

Monthly water situation report: Lincolnshire and Northamptonshire Area

1 Summary - October 2024

October was a very normal month with rainfall varying between 93% to 139% of the long term average (LTA) in the six catchments, all of which were classified as normal levels (relative to the monthly LTA) of rainfall for the time of year. The 3-month and 6-month totals show the southern areas receiving more rainfall than those in the north. Soil moisture deficits (SMD) generally decreased during the month of October. The area as a whole ended the month with SMD of 28mm. SMD ranges from normal to notably low across the six hydrological areas. River flows at indicator sites show mean monthly flows ranging from normal to exceptionally high classification. Following the normal levels of rainfall and below normal SMD across the area in October, groundwater levels remained normal or higher at all sites with data. With the exception of Covenham, reservoirs in the area ended the month above their normal operating curves.

1.1 Rainfall

October was a very normal month, with an average of 57mm of rainfall across LNA, which was 118% of the LTA. Rainfall ranged from 49mm to 61mm (93% to 139% of the LTA), classifying it as normal for the time of year in all six hydrological areas. This is a reduction from September's report which showed notably high to exceptionally high levels in all rainfall units. The 3-month and 6-month totals show a clear north-south divide with the southern areas receiving more rainfall than those in the north. Following the rainfall in October, the last 12 months' rainfall totals still show exceptionally high levels in most of the hydrological areas except for the Louth Grimsby and Ancholme catchment which showed notably high levels of rainfall.

1.2 Soil moisture deficit and recharge

Soil moisture deficits responded in line with the rainfall received across October. SMD decreased in all hydrological areas except the Upper Welland and Nene where the levels remained relatively stable throughout October. The lowest levels of SMD were observed in the Upper Welland and Nene hydrological area (10mm), whilst the highest levels were observed in the South Forty Foot and Hobhole hydrological area (46mm). The area as a whole ended the month with SMD of 28mm. This figure is within the below normal range for the time of year.

1.3 River flows

River flows at indicator sites show mean monthly flows ranging from normal to exceptionally high classification. Five of the ten sites have not changed banding since September 2024. The only site classified as normal is the Lud in the Steeping Great Eau and Long Eau hydrological area, but the site has not changed banding since August 2024.

1.4 Groundwater levels

Following the normal levels of rainfall and below normal SMD across the area in October, groundwater levels remained normal or higher at all sites with data. Most groundwater bandings have increased since September 2024, except Hanthorpe which remained exceptionally high for the time of year and Barton Horkstow Road that has decreased from notably high to above normal levels.

1.5 Reservoir stocks

With the exception of Covenham, reservoirs in the area ended the month above their normal operating curves. The level at Covenham was 8% below target in October, however levels are not alarmingly low .

1.6 Environmental impact

All transfer schemes remained off throughout October. No licence cessations were issued. There were 14 flood alerts, and no flood warnings issued.

1.7 Forward look

1.7.1 Probabilistic ensemble projections for river flows at key sites

December 2024: All sites are showing a greatly increased probability of greater than normal flows.

March 2025: The two Nene sites are showing slightly increased probabilities of above normal flows. North Brook is showing a slightly increased probability of below normal flows.

1.7.2 Probabilistic ensemble projections for groundwater levels in key aquifers

March 2025: All sites are showing an increased probability of groundwater levels being normal or higher with none of the modelled rainfall scenarios showing exceptionally low levels.

September 2025: All sites are showing a reduced probability of exceptionally low levels.

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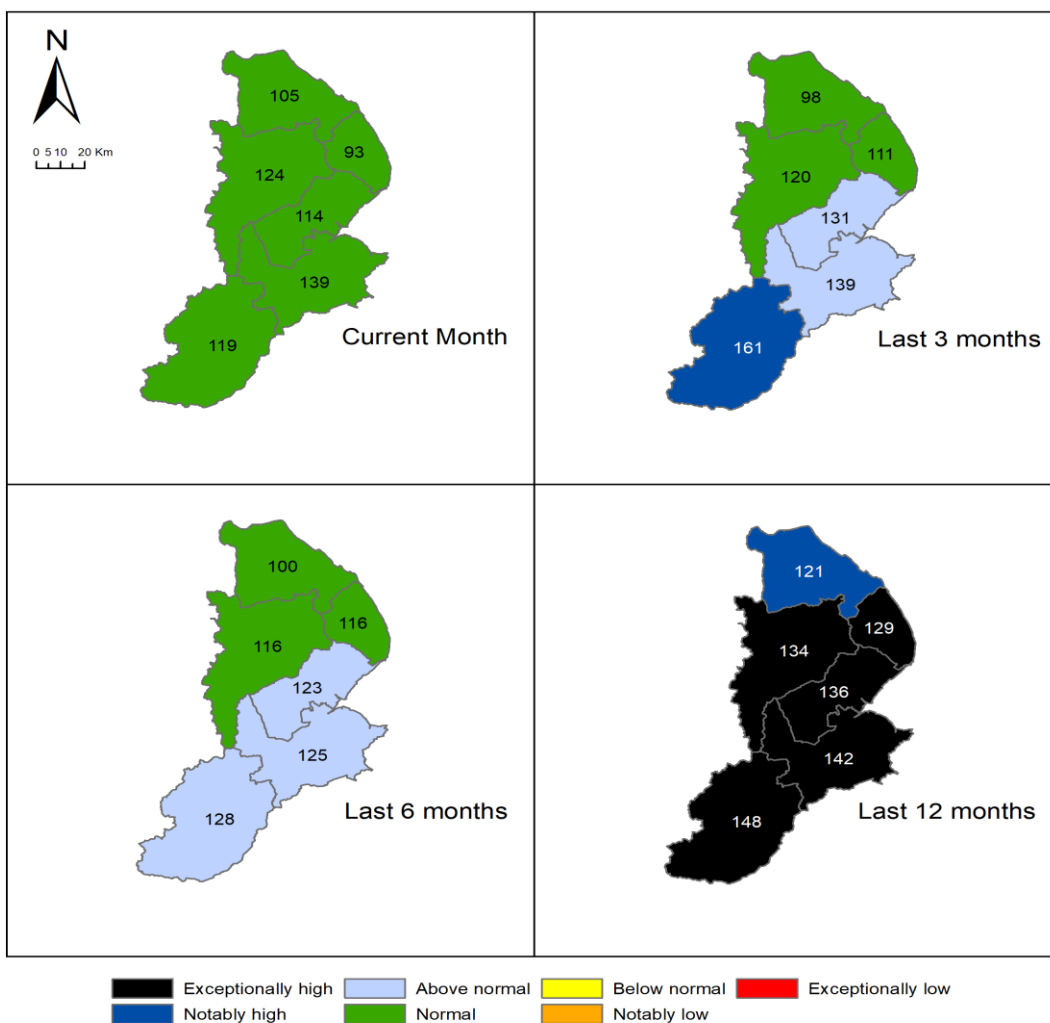
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Contact Details: 03708 506 506

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 October 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.

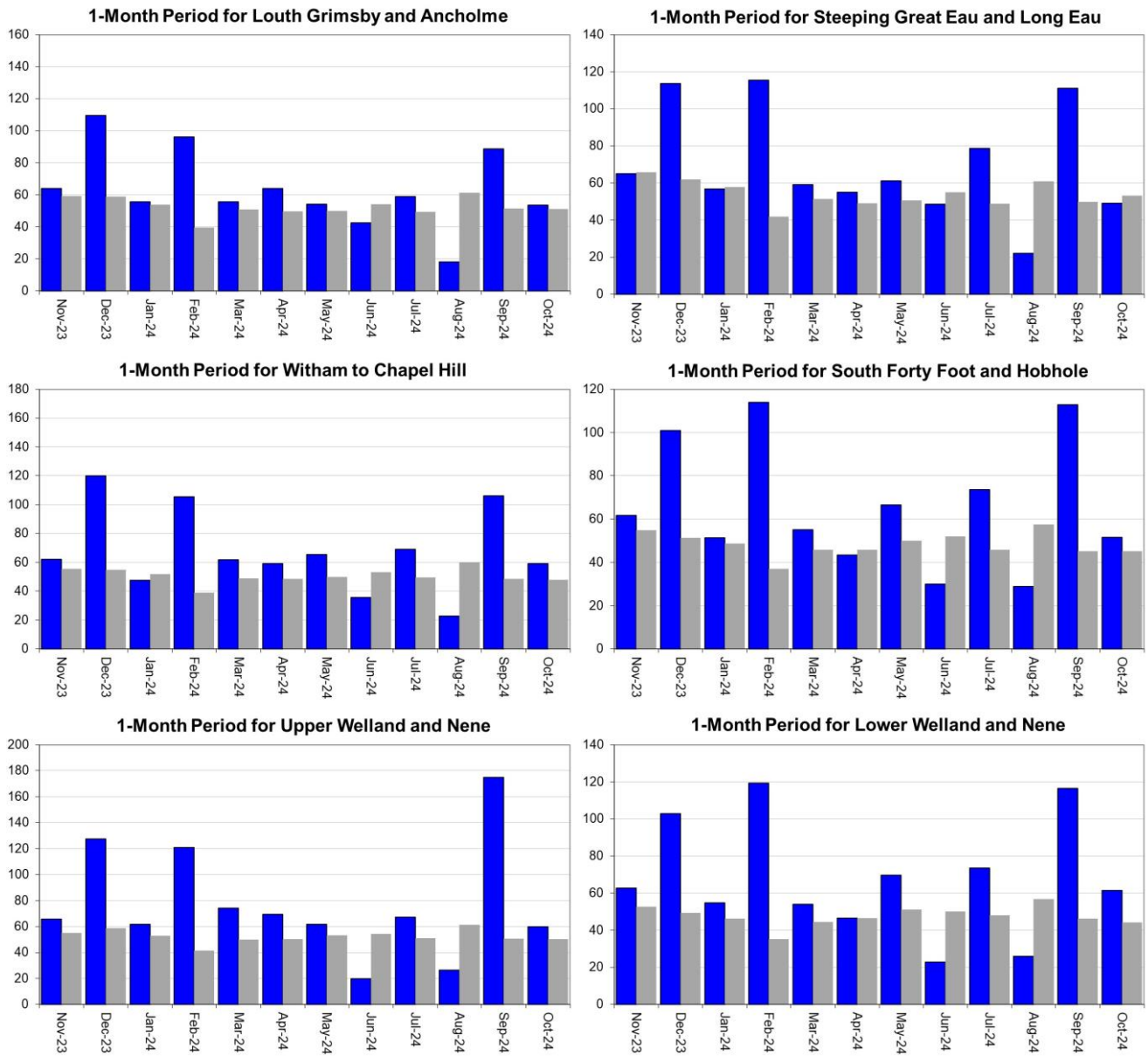


HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2024). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved.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

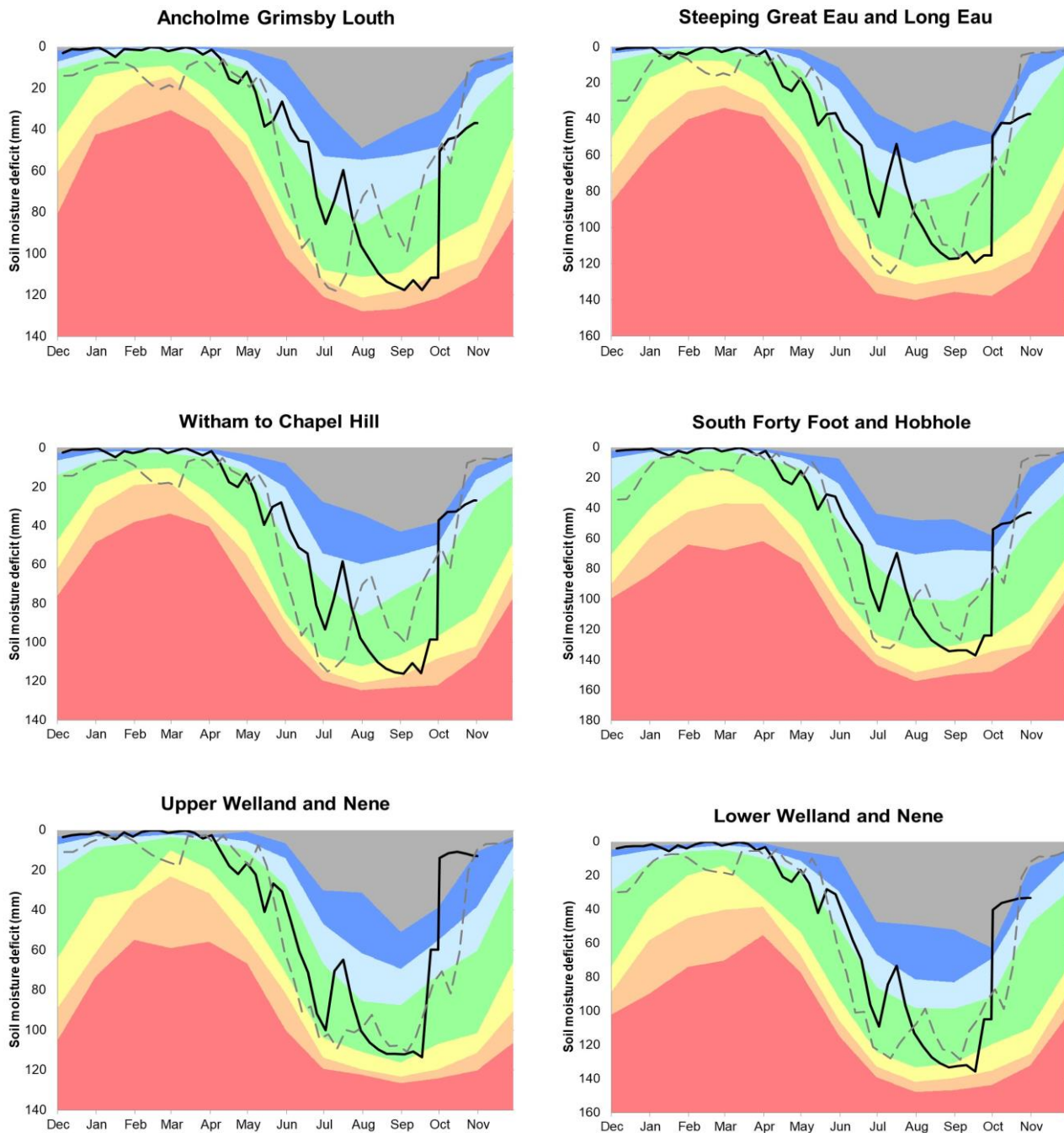


HadUK rainfall data. (Source: Met Office. Crown copyright, 2024).

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.

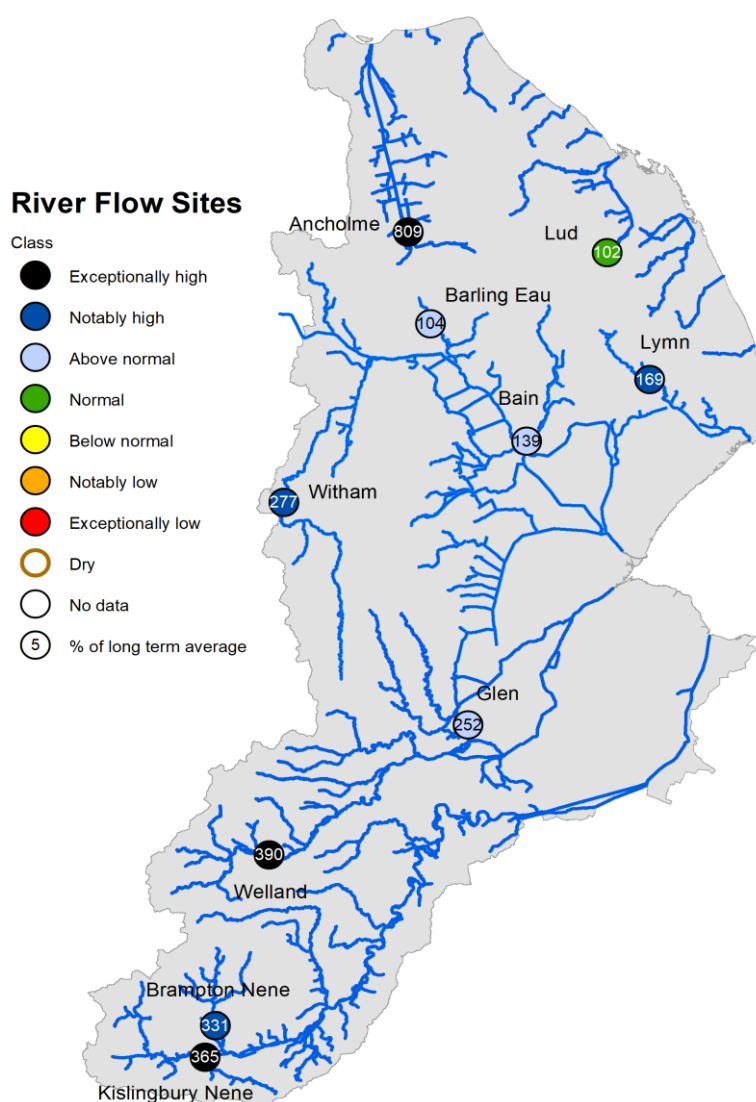


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4 River flows

4.1 River flows map

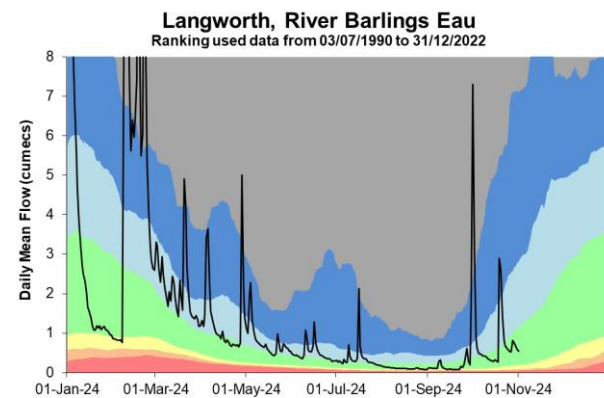
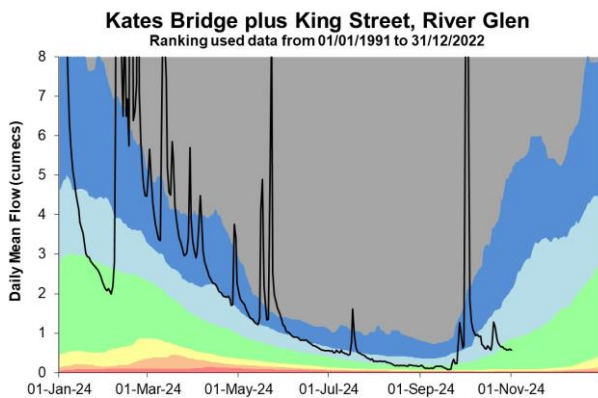
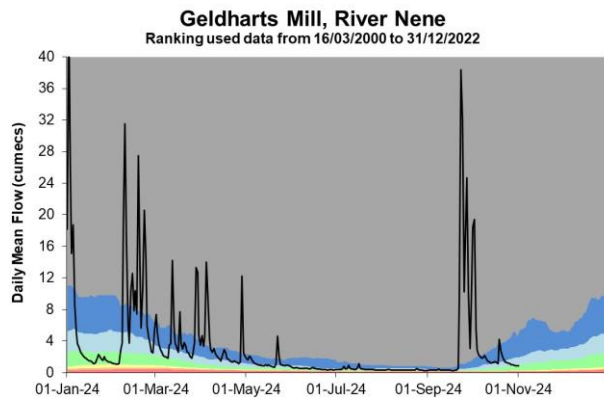
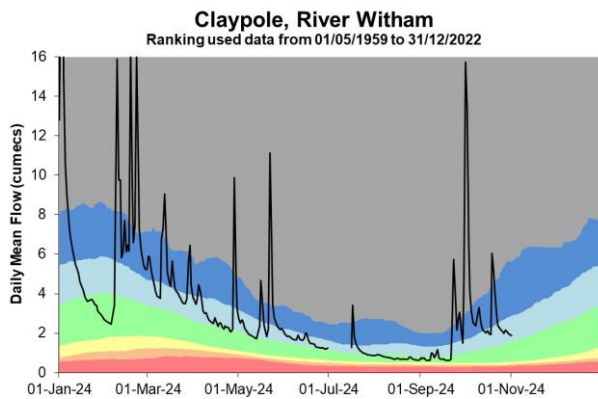
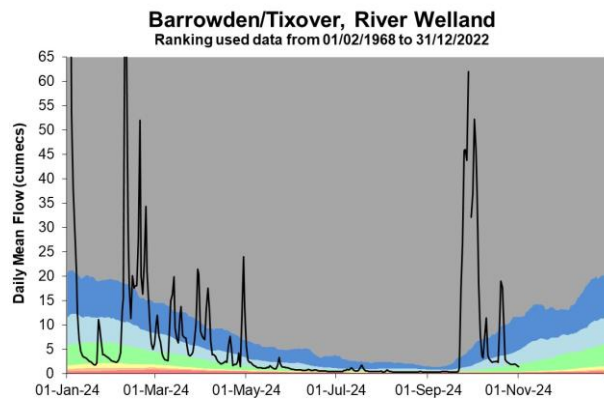
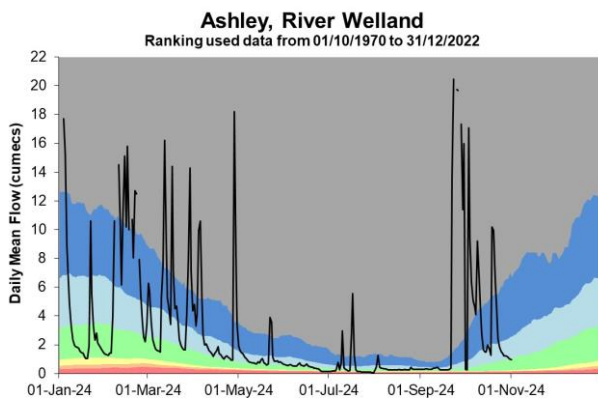
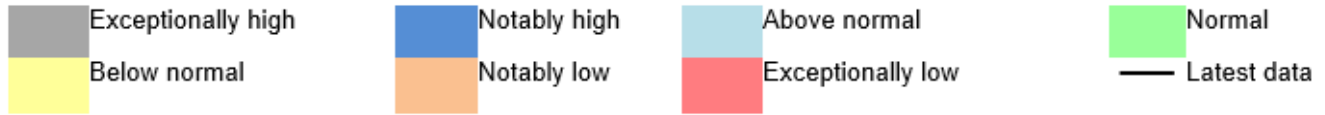
Figure 4.1: Monthly mean river flow for indicator sites for October 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic October monthly means Table available in the appendices with detailed information.

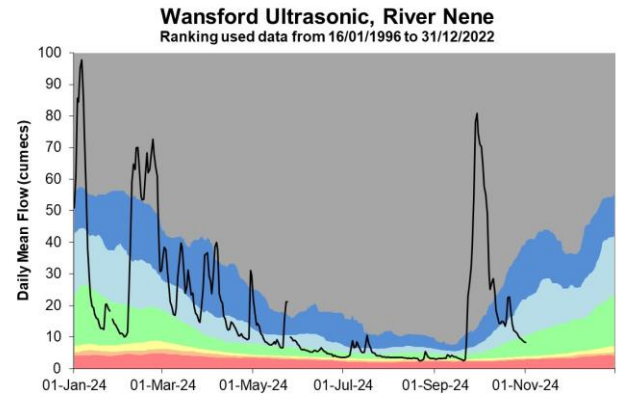
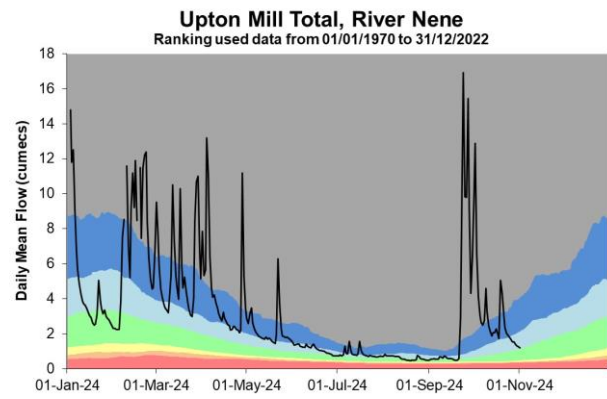
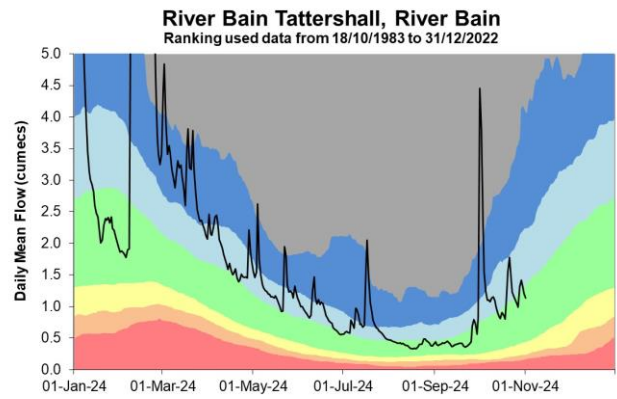
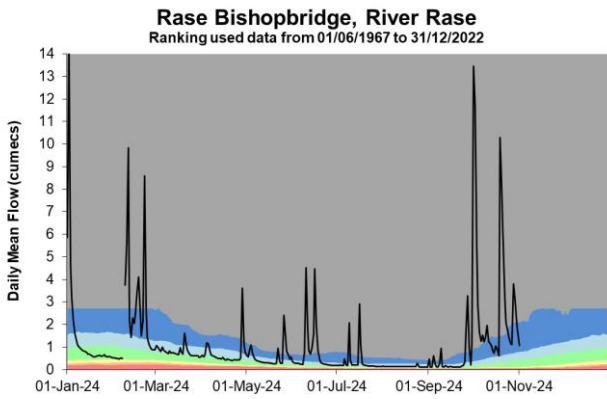
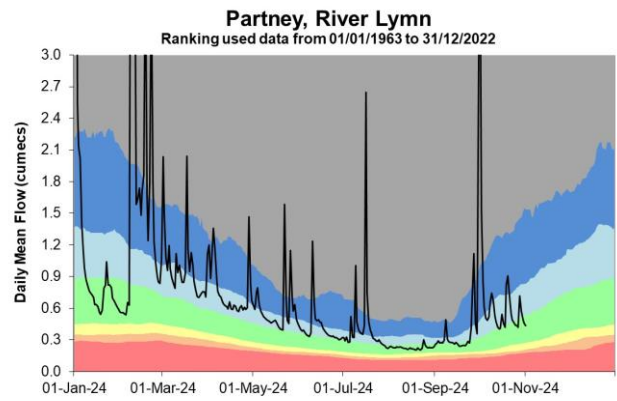
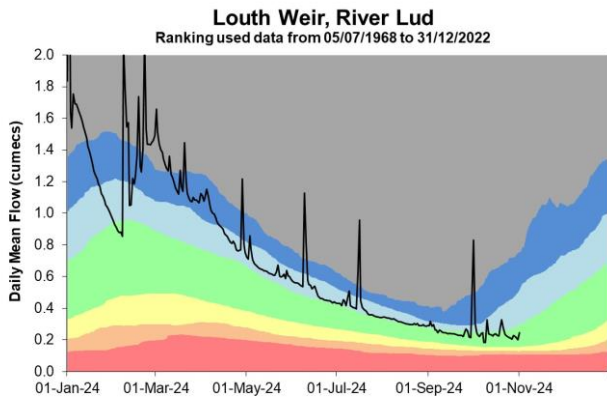


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4.2 River flow charts

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.



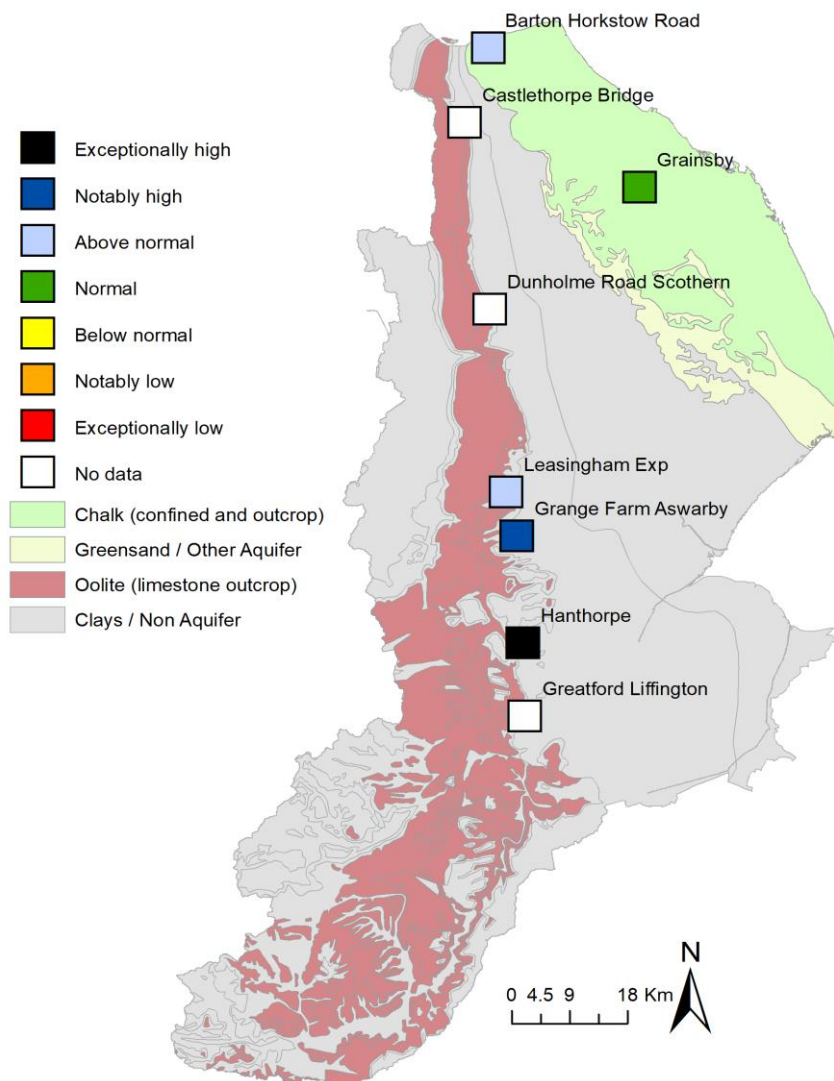


Source: Environment Agency.

5 Groundwater levels

5.1 Groundwater levels map

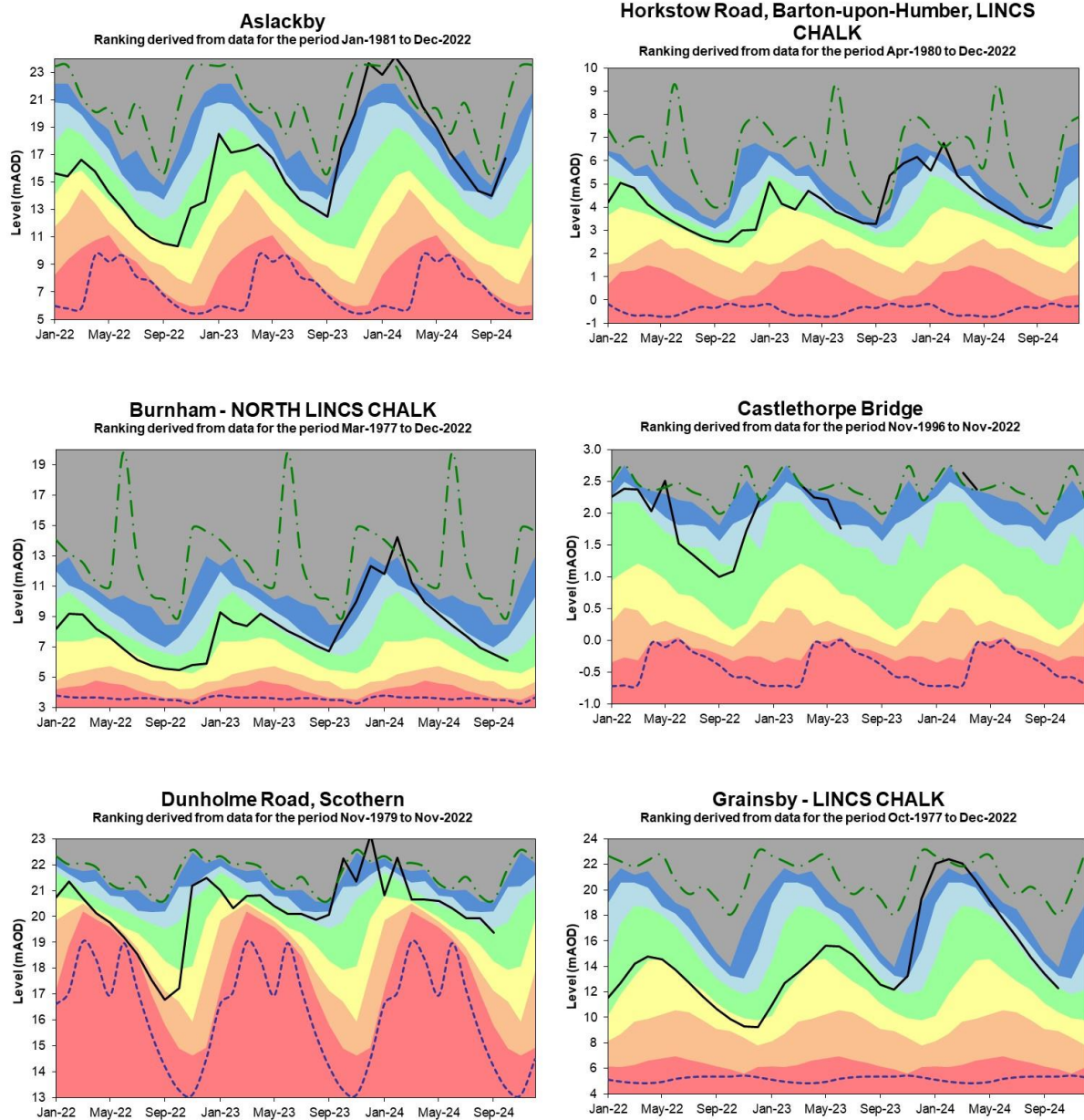
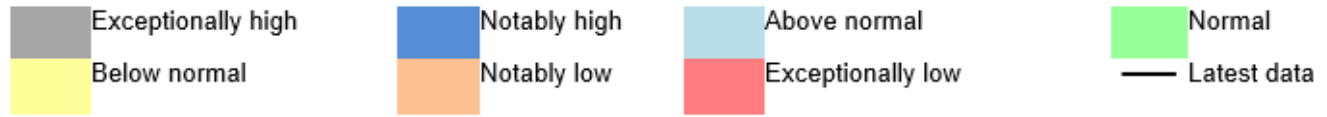
Figure 5.1: Groundwater levels for indicator sites at the end of October 2024, classed relative to an analysis of respective historic October levels. Table available in the appendices with detailed information.

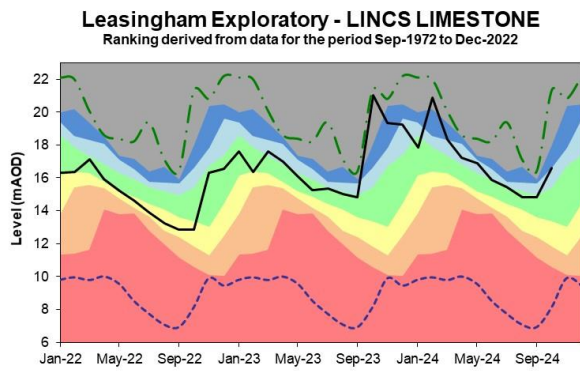
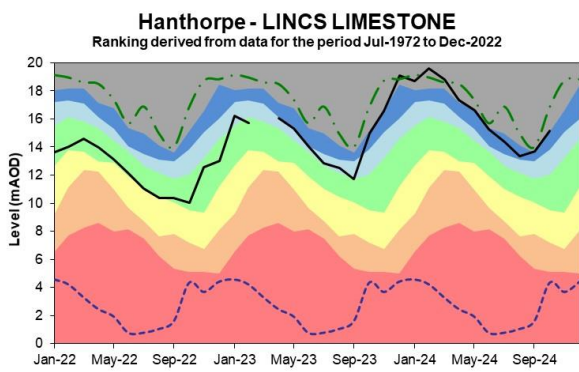
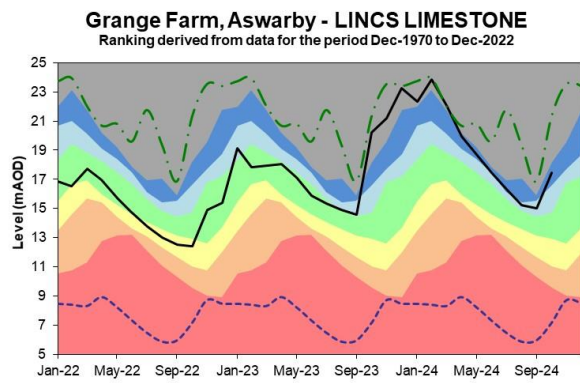
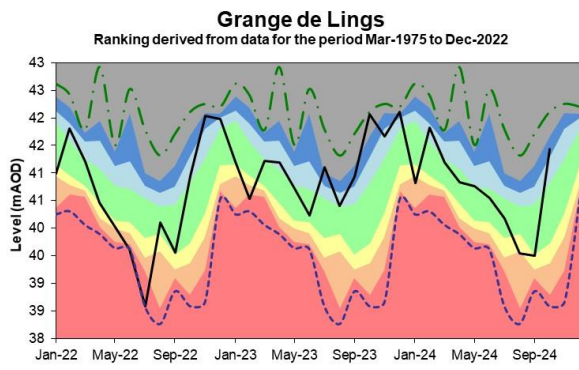


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5.2 Groundwater level charts

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.

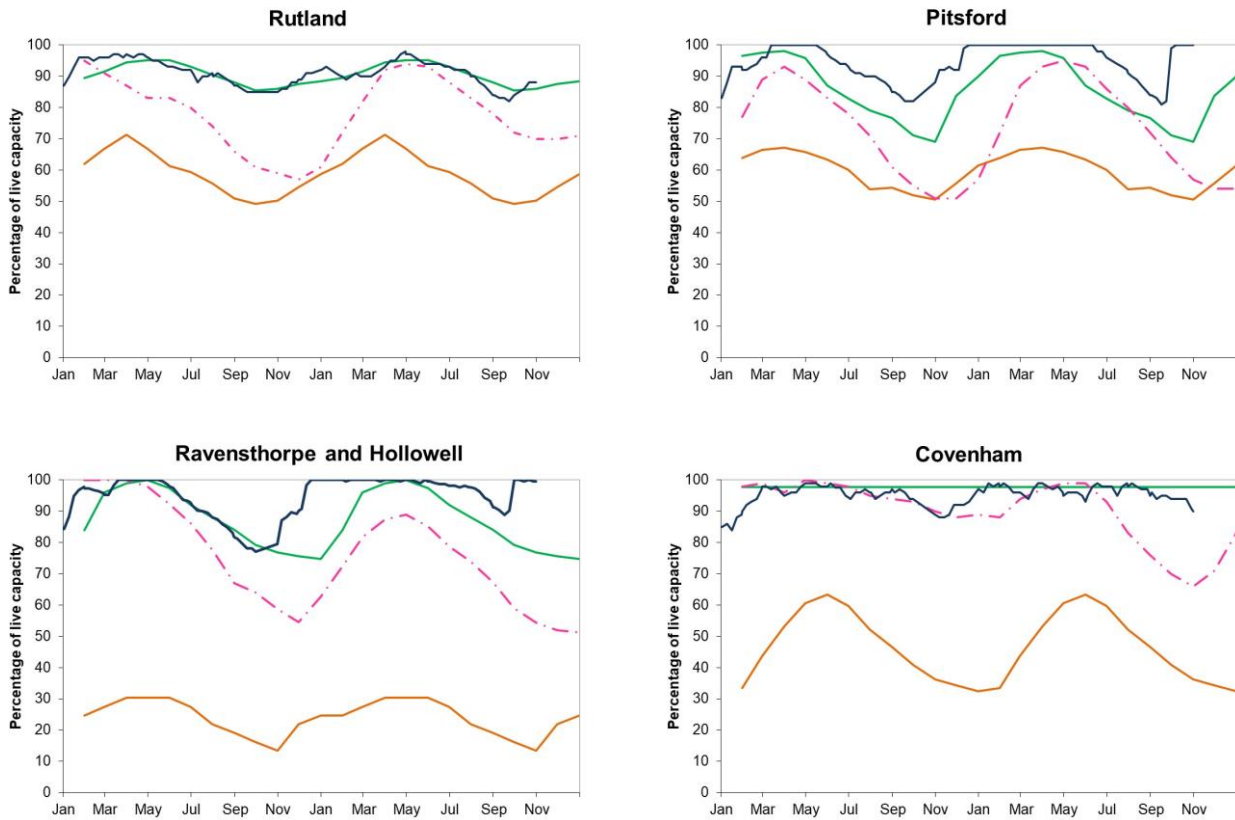




Source: Environment Agency, 2024.

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



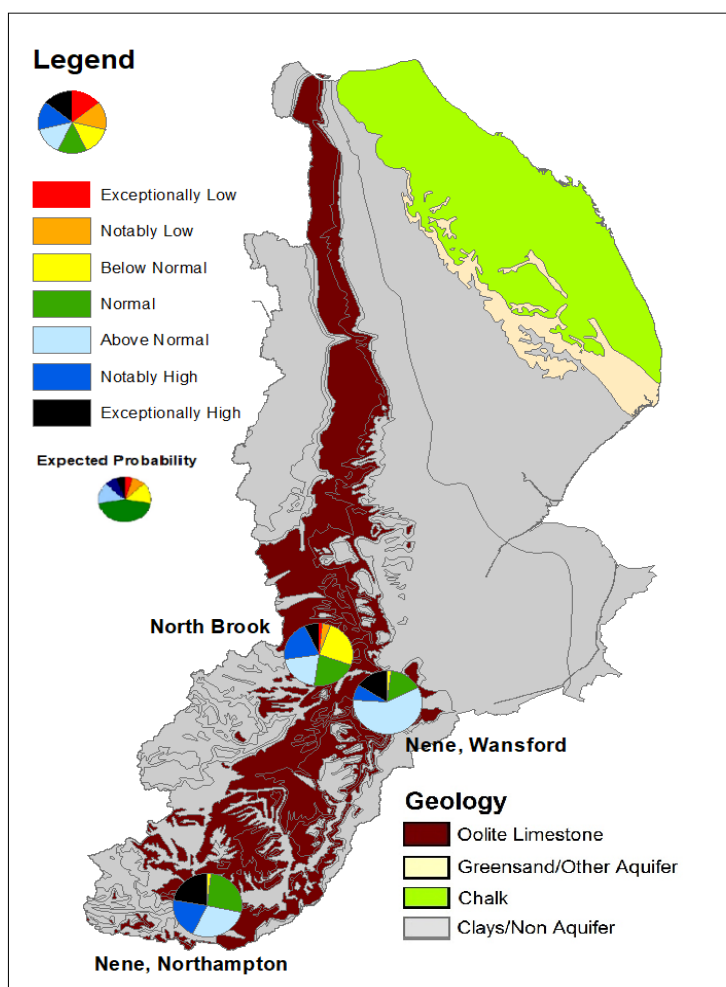
— 2023-2024 — Normal Operating Curve — Drought Alert Curve — 1995-1996

(Source: water companies).

7 Forward Look

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

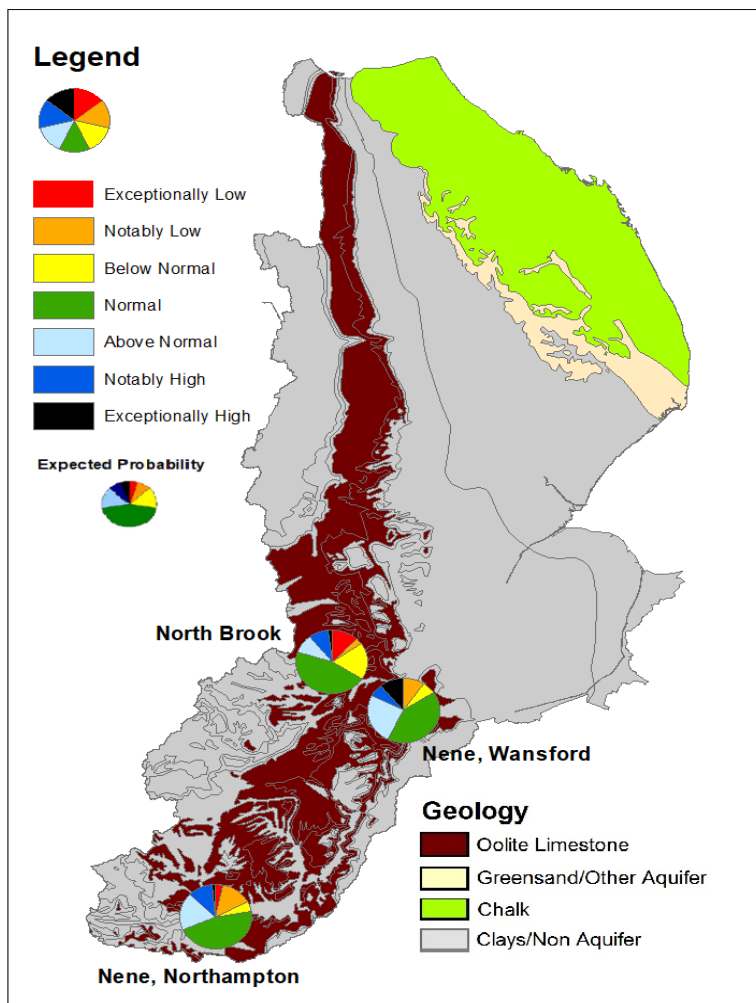
Table available in the appendices with detailed information. Exceptionally high or low levels are those which would typically occur 5% of the time within the historic record. Notably high or low levels are those which would typically occur 8% of the time. Above normal or below normal levels are those 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 March 2025

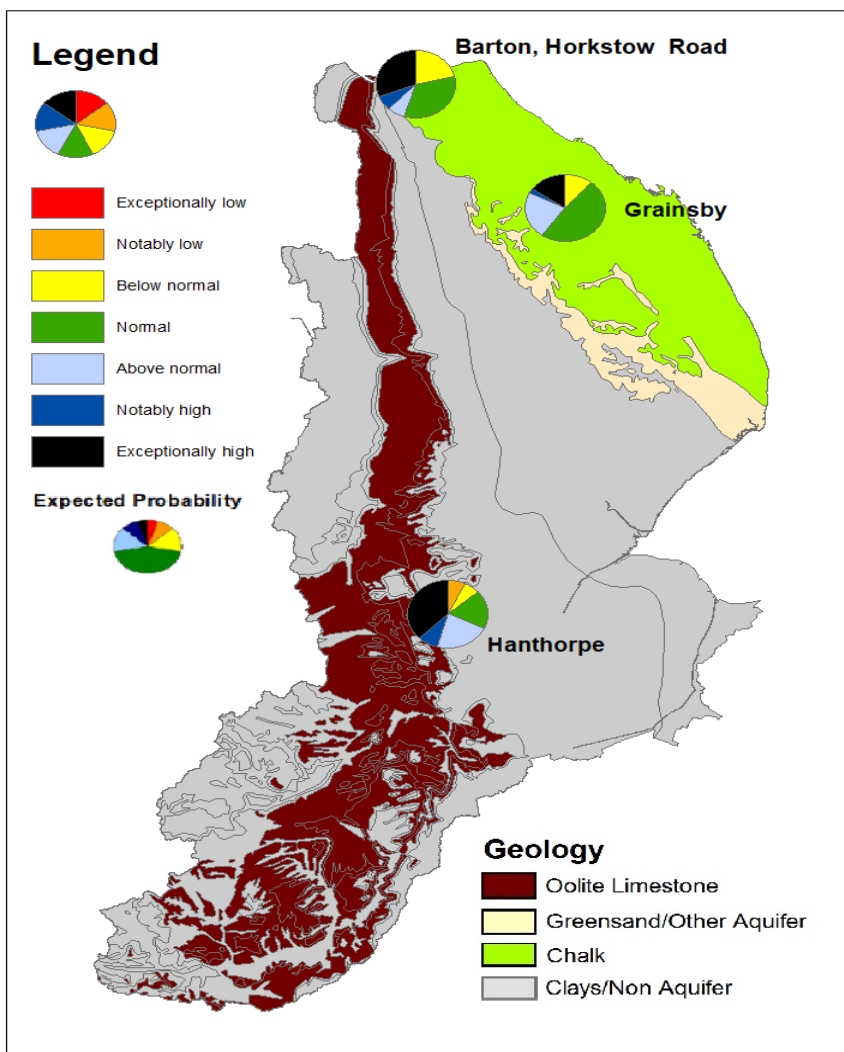
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7.3 Probabilistic ensemble projection of groundwater levels at key sites in March 2025

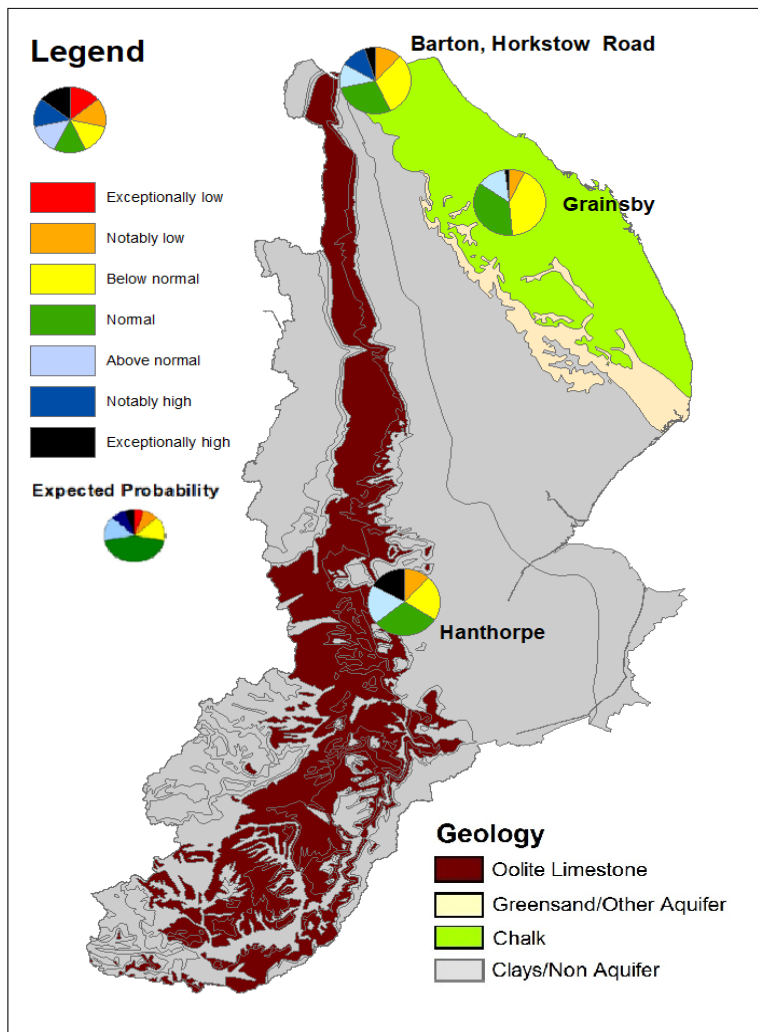
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7.4 Probabilistic ensemble projection of groundwater levels at key sites in September 2025

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)
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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 (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).

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	Oct 2024 rainfall % of long term average 1961 to 1990	Oct 2024 band	Aug 2024 to October cumulative band	May 2024 to October cumulative band	Nov 2023 to October cumulative band
Louth Grimsby And Ancholme	105	Normal	Normal	Normal	Notably high
Lower Welland And Nene	139	Normal	Above normal	Above normal	Exceptionally high
South Forty Foot And Hobhole	114	Normal	Above normal	Above normal	Exceptionally high
Steeping Great Eau And Long Eau	93	Normal	Normal	Normal	Exceptionally high
Upper Welland And Nene	119	Normal	Notably high	Above normal	Exceptionally high
Witham To Chapel Hill	124	Normal	Normal	Normal	Exceptionally high

9.2 River flows table

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

Wansford Combined	Nene (wollaston To Wansford)	Nene Wansford	Exceptionally high	Exceptionally high
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9.3 Groundwater table

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

9.4 Ensemble projections tables

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

Percentage of pie chart for each band

Site	Nene Nton	Nene Wansford	North Brook
Exceptionally low	0.0	0.0	1.4
Notably low	0.0	0.0	4.1
Below normal	1.6	1.6	24.7
Normal	27.0	15.9	21.9
Above normal	28.6	58.7	20.5
Notably high	20.6	7.9	20.5
Exceptionally high	22.2	15.9	6.8

9.4.2 Probabilistic ensemble projection of river flows at key sites in March 2025

Percentage of pie chart for each band

Site	Nene Nton	Nene Wansford	North Brook
Exceptionally low	3.2	0.0	12.3
Notably low	14.3	9.5	3.1
Below normal	4.8	6.3	18.5
Normal	46.0	41.3	46.2
Above normal	19.0	25.4	9.2
Notably high	11.1	6.3	9.2
Exceptionally high	1.6	11.1	1.5

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

Percentage of pie chart for each band

Site	Grainsby	Hanthorpe	Horkstow
Exceptionally low	0.0	0.0	0.0
Notably low	0.0	6.8	0.0
Below normal	11.1	6.8	21.4
Normal	48.9	18.6	33.3
Above normal	22.2	22.0	7.1
Notably high	2.2	8.5	7.1
Exceptionally high	15.6	37.3	31.0

9.4.4 Probabilistic ensemble projection of groundwater levels at key sites in September 2025

Percentage of pie chart for each band

Site	Grainsby	Hanthorpe	Horkstow
Exceptionally low	0.0	0.0	0.0
Notably low	6.7	11.9	11.9
Below normal	42.2	22.0	31.0
Normal	35.6	30.5	28.6
Above normal	13.3	18.6	11.9
Notably high	0.0	0.0	11.9
Exceptionally high	2.2	16.9	4.8