

# Monthly water situation report: Lincolnshire and Northamptonshire Area

## 1 Summary - May 2024

The Lincolnshire and Northamptonshire area received above average rainfall of 63mm in May, which was 124% of the LTA. Soil moisture deficits (SMDs) increased in all six catchments but saw a slight decrease again towards the end of the month. The area as a whole ended the month with an SMD of 27mm. Mean monthly flows ranged from 127% to 314% of the LTA which were classified from above normal to exceptionally high for the time of year. In response to above normal levels of rainfall across the area, groundwater levels remained high. At all sites with data, groundwater levels were classified as normal to notably high for the time of year. Reservoirs in the area ended the month above their normal operating curves with the exemption of Covenham and Rutland which remained slightly below target.

### 1.1 Rainfall

The Lincolnshire and Northamptonshire area received above average rainfall of 63mm, 124% of the LTA during May of which 56mm fell in the last two weeks of the month. This is now the ninth month in succession with above average rainfall. It has been the wettest September to May period across Lincs and Northants since records began in 1871. The highest levels of rainfall were in the Lower Welland and Nene (69.6mm, 136% of the LTA) and South Forty Foot and Hobhole catchments (66.6mm, 133% of the LTA). Four of the 6 hydrological areas were classified as above normal. The Upper Welland and Nene and Louth Grimsby and Ancholme were classified as normal levels of rainfall for the time of year.

The last 3 months' rainfall totals showed above normal levels in almost all of the hydrological areas (except for the Upper Welland and Nene and Witham to Chapel Hill catchments which showed as notably high in the 3-month map). The record breaking rainfall totals over winter are still having an impact on the long term analysis with the last 6 months and the last 12 months rainfall totals in all catchments still being exceptionally high during these periods.

### 1.2 Soil moisture deficit and recharge

Soil moisture deficit responded in line with the rainfall received across May; SMD increased in all six catchments but saw a slight decrease again towards the end of the month, when the month's main rainfall fell. The area as a whole ended the month with an SMD of 27mm, in

comparison to 13mm at the end of April. This figure is still within the below normal range for the time of year.

### **1.3 River flows**

River flows remained relatively high at all key indicator sites. Mean monthly flows ranged from 127% to 314% of the LTA, and from above normal to exceptionally high classification. In most sites river flow responded in line with the amount of rainfall received in May. The River Glen returned an exceptionally high classification for the time of year and moving from above normal to exceptionally high.

### **1.4 Groundwater levels**

Following the above normal levels of rainfall and below normal SMD across Lincolnshire and Northamptonshire area in May, groundwater remained high, but trend showed a slight decline at all indicator sites. However, at most sites ground water level show no change in banding since April 2024 except ground water level at Dunholme Road Scothern which moved from normal to above normal classification and Hanthorpe which moved from exceptionally high to notably high classification. Overall, at all sites with data, groundwater levels were classified as normal to notably high for the time of year.

### **1.5 Reservoir stocks**

With the exception of Covenham and Rutland, reservoirs the area ended the month above their normal operating curves. The levels at Covenham was 5% below target curve and Rutland was 1% below target curve in April, however levels are not alarmingly low (around 1995-96 operational curve).

### **1.6 Environmental impact**

All transfer schemes remained off throughout May. There were no cessation notices issued due to the high flows. There were 5 flood alerts. There were no flood warnings issued.

## 1.7 Forward look

### 1.7.1 Probabilistic ensemble projections for river flows at key sites

June 2024: There is an increased probability of normal or higher flows with none of modelled rainfall scenarios showing notably low levels at Nene Northampton and Nene Wansford.

September 2024: All sites are showing a decreased probability of river flows being notably low or exceptionally low .

### 1.7.2 Probabilistic ensemble projections for groundwater levels in key aquifers

September 2024: All sites are showing an increased probability of groundwater levels being normal or higher with none of modelled rainfall scenarios showing notably or exceptionally low levels.

March 2025: All sites are showing a decreased probability of groundwater levels being notably low or exceptionally low.

Author: Pan Hydrology Team, [Hydrology-EAN-and-LNA@environment-agency.gov.uk](mailto:Hydrology-EAN-and-LNA@environment-agency.gov.uk)

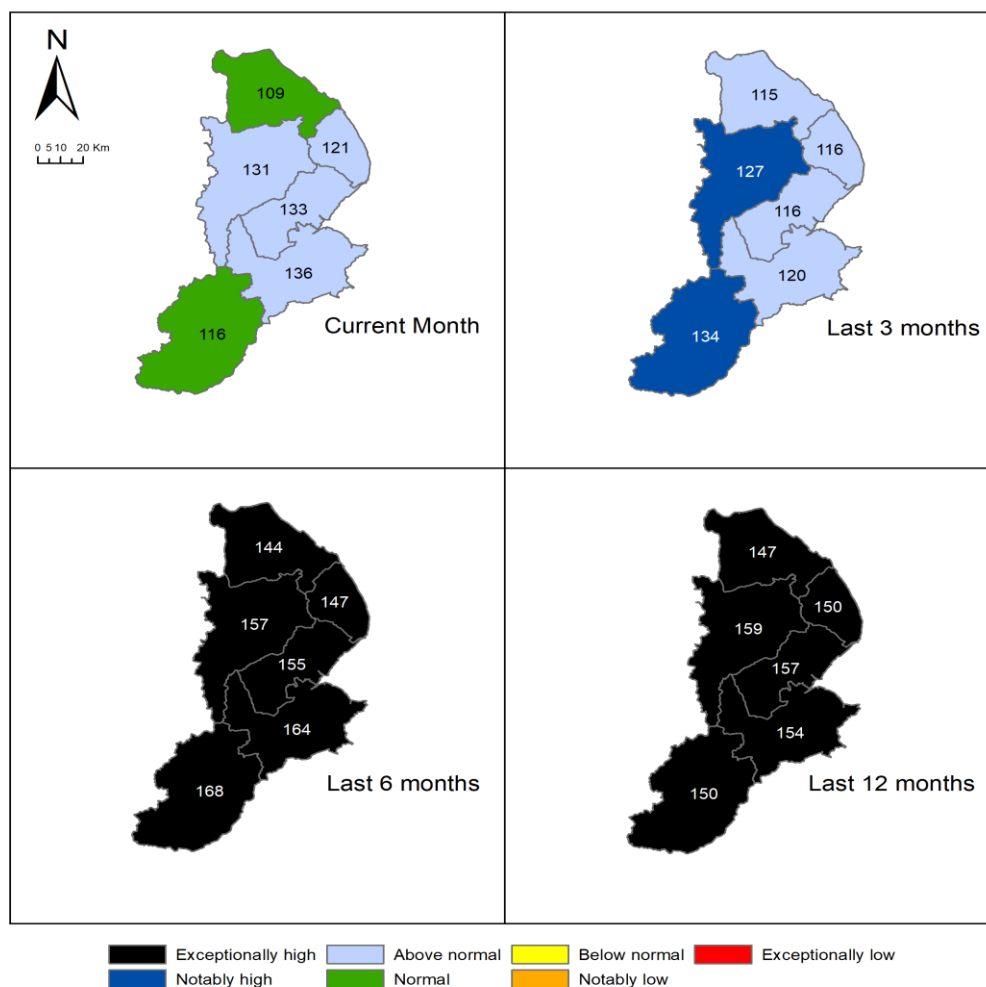
All data are provisional and may be subject to revision. The views expressed in this document are not necessarily those of the Environment Agency. Its officers, servants or agents accept no liability for any loss or damage arising from the interpretation or use of the information, or reliance upon views contained in this report

Contact Details: 03708 506 506

## 2 Rainfall

### 2.1 Rainfall map

Figure 2.1: Total rainfall for hydrological areas across Lincolnshire and Northamptonshire, expressed as a percentage of long term average rainfall for the current month (up to 31 May 2024), the last 3 months, the last 6 months, and the last 12 months. Category classes are based on an analysis of respective historic totals. Table available in the appendices with detailed information.

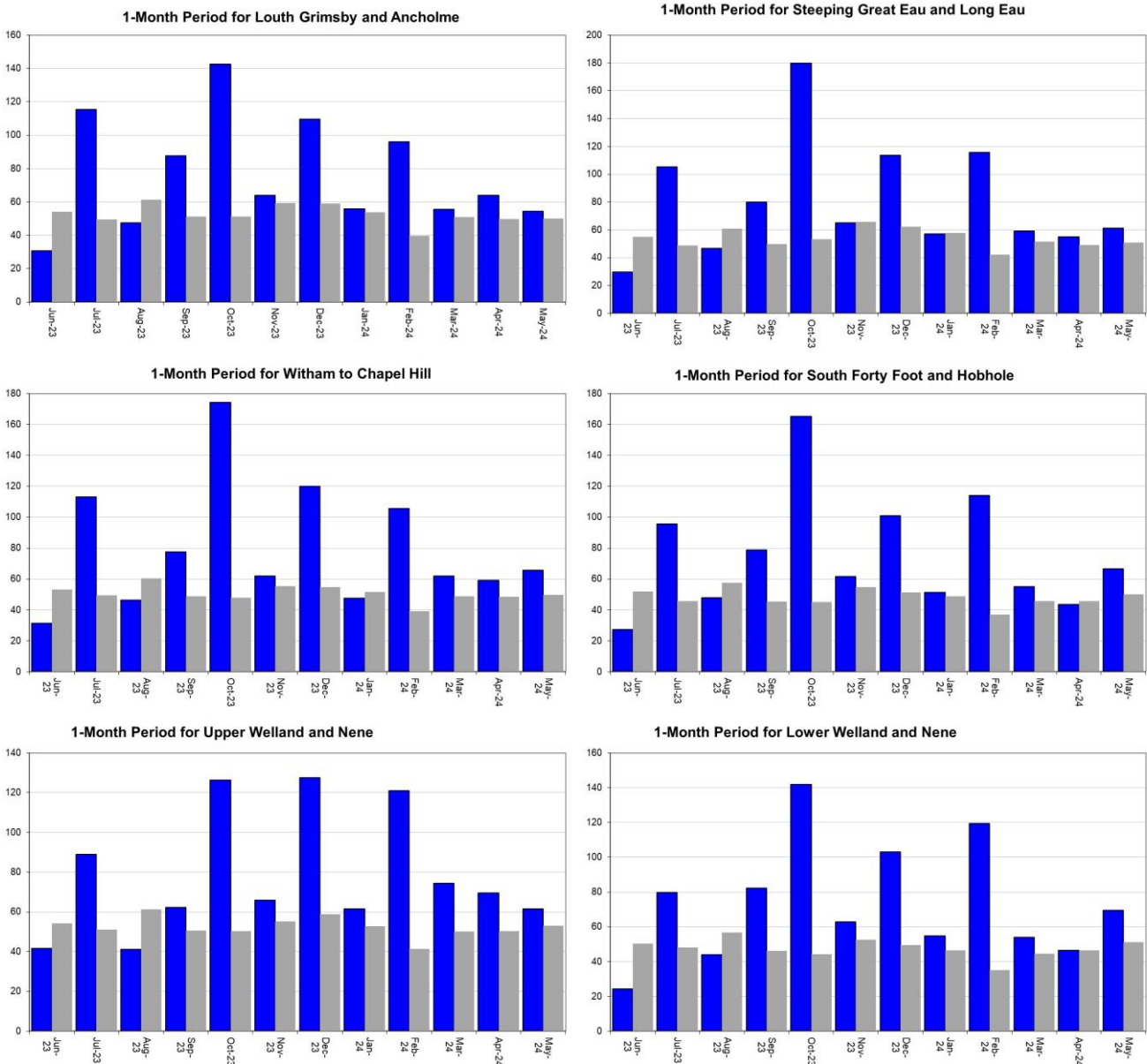


HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2024). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved. Environment Agency, 100024198, 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 region and for England.

■ Total Rainfall in Millimetres     
 ■ Long Term Average Rainfall in Millimetres

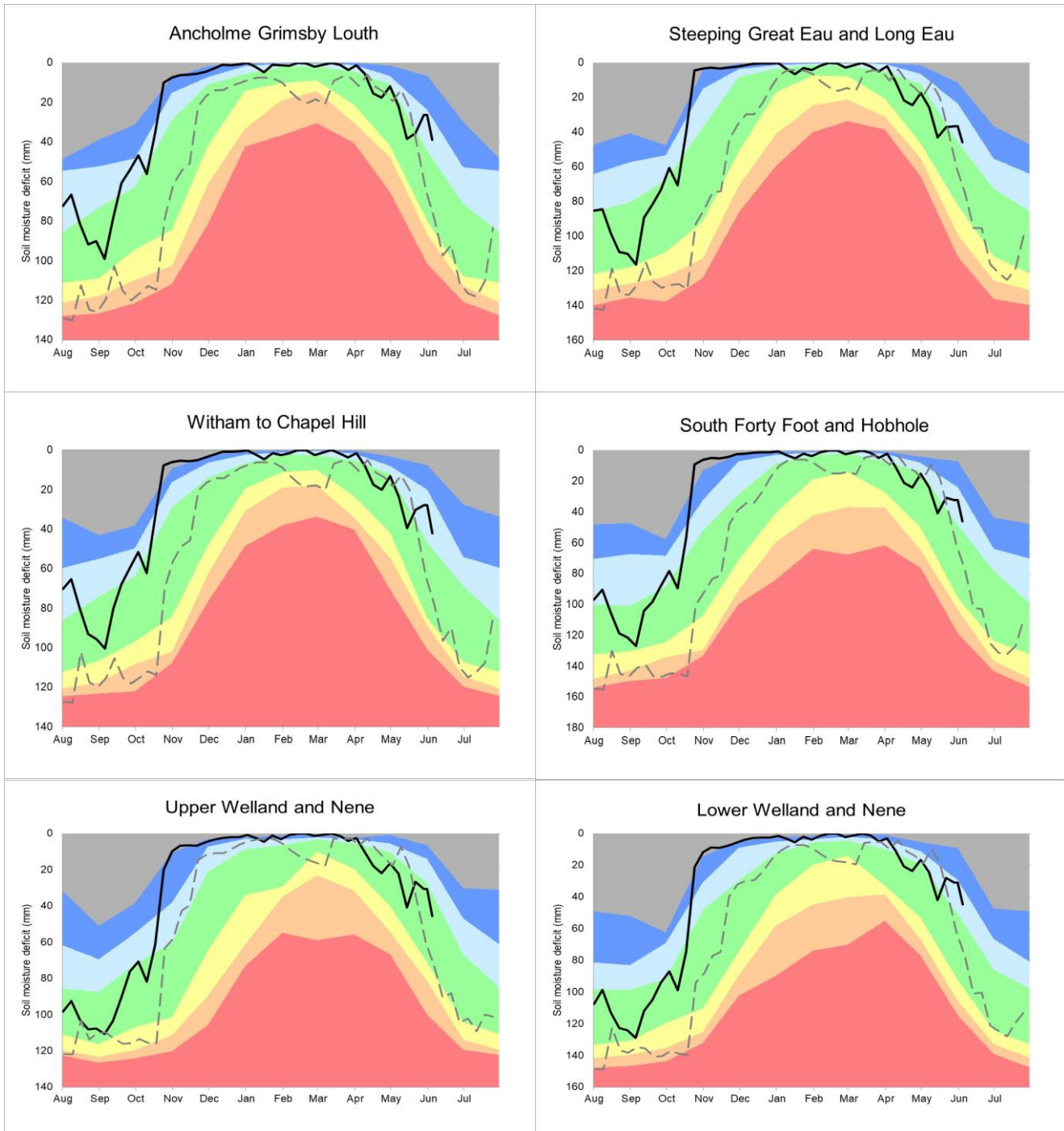


HadUK rainfall data. (Source: Met Office. Crown copyright, 2024).

### 3 Soil moisture deficit

#### 3.1 Soil moisture deficit charts

Figure 3.1: Latest soil moisture deficit compared to an analysis of historic 1961 to 1990 long term data set. Weekly MORECS data for real land use.

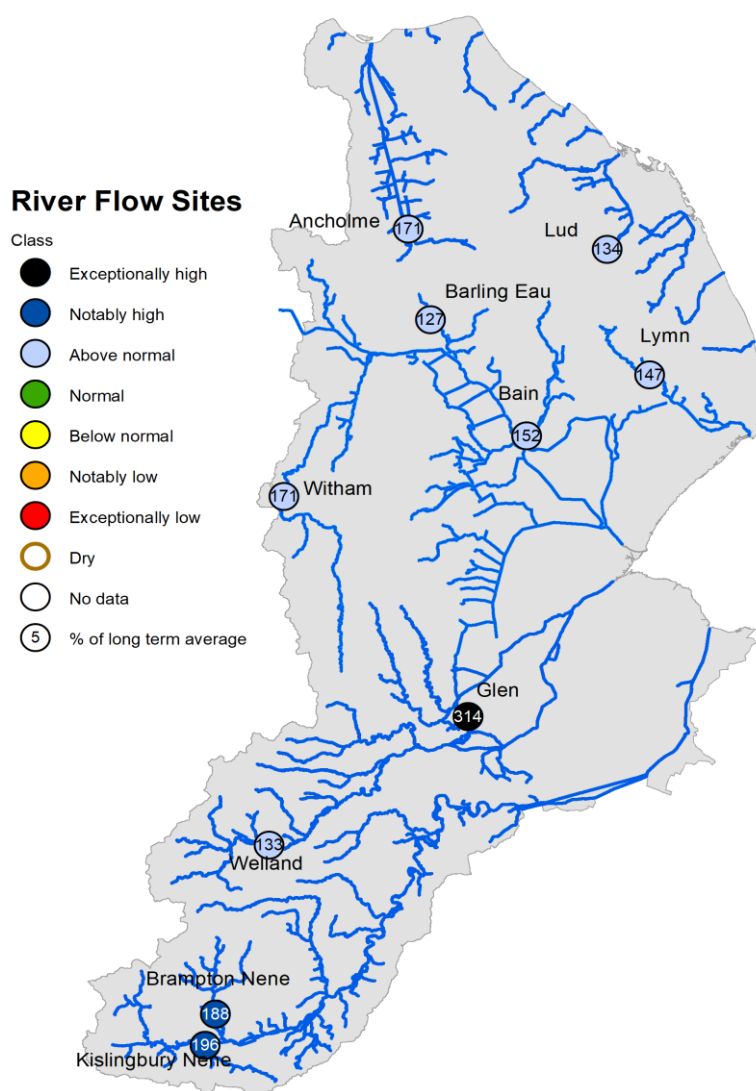


(Source: Met Office. Crown copyright, 2024). All rights reserved. Environment Agency, 100024198, 2024

## 4 River flows

### 4.1 River flows map

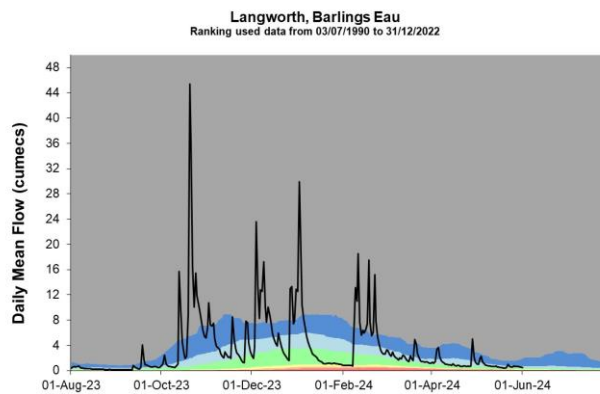
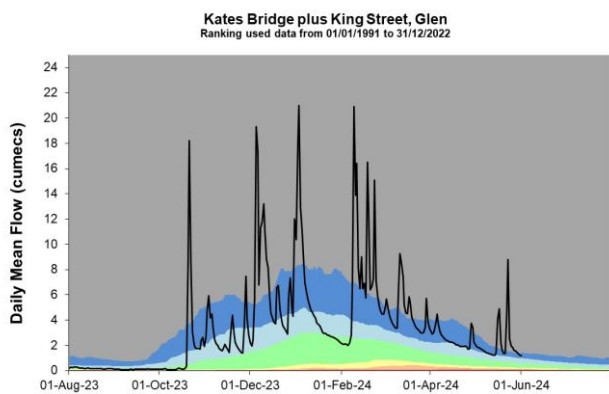
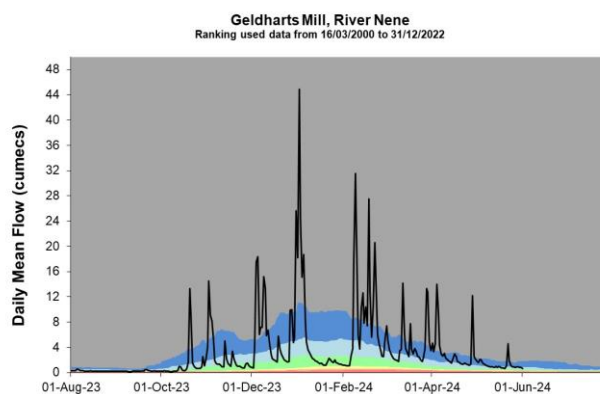
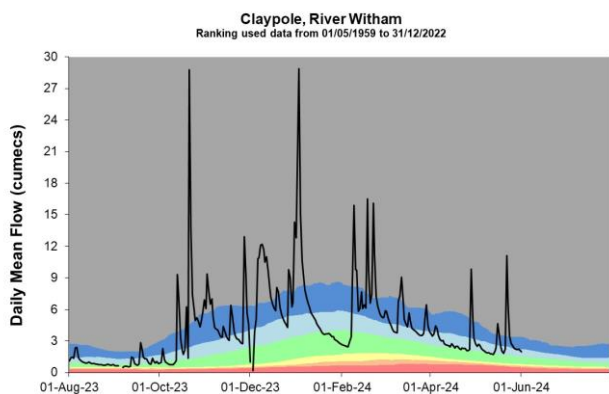
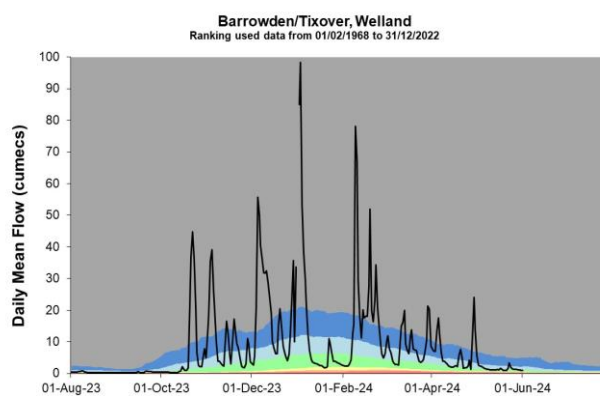
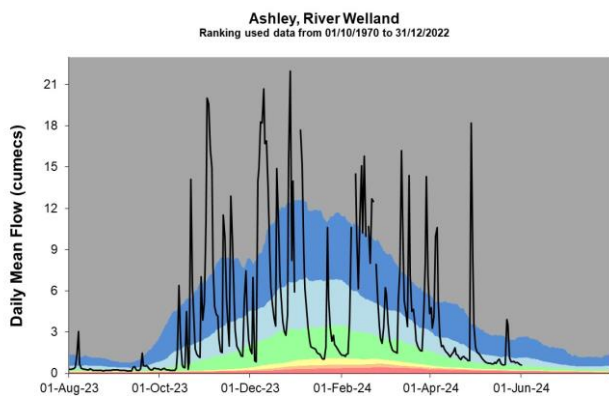
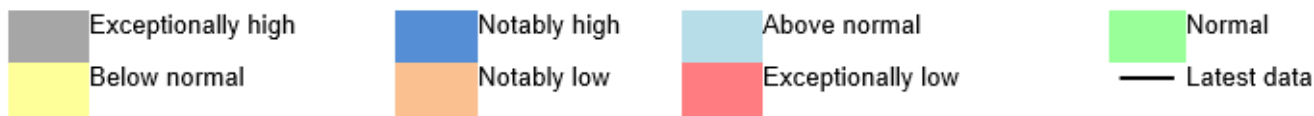
Figure 4.1: Monthly mean river flow for indicator sites for May 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic May monthly means Table available in the appendices with detailed information.



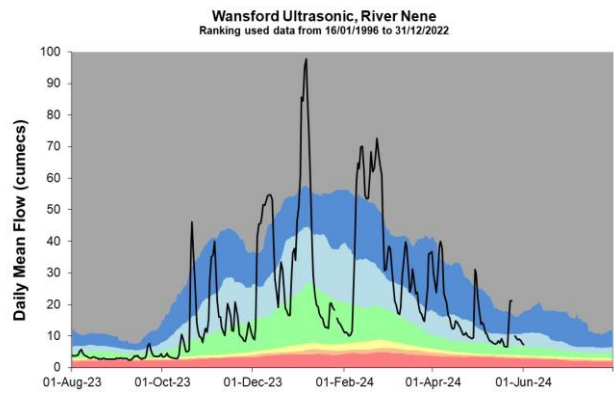
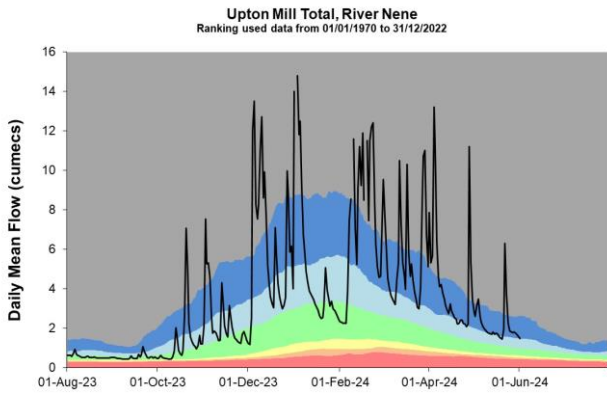
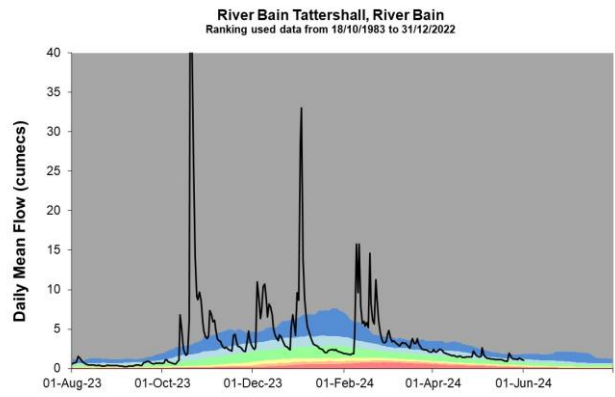
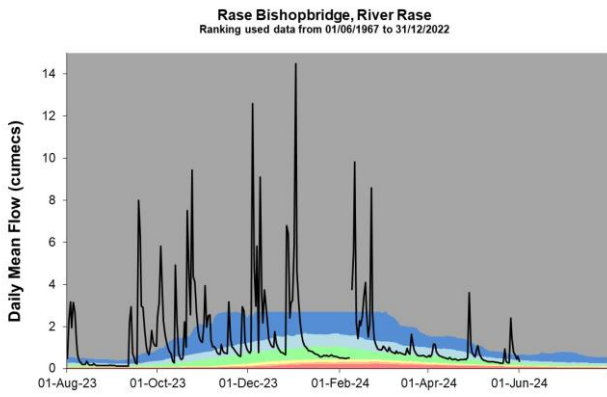
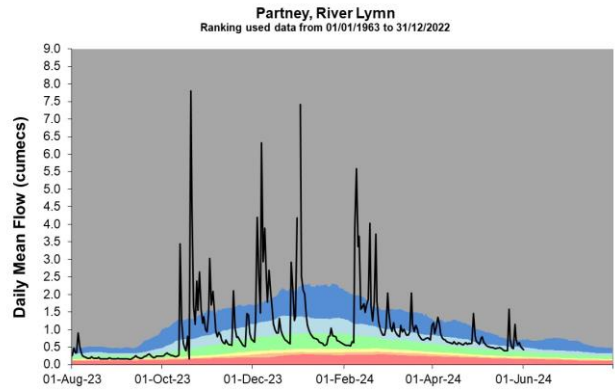
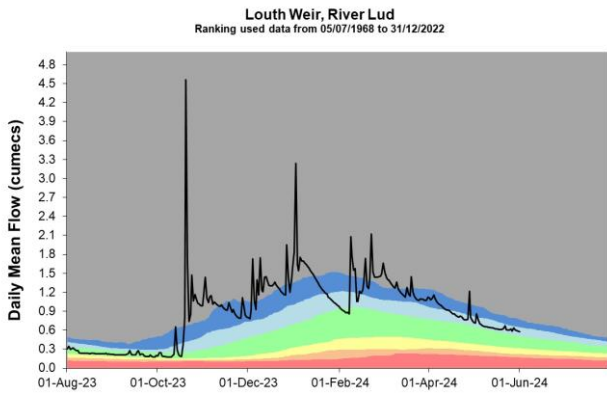
(Source: Environment Agency). Crown copyright. All rights reserved. Environment Agency, 100024198, 2024.

## 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.





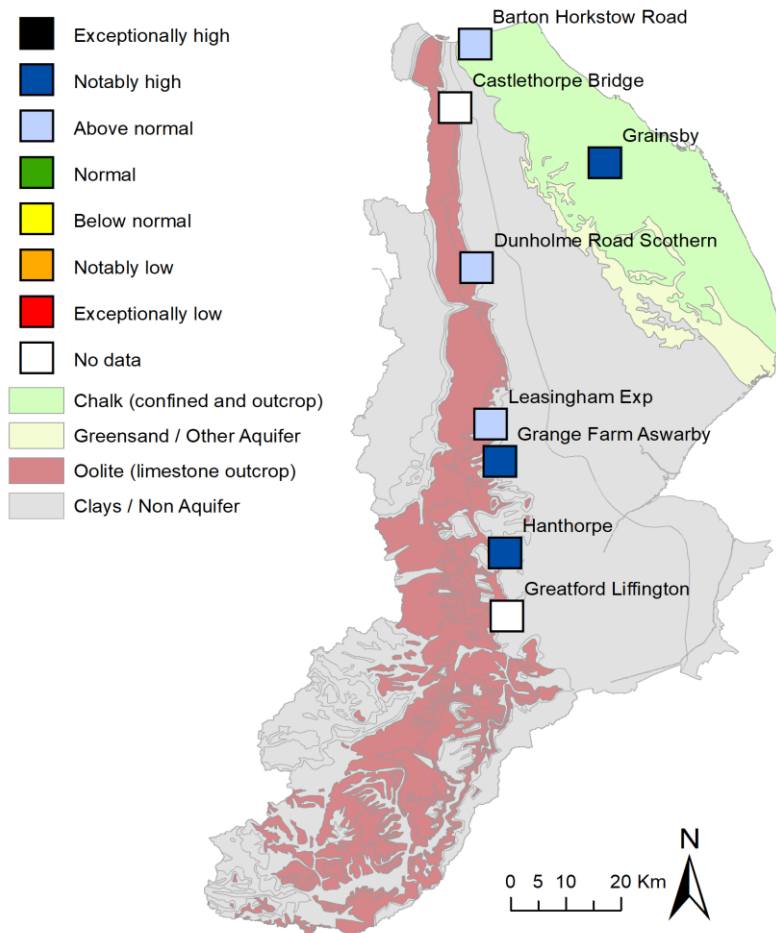


Source: Environment Agency.

# 5 Groundwater levels

## 5.1 Groundwater levels map

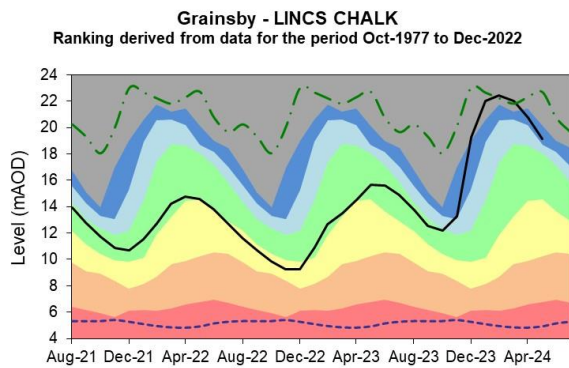
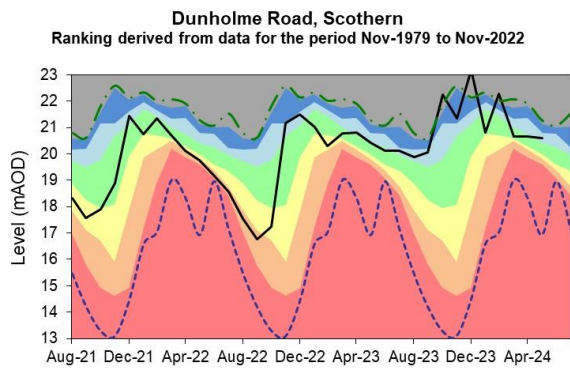
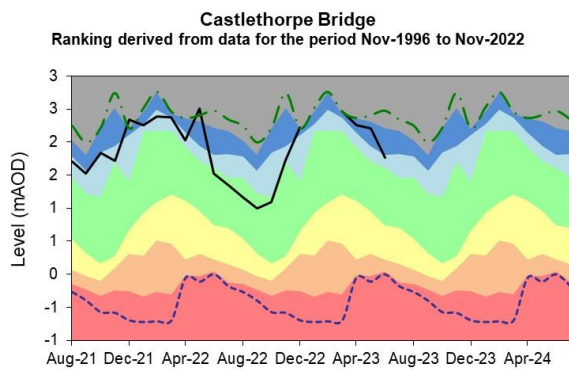
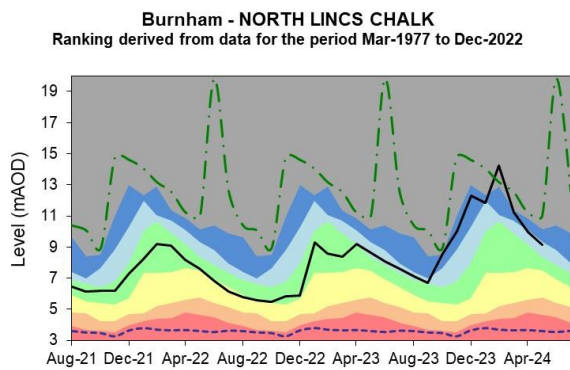
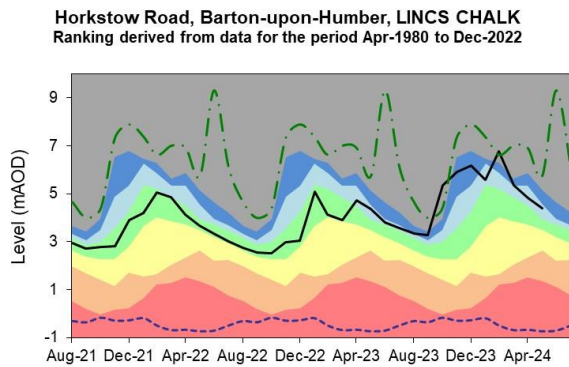
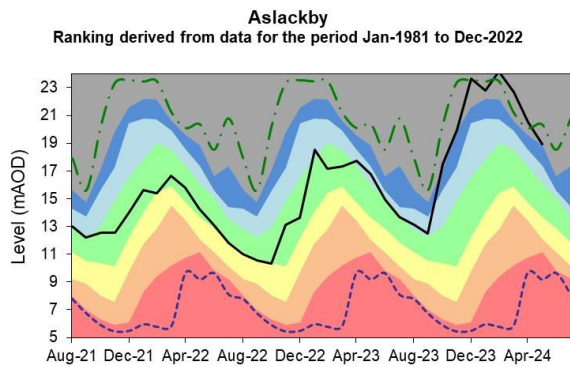
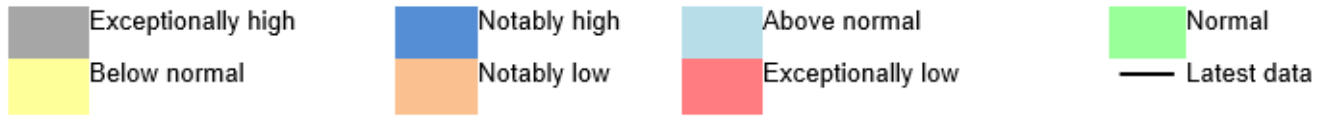
Figure 5.1: Groundwater levels for indicator sites at the end of May 2024, classed relative to an analysis of respective historic May levels. Table available in the appendices with detailed information.

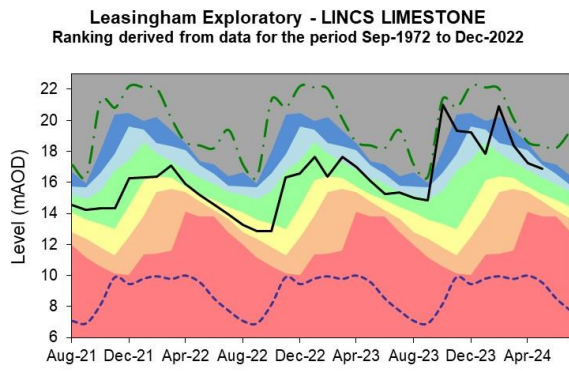
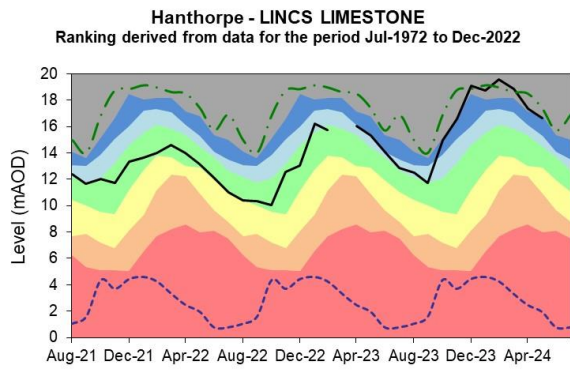
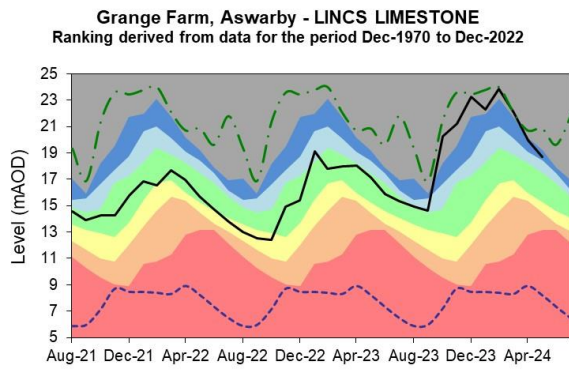
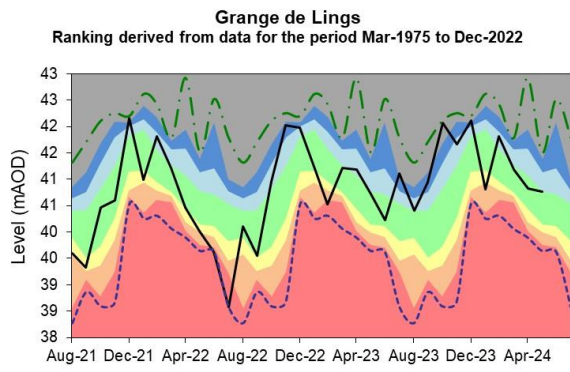


(Source: Environment Agency). Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2024.

## 5.2 Groundwater level charts

Figure 5.2: End of month groundwater levels at index groundwater level sites for major aquifers. 22 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.

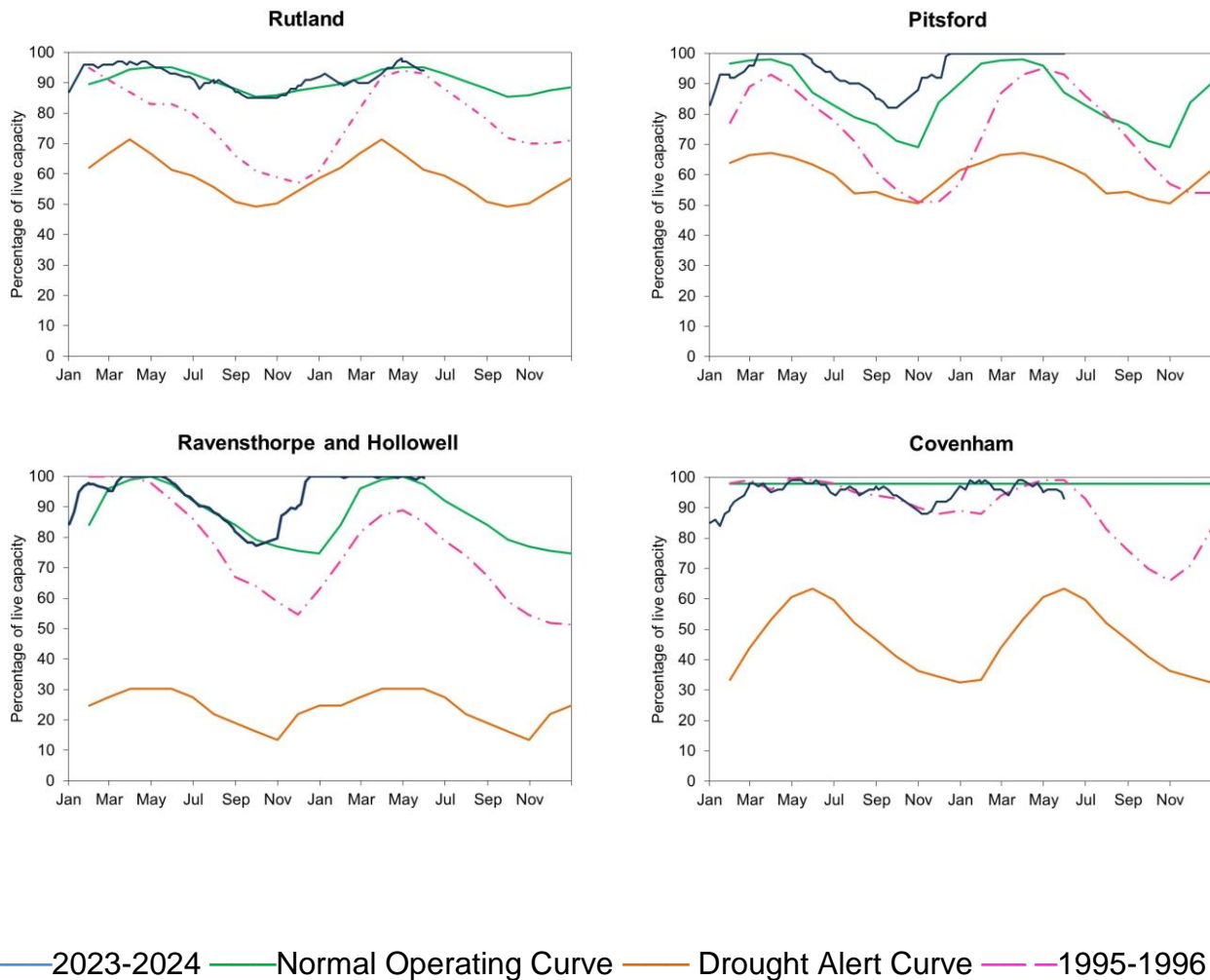




Source: Environment Agency, 2024.

## 6 Reservoir stocks

Figure 6.1: End of month regional reservoir stocks compared to the normal operating curve, drought curve and dry 1995-1996 stocks. Note: Historic records of individual reservoirs and reservoir groups making up the regional values vary in length

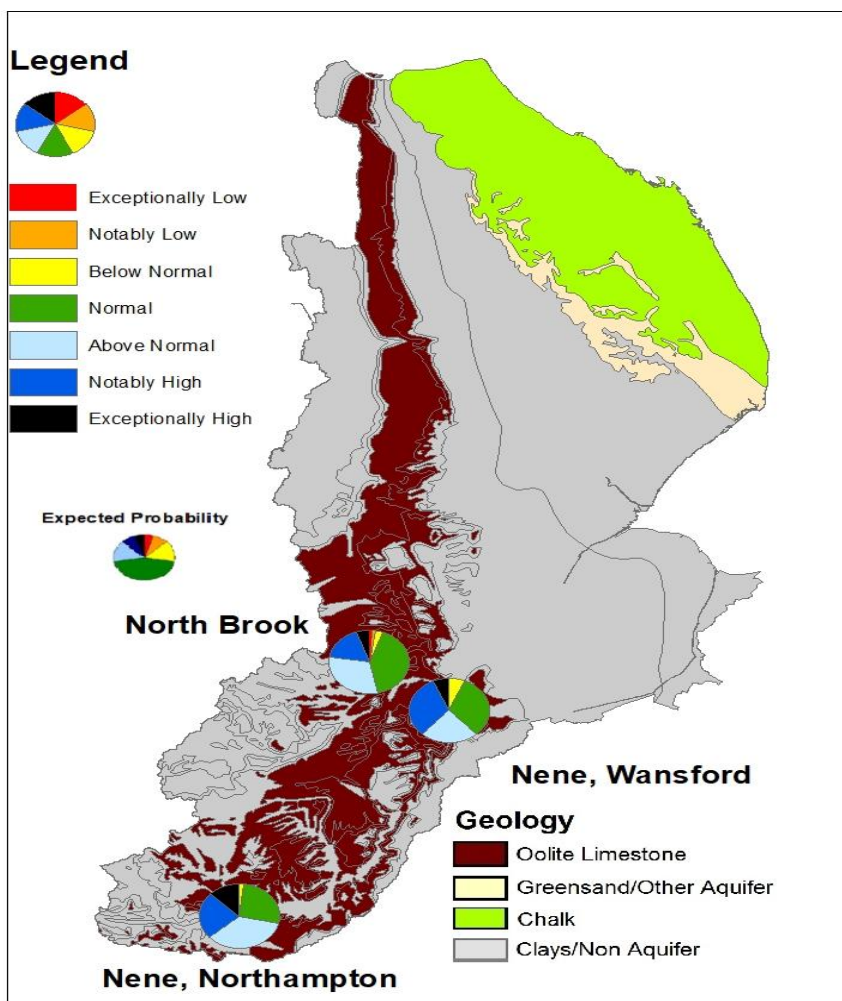


(Source: water companies).

## 7 Forward Look

### 7.1 Probabilistic ensemble projection of river flows at key sites in June 2024

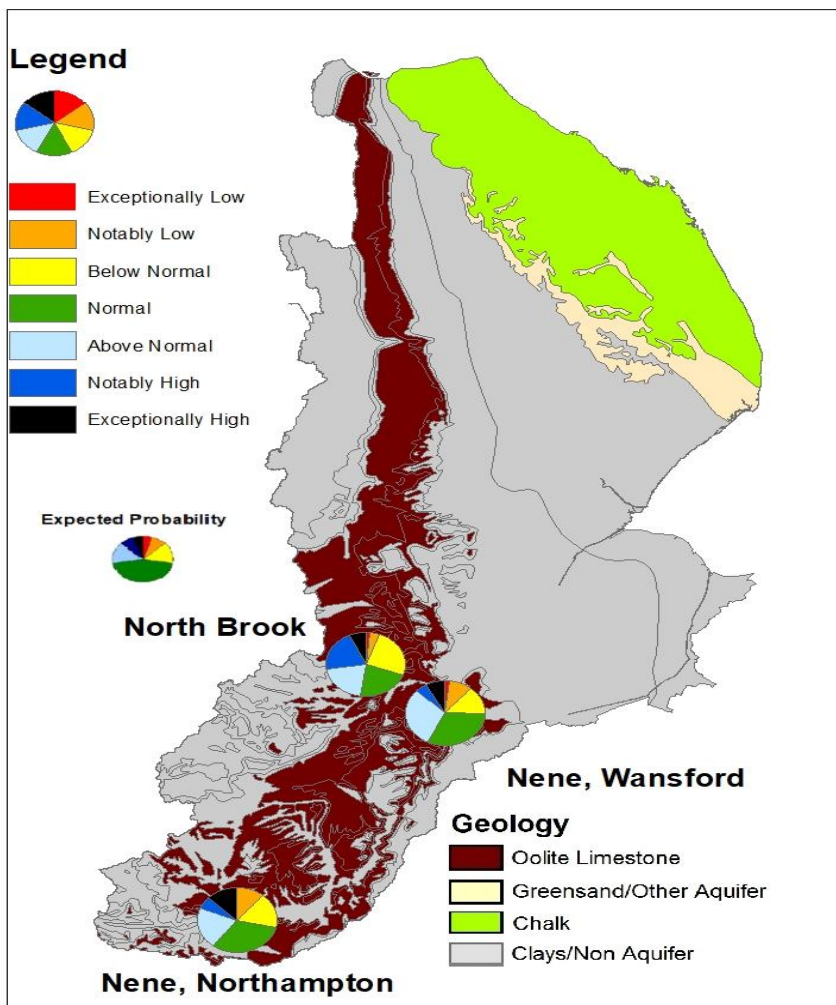
Table available in the appendices with detailed information. Exceptionally high or low levels are those which would typically occur 5% of the time within the historic record. Notably high or low levels are those which would typically occur 8% of the time. Above normal or below normal levels are those which would typically occur 15% of the time. Normal levels are those which would typically occur 44% of the time within the historic record.



Pie charts indicate probability, based on climatology, of the surface water flow at each site being, for example, exceptionally low for the time of year. (Source: Centre for Ecology and Hydrology, Environment Agency) Geological map reproduced with kind permission from UK Groundwater Forum, BGS © NERC. Crown copyright. All rights reserved. Environment Agency, 100026380, 2024.

## 7.2 Probabilistic ensemble projection of river flows at key sites in September 2024

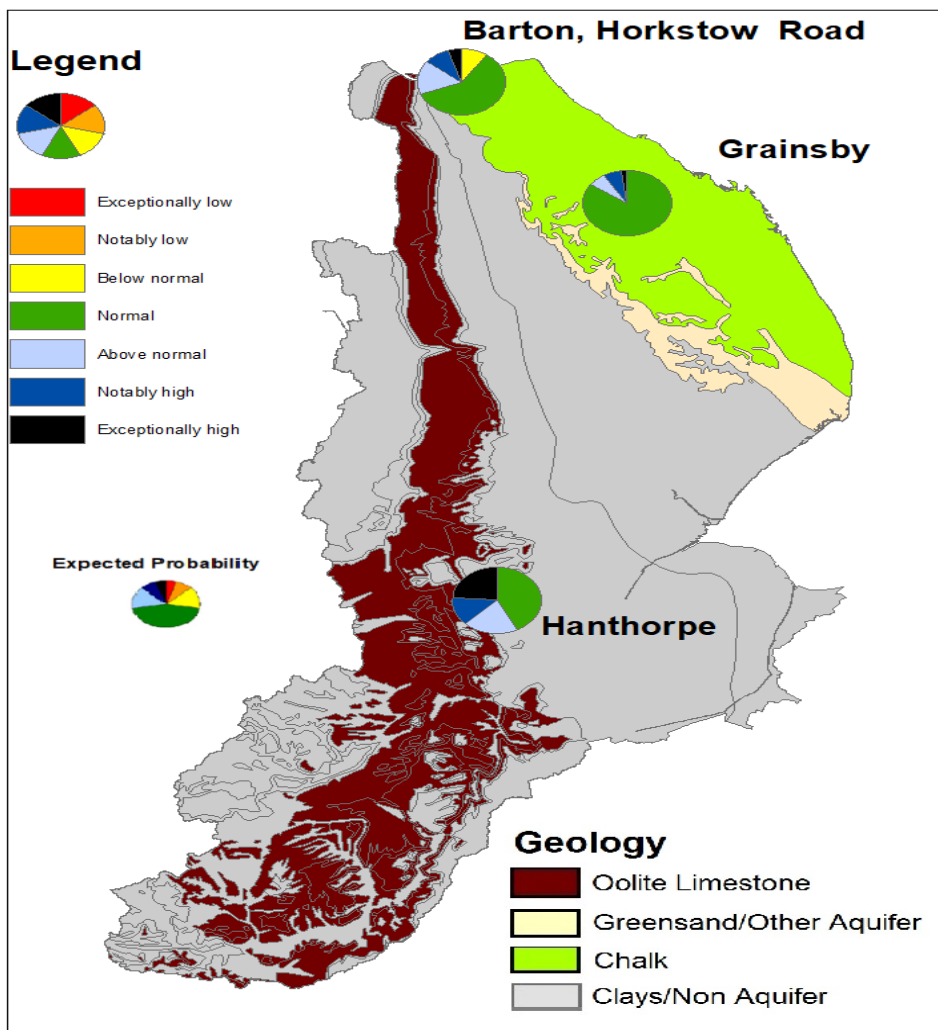
Table available in the appendices with detailed information. Exceptionally high or low levels are those which would typically occur 5% of the time within the historic record. Notably high or low levels are those which would typically occur 8% of the time. Above normal or below normal levels are those which would typically occur 15% of the time. Normal levels are those which would typically occur 44% of the time within the historic record.



Pie charts indicate probability, based on climatology, of the surface water flow at each site being, for example, exceptionally low for the time of year. (Source: Centre for Ecology and Hydrology, Environment Agency) Geological map reproduced with kind permission from UK Groundwater Forum, BGS © NERC. Crown copyright. All rights reserved. Environment Agency, 100026380, 2024

### 7.3 Probabilistic ensemble projection of groundwater levels at key sites in September 2024

Table available in the appendices with detailed information. Exceptionally high or low levels are those which would typically occur 5% of the time within the historic record. Notably high or low levels are those which would typically occur 8% of the time. Above normal or below normal levels are those which would typically occur 15% of the time. Normal levels are those which would typically occur 44% of the time within the historic record.

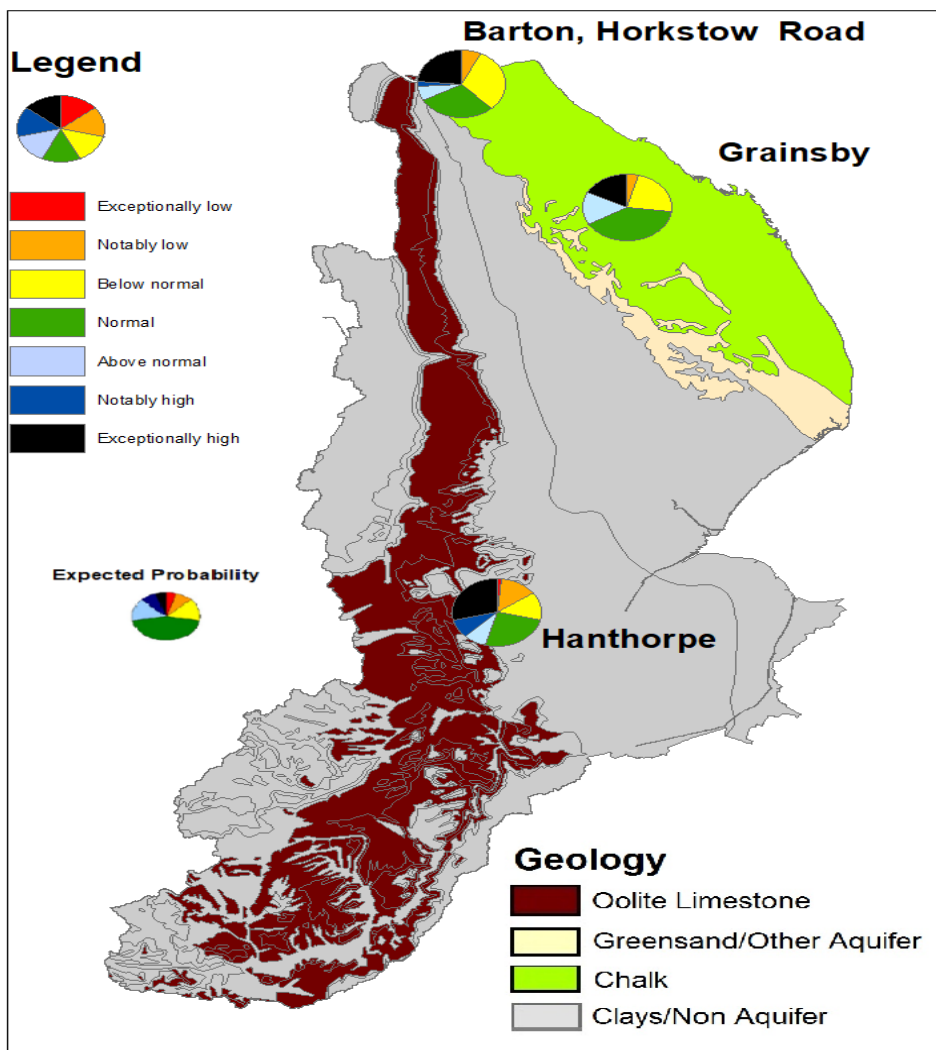


Pie charts indicate probability, based on climatology, of the groundwater level at each site being, for example, exceptionally low for the time of year. (Source: Environment Agency)  
 Geological map reproduced with kind permission from UK Groundwater Forum, BGS © NERC. Crown copyright. All rights reserved. Environment Agency, 100026380, 2024



## 7.4 Probabilistic ensemble projection of groundwater levels at key sites in March 2025

Table available in the appendices with detailed information. Exceptionally high or low levels are those which would typically occur 5% of the time within the historic record. Notably high or low levels are those which would typically occur 8% of the time. Above normal or below normal levels are those which would typically occur 15% of the time. Normal levels are those which would typically occur 44% of the time within the historic record.



Pie charts indicate probability, based on climatology, of the groundwater level at each site being, for example, exceptionally low for the time of year. (Source: Environment Agency) Geological map reproduced with kind permission from UK Groundwater Forum, BGS © NERC. Crown copyright. All rights reserved. Environment Agency, 100026380, 2024

## 8 Glossary

### 8.1 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).

## 8.2 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.

## 9 Appendices

### 9.1 Rainfall table

Hydrological area	May 2024 rainfall % of long term average 1961 to 1990	May 2024 band	Mar 2024 to May cumulative band	Dec 2023 to May cumulative band	Jun 2023 to May cumulative band
Louth Grimsby And Ancholme	109	Normal	Above normal	Exceptionally high	Exceptionally high
Lower Welland And Nene	136	Above Normal	Above normal	Exceptionally high	Exceptionally high
South Forty Foot And Hobhole	133	Above Normal	Above normal	Exceptionally high	Exceptionally high
Steeping Great Eau And Long Eau	121	Above Normal	Above normal	Exceptionally high	Exceptionally high
Upper Welland And Nene	116	Normal	Notably high	Exceptionally high	Exceptionally high
Witham To Chapel Hill	132	Above Normal	Notably high	Exceptionally high	Exceptionally high

## 9.2 River flows table

Site name	River	Catchment	May 2024 band	Apr 2024 band
Ashley	Welland Mkt.harb-rockinghm	Welland Rockingham	Above normal	Above normal
Barrowden/tixover	Welland (rockingham To Stamford)	Welland Stamford	Above normal	Above normal
Claypole	Upper Witham	Witham Bargate Upper	Above normal	Above normal
Geldharts Mill	Nene (brampton Branch)	Nene Brampton Bridge	Notably high	Notably high
Kates Bridge Plus King Street	Glen (an)	Welland and Glen	Exceptionally high	Above normal
Langworth	Barlings Eau	Barlings Eau	Above normal	Normal
Louth Weir	Lud	Louth Canal	Above normal	Above normal
Partney	Lymn & Steeping	Lymn Steeping	Above normal	Above normal
Rase Bishopbridge	Ancholme	Ancholme W Mid	Above normal	Normal
Upton Mill Total	Nene (kislingbury Branch)	Nene Kislingbry Bridge	Notably high	Exceptionally high

Wansford Combined	Nene (wollaston To Wansford)	Nene Wansford	Above normal	Above normal
----------------------	------------------------------------	---------------	--------------	--------------

### 9.3 Groundwater table

Site name	Aquifer	End of May 2024 band	End of Apr 2024 band
Barton-upon-humber	Grimsby Ancholme Louth Chalk	Above normal	Above normal
Castlethorpe Bridge	Grimsby Ancholme Louth Limestone		
Dunholme Road, Scothern	Grimsby Ancholme Louth Limestone	Above normal	Normal
Grainsby	Grimsby Ancholme Louth Chalk	Notably high	Notably high
Grange Farm, Aswarby	Central Lincs Limestone?	Notably high	Notably high
Hanthorpe	Cornbrash (south)	Notably high	Exceptionally high
Leasingham Exploratory	Blisworth Limestone Rutland Formation (south)?	Above normal	Above normal



## 9.4 Ensemble projections tables

### 9.4.1 Probabilistic ensemble projection of river flows at key sites in June 2024

Percentage of pie chart for each band

Site	Nene Nton	Nene Wansford	North Brook
Exceptionally low	0.0	0.0	1.3
Notably low	0.0	0.0	1.3
Below normal	1.6	6.3	2.7
Normal	27.0	31.7	41.3
Above normal	34.9	23.8	30.7
Notably high	23.8	31.7	17.3
Exceptionally high	12.7	6.3	5.3

### 9.4.2 Probabilistic ensemble projection of river flows at key sites in September 2024

Percentage of pie chart for each band

Site	Nene Nton	Nene Wansford	North Brook
Exceptionally low	0.0	1.6	1.4
Notably low	11.1	9.5	4.1
Below normal	17.5	14.3	24.7
Normal	31.7	31.7	21.9
Above normal	20.6	30.2	20.5
Notably high	6.3	4.8	20.5
Exceptionally high	12.7	7.9	6.8

### 9.4.3 Probabilistic ensemble projection of groundwater levels at key sites in September 2024

Percentage of pie chart for each band

Site	Grainsby	Hanthorpe	Horkstow
Exceptionally low	0.0	0.0	0.0
Notably low	0.0	0.0	0.0
Below normal	0.0	0.0	9.5
Normal	84.4	42.4	59.5
Above normal	6.7	20.3	16.7
Notably high	6.7	13.6	9.5
Exceptionally high	2.2	23.7	4.8

#### 9.4.4 Probabilistic ensemble projection of groundwater levels at key sites in March 2024

Percentage of pie chart for each band

Site	Grainsby	Hanthorpe	Horkstow
Exceptionally low	0.0	1.7	0.0
Notably low	4.4	13.6	7.1
Below normal	22.2	13.6	31.0
Normal	40.0	25.4	28.6
Above normal	15.6	8.5	7.1
Notably high	0.0	8.5	2.4
Exceptionally high	17.8	28.8	23.8