Monthly water situation report: Yorkshire Area

1 Summary - January 2025

Soils were saturated, reservoirs remained close to capacity and rivers were responsive to rainfall episodes. Groundwater levels rose in all aquifers. January did feature some settled periods and monthly precipitation totals in the normal range or above were influenced by a contribution from snowfall in the first week. Monthly mean river flows were in the normal to above normal range.

1.1 Rainfall

Monthly rainfall totals were in the normal range in most catchments, between 80% and 127% of the long term average (LTA). Rainfall was below the LTA in the northern Dales catchments of the Swale, Ure, Nidd and Wharfe. Precipitation in the Don catchment was notably high at 143% of the LTA, and above normal in the Hull and Humber at 130% of the LTA.

Snow and heavy rain on days 5 and 6 contributed 45% to 65% of the monthly total at many rain gauges in the Don, Ouse, Rye, Derwent and Hull catchments. This weather affected the northern Dales catchments to a lesser extent, accounting for the lower January totals as percentage of LTA in those areas. Other wet days occurred on 12 and 13 January in the Pennines and on days 23 and 26 throughout Yorkshire. Much of the second and third weeks of January featured settled conditions.

1.2 Soil moisture deficit

Soils throughout Yorkshire remained saturated and classified as wet all month. Even in settled periods, temperatures were too low for evaporation to increase soil moisture deficit.

1.3 River flows

Monthly mean river flows in most catchments were above the LTA and in the normal or above normal range for January. The monthly mean flow on the Don at Doncaster was notably high at 183% of the LTA, reflecting the higher snowfall and rainfall in this catchment.

The monthly mean flow on the West Beck in the upper Hull catchment was also notably high, at 186% of the LTA. This river sustained high flows all month, generated by strong spring flows from high Chalk groundwater levels and also a response to rainfall and snowmelt after day 5.

January began with high river flows across Yorkshire following a storm event on 31 December 2024 and the morning of New Year's Day. Rainfall had been most intense in the Calder and particularly upper Colne catchments. The highest river level in the 45-year record occurred on the Colne at Huddersfield Longroyd Bridge, with significant peaks also recorded at other monitoring stations in the Calder catchment.

All the Pennine-fed rivers remained responsive to rainfall episodes through January, with moderate peaks on days 5 to 7, mid-month and on day 27. On the Don, Rother and the Esk in the north-east the highest flow of the month occurred on day 6 following rain and snowmelt. The Rye and Derwent showed a similar pattern, with a more moderate peak also building on the Derwent on days 28 to 30. Daily mean flows in most catchments fluctuated accordingly between the normal range for January and notably or exceptionally high. The Esk, upper Wharfe and upper Ure receded into below normal flows

only for short periods within the settled second and third weeks. The geology of these catchments supports a low baseflow contribution in drier weather.

1.4 Groundwater levels

Magnesian Limestone

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

Millstone Grit

The groundwater level increased within the Millstone Grit at Hill Top Farm and was above normal for the time of the year. *It should be noted that this observation borehole is used for water abstraction by means of a pump. Therefore, the groundwater level recorded here may be subjected to the effects of this.*

Sherwood Sandstone

The groundwater level in the Sherwood Sandstone decreased at Great Ouseburn but remained notably high for the time of year while groundwater levels increased at Riccal Approach Farm, remaining normal for the time of year.

Corallian Limestone

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

Chalk

The groundwater level increased at Wetwang but moved into the upper part of the normal range for the time of year (northern Yorkshire Wolds chalk), while Dalton Estate (central Yorkshire Wolds chalk) increased and was above normal for the time of year.

1.5 Reservoir stocks

Total reservoir stocks increased marginally during January and were 6% above the LTA at the end of the month.

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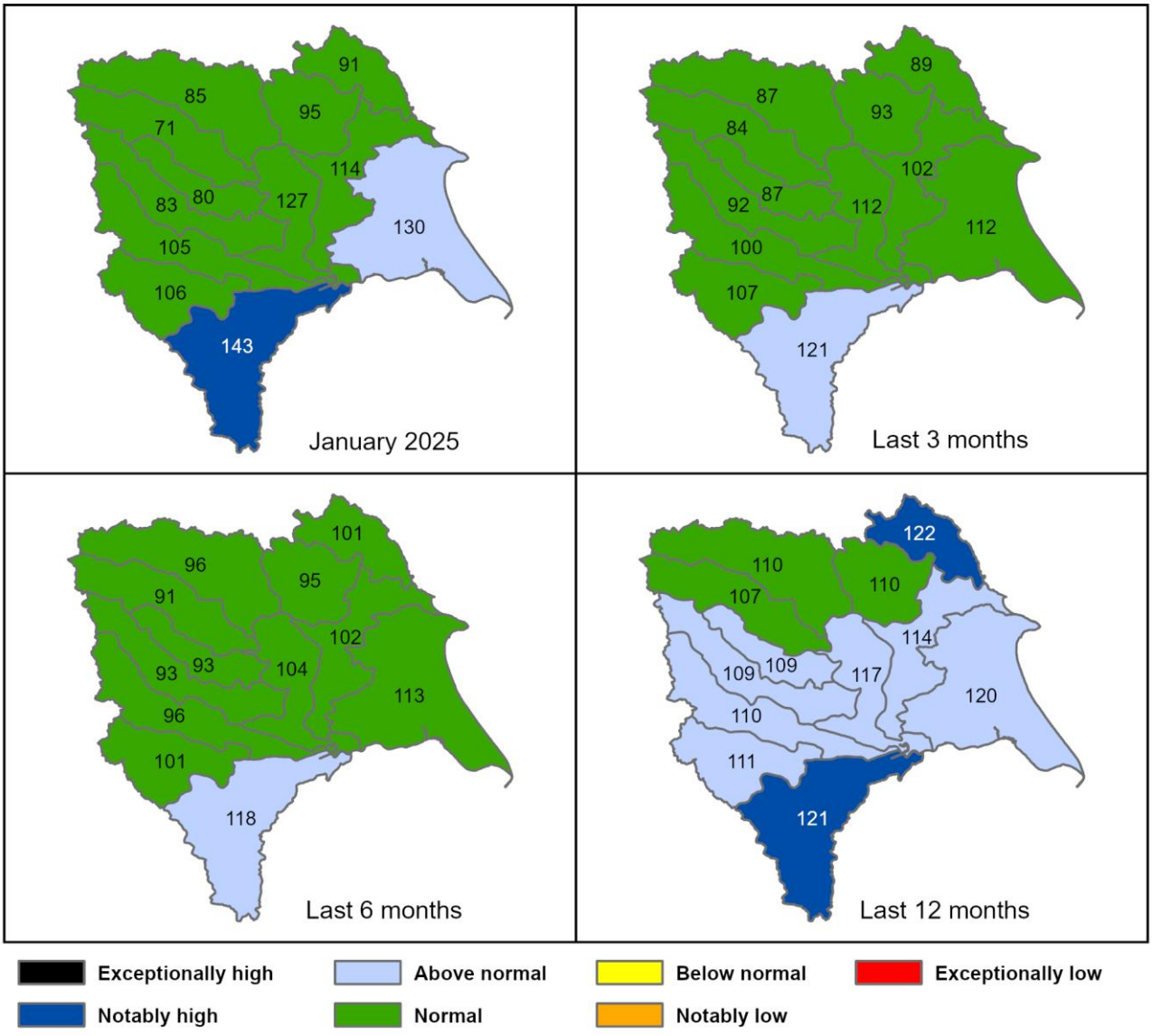
2 Rainfall

2.1 Rainfall map

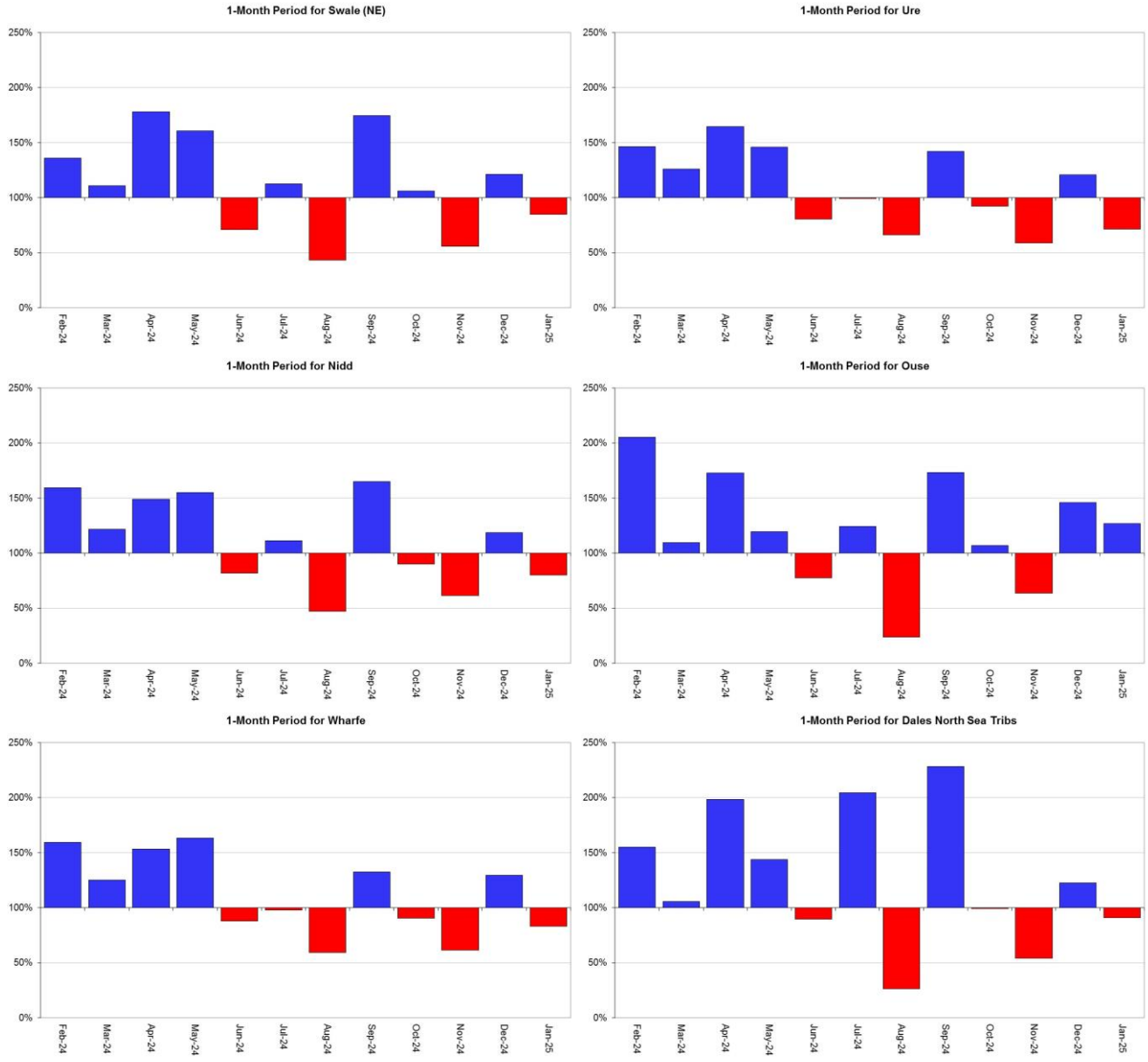
Figure 2.1: Total rainfall for hydrological areas for the current month (up to 31 January 2025), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.

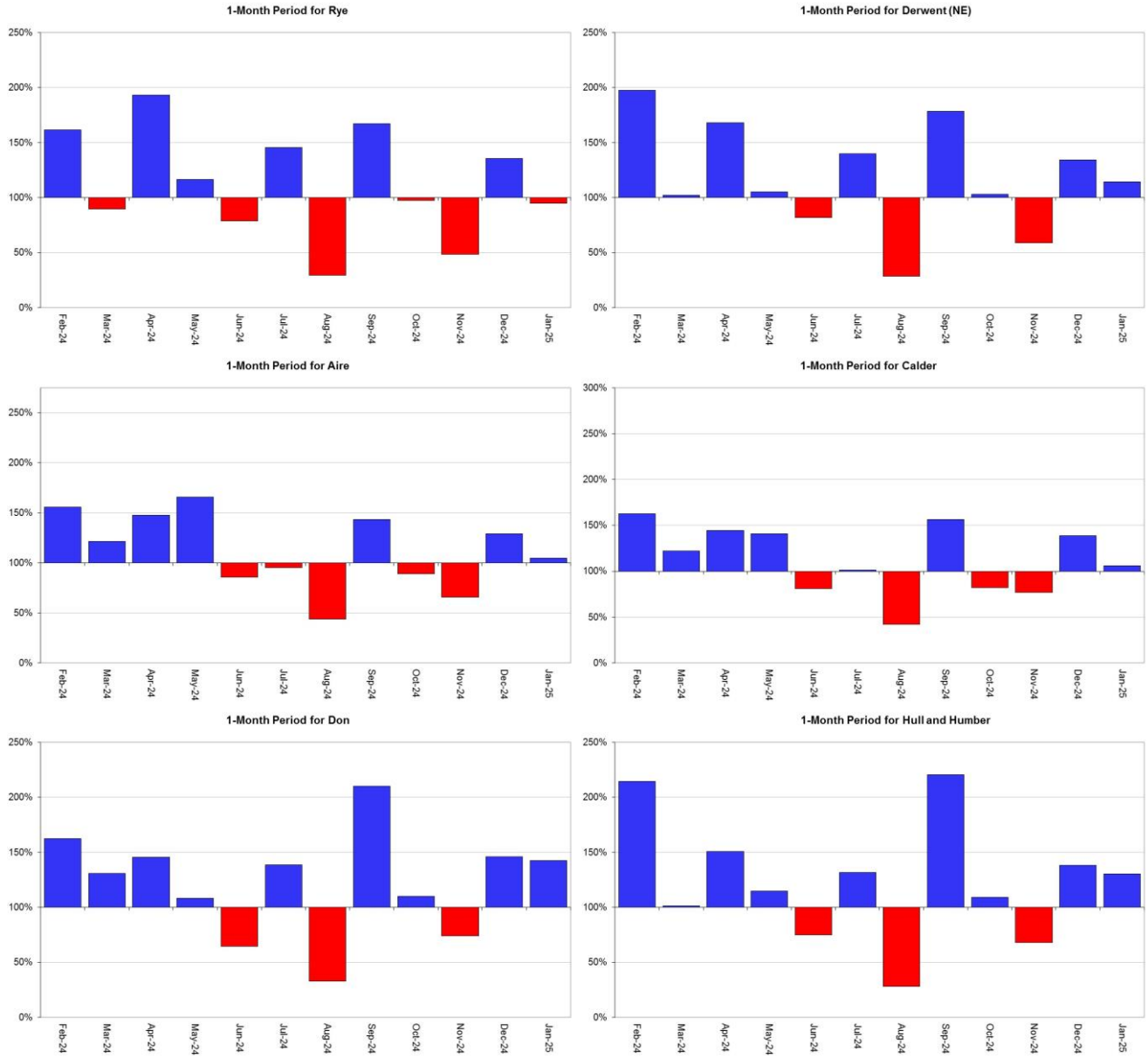


HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2025). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved. Environment Agency, 100024198, 2025.

2.2 Rainfall charts

Figure 2.2: Monthly rainfall totals for the past 24 months as a percentage of the 1961 to 1990 long term average for each region and for England.



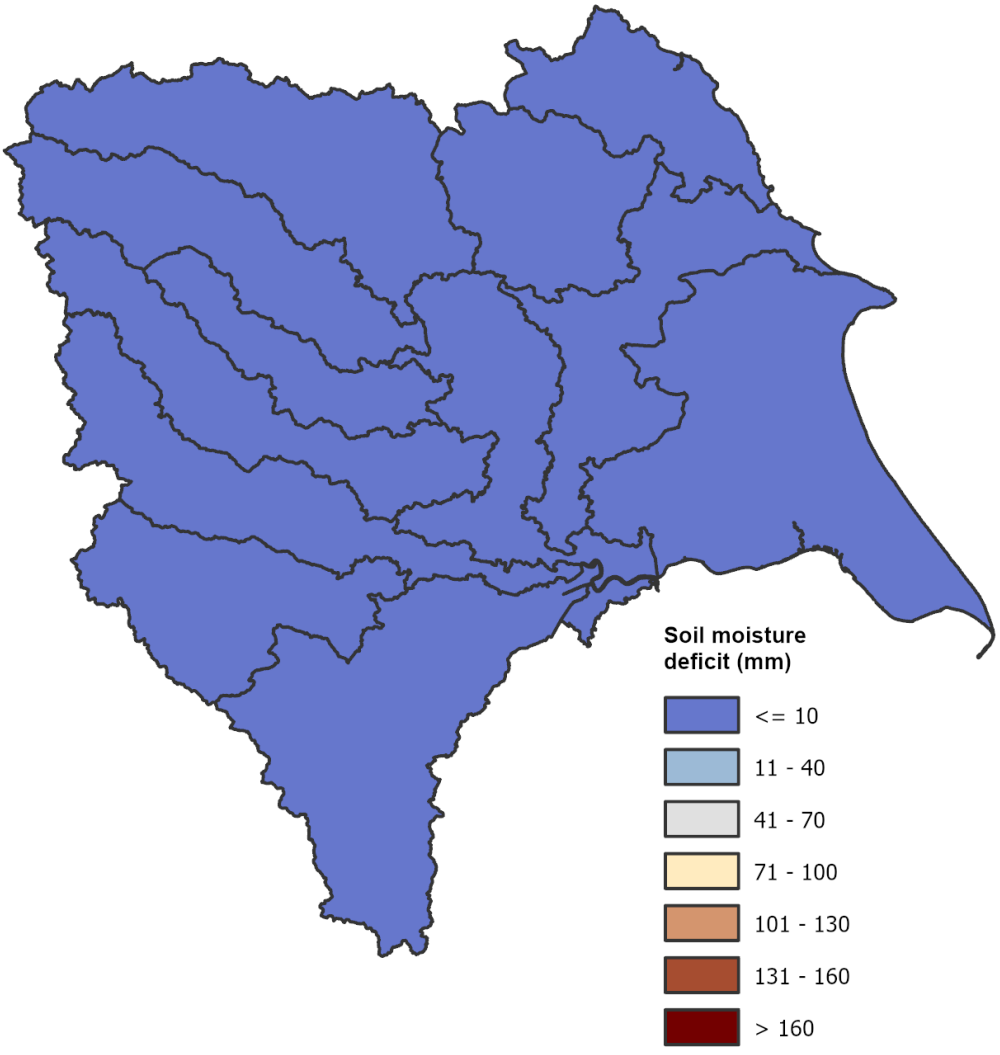


Rainfall data for 2024 and 2025, extracted from Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. (Source: Environment Agency. Crown Copyright, 100024198, 2025). Rainfall data prior to 2024, extracted from Met Office HadUK 1km gridded rainfall dataset derived from registered rain gauges (Source: Met Office. Crown copyright, 2025).

3 Soil moisture deficit

3.1 Soil moisture deficit map

Figure 3.1: Soil moisture deficits for weeks ending 31 January 2025. Shows the difference (mm) of the actual soil moisture deficit from the 1961 to 1990 long term average soil moisture deficits. MORECS data for real land use.



4 River flows

4.1 River flows map

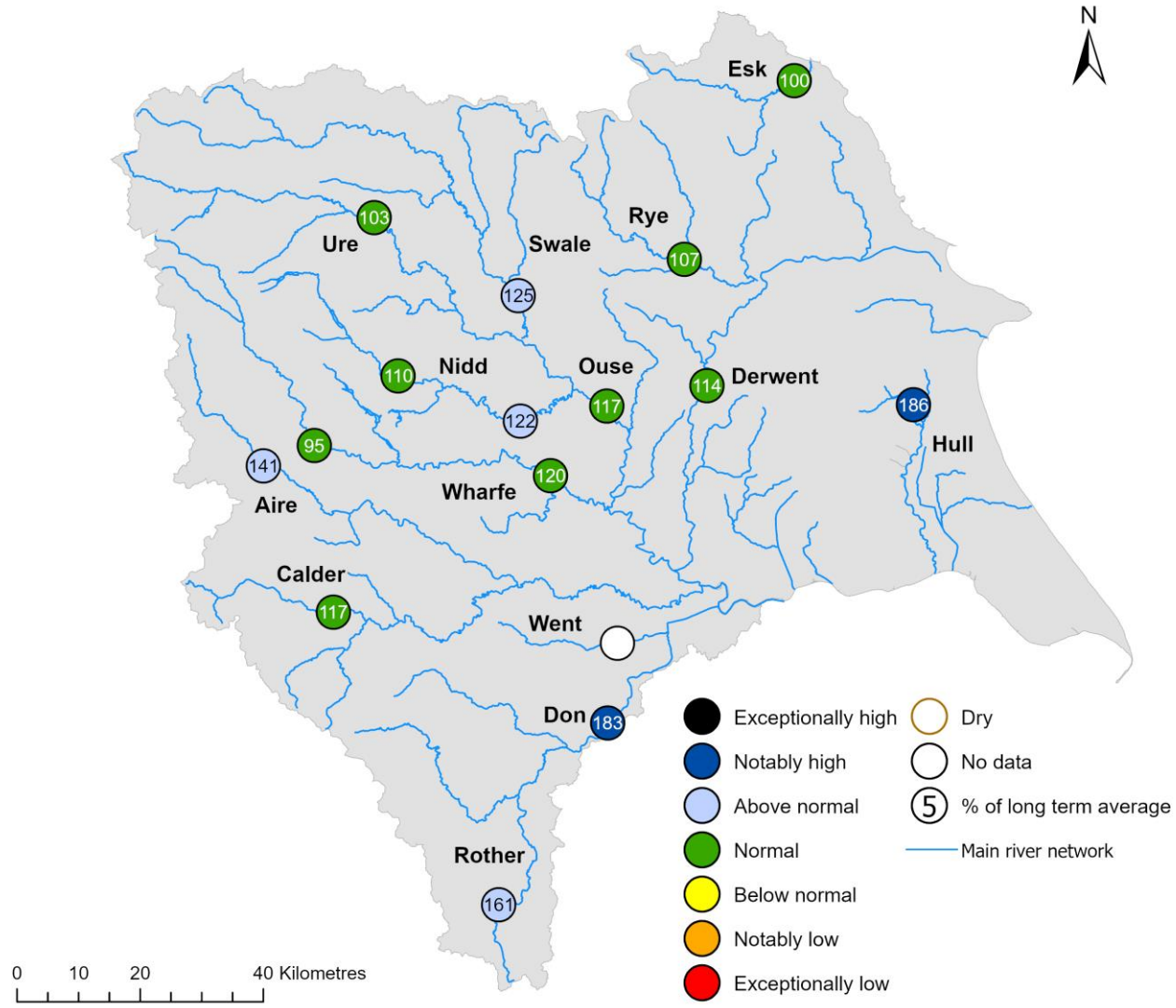
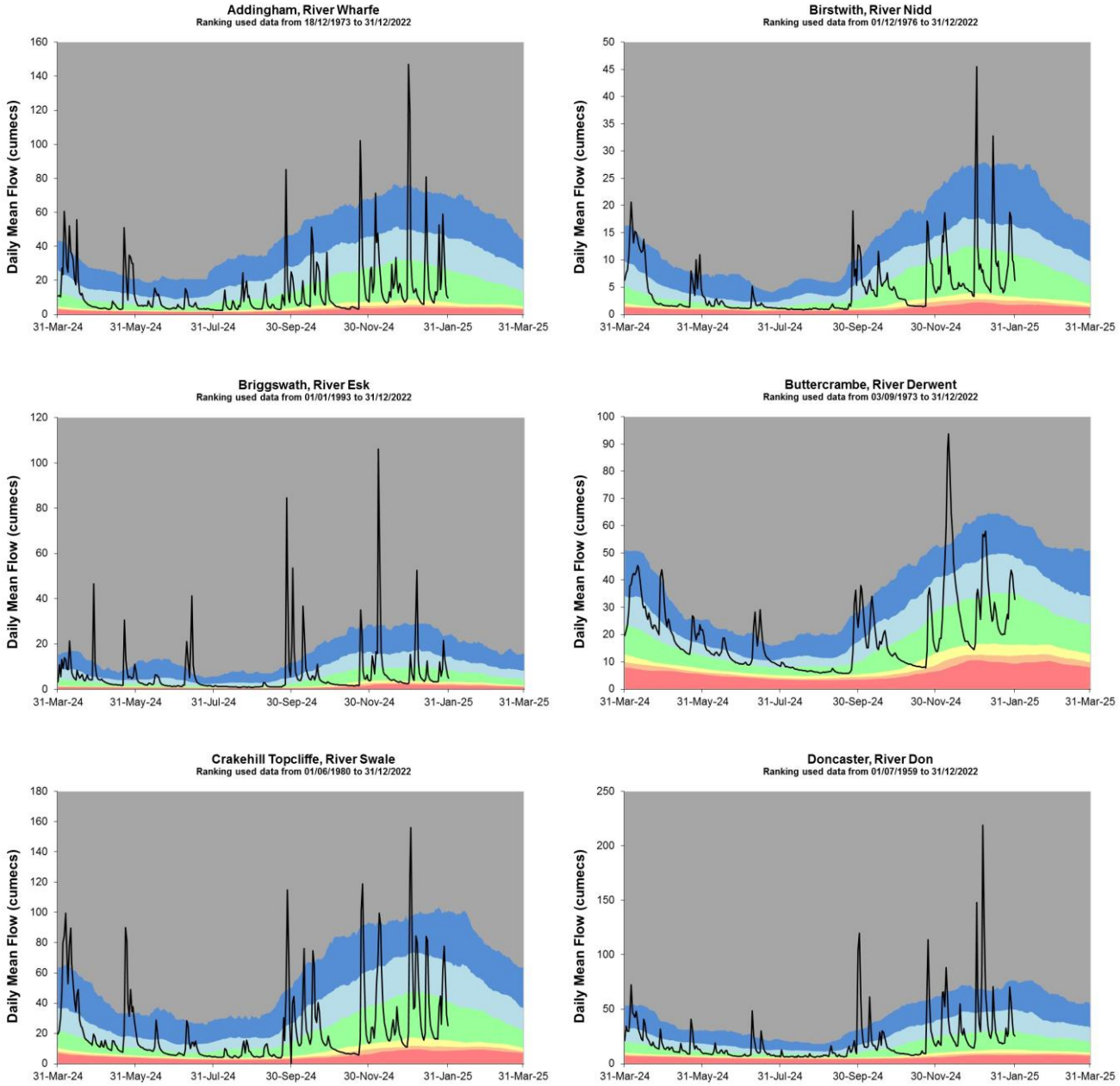


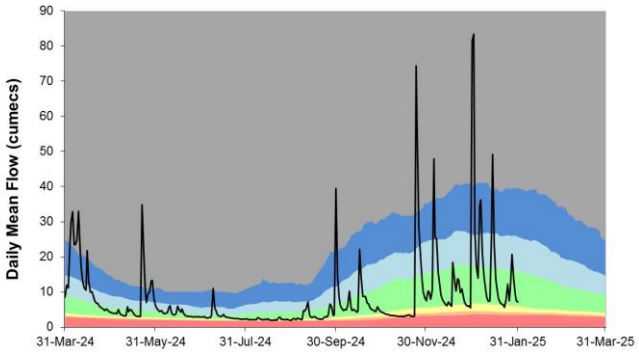
Figure 4.1: Monthly mean river flow for indicator sites for January 2025, expressed as a percentage of the respective long term average and classed relative to an analysis of historic January monthly means Table available in the appendices with detailed information.

4.2 River flow charts

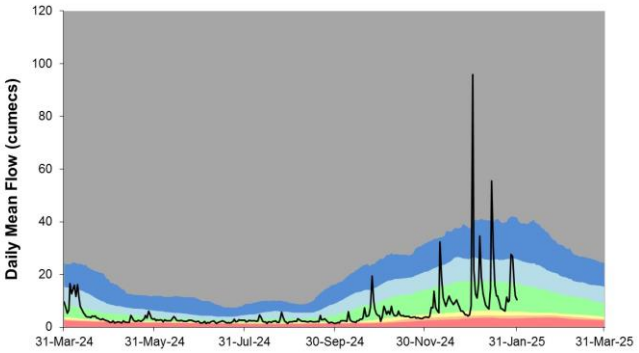
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows.



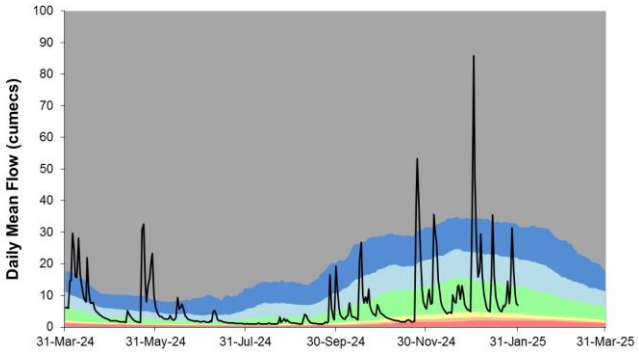
Elland, River Calder
Ranking used data from 01/07/1971 to 31/12/2022



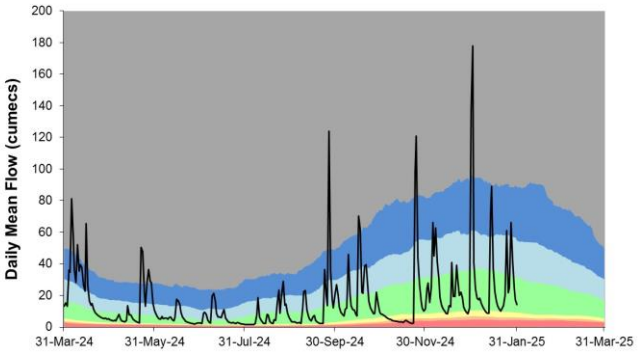
Hunsingore, River Nidd
Ranking used data from 01/10/1968 to 31/12/2022



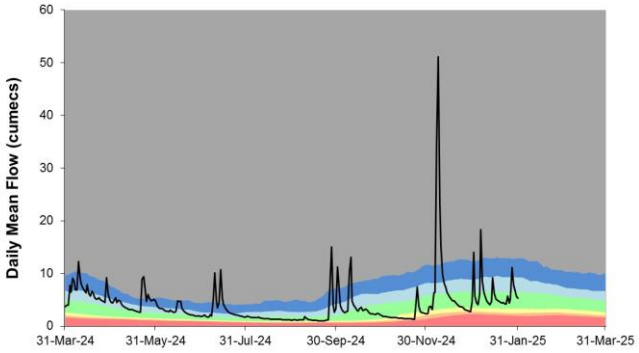
Kildwick, River Aire
Ranking used data from 01/08/1971 to 31/12/2022



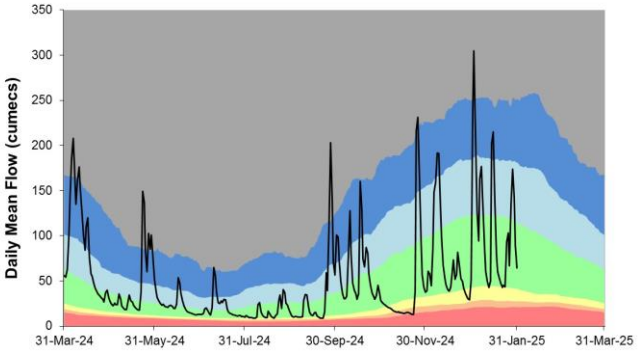
Kilgram Bridge, River Ure
Ranking used data from 01/08/1971 to 31/12/2022

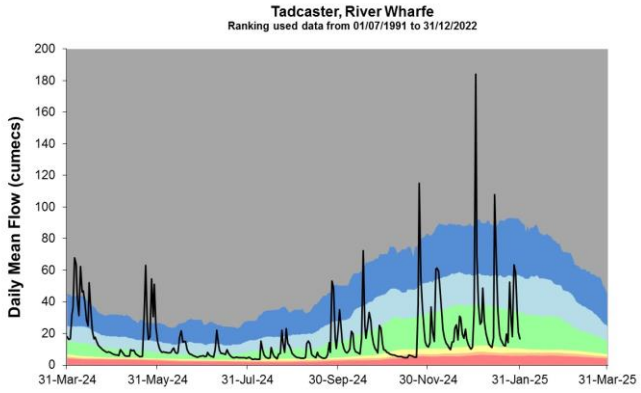


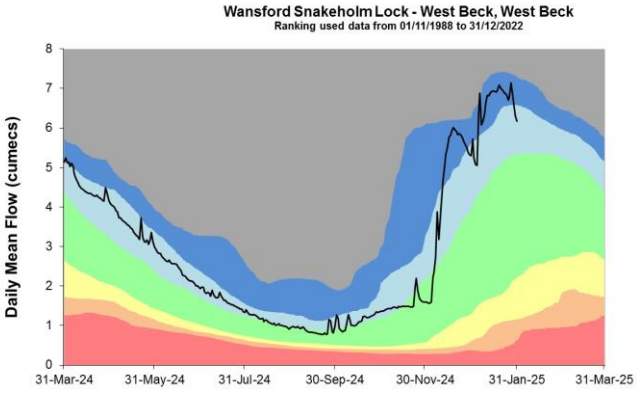
Ness, River Rye
Ranking used data from 01/09/1974 to 31/12/2022

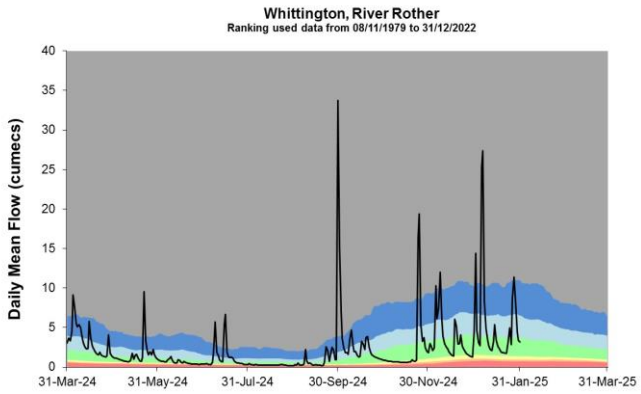


Skelton, River Ouse
Ranking used data from 18/09/1969 to 31/12/2022









5 Groundwater levels

5.1 Groundwater levels map

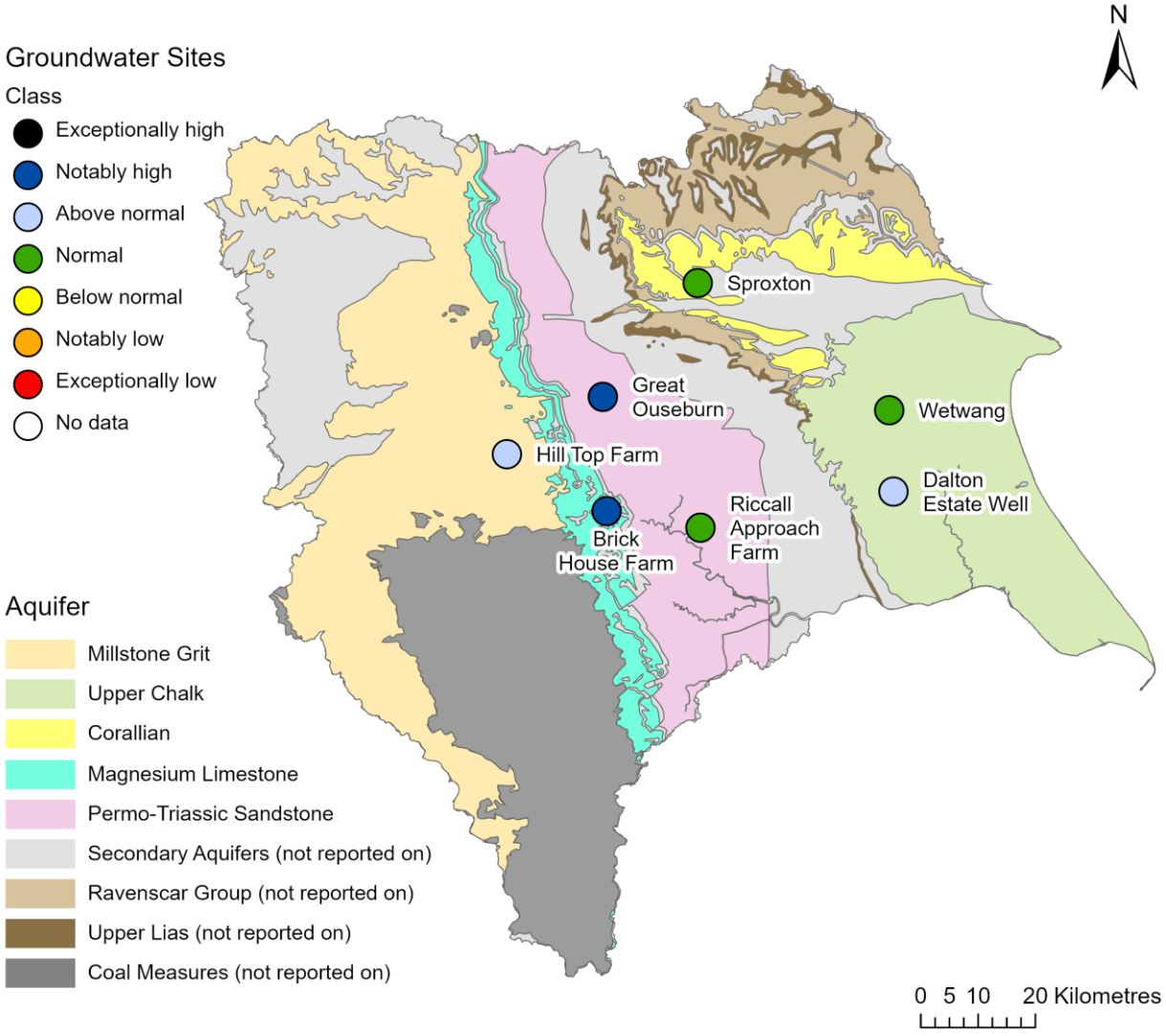
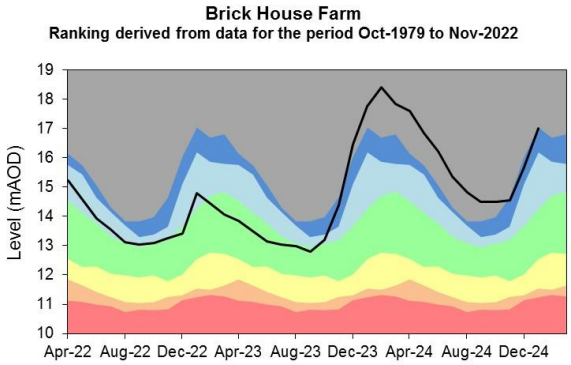
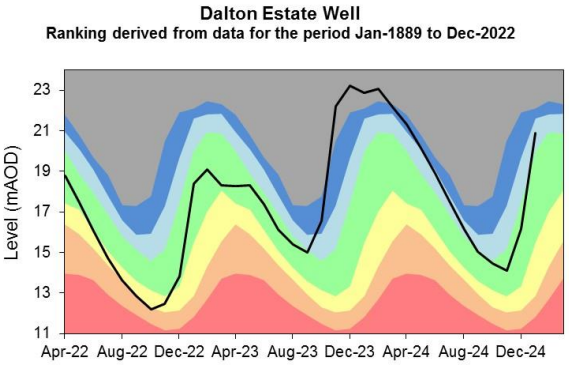
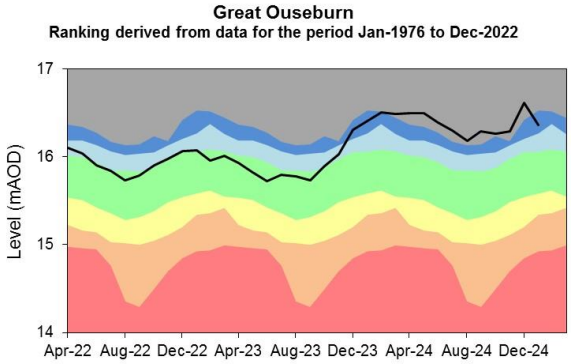


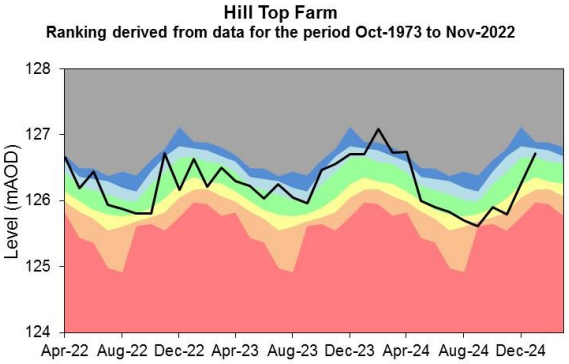
Figure 5.1: Groundwater levels for indicator sites at the end of January 2025, classed relative to an analysis of respective historic January levels. Table available in the appendices with detailed information.

5.2 Groundwater level charts









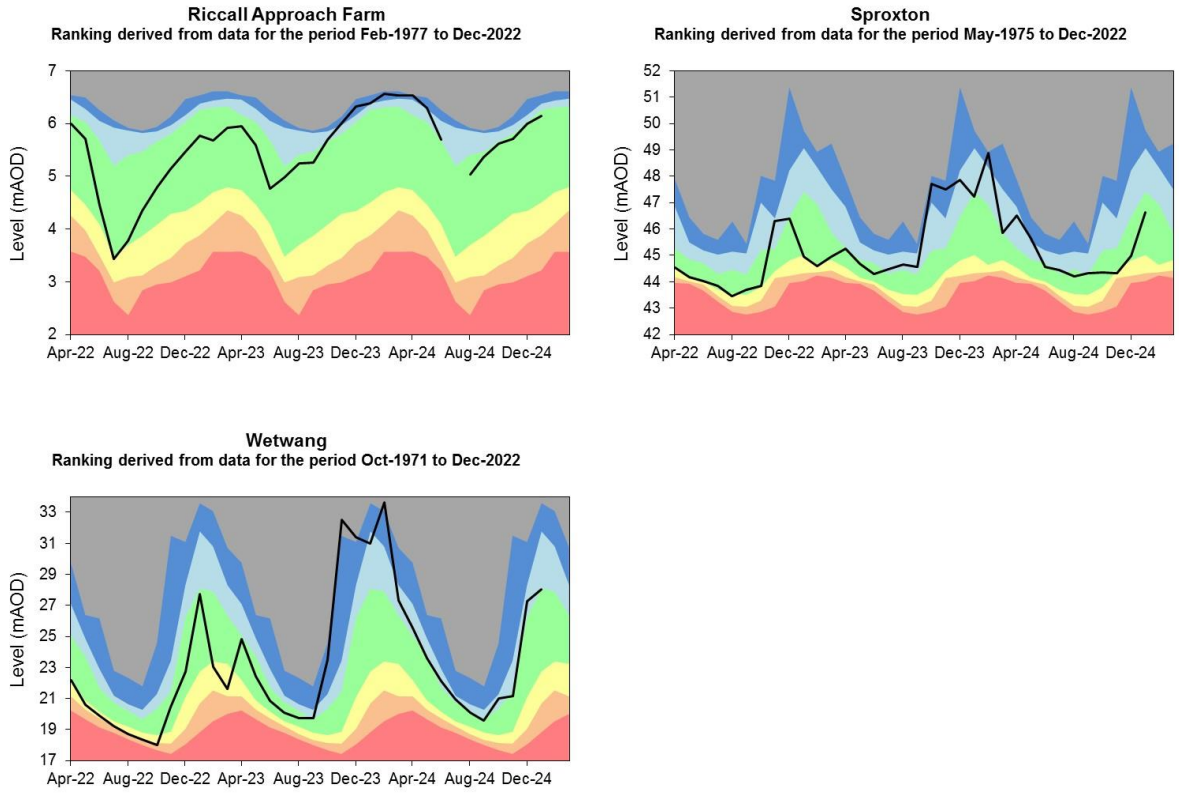
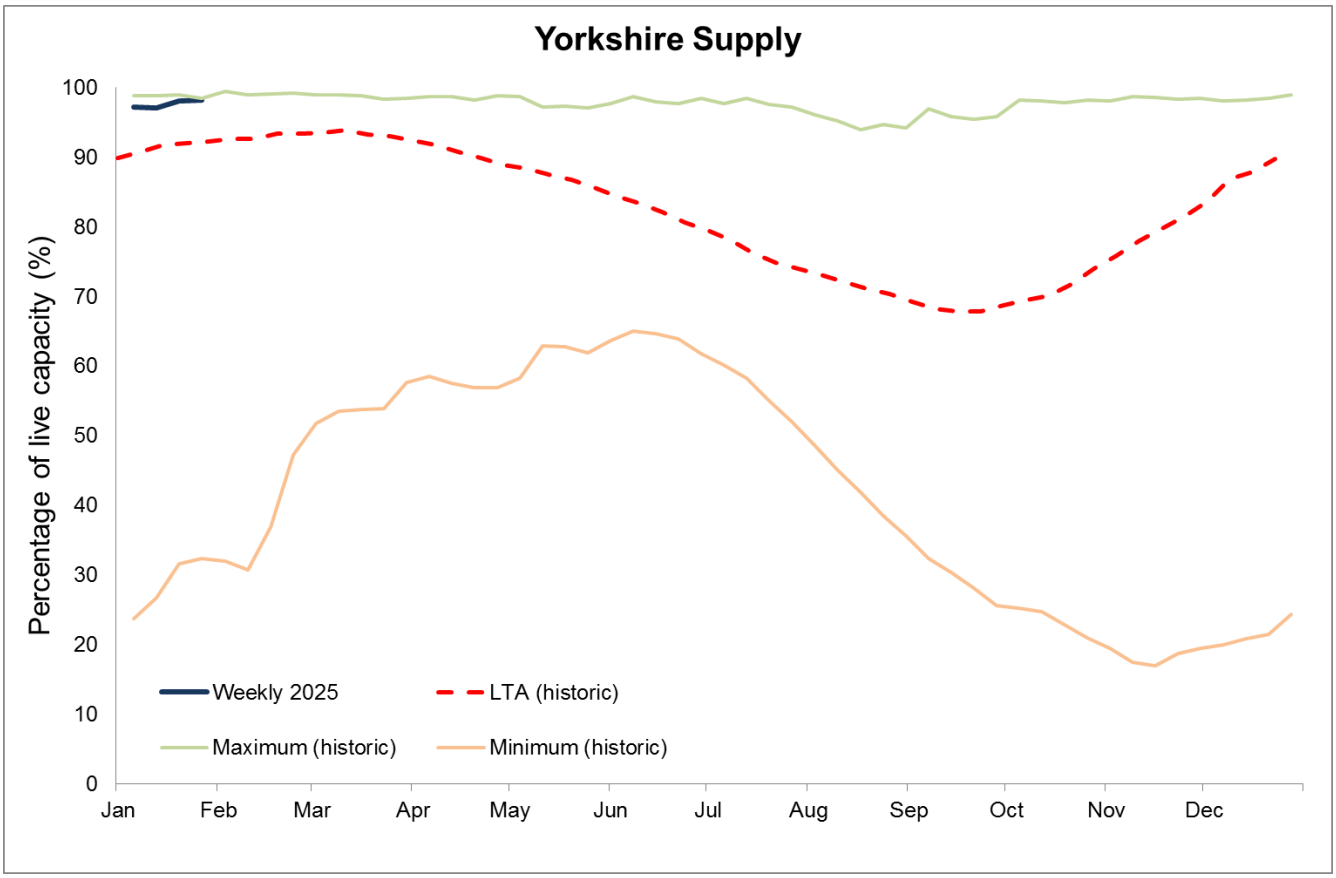


Figure 5.2: End of month groundwater levels at index groundwater level sites for major aquifers. 22 months compared to an analysis of historic end of month.

 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

Figure 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.



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 1961 to 1990. 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	Jan 2025 rainfall % of long term average 1961 to 1990	Jan 2025 band	Nov 2024 to January cumulative band	Aug 2024 to January cumulative band	Feb 2024 to January cumulative band
Aire	105	Normal	Normal	Normal	Above normal
Calder	106	Normal	Normal	Normal	Above normal
Dales North Sea Tribs	91	Normal	Normal	Normal	Notably high
Derwent (ne)	114	Normal	Normal	Normal	Above normal
Don	143	Notably High	Above normal	Above normal	Notably high
Hull And Humber	130	Above Normal	Normal	Normal	Above normal
Nidd	80	Normal	Normal	Normal	Above normal
Ouse	127	Normal	Normal	Normal	Above normal
Rye	95	Normal	Normal	Normal	Normal
Swale (ne)	85	Normal	Normal	Normal	Normal
Ure	71	Normal	Normal	Normal	Normal
Wharfe	83	Normal	Normal	Normal	Above normal

8.2 River flows table

Site name	River	Catchment	Jan 2025 band	Dec 2024 band
Addingham	Wharfe	Wharfe Middle	Normal	Normal
Birstwith	Nidd	Nidd Middle	Normal	Normal
Briggswath	Esk	Esk Yorks	Normal	Above normal
Buttercrambe	Derwent	Derwent Yorks Middle	Normal	Above normal
Crakehill Topcliffe	Swale	Swale Lower	Above normal	Normal
Doncaster	Don	Don Lower	Notably high	Above normal
Elland	Calder	Calder Yorks Upper	Normal	Normal
Hunsingore	Nidd	Nidd Lower	Above normal	Normal
Kildwick	Aire	Aire Upper	Above normal	Normal
Kilgram Bridge	Ure	Ure Middle	Normal	Normal
Ness	Rye	Rye	Normal	Above normal
Skelton	Ouse	Ouse Yorks	Normal	Normal
Tadcaster	Wharfe	Wharfe Lower	Normal	Normal
Walden Stubbs	Went	Don Lower		

Wansford Snakeholm Lock	West Beck	Hull Upper	Notably high	Notably high
Whittington	Rother	Rother Yorks	Above normal	Normal

8.3 Groundwater table

Site name	Aquifer	End of Jan 2025 band	End of Dec 2024 band
Brick House Fm	Wharfe Magnesian Limestone	Notably high	Notably high
Dalton Estate Well	Hull & East Riding Chalk	Above normal	Normal
Great Ouseburn	Sherwood Sandstone	Notably high	Exceptionally high
Hill Top Fm	Millstone Grit And Carboniferous Limestone	Above normal	Normal
Riccall Approach Farm	Sherwood Sandstone	Normal	Normal
Sproxton	Sherwood Sandstone	Normal	Normal
Wetwang	Hull & East Riding Chalk	Normal	Above normal