

Monthly water situation report: North East

1 Summary – February 2024

February was a relatively average month with monthly rainfall totals classed as normal or above normal. River flows have generally decreased and now fall within the above normal, normal or below normal ranges. Soil moisture deficits fell within the wet category across the whole area. Reservoir stocks remained high. Groundwater levels varied but remained healthy.

1.1 Rainfall

February's monthly rainfall totals were above the Long Term Average (LTA) across all catchments in the North East and were classed as normal across the majority of catchments except for the Seaham catchment, which were classed as above normal. Monthly totals ranged from 103% of the LTA in the Tweed catchment to 159% of the LTA in the Seaham catchment.

The first week of February was mainly dry with little rainfall recorded. The second week recorded small to moderate showers throughout the week with noticeable totals recorded on the 8 and 9 February. The rest of the month saw frequent small showers throughout.

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 generally decreased slightly since last month and mean monthly flows at indicator sites are normal or above normal for February. Monthly mean flows ranged from 90% of the LTA at Rothbury on the River Coquet and Middleton in Teesdale on the River Tees to 167% at Mitford on the River Wansbeck.

Analysis of daily mean flows shows that flows were in the above normal or normal ranges at the start of the month. Many indicator sites recorded an increase in daily flow on 8 and 9 February following a period of prolonged rainfall, with exceptionally high flows recorded at Mitford on the River Wansbeck and Hartford Bridge on the River Blyth. River flows decreased towards the end of the month with all sites falling within the normal range, except Heaton Mill

on the River Till which remains below normal and Middleton in Teesdale which remains above normal for February.

1.4 Groundwater levels

Groundwater levels have generally remained constant this month with the exception of the levels in the Magnesian Limestone at West Hall Farm which have increased from above normal at notably high. This is reflective of the rainfall recorded towards the south of the area throughout February. Groundwater levels remain exceptionally high at Aycliffe NRA2 on the Skerne Magnesian Limestone. The remains consistent with the above average rainfall and saturated soil across the area.

1.5 Reservoir stocks

All the reservoirs across the area have seen a decrease in stock level this month, with the exception of Cow Green reservoir which remains at 100% stock. Overall reservoir stocks remain very healthy. In accordance with reservoir control rules, Derwent reservoir has been releasing additional water throughout February to create some additional capacity in the reservoir.

| Reservoir or reservoir group | Percentage of current stocks | Percentage of previous month stocks |
|------------------------------|------------------------------|-------------------------------------|
| Kielder | 94.7 | 97.9 |
| North Tynedale group | 94.3 | 97.8 |
| Derwent | 94.9 | 100 |
| Durham group | 91.8 | 92.6 |
| Lune and Balder group | 97.4 | 98.5 |
| Cow Green | 100 | 100 |

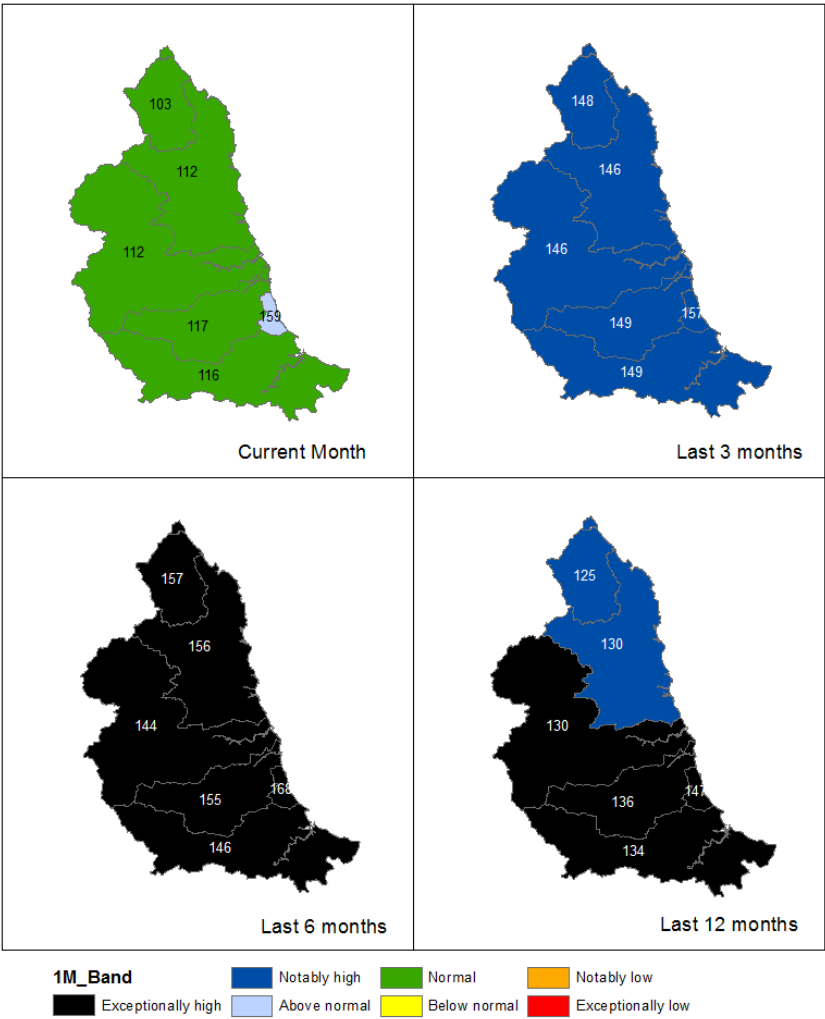
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2 Rainfall

2.1 Rainfall map

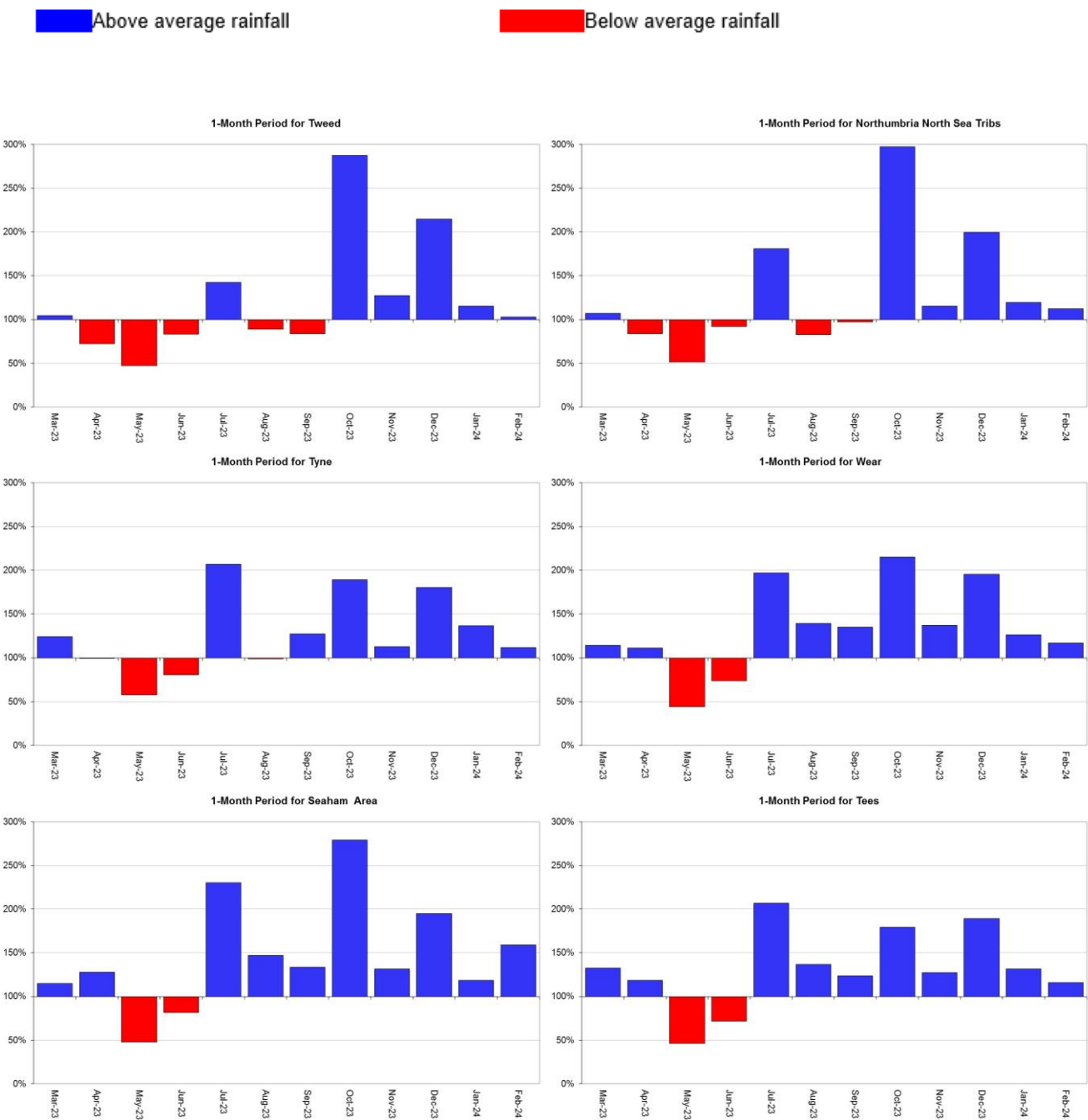
Figure 2.1: Total rainfall for hydrological areas for the current month (up to 29 February 2024), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. February’s rainfall totals are classed as normal for all catchments in the North East except the Seaham catchment, which are classed as above normal. Table available in the appendices with detailed information.



Rainfall data for 2023, 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. February’s rainfall totals are classed as above average for all catchments in the North East.



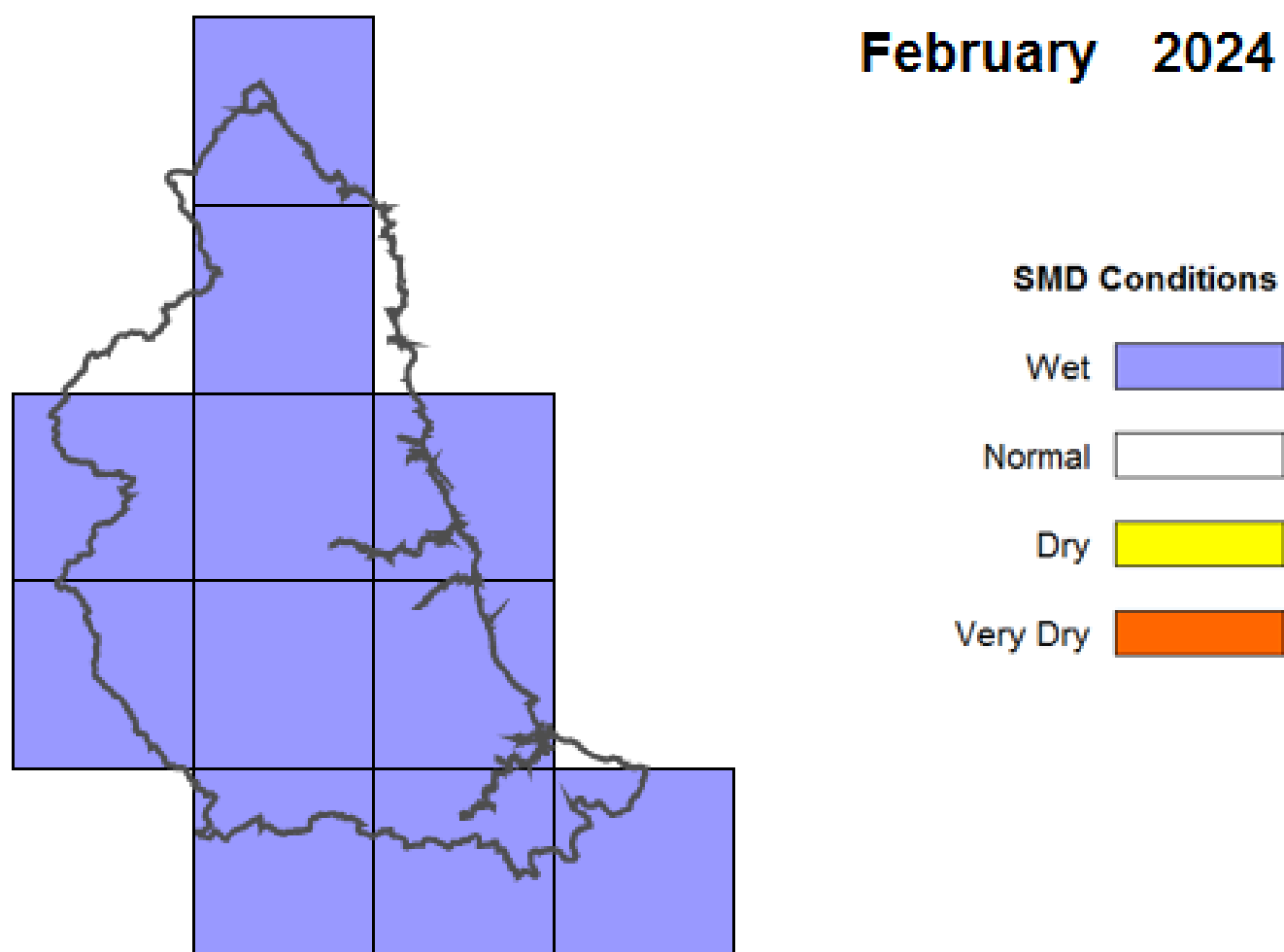
Rainfall data for 2024, extracted from Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. (Source: Environment Agency. Crown

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 29 February 2024. MORECS data for real land use. Soils across the whole of the North East are fully saturated.

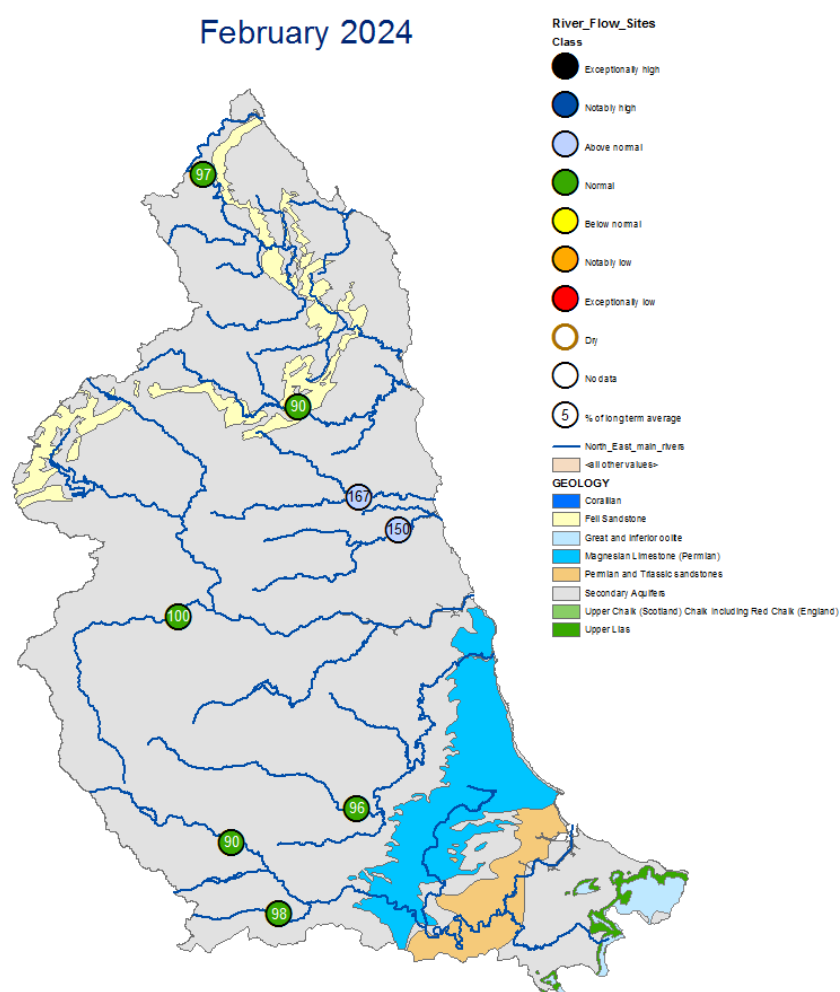


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4 River flows

4.1 River flows map

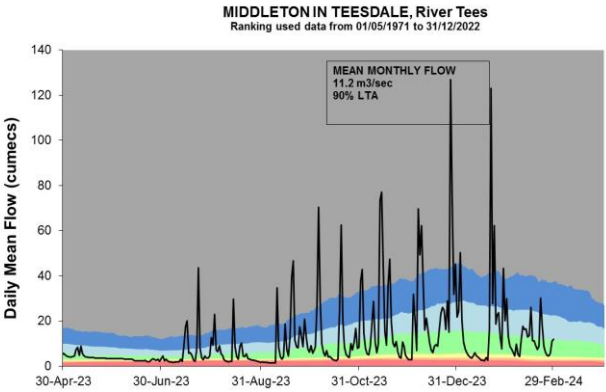
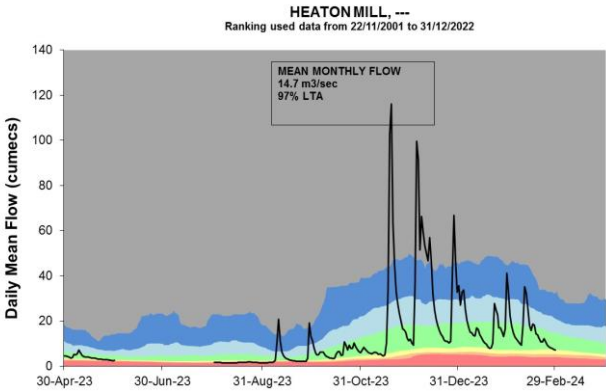
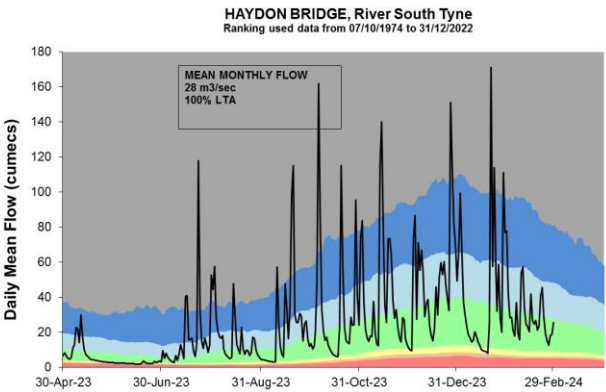
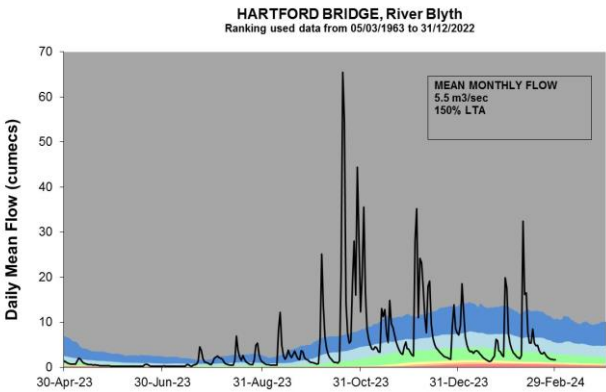
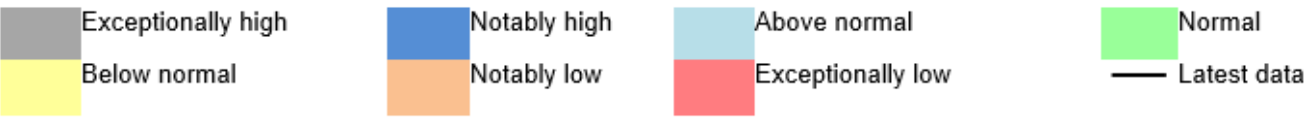
Figure 4.1: Monthly mean river flow for indicator sites for February 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic February monthly means. Monthly means are classed as normal and above normal. Table available in the appendices with detailed information.

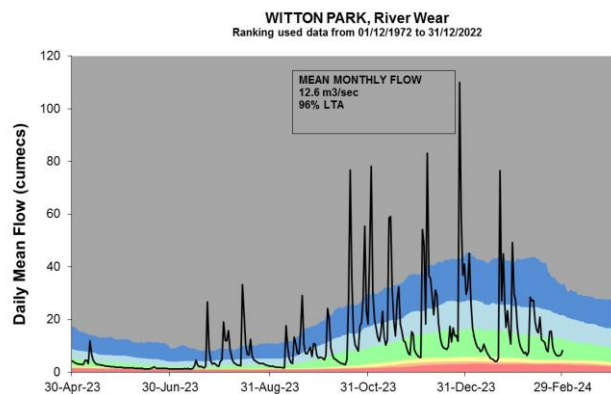
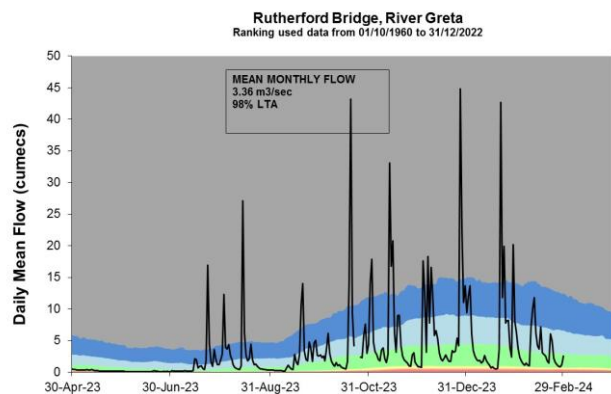
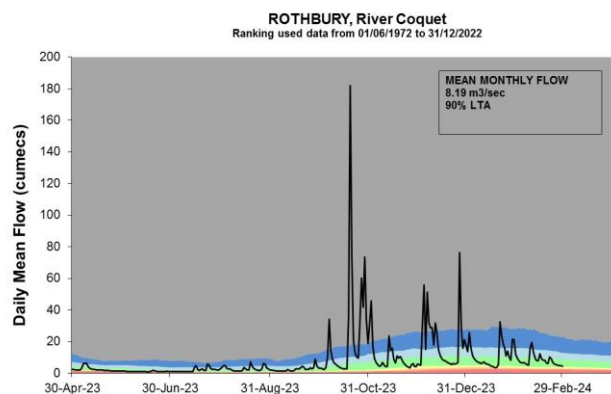
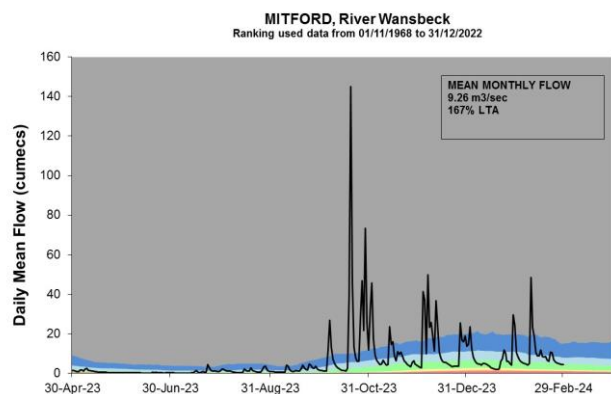


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4.2 River flow charts

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.



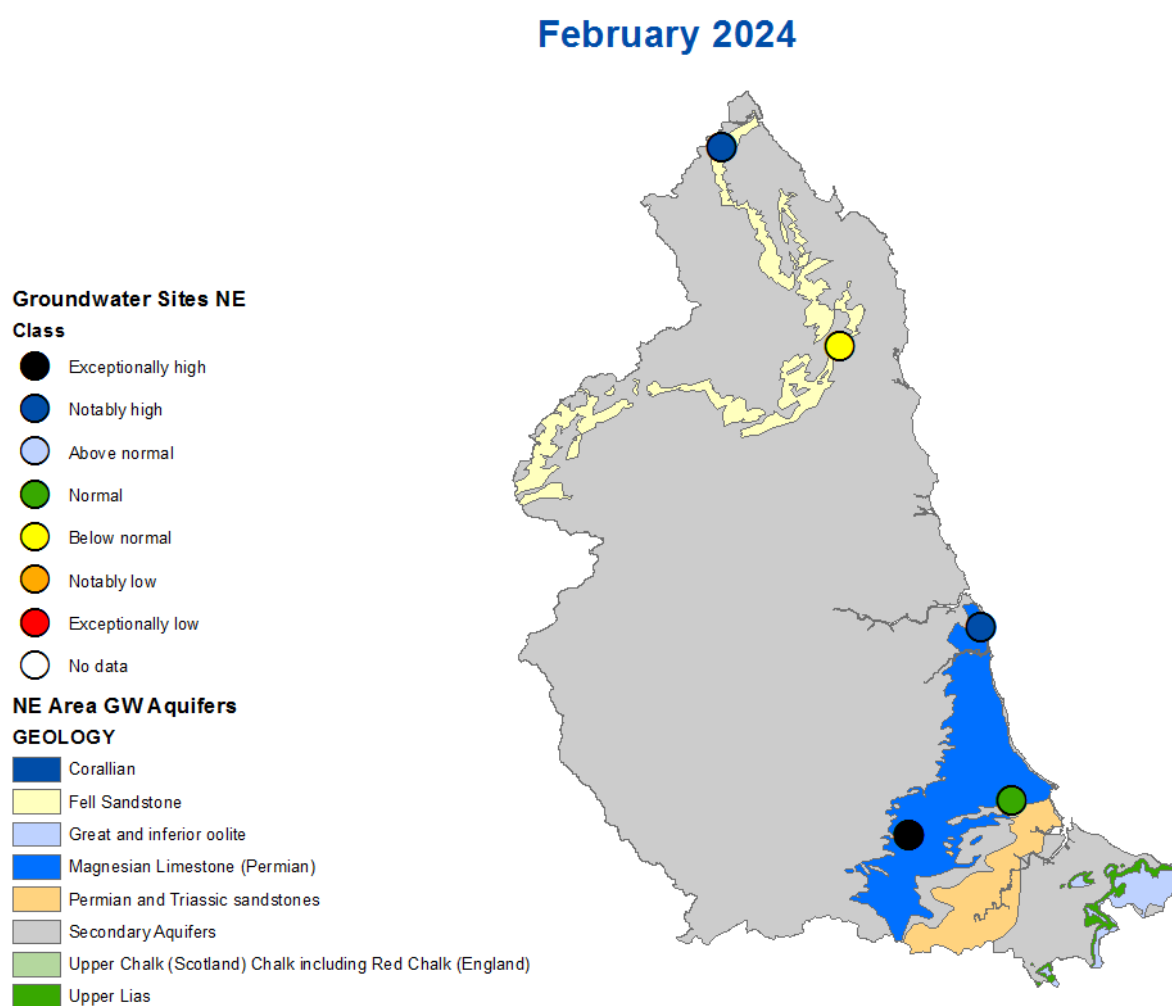


Source: Environment Agency, 2024.

5 Groundwater levels

5.1 Groundwater levels map

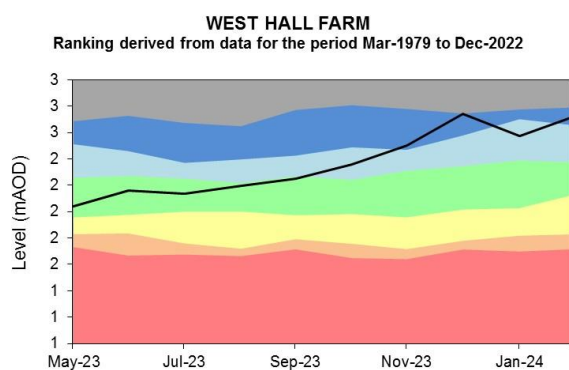
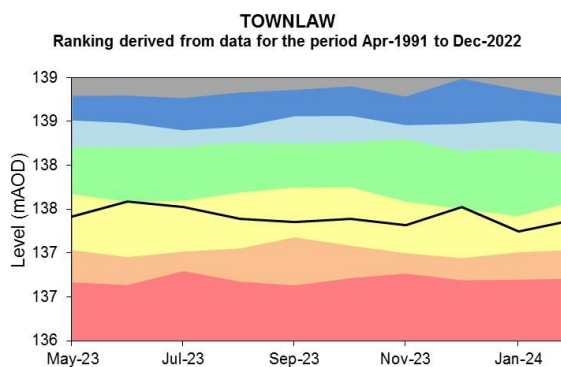
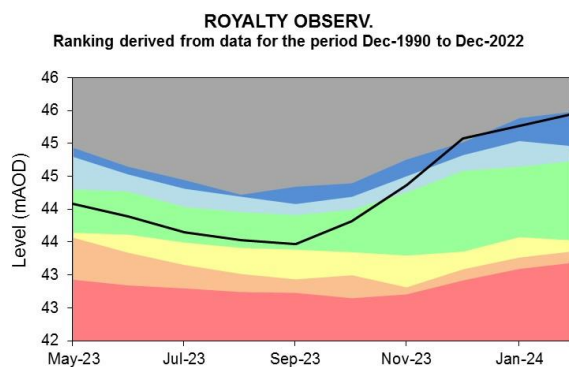
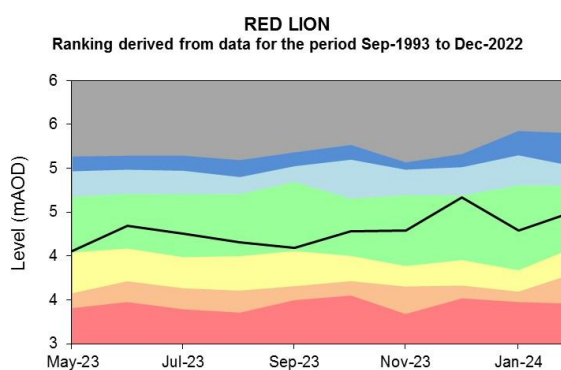
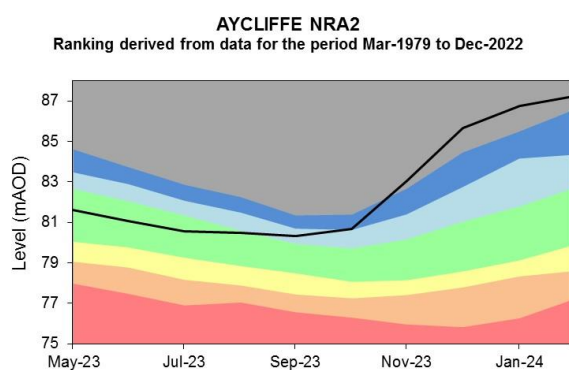
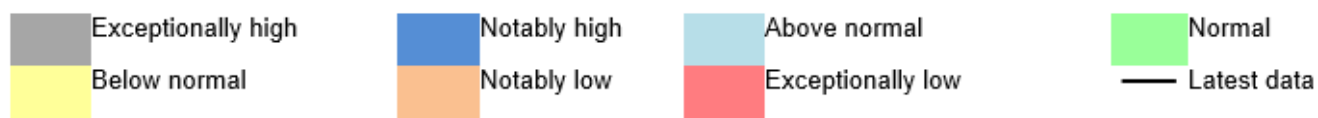
Figure 5.1: Groundwater levels for indicator sites at the end February 2024, classed relative to an analysis of respective historic February levels. Indicator sites fall within the exceptionally high, notably high, normal and below normal ranges. Table available in the appendices with detailed information.



(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.

5.2 Groundwater level charts

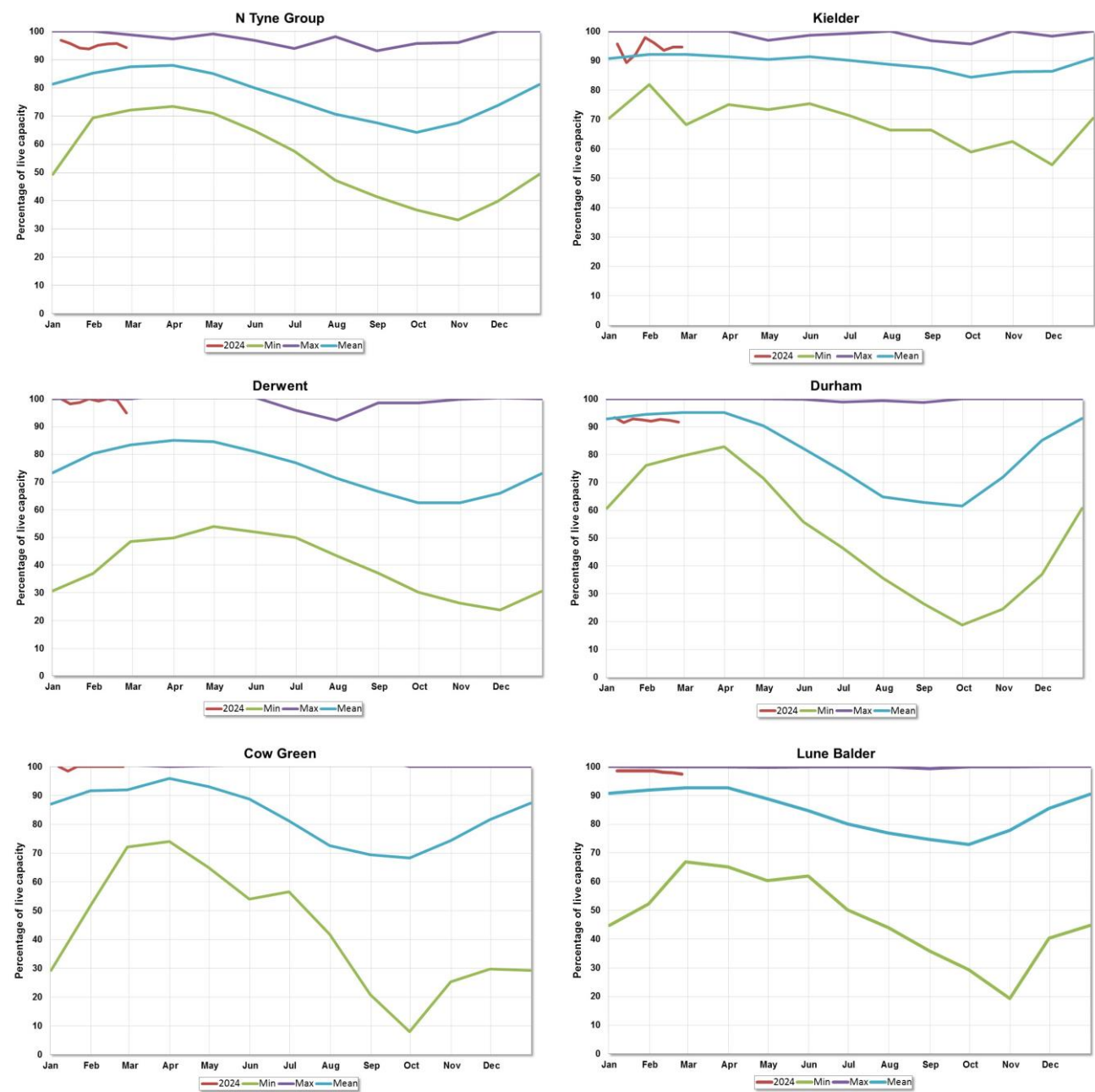
Figure 5.2: End of month groundwater levels at index groundwater level sites for major aquifers in the North East. 12 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



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 | February 2024 rainfall % of long term average 1961 to 1990 | February 2024 band | Dec 2023 to Feb 2024 cumulative band | Sep 2023 to Feb 2024 cumulative band | March 2023 to Feb 2024 cumulative band |
|-----------------------------|--|--------------------|--------------------------------------|--------------------------------------|--|
| Northumbria North Sea Tribs | 112 | Normal | Notably high | Exceptionally high | Notably high |
| Seaham Area | 159 | Above Normal | Notably high | Exceptionally high | Exceptionally high |
| Tees | 116 | Normal | Notably high | Exceptionally high | Exceptionally high |
| Tweed | 103 | Normal | Notably high | Exceptionally high | Notably high |
| Tyne | 112 | Normal | Notably high | Exceptionally high | Exceptionally high |
| Wear | 117 | Normal | Notably high | Exceptionally high | Exceptionally high |

8.2 River flows table

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

8.3 Groundwater table

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