

Monthly water situation report: North East

1 Summary – March 2024

March was a slightly wet month with monthly rainfall totals classed as normal or above normal. River flows have remained in the same categories as February, falling within the above normal and normal ranges. Soil moisture deficits remain within the wet category across the whole area. Reservoir stocks remain healthy for this time of year. Groundwater stocks vary but remain healthy, with only one indicator site falling within the below normal category.

1.1 Rainfall

March monthly rainfall totals remained above the Long Term Average (LTA) across all catchments in the North East and were classed as above normal for most catchments with the exception of the Tees and Seaham catchments which fell into the normal category. Monthly totals ranged from 104% of the LTA in the Tees catchment to 134% of the LTA in the Tweed catchment. This follows an extremely wet period. Cumulative six month totals show that the last 6 months were the wettest on record since 1871 for Seaham and Tweed catchments, second wettest for the Wear catchment, and third for Tyne and Northumberland. For Seaham, Wear, and Tees cumulative totals for the past nine months have been the wettest on record since 1871.

The first few days in March saw some showers. Further showers occurred on 9 and 10 March. The month was then relatively dry until 25 and 26 March where larger totals were observed, leading to higher river levels.

1.2 Soil moisture deficit and recharge

All soils remain saturated throughout the North East and were classified as wet across the area.

1.3 River flows

River flows have remained similar to last month with mean monthly flows at indicator sites remaining normal or above normal for March. Monthly mean flows ranged from 90% of the LTA at Rothbury on the River Coquet to 150% of the LTA at Mitford on the River Wansbeck.

Analysis of the daily mean flows shows that flows were in the above normal or notably high ranges at the start of the month as a result of heavy showers. Most flows dropped back to normal until further rainfall on 9 and 10 March. For a few indicator sites flows remained above normal for several days before increasing again at the end of the month as a result of heavier rainfall. Mitford remained above normal and above for the majority of the month.

1.4 Groundwater levels

Groundwater levels have generally remained constant this month, with the exception of the levels in the Fell Sandstone at Royal Observation which have increased from notably high to exceptionally high. Groundwater levels remain exceptionally high at Aycliffe NRA2 on the Skerne Magnesian Limestone. This remains consistent with the above average rainfall and saturated soil across the area. Townlaw in the Fell sandstone remains at below normal levels.

1.5 Reservoir stocks

Most of the reservoirs across the area have seen a slight decrease in stock level this month, with the exception of Cow Green reservoir which remains at 100% stock, and Derwent reservoir which has increased from 94.9% to 99.1%. Overall, reservoir stocks remain very healthy.

Reservoir or reservoir group	Percentage of current stocks	Percentage of previous month stocks
Kielder	94.6	94.7
North Tynedale group	91.3	94.3
Derwent	99.1	94.9
Durham group	91.1	91.8
Lune and Balder group	95.7	97.4
Cow Green	100	100

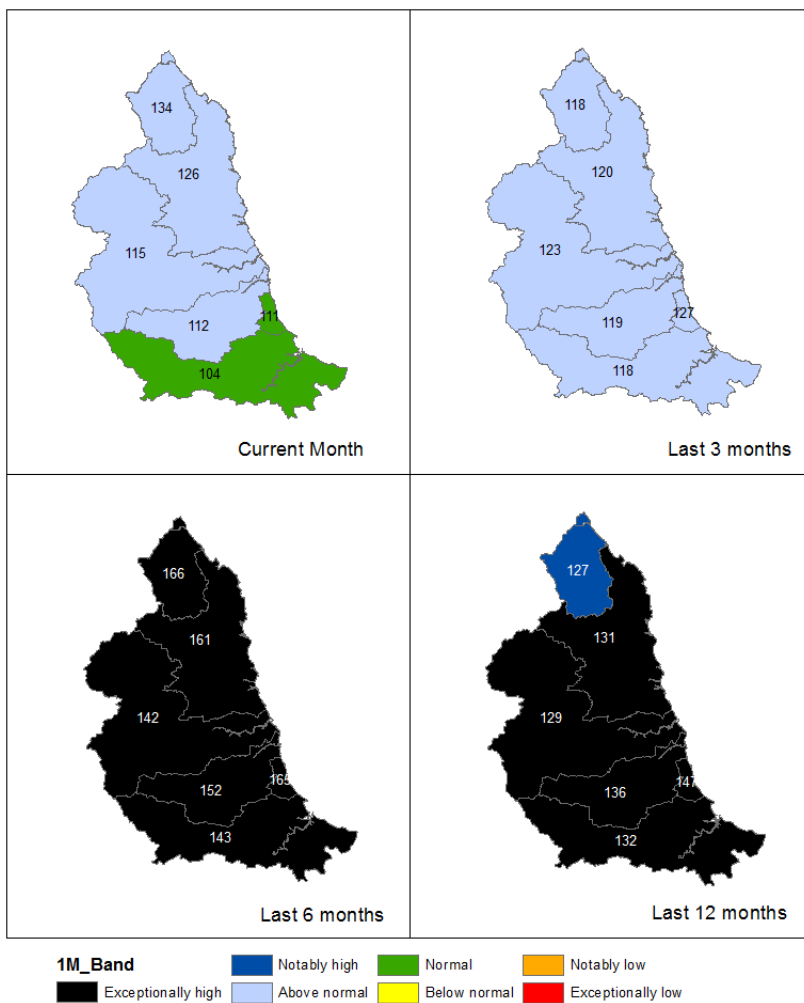
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2 Rainfall

2.1 Rainfall map

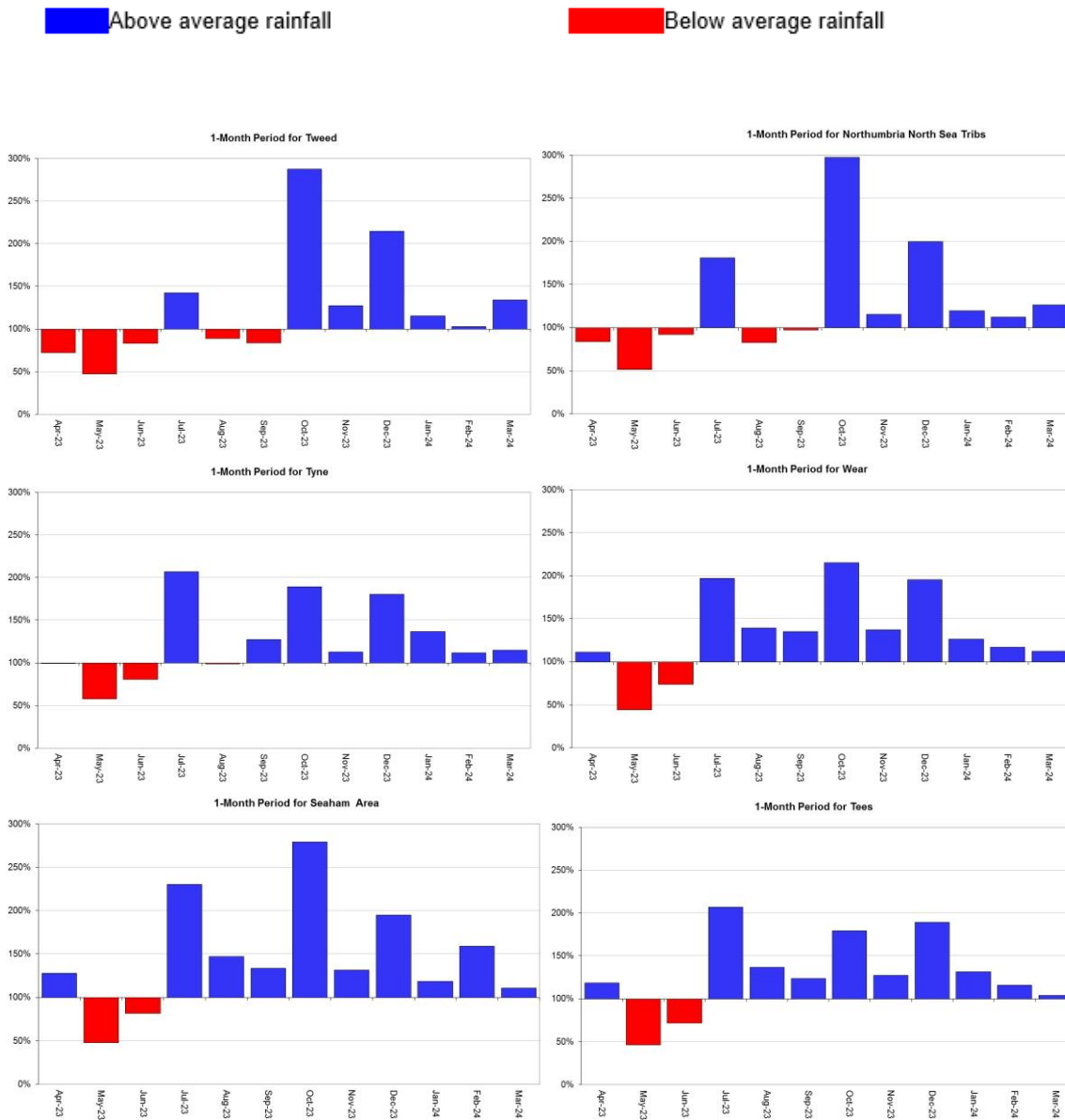
Figure 2.1: Total rainfall for hydrological areas for the current month (up to 31 March 2024), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. March rainfall totals were classed as above normal in the majority of the North East with the exceptions of the Tees and Seaham catchments which were classed as normal. 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. March rainfall totals are classed as above average for all catchments in the North East.

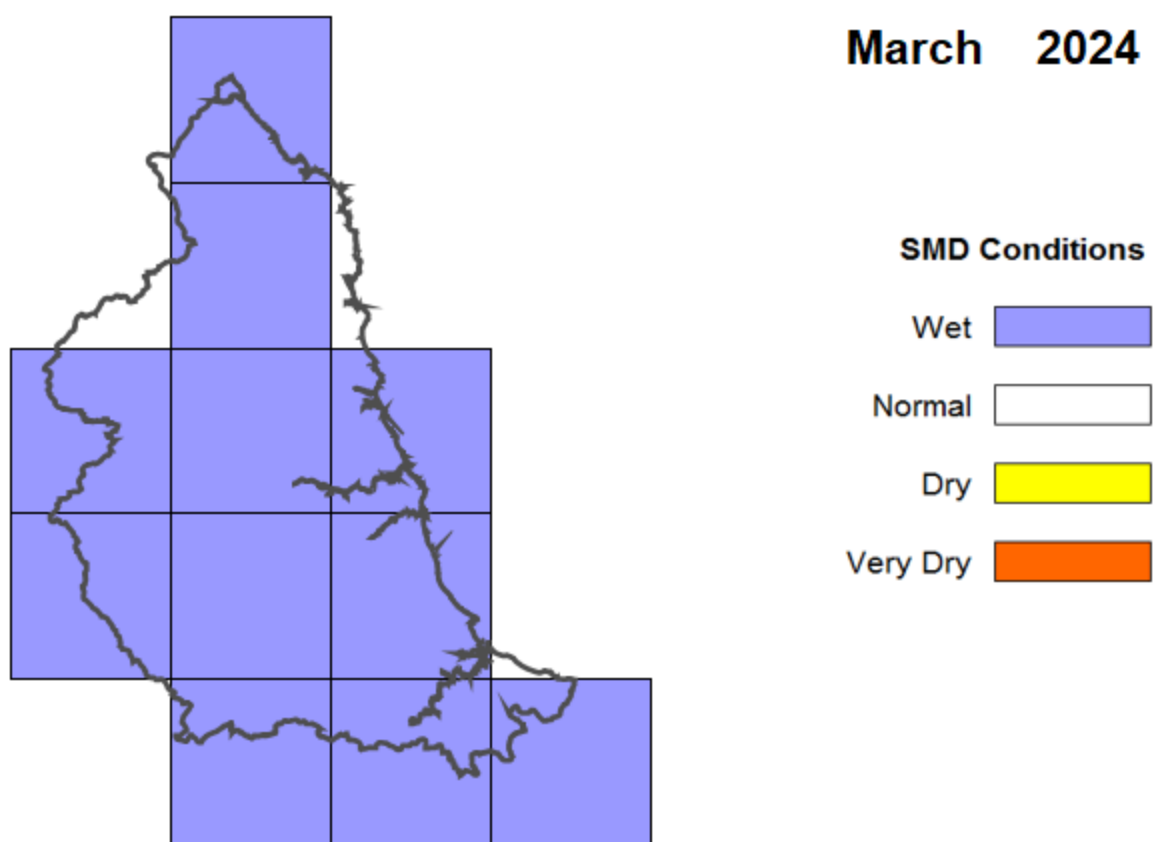


Rainfall data for 2024, extracted from Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. (Source: Environment Agency. Crown Copyright, 100024198, 2024). Rainfall data prior to 2023, extracted from Met Office HadUK 1km gridded rainfall dataset derived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

3 Soil moisture deficit

3.1 Soil moisture deficit map

Figure 3.1: Soil moisture deficits for weeks ending 31 March 2024. MORECS data for real land use. Soils across the whole of the North East are wet.

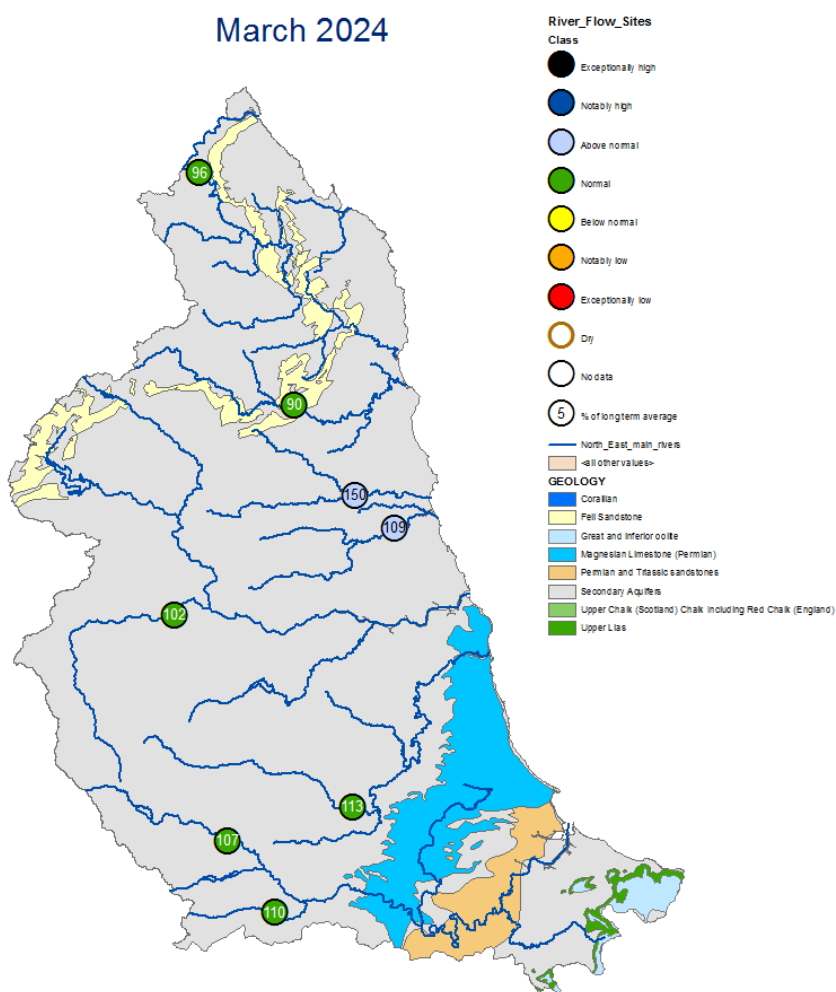


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4 River flows

3.2 River flows map

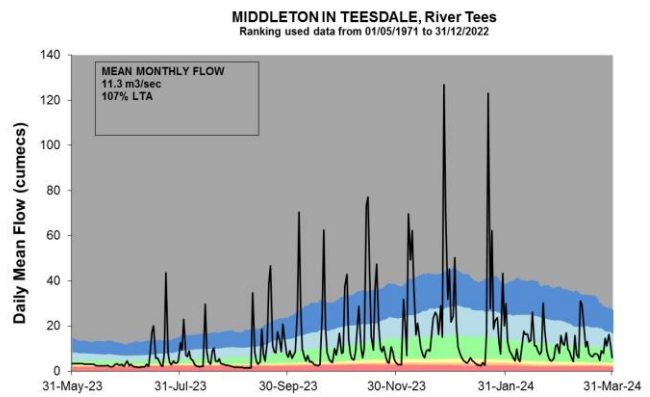
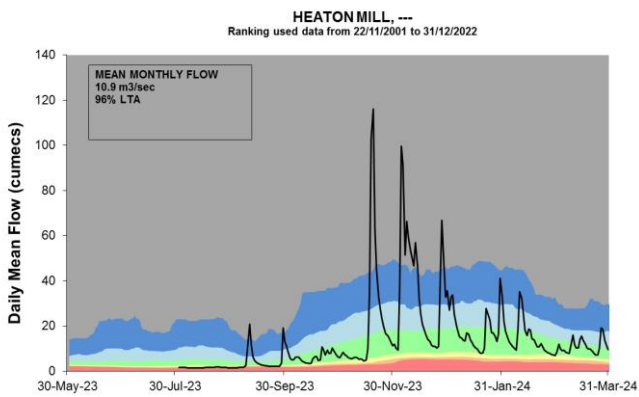
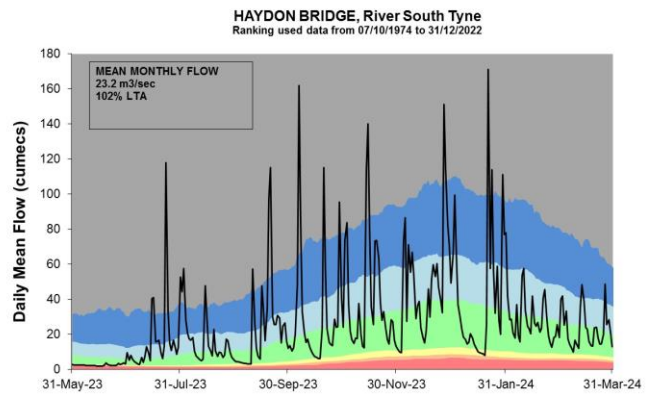
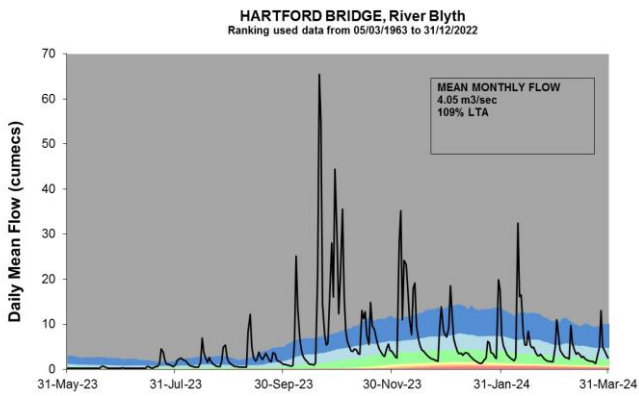
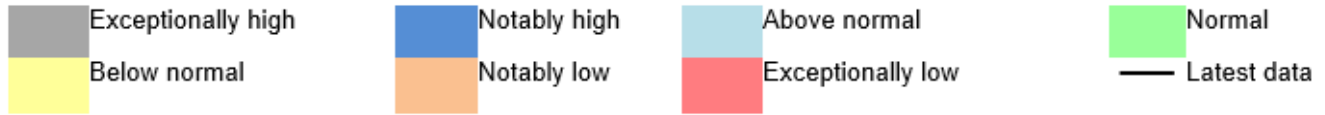
Figure 0.1: Monthly mean river flow for indicator sites for March 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic March monthly means. Monthly means are classed as normal and above normal. Table available in the appendices with detailed information.

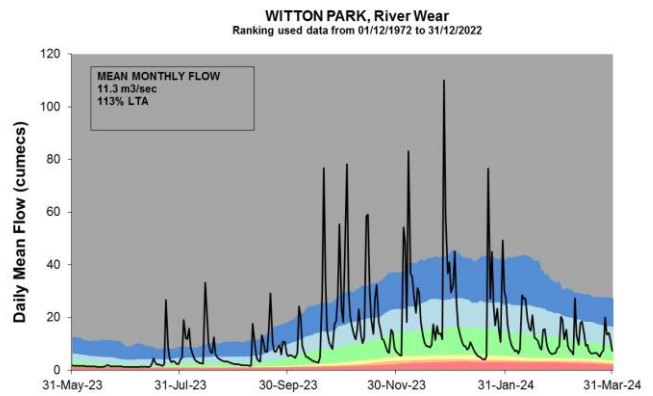
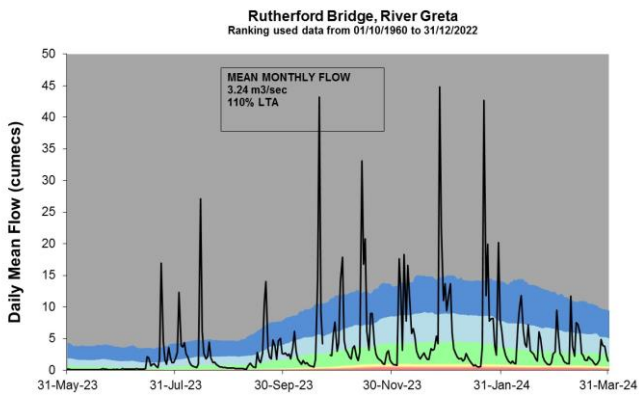
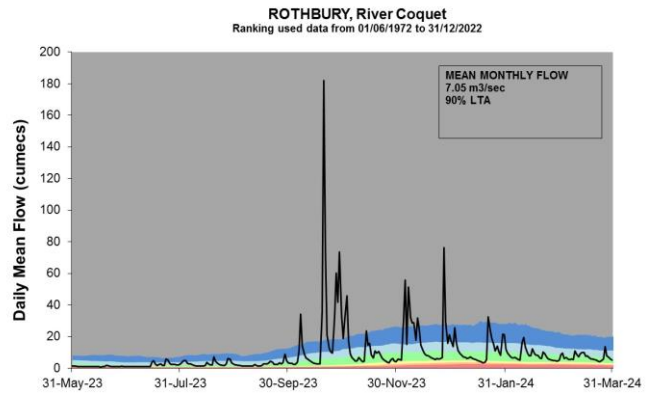
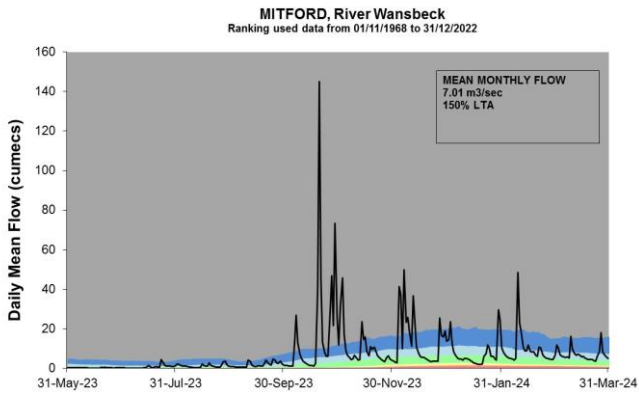


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3.3 River flow charts

Figure 0.2: 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.



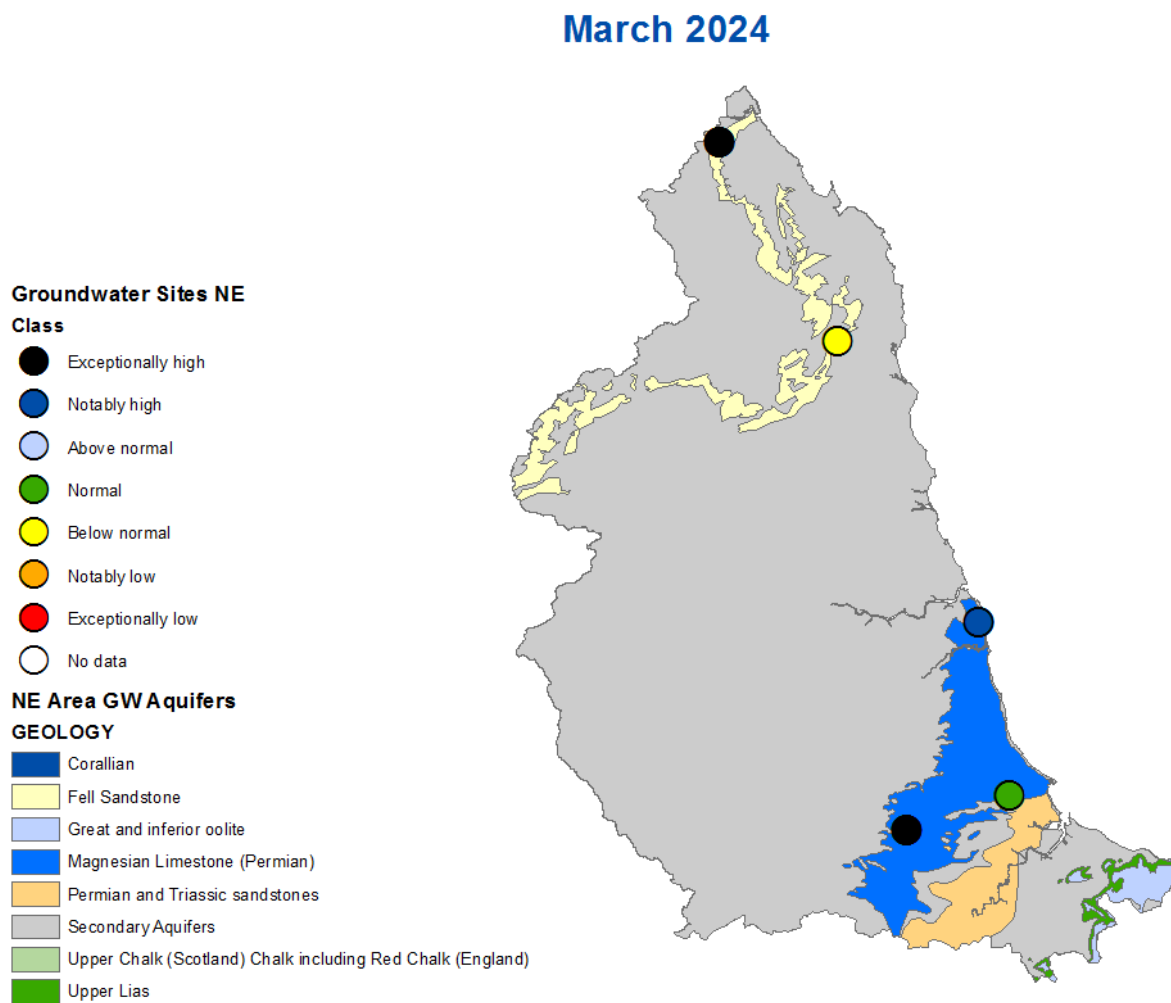


Source: Environment Agency, 2024.

4 Groundwater levels

4.1 Groundwater levels map

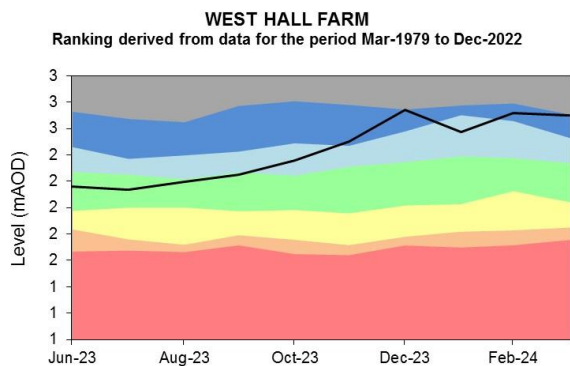
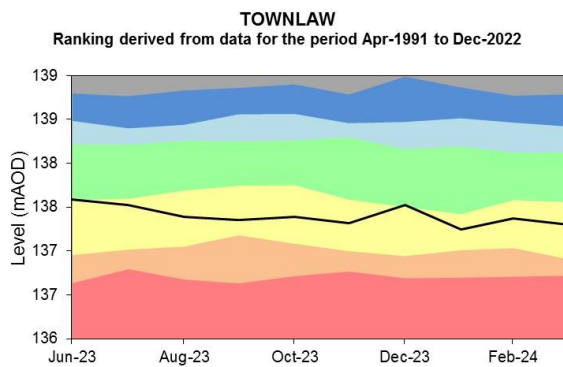
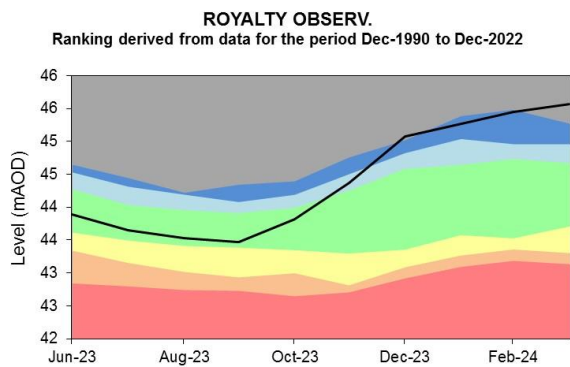
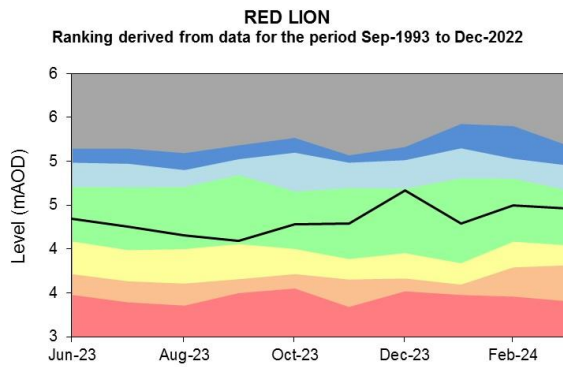
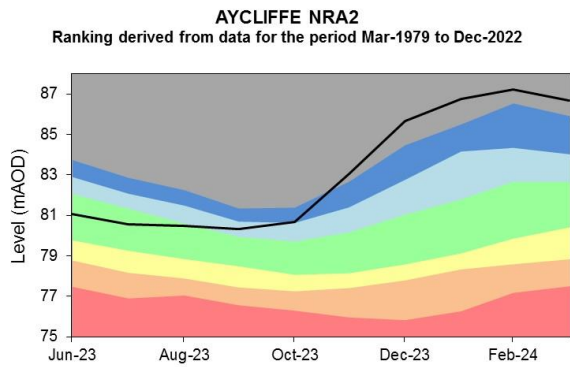
Figure 4.1: Groundwater levels for indicator sites at the end of March 2024, classed relative to an analysis of respective historic March levels. Indicator sites fall within the exceptionally high, notably high, normal, and below normal ranges. Table available in the appendices with detailed information.



(Source: Environment Agency). Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2024.

4.2 Groundwater level charts

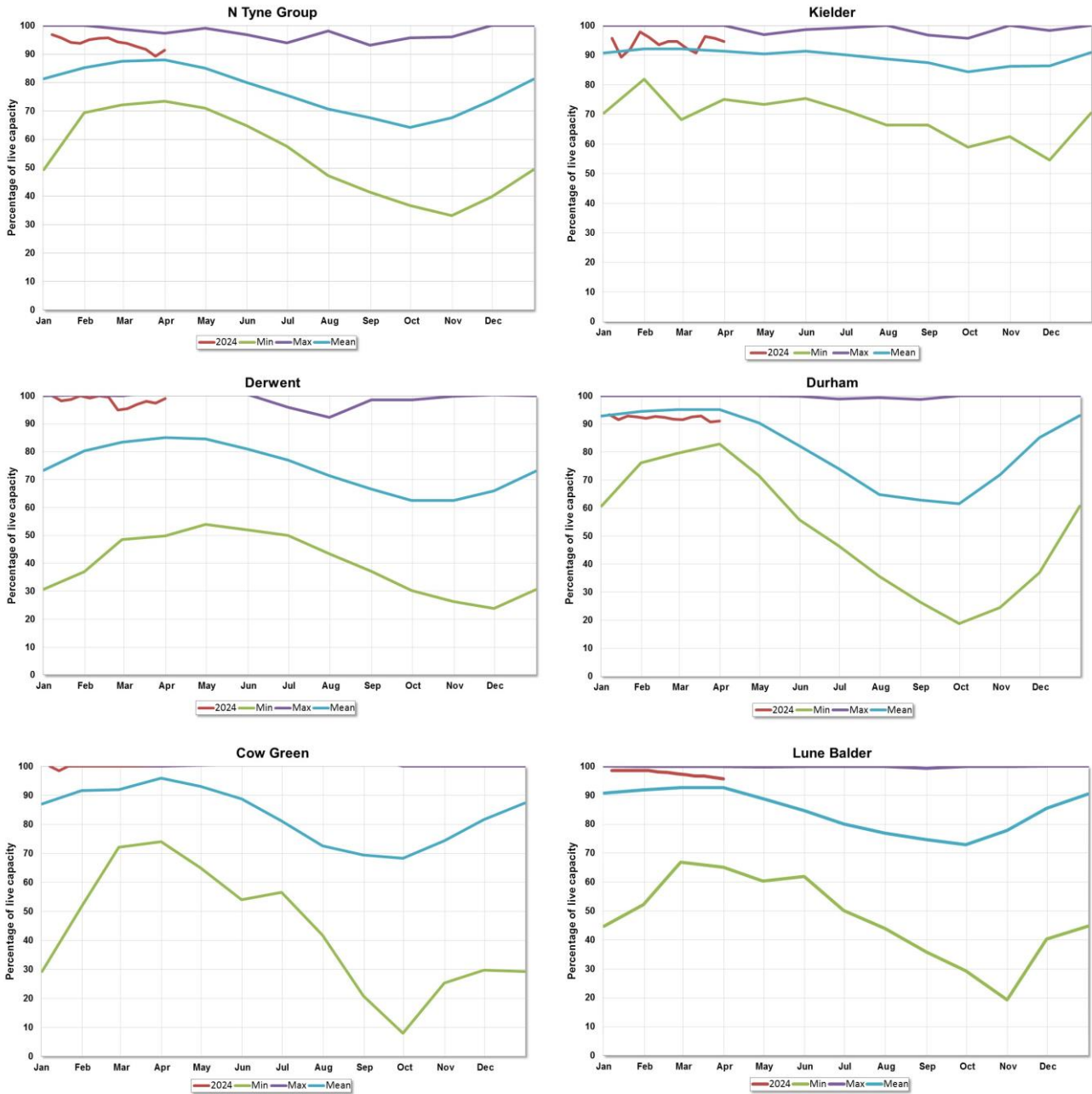
Figure 4.2: End of month groundwater levels at index groundwater level sites for major aquifers in the North East. 12 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



Source: Environment Agency, 2024.

5 Reservoir stocks

Figure 5.1: 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).

6 Glossary

6.1 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).

6.2 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.

7 Appendices

7.1 Rainfall table

Hydrological area	March 2024 rainfall % of long term average 1961 to 1990	March 2024 band	Jan 2024 to Mar 2024 cumulative band	Oct 2023 to Mar 2024 cumulative band	Apr 2023 to Mar 2024 cumulative band
Northumbria North Sea Tribs	126	Above Normal	Above normal	Exceptionally high	Exceptionally high
Seaham Area	111	Normal	Above normal	Exceptionally high	Exceptionally high
Tees	104	Normal	Above normal	Exceptionally high	Exceptionally high
Tweed	134	Above Normal	Above normal	Exceptionally high	Notably high
Tyne	115	Above Normal	Above normal	Exceptionally high	Exceptionally high
Wear	113	Above Normal	Above normal	Exceptionally high	Exceptionally high

7.2 River flows table

Site name	River	Catchment	March 2024 band	February 2024 band
Hartford Bridge	Blyth	Blyth	Above normal	Above normal
Haydon Bridge	South Tyne	South Tyne	Normal	Normal
Heaton Mill	Till	Till	Normal	Normal
Middleton In Teesdale	Tees	Tees	Normal	Normal
Mitford	Wansbeck	Wansbeck	Above normal	Above normal
Rothbury	Coquet	Coquet	Normal	Normal
Rutherford Bridge	Greta	Greta	Normal	Normal
Witton Park	Wear	Wear	Normal	Normal

7.3 Groundwater table

Site name	Aquifer	End of Mar 2024 band	End of Feb 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	Notably high
Townlaw	Till Fell Sandstone	Below normal	Below normal
West Hall Farm	Wear Magnesian Limestone	Notably high	Notably high