Monthly water situation report: East Anglia

1 Summary - November 2024

Rainfall across East Anglia, through the month of November, was average for this time of year, following a similar trend in October 2024, with rainfall across the region's catchments ranging from 71% to 139% of the long term average. A significant portion of that rainfall came towards the end of month, seen by spikes in the river hydrographs in response to the increased precipitation. Soil moisture deficits reduced as a result of the rainfall towards the end of the month and average around 16mm across East Anglia. Groundwater levels remain healthy with most catchments sitting above normal, with the exception of the most northerly sites recording normal groundwater levels for this time of year. Public water supply reservoirs are either above their respective operating curve, or just below their operating curves.

1.1 Rainfall

November rainfall across East Anglia was predominately normal for the time of year, ranging from 71% to 139% of the long term average. Only the Upper Bedford Ouse saw an above normal rainfall total, 78.2mm or 139% of the long term average. The one month totals follow the trend over the past 3, 6 and twelve months where the western catchments have received above normal or greater levels of rainfall, while the eastern catchments have experienced normal or greater rainfall totals. The past twelve months' rainfall totals remain exceptionally high for the western catchments, 127% to 158% of the long term average, while the rainfall for the region as a whole, from December to October, is the eight wettest since 1871, at 777mm.

1.2 Soil moisture deficit and recharge

Cool and wet conditions throughout November allowed the SMD to reduce across East Anglia. In a similar trend to rainfall and groundwater levels, the west saw the smallest SMD figures, below 10mm surrounding the Ouse catchments, due to higher rainfall in the west in November 2024. The central and eastern catchments have an SMD within 11 to 40mm, a normal level for this time of year. Region-wide SMD increased to 35mm by the middle of the month, but increased rainfall in the second half of November reduced the deficit to 16mm, on average across East Anglia.

1.3 River flows

There was an east to west split in river flow throughout November 2024. High rainfall in the west meant flows were above normal, ranging from 119% to 245% of the long term average. Central areas saw normal river flows ranging from 76% of the long term average on the Chelmer to 109% on the Cam. While the eastern catchments also saw normal river flow for the time of year, they were the lowest when compared to the long term average, ranging from 58% of the long term average on the Yare to 64% on the Colne.

1.4 Groundwater levels

Groundwater levels have either begun to level out or rise after the summer recession in levels. Recovery has been strongest in the west of East Anglia, coinciding with the catchments experiencing the highest rainfall over the last month and the last 12 months. All groundwater sites recorded levels above normal, except Bury St Edmunds and Redlands Hall which recorded notably high levels for November, and Hindolveston, South Creake and The Spinney Costessey in the north of East Anglia that had normal groundwater levels for this time of year.

1.5 Reservoir stocks

By the end of November 2024, Ardleigh and Grafham were marginally below their respective normal operating curves, while Abberton, Alton and Hanningfield were comfortably above their operating curves.

1.6 Forward look

1.6.1 Probabilistic ensemble projections for river flows at key sites

For all surface water sites there is a high probability, over 70%, of flows being above normal by end of December 2024, with it being very unlikely any river flows will be below normal, all projections have the likelihood of below normal at 0% apart from Ely Ouse at 7%. By March 2025, it is likely flows will be normal or above normal, while flows are vulnerable to dropping to below normal, however this is projected to be a less than 25% likelihood at all sites apart from Kym which has 21% chance of flows being notably low.

1.6.2 Probabilistic ensemble projections for groundwater levels in key aquifers

Groundwater levels at key sites have a very high probability of being normal or higher by March and September 2025 and a high probability of being above normal or higher. The

probability of below normal at all key sites is below 5% in March and September 2025, except Newmarket with 13% likelihood of levels below normal in March and Bury St Edmunds with 18% likelihood of levels below normal by September 2025.

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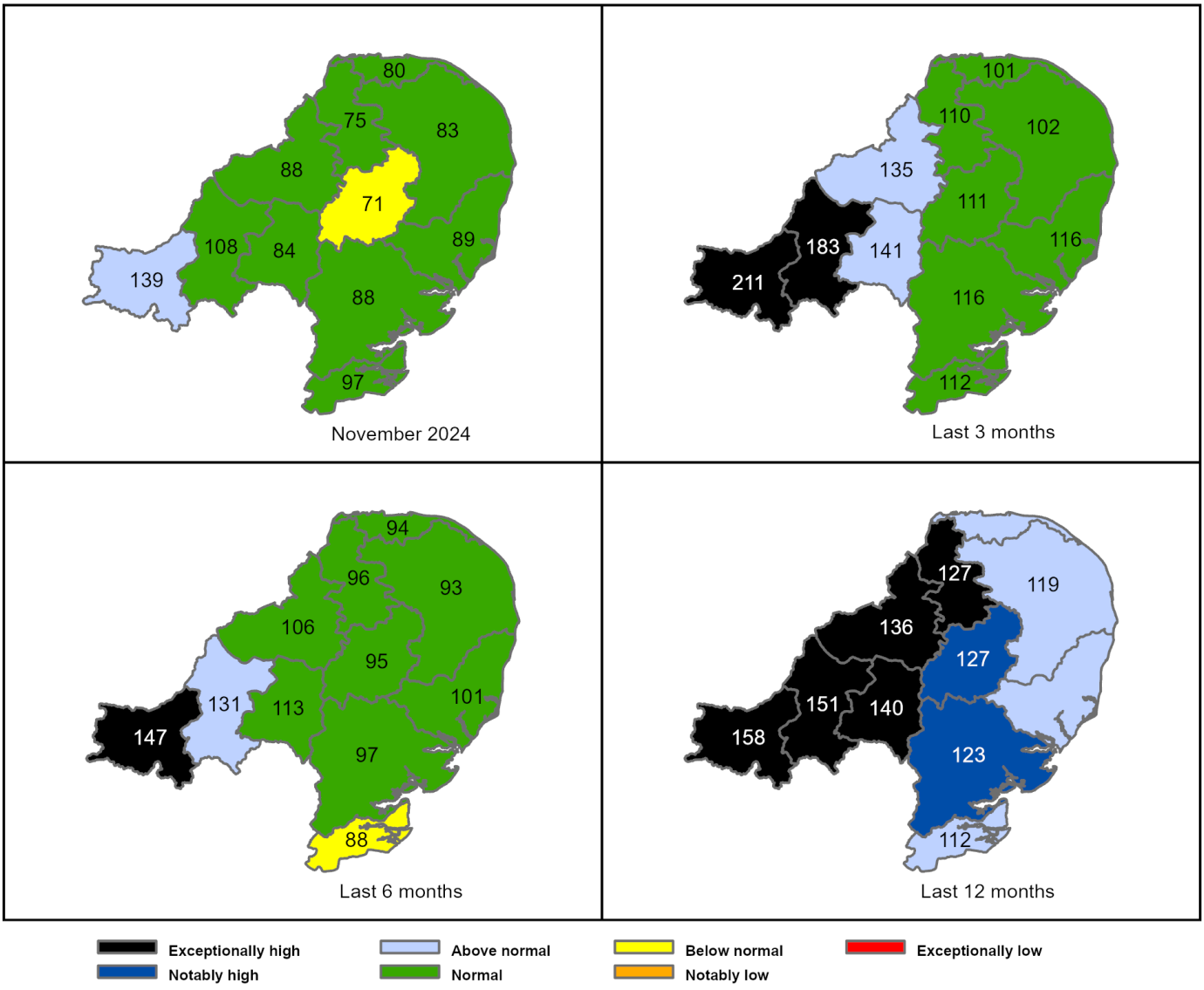
2 Rainfall

2.1 Rainfall map

Figure 2.1: Total rainfall for hydrological areas across East Anglia, expressed as a percentage of long term average rainfall for the current month (up to 30 November 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.

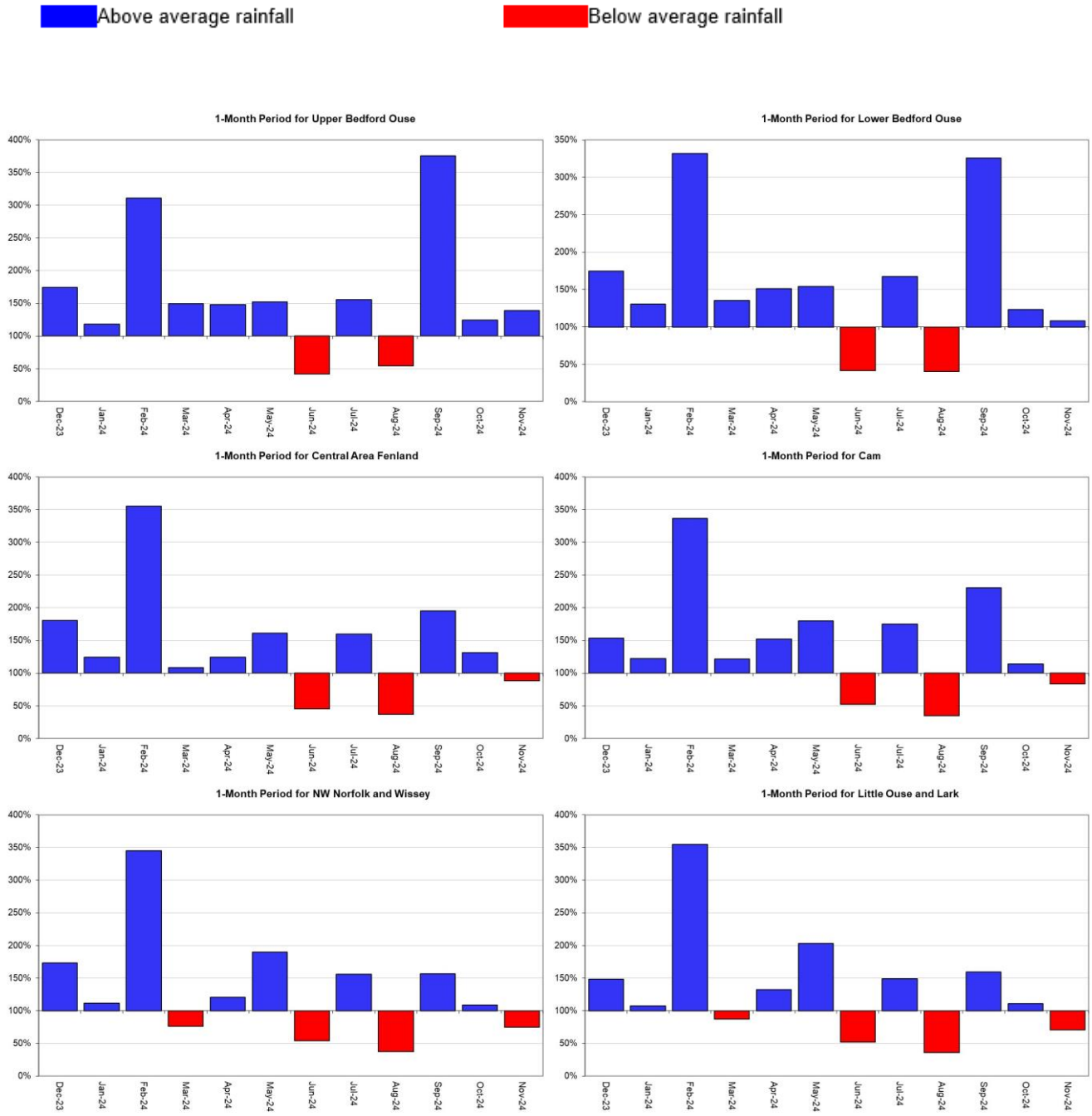


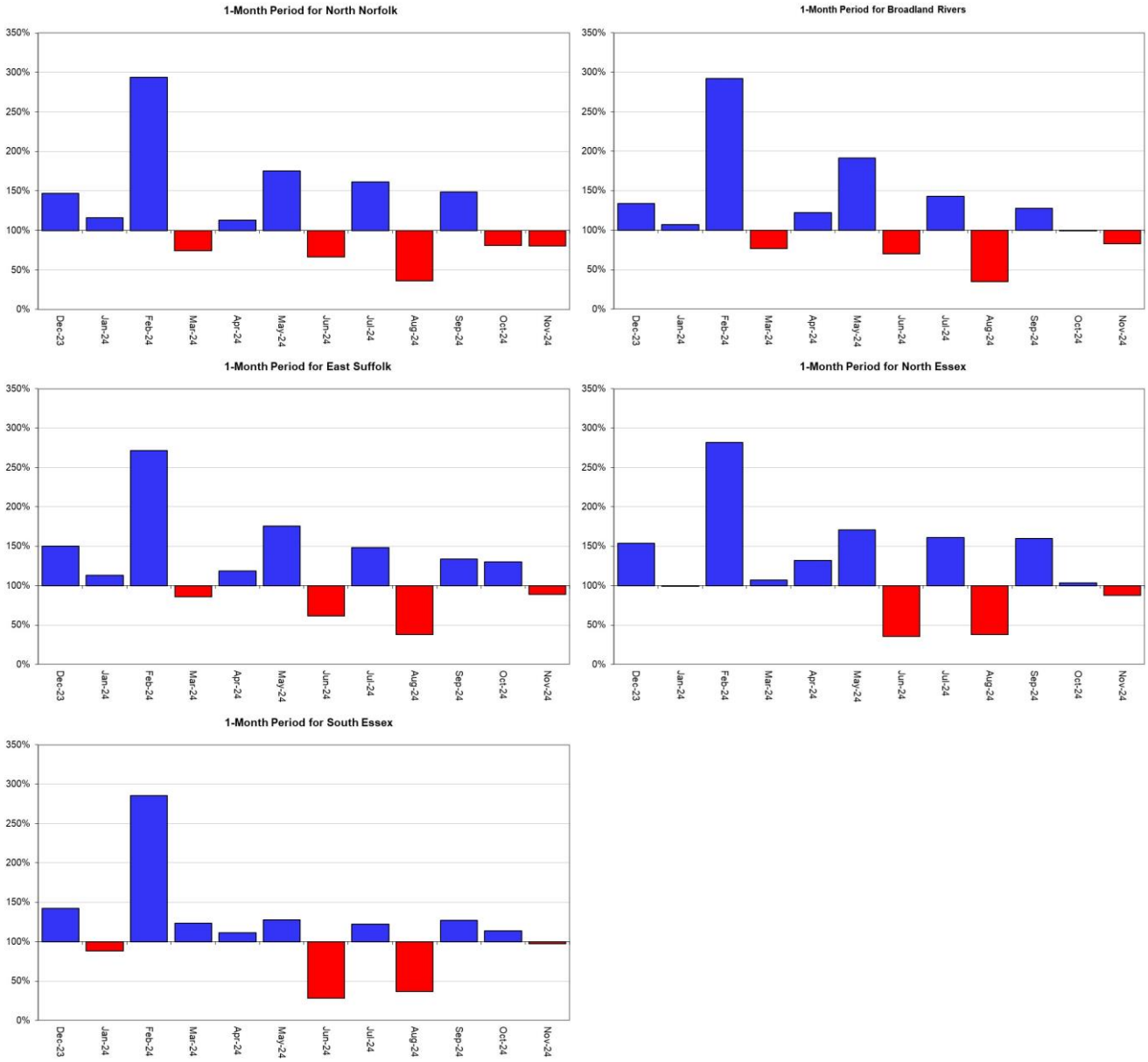
HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2024). Provisional data based on Environment Agency

1km gridded rainfall dataset derived from Environment Agency intensity rain gauges.

2.2 Rainfall charts

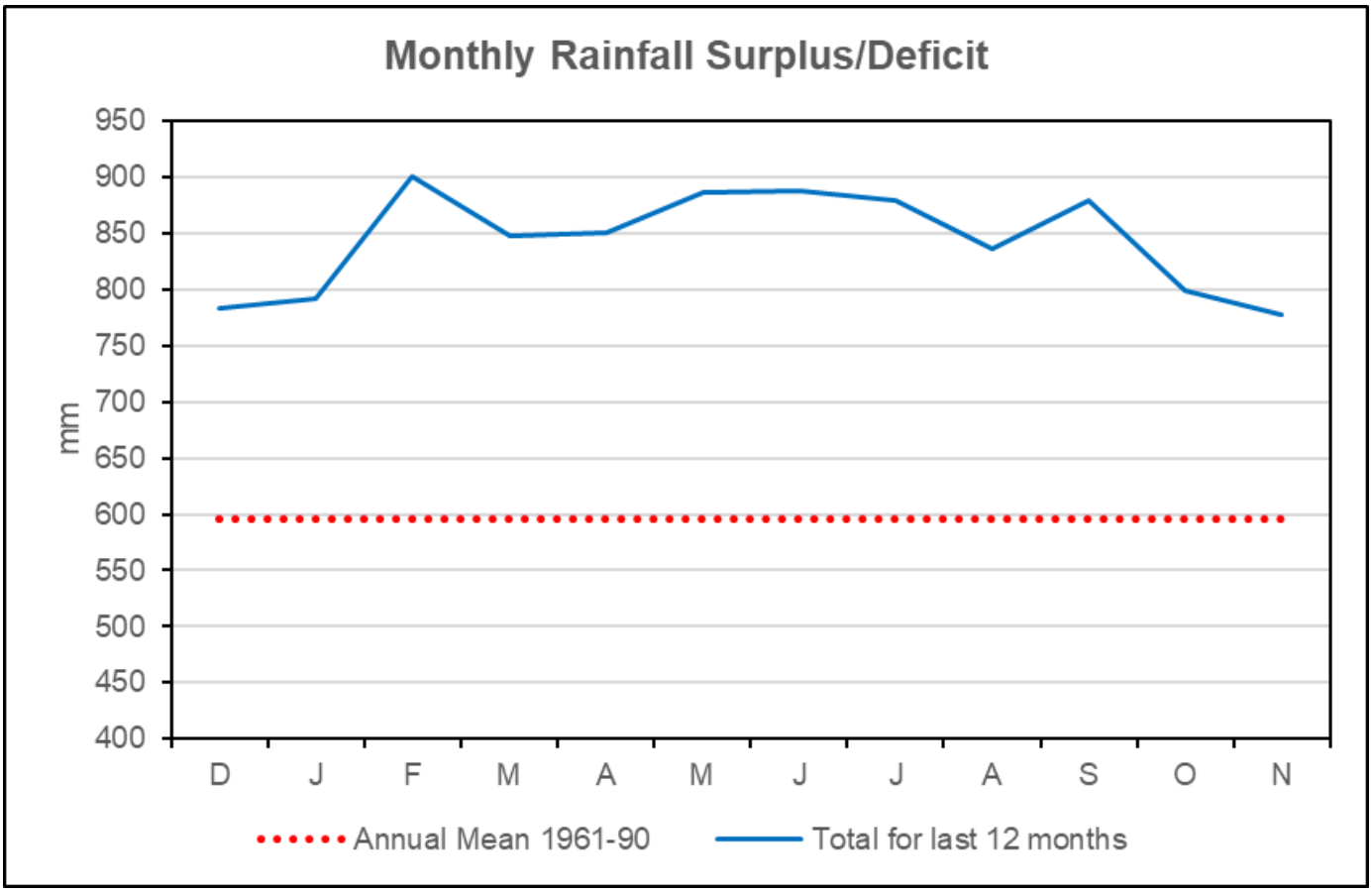
Figure 2.2: Monthly rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average for each region and for England.





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

2.3 Monthly rainfall surplus deficit chart

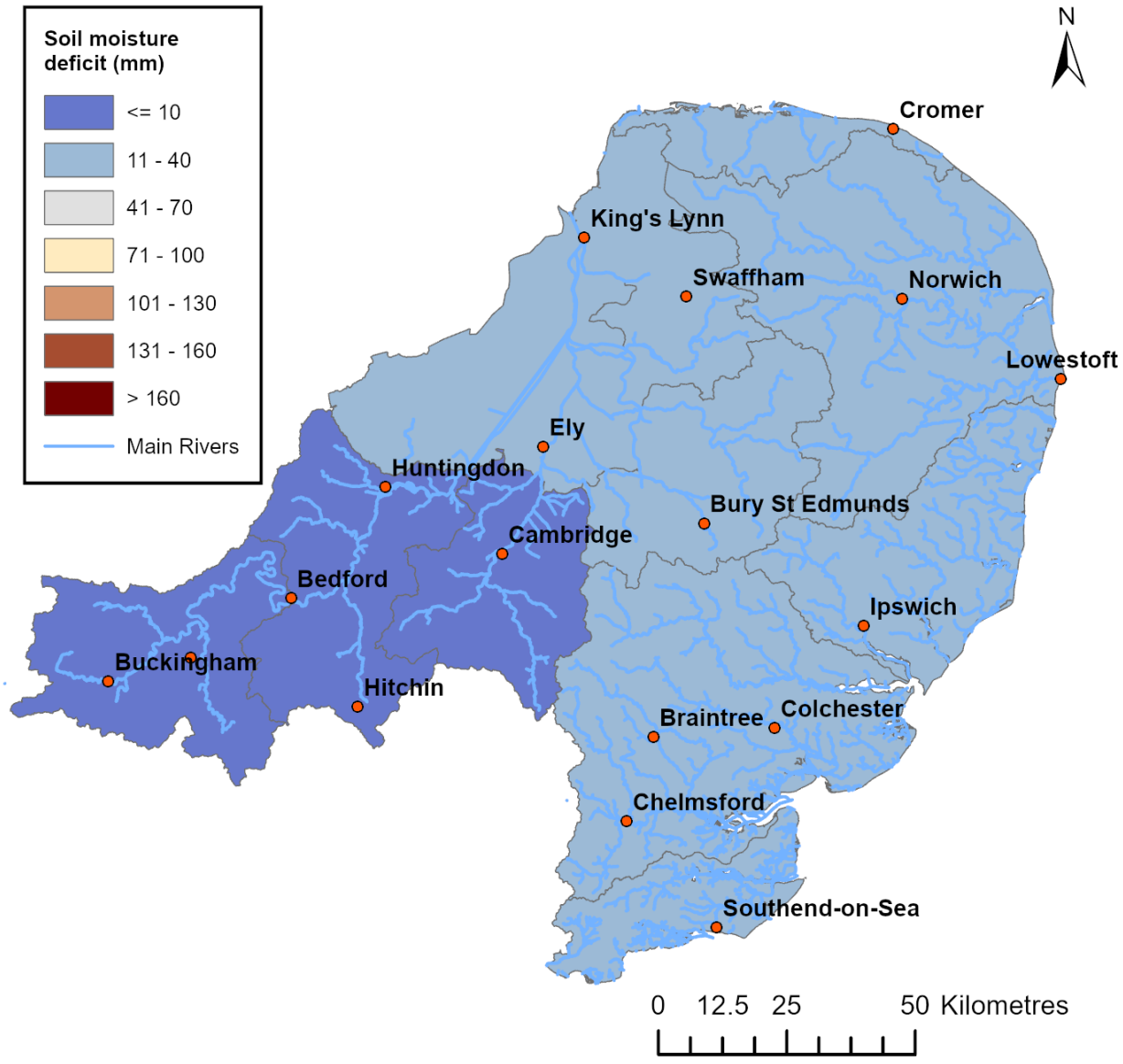


HadUK rainfall data. (Source: Met Office. Crown copyright, 2024).

3 Soil moisture deficit

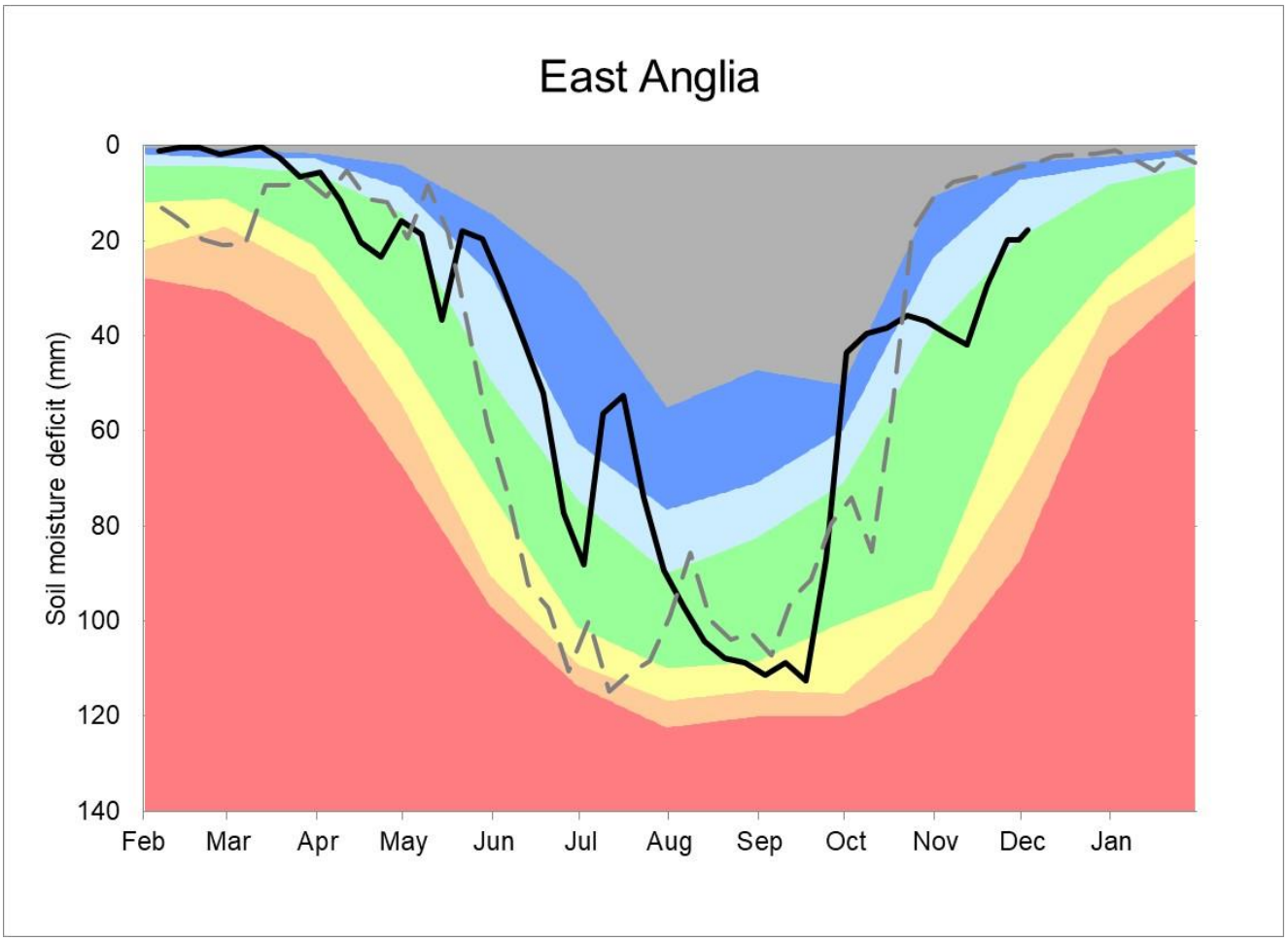
3.1 Soil moisture deficit map

Figure 3.1: Soil moisture deficit values for 30 November 2024. Values based on the weekly MORECS data for real land use.



3.2 Soil moisture deficit charts

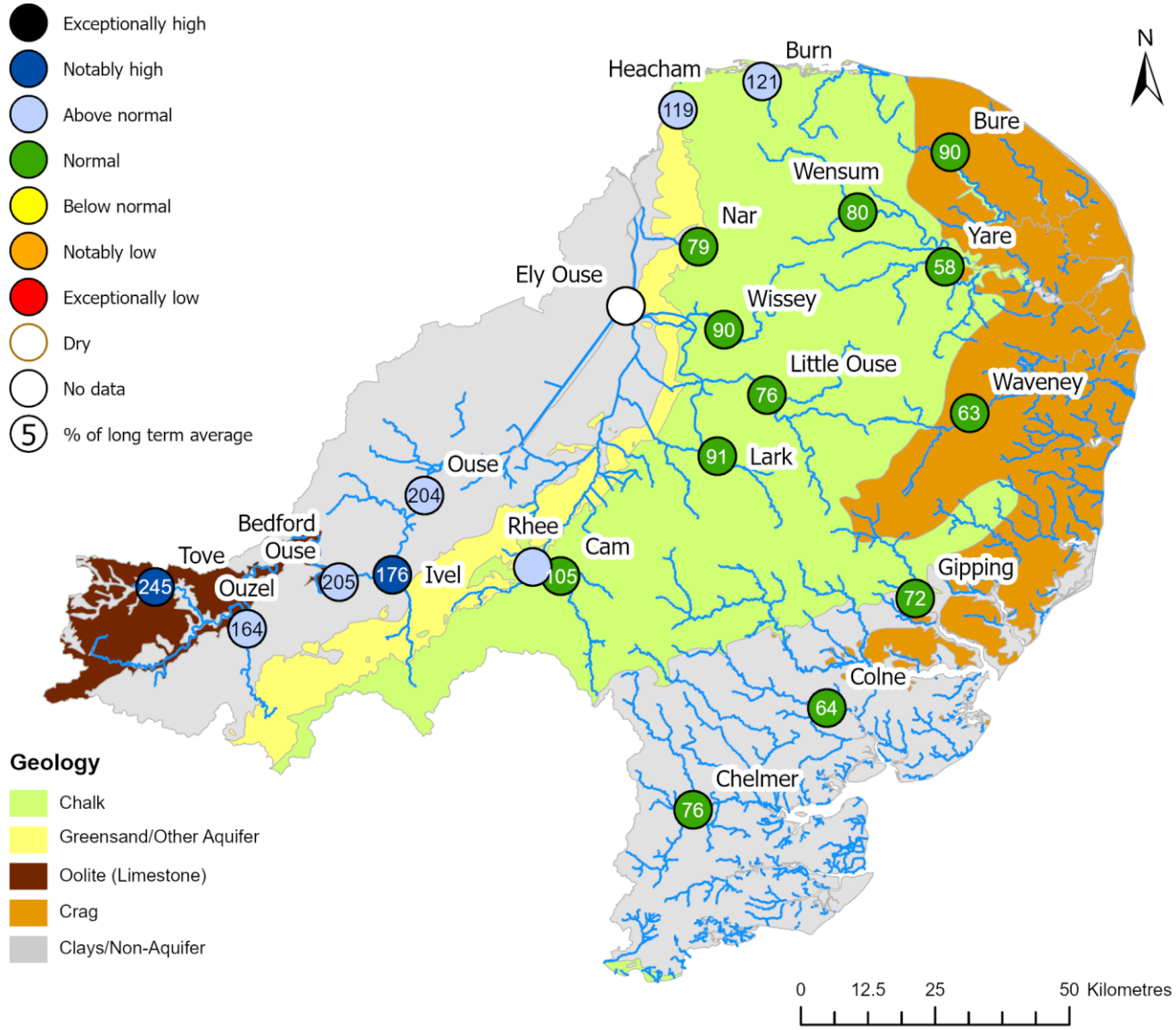
Figure 3.2: Latest soil moisture deficit compared to an analysis of historic 1961 to 1990 long term data set. Weekly MORECS data for real land use.



4 River flows

4.1 River flows map

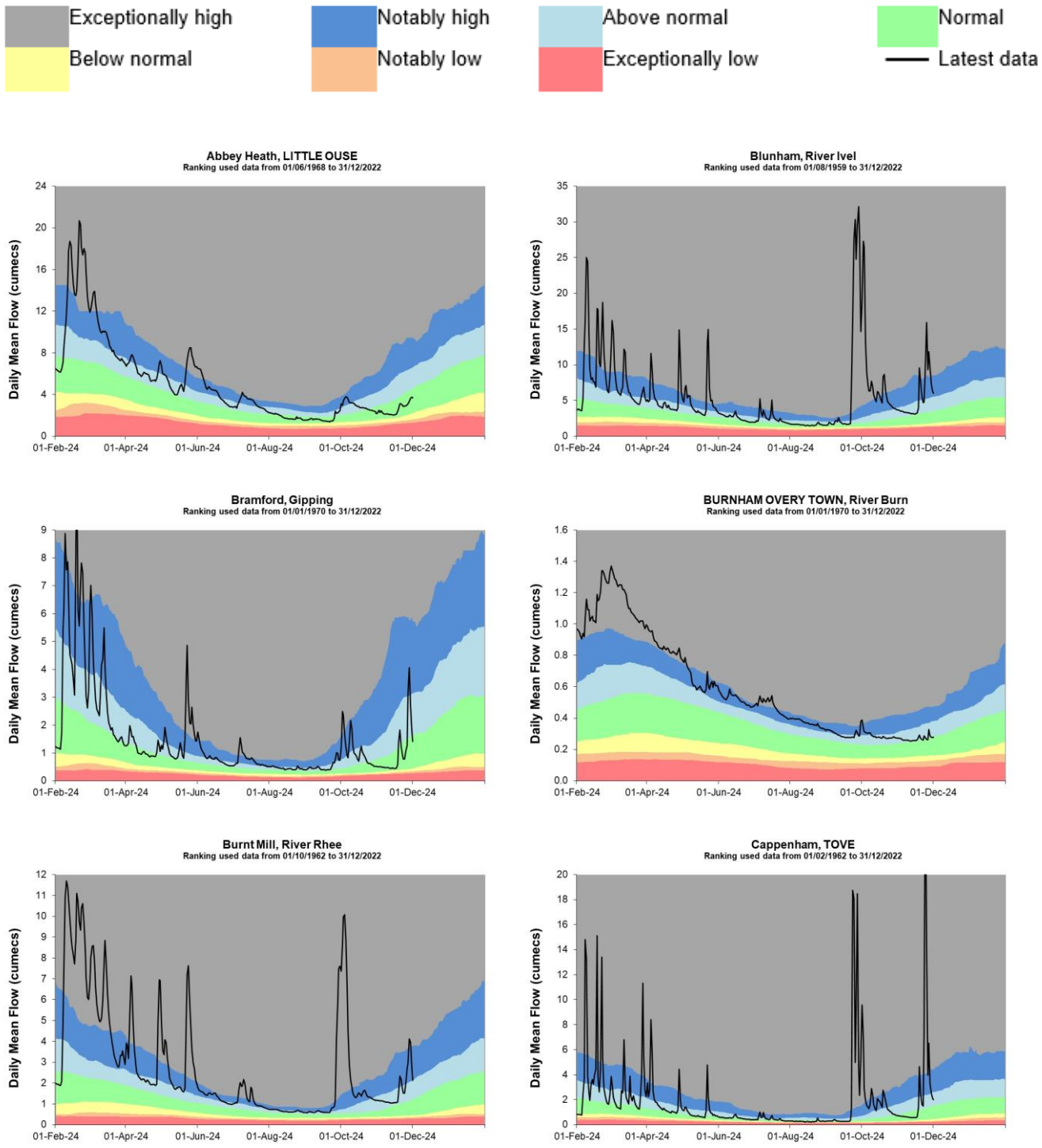
Figure 4.1: Monthly mean river flow for indicator sites for November 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic November monthly means Table available in the appendices with detailed information.

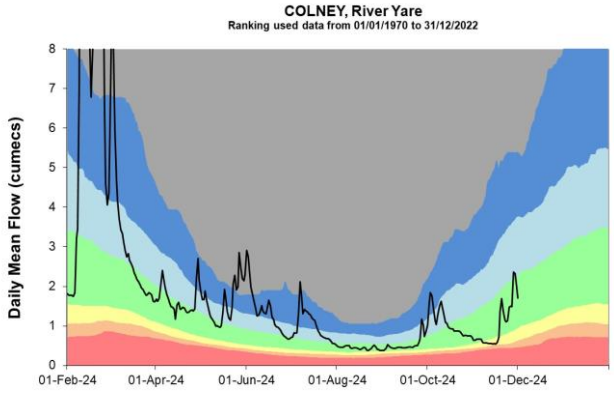


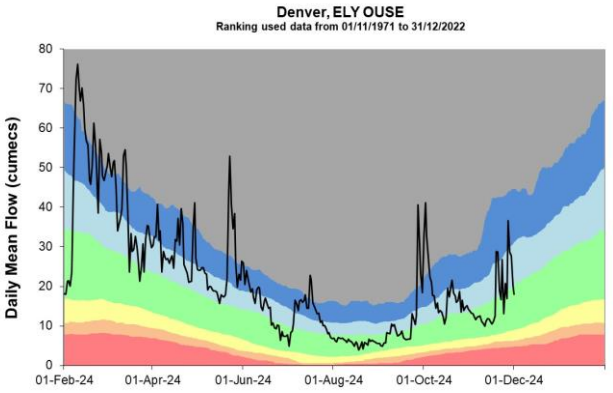
(Source: Environment Agency). Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2024

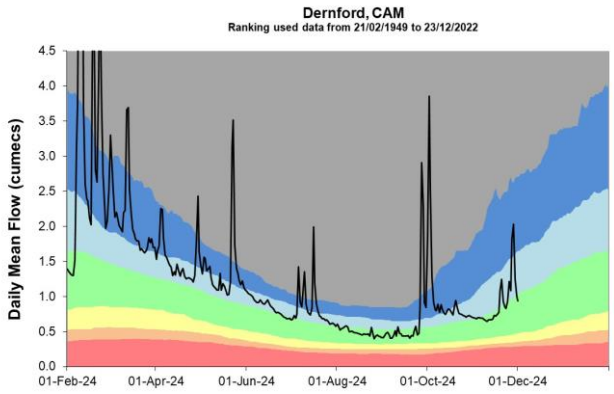
4.2 River flow charts

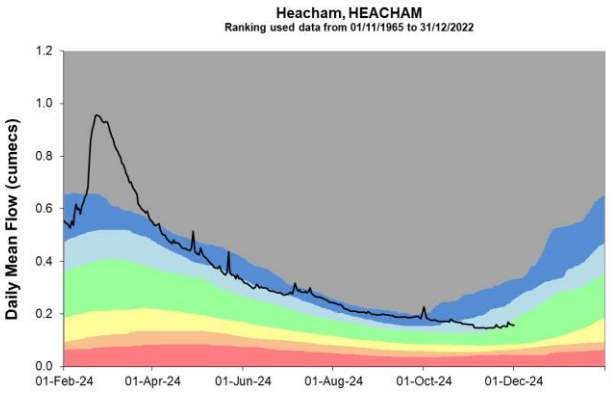
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.

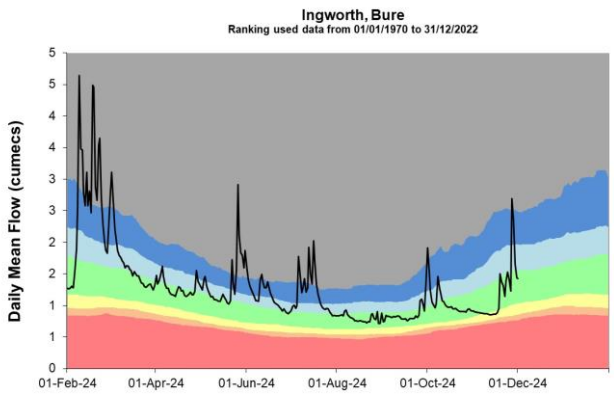


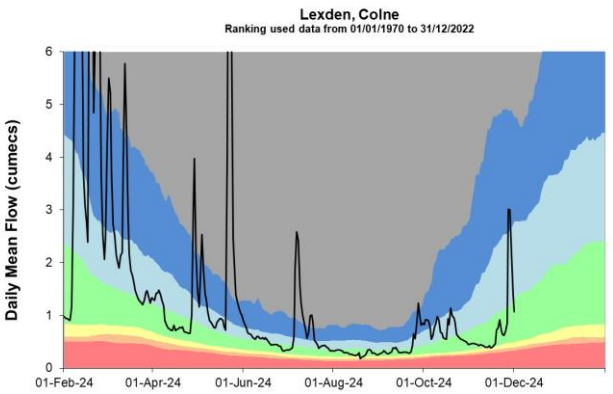

COLNEY, River Yare
Ranking used data from 01/01/1970 to 31/12/2022
Daily Mean Flow (cumecs)
0
1
2
3
4
5
6
7
8
01-Feb-24
01-Apr-24
01-Jun-24
01-Aug-24
01-Oct-24
01-Dec-24

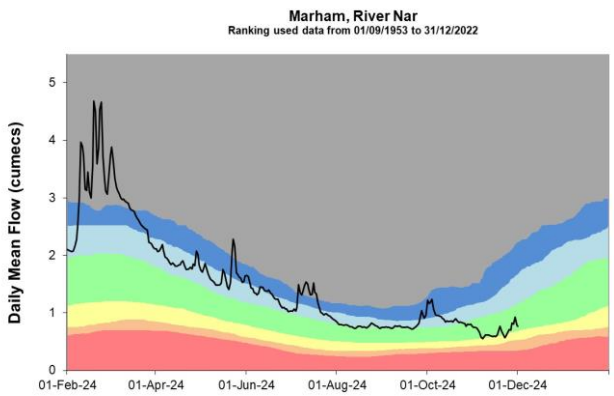

Denver, ELY OUSE
Ranking used data from 01/11/1971 to 31/12/2022
Daily Mean Flow (cumecs)
0
10
20
30
40
50
60
70
80
01-Feb-24
01-Apr-24
01-Jun-24
01-Aug-24
01-Oct-24
01-Dec-24

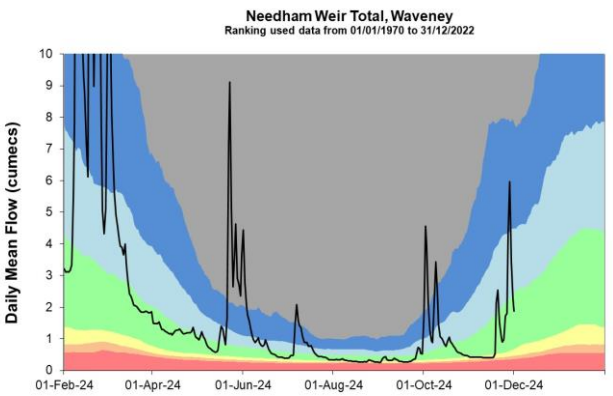

Dernford, CAM
Ranking used data from 21/02/1949 to 23/12/2022
Daily Mean Flow (cumecs)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
01-Feb-24
01-Apr-24
01-Jun-24
01-Aug-24
01-Oct-24
01-Dec-24

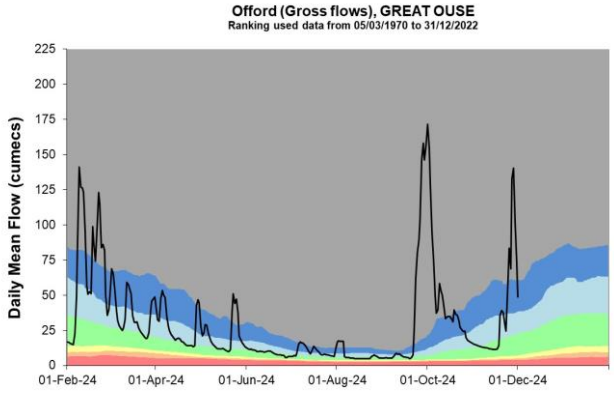

Heacham, HEACHAM
Ranking used data from 01/11/1965 to 31/12/2022
Daily Mean Flow (cumecs)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
01-Feb-24
01-Apr-24
01-Jun-24
01-Aug-24
01-Oct-24
01-Dec-24

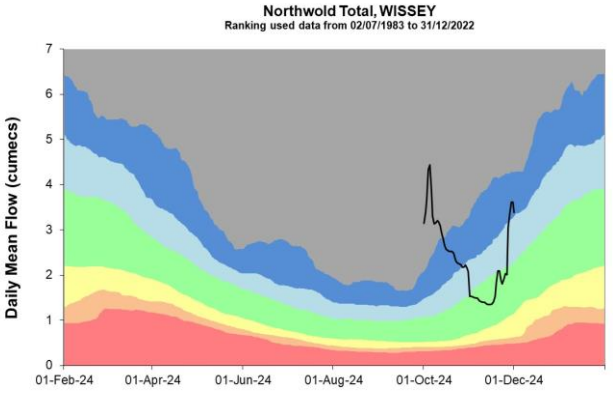

Ingworth, Bure
Ranking used data from 01/01/1970 to 31/12/2022
Daily Mean Flow (cumecs)
0
1
1
2
3
4
4
5
5
01-Feb-24
01-Apr-24
01-Jun-24
01-Aug-24
01-Oct-24
01-Dec-24

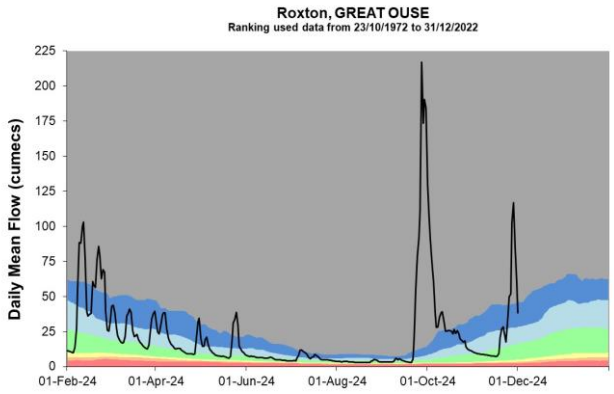

Lexden, Colne
Ranking used data from 01/01/1970 to 31/12/2022
Daily Mean Flow (cumecs)
0
1
2
3
4
5
6
01-Feb-24
01-Apr-24
01-Jun-24
01-Aug-24
01-Oct-24
01-Dec-24

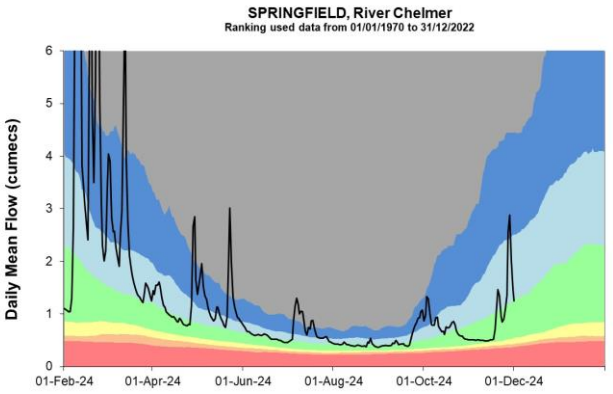

Marham, River Nar
Ranking used data from 01/09/1953 to 31/12/2022
Daily Mean Flow (cumecs)
0
1
2
3
4
5
01-Feb-24
01-Apr-24
01-Jun-24
01-Aug-24
01-Oct-24
01-Dec-24

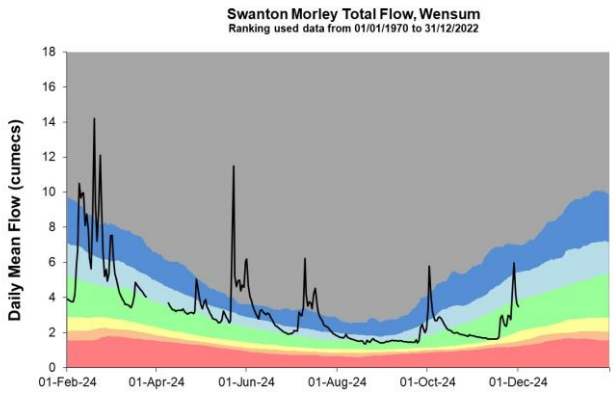

Needham Weir Total, Waveney
Ranking used data from 01/01/1970 to 31/12/2022
Daily Mean Flow (cumecs)
0
1
2
3
4
5
6
7
8
9
10
01-Feb-24
01-Apr-24
01-Jun-24
01-Aug-24
01-Oct-24
01-Dec-24

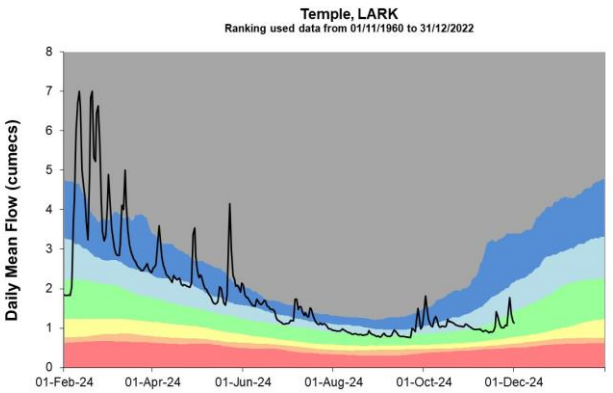


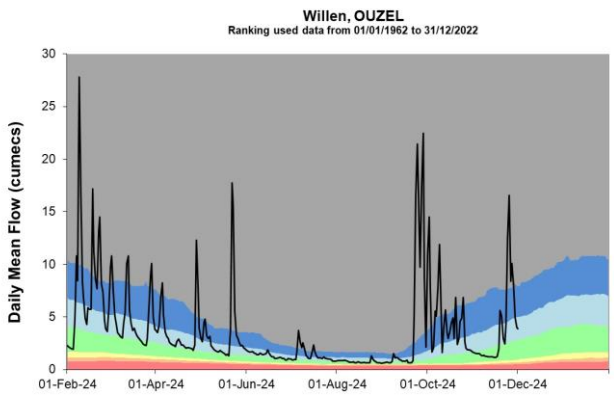










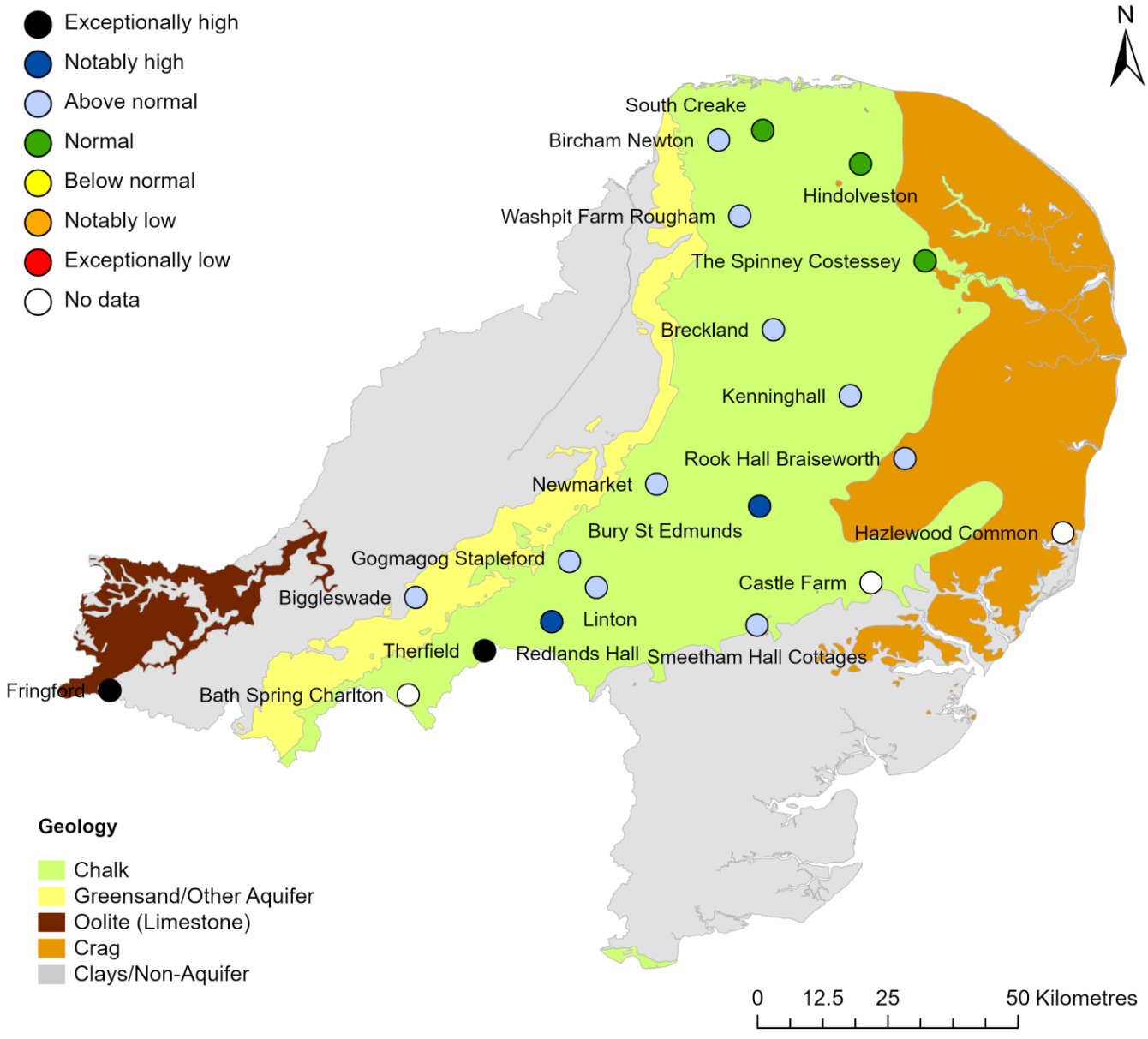


Source: Environment Agency.

5 Groundwater levels

5.1 Groundwater levels map

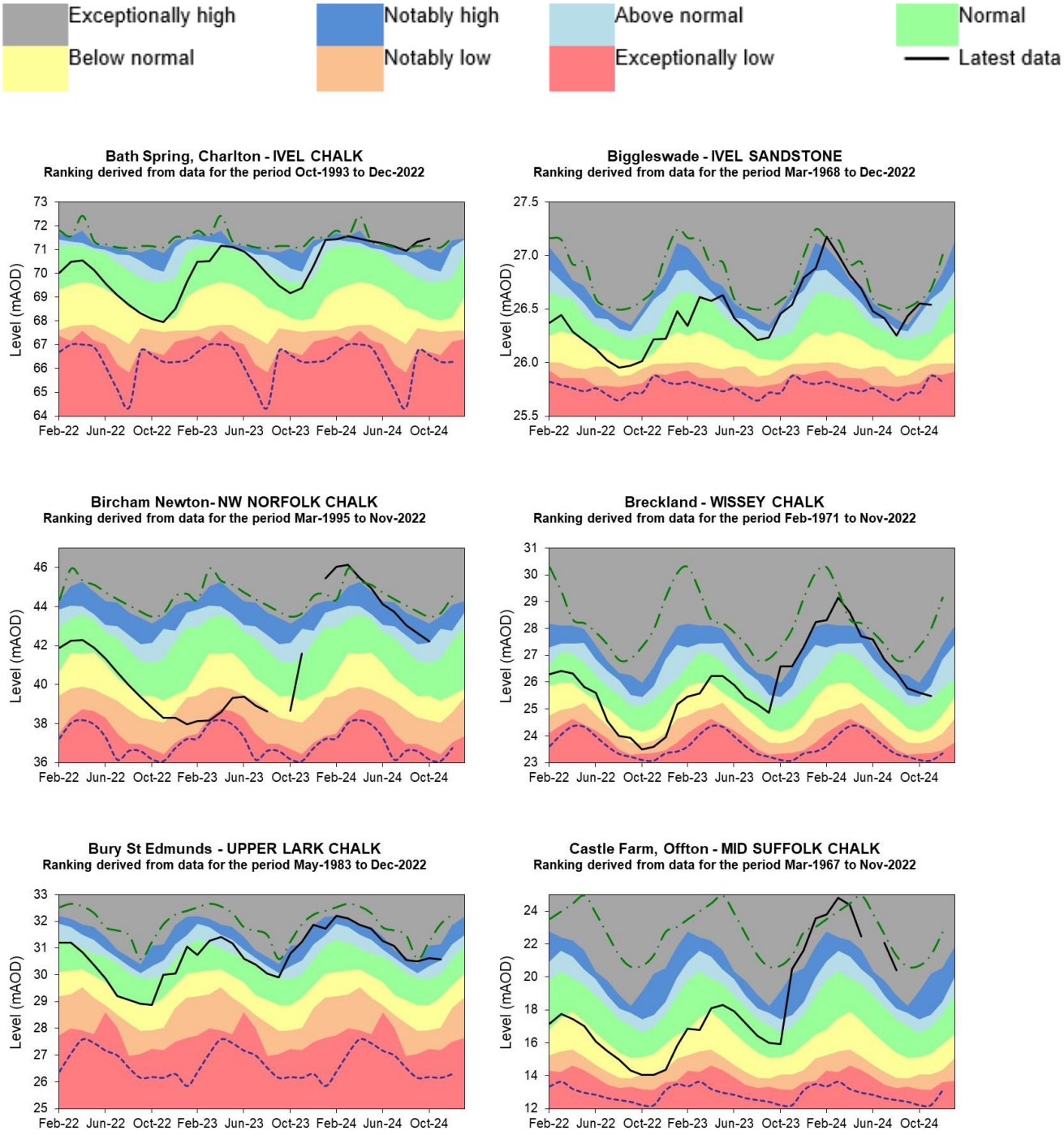
Figure 5.1: Groundwater levels for indicator sites at the end of November 2024, classed relative to an analysis of respective historic November levels. Table available in the appendices with detailed information.



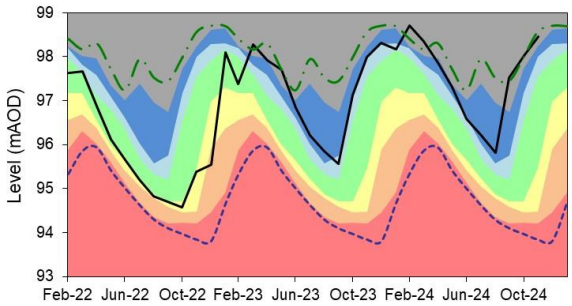
(Source: Environment Agency). Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2024.

5.2 Groundwater level charts

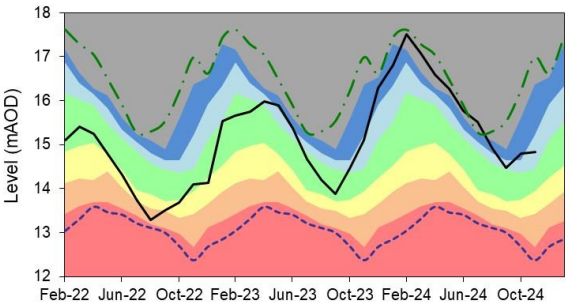
Figure 5.2: End of month groundwater levels at index groundwater level sites for major aquifers. 22 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



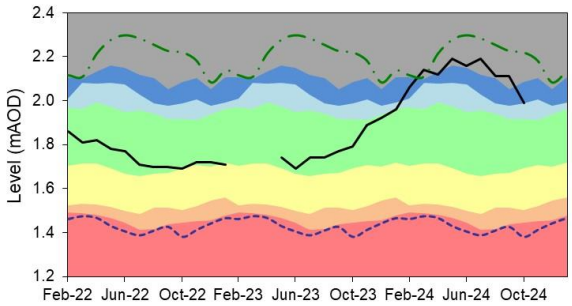
Fringford - GREAT OOLITE
Ranking derived from data for the period Sep-1980 to Dec-2022



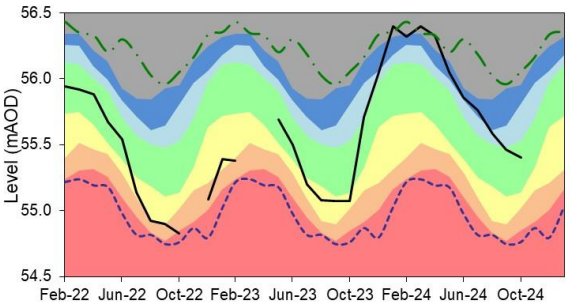
Gog Magog, Stapleford - CAM CHALK
Ranking derived from data for the period Jan-1980 to Dec-2022



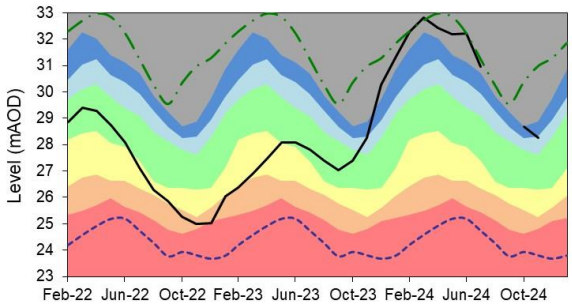
Hazlewood Common - SUFFOLK CRAG
Ranking derived from data for the period Oct-1988 to Nov-2022



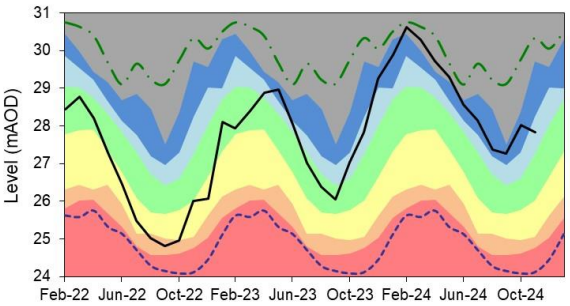
Hindolveston - NORFOLK CHALK
Ranking derived from data for the period Sep-1984 to Nov-2022



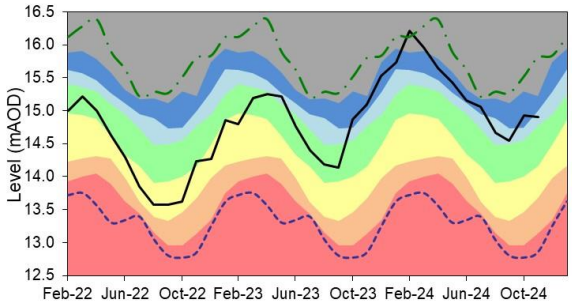
Kenninghall - LITTLE OUSE CHALK
Ranking derived from data for the period Aug-1973 to Dec-2022



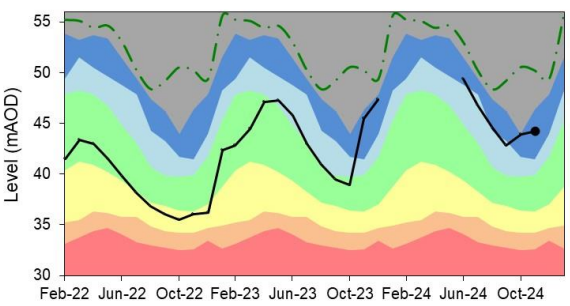
Linton- CAM CHALK
Ranking derived from data for the period Jan-1980 to Dec-2022

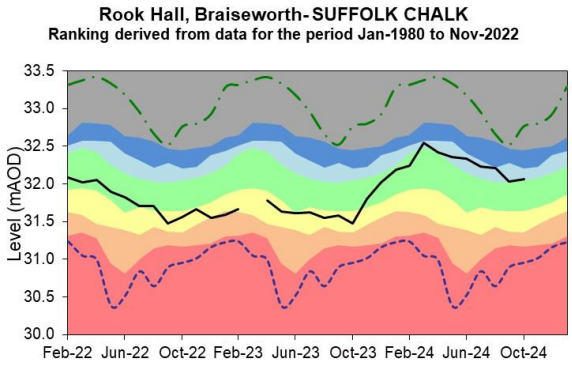


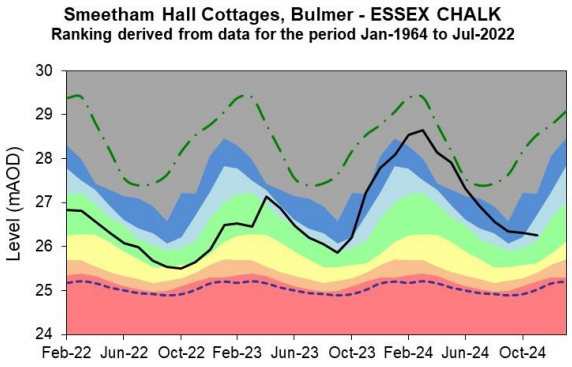
Newmarket - SNAIL CHALK
Ranking derived from data for the period Feb-1983 to Dec-2022

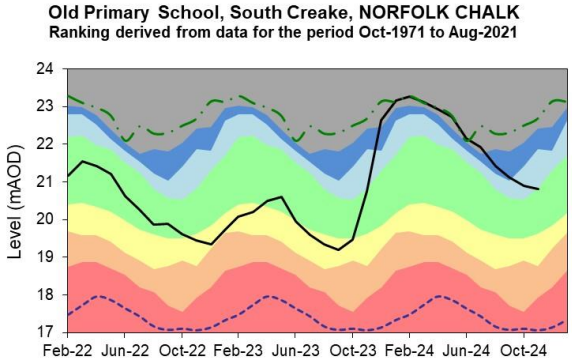


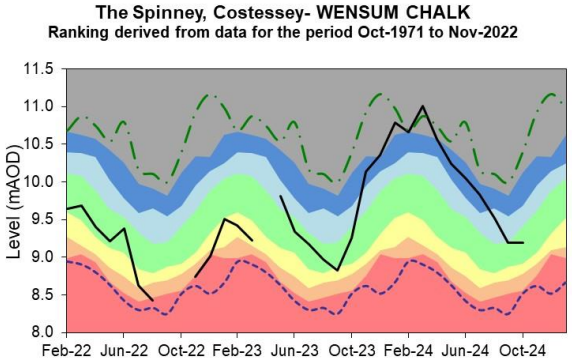
Redlands Hall, Ickleton - CAM CHALK
Ranking derived from data for the period Aug-1963 to Dec-2022

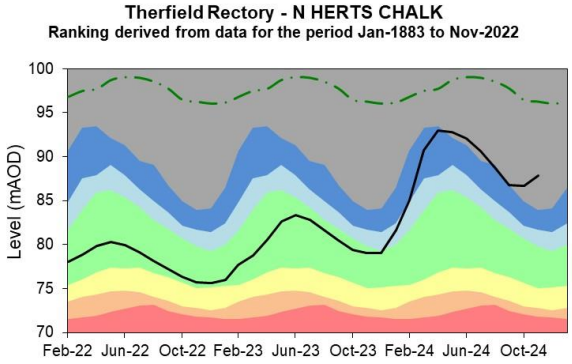


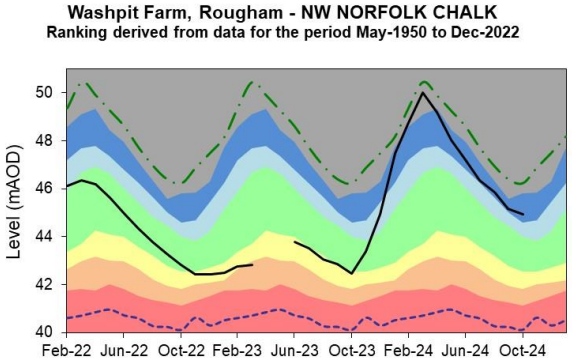










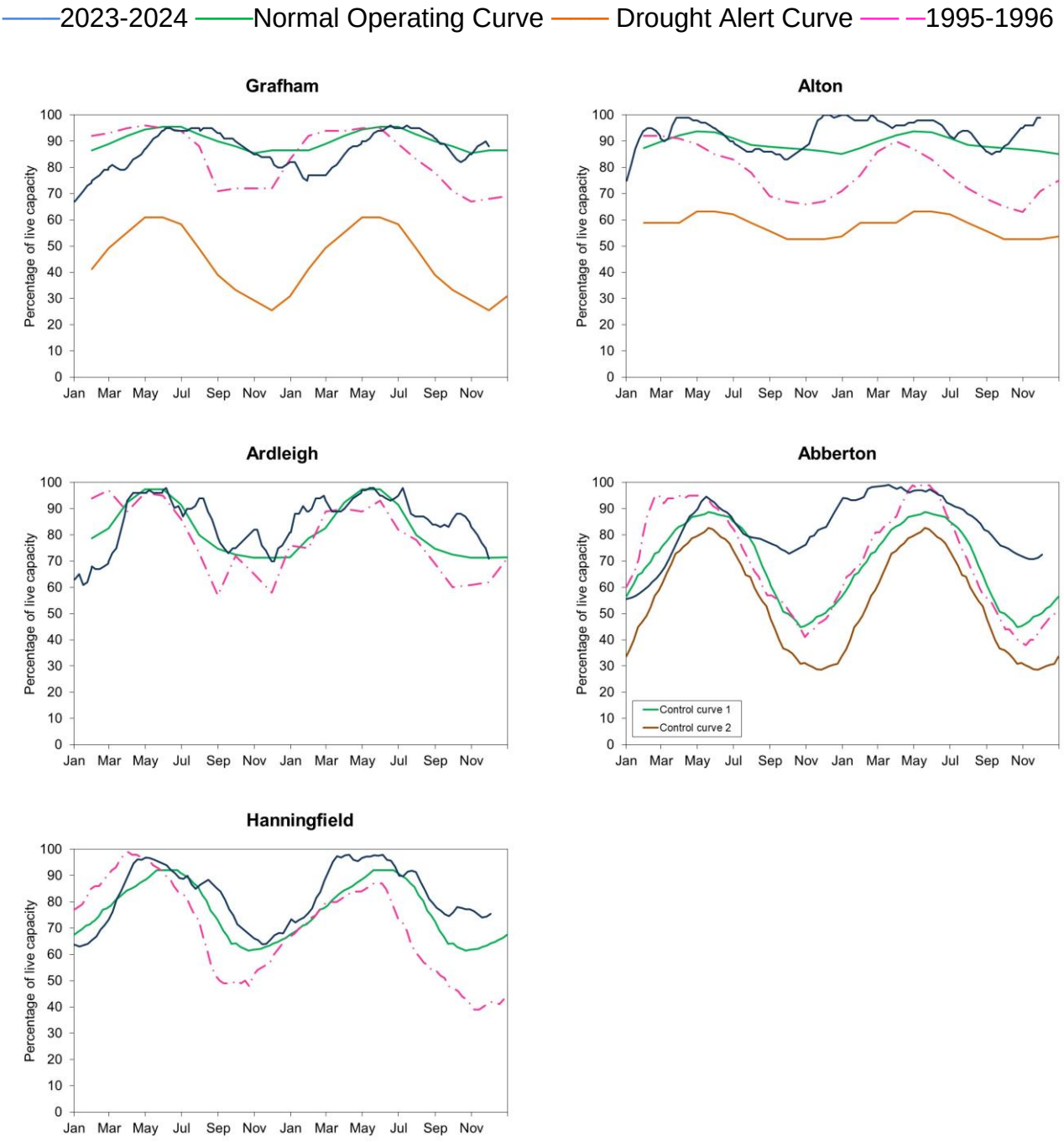


Note: the last available data for Washpit Farm, Rougham (NW Norfolk Chalk) was collected on 21/11/24 and is not month end, however trends suggest no dramatic groundwater level change in missing dates.

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.

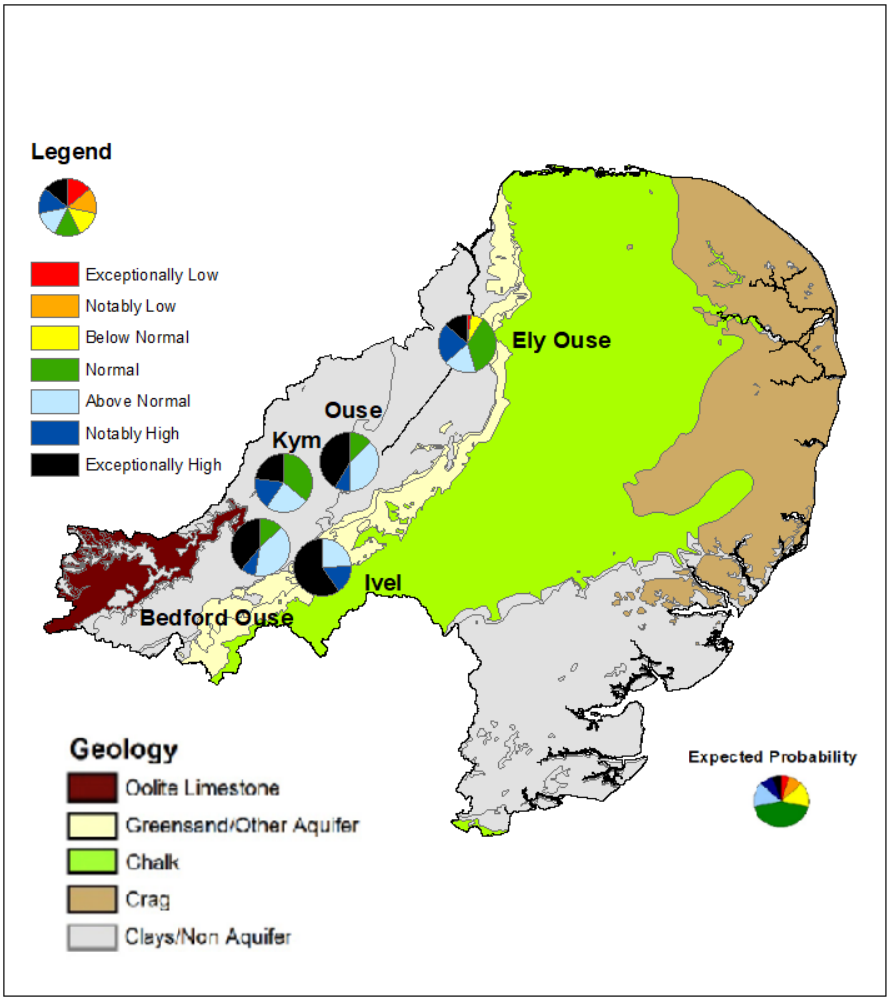


(Source: water companies).

7 Forward look

7.1 Probabilistic ensemble projection of river flows at key sites in 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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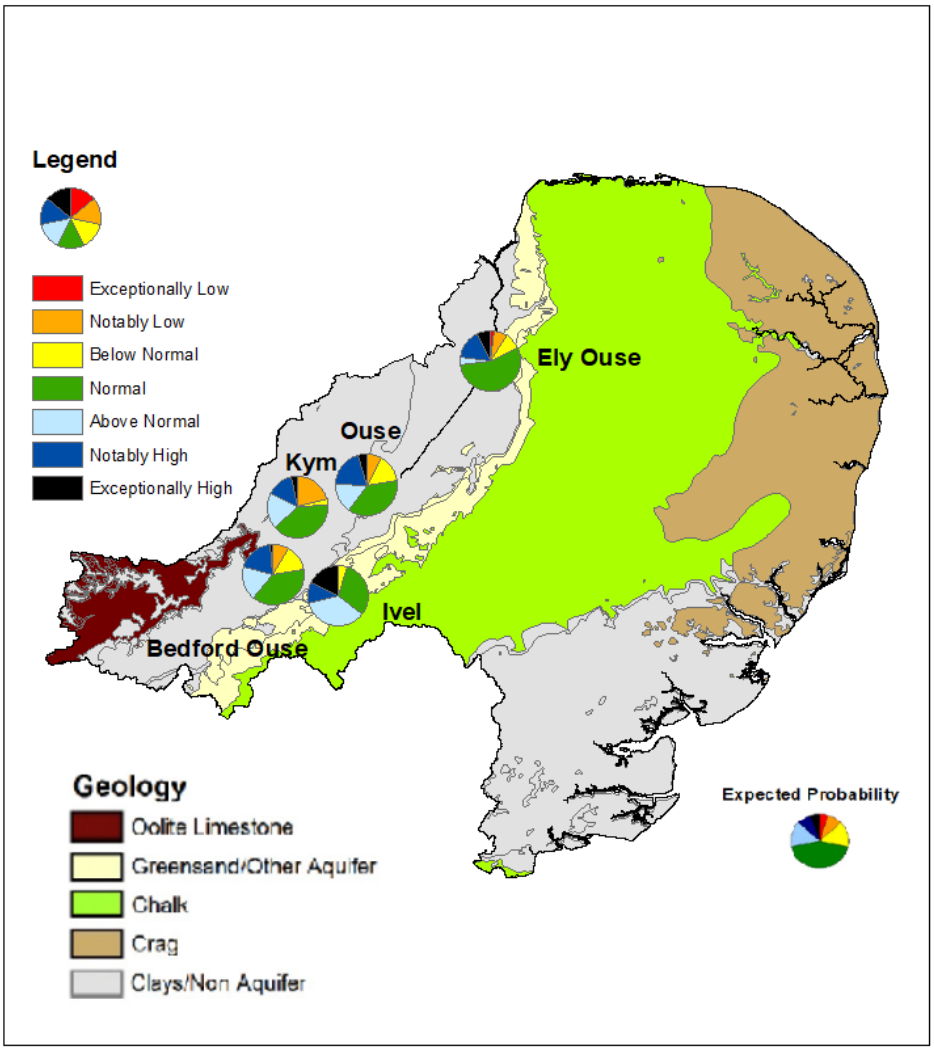
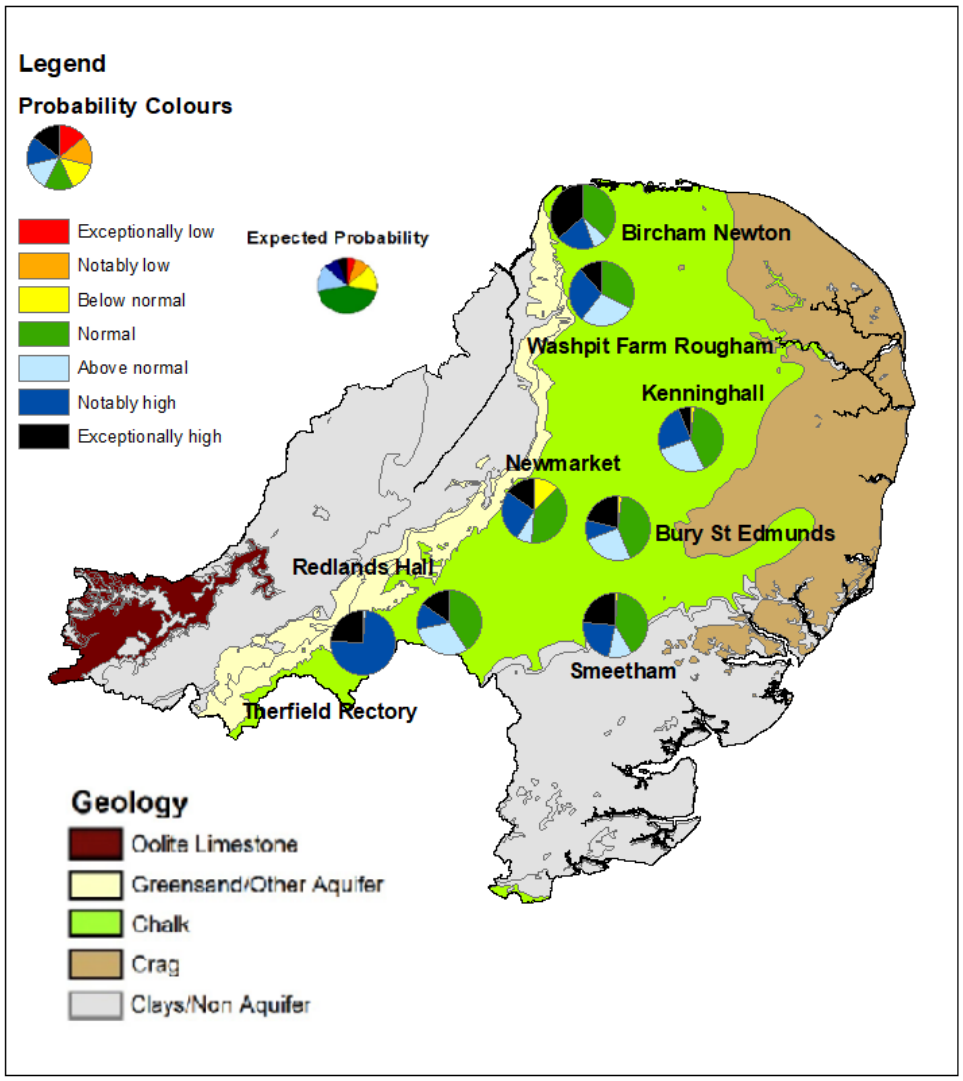


Pie charts indicate probability, based on climatology, of the surface water flow at each site being, for example, exceptionally low for the time of year. (Source: Centre for Ecology and Hydrology, Environment Agency) Geological map reproduced with kind permission from UK Groundwater Forum, BGS © NERC.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

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

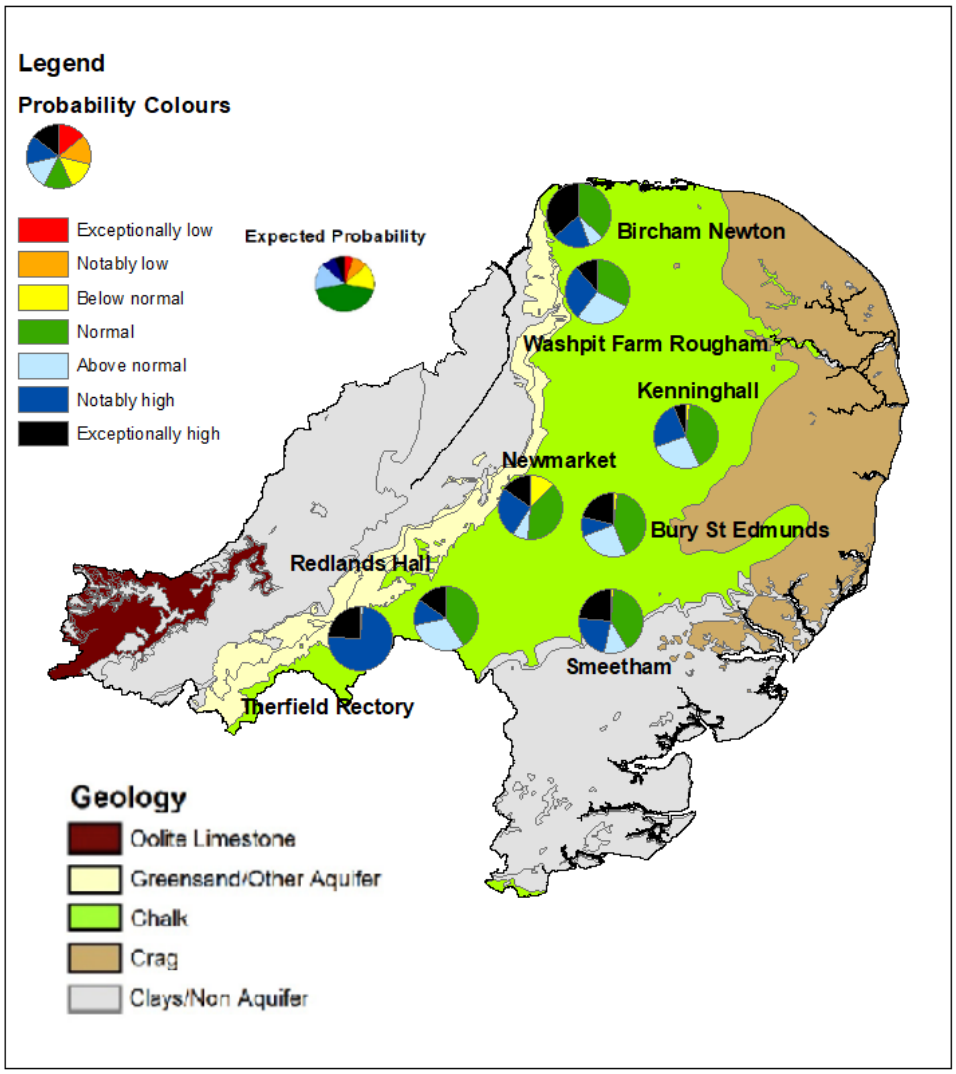
Table available in the appendices with detailed information. Exceptionally high or low levels are those which would typically occur 5% of the time within the historic record. Notably high or low levels are those which would typically occur 8% of the time. Above normal or below normal levels are those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

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)

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	Nov 2024 rainfall % of long term average 1961 to 1990	Nov 2024 band	Sep 2024 to November cumulative band	Jun 2024 to November cumulative band	Dec 2023 to November cumulative band
Broadland Rivers	83	Normal	Normal	Normal	Above normal
Cam	84	Normal	Above normal	Normal	Exceptionally high
Central Area Fenland	88	Normal	Above normal	Normal	Exceptionally high
East Suffolk	89	Normal	Normal	Normal	Above normal
Little Ouse And Lark	71	Below Normal	Normal	Normal	Notably high
Lower Bedford Ouse	109	Normal	Exceptionally high	Above normal	Exceptionally high
North Essex	88	Normal	Normal	Normal	Notably high
North Norfolk	80	Normal	Normal	Normal	Above normal
Nw Norfolk And Wissey	75	Normal	Normal	Normal	Exceptionally high
South Essex	97	Normal	Normal	Below normal	Above normal

Upper Bedford Ouse	139	Above Normal	Exceptionally high	Exceptionally high	Exceptionally high

9.2 River flows table

Site name	River	Catchment	Nov 2024 band	Oct 2024 band
Abbey Heath	Little Ouse	Little Ouse	Normal	Above normal
Blunham	Ivel	Ivel	Notably high	Exceptionally high
Bramford	Gipping	Gipping	Normal	Above normal
Burnham Overy	Burn	Burn	Above normal	Above normal
Burnt Mill	Rhee	Rhee	Above normal	Exceptionally high
Cappenham	Tove	Tove	Notably high	Exceptionally high
Colney	Yare	Yare	Normal	Normal
Denver	Ely Ouse	Cutoff and Renew Channel	Normal	Notably high
Dernford	Cam	Cam	Normal	Notably high
Heacham	Heacham	Heacham	Above normal	Notably high
Ingworth	Bure	Bure	Normal	Normal
Lexden	Colne	Colne Essex	Normal	Normal
Marham	Nar	Nar	Normal	Above normal

Needham Weir Total	Waveney (lower)	Waveney	Normal	Above normal
Northwold Total	Wissey	Wissey	Normal	Notably high
Offord (gross Flows)	Great Ouse	Ouse Beds	Above normal	Exceptionally high
Roxton	Great Ouse	Ivel	Above normal	Exceptionally high
Springfield	Chelmer	Chelmer Upper	Normal	Above normal
Swanton Morley Total	Wensum	Wensum	Normal	Normal
Temple	Lark	Lark	Normal	Above normal
Willen	Ouzel	Ouzel	Above normal	Exceptionally high

9.3 Groundwater table

Site name	Aquifer	End of Nov 2024 band	End of Oct 2024 band
Biggleswade	Ivel Woburn Sands	Above normal	Exceptionally high
Bircham Newton	North West Norfolk Chalk	Above normal	Notably high
Breckland	Wissey Chalk	Above normal	Notably high
Bury St Edmunds	Upper Lark Chalk	Notably high	Notably high
Castle Farm, Offton	East Suffolk Chalk		
Gog Magog, Stapleford	Cam Chalk	Above normal	Notably high
Hazlewood Common	East Suffolk Crag		Notably high
Hindolveston	Norfolk Chalk	Normal	Normal
Kenninghall	Little Ouse Chalk	Above normal	Notably high
Linton	Cam Chalk	Above normal	Notably high
Newmarket	Snail Chalk	Above normal	Notably high
Old Primary School, South Creake	North Norfolk Chalk	Normal	Above normal

Redlands Hall, Ickleton	Cam Chalk	Notably high	Notably high
Rook Hall, Braiseworth	East Suffolk Chalk	Above normal	Above normal
Smeetham Hall Cottages, Bulmer	North Essex Chalk	Above normal	Notably high
The Spinney, Costessey	Wensum Chalk	Normal	Normal
Washpit Farm, Rougham	North West Norfolk Chalk	Above normal	Notably high
Therfield Rectory	Upper Lee Chalk	Exceptionally high	Exceptionally high
Fringford P.s.	Upper Bedford Ouse Oolitic Limestone (great)	Exceptionally high	Exceptionally high

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	Bedford Ouse	Kym	Ivel	Ouse	Ely Ouse	Stiffkey	Gipping
Exceptionally low	0	0	0	0	2	#DIV/0!	#DIV/0!
Notably low	0	0	0	0	0	#DIV/0!	#DIV/0!
Below normal	0	0	0	0	7	#DIV/0!	#DIV/0!
Normal	13	35	0	13	36	#DIV/0!	#DIV/0!
Above normal	40	24	24	37	18	#DIV/0!	#DIV/0!
Notably high	8	18	16	8	23	#DIV/0!	#DIV/0!
Exceptionally high	39	23	60	42	14	#DIV/0!	#DIV/0!

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

Percentage of pie chart for each band

Site	Bedford Ouse	Kym	Ivel	Ouse	Ely Ouse	Stiffkey	Gipping
Exceptionally low	0	0	0	0	2	#DIV/0!	#DIV/0!
Notably low	8	21	0	8	7	#DIV/0!	#DIV/0!
Below normal	15	3	5	15	9	#DIV/0!	#DIV/0!
Normal	39	39	31	37	55	#DIV/0!	#DIV/0!
Above normal	18	19	35	16	5	#DIV/0!	#DIV/0!
Notably high	19	15	11	19	16	#DIV/0!	#DIV/0!
Exceptionally high	2	3	18	5	7	#DIV/0!	#DIV/0!

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

Percentage of pie chart for each band

Site	Therfield Rectory	Redlands Hall	Newmarket	Washpit Farm	Bircham Newton	Kenninghall	Bury St Edmunds	Smeetham
Exceptionally low	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Notably low	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Below normal	0.0	0.0	12.8	0.0	0.0	2.0	2.6	1.7
Normal	0.0	40.7	38.5	32.8	37.0	40.8	41.0	39.7
Above normal	1.6	30.5	7.7	27.9	7.4	26.5	25.6	12.1
Notably high	73.8	13.6	25.6	27.9	18.5	24.5	10.3	22.4
Exceptionally high	24.6	15.3	15.4	11.5	37.0	6.1	20.5	24.1

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

Percentage of pie chart for each band

Site	Therfield Rectory	Redlands Hall	Newmarket	Washpit Farm	Bircham Newton	Kenninghall	Bury St Edmunds	Smeetham
Exceptionally low	0.0	0.0	0.0	0.0	0.0	N/A	0.0	0.0
Notably low	0.0	0.0	0.0	0.0	0.0	N/A	0.0	0.0
Below normal	0.0	5.1	4.9	4.9	0.0	N/A	17.9	1.7
Normal	8.2	57.6	78.0	62.3	48.1	N/A	64.1	13.8
Above normal	19.7	35.6	2.4	21.3	22.2	N/A	12.8	10.3
Notably high	62.3	1.7	7.3	8.2	25.9	N/A	0.0	62.1
Exceptionally high	9.8	0.0	7.3	3.3	3.7	N/A	5.1	12.1