Monthly water situation report: Yorkshire Area

1 Summary - September 2025

Rainfall in September was above average across all of Yorkshire and was concentrated between days 10 and 20. Flows began the month low but peaked in response to the rainfall before returning to normal in most catchments. Over the month, soil moisture deficits were substantially reduced on the Pennines but this effect was much less significant in the east and south. Reservoir stocks increased significantly but remained well below the long term average (LTA) for the time of year.

1.1 Rainfall

Rainfall this month was above normal for the first time since February. The monthly rainfall totals were high and ranged from 147% of the LTA in the Derwent catchment to 201% in the Nidd catchment.

The Ure, Nidd, Wharfe and Aire catchments had scattered rainfall for the first few days of the month and then returned to settled and dry conditions until day 10. There followed prolonged rainfall, which became particularly intense on day 20, when most gauges recorded over 40mm. The next six days were mostly dry and then there were small amounts of rain on days 27 and 30. In each of these catchments the total September rainfall was exceptionally high for the time of year, especially in the Wharfe which had the fifth wettest September since 1871.

The remaining Pennine catchments of the Swale, Ouse, Don and Rother had notably high amounts of rainfall. The rain followed a similar pattern to other Pennine catchments but with lower monthly totals and less rain between days 10 and 20.

The Esk, Rye, Derwent and Hull all had notably high rainfall. The Esk catchment received 92% of the month’s LTA on day 20 at both Easby and Westerdale.

1.2 Soil moisture deficit and recharge

Soils began the month very dry across most of Yorkshire. The substantial rainfall of the third week meant that during the month soil moisture deficits reduced across the whole county. By the end of the month soils in the northern and western Pennines were wet and almost completely saturated. In the Vale of York and over the North Yorkshire Moors soil moisture deficits had returned to normal for the time of year. In the southern Pennines and in the east of Yorkshire there was a small reduction in soil moisture deficits but nonetheless they remained dry for the time of year.

1.3 River flows

In September flows increased across the majority of catchments. The only exception was the Chalk fed catchment of the West Beck in the east of Yorkshire .

Monthly mean flows in the northern Pennines were high and ranged between 130% and 214% of the LTA. Flow in the upper Wharfe was exceptionally high, responding to the periods of intense rainfall in the catchment. Elsewhere, monthly mean flows were lower and ranged from 49% to 114% of the LTA.

Daily average flows were exceptionally low in many catchments at the beginning of September. Flows in the Pennine catchments remained low until day 11 and then responded to rainfall events on days 11, 15 and 20. Flows in the Swale, Ure, Nidd, Aire and Ouse all reached exceptionally high levels between days 15 to 17 before receding. They then peaked again on days 20 to 22, again to exceptionally high flows. Flows in the Nidd then remained above normal for the rest of the month, but elsewhere they quickly returned to normal flows.

In the Rye, Esk and Derwent catchments, flows remained notably low and exceptionally low for much of the first two weeks of the month. There was a small response to rainfall around day 16. The most significant increases in flow took place on day 20, during which the Esk and Rye flow was exceptionally high, and day 21 when flows in the Derwent became notably high.

Flows in the Don and Rother reacted slightly to rain on days 3 and 4. In a similar manner to other catchments they also reached exceptionally high flows on days 20 and 21 before receding to normal flows.

The West Beck was notably low for much of the month, a result of the continued low groundwater levels in the chalk. Flows briefly reached normal levels on day 4.

1.4 Groundwater levels

Magnesian Limestone

The groundwater level within the Magnesian Limestone increased at Brick House Farm and became notably high for the time of year.

Millstone Grit

The groundwater level within the Millstone Grit decreased at Hill Top Farm and was exceptionally low for the time of year. This observation borehole is used for water abstraction by means of a pump which may affect the groundwater level recorded here.

Sherwood Sandstone

The groundwater level within the Sherwood Sandstone increased at Great Ouseburn and was above normal for the time of year. The groundwater level increased at Riccall Approach Farm and was normal for the time of year.

Corallian Limestone

The groundwater level within the Corallian Limestone increased at Sproxton and was normal for the time of year.

Chalk

The groundwater level decreased at Wetwang and was notably low for the time of year. The groundwater level also decreased at Dalton Estate Well and was notably low for the time of year.

1.5 Reservoir stocks

Reservoir stocks increased significantly this month. In the third week, they increased by 15.6% which is one of the largest weekly increases on record. At the end of September, stocks were at 46.5%, still 21.4% less than the LTA for the time of year.

1.6 Environmental impact

In late September, there were 42 abstraction licences with a Hands Off Flow condition in force, and another 106 abstraction licence holders had been given advance warning that flows were low.

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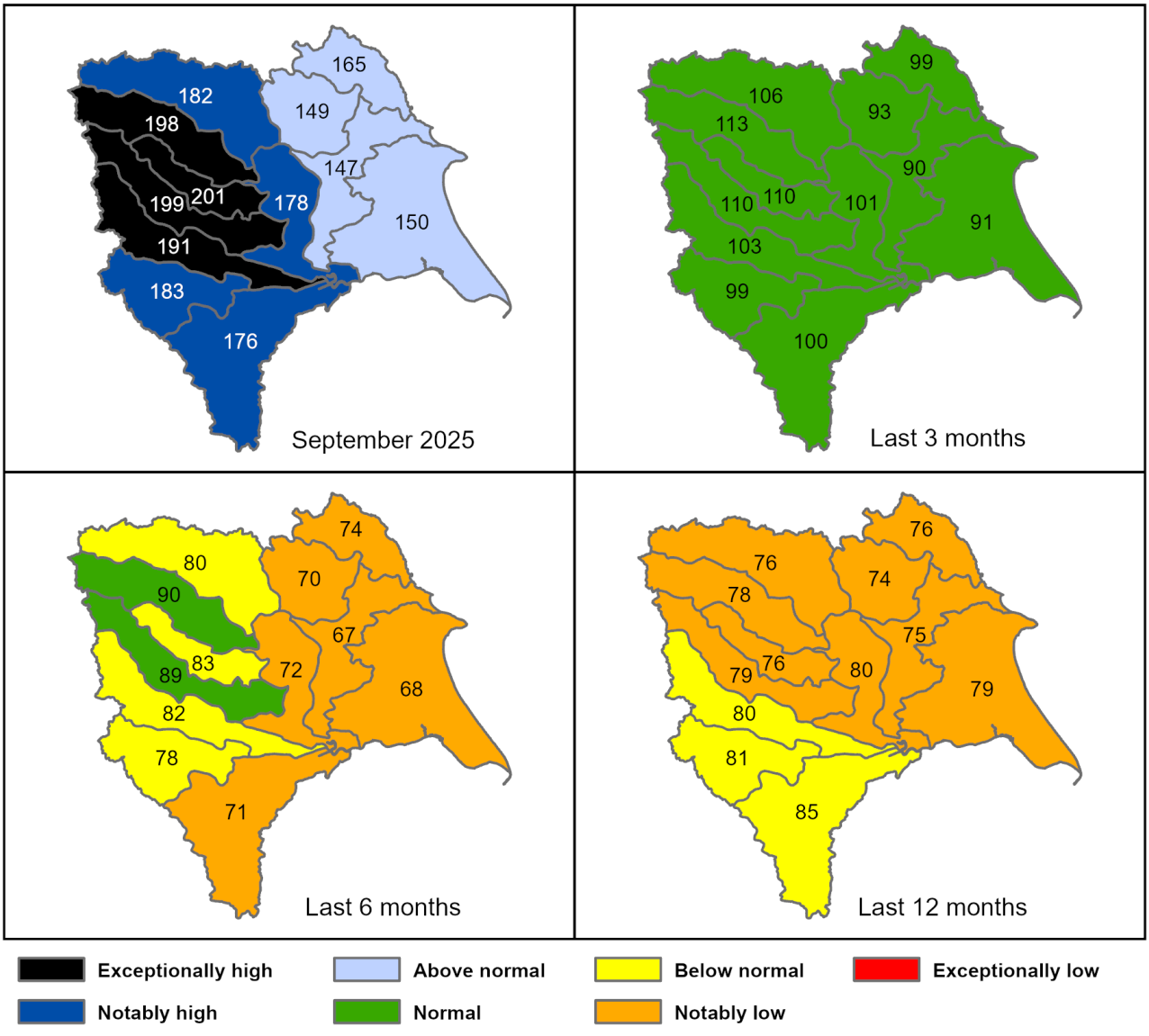
2 Rainfall

2.1 Rainfall map

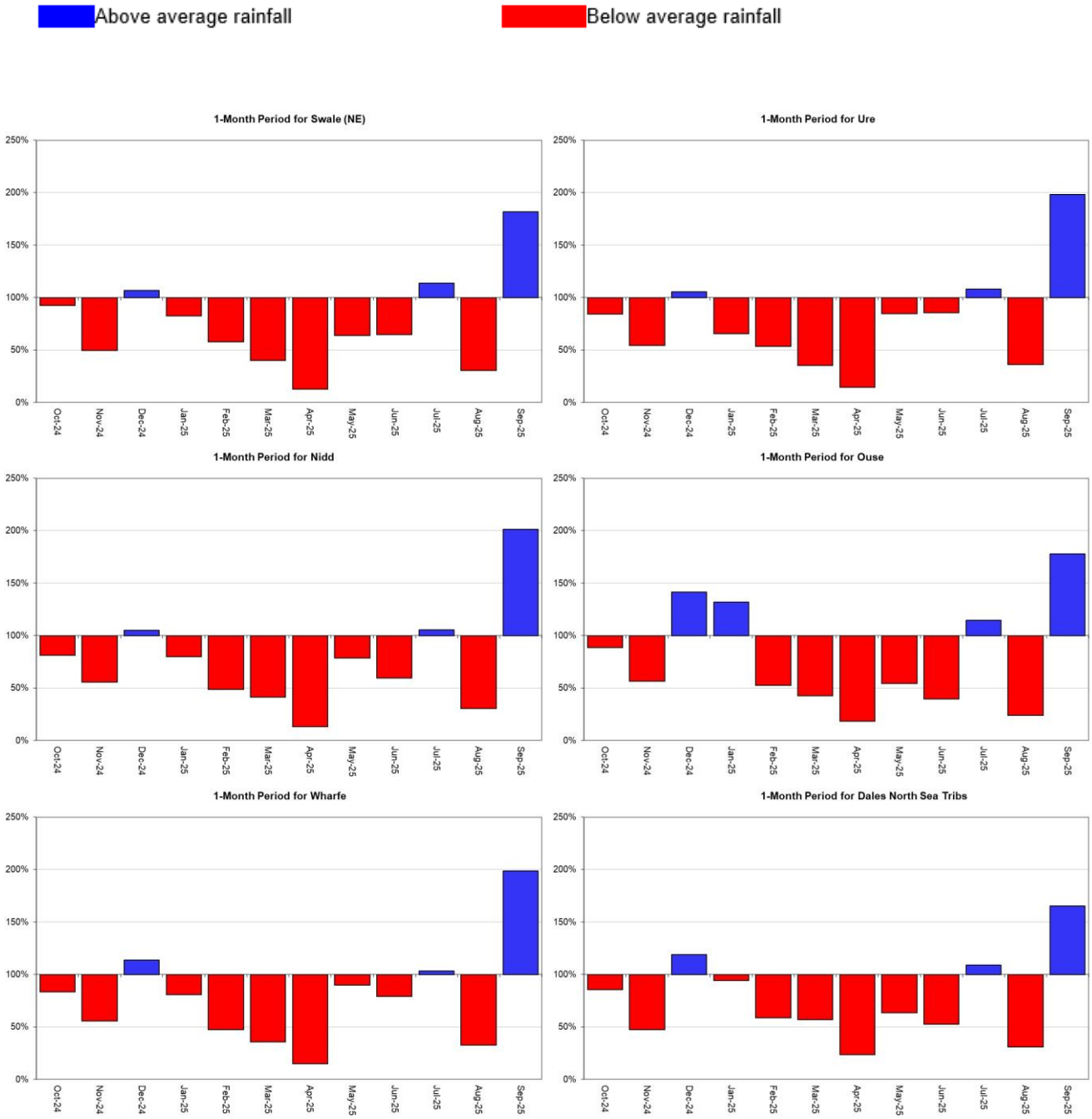
2.1: Total rainfall for hydrological areas across Yorkshire, expressed as a percentage of the 1990 to 2020 long term average rainfall, for the current month (up to 30 September 2025), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.

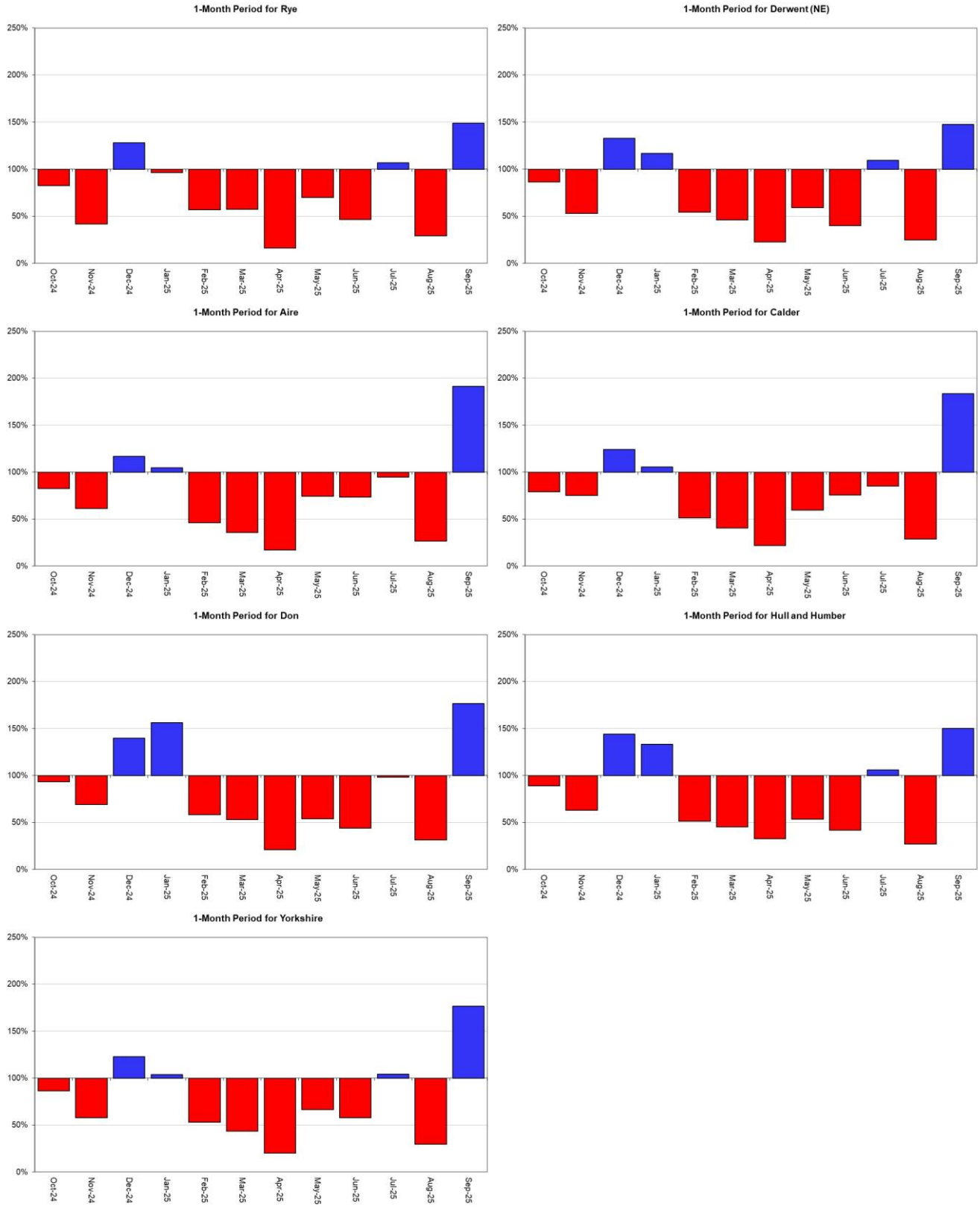


HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2025). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved. Environment Agency, AC0000807064, 2025.

2.2 Rainfall charts

2.2: Monthly rainfall totals for the past 24 months as a percentage of the 1991 to 2020 long term average for each catchment.



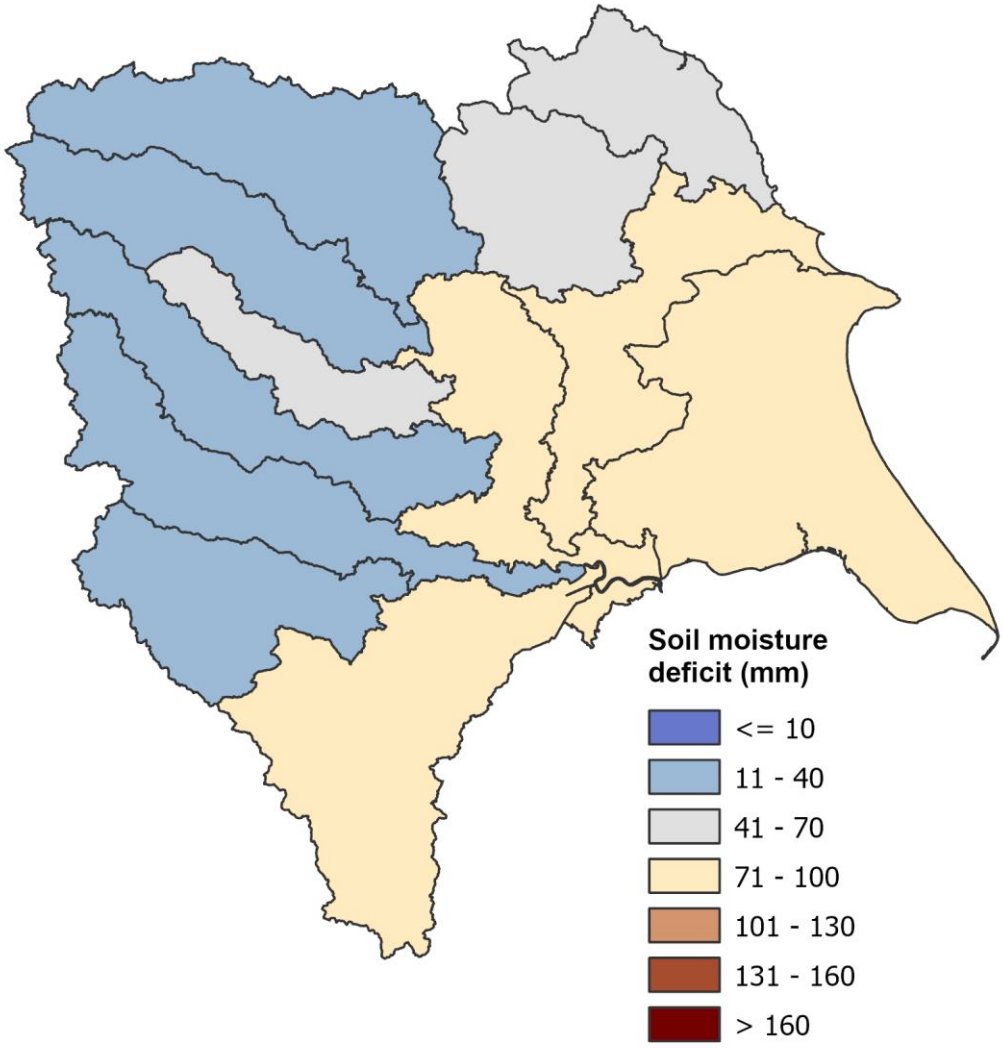


HadUK rainfall data. (Source: Met Office. Crown copyright, 2025).

3 Soil moisture deficit

3.1 Soil moisture deficit map

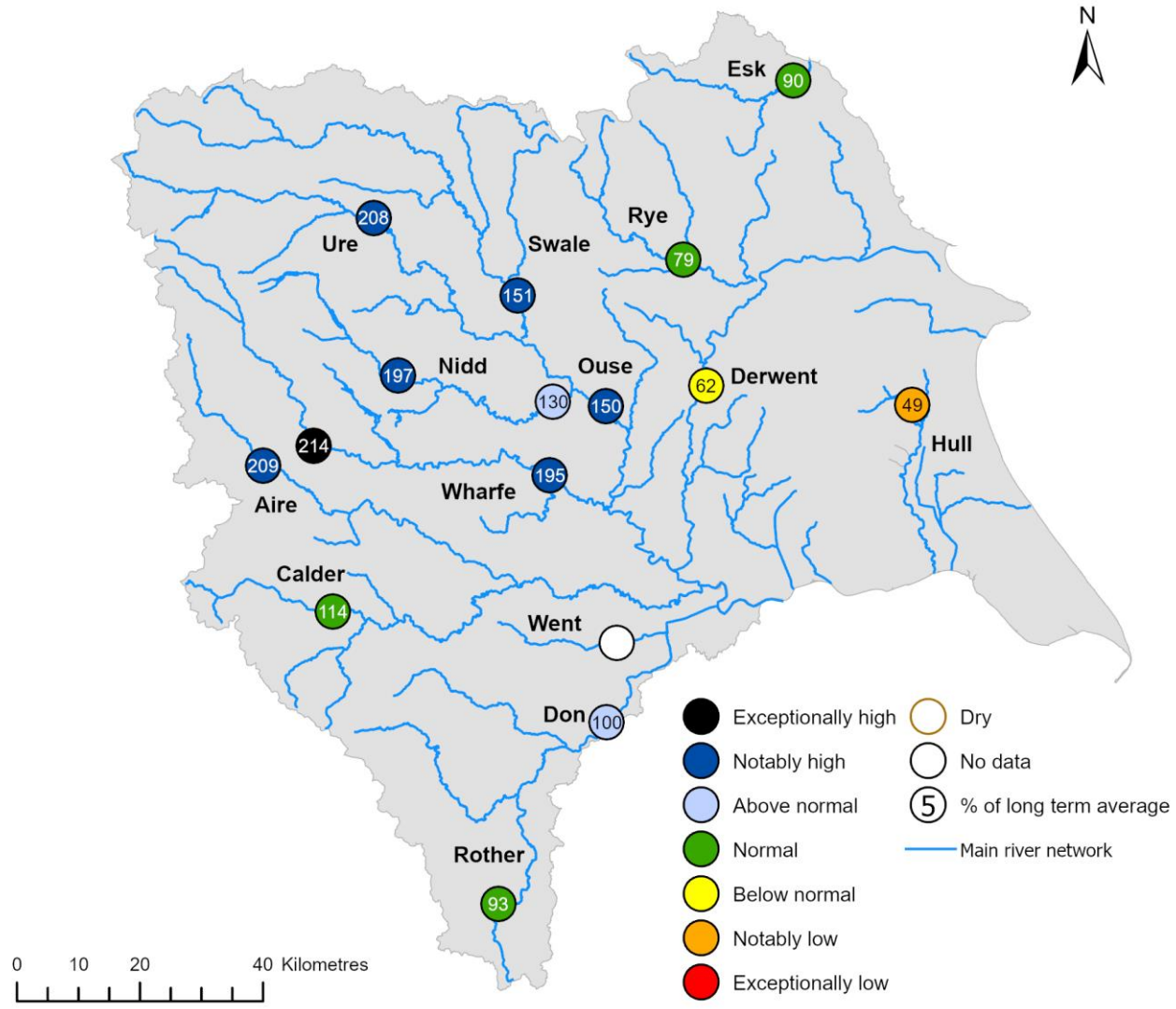
3.1: Soil moisture deficits for weeks ending 30 September 2025. Shows the actual soil moisture deficits (mm) within each hydrological area. Calculated from MORECS data for real land use.



4 River flows

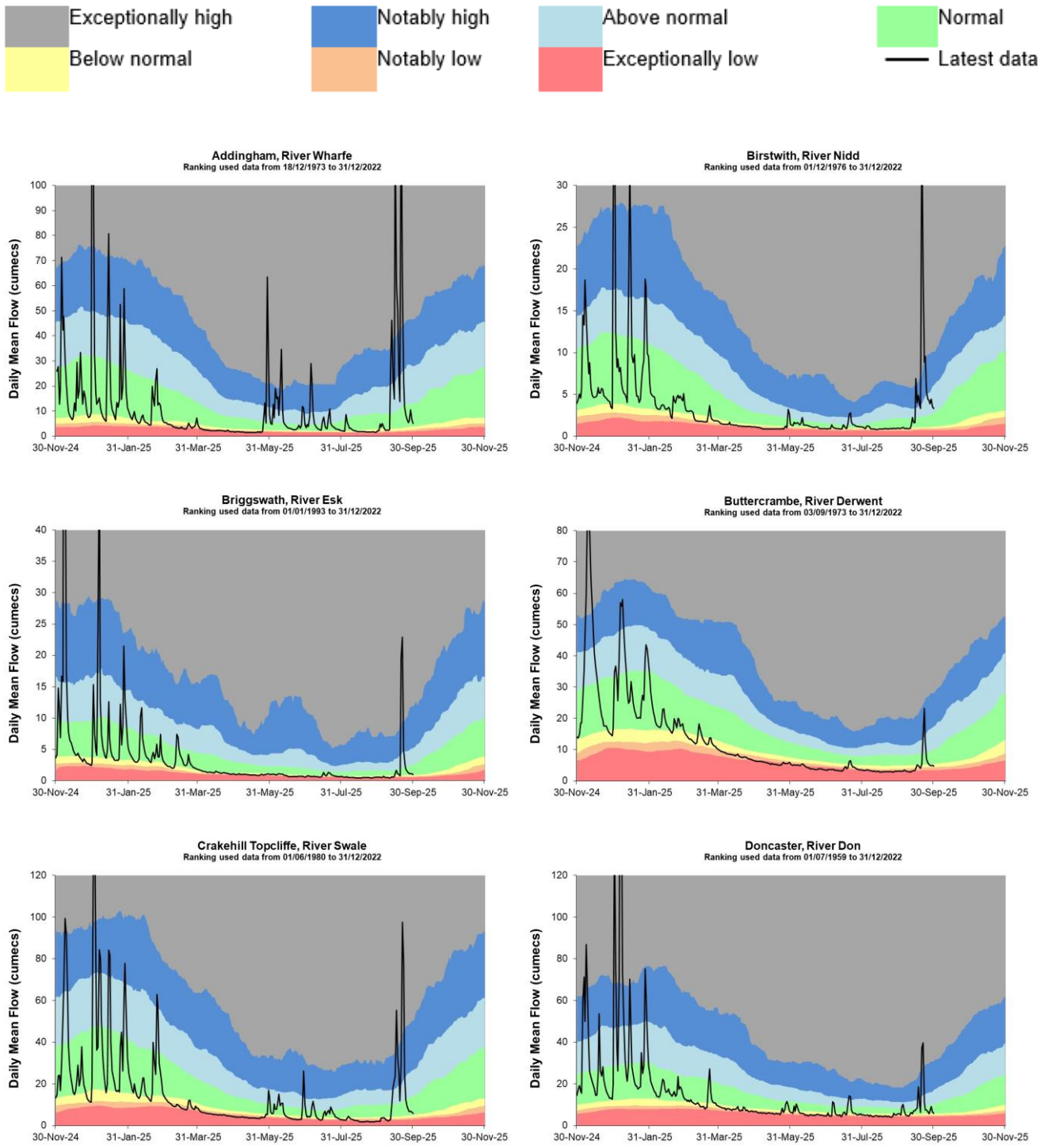
4.1 River flows map

4.1: Monthly mean river flow for indicator sites for September 2025, expressed as a percentage of the respective long term average and classed relative to an analysis of historic September monthly means. Table available in the appendices with detailed information.

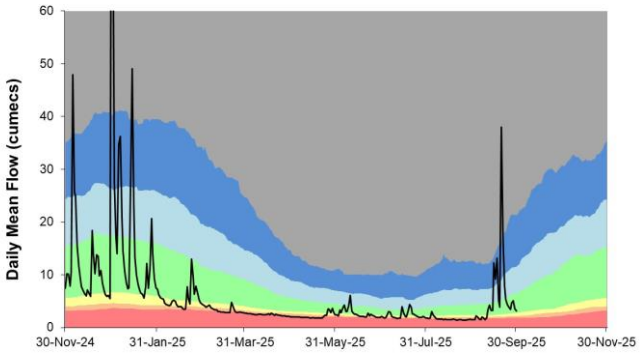


4.2 River flow charts

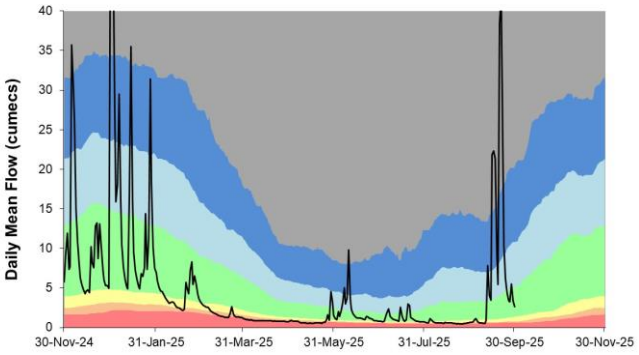
4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



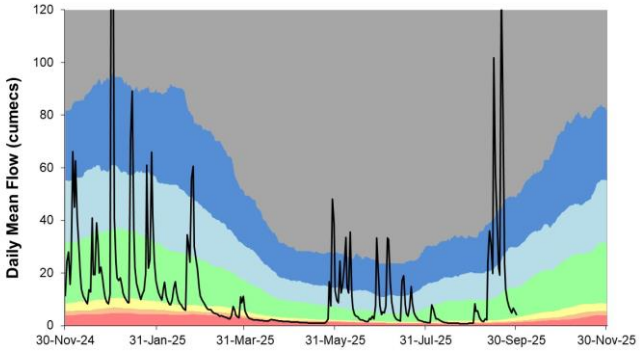
Elland, River Calder
Ranking used data from 01/07/1971 to 31/12/2022



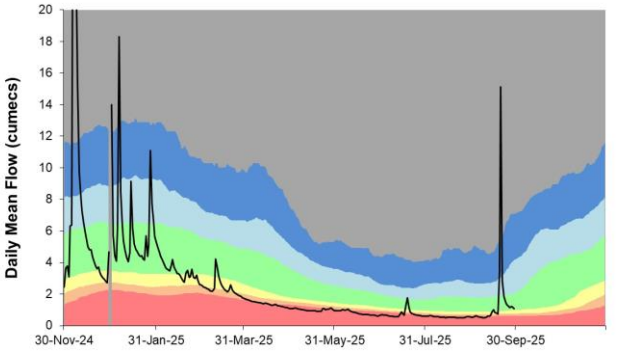
Kildwick, River Aire
Ranking used data from 01/08/1971 to 31/12/2022



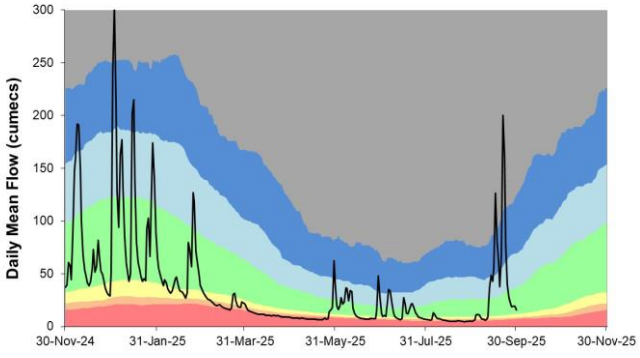
Kilgram Bridge, River Ure
Ranking used data from 01/08/1971 to 31/12/2022



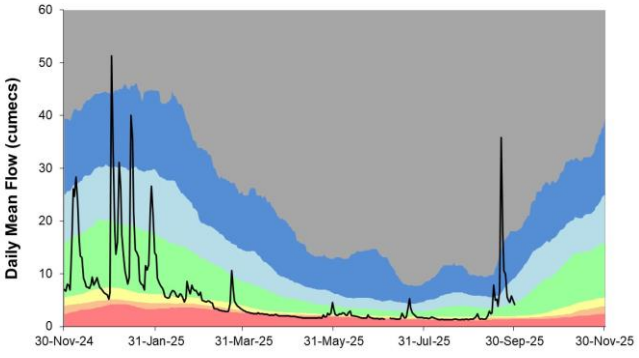
Ness, River Rye
Ranking used data from 01/09/1974 to 31/12/2022

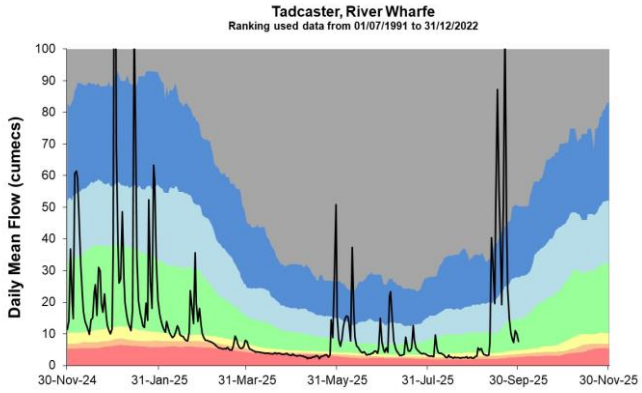


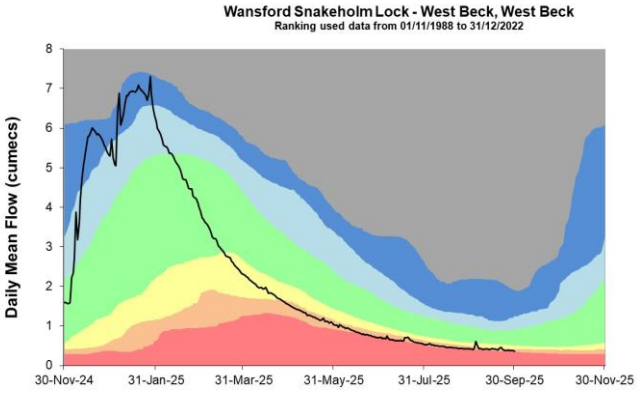
Skelton, River Ouse
Ranking used data from 18/09/1969 to 31/12/2022

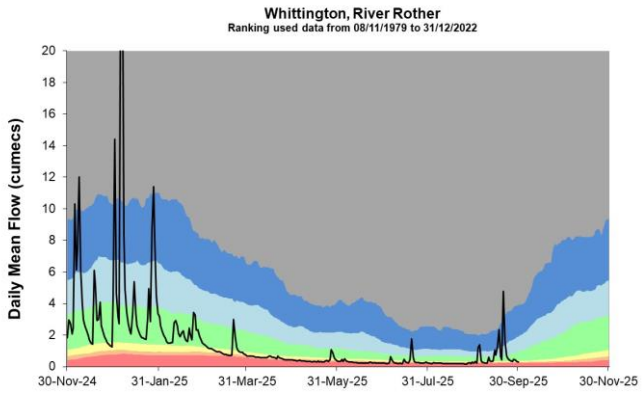


Skip Bridge Kirk Hammerton, River Nidd
Ranking used data from 12/06/1979 to 31/12/2022







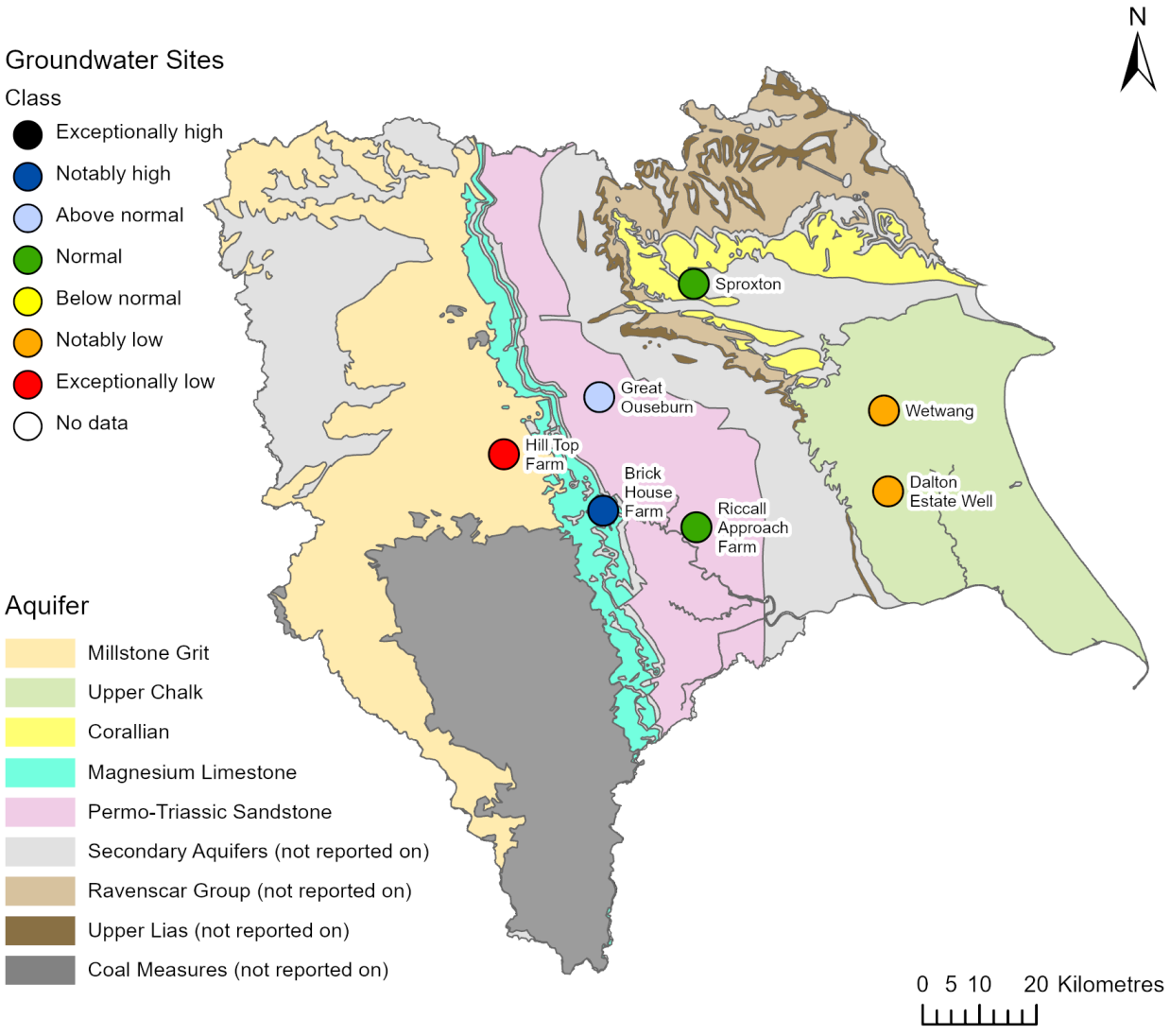


Source: Environment Agency.

5 Groundwater levels

5.1 Groundwater levels map

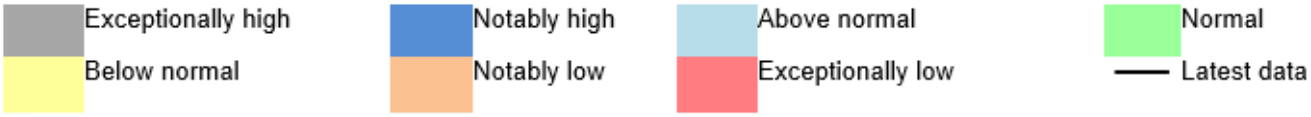
5.1: Groundwater levels for indicator sites at the end of September 2025, classed relative to an analysis of respective historic September levels. Table available in the appendices with detailed information.

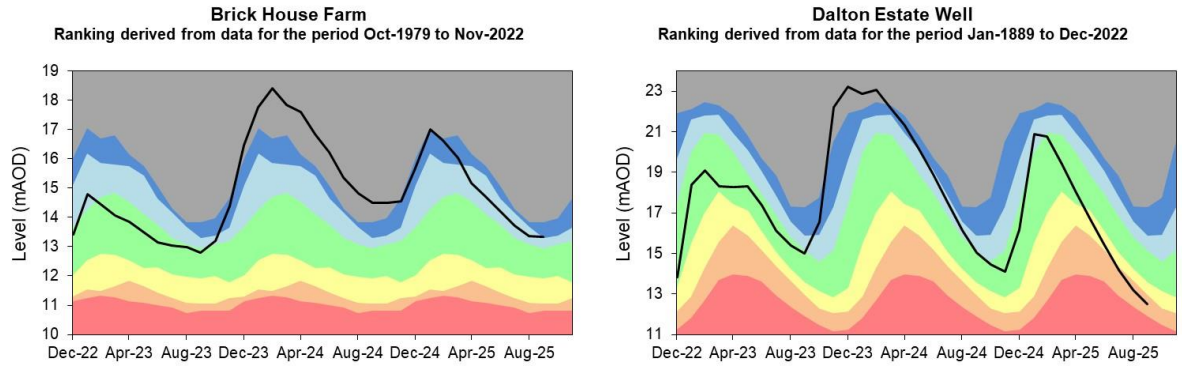


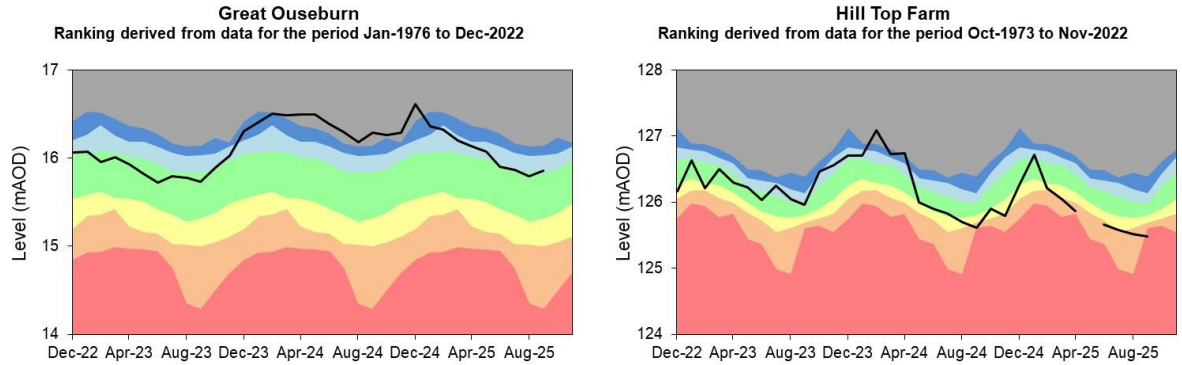
(Source: Environment Agency). Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, AC0000807064, 2025.

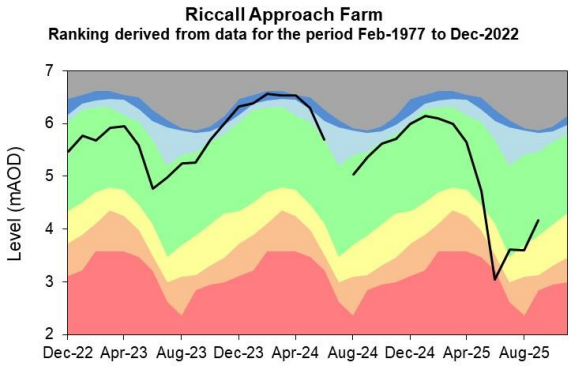
5.2 Groundwater level charts

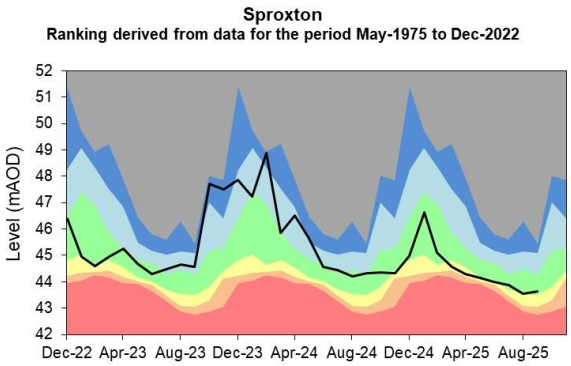
5.2: End of month groundwater levels at index groundwater level sites for major aquifers. 22 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.

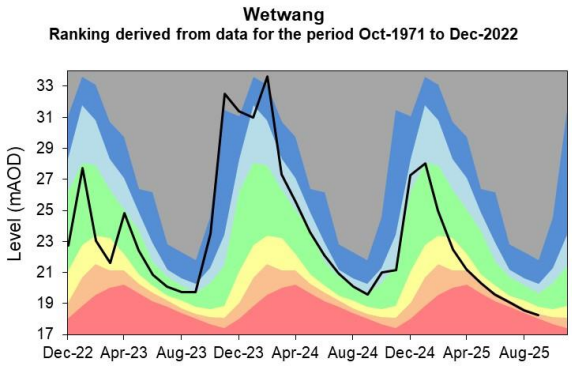










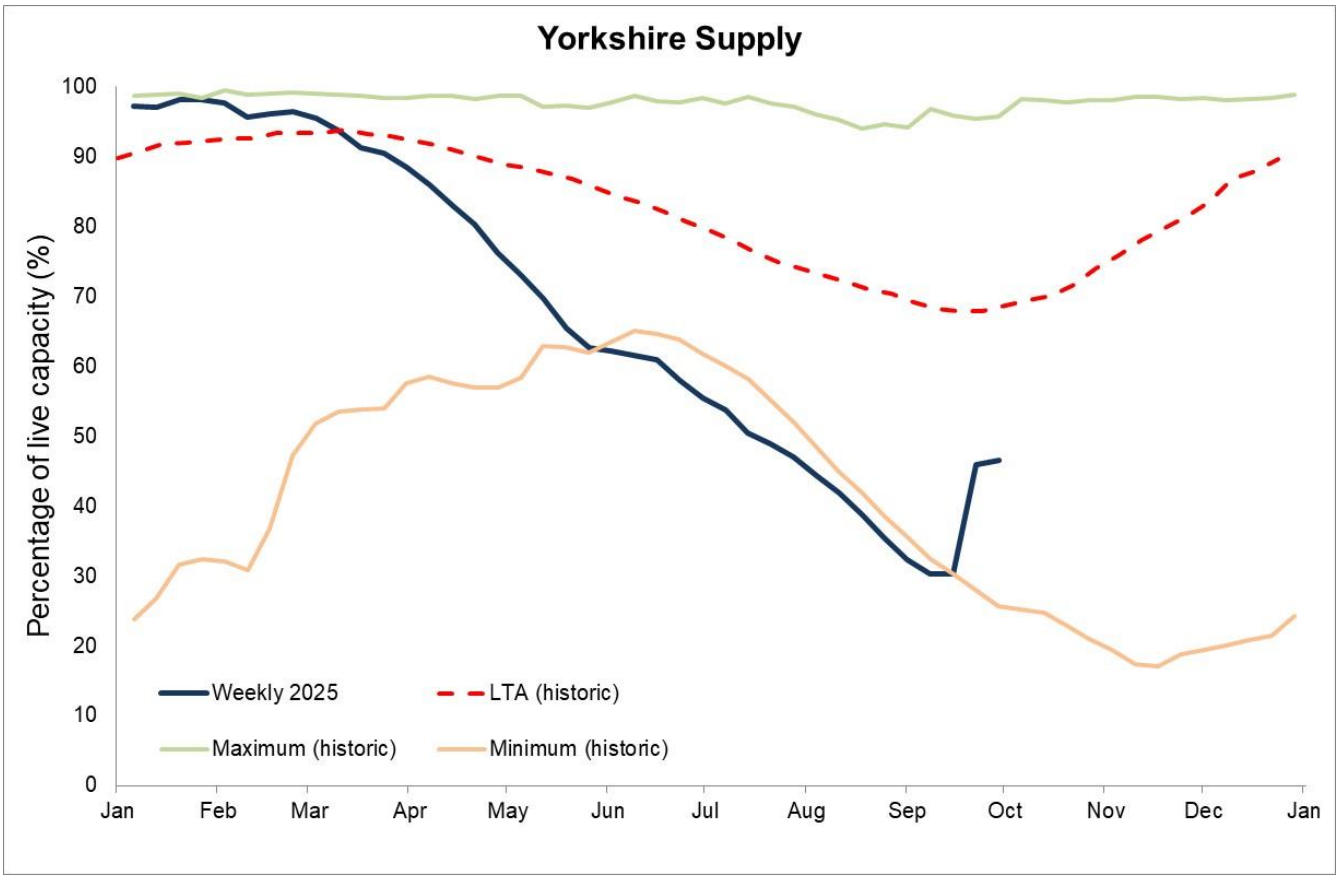


Source: Environment Agency, 2025.

N.B. Hill Top Farm observation borehole is used for abstraction, therefore, the groundwater level record will be directly affected by pumping.

6 Reservoir stocks

6.1: End of month regional reservoir stocks compared to long term maximum, minimum and average stocks. Note: Historic records of individual reservoirs and reservoir groups making up the regional values vary in length.



(Source: Yorkshire Water).

7 Glossary

7.1 Terminology

Aquifer

A geological formation able to store and transmit water.

Areal average rainfall

The estimated average depth of rainfall over a defined area. Expressed in depth of water (mm).

Artesian

The condition where the groundwater level is above ground surface but is prevented from rising to this level by an overlying continuous low permeability layer, such as clay.

Artesian borehole

Borehole where the level of groundwater is above the top of the borehole and groundwater flows out of the borehole when unsealed.

Cumecs

Cubic metres per second (m^{3s-1}).

Effective rainfall

The rainfall available to percolate into the soil or produce river flow. Expressed in depth of water (mm).

Flood alert and flood warning

Three levels of warnings may be issued by the Environment Agency. Flood alerts indicate flooding is possible. Flood warnings indicate flooding is expected. Severe flood warnings indicate severe flooding.

Groundwater

The water found in an aquifer.

Long term average (LTA)

The arithmetic mean calculated from the historic record, usually based on the period 1991 to 2020. However, the period used may vary by parameter being reported on (see figure captions for details).

mAOD

Metres above ordnance datum (mean sea level at Newlyn Cornwall).

MORECS

Met Office Rainfall and Evaporation Calculation System. Met Office service providing real time calculation of evapotranspiration, soil moisture deficit and effective rainfall on a 40 by 40 km grid.

Naturalised flow

River flow with the impacts of artificial influences removed. Artificial influences may include abstractions, discharges, transfers, augmentation and impoundments.

NCIC

National Climate Information Centre. NCIC area monthly rainfall totals are derived using the Met Office 5 km gridded dataset, which uses rain gauge observations.

Recharge

The process of increasing the water stored in the saturated zone of an aquifer. Expressed in depth of water (mm).

Reservoir gross capacity

The total capacity of a reservoir.

Reservoir live capacity

The capacity of the reservoir that is normally usable for storage to meet established reservoir operating requirements. This excludes any capacity not available for use (for example, storage held back for emergency services, operating agreements or physical restrictions). May also be referred to as ‘net’ or ‘deployable’ capacity.

Soil moisture deficit (SMD)

The difference between the amount of water actually in the soil and the amount of water the soil can hold. Expressed in depth of water (mm).

7.2 Categories

Exceptionally high

Value likely to fall within this band 5% of the time.

Notably high

Value likely to fall within this band 8% of the time.

Above normal

Value likely to fall within this band 15% of the time.

Normal

Value likely to fall within this band 44% of the time.

Below normal

Value likely to fall within this band 15% of the time.

Notably low

Value likely to fall within this band 8% of the time.

Exceptionally low

Value likely to fall within this band 5% of the time.

8 Appendices

8.1 Rainfall table

Hydrological area	Sep 2025 rainfall % of long term average 1991 to 2020	Sep 2025 band	Jul 2025 to September cumulative band	Apr 2025 to September cumulative band	Oct 2024 to September cumulative band
Aire	191	Exceptionally high	Normal	Below normal	Below normal
Calder	183	Notably high	Normal	Below normal	Below normal
Dales North Sea Tributaries	165	Above normal	Normal	Notably low	Notably low
Derwent (NE)	148	Above normal	Normal	Notably low	Notably low
Don	176	Notably high	Normal	Notably low	Below normal
Hull and Humber	150	Above normal	Normal	Notably low	Notably low
Nidd	201	Exceptionally high	Normal	Below normal	Notably low
Ouse	178	Notably high	Normal	Notably low	Notably low
Rye	149	Above normal	Normal	Notably low	Notably low
Swale (NE)	182	Notably high	Normal	Below normal	Notably low

Hydrological area	Sep 2025 rainfall % of long term average 1991 to 2020	Sep 2025 band	Jul 2025 to September cumulative band	Apr 2025 to September cumulative band	Oct 2024 to September cumulative band
Ure	198	Exceptionally high	Normal	Normal	Notably low
Wharfe	199	Exceptionally high	Normal	Normal	Notably low

8.2 River flows table

Site name	River	Catchment	Sep 2025 band	Aug 2025 band
Addingham	Wharfe	Wharfe Middle	Exceptionally high	Notably low
Birstwith	Nidd	Nidd Middle	Notably high	Below normal
Briggswath	Esk	Esk Yorks	Normal	Exceptionally low
Buttercrambe	Derwent	Derwent Yorks Middle	Below normal	Exceptionally low
Crakehill Topcliffe	Swale	Swale Lower	Notably high	Exceptionally low
Doncaster	Don	Don Lower	Above normal	Exceptionally low
Elland	Calder	Calder Yorks Upper	Normal	Exceptionally low
Kildwick	Aire	Aire Upper	Notably high	Exceptionally low
Kilgram Bridge	Ure	Ure Middle	Notably high	Notably low
Ness	Rye	Rye	Normal	Exceptionally low
Skelton	Ouse	Ouse Yorks	Notably high	Exceptionally low

Site name	River	Catchment	Sep 2025 band	Aug 2025 band
Skip Bridge Kirk Hammerton	Nidd	Nidd Lower	Above normal	Notably low
Tadcaster	Wharfe	Wharfe Lower	Notably high	Exceptionally low
Wansford Snakeholm Lock	West Beck	Hull Upper	Notably low	Notably low
Whittington	Rother	Rother Yorks	Normal	Exceptionally low

8.3 Groundwater table

Site name	Aquifer	End of Sep 2025 band	End of Aug 2025 band
Brick House Farm	Wharfe Magnesian Limestone	Notably high	Above normal
Dalton Estate Well	Hull and East Riding Chalk	Notably low	Notably low
Great Ouseburn	Sherwood Sandstone	Above normal	Normal
Hill Top Farm	Millstone Grit and Carboniferous Limestone	Exceptionally low	Notably low
Riccall Approach Farm	Sherwood Sandstone	Normal	Below normal
Sproxton	Sherwood Sandstone	Normal	Normal
Wetwang	Hull and East Riding Chalk	Notably low	Notably low