Monthly water situation report: Hertfordshire and North London Area

1 Summary - December 2024

During December, the Hertfordshire and North London area received 49mm of rain, which was 78% of the long term average. Monthly river flows varied according to catchment type – several chalk river indicator sites recorded flows in the exceptionally high band, while in clay and urban catchments all indicator sites recorded in the normal band. Groundwater levels remained high, with most sites in the exceptionally high band and some sites recording their highest end of month levels on record.

1.1 Rainfall

December was a fairly average month for rainfall across the Hertfordshire and North London area (“the Area”). The area received 49mm of rain, which was 78% of the long term average (LTA). All five areal rainfall units ended December below the LTA but remained in the normal band. Due to Storm Darragh, all five of December’s rainiest days occurred in the first half of the month, with significantly less rainfall in the second half. The wettest day of the month was 7 December, with 19.6mm recorded at Braughing (Lee Chalk). On this day, the highest rainfall totals were recorded in the Lee Chalk and Lower Lee units with rain gauges like Whitwell, Widford, Darnicle Hill and Nazeing all recording over 14mm of rain. During December, the Area had a total of 14 dry days (less than 0.2mm of rain). In both the Lee Chalk and Chilterns East Colne units, rainfall totals for the calendar year were the third highest on record, only exceeded in 2000 and 1903 (records for both begin in 1871).

1.2 Soil moisture deficit and recharge

Due to the slightly below average rainfall received during December, soil moisture deficits (SMDs) saw a small increase in all areal units other than the Roding, however, all SMDs remained well below the LTA. All rainfall units in the Area received effective rainfall above the LTA for December. The Chilterns East Colne unit received the most effective rainfall for the month but the Lee Chalk recorded by far the highest percentage in relation to its December LTA.

1.3 River flows

River base flows saw a slight increase during December, particularly in the chalk catchments, where five of eight indicator sites recorded monthly flows in the exceptionally high band. Panshanger on the River Mimram and Colney Street on the River Ver recorded their highest mean December flows on record (records begin in 1952 and 1956 respectively). All indicator sites in the more runoff-dominated clay and urban catchments recorded monthly flows in the normal band.

A total of seven fluvial flood alerts were issued during December, however, no flood warnings were issued. The flood alerts were mostly issued on 6 December in response to the rainfall received across the Area in the preceding days, which included:

- Tidal River Crane
- Upper River Colne and Radlett Brook
- Lower River Colne and Fray's River
- Middle River Roding

1.4 Groundwater levels

December saw a continuation of high groundwater levels across the Area, with all indicator sites increasing during the month. Four sites recorded end of month levels in the notably high band, while five sites recorded in the exceptionally high band. In the Mid-Chilterns Chalk, Ballingdon Farm recorded its highest ever level for the end of December (records begin in 1975). In the Upper Lee Chalk, Cave Gate, Crescent Cottages and Lilley Bottom also recorded their highest ever groundwater levels for the end of December (records begin in 1966, 1968 and 1979 respectively). Therfield Rectory (Upper Lee Chalk), which has been recording groundwater levels since 1883 was at its highest level for the end of December since 1917.

Two groundwater flood alerts were issued during the month, both on the 19 December at:

- Kimpton and Lilley Bottom (Upper Lee Chalk)
- Flamstead (Mid-Chilterns Chalk)

1.5 Reservoir stocks

Both reservoir groups in the Area ended December with their levels well above the LTA. In the Lee Valley Reservoirs, stocks went from 94% to 93% of live capacity, while the Lower Thames Reservoirs increased from 82% to 95% of live capacity.

1.6 Environmental impact

In the Colne catchment, all of the chalk river sources were in virtually the same location as November.

- The River Ver started flowing above Markyate.
- The River Gade started flowing at Hudnall Corner.
- The River Bulbourne was flowing upstream of Dudswell village.
- The source of the River Chess remained upstream of Chesham.
- The River Misbourne flowed continuously from Mobwell pond.

The chalk river sources in the Upper Lee remained mostly the same as in November.

- The River Mimram started flowing at Lilley Bottom Road.
- The River Beane started flowing above Cromer.

- The source of the River Rib remained upstream of Hay Green, where it flowed intermittently before gaining a steadier flow at Buntingford.
- The River Ash (Herts) was flowing upstream of Brent Pelham, although it temporarily lost flow at Little Hadham.
- The source of the River Stort was still above Langley Lower Green.

To protect the environment, during December a number of abstraction licence flow constraints were in force. This ranged between 1 and 9 per week, out of a winter maximum of 48.

Author: Groundwater and Hydrology, groundwaterhydrology@environment-agency.gov.uk

Contact Details: 03708 506 506

2 Rainfall

2.1 Rainfall map

Figure 2.1: Total rainfall for hydrological areas for the current month (up to 31 December 2024), classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.

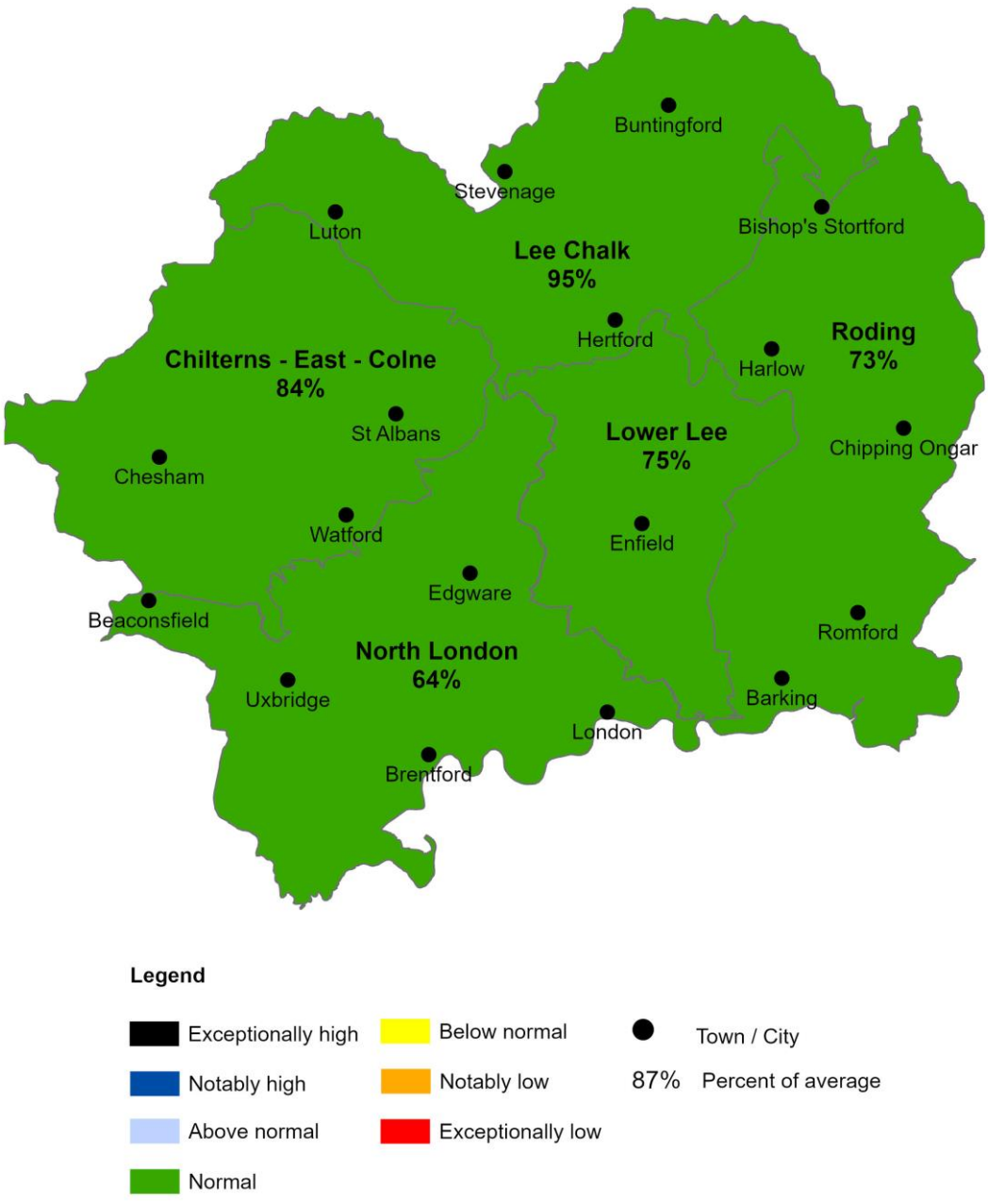
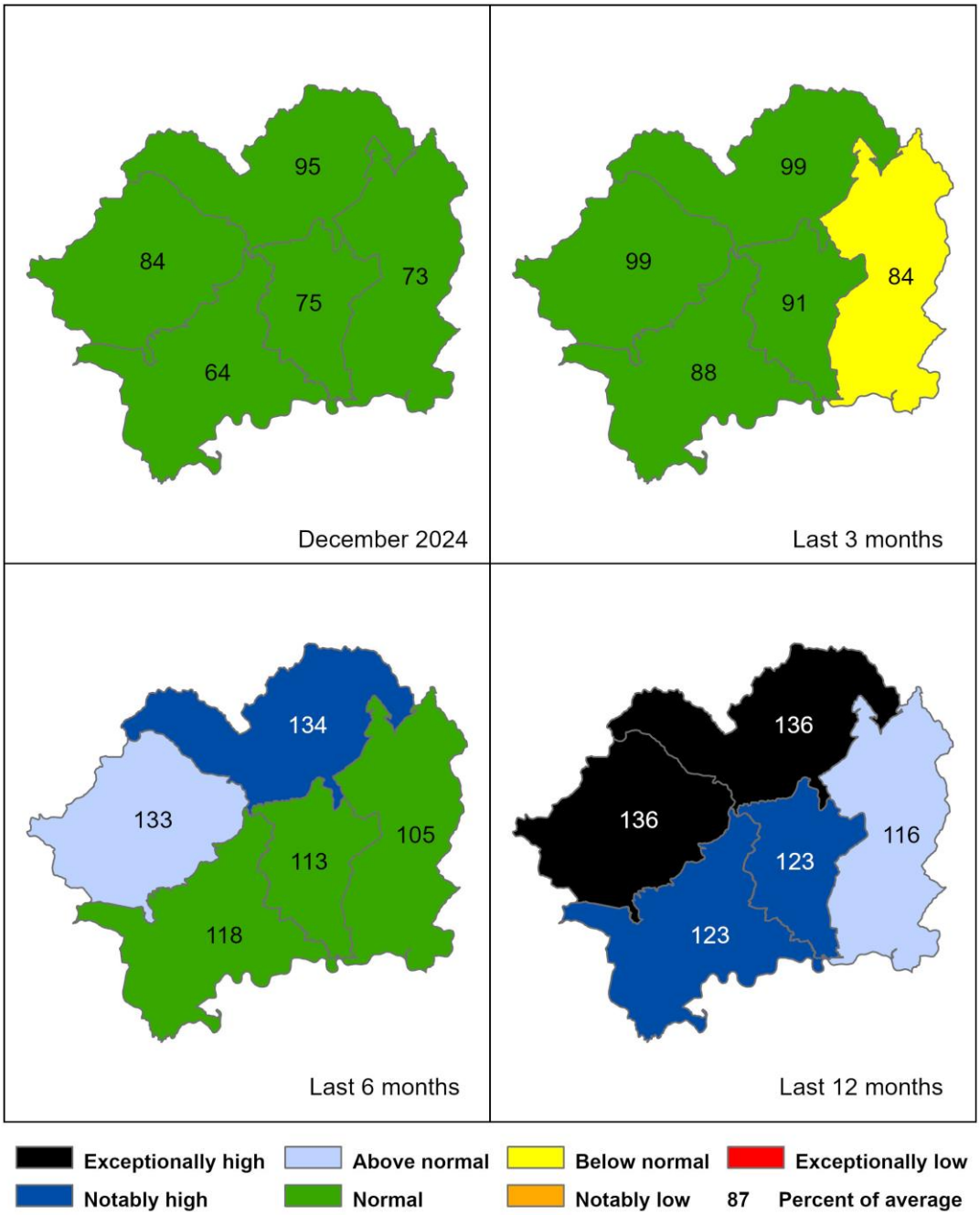


Figure 2.2: Total rainfall for hydrological areas for the current month (up to 31 December 2024), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.

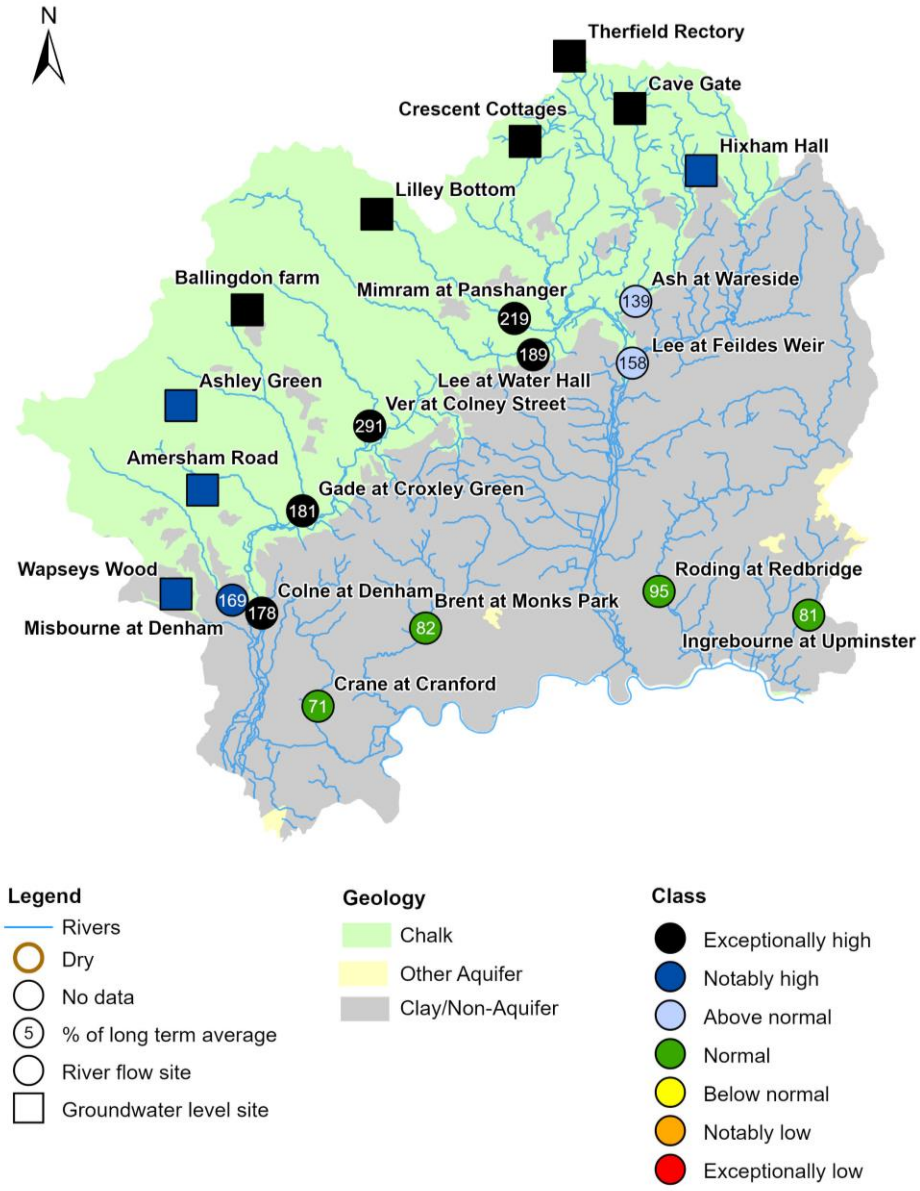


HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2025). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved. Environment Agency, 100024198, 2025.

3 River flows and Groundwater levels

3.1 River flows and Groundwater level map

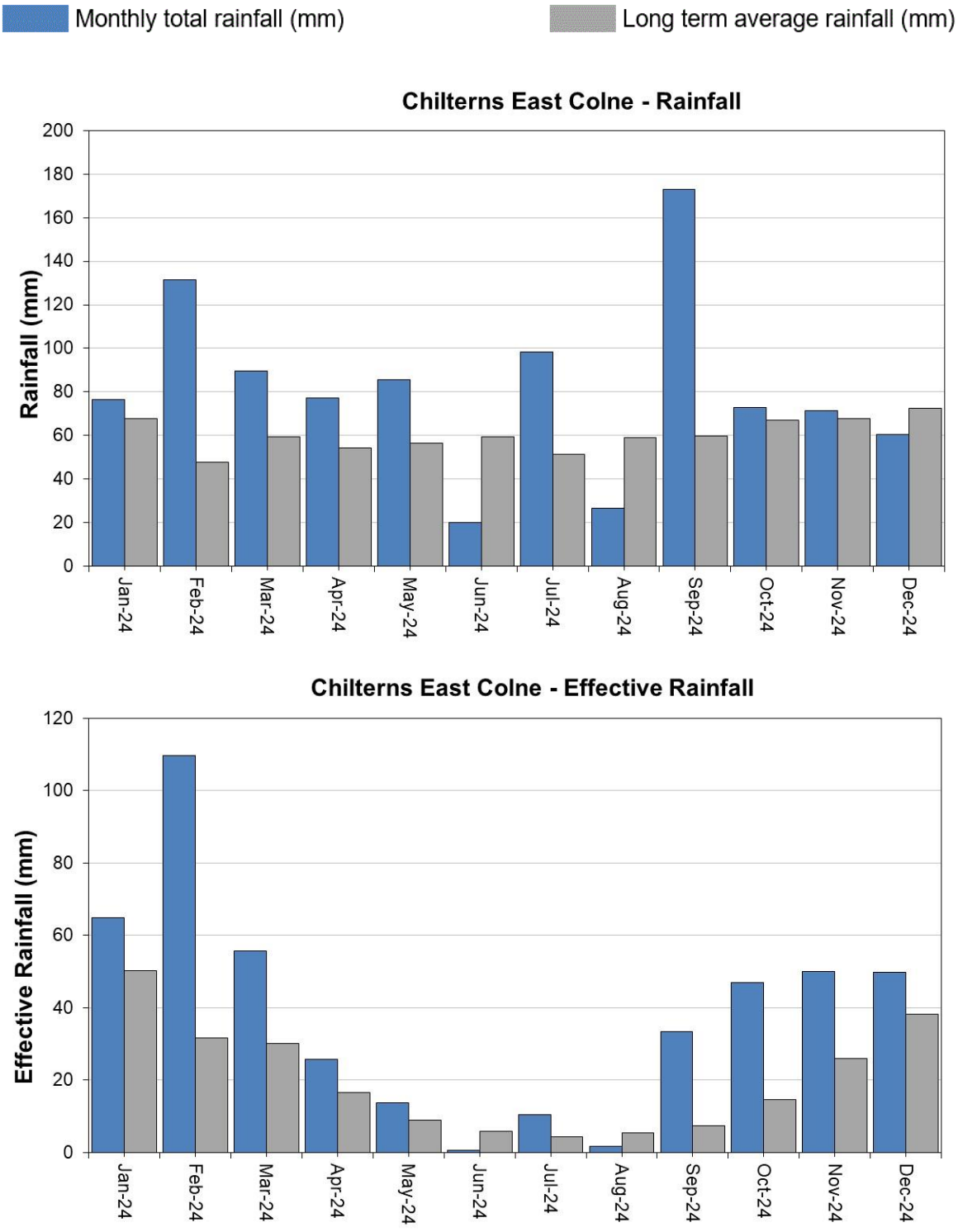
Figure 3.1: Monthly mean river flow and groundwater levels at our indicator sites for December 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic December monthly means. Table available in the appendices with detailed information.



4 Colne Catchment

4.1 Colne Rainfall and effective rainfall charts

Figure 4.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average for the Colne.

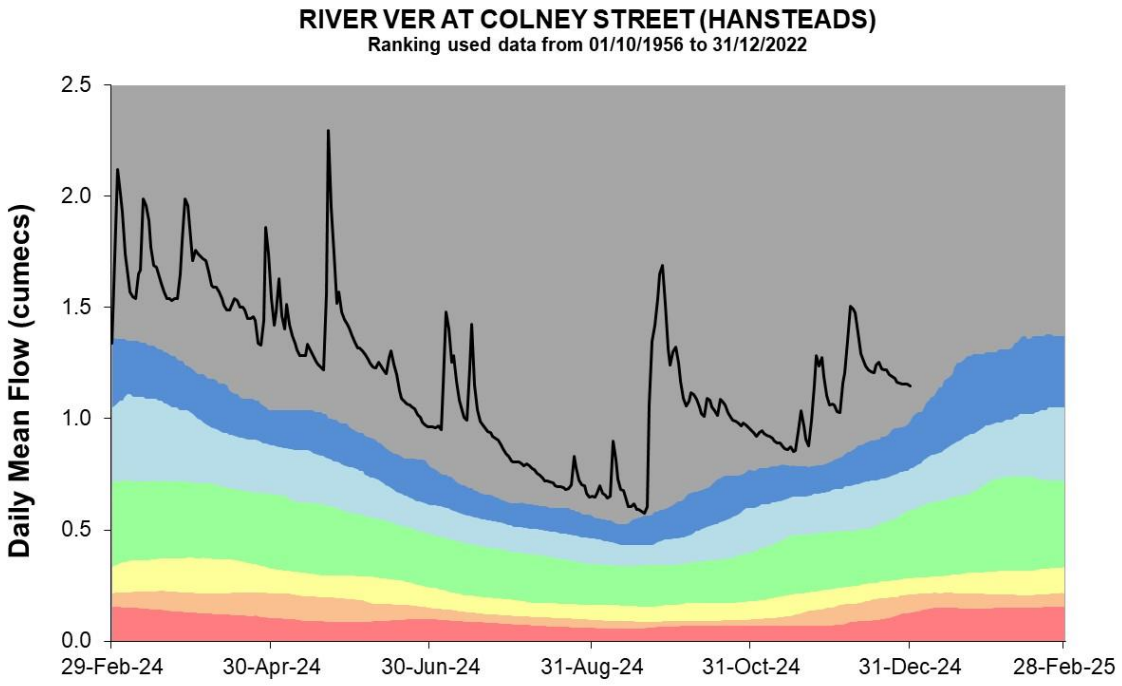


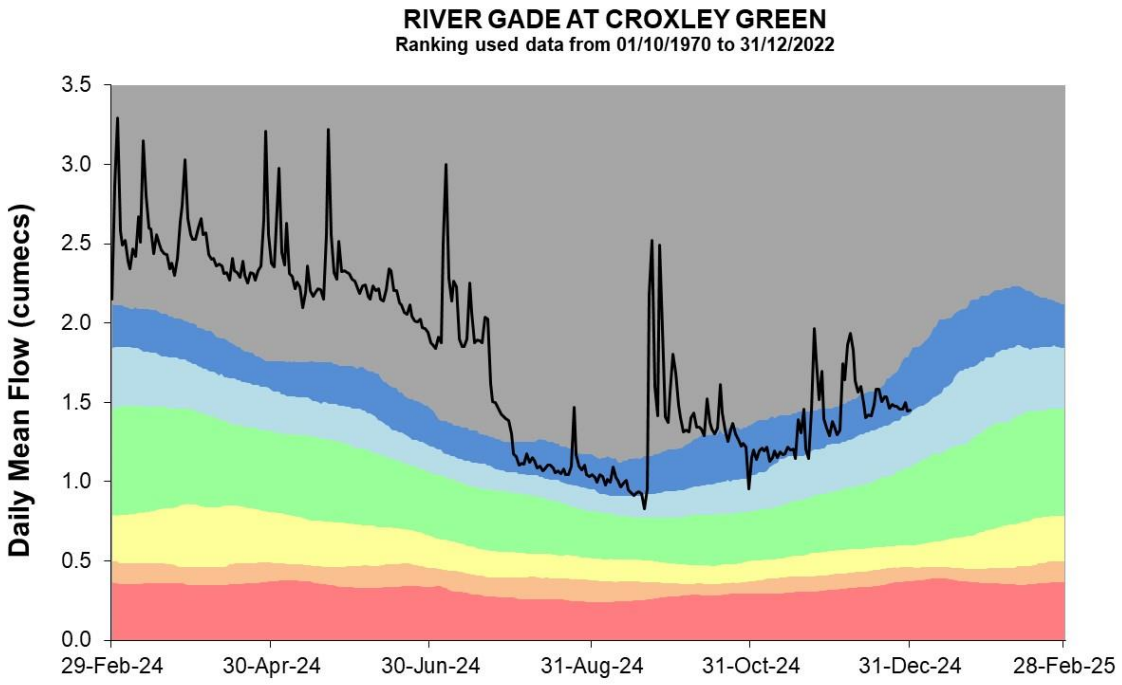
HadUK rainfall data (Source: Met Office. Crown copyright, 2025)

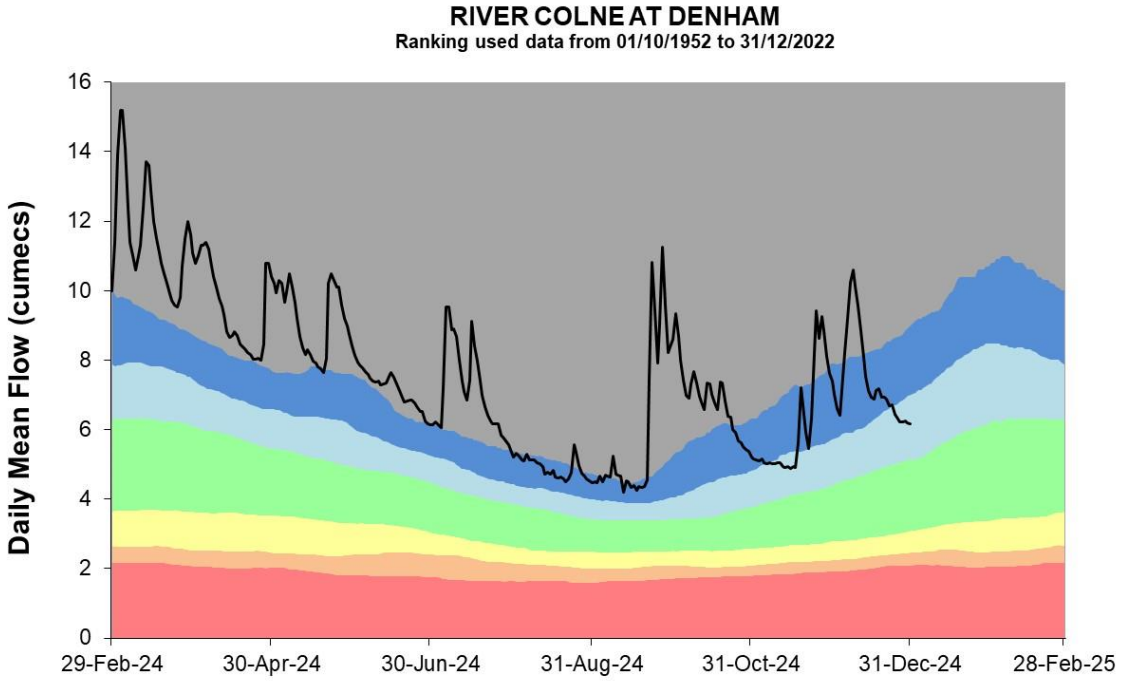
EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2025)

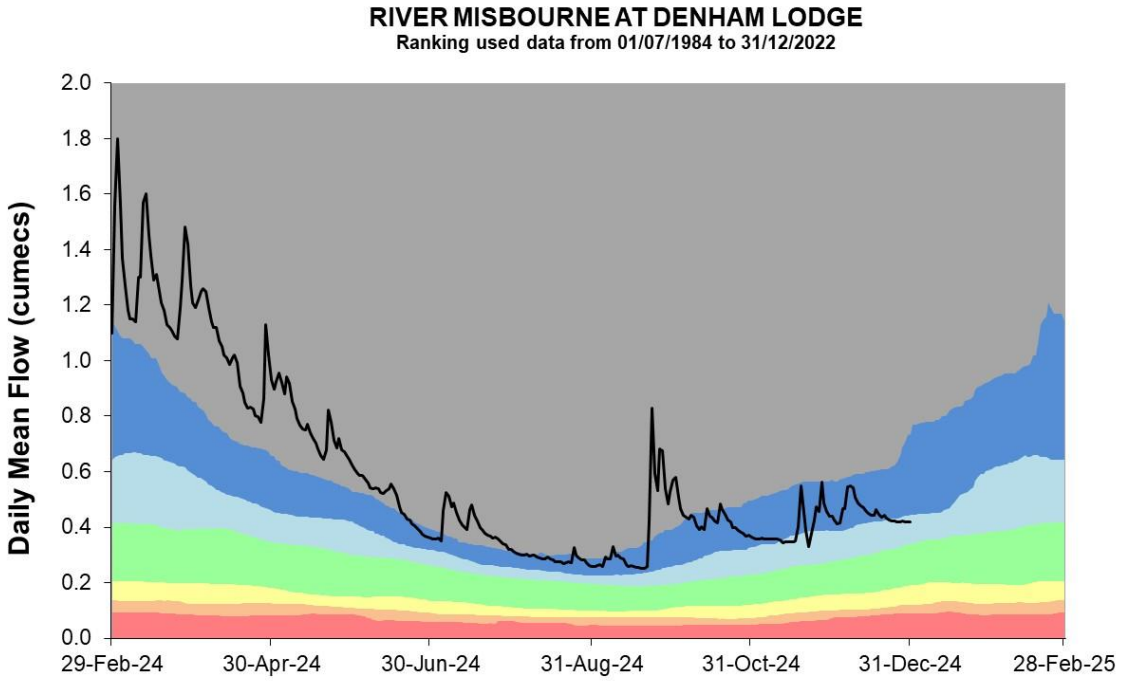
4.2 Colne River flow charts

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.





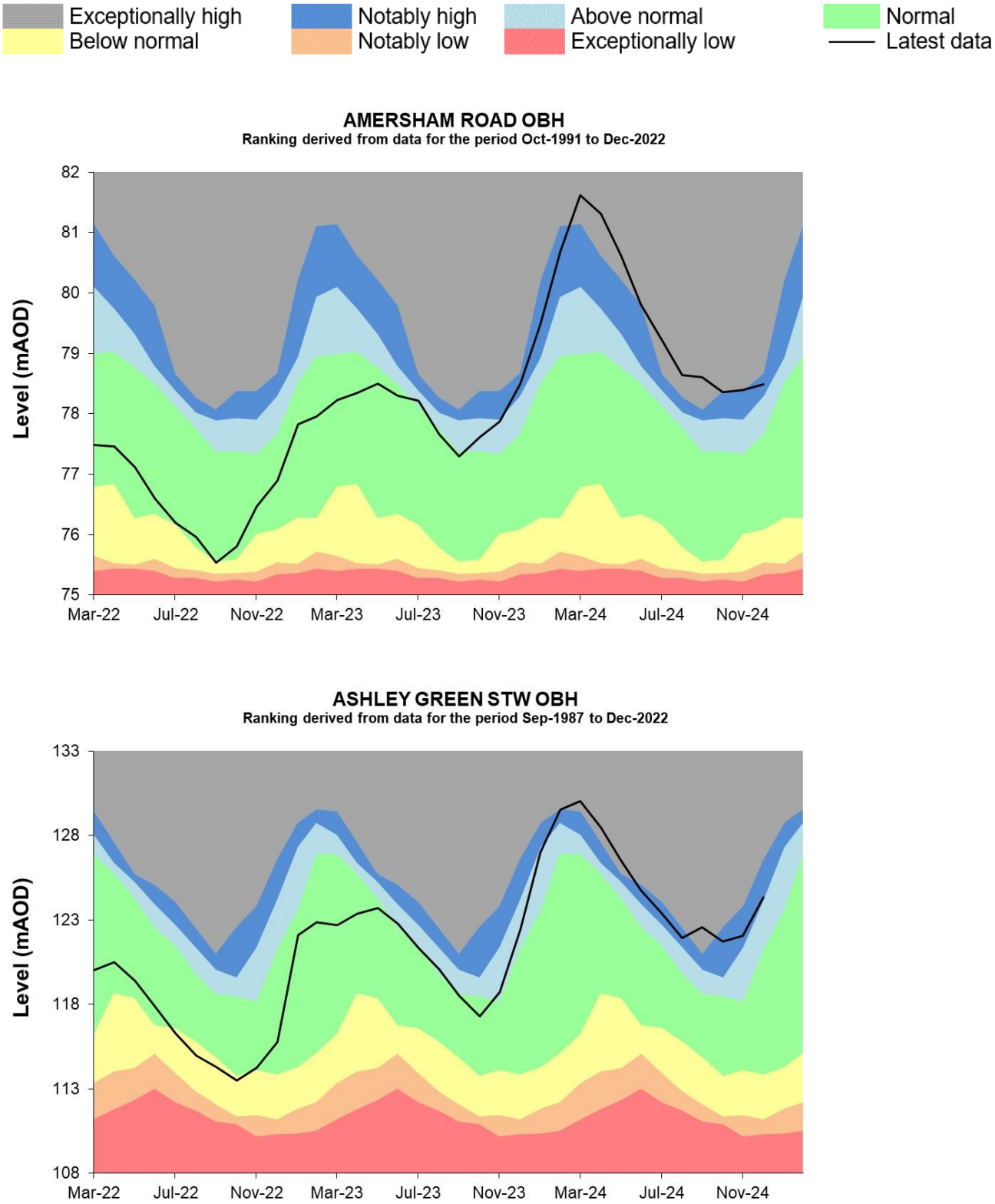


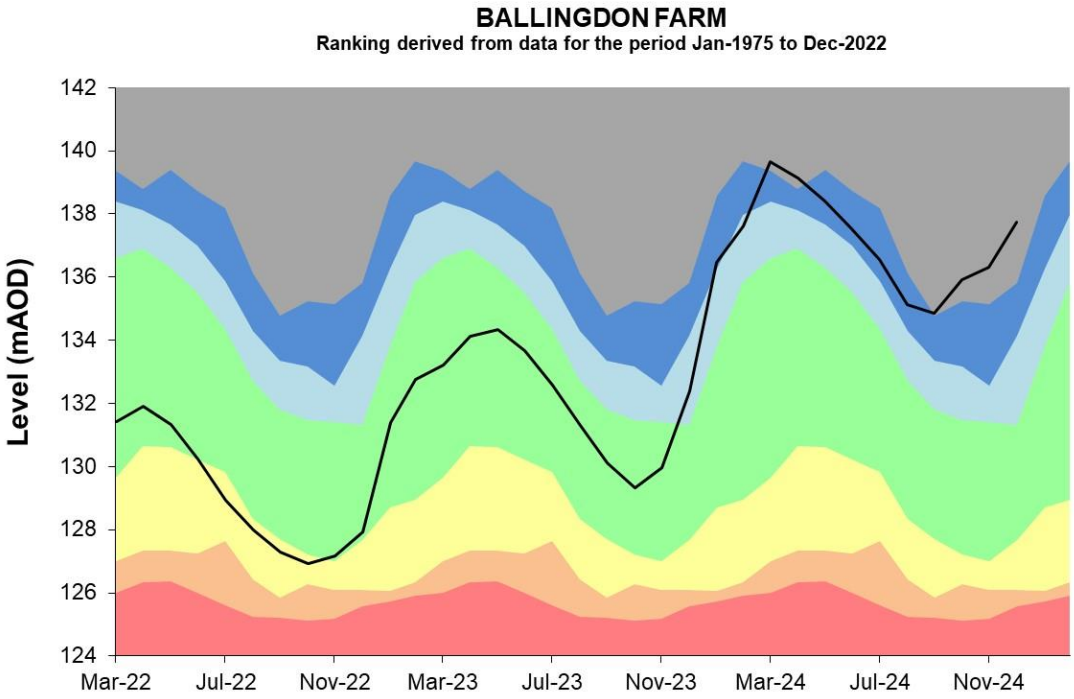


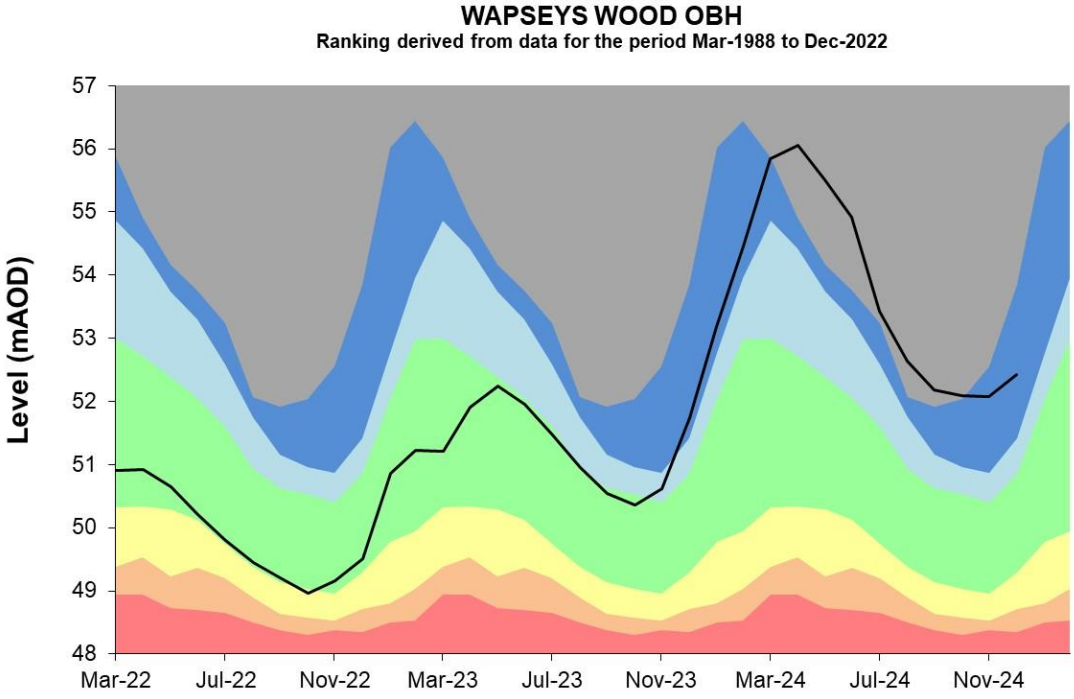
Source: Environment Agency, 2025

4.3 Colne Groundwater level charts

Figure 4.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.





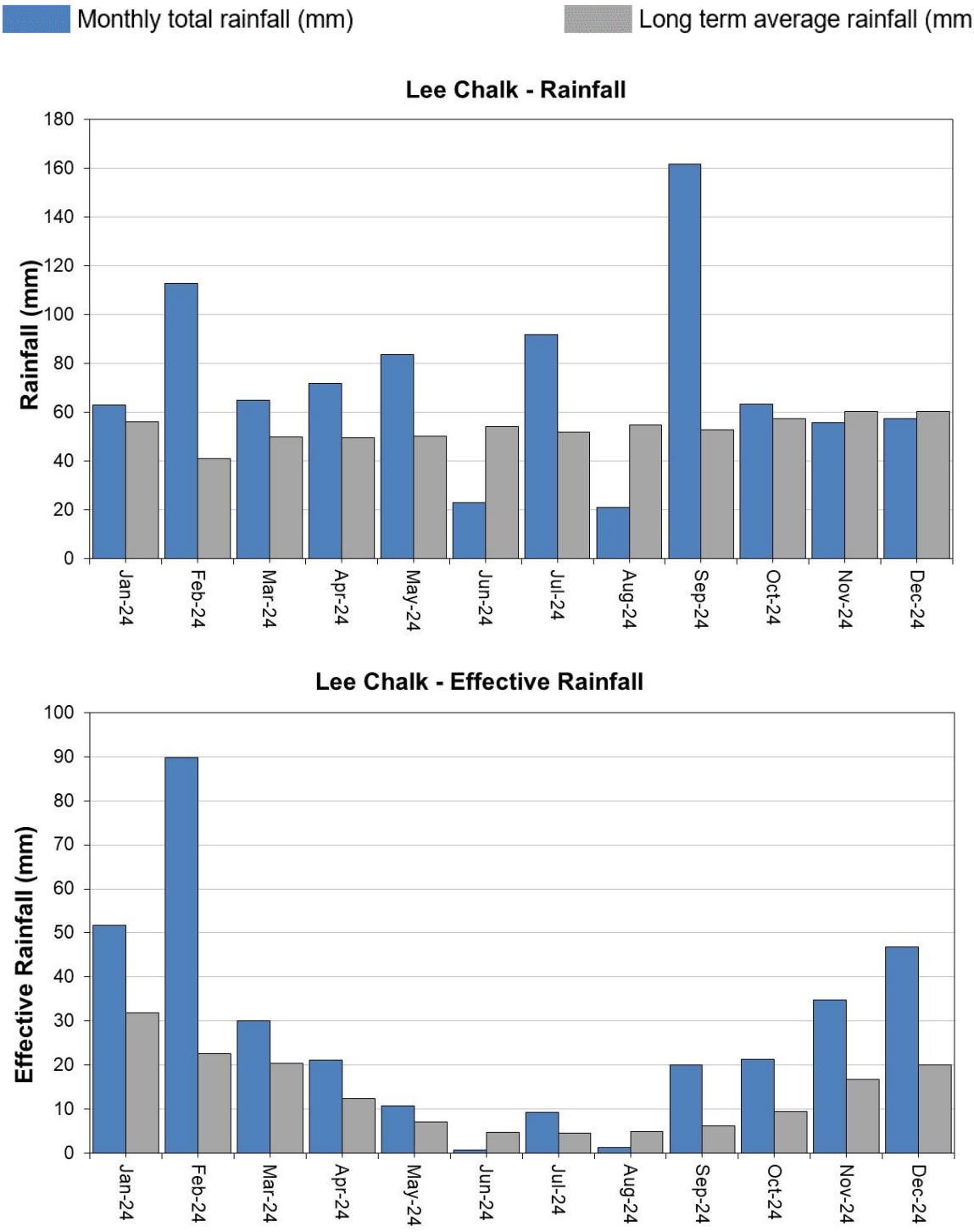


Source: Environment Agency, 2025

5 Upper Lee Catchment

5.1 Upper Lee Rainfall and Effective rainfall charts

Figure 5.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average for each region and for England.

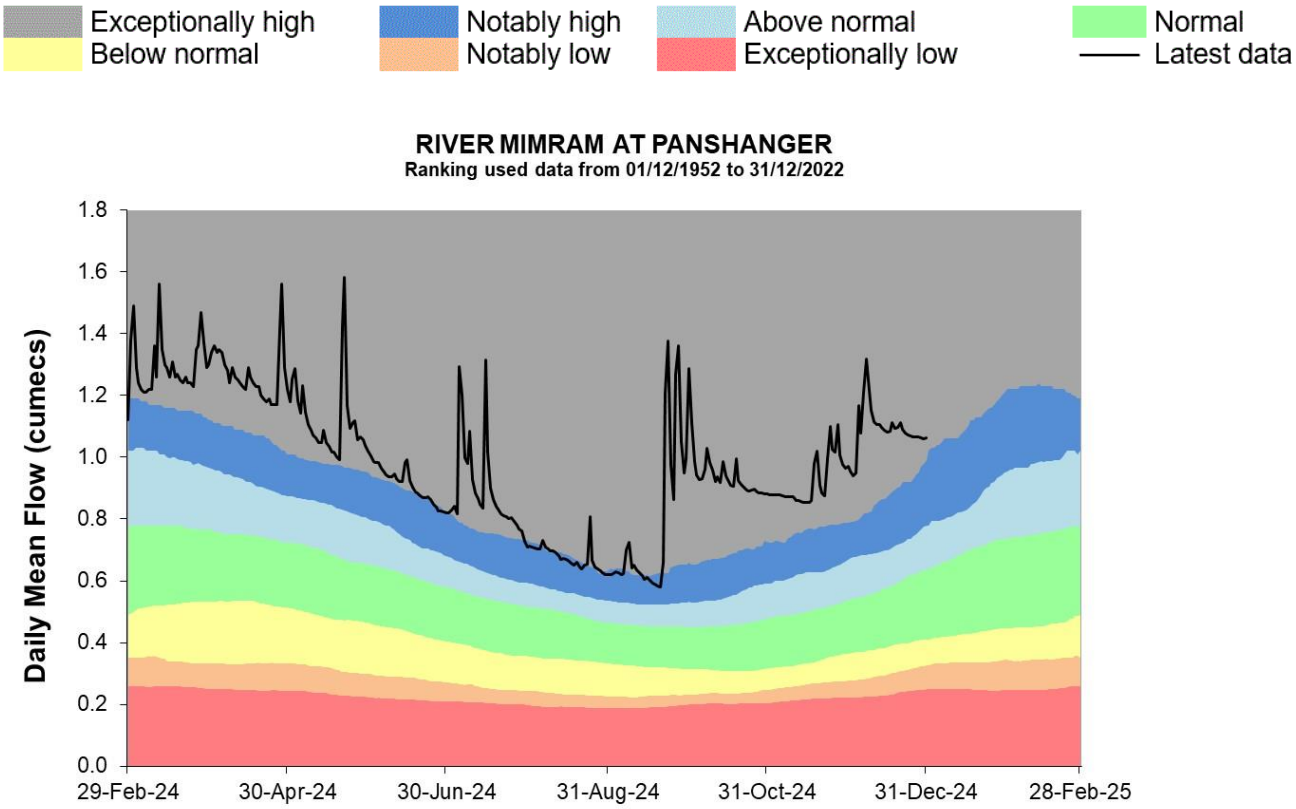


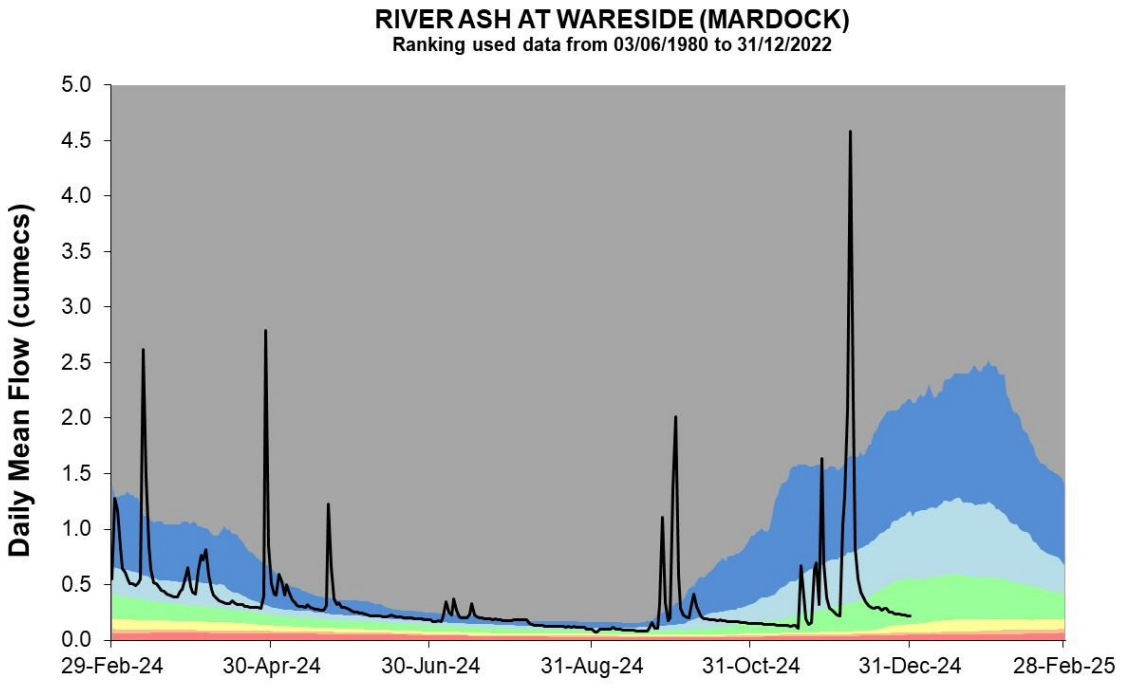
HadUK rainfall data (Source: Met Office. Crown copyright, 2025)

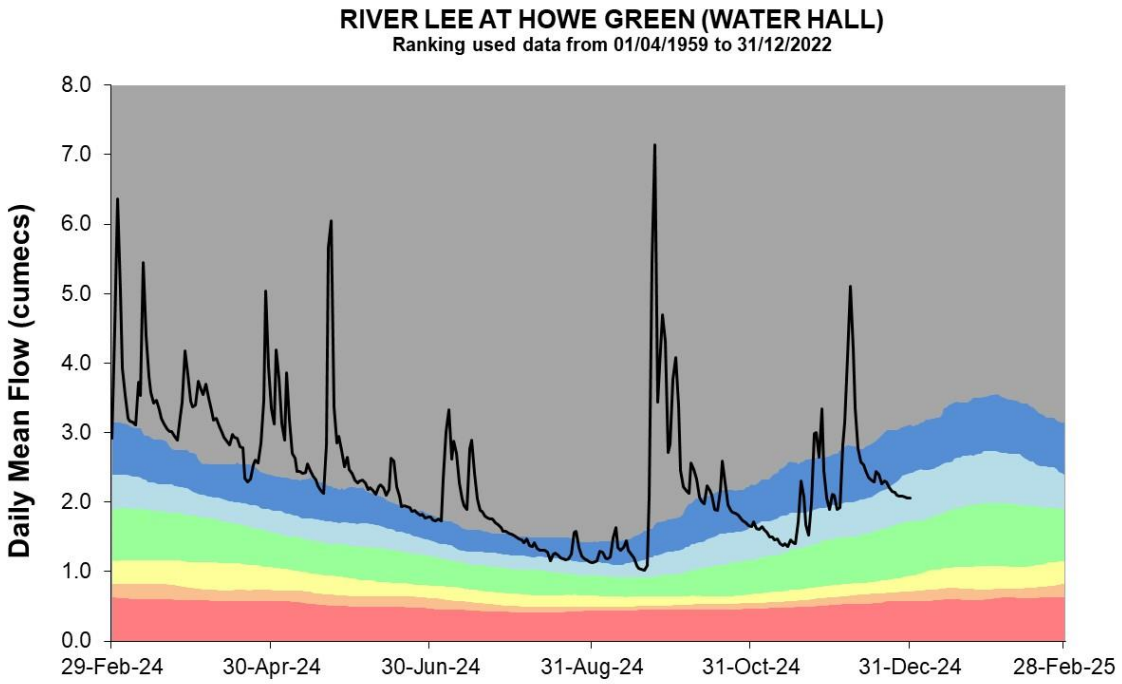
EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2025)

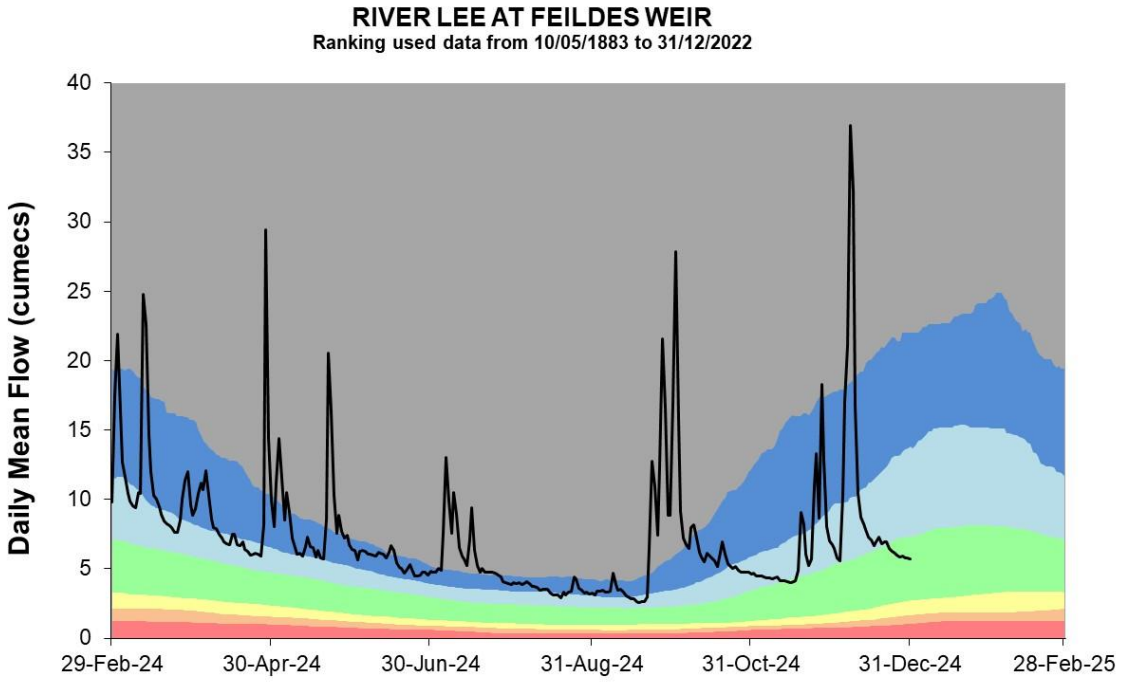
5.2 Upper Lee River flow charts

Figure 5.2 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.





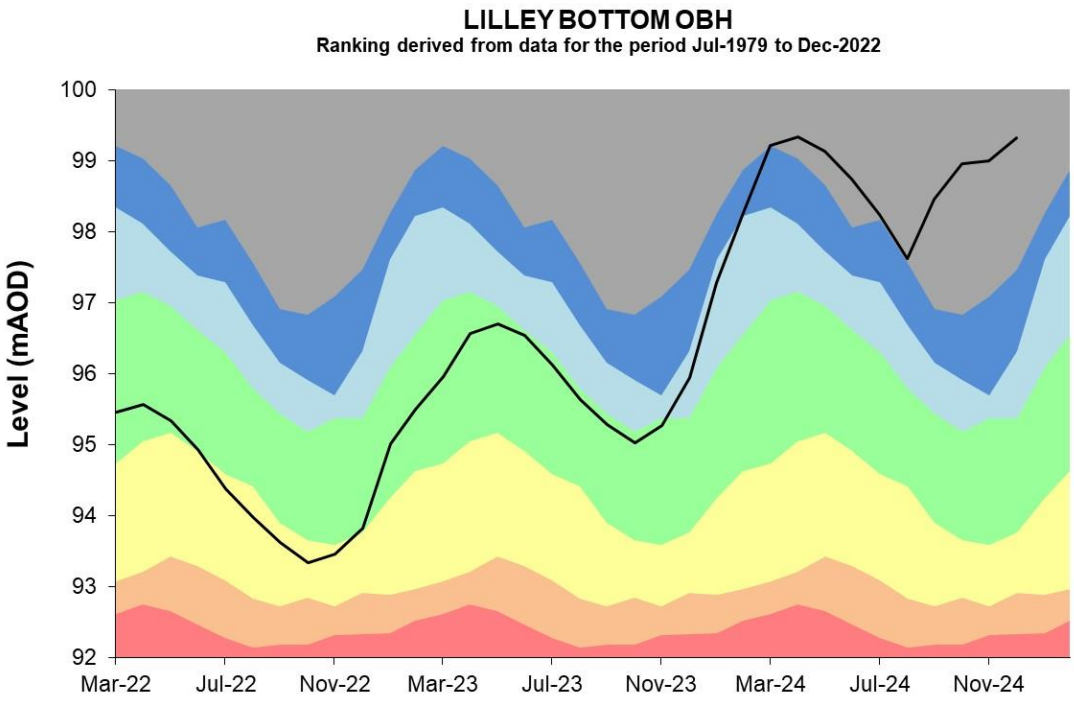


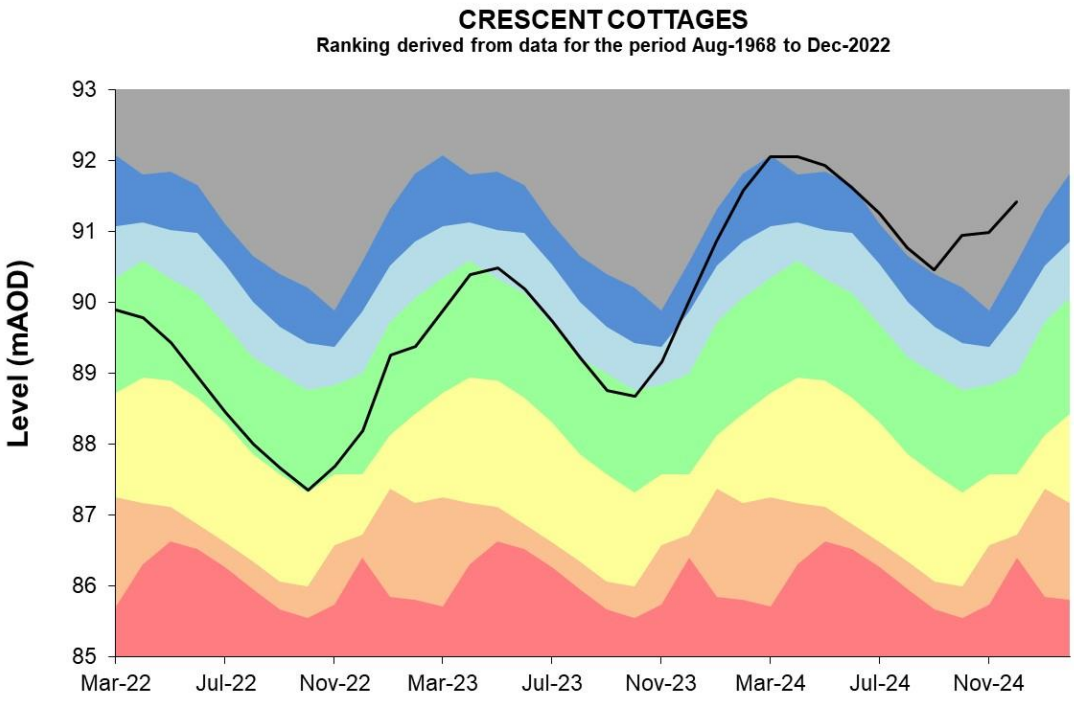


Source: Environment Agency, 2025

5.3 Upper Lee Groundwater level charts

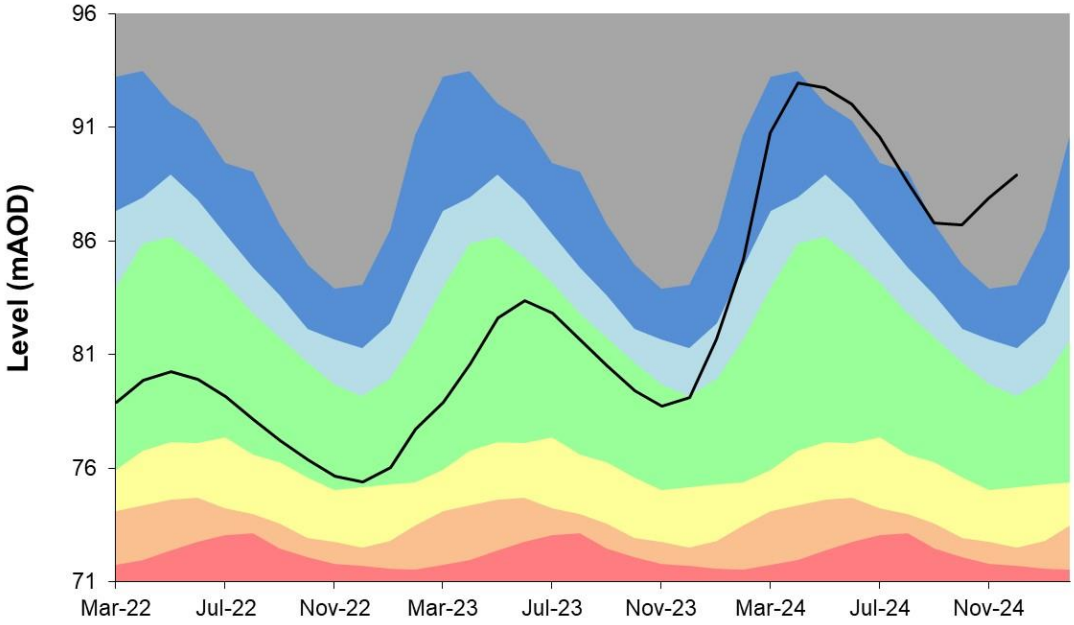
Figure 5.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.





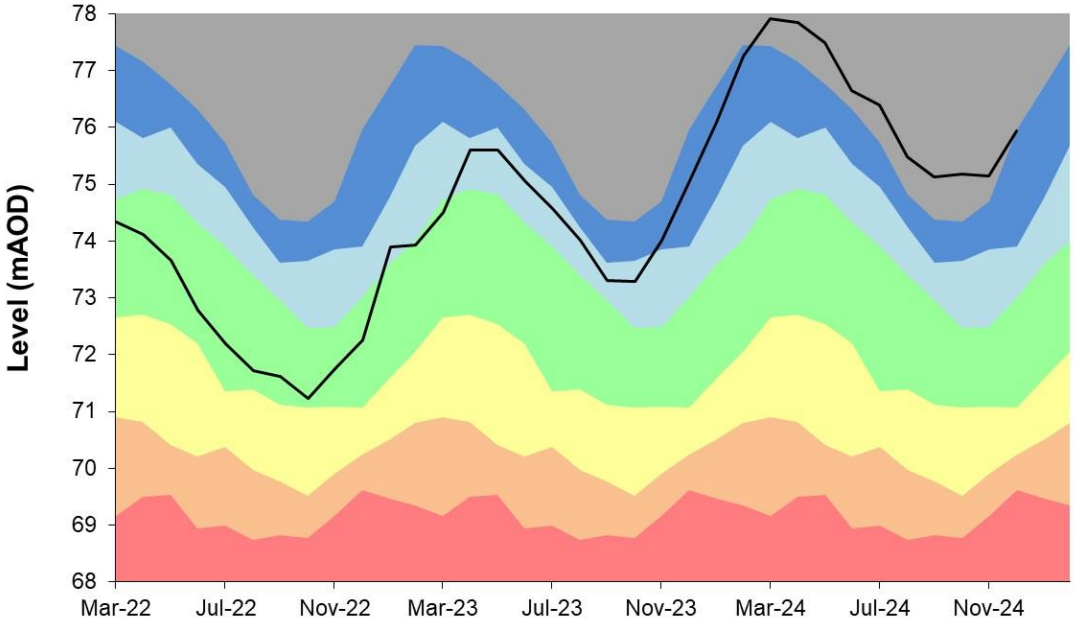
THERFIELD RECTORY

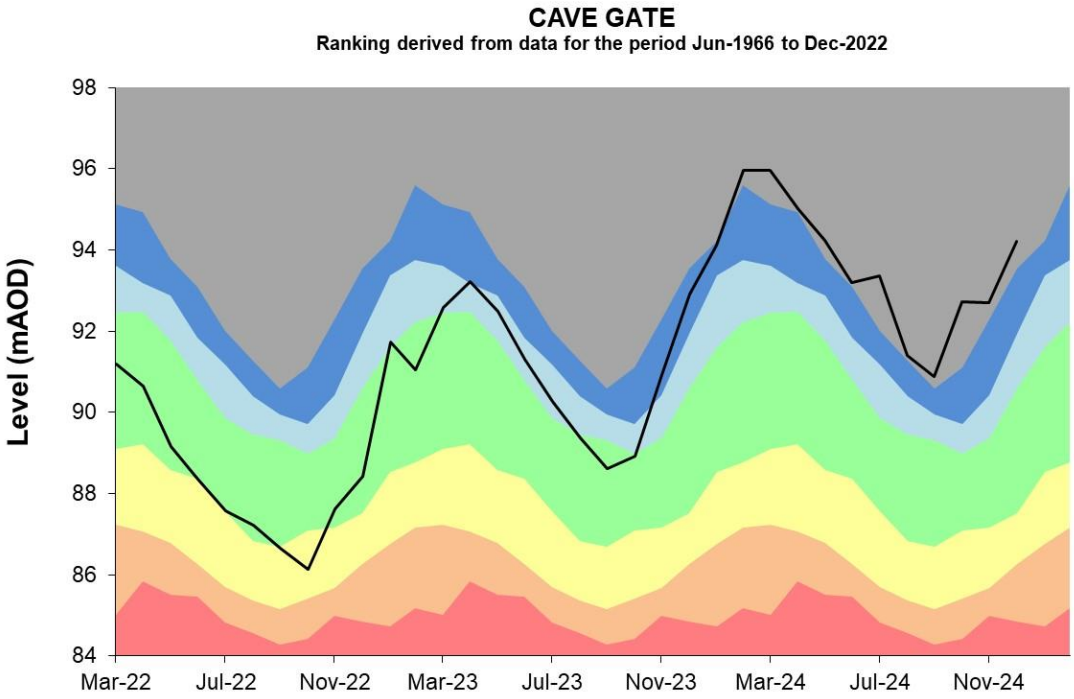
Ranking derived from data for the period Jan-1883 to Dec-2022



HIXHAM HALL

Ranking derived from data for the period Jun-1964 to Dec-2022



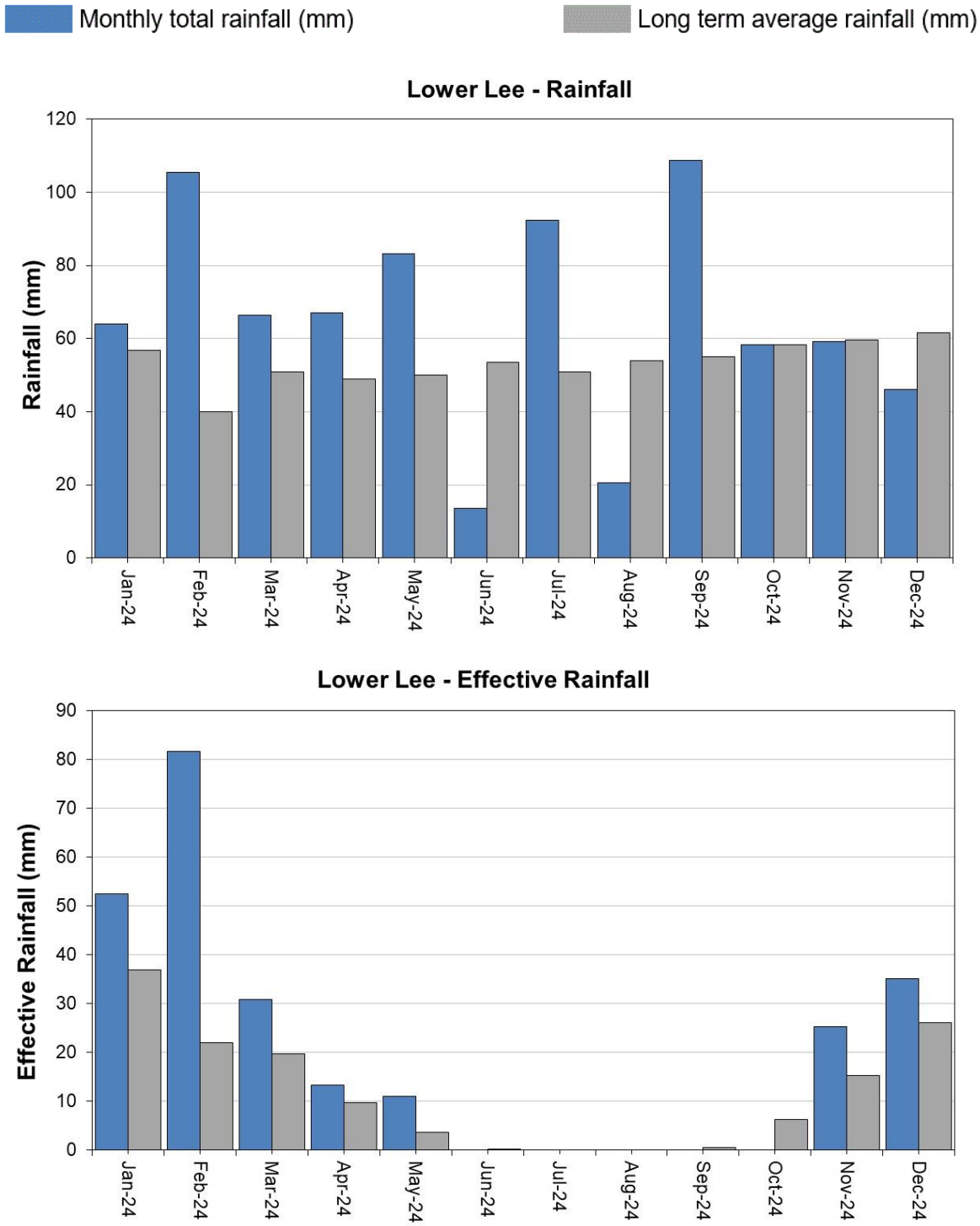


Source: Environment Agency, 2025

6 Lower Lee Catchment

6.1 Lower Lee Rainfall and Effective Rainfall charts

Figure 6.1: Monthly rainfall and effective rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average for the Lower Lee.

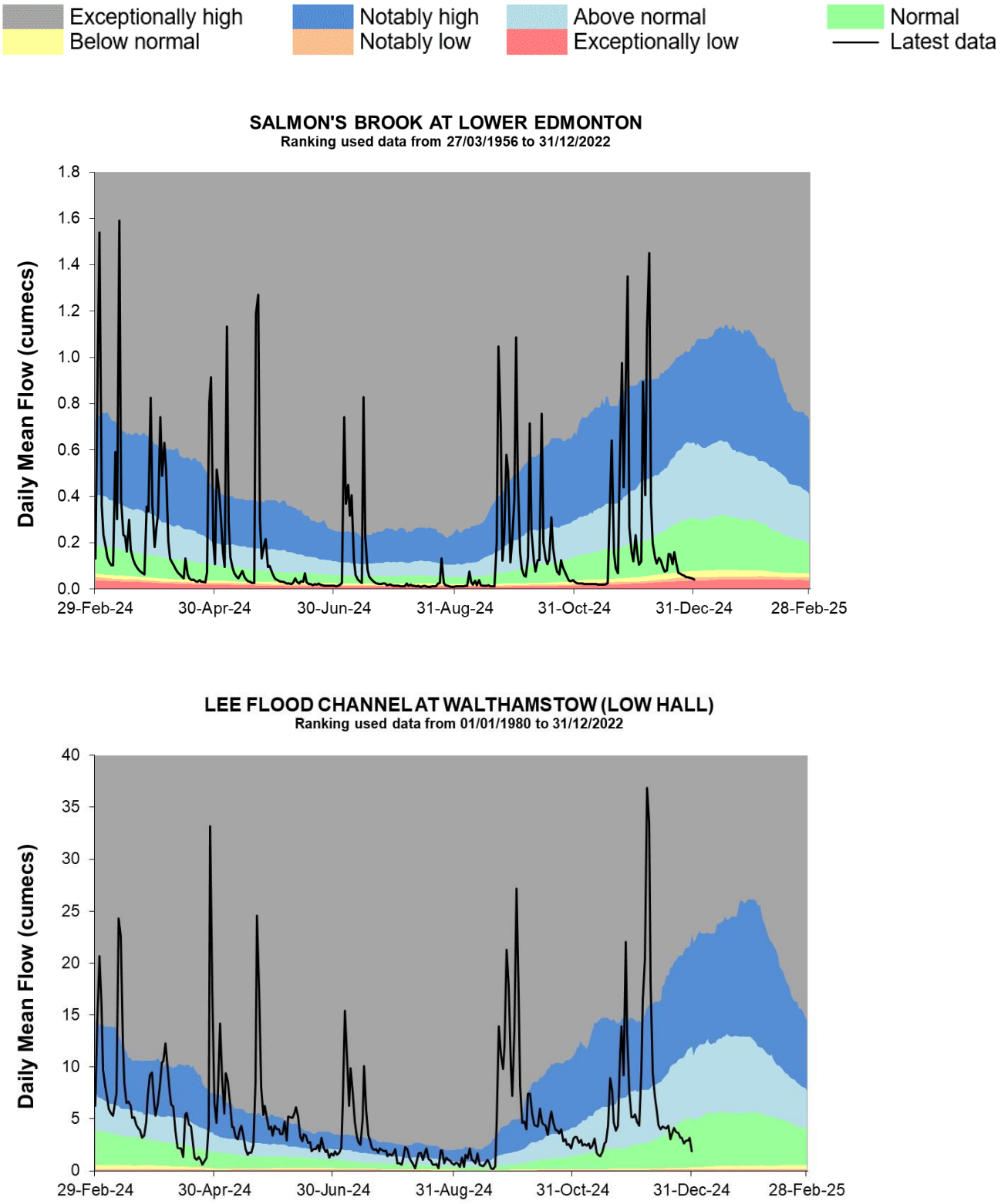


HadUK rainfall data (Source: Met Office. Crown copyright, 2025)

EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2025)

6.2 Lower Lee River flow charts

Figure 6.2: 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.

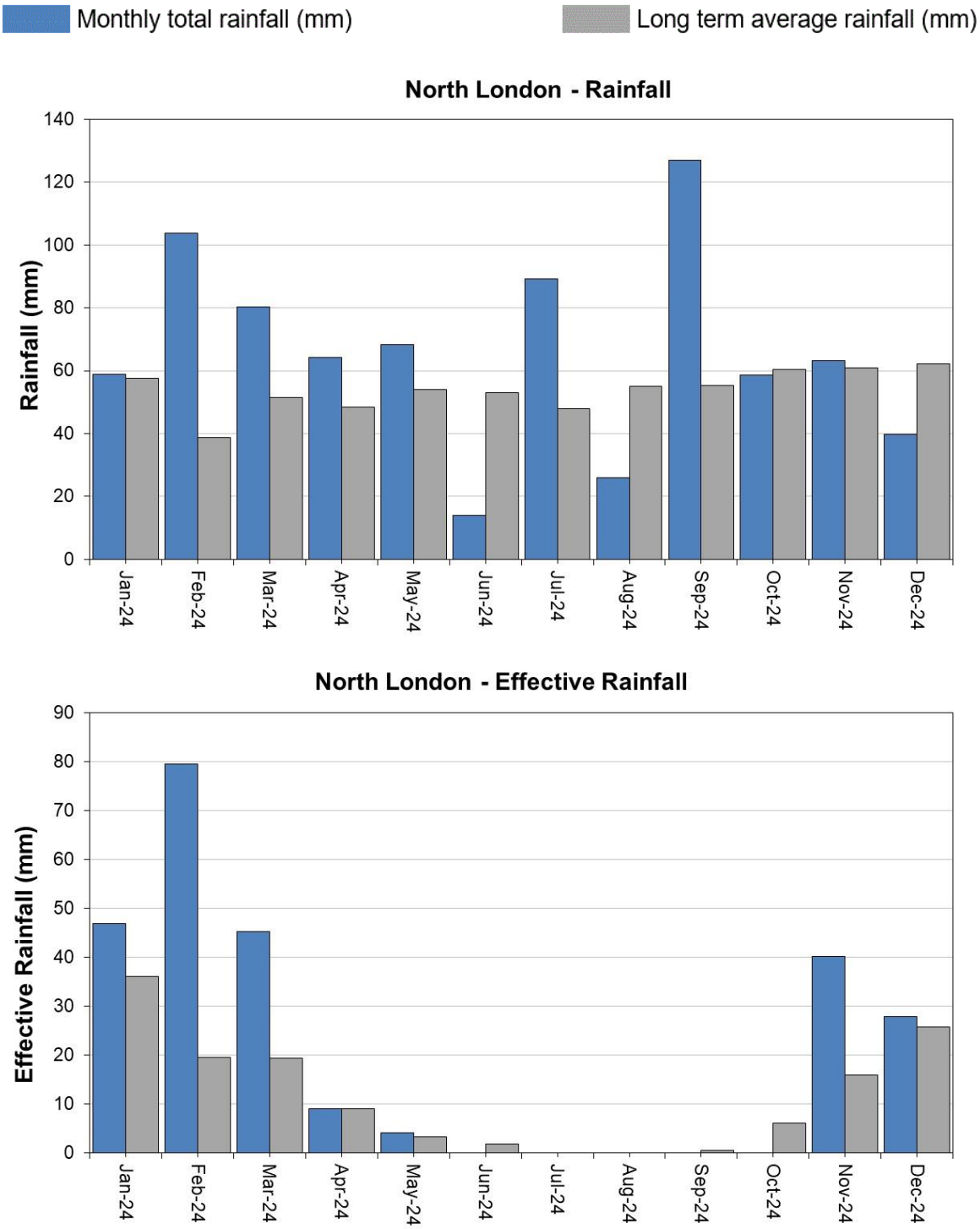


Source: Environment Agency, 2025

7 North London Catchment

7.1 North London Rainfall and Effective Rainfall charts

Figure 7.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average for each region and for England.

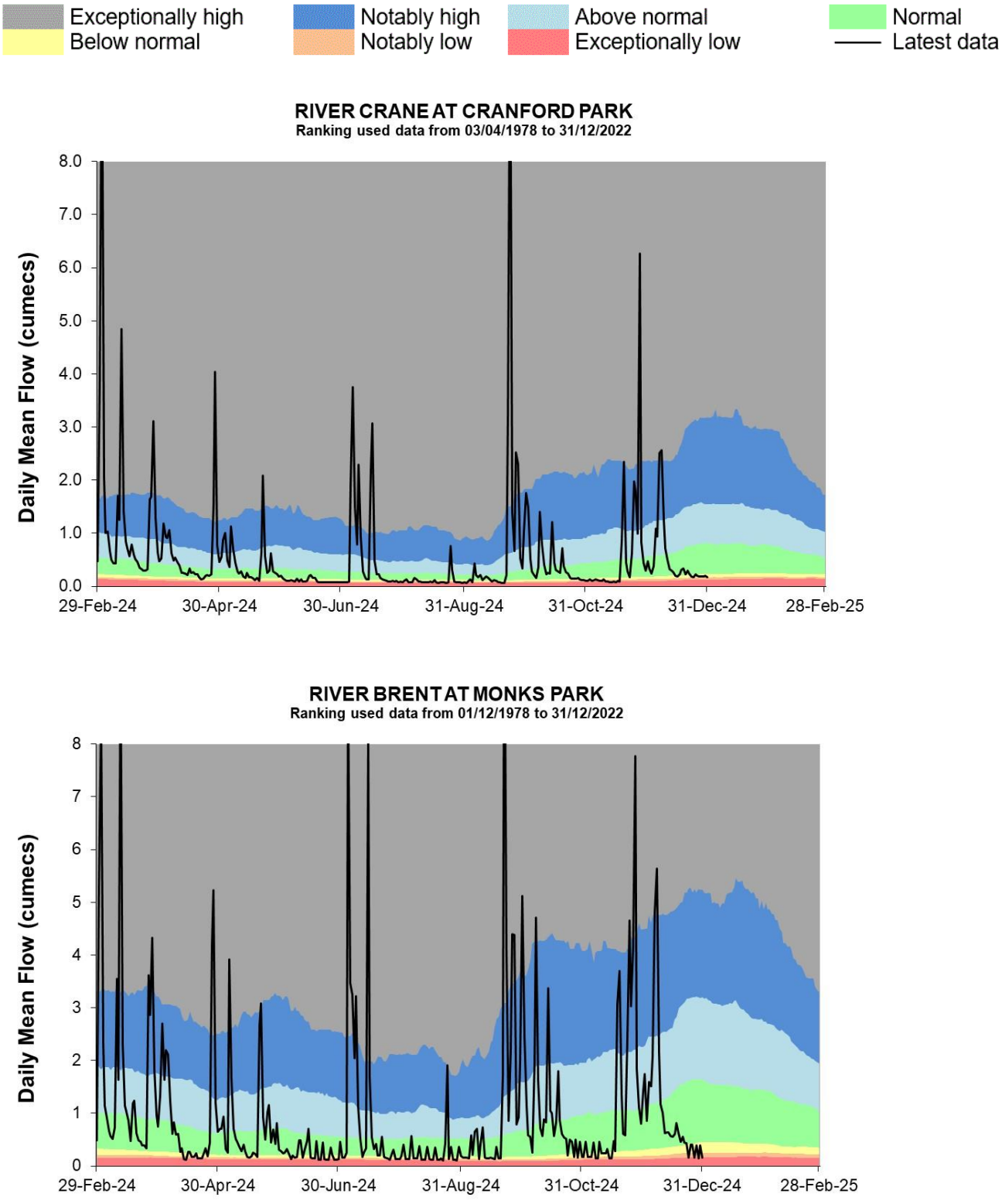


HadUK rainfall data (Source: Met Office. Crown copyright, 2025)

EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2025)

7.2 North London River flow charts

Figure 7.2: 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.

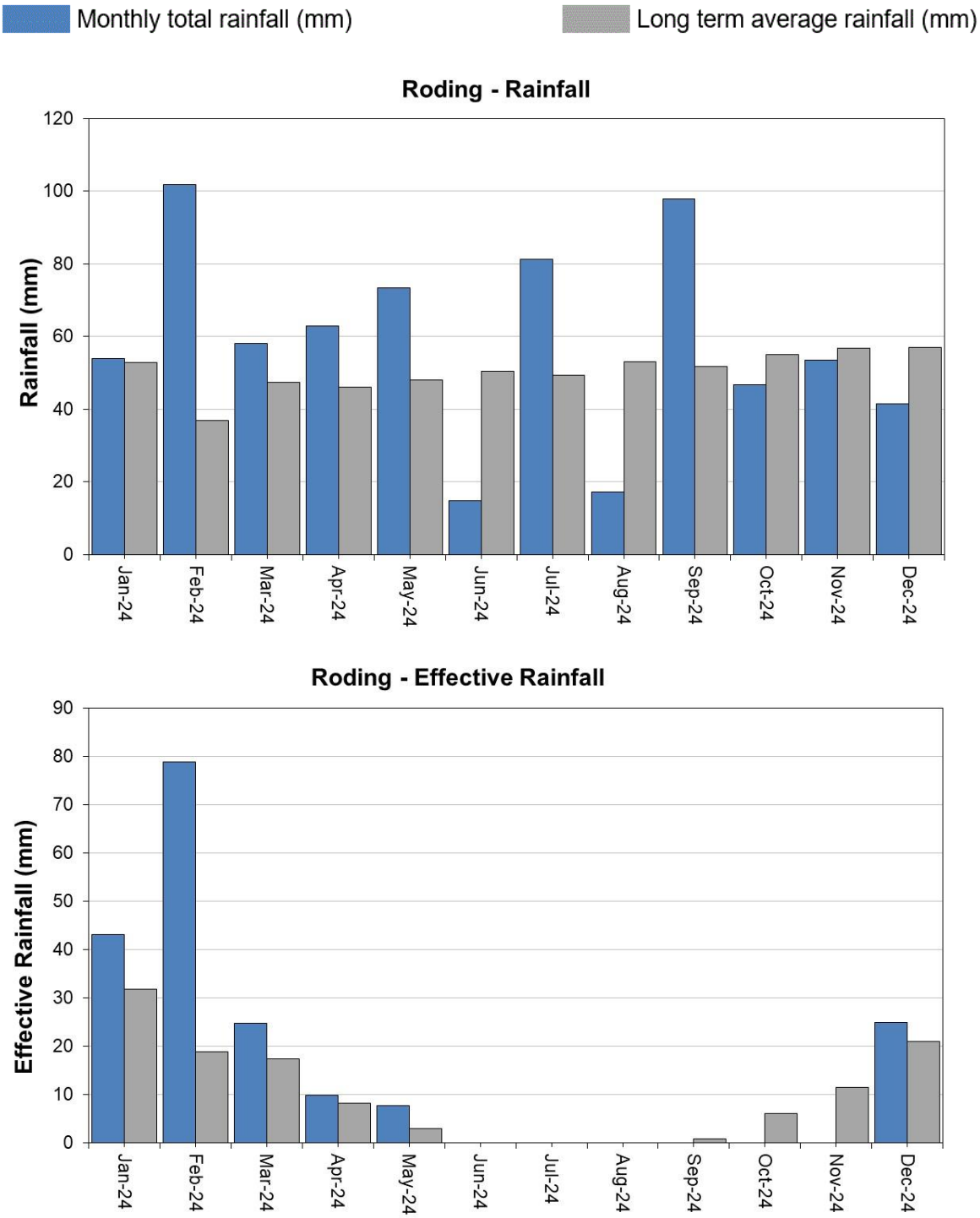


Source: Environment Agency, 2025

8 Roding Catchment

8.1 Roding Rainfall and Recharge chart

Figure 8.1: Monthly rainfall and recharge totals for the past 12 months compared to the 1961 to 1990 long term average for each region and for England.

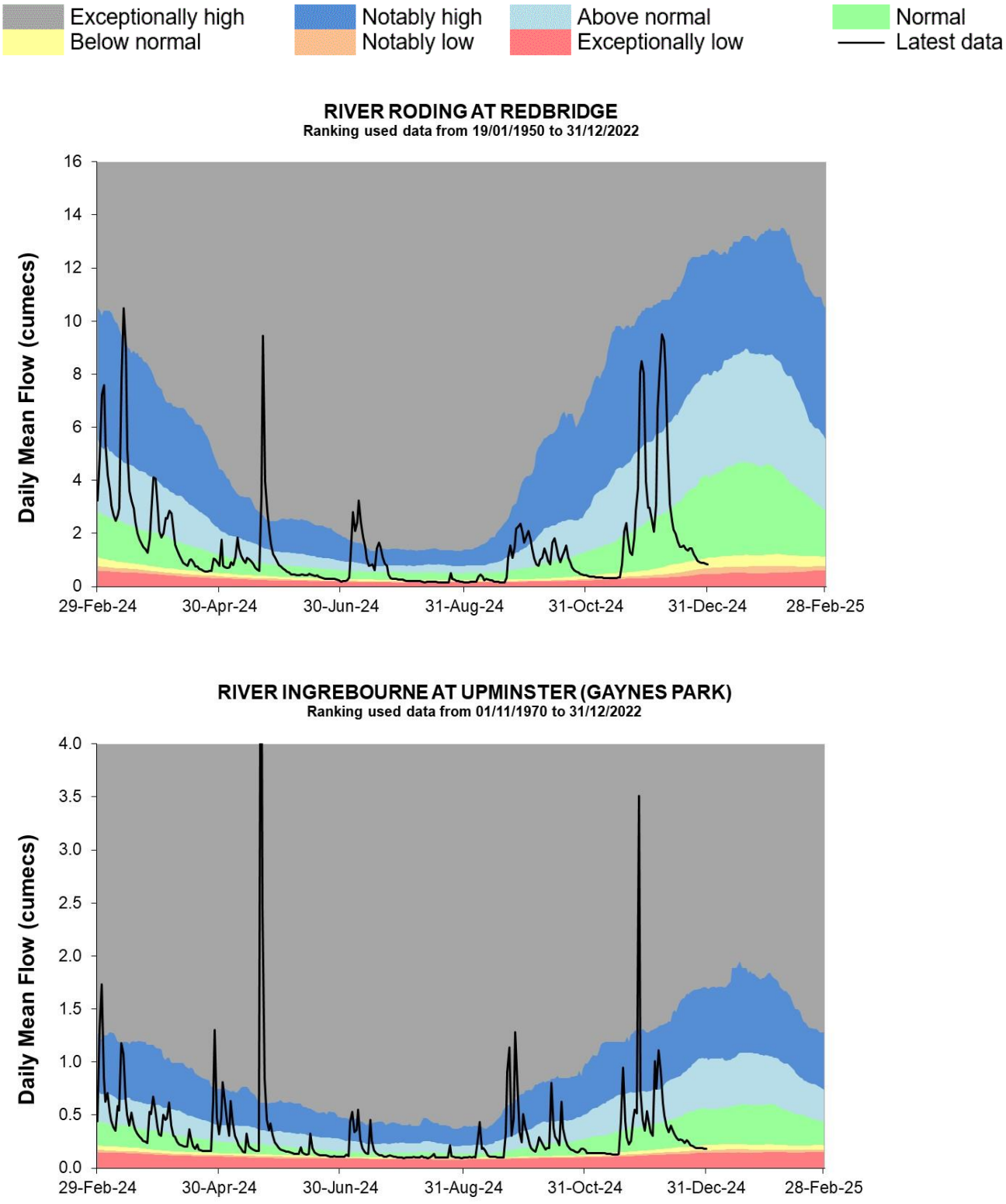


HadUK rainfall data (Source: Met Office. Crown copyright, 2025)

EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2025)

8.2 Roding River flow charts

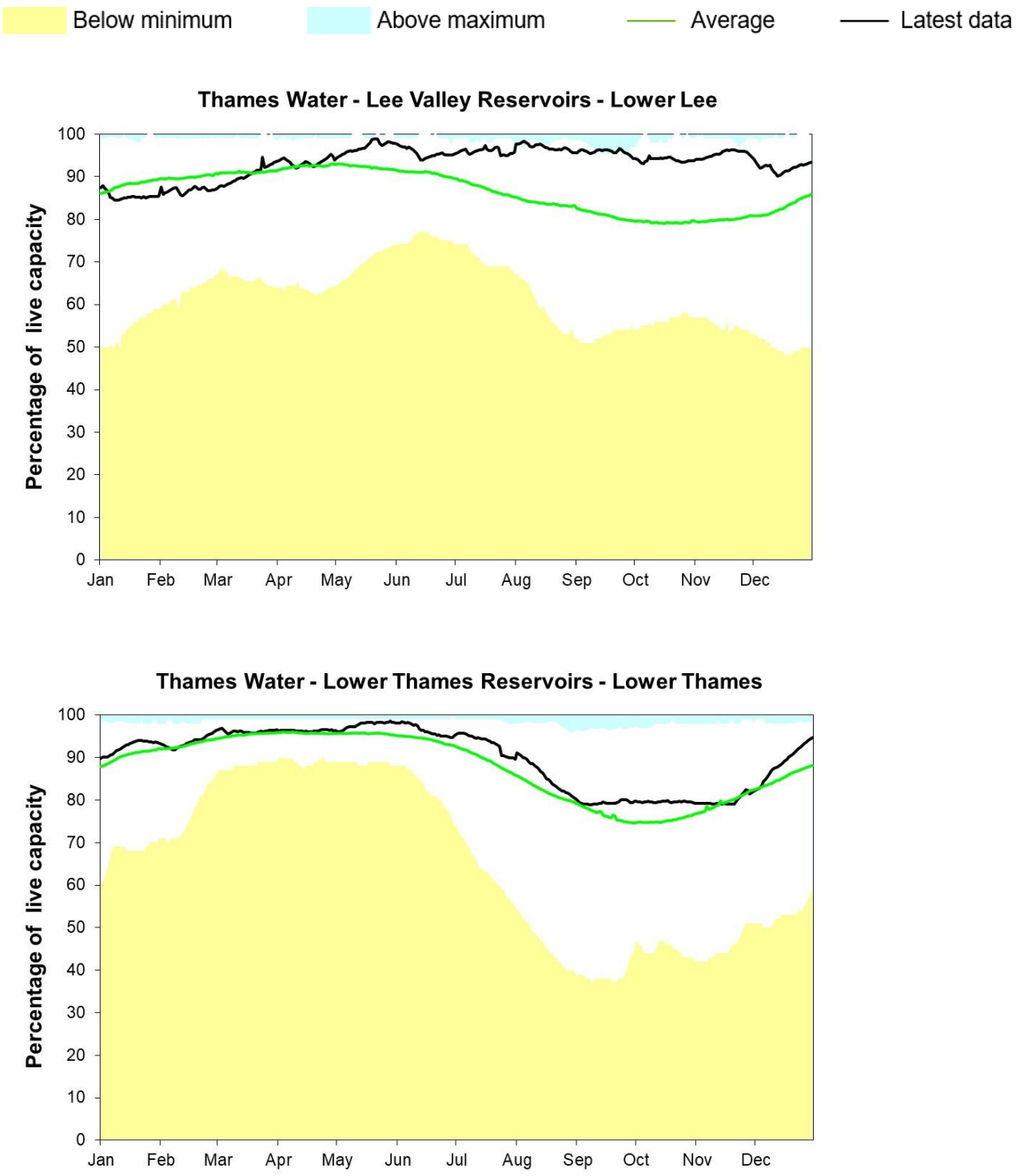
Figure 8.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2025

9 Reservoir stocks

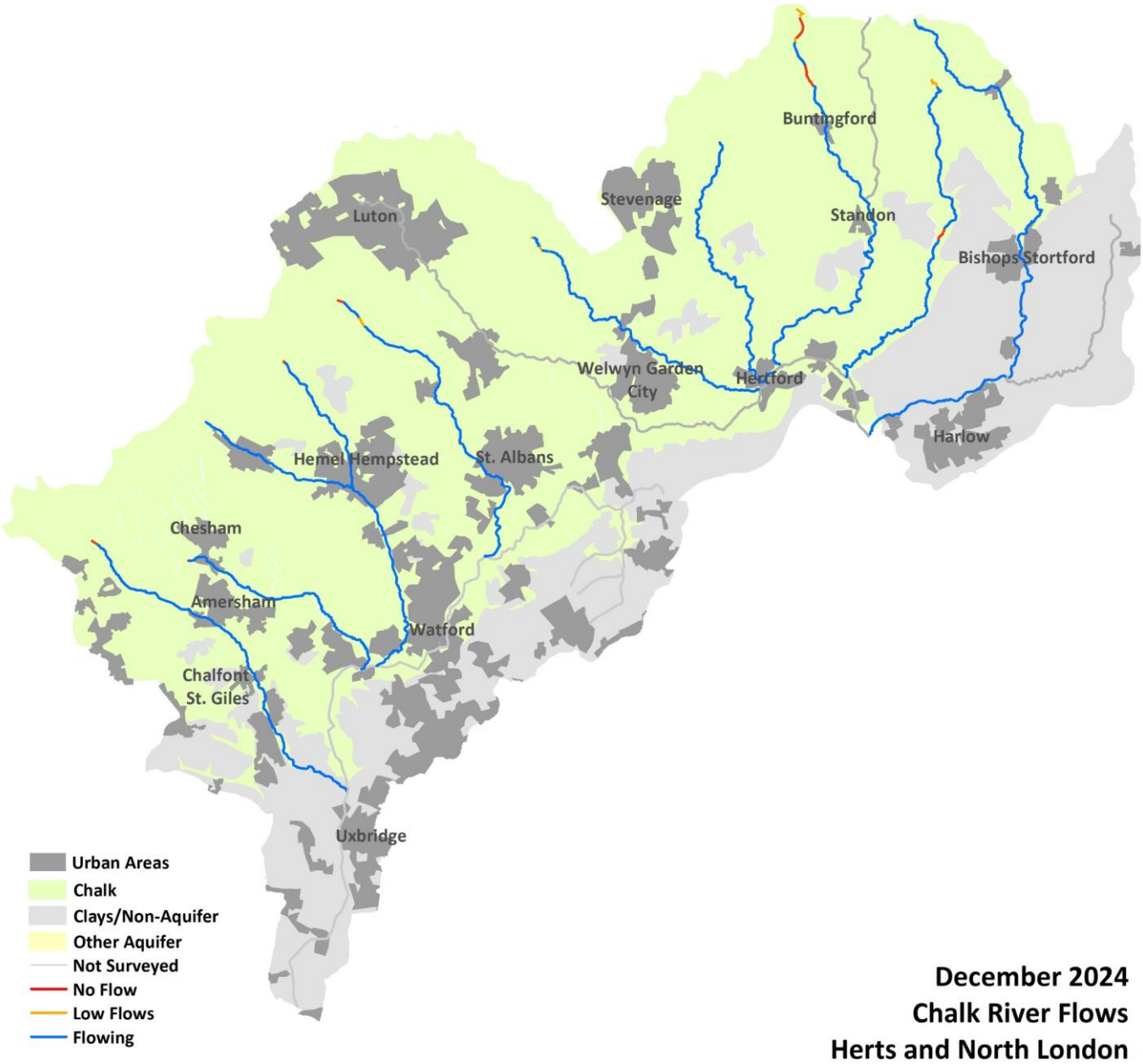
Figure 9.1: End of month reservoir stocks for the Lower Thames reservoir group and the Lee Valley reservoir group compared to long term maximum, minimum and average stocks. Note: Historic records of individual reservoirs and reservoir groups making up the regional values vary in length.



Source: water companies, 2025

10 Chalk Rivers

Figure 10.1: Length of Chalk Rivers surveyed during the month and categorised as: Flowing, Low Flows, No Flow or Not Surveyed.



Source: Environment Agency, 2025

11 Glossary

11.1 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).

11.2 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.

12 Appendices

12.1 Rainfall table

Hydrological area	Dec 2024 total rainfall in mm	Dec 2024 rainfall long term average 1961 to 1990	Dec 2024 rainfall % of long term average 1961 to 1990	Winter Oct 2024 to Dec 2024 total rainfall in mm	Winter Oct 2024 to Dec 2024 rainfall % of long term average 1961 to 1990
Chilterns East Colne	61	72	84	205	99
Lee Chalk	57	60	95	176	99
Lower Lee	46	62	75	164	91
North London	40	62	64	161	88
Roding	42	57	73	141	84
Herts and North London total	49	63	78	169	92

12.2 Rainfall banding table

Hydrological area	Dec 2024 band	Oct 2024 to Dec 2024 cumulative band	Jul 2024 to Dec 2024 cumulative band	Jan 2024 to Dec 2024 cumulative band
Chilterns East Colne	Normal	Normal	Above normal	Exceptionally high
Lee Chalk	Normal	Normal	Notably high	Exceptionally high
Lower Lee	Normal	Normal	Normal	Notably high
North London	Normal	Normal	Normal	Notably high
Roding	Normal	Below normal	Normal	Above normal

12.3 Effective Rainfall table

Hydrological area	Dec 2024 total effective rainfall in mm	Dec 2024 effective rainfall long term average 1961 to 1990 in mm	Dec 2024 effective rainfall % of long term average 1961 to 1990	Winter Oct 2024 to Dec 2024 total effective rainfall in mm	Winter Oct 2024 to Dec 2024 effective rainfall % of long term average 1961 to 1990
Chilterns East Colne	50	38	130	147	186
Lee Chalk	47	20	234	103	222
Lower Lee	35	26	135	60	127
North London	28	26	109	68	143
Roding	25	21	119	25	65
Herts and North London total	37	26	141	81	156

12.4 Soil Moisture Deficit table

Hydrological area	Dec 2024 end of month Soil Moisture Deficit in mm	Dec 2024 end of month Soil Moisture Deficit long term average 1961 to 1990 in mm	Nov 2024 end of month Soil Moisture Deficit in mm	Nov 2024 end of month Soil Moisture Deficit long term average 1961 to 1990 in mm
Chilterns East Colne	2	19	0	44
Lee Chalk	3	35	1	64
Lower Lee	3	21	1	48
North London	3	23	1	49
Roding	3	25	7	53
Herts and North London total	3	25	2	52

12.5 River flows table

Site name	River	Catchment	Dec 2024 band	Nov 2024 band
Colney Street (Hansteads)	Ver	Colne	Exceptionally high	Exceptionally high
Croxley Green	Gade	Colne	Exceptionally high	Exceptionally high
Denham Lodge	Misbourne	Colne	Notably high	Notably high
Denham Colne	Colne	Colne	Exceptionally high	Notably high
Howe Green (Water Hall)	Lee	Upper Lee	Exceptionally high	Notably high
Panshanger	Mimram	Upper Lee	Exceptionally high	Exceptionally high
Wareside (Mardock)	Ash	Upper Lee	Above normal	Normal
Feildes Weir (naturalised)	Lee	Upper Lee	Above normal	Above normal
Brent (Monks Park)	Brent	North London	Normal	Normal
Cranford (Cranford Park)	Crane	North London	Normal	Normal
Redbridge	Roding	Roding, Beam and Ingrebourne	Normal	Normal
Upminster (Gaynes Park)	Ingrebourne	Roding, Beam and Ingrebourne	Normal	Normal

12.6 Groundwater table

Site name	Aquifer	Dec 2024 band	Nov 2024 band
Ashley Green	Mid-Chilterns Chalk	Notably high	Notably high
Ballingdon Farm	Mid-Chilterns Chalk	Exceptionally high	Exceptionally high
Amersham Road	Mid-Chilterns Chalk	Notably high	Exceptionally high
Wapseys Wood	Mid-Chilterns Chalk	Notably high	Notably high
Lilley Bottom	Upper Lee Chalk	Exceptionally high	Exceptionally high
Crescent Cottages	Upper Lee Chalk	Exceptionally high	Exceptionally high
Cave Gate	Upper Lee Chalk	Exceptionally high	Exceptionally high
Hixham Hall	Upper Lee Chalk	Notably high	Exceptionally high
Therfield Rectory	Upper Lee Chalk	Exceptionally high	Exceptionally high

12.7 Abstraction licence flow constraints

Number of flow constraints in force between 2 and 8 December 2024	Number of flow constraints in force between 9 and 15 December 2024	Number of flow constraints in force between 16 and 22 December 2024	Number of flow constraints in force between 23 and 29 December 2024
7	1	8	9