

Monthly water situation report: North East

1 Summary – April 2024

Cumulative 12 month rainfall totals for the North East area show that the last 12 months were the second wettest since records began in 1871. River flows have increased at all indicator sites with the highest mean monthly flows on record for April recorded at Heaton Mill on the River Till and Haydon Bridge on the South Tyne. Groundwater levels have also seen an increase this month across the whole area, with the highest levels on record for April recorded at Aycliffe NRA2 on the Skerne Magnesian Limestone and Royalty Observation on the Till Fell Sandstone. Reservoir stocks remain very healthy for this time of year.

1.1 Rainfall

April saw continuous rainfall throughout the month with most catchments recording rainfall for more than half of the month. Monthly rainfall totals were classed as above the Long Term Average (LTA) across all catchments in the North East. Rainfall totals in the Tyne catchment were classed as exceptionally high and recorded 193% of the LTA. All the other catchments in the area recorded totals in the notably high range with monthly totals ranging from 172% of the LTA in the Wear catchment to 204% of the LTA in the Tweed catchment.

Analysis of the April rainfall totals for the North East ranks April 2024 as the 10th wettest April on record since 1871, the wettest since 2012. Cumulative nine month totals show that the last nine months were the wettest on record since 1871. The 10 and 11 month cumulative totals were also the wettest on record since 1871 and 12 month cumulative totals second wettest on record.

1.2 Soil moisture deficit and recharge

Soils remain saturated throughout the North East and were classified as wet across the area with the exception of the Tweed catchment which is classed as normal for April.

1.3 River flows

Monthly mean river flows have increased this month at all indicator sites. Monthly mean flows ranged from 176% of the LTA at Middleton in Teesdale on the River Tees to 267% of the LTA at Heaton Mill on the River Till. This is the highest monthly mean flow recorded at Heaton Mill

since records began in 2001. Haydon Bridge on the South Tyne also recorded its highest monthly mean flow since records began in 1974 at 226% of the LTA.

Analysis of the daily mean flows shows that flows were in the above normal or notably high ranges at the start of the month. Daily mean flows increased at all indicator sites over the first 10 days of April following prolonged rainfall across the area. Most sites recorded exceptionally high flows during this period. During the second half of the month daily mean flows remained high following more prolonged rainfall. Towards the end of the month flows generally decreased to fall within the above normal or normal range at the end of April.

1.4 Groundwater levels

Groundwater levels have increased at all reporting boreholes this month. These increases reflect the well above average rainfall experienced over the last 12 months, as well as the high rainfall totals recorded in April. The highest groundwater level on record for April have been recorded this month at Aycliffe NRA2 on the Skerne Magnesian Limestone and Royalty Observation on the Till Fell Sandstone. Groundwater levels at West Hall Farm on the Wear Magnesian Limestone also fall within the exceptionally high range. Townlaw in the Fell sandstone remains at below normal levels. This borehole is confined and has a small recharge area hence a slower response to the wetter weather.

1.5 Reservoir stocks

All of the reservoirs across the area have seen a slight decrease in stock level this month. Overall, reservoir stocks remain very healthy for the time of year.

Reservoir or reservoir group	Percentage of current stocks	Percentage of previous month stocks
Kielder	92.6	94.6
North Tynedale group	89.8	91.3
Derwent	98.1	99.1
Durham group	89.8	91.1

Lune and Balder group	95.4	95.7
Cow Green	99.7	100

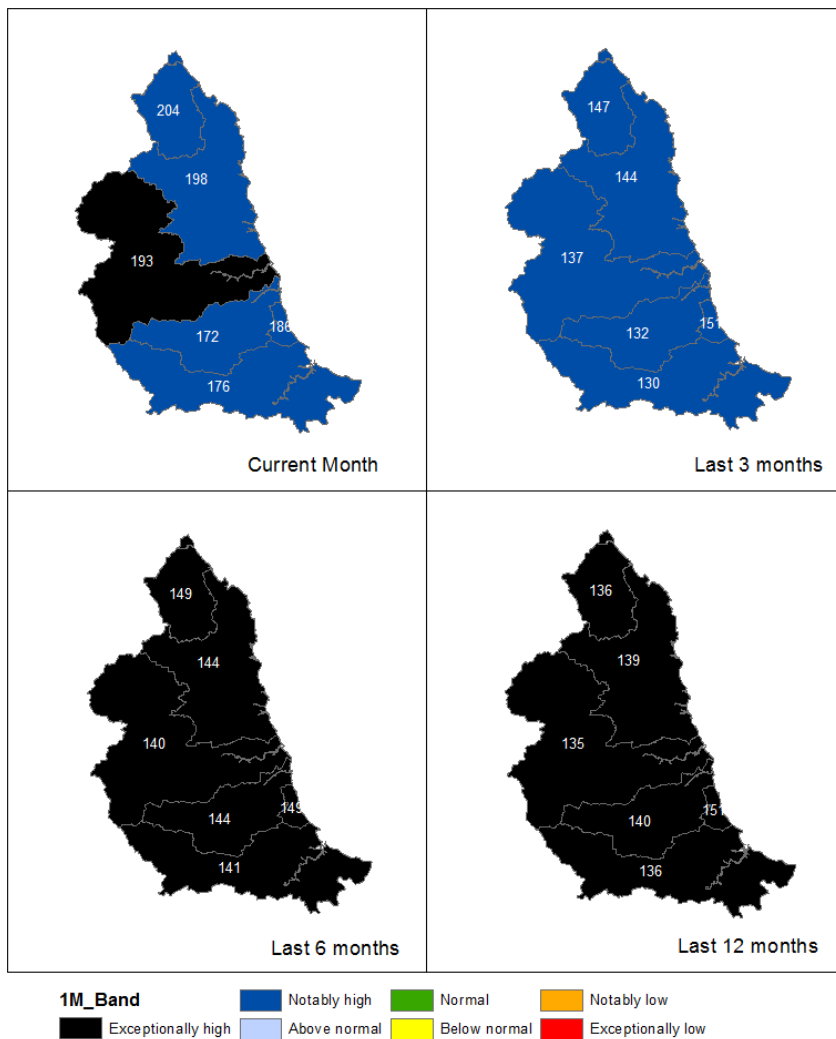
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2 Rainfall

2.1 Rainfall map

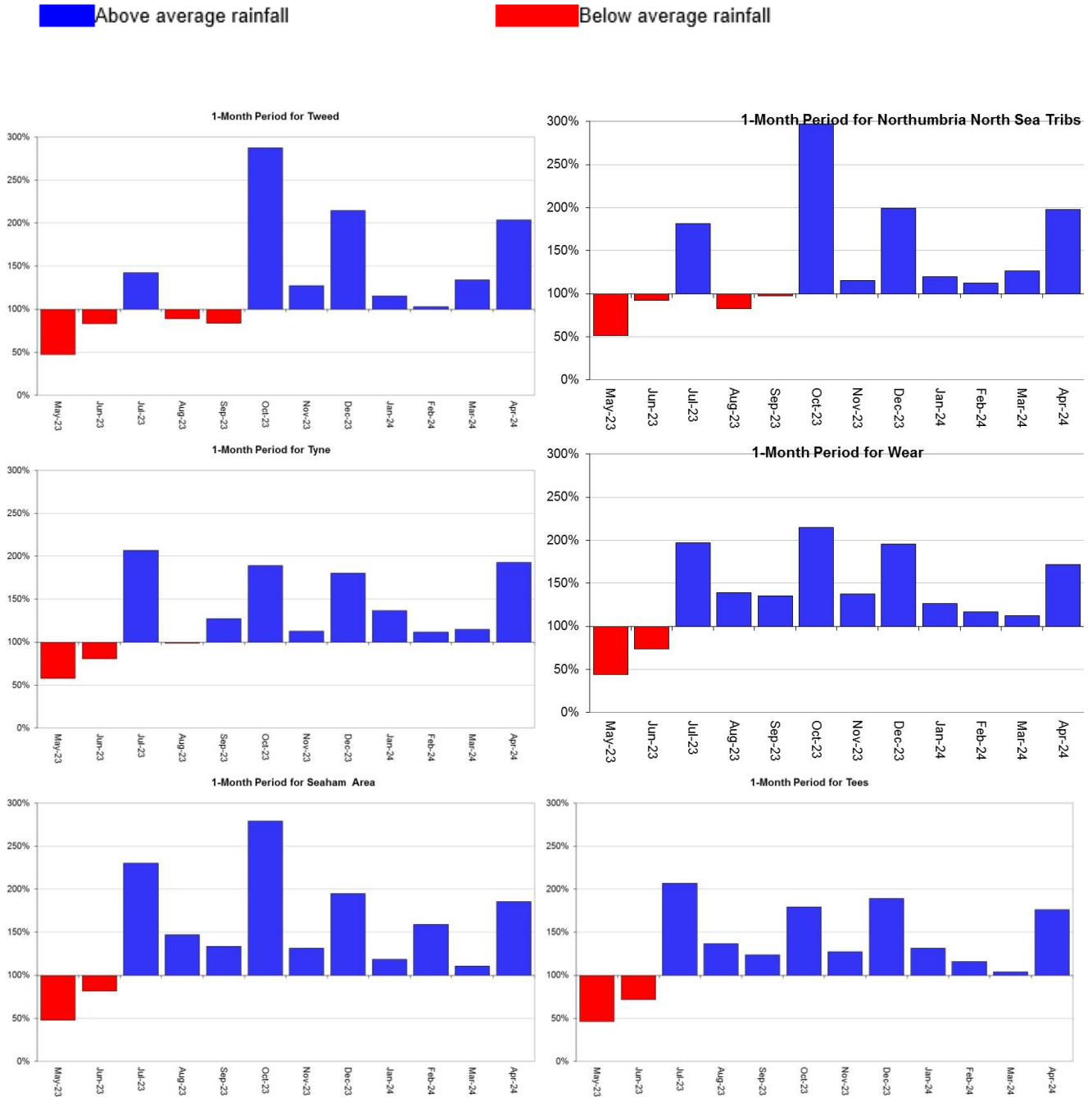
Figure 2.1: Total rainfall for hydrological areas for the current month (up to 30 April), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. April rainfall totals were classed as notably high across the whole of the North East with the exception of the Tyne catchment which was classed as exceptionally high. 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. All hydrometric areas have recorded above average rainfall for April 2024.



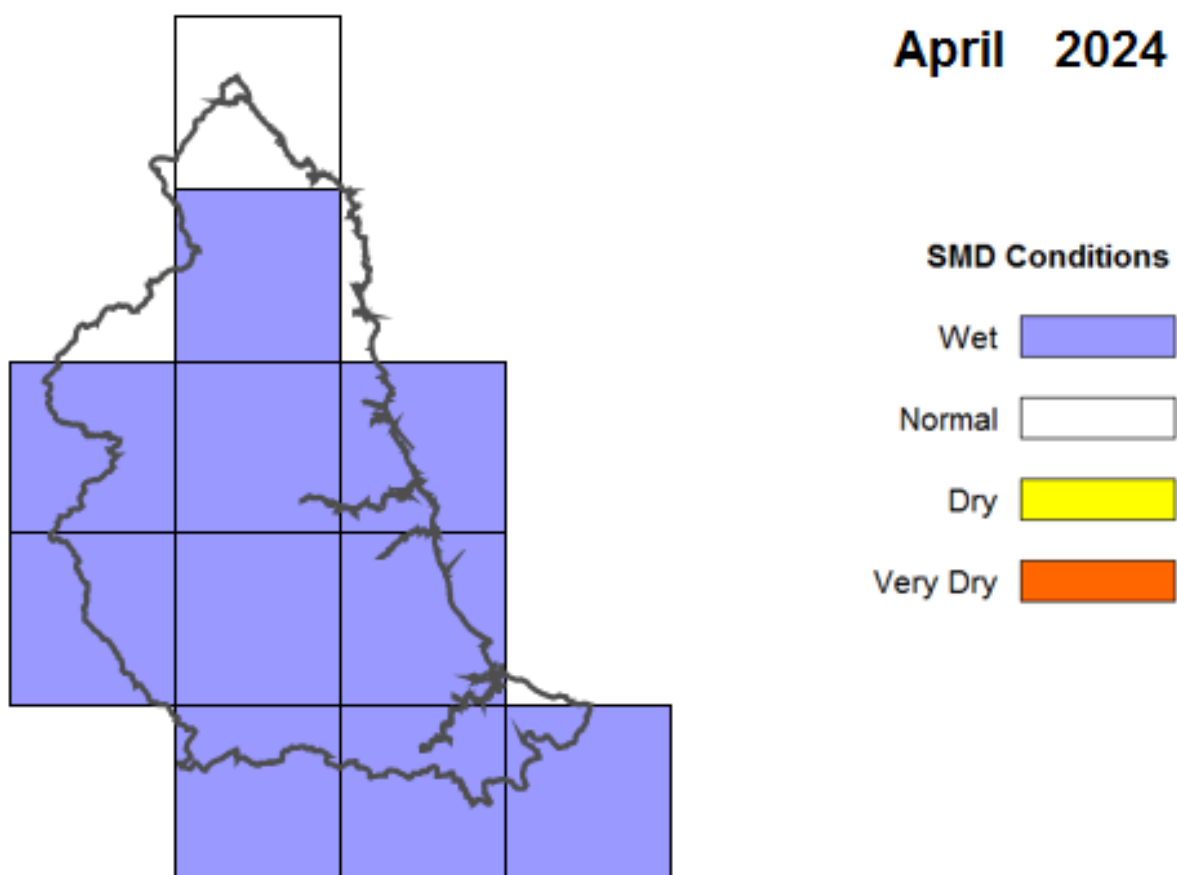
Rainfall data for 2024, extracted from Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. (Source: Environment Agency. Crown Copyright, 100024198, 2024). Rainfall data prior to 2023, extracted from Met Office HadUK

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 30 April. MORECS data for real land use. Soils across the whole of the North East are wet with the exception of the Till catchment which is classed as normal for April.

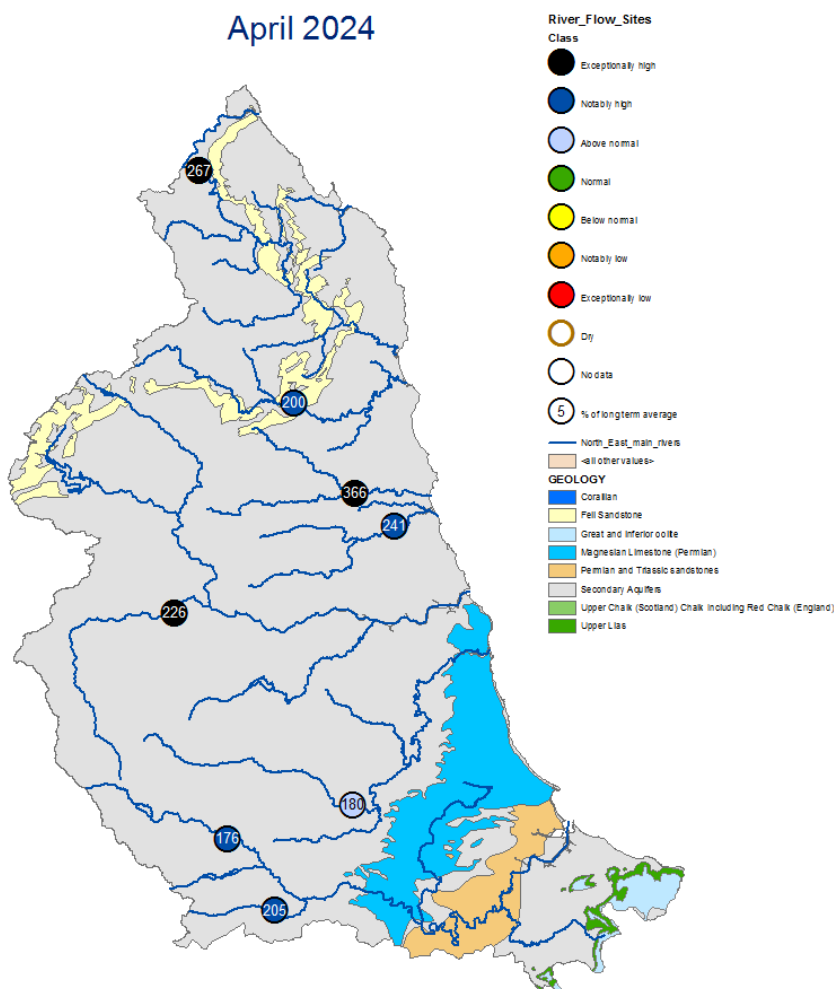


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4 River flows

4.1 River flows map

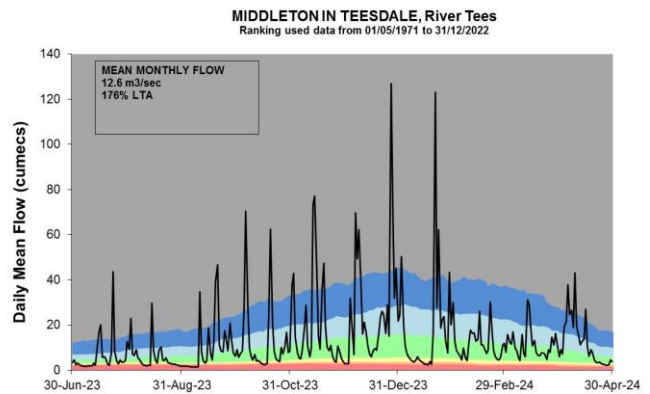
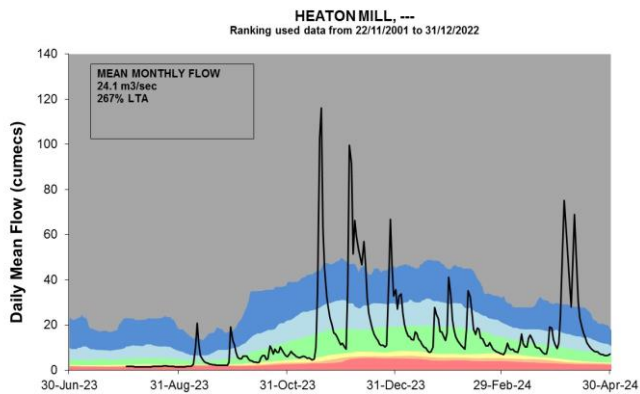
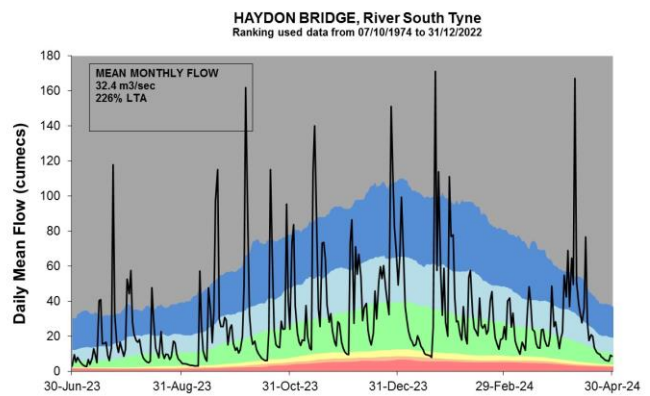
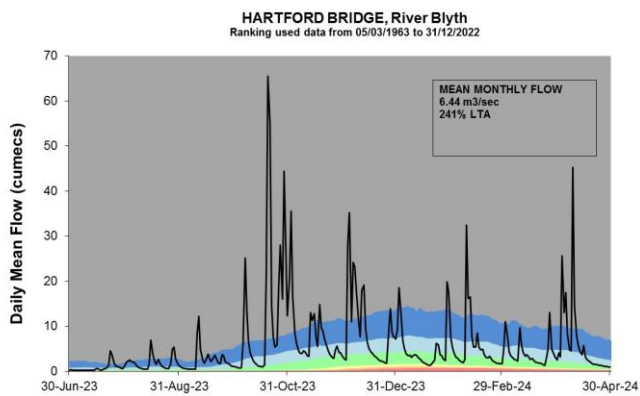
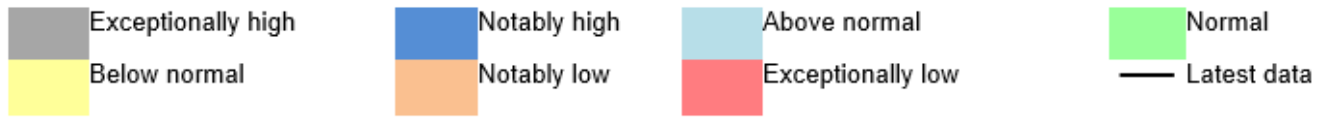
Figure 4.1: Monthly mean river flow for indicator sites for April 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic April monthly means. Monthly means are classed as exceptionally high, notably high and above normal. Table available in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

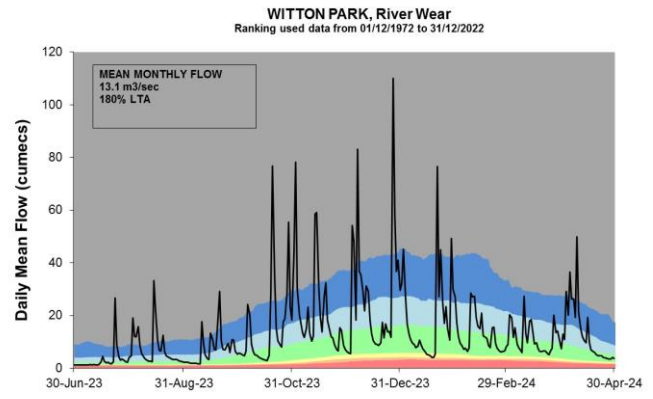
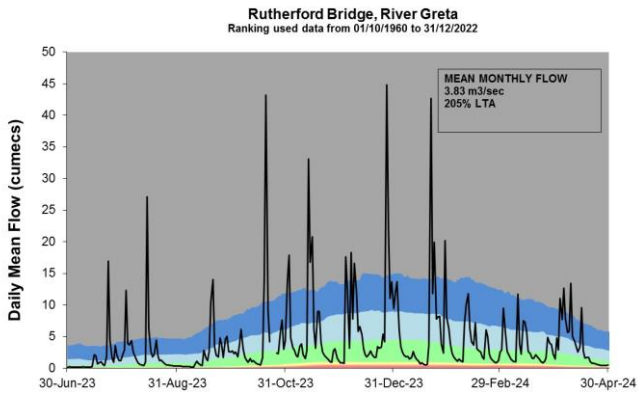
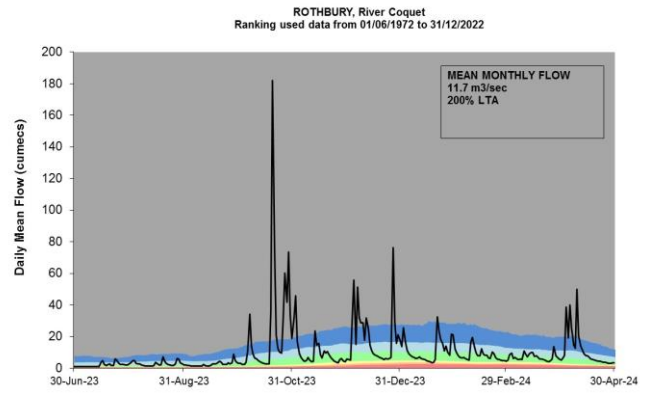
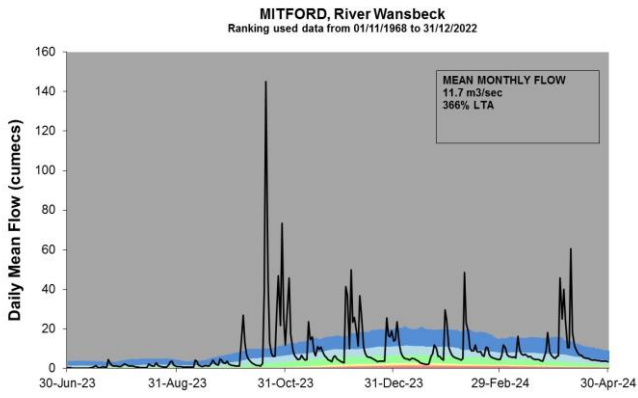


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4.2 River flow charts

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.



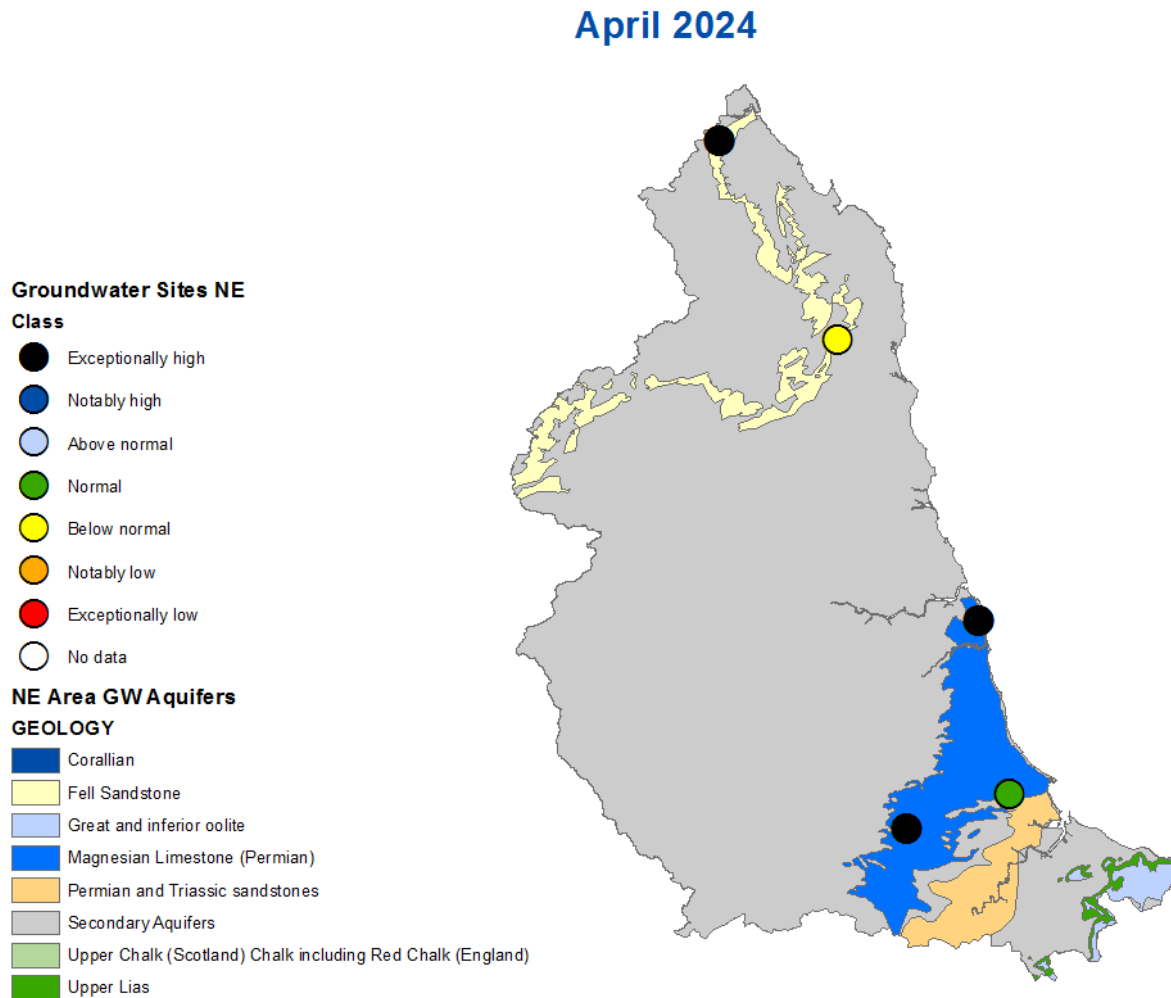


Source: Environment Agency, 2024.

5 Groundwater levels

5.1 Groundwater levels map

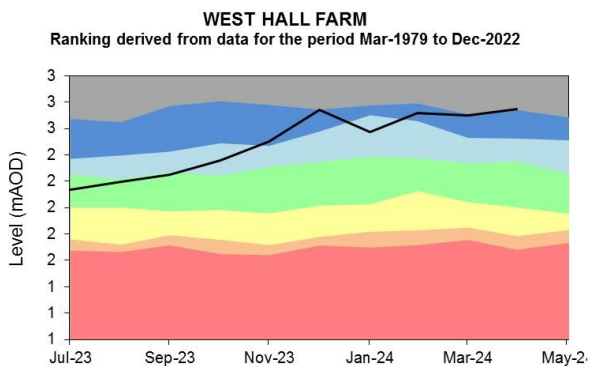
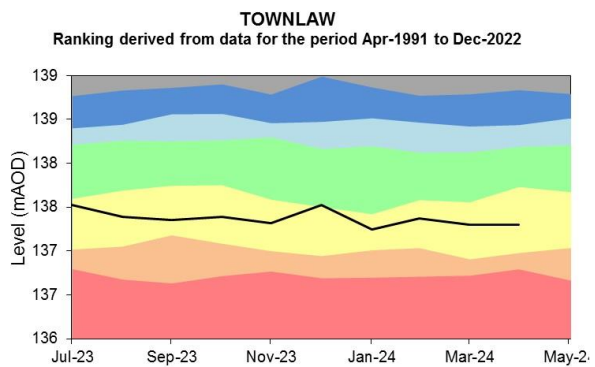
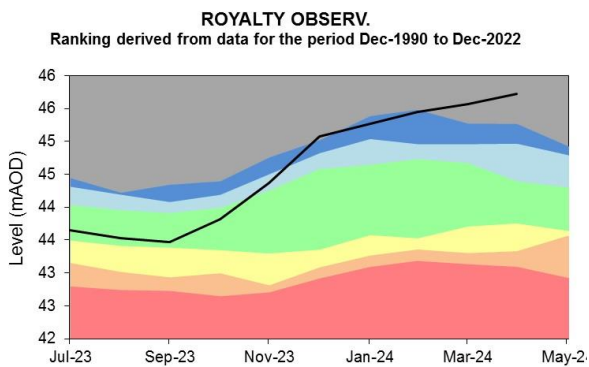
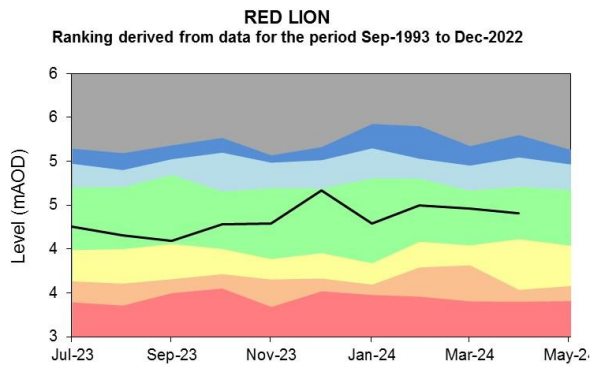
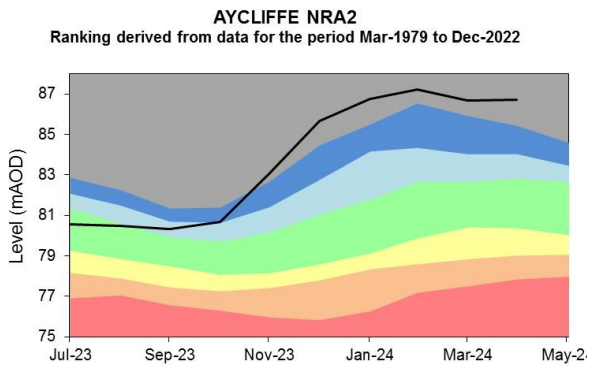
Figure 5.1: Groundwater levels for indicator sites at the end of April 2024, classed relative to an analysis of respective historic April levels. Indicator sites fall within the exceptionally high, normal and below normal ranges. Table available in the appendices with detailed information.



(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

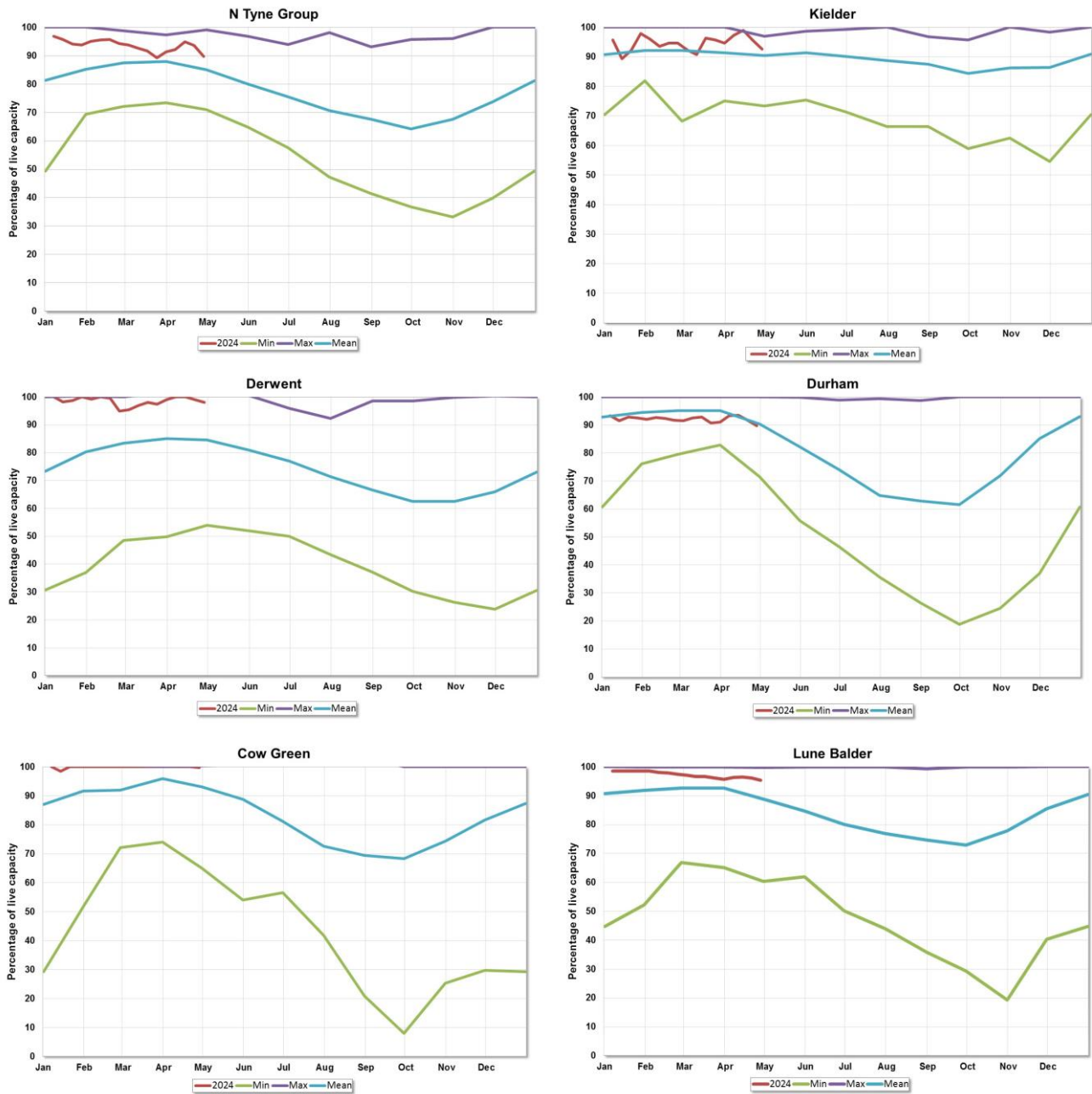
Figure 5.2: End of month groundwater levels at index groundwater level sites for major aquifers in the North East. 12 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



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	April 2024 rainfall % of long term average 1961 to 1990	April 2024 band	February 2024 to April 2024 cumulative band	November 2023 to April 2024 cumulative band	May 2023 to April 2024 cumulative band
Northumbria North Sea Tribs	198	Notably High	Notably high	Exceptionally high	Exceptionally high
Seaham Area	186	Notably High	Notably high	Exceptionally high	Exceptionally high
Tees	176	Notably High	Notably high	Exceptionally high	Exceptionally high
Tweed	204	Notably High	Notably high	Exceptionally high	Exceptionally high
Tyne	193	Exceptionally High	Notably high	Exceptionally high	Exceptionally high
Wear	172	Notably High	Notably high	Exceptionally high	Exceptionally high

8.2 River flows table

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

8.3 Groundwater table

Site name	Aquifer	End of April 2024 band	End of March 2024 band
Aycliffe Nra2	Skerne Magnesian Limestone	Exceptionally high	Exceptionally high
Red Lion	Skerne Magnesian Limestone	Normal	Normal
Royalty Observation	Till Fell Sandstone	Exceptionally high	Exceptionally high
Townlaw	Till Fell Sandstone	Below normal	Below normal
West Hall Farm	Wear Magnesian Limestone	Exceptionally high	Notably high