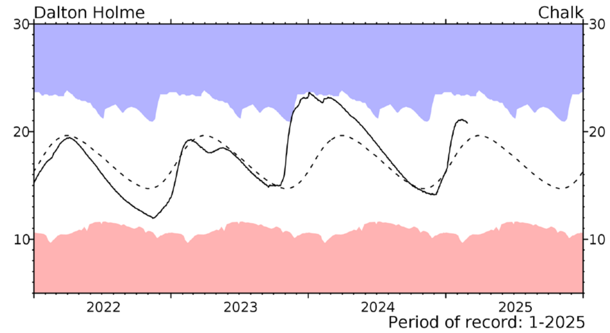

Colne at Lexden
2024/2025
M A M J J A S O N D J F
Period of record: 1959-2025

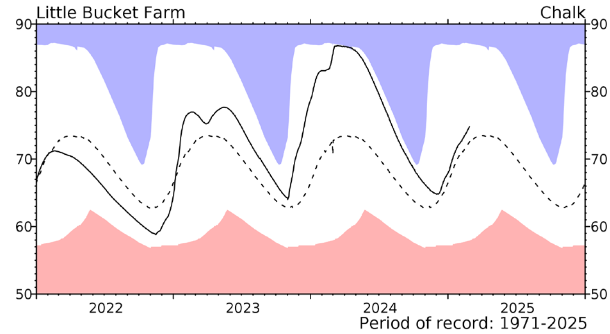

Blackwater at Swallowfield
2024/2025
M A M J J A S O N D J F
Period of record: 1952-2025

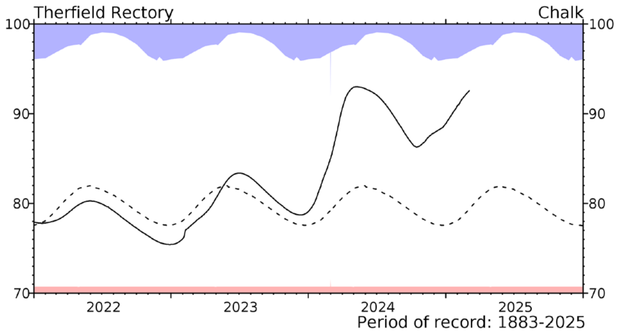

Thames at Kingston (Naturalised)
2024/2025
M A M J J A S O N D J F
Period of record: 1883-2025

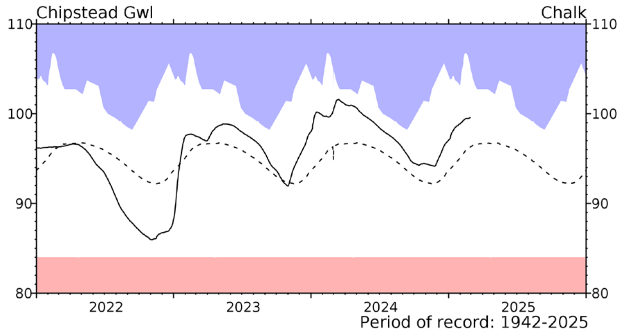

Stour at Throop
2024/2025
M A M J J A S O N D J F
Period of record: 1973-2025

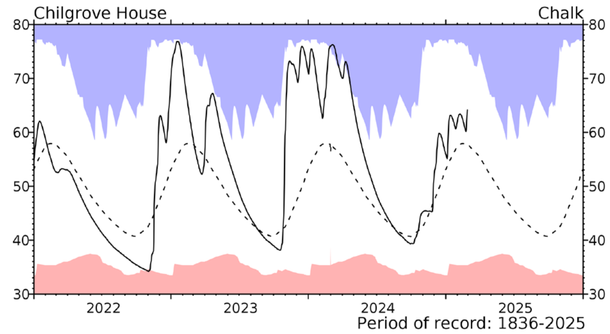

Ouse at Gold Bridge
2024/2025
M A M J J A S O N D J F
Period of record: 1960-2025

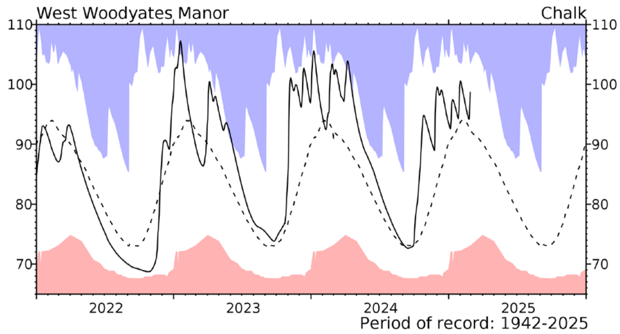


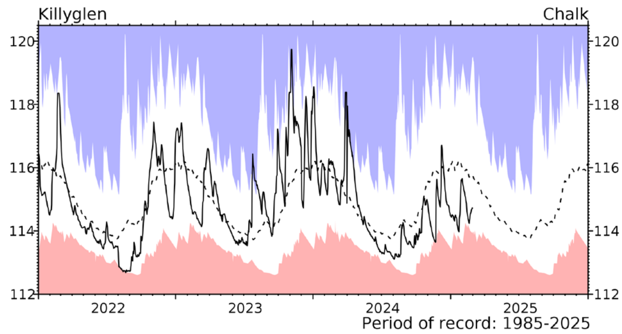


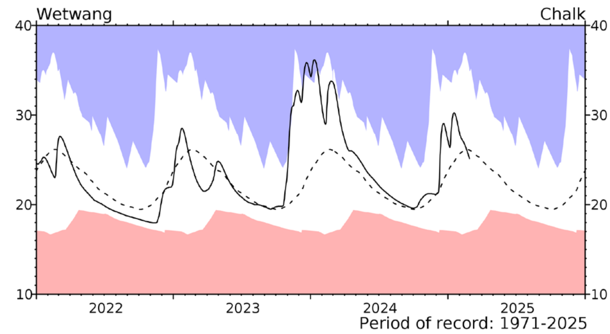


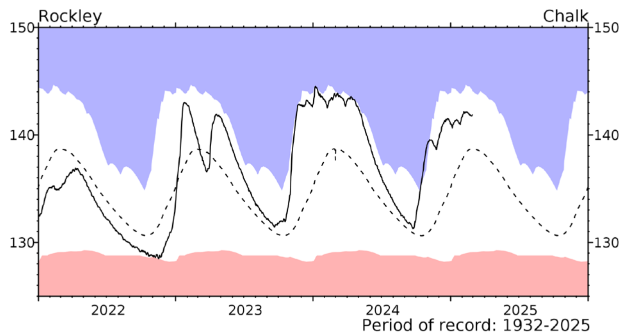


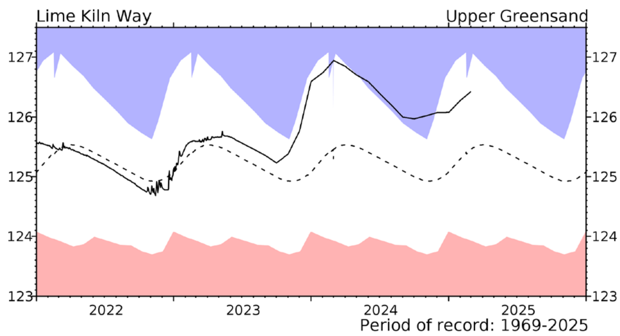




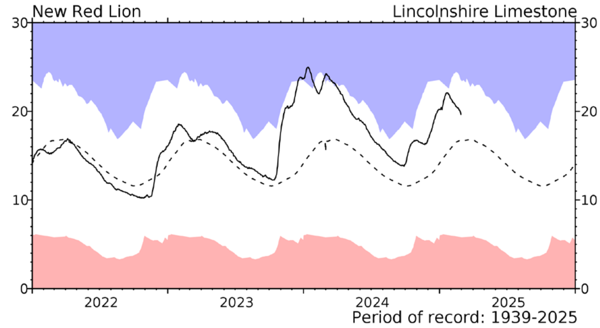


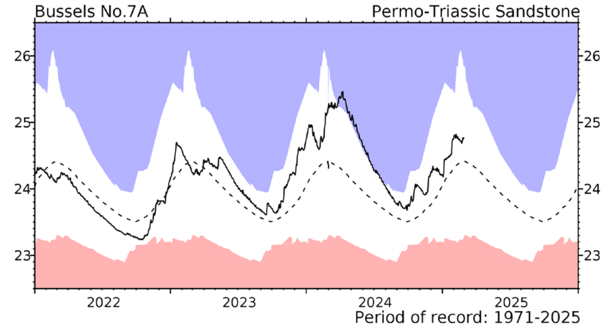


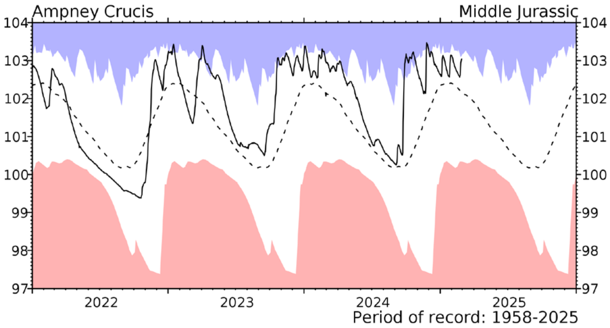


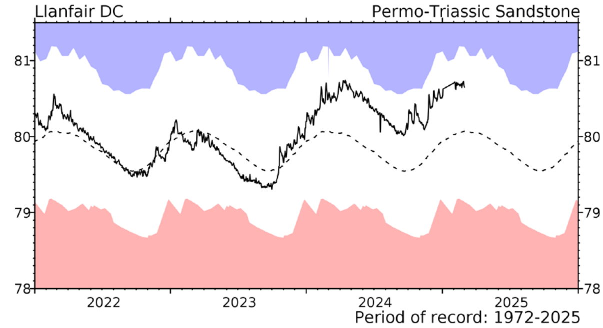


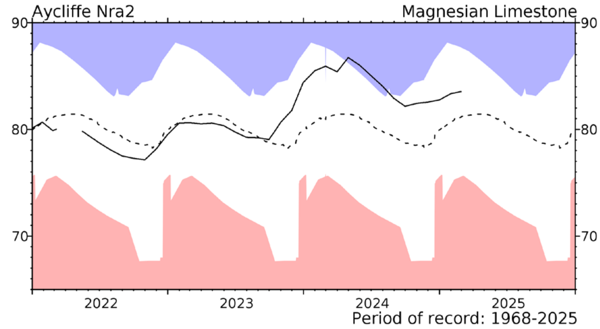
Groundwater levels (measured in metres above ordnance datum) normally rise and fall with the seasons, reaching a peak in the spring following replenishment through the winter (when evaporation losses are low and soil moist). They decline through the summer and early autumn. This seasonal variation is 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.

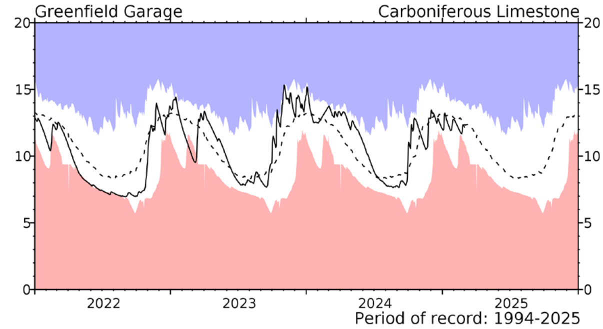

New Red Lion
Lincolnshire Limestone
2022
2023
2024
2025
Period of record: 1939-2025

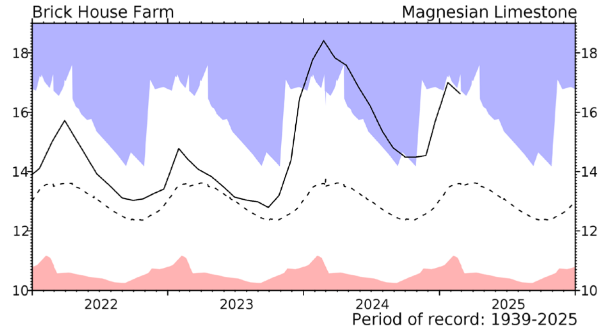

Bussels No.7A
Permo-Triassic Sandstone
2022
2023
2024
2025
Period of record: 1971-2025

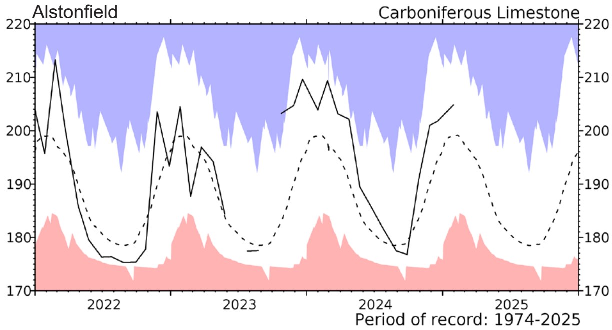

Ampney Crucis
Middle Jurassic
2022
2023
2024
2025
Period of record: 1958-2025

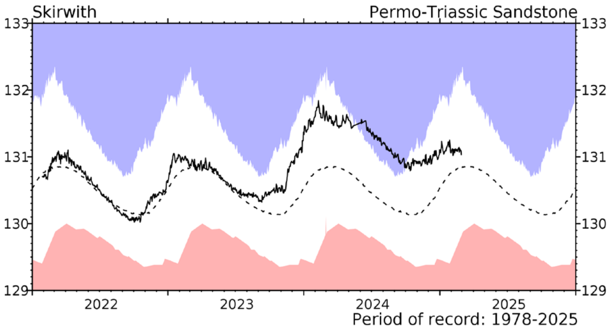

Llanfair DC
Permo-Triassic Sandstone
2022
2023
2024
2025
Period of record: 1972-2025

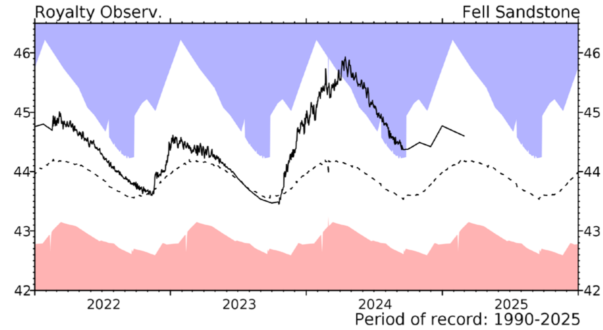

Aycliffe Nra2
Magnesian Limestone
2022
2023
2024
2025
Period of record: 1968-2025

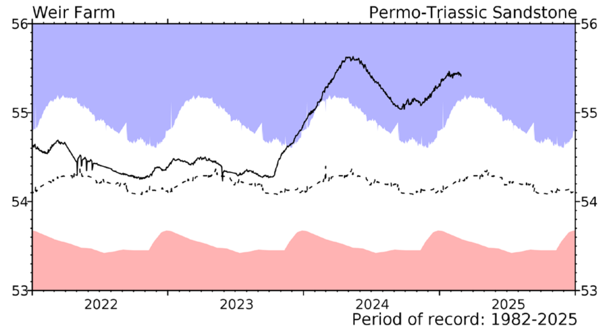

Greenfield Garage
Carboniferous Limestone
2022
2023
2024
2025
Period of record: 1994-2025

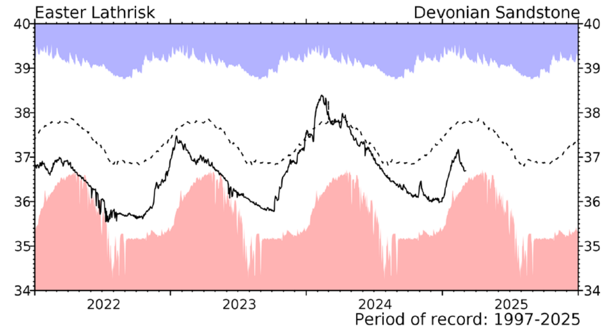

Brick House Farm
Magnesian Limestone
2022
2023
2024
2025
Period of record: 1939-2025


Alstonfield
Carboniferous Limestone
2022
2023
2024
2025
Period of record: 1974-2025

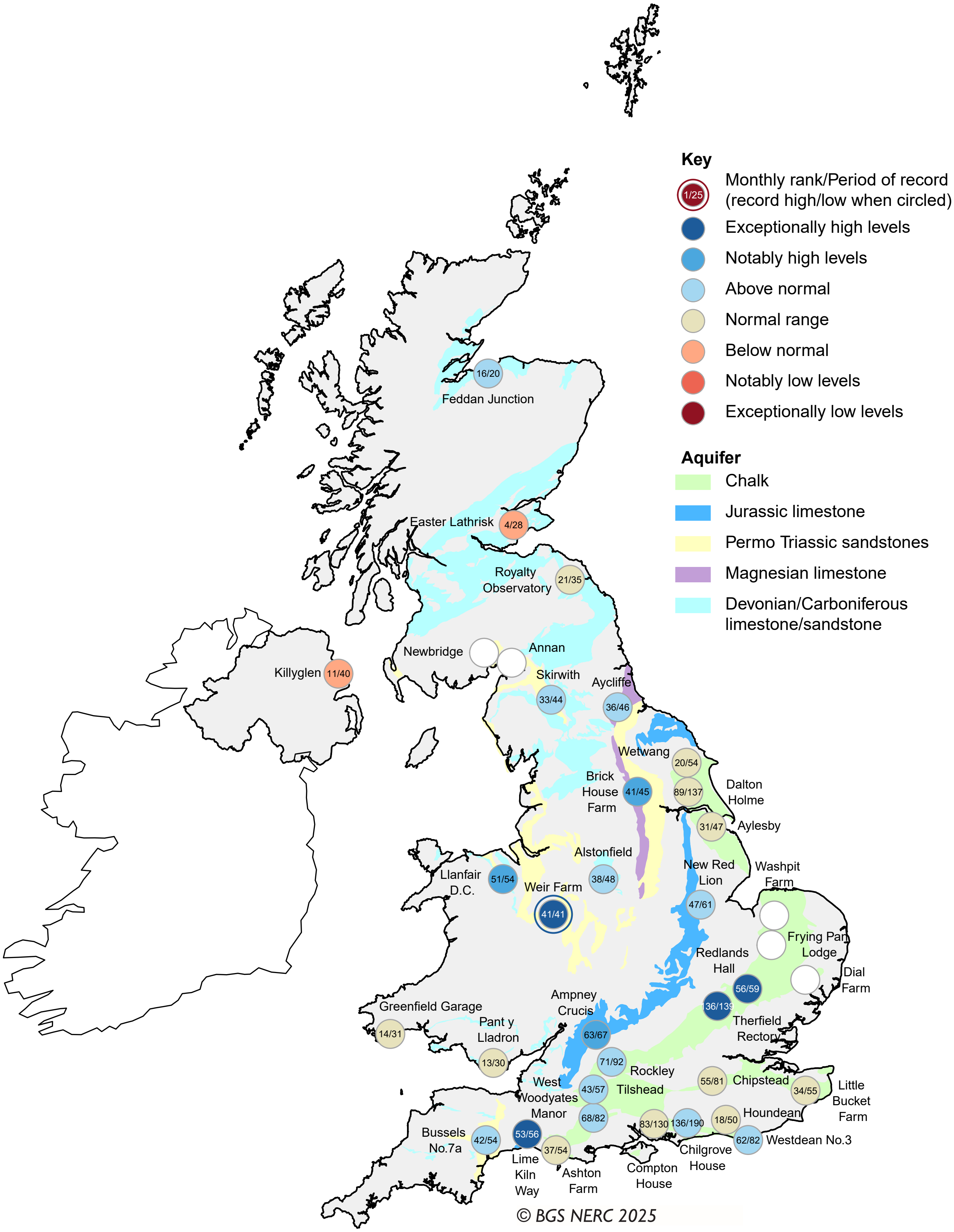

Skirwith
Permo-Triassic Sandstone
2022
2023
2024
2025
Period of record: 1978-2025


Royalty Observ.
Fell Sandstone
2022
2023
2024
2025
Period of record: 1990-2025


Weir Farm
Permo-Triassic Sandstone
2022
2023
2024
2025
Period of record: 1982-2025


Easter Lathrisk
Devonian Sandstone
2022
2023
2024
2025
Period of record: 1997-2025

Groundwater . . . Groundwater

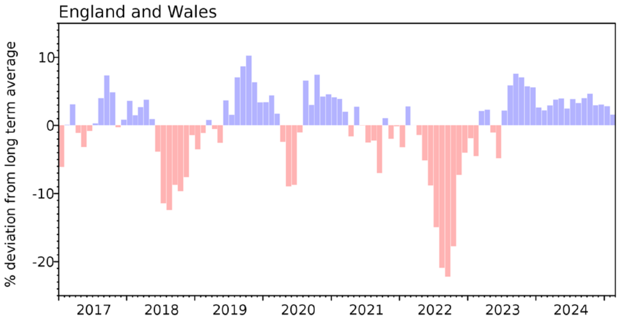


Groundwater levels - February 2025

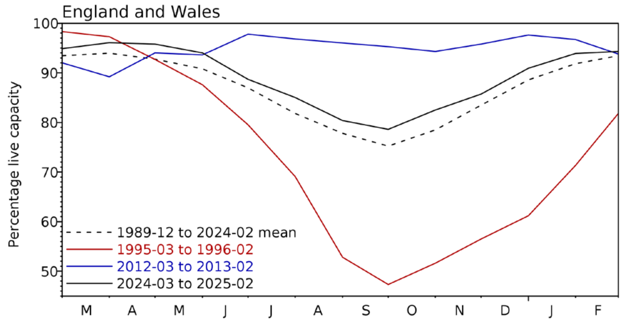
The calculation of ranking has been modified from that used in summaries published prior to October 2012. It is now based on a comparison between the most recent level and levels for the same date during previous years of record. Where appropriate, levels for earlier years may have been interpolated. 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

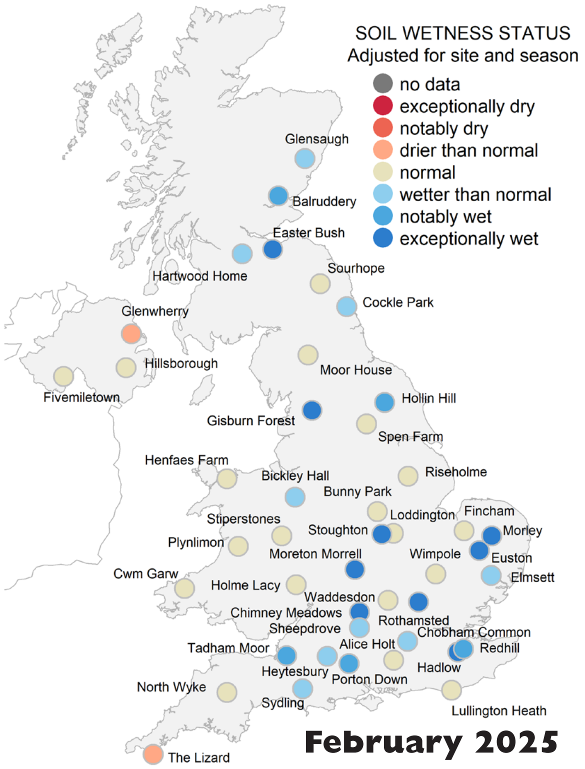
Area	Reservoir		Capacity (Ml)	2024 Dec	2025 Jan	2025 Feb	Feb Anom.	Min Feb	Year* of min	2024 Feb	Diff 25-24
North West	N Command Zone	•	124929	85	88	93	0	78	1996	100	-7
	Vyrnwy		55146	98	97	100	5	59	1996	100	0
Northumbrian	Teesdale	•	87936	100	98	96	3	72	1996	99	-4
	Kielder		(199175)	89	88	89	-4	81	1993	95	-5
Severn-Trent	Clywedog		49936	86	93	95	3	77	1996	95	1
	Derwent Valley	•	46692	95	99	94	-1	46	1996	100	-5
Yorkshire	Washburn	•	23373	92	97	95	2	53	1996	98	-4
	Bradford Supply	•	40942	92	100	98	3	53	1996	100	-1
Anglian	Grafham		(55490)	91	94	95	7	72	1997	77	18
	Rutland		(116580)	92	100	93	4	71	2012	90	4
Thames	London	•	202828	95	95	94	1	83	1988	95	-1
	Farmoor	•	13822	97	92	88	-5	64	1991	84	4
Southern	Bewl		31000	68	88	91	4	40	2012	86	5
	Ardingly		4685	100	100	100	3	46	2012	100	0
Wessex	Clatworthy		5662	100	100	100	2	82	1992	100	0
	Bristol	•	(38666)	93	99	100	7	65	1992	99	1
South West	Colliford		28540	79	85	89	3	49	2023	89	0
	Roadford		34500	95	100	100	15	35	1996	100	0
	Wimbleball		21320	87	96	100	5	72	1996	100	0
	Stithians		4967	75	91	100	6	45	1992	100	0
Welsh	Celyn & Brenig	•	131155	82	84	87	-9	69	1996	85	2
	Brianne		62140	100	100	100	2	89	2023	100	0
	Big Five	•	69762	86	98	100	4	85	1988	100	0
	Elan Valley	•	99106	100	100	100	2	88	1993	100	0
Scotland(E)	Edinburgh/Mid-Lothian	•	97223	93	93	95	-1	73	1999	98	-3
	East Lothian	•	9317	96	100	100	1	91	1990	100	0
Scotland(W)	Loch Katrine	•	110326	100	100	100	4	76	2010	100	0
	Daer		22494	84	92	92	-6	88	2024	88	4
	Loch Thom		10721	100	100	100	1	90	2004	100	0
Northern Ireland	Total+	•	56800	90	92	93	1	81	2004	99	-6
	Silent Valley	•	20634	94	95	99	10	57	2002	100	-1

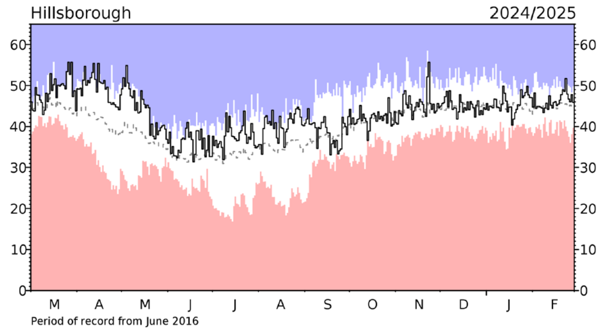
( ) figures in parentheses relate to gross storage • denotes reservoir groups *last occurrence

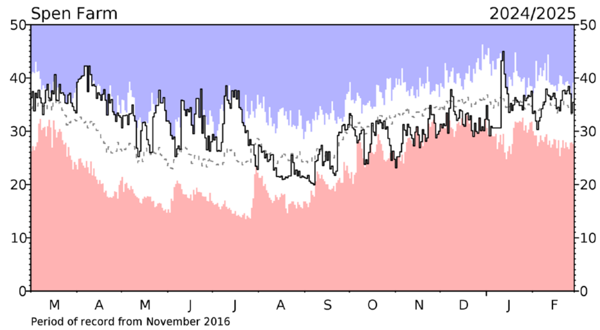
+ excludes Lough Neagh

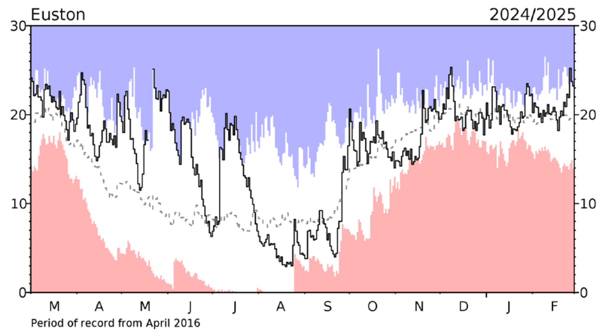
Details of the individual reservoirs in each of the groupings listed above are available on request. The percentages given in the Average and Minimum storage columns relate to the 1988-2012 period except for West of Scotland and Northern Ireland where data commence in the mid-1990s. In some gravity-fed 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.

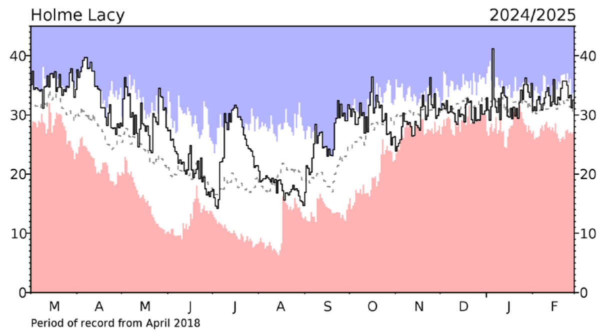
Soil Moisture . . . Soil Moisture

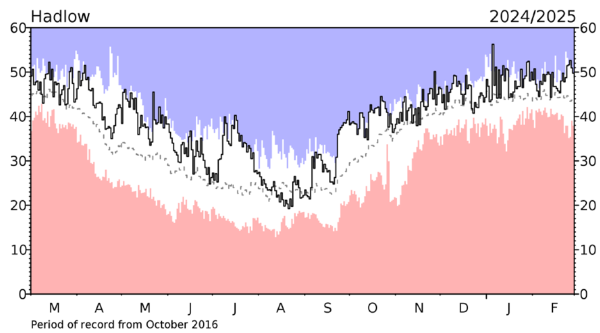












Despite the generally drier meteorological conditions, soil moisture levels across the COSMOS-UK network remain high, with conditions at many sites toward the wet/saturated range. The antecedent wet soil moisture conditions mean that the dry start to the month wasn't enough to dry the soils out, and when there were heavy rainfall events towards the end of the month, soil moisture levels rose again quickly (e.g. Euston, Hadlow). Where it was drier throughout the full month, soil moisture levels remained more stable (e.g. Hillsborough, Holme Lacy, Moor House, Spen Farm).

Overall, soil moisture levels remain in the normal to high range at many COSMOS-UK sites, despite the drier weather in places. The wet conditions over the winter remain important to the system, with soil conditions sensitive to heavy rainfall events.

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