Monthly water situation report: North East

1 Summary – December 2024

December rainfall totals were classed as above average, with notable amounts of rainfall recorded on 7 and 31 December. Monthly mean river flows increased this month at all indicator sites and fall within the normal and above normal ranges. Groundwater levels vary across the area and generally remain above normal due to the high rainfall recorded in previous months. Soil moisture deficit (SMD) data still shows wet soils across the area. All reservoirs in the area have either seen an increase or no change in stocks this month and remain healthy for the time of year.

1.1 Rainfall

Monthly rainfall totals were classed as above the long term average (LTA) for all catchments across the area. Monthly rainfall totals ranged from 101% of the LTA in the Seaham catchment to 119% of the LTA in the Tyne catchment.

Analysis of the daily rainfall shows a dry spell at the start of the month then a significant rainfall event on 7 December. The remainder of the month was also relatively dry with the exception of 31 December when large rainfall totals were recorded across the southern half of the area.

Cumulative 3-month rainfall totals are in the normal range for all catchments except the Seaham catchment which falls in the below normal range.

1.2 Soil moisture deficit and recharge

Soils are classed as wet with less than 10mm soil moisture deficit across the area.

1.3 River flows

Monthly mean river flows have increased this month at all indicator sites and fall within the normal or above normal ranges. Monthly mean flows ranged from 86% of the LTA at Haydon Bridge on the River South Tyne to 129% of the LTA at Rothbury on the River Coquet.

Analysis of the daily mean flows shows that flows were in the notably low, below normal or normal ranges at the start of the month. Daily mean flows increased at all indicator sites

following a period of significant rainfall on 7 December. Mean daily flows remained relatively steady for the remainder of the month up to 31 December when flows rapidly increased following a period of heavy rainfall in the south of the area. Peaks were recorded at all indicator sites with the exception of Heaton Mill on the River Till, where flows ended the month exceptionally low as the rainfall did not extend to the Till catchment. All other indicator sites fell within the normal, above normal or exceptionally high ranges by the end of the month.

1.4 Groundwater levels

Groundwater levels vary across the area. Levels in West Hall Farm borehole in the Wear Magnesian Limestone remain in the exceptionally high range. The level in Aycliffe NRA2 in the Skerne Magnesian Limestone decreased slightly and now falls within the above normal range. Royalty Observation is classed as above normal in the Fell Sandstone. Red Lion in the Skerne Magnesian Limestone and Town Law in the Fell Sandstone fall within the normal ranges for December.

1.5 Reservoir stocks

All reservoirs in the area have seen an increase in stocks this month, with the exception of the Lune and Balder group which remained the same. Stocks in the Durham group, Lune and Balder Group and Cow Green reservoir ended the month above 90% full. Overall, reservoir stocks remain healthy for the time of year.

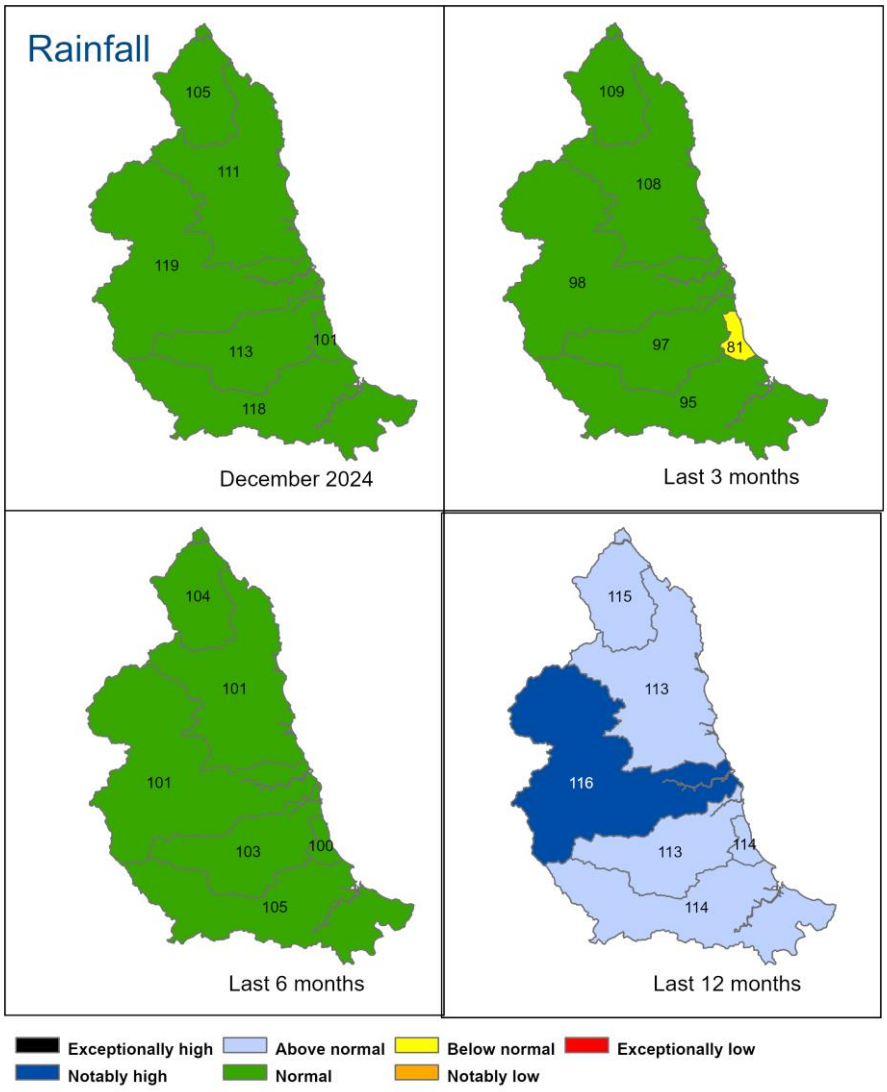
Reservoir or reservoir group	Percentage of current stocks	Percentage of previous month stocks
Kielder	87.3	81.9
North Tynedale group	80	76.6
Derwent	87.2	85.9
Durham group	96.6	90.1
Lune and Balder group	97.4	97.4
Cow Green	98.1	97.6

Author: GWHCL North East, hydrology.northeast@environment-agency.gov.uk

2 Rainfall

2.1 Rainfall map

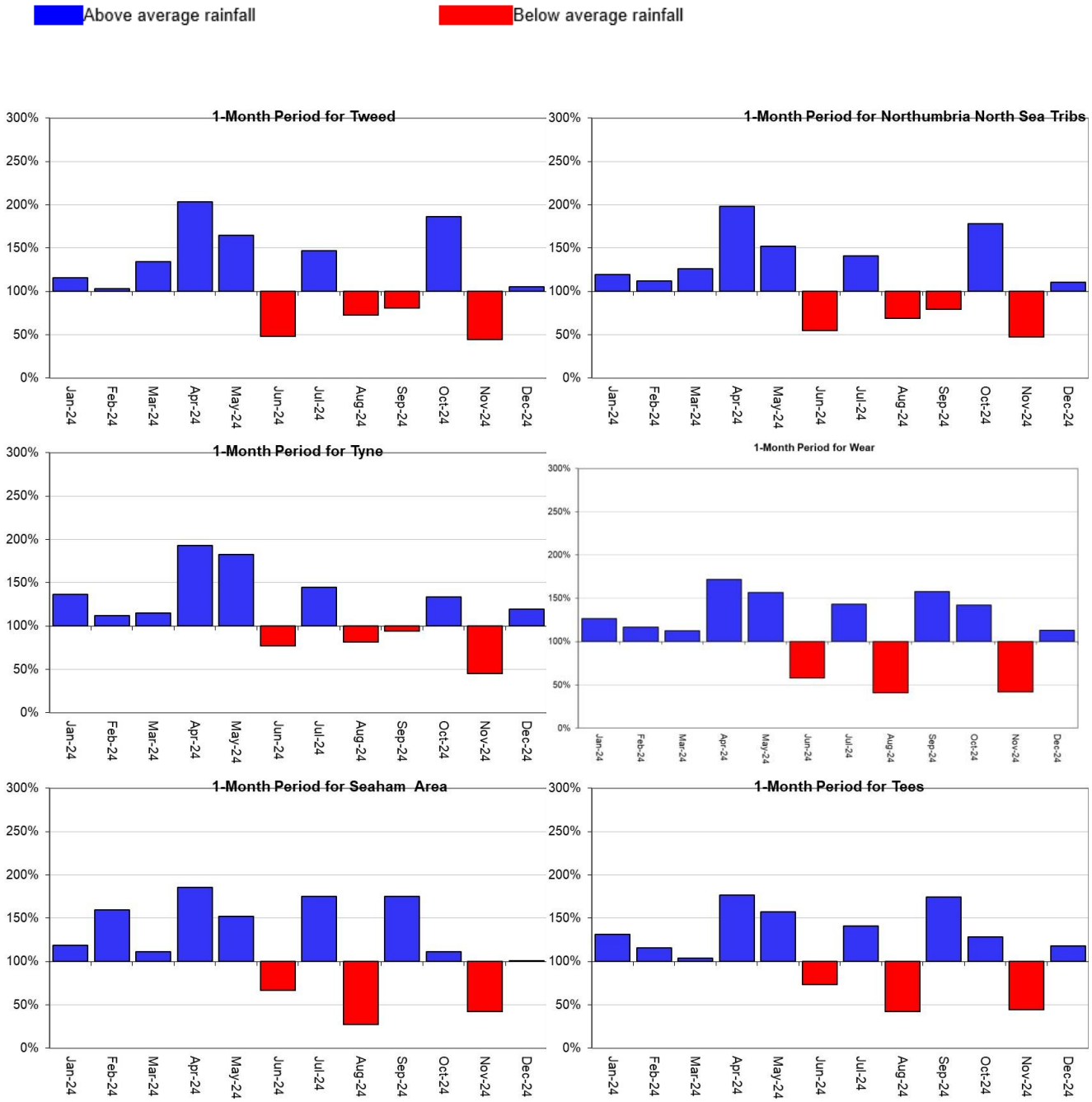
Figure 2.1: Total rainfall for hydrological areas for the current month (up to 31 December), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. December rainfall totals were classed as normal across the area. Table available in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



Rainfall data for 2024, 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 2023, extracted from Met Office HadUK 1km gridded rainfall dataset derived from registered rain gauges (Source: Met Office. Crown copyright, 2025).

2.2 Rainfall charts

Figure 2.2: Monthly rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average for each hydrometric area in the North East. Monthly rainfall totals are classed as above average for all catchments for December.



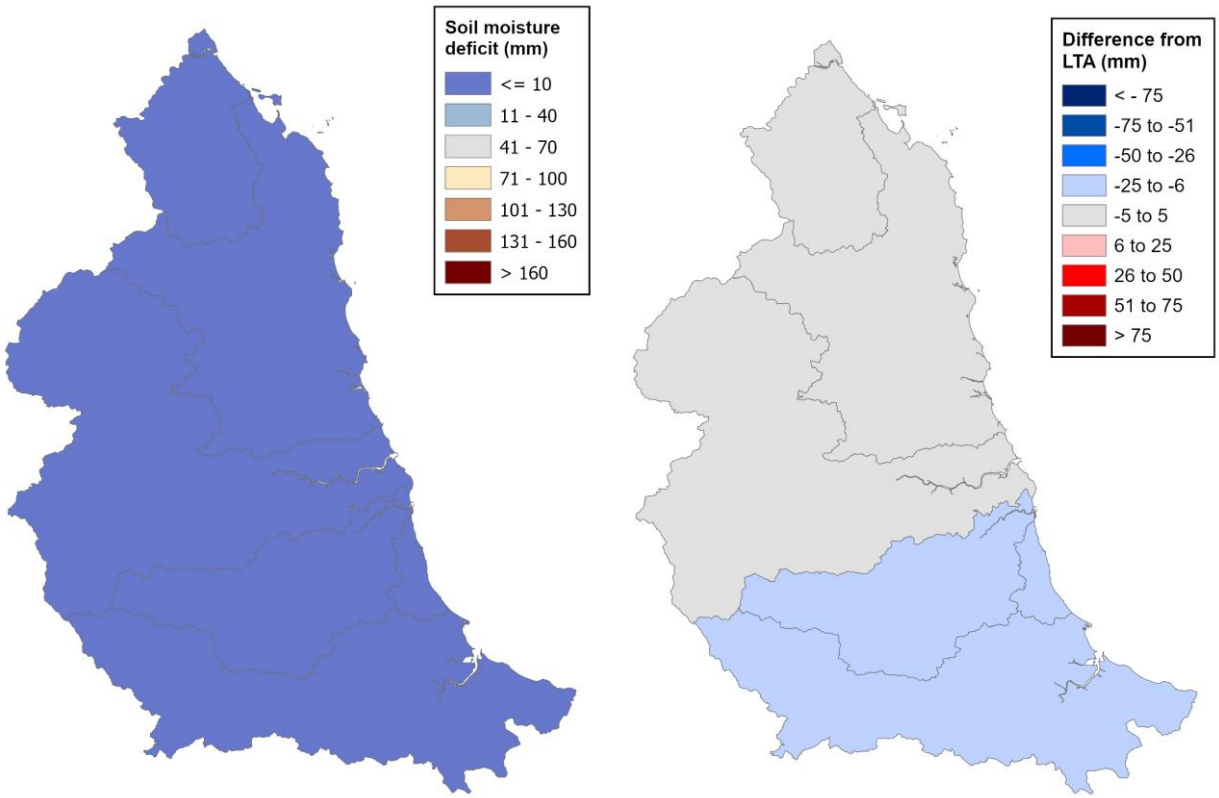
Rainfall data for 2024, extracted from Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. (Source: Environment Agency. Crown Copyright, 100024198, 2025). Rainfall data prior to 2023, extracted from Met Office HadUK

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

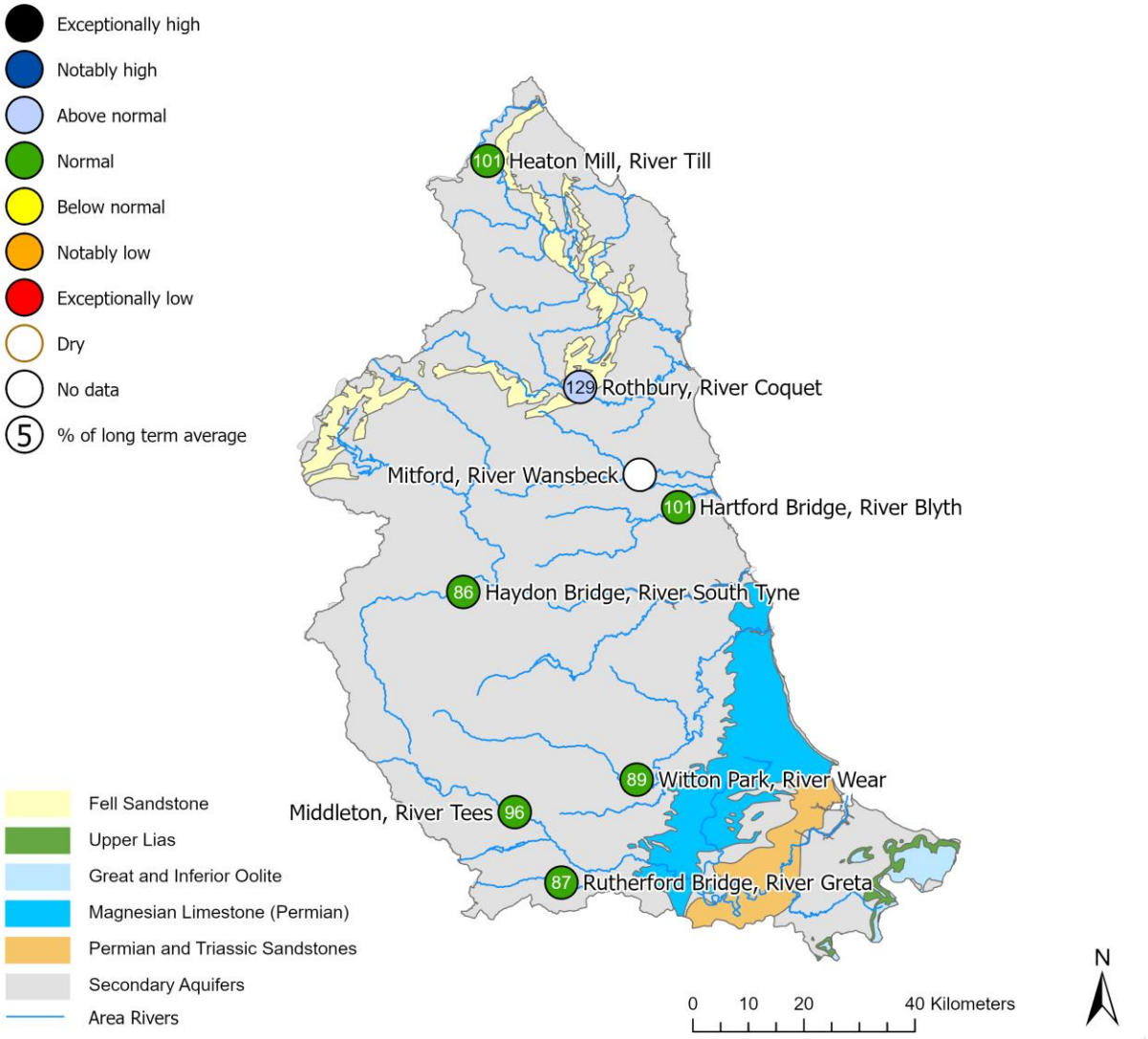
Figure 3.1: Map to the left shows soil moisture deficits for week ending 31 December. Map on the right shows the difference (mm) between the actual soil moisture deficit and the 1961 to 1990 long term average soil moisture deficits MORECS data for real land use. Soils are classed as wet with less than 10mm soil moisture deficit across the area.



4 River flows

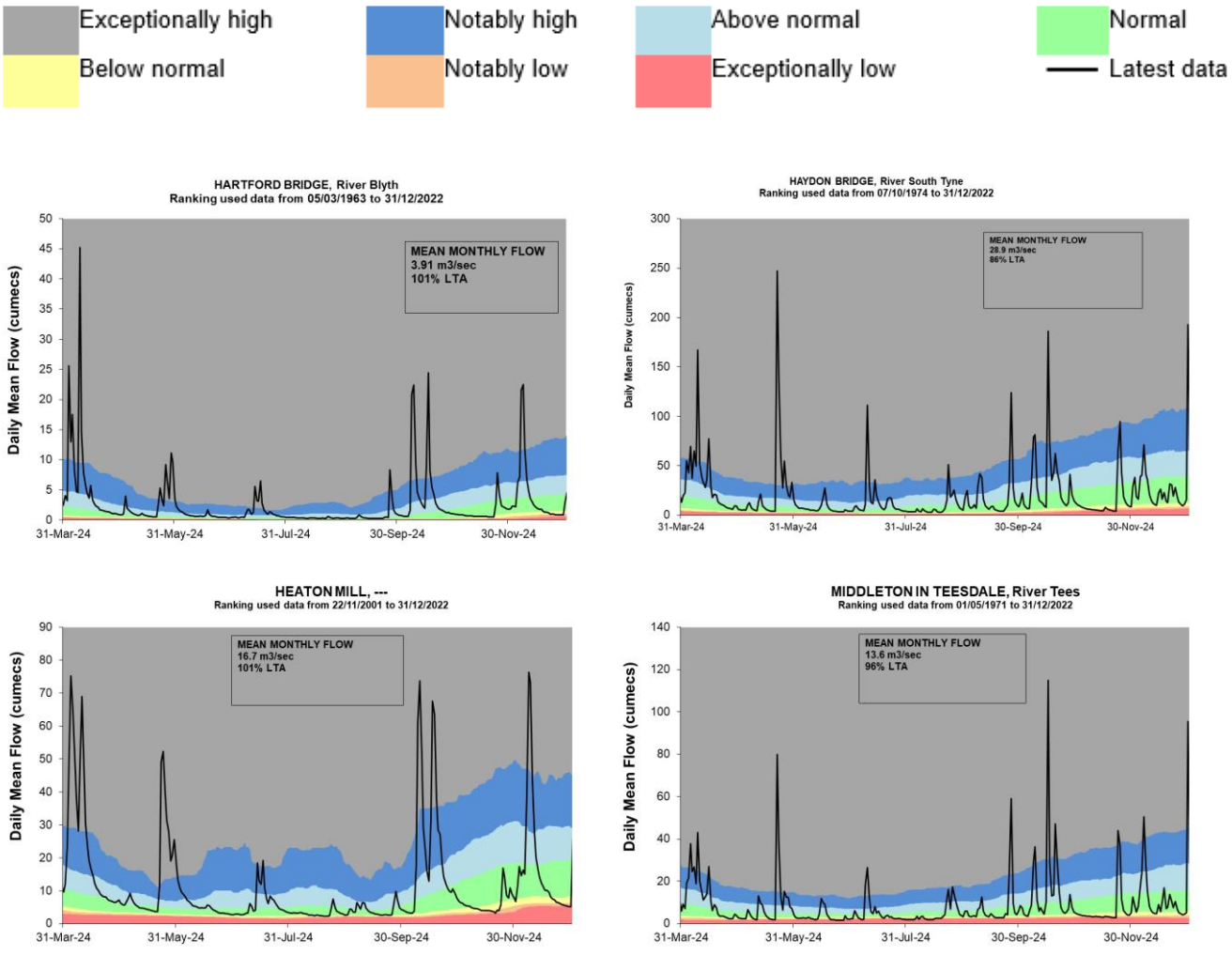
4.1 River flows map

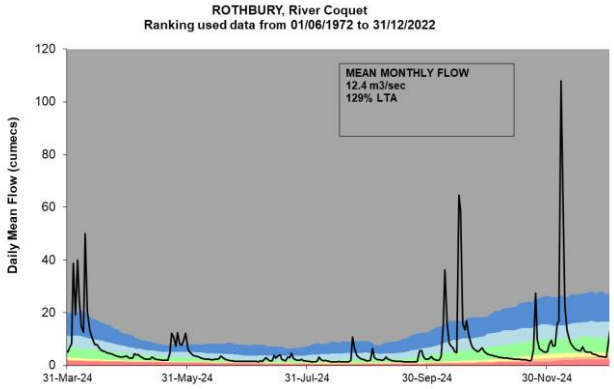
Figure 4.1: Monthly mean river flow for indicator sites for December 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic December monthly means. Monthly means are classed as normal at all indicator sites across the area with the exception of Rothbury on the River Coquet which is classed as above normal. There are ongoing data quality issues at Mitford on the River Wansbeck and therefore the site is marked as no data for the month. Table available in the appendices with detailed information.

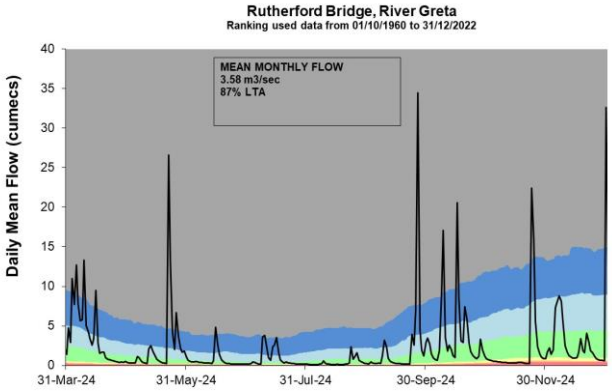


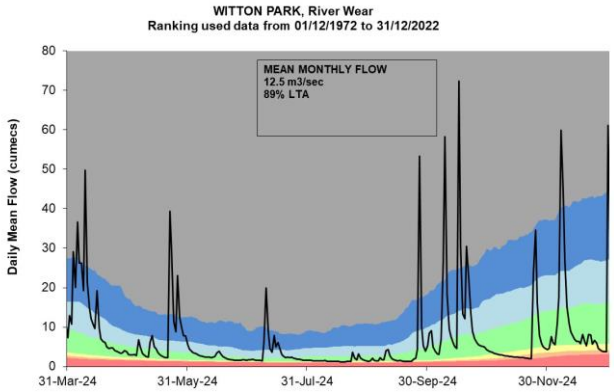
4.2 River flow charts

Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows. There are ongoing data quality issues at Mitford on the River Wansbeck with no data from October 2023 onwards and hence no graph below.







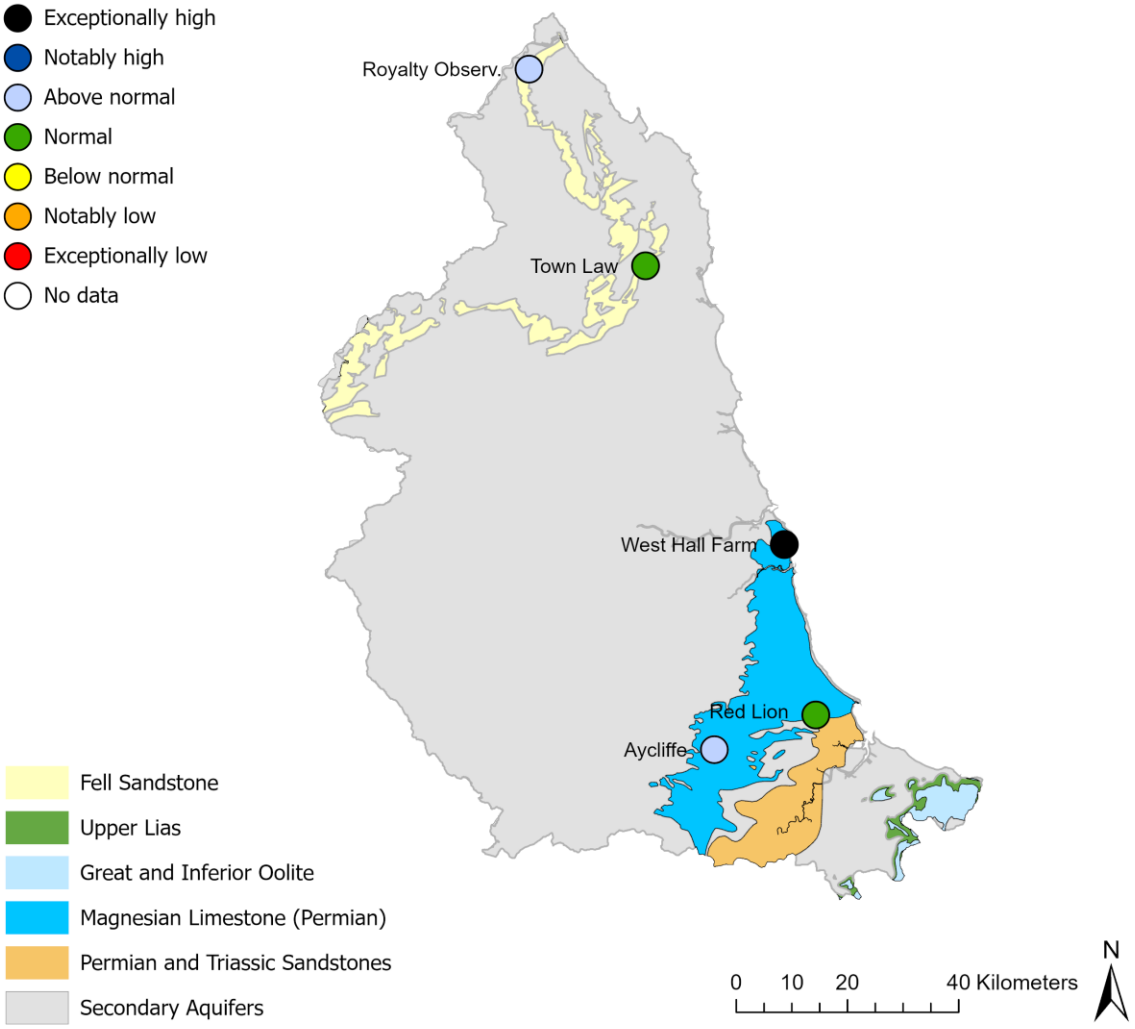


Source: Environment Agency, 2024.

5 Groundwater levels

5.1 Groundwater levels map

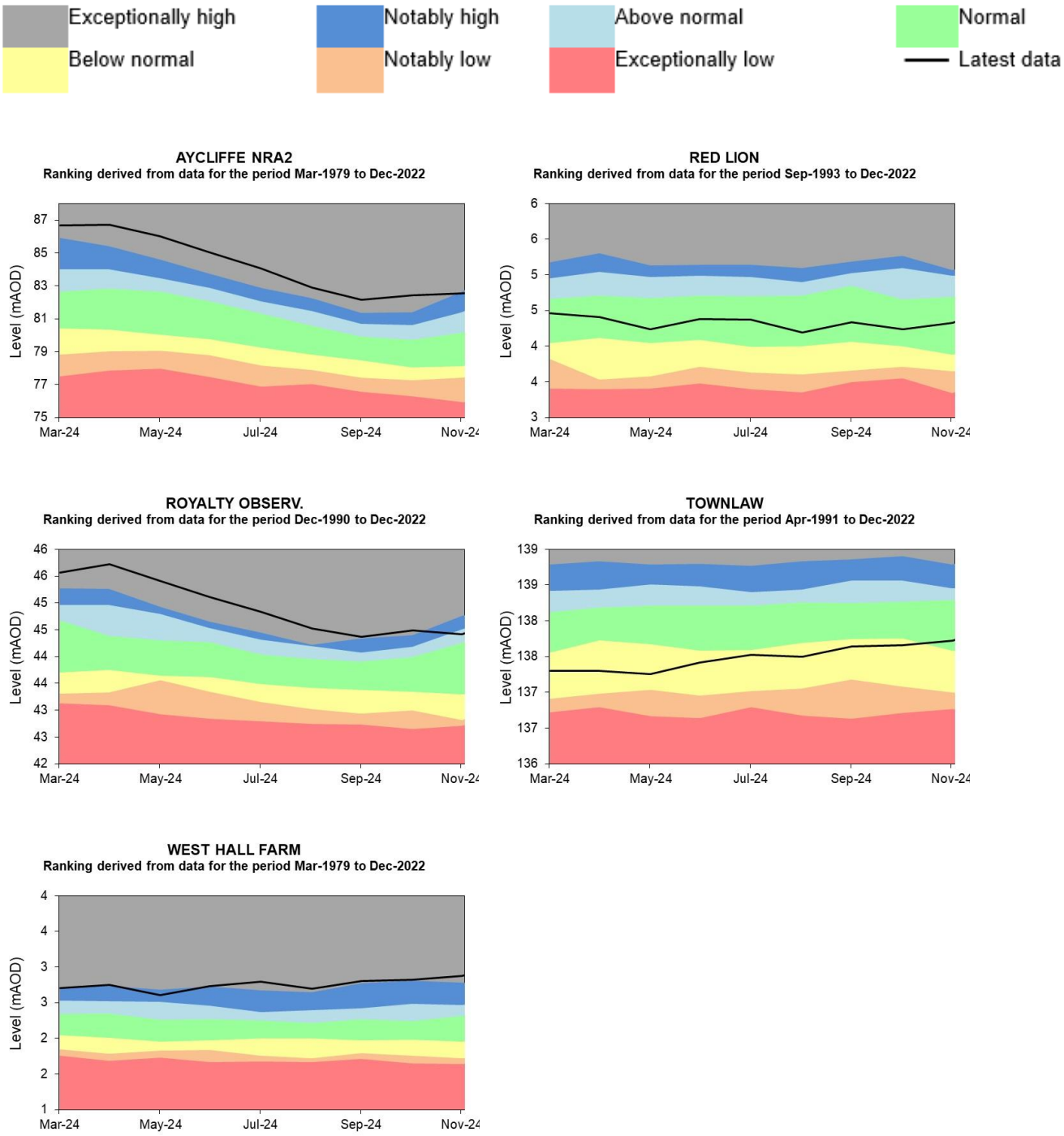
Figure 5.1: Groundwater levels for indicator sites at the end of December 2024, classed relative to an analysis of respective historic December levels. Groundwater levels are classed as exceptionally high at West Hall Farm on the Magnesian Limestone, as above normal at Aycliffe and normal at Red lion. In the north of the area Town Law is classed as normal and Royalty Observation is classed as above normal on the Fell Sandstone. 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, 100024198, 2025.

5.2 Groundwater level charts

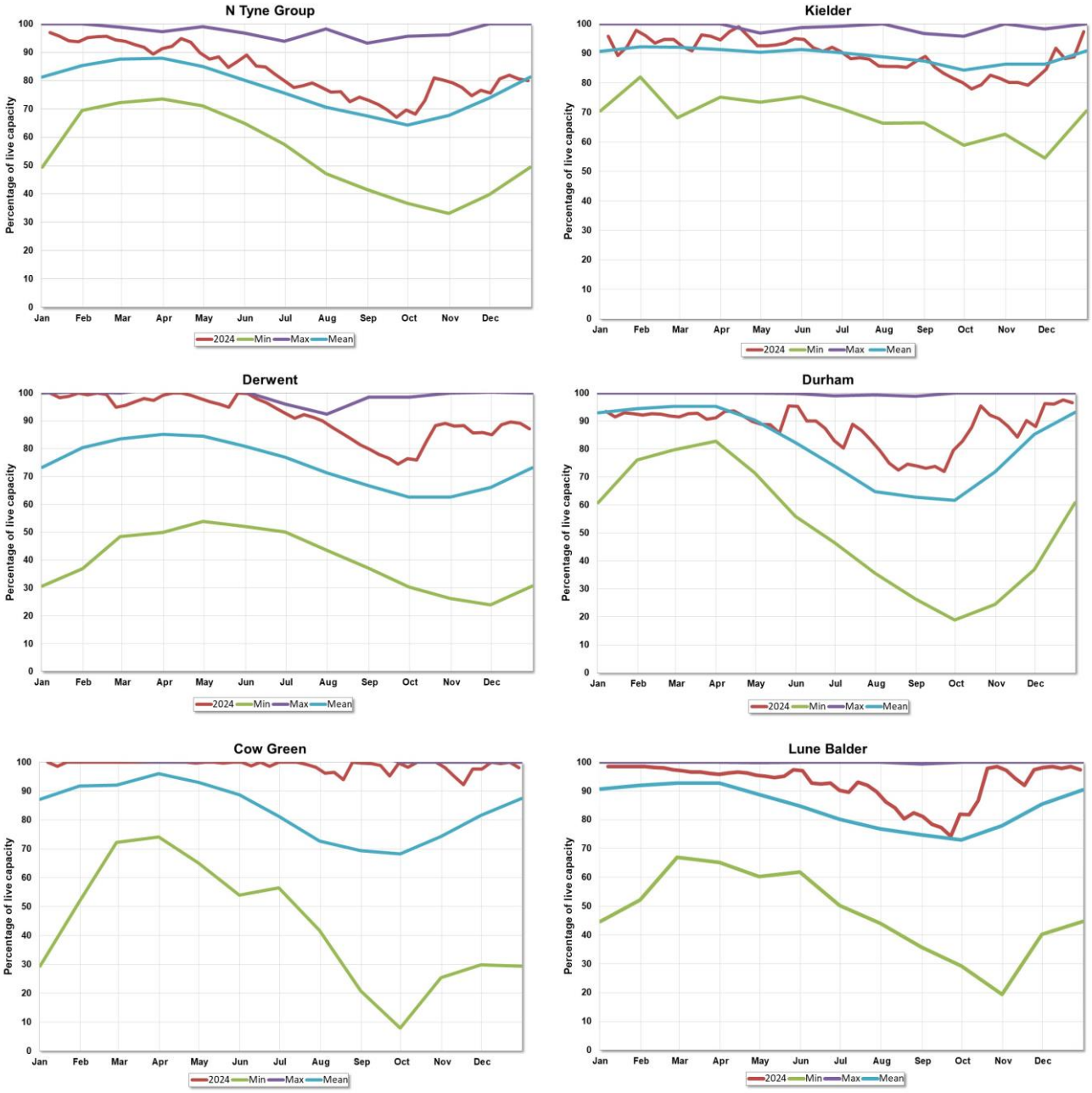
Figure 5.2: End of month groundwater levels at index groundwater level sites for major aquifers in the North East. 12 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



Source: Environment Agency, 2025.

6 Reservoir stocks

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



(Source: Water Company).

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	December 2024 rainfall % of long term average 1961 to 1990	December 2024 band	October 2024 to December 2024 cumulative band	July 2024 to December 2024 cumulative band	January 2024 to December 2024 cumulative band
Northumbria North Sea Tribs	111	Normal	Normal	Normal	Above normal
Seaham Area	101	Normal	Below normal	Normal	Above normal
Tees	118	Normal	Normal	Normal	Above normal
Tweed	105	Normal	Normal	Normal	Above normal
Tyne	119	Normal	Normal	Normal	Notably high
Wear	113	Normal	Normal	Normal	Above normal

8.2 River flows table

Site name	River	Catchment	December 2024 band	November 2024 band
Hartford Bridge	Blyth	Blyth	Normal	Normal
Haydon Bridge	South Tyne	Tyne	Normal	Notably low
Heaton Mill	Till	Till	Normal	Notably low
Middleton In Teesdale	Tees	Tees	Normal	Notably low
Mitford	Wansbeck	Wansbeck	No data	No data
Rothbury	Coquet	Coquet	Above normal	Below normal
Rutherford Bridge	Greta	Tees	Normal	Below normal
Witton Park	Wear	Wear	Normal	Below normal

8.3 Groundwater table

Site name	Aquifer	End of December 2024 band	End of November 2024 band
Aycliffe Nra2	Skerne Magnesian Limestone	Above normal	Notably high
Red Lion	Skerne Magnesian Limestone	Normal	Normal
Royalty Observ.	Till Fell Sandstone	Above normal	Above normal
Townlaw	Till Fell Sandstone	Normal	Normal
West Hall Farm	Wear Magnesian Limestone	Exceptionally high	Exceptionally high