

# Monthly water situation report: North East

## 1 Summary – July 2024

July was a month of two halves. The first half was very wet and the second half was dry with higher temperatures. Overall monthly rainfall totals were above average for the month. Flows were elevated for most of the month following the rain and fell within the normal or higher ranges. Groundwater levels remained the same as last month, generally falling into the normal or high ranges. Soil moisture deficit (SMD) data has recorded the first dry tile since September 2023. Reservoir stocks have decreased but remain healthy for the time of year

### 1.1 Rainfall

Monthly rainfall totals were classed as above the long term average (LTA) across all catchments in the North East area. The Tweed, Tyne and Seaham Area catchments recorded above normal rainfall while Northumbria North Sea Tribs, Wear and Tees catchments recorded normal. Monthly rainfall totals ranged from 141% of the LTA in both the Northumbria and North Sea Tribs and Tees catchments to 175% of the LTA in the Seaham Area catchment.

This was a month of two halves, with a very wet first half followed by very little rain from the 16 July. Warmer temperatures were observed in the second half of July.

Cumulative 12 month rainfall totals show that all catchments in the North East area recorded exceptionally high totals.

### 1.2 Soil moisture deficit and recharge

Soils are classified as wet in the west and south-west, dry around the coast and in the lower Tyne catchment and normal for the rest of the North East area. This is the first time any North East area SMD tiles have been classified as dry since September 2023.

### 1.3 River flows

Monthly mean river flows have increased this month at almost all indicator sites. The exceptions are Rothbury and Rutherford Bridge which remain in the normal category. All monthly mean flows are classed as normal or above. Flows ranged from 92% of the LTA at

Middleton in Teesdale on the River Tees to 225% of the LTA at Hartford Bridge on the River Blyth.

Analysis of daily mean flows shows that flows reached notably high or higher in the middle of the month for most indicator sites following the prolonged rainfall. Flows decreased, but remained between normal and notably high for the rest of the month, with the exception of Middleton in Teesdale which fell within the exceptionally low category.

### 1.4 Groundwater levels

Groundwater levels across all reporting boreholes have remained the same as June. 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

Most reservoir stocks have seen a decrease this month, with the exception of the Durham group which have slightly increased. Overall, reservoir stocks remain healthy for the time of year.

Reservoir or reservoir group	Percentage of current stocks	Percentage of previous month stocks
Kielder	85.8	90.6
North Tynedale group	77.5	79.9
Derwent	89.9	92.8
Durham group	83.1	82.9
Lune and Balder group	89.8	90.2
Cow Green	98.2	100

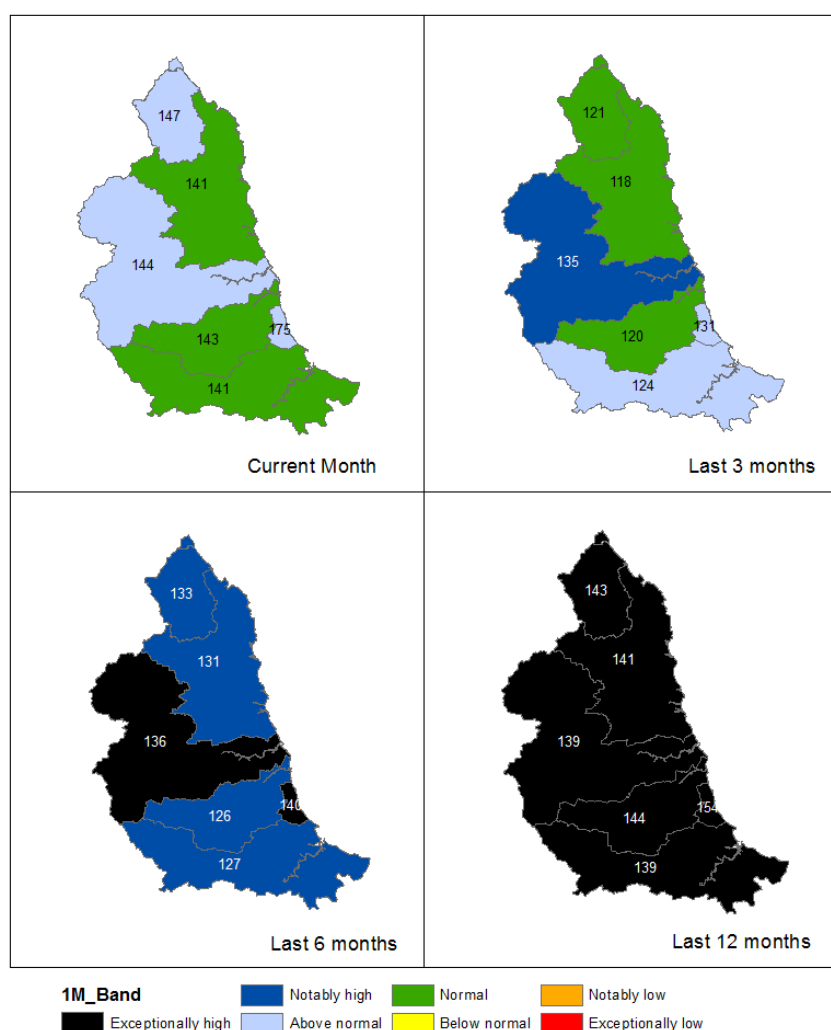
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## 2 Rainfall

### 2.1 Rainfall map

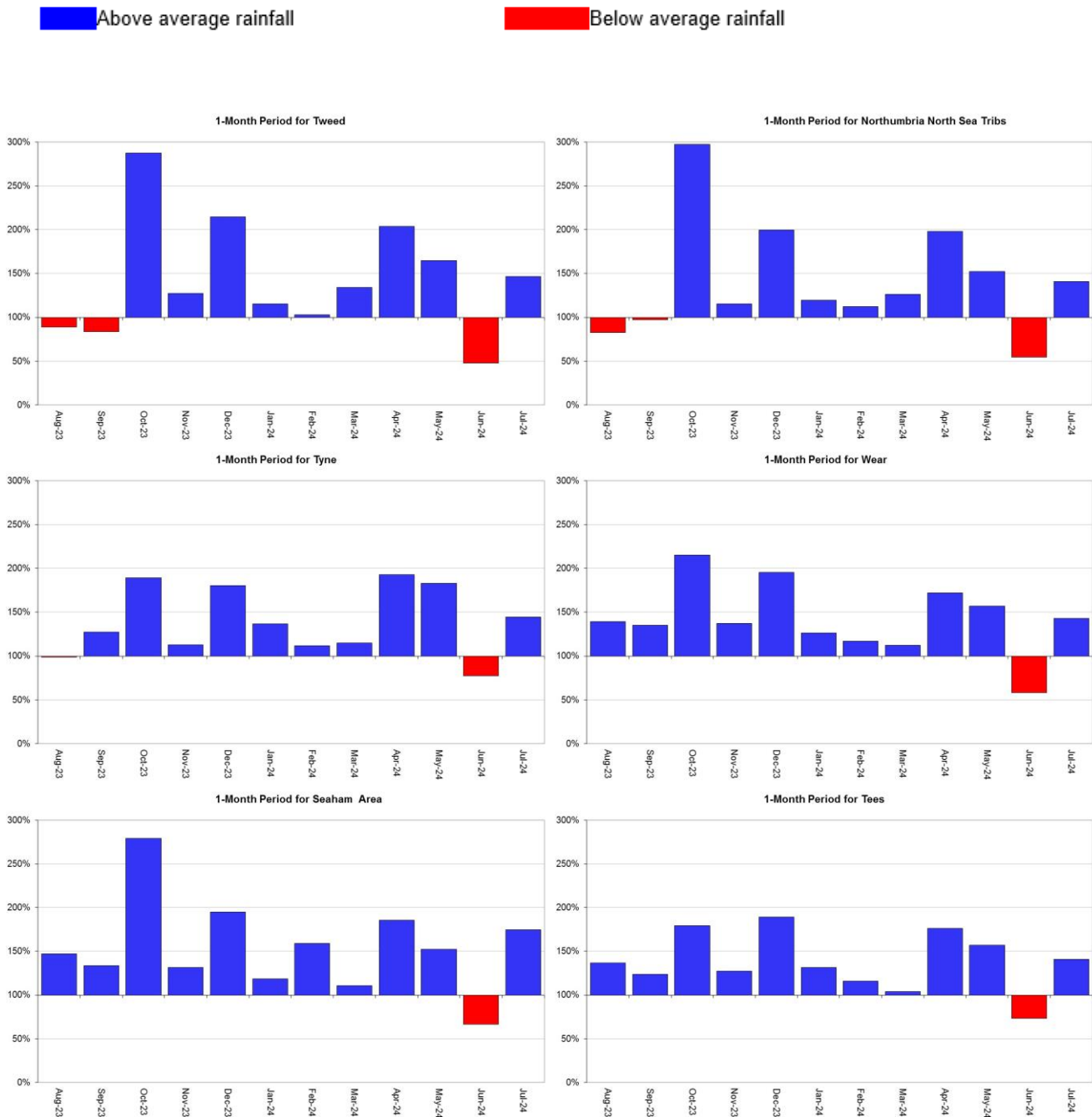
Figure 2.1: Total rainfall for hydrological areas for the current month (up to 31 July 2024), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. July rainfall totals were classed as above normal for the Tweed, Tyne, and Seaham catchments. Totals were classed as normal across the rest of the North East. 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 catchments have recorded above average rainfall for July 2024.



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

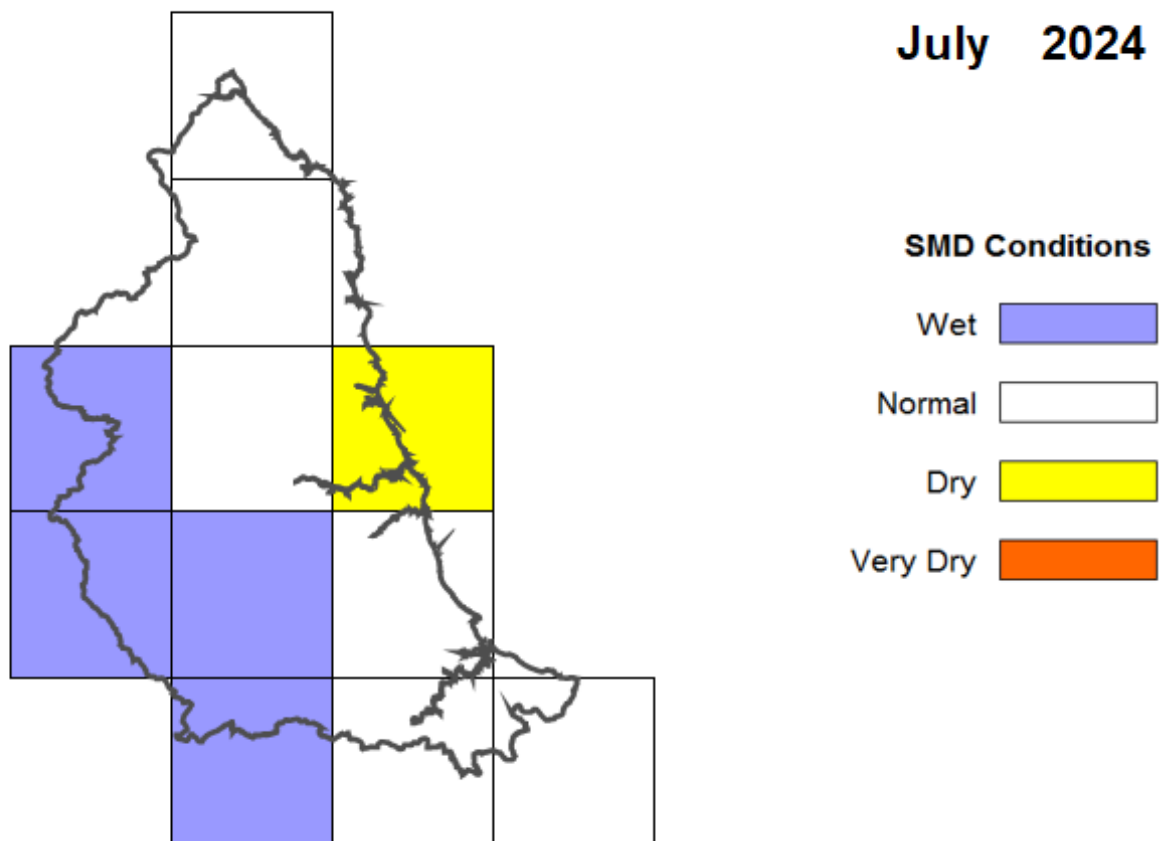
Copyright, 100024198, 2024). Rainfall data prior to 2023, extracted from Met Office HadUK 1km gridded rainfall dataset derived from registered rain gauges (Source: Met Office. Crown copyright, 2024).

### 3 Soil moisture deficit

#### 3.1 Soil moisture deficit map

Figure 3.1: Soil moisture deficits for weeks ending 31 July 2024. MORECS data for real land use. Soils are wet across the west and south-west of the North East. There is one tile on the easternmost side classed as dry covering the easternmost side of the Tyne and Northumbria North Sea Tribs catchments. The rest of the North East is classed as normal.

## Environment Agency - North East Area Monthly MORECS SMD Levels

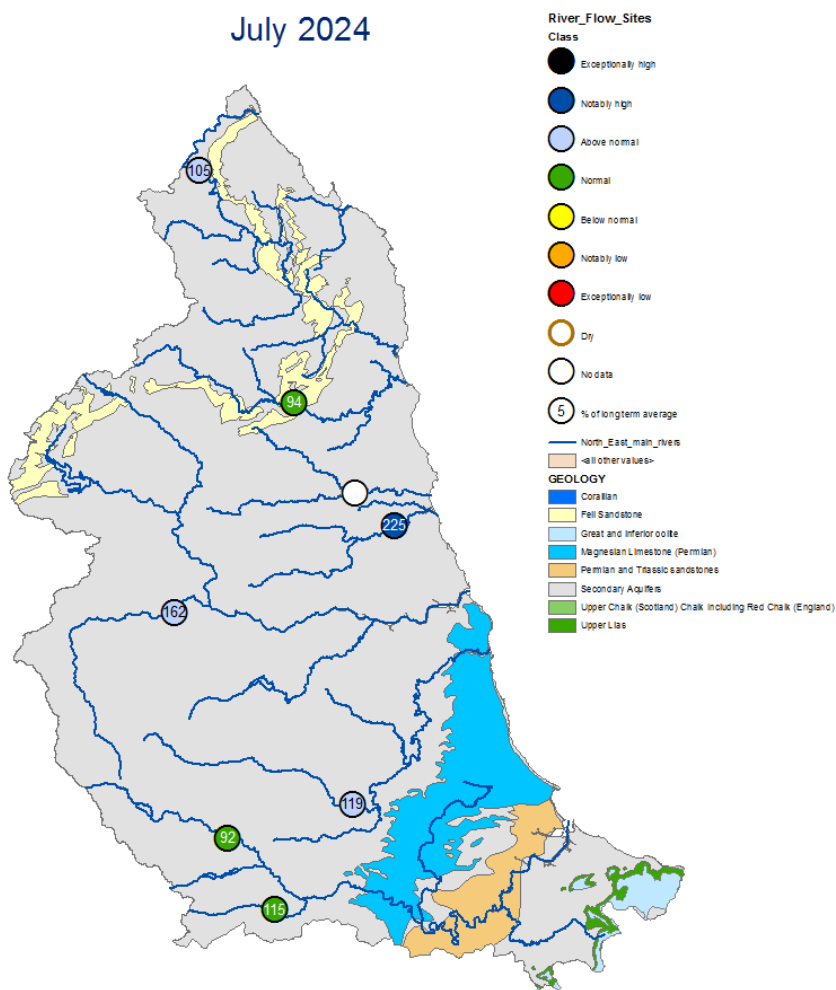


(Source: Met Office. Crown copyright, 2024). All rights reserved. Environment Agency, 100024198, 2024.

## 4 River flows

### 4.1 River flows map

Figure 4.1: Monthly mean river flow for indicator sites for July 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic July monthly means. Monthly means are classed as normal at Rothbury, Middleton in Teesdale and Rutherford Bridge. They are classed as above normal at Witton Park, Haydon Bridge and Heaton Mill, and notably high at Hartford Bridge. Table available in the appendices with detailed information.

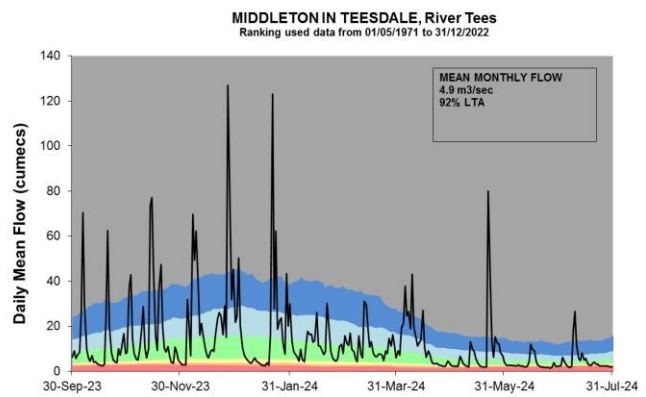
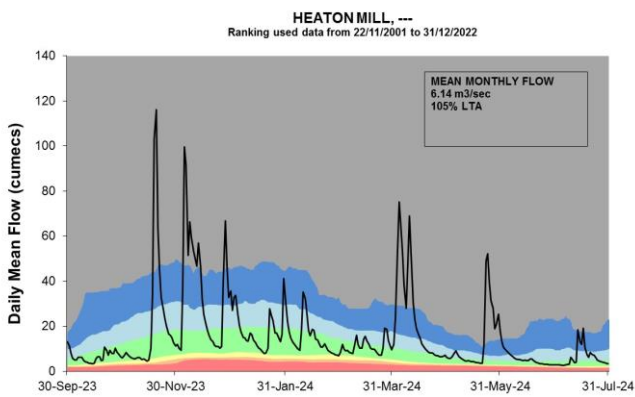
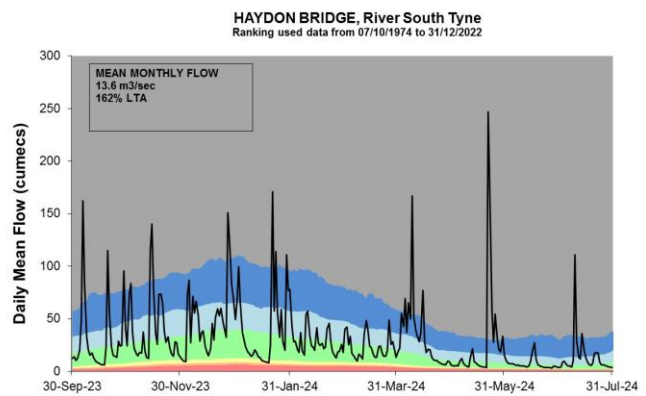
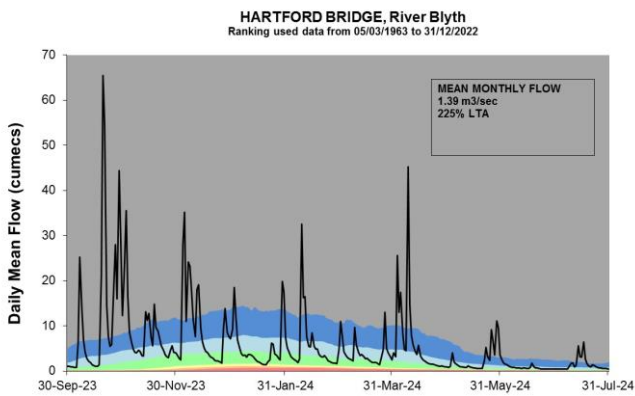
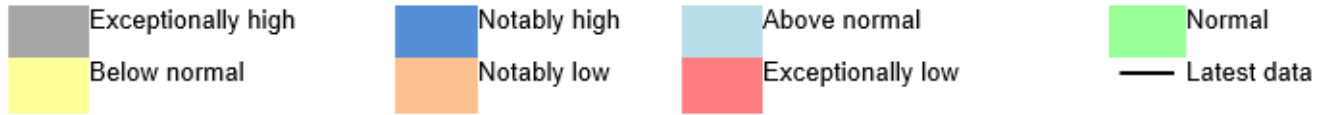


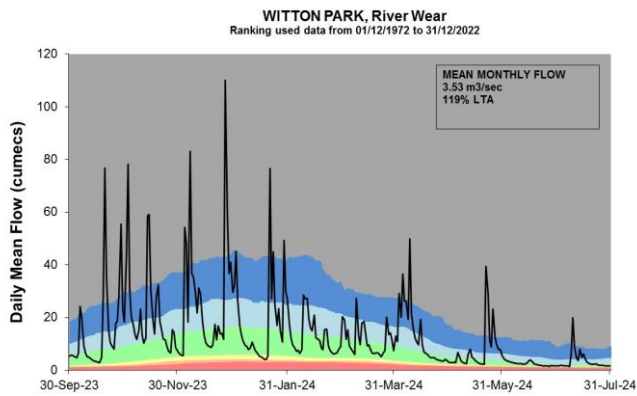
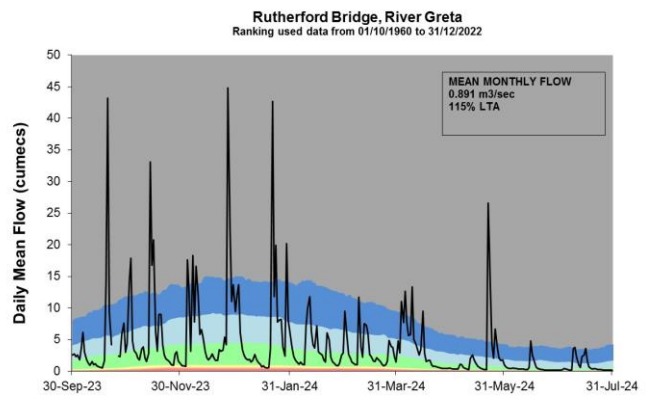
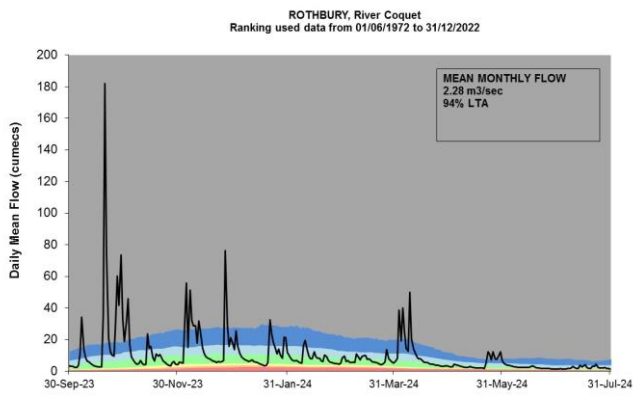
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## 4.2 River flow charts

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.



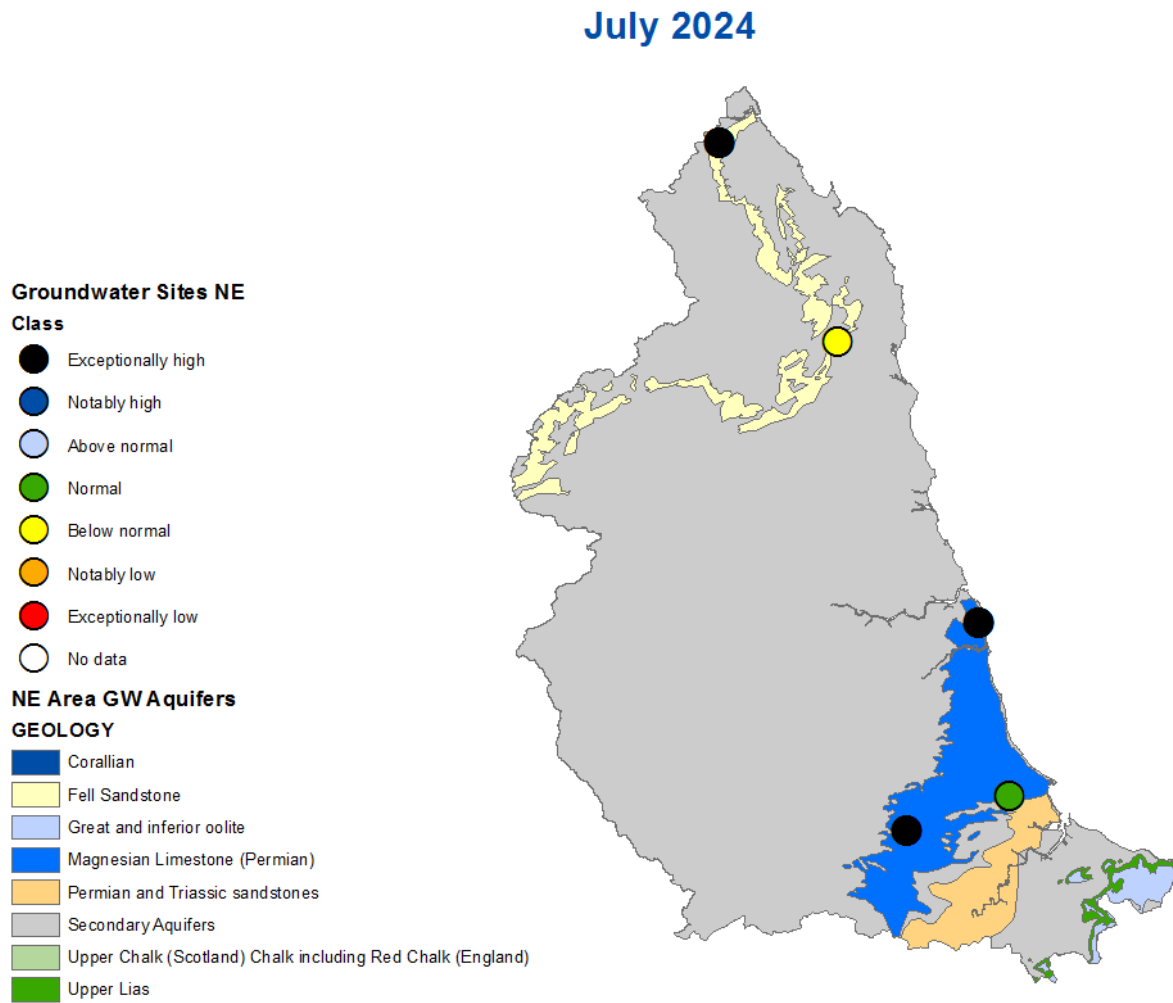


Source: Environment Agency, 2024.

# 5 Groundwater levels

## 5.1 Groundwater levels map

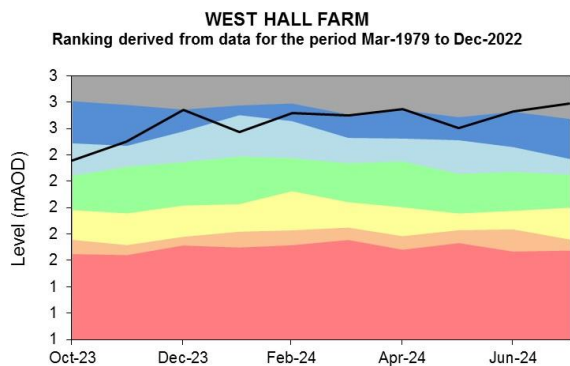
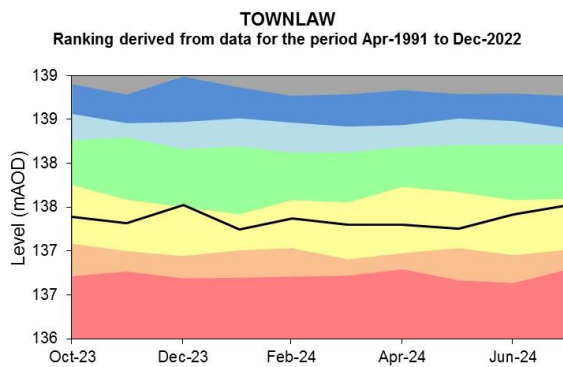
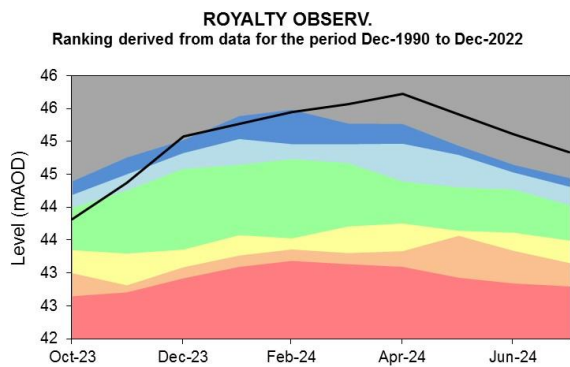
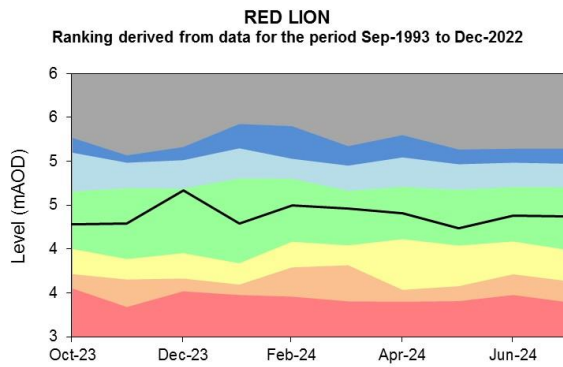
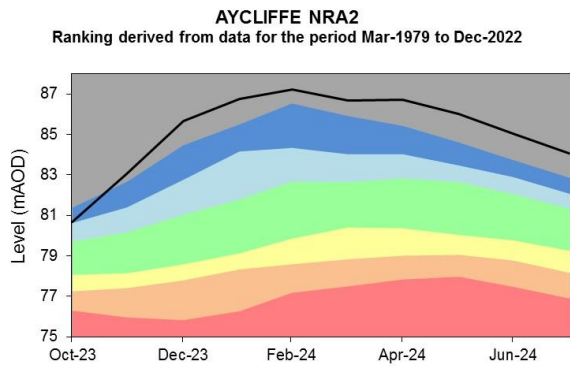
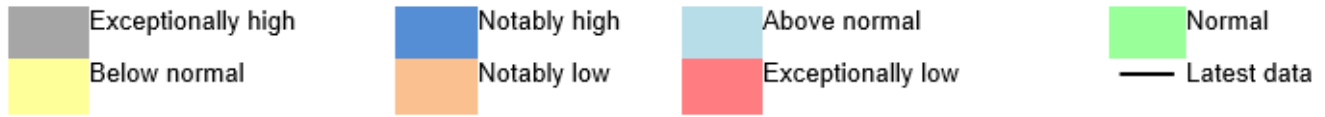
Figure 5.1: Groundwater levels for indicator sites at the end of July 2024, classed relative to an analysis of respective historic July levels. Indicator sites fall within the exceptionally high, normal, and below normal ranges. Table available in the appendices with detailed information.



(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

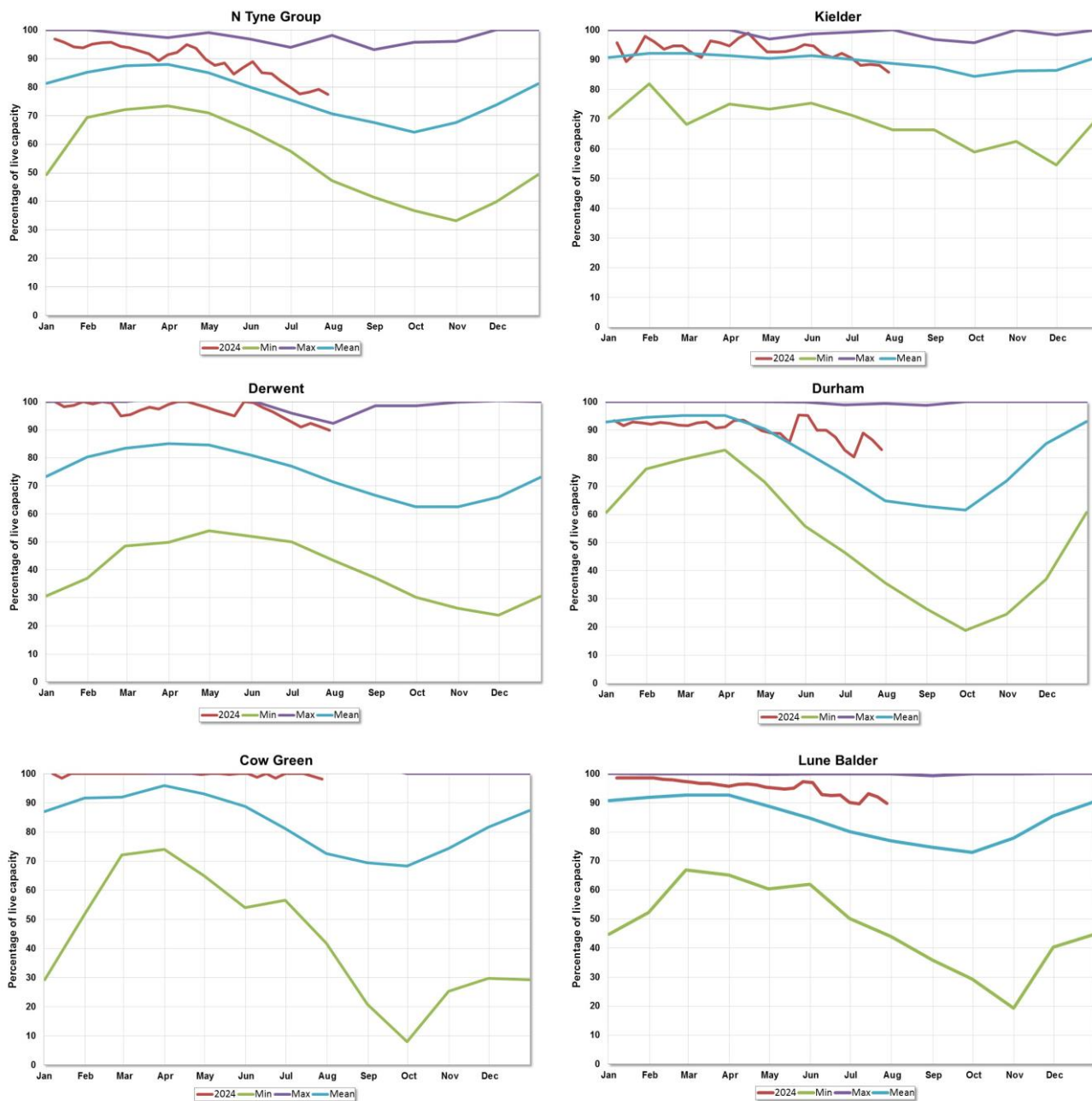
Figure 5.2: End of month groundwater levels at index groundwater level sites for major aquifers in the North East. 12 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



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 ( $\text{m}^3\text{s}^{-1}$ ).

#### **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	July 2024 rainfall % of long term average 1961 to 1990	July 2024 band	May 2024 to July 2024 cumulative band	February 2024 to July 2024 cumulative band	August 2023 to July 2024 cumulative band
Northumbria North Sea Tribs	129	Notably High	Normal	Notably high	Exceptionally high
Seaham Area	136	Exceptionally High	Above normal	Exceptionally high	Exceptionally high
Tees	128	Notably High	Above normal	Notably high	Exceptionally high
Tweed	130	Notably High	Normal	Notably high	Exceptionally high
Tyne	136	Exceptionally High	Notably high	Exceptionally high	Exceptionally high
Wear	126	Notably High	Normal	Notably high	Exceptionally high

## 8.2 River flows table

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

### 8.3 Groundwater table

Site name	Aquifer	End of July 2024 band	End of June 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