

Monthly water situation report: North East

1 Summary – October 2024

October was a month of two halves with the majority of rainfall recorded in the first half of the month. Monthly rainfall totals were classed as above average for October. Monthly mean river flows have increased this month at all indicator sites and fall within the above normal or notably high ranges. Groundwater levels remained the same as last month, generally falling into the normal or high ranges. Soil moisture deficit (SMD) data recorded an increase in wet soils across the area. All reservoirs in the area have seen an increase 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. October rainfall totals were classed as above normal for the Tweed and Northumbria North Sea Tribs catchments and normal for the rest of area. Monthly rainfall totals ranged from 111% of the LTA in the Seaham catchment to 186% of the LTA in the Tweed catchment.

Analysis of the daily rainfall shows a few rainfall spells were recorded across the area in the first week of October. Significant rainfall was recorded across the area on 8 and 9 October and again on 16 October with some very high rainfall accumulations recorded in a 24 hour period on 16 October. The final 2 weeks of October was fairly dry with little rainfall recorded.

Cumulative 3 month rainfall totals are all in the normal range. Cumulative 6 month totals are also in the normal range with the exception of the Tyne catchment which is classed as above normal.

1.2 Soil moisture deficit and recharge

Soils are classed as wet across the area with the exception of the eastern coastal area which is classed as normal.

1.3 River flows

Monthly mean river flows have increased this month at all indicator sites and fall within the above normal or notably high ranges. Monthly mean flows ranged from 145% of the LTA at Rutherford Bridge on the River Greta to 286% of the LTA at Hartford Bridge on the River Blyth.

Analysis of the daily mean flows shows that flows were in the normal or above normal ranges at the start of the month. Daily mean flows increased at all indicator sites from 7 October following a period of intense rainfall. Daily mean flows increased again on 16 October following another period of intense rainfall in the area with exceptionally high flows recorded across all indicator sites. In the second half of October flows decreased across all indicator sites following a fairly dry period and fell within the normal or above normal ranges by the end of the month.

1.4 Groundwater levels

Groundwater levels across all reporting boreholes have remained the same since last month. West Hall Farm on the Wear Magnesian Limestone, Aycliffe NRA2 on the Skerne Magnesian Limestone and Royal Observation on the Till Fell Sandstone remain in the exceptionally high range. Townlaw on the Fell sandstone remains at below normal levels. Red Lion on the Magnesian Limestone remains normal.

1.5 Reservoir stocks

All reservoirs in the area have seen an increase in stocks this month, with notable increases observed in the North Tynedale group, Durham group, Lune and Balder Group and Derwent reservoir. Cow Green reservoir is 100% 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	81.5	80.2
North Tynedale group	80.1	69.6
Derwent	89.2	76.4

Durham group	92.1	79.6
Lune and Balder group	98.5	82
Cow Green	100	99.7

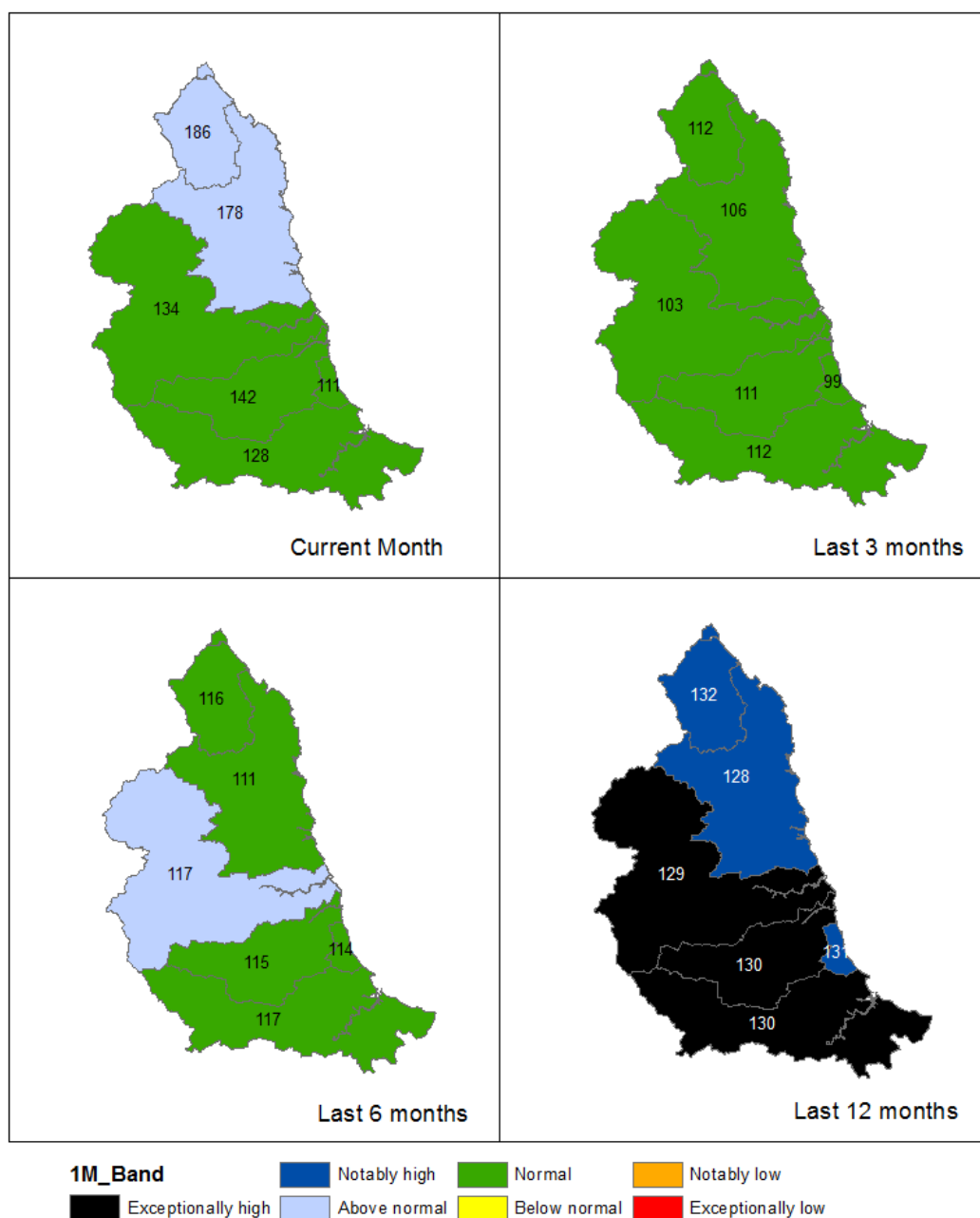
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2 Rainfall

2.1 Rainfall map

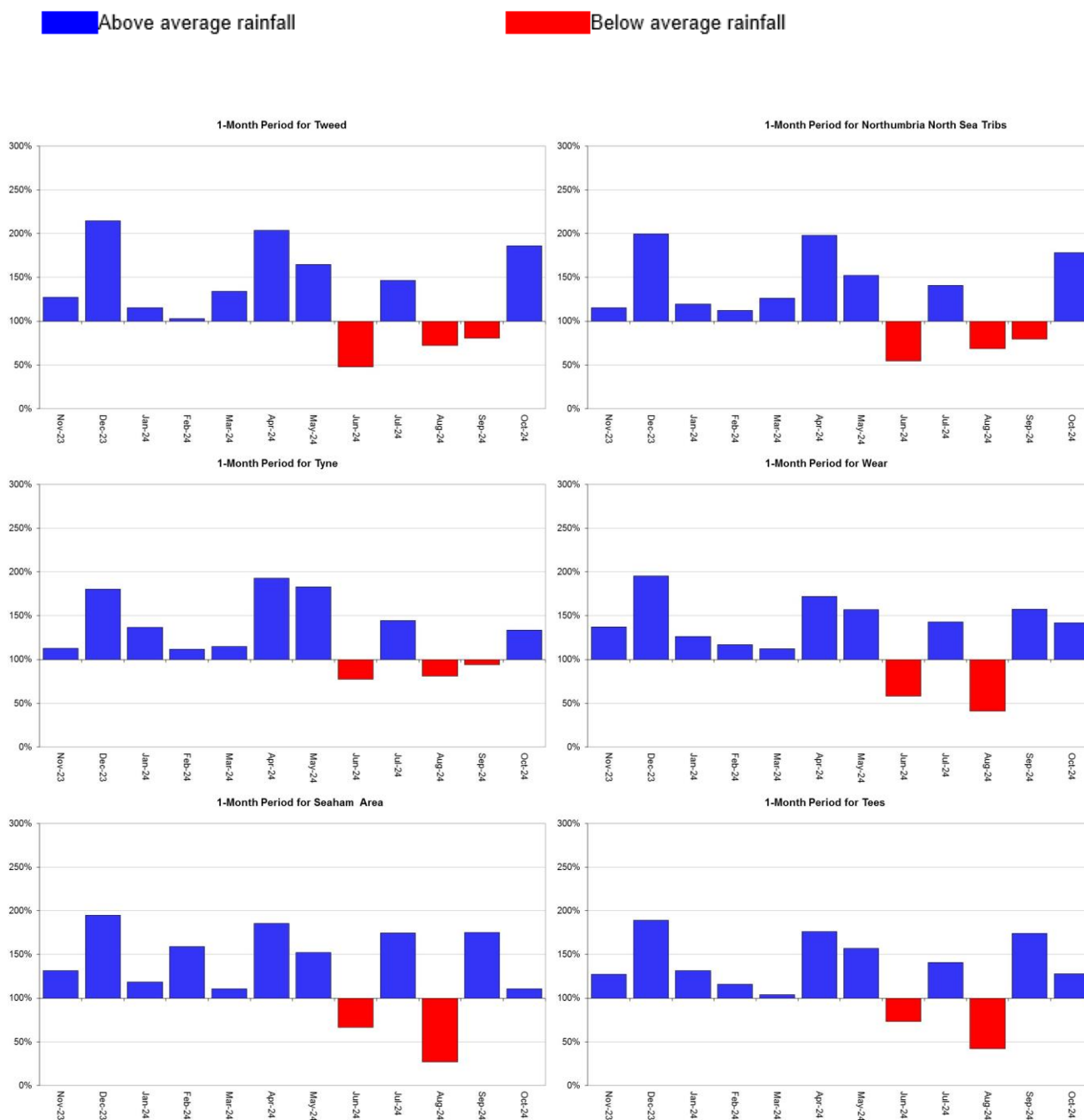
Figure 2.1: Total rainfall for hydrological areas for the current month (up to 31 October), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. October rainfall totals were classed as above normal for the Tweed and Northumbria North Sea Tribs catchments, and normal for the rest of 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, 2024). Rainfall data prior to 2023, extracted from Met Office HadUK 1km gridded rainfall dataset derived from registered rain gauges (Source: Met Office. Crown copyright, 2024).

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 October.



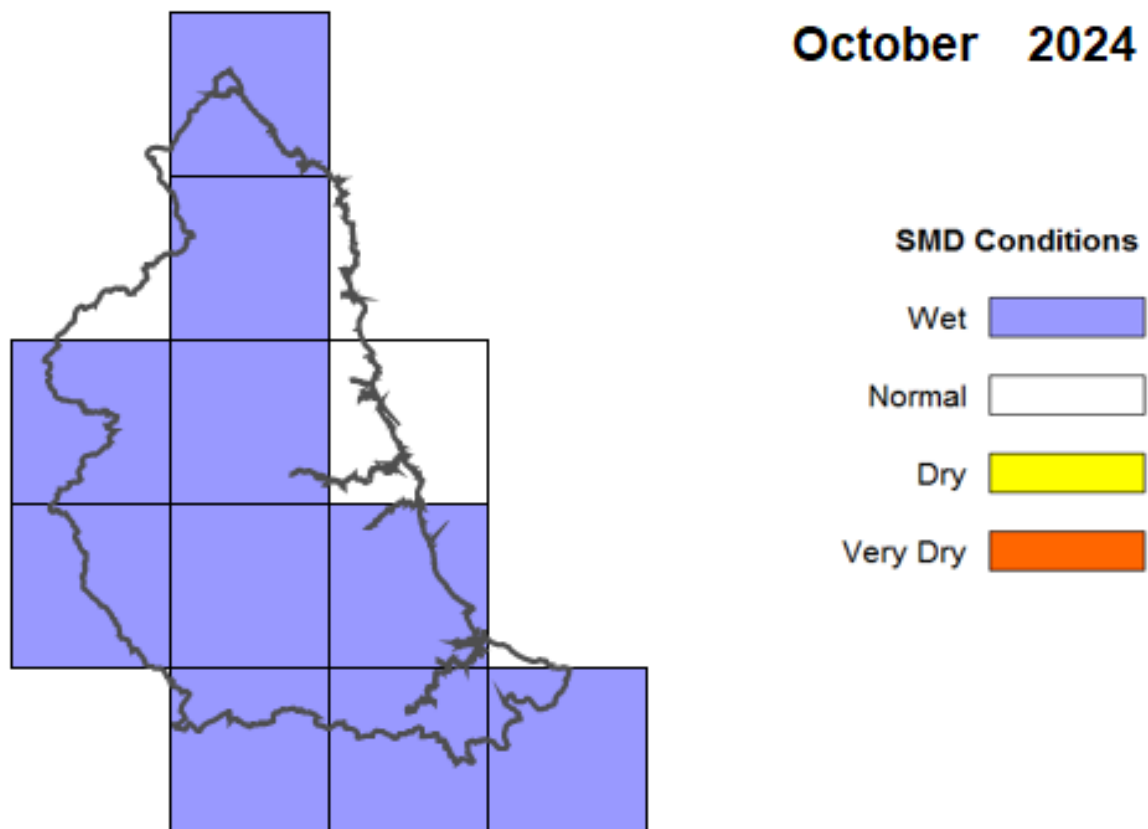
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3 Soil moisture deficit

3.1 Soil moisture deficit map

Figure 3.1: Soil moisture deficits for weeks ending 31 October. MORECS data for real land use. Soils are classed as wet across the area with the exception of the eastern coastal area which is classed as normal.

Environment Agency - North East Area Monthly MORECS SMD Levels

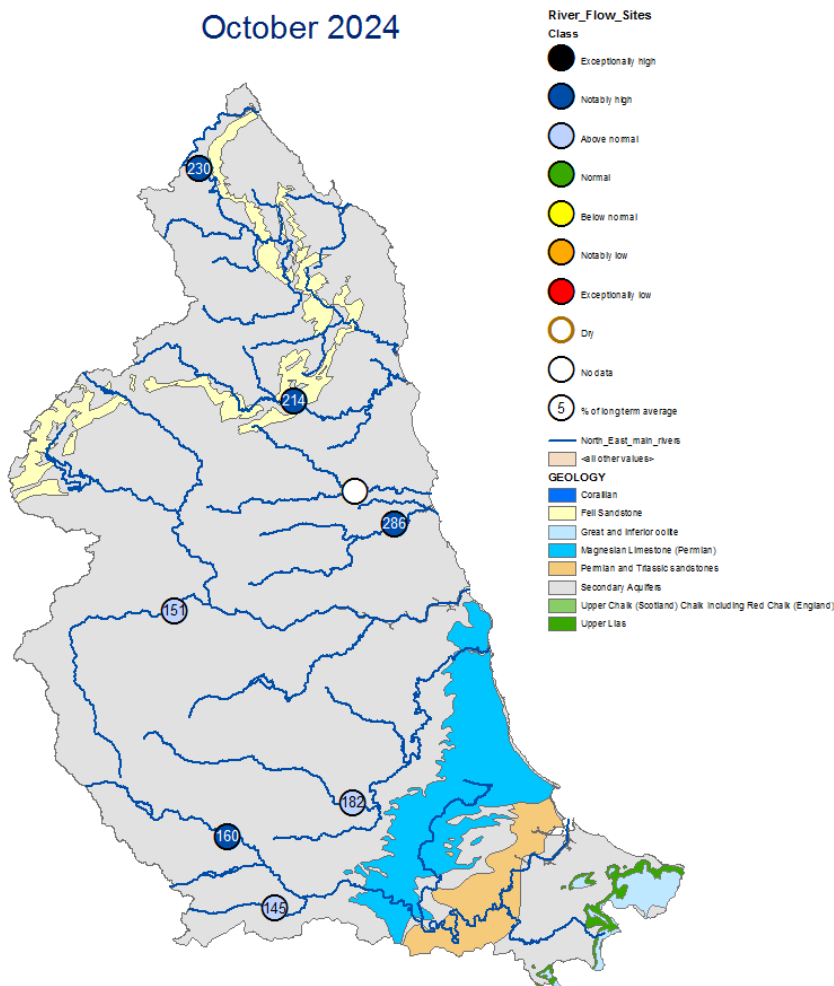


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4 River flows

4.1 River flows map

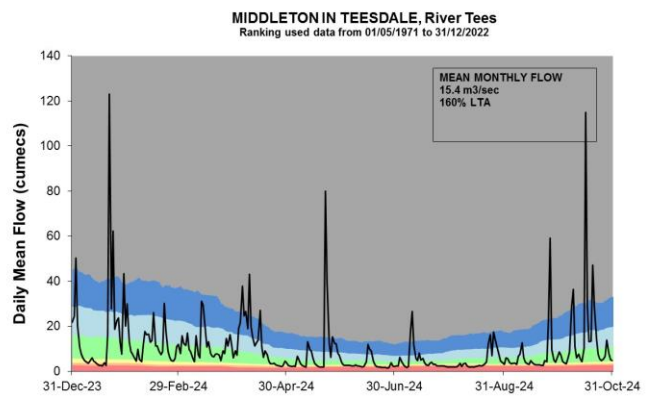
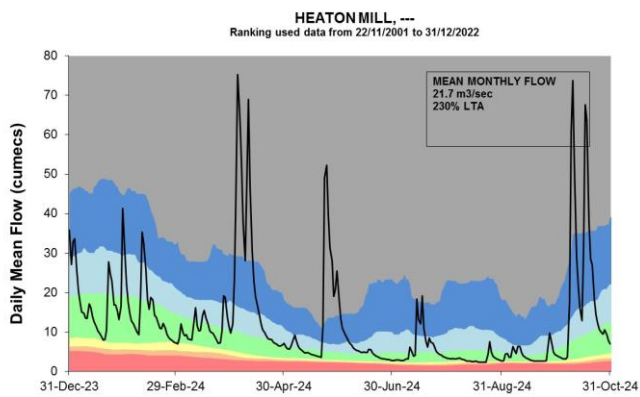
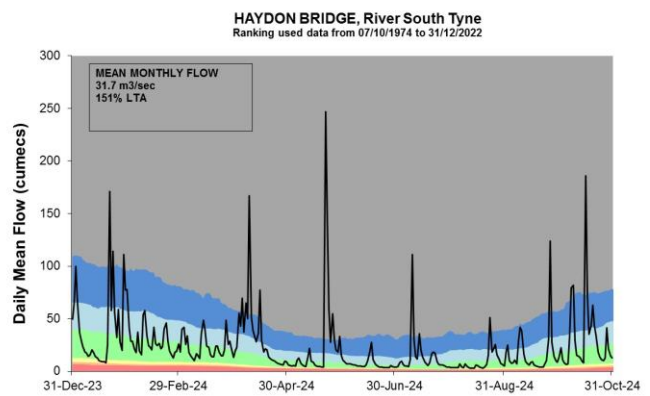
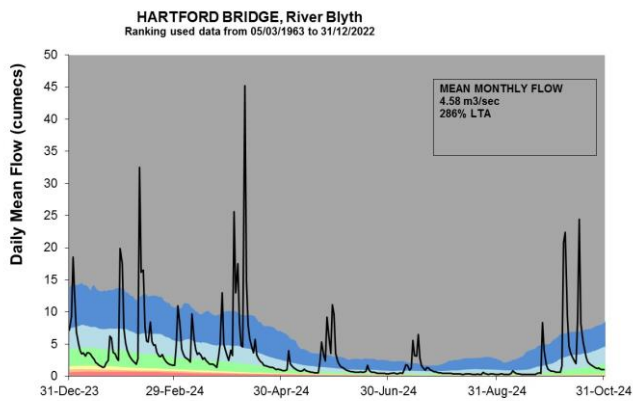
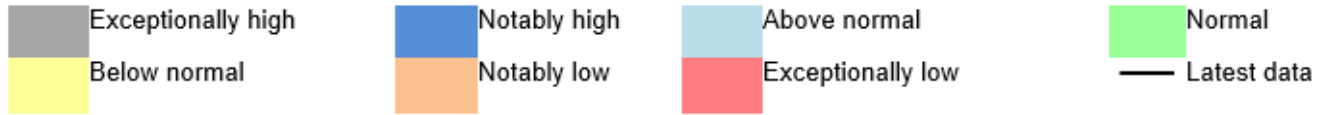
Figure 4.1: Monthly mean river flow for indicator sites for October 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic October monthly means. Monthly means are classed as above notably high at Hartford Bridge, Heaton Mill, Middleton in Teesdale and Rothbury. Flows are classed as above normal at Haydon Bridge, Rutherford Bridge and Witton Park. There are current ongoing data quality issues at Mitford on the River Coquet and therefore the site is marked as no data for the month. Table available in the appendices with detailed information.

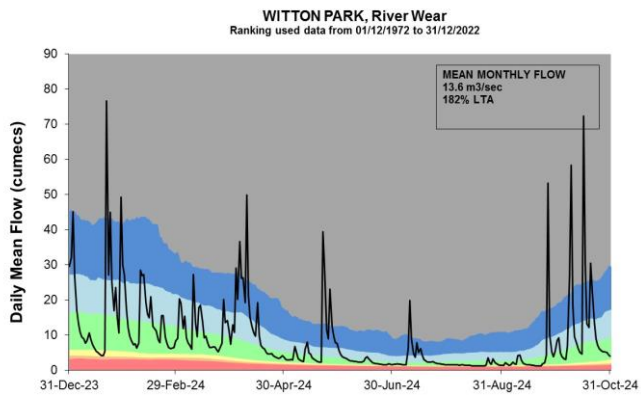
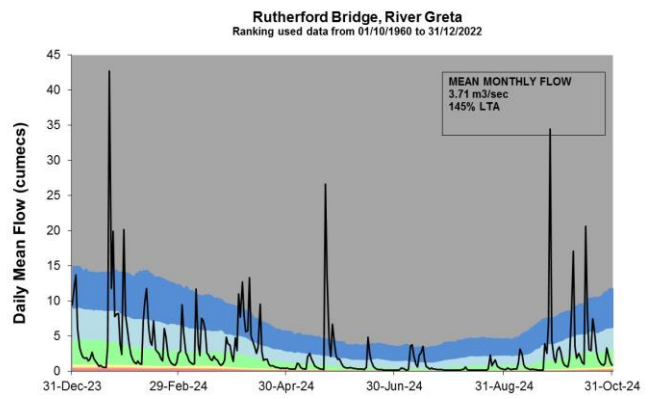
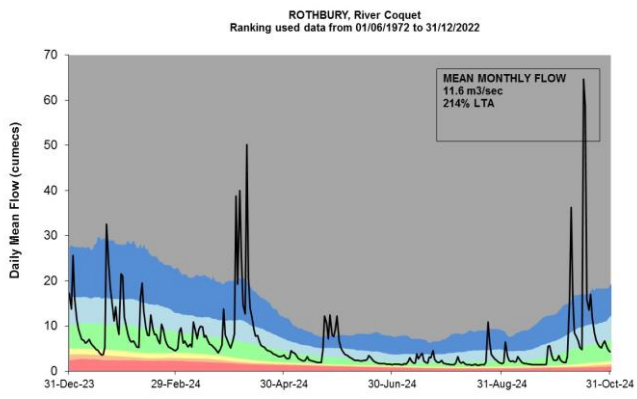


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4.2 River flow charts

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.



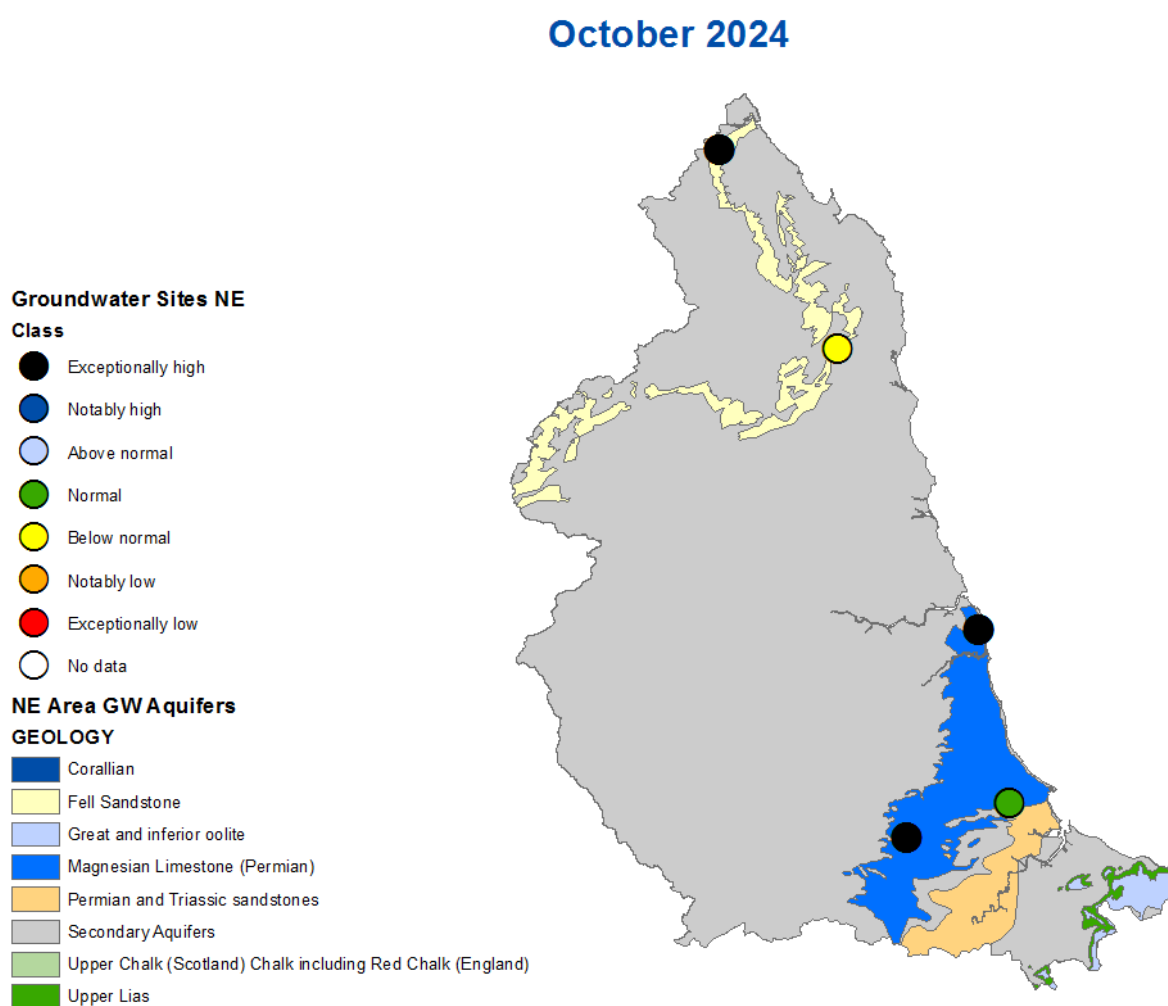


Source: Environment Agency, 2024.

5 Groundwater levels

5.1 Groundwater levels map

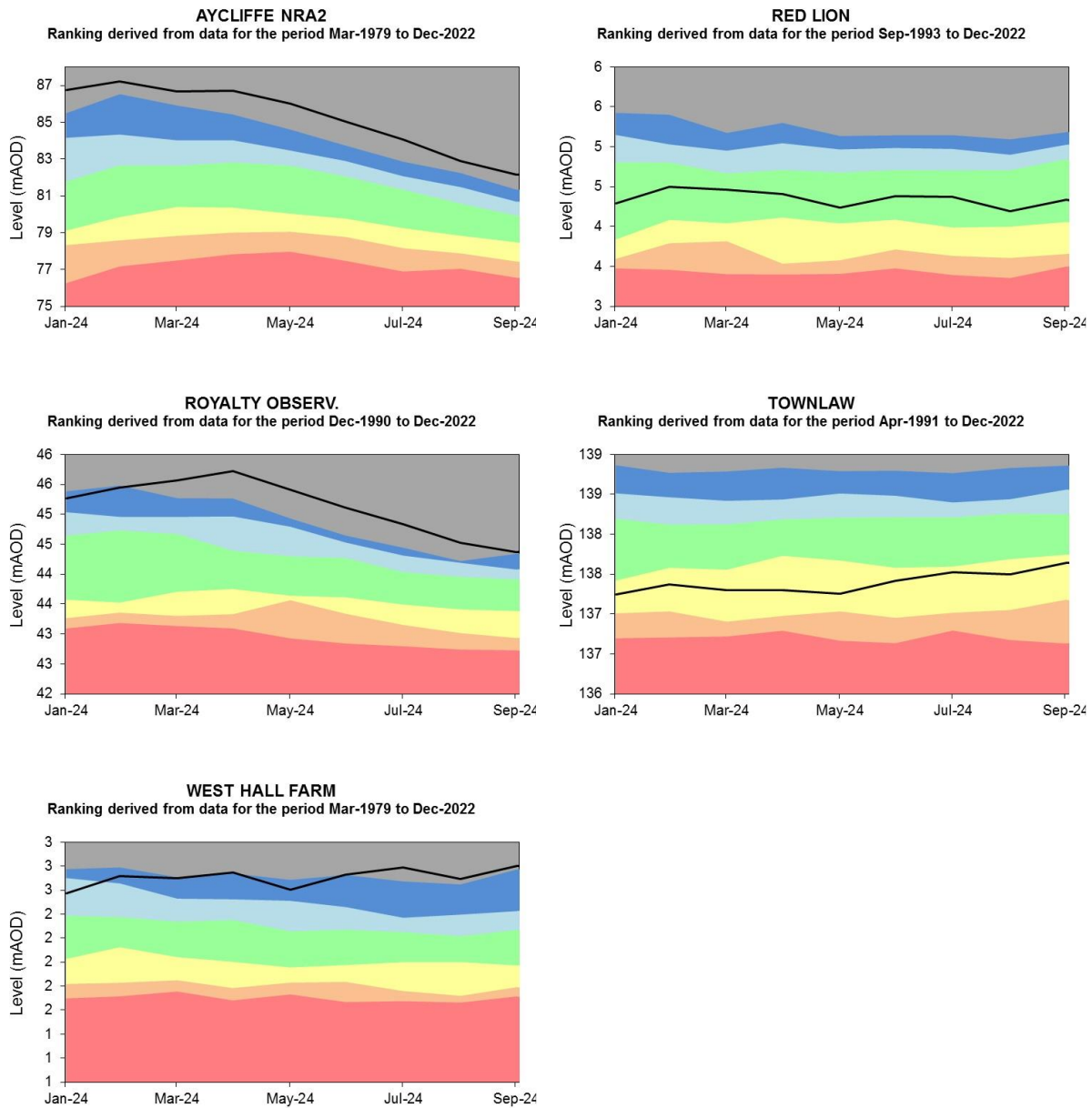
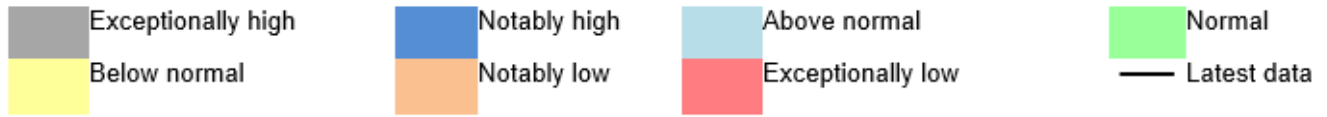
Figure 5.1: Groundwater levels for indicator sites at the end of October 2024, classed relative to an analysis of respective historic October levels. Indicator sites fall within the exceptionally high, normal, and below normal ranges. Table available in the appendices with detailed information



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5.2 Groundwater level charts

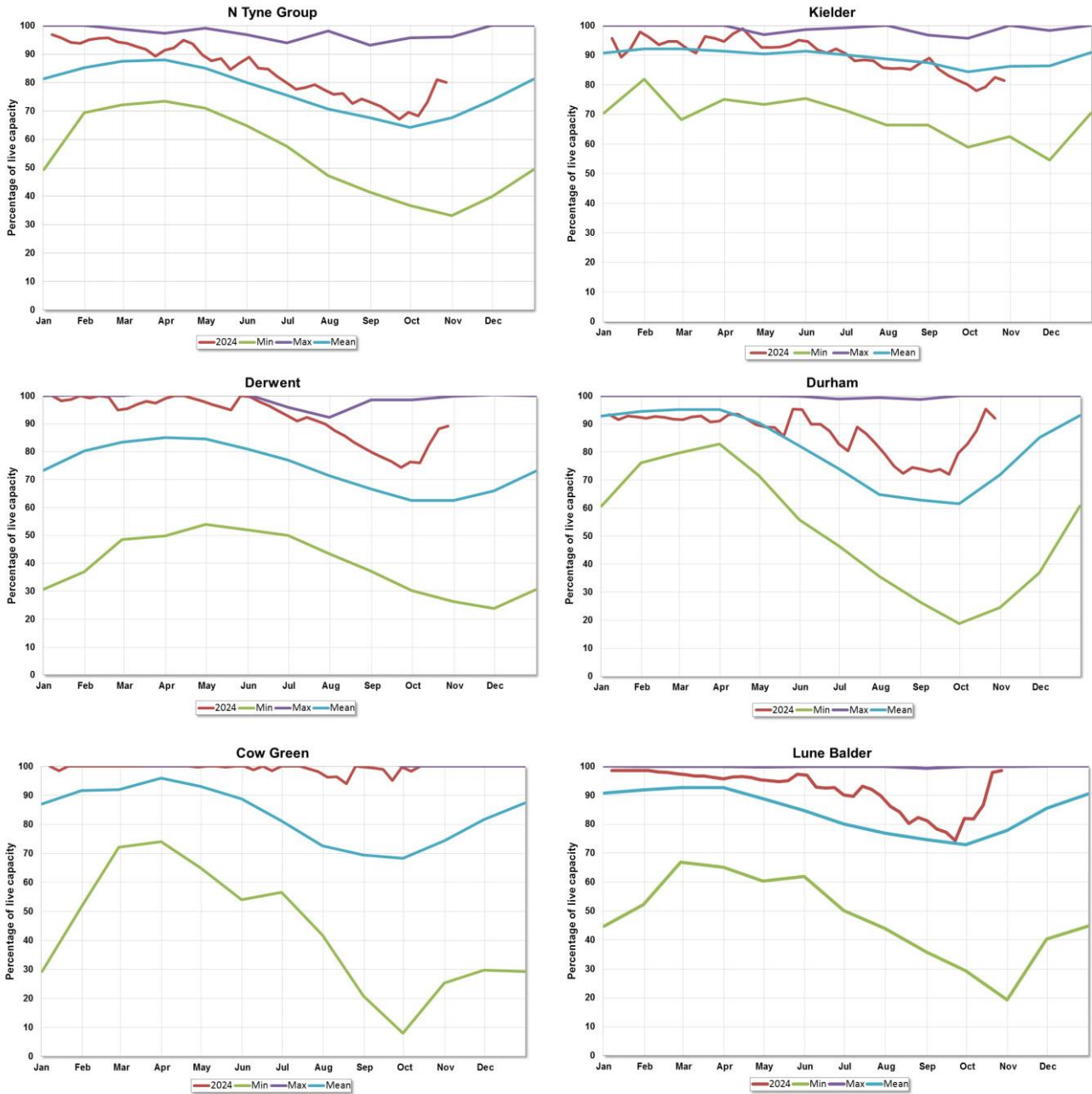
Figure 5.2: End of month groundwater levels at index groundwater level sites for major aquifers in the North East. 12 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



Source: Environment Agency, 2024.

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	October 2024 rainfall % of long term average 1961 to 1990	October 2024 band	August 2024 to October 2024 cumulative band	May 2024 to October 2024 cumulative band	November 2023 to October 2024 cumulative band
Northumbria North Sea Tribs	178	Above Normal	Normal	Normal	Notably high
Seaham Area	111	Normal	Normal	Normal	Notably high
Tees	128	Normal	Normal	Normal	Exceptionally high
Tweed	186	Above Normal	Normal	Normal	Notably high
Tyne	134	Normal	Normal	Above normal	Exceptionally high
Wear	142	Normal	Normal	Normal	Exceptionally high

8.2 River flows table

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

8.3 Groundwater table

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