

Monthly water situation report: Hertfordshire and North London Area

1 Summary - February 2024

The Hertfordshire and North London area received 111mm of rainfall during February, 272% of the long term average. Rainfall across Hertfordshire and North London was the highest for February since 1951. The soil moisture deficit decreased from 3mm to 0mm, remaining below the long term average. Monthly river flows ranged between the above normal and exceptionally high bands. Groundwater levels increased at all monthly indicator sites, also ranging from the above normal to exceptionally high bands.

1.1 Rainfall

Although there were no named storms, February was a very wet month over the Hertfordshire and North London area ("the Area"), with all 5 areal rainfall units falling in the exceptionally high band. An average of 111mm of rain fell in the Area during February, 272% of the long term average (LTA). Average rainfall over the Area was the highest for February since 1951. The Chilterns East Colne and Lee Chalk units received 132mm and 113mm of rain respectively, higher than any other February on record (records start at 1910). The 8 February was the wettest day of the month, with 31.4mm of rain recorded at Chenies. Over 25mm were also recorded at Wheathampstead, St. Albans, Prestwood Reservoir and Whitwell. Despite the high rainfall in February, there were 11 dry days (under 0.2mm of rain on average). Over the winter period (October 2023 to January 2024), the Area recorded 165% of the LTA rainfall (467mm in total).

1.2 Soil moisture deficit and recharge

The heavy rainfall recorded in the Area during February led to the soil moisture deficit (SMD) remaining low, decreasing from 3mm at the start of the month to 0mm at the end (lower than the LTA of 6mm). The continued saturation of soils and heavy rainfall across the Area meant that 385% of the LTA effective rainfall was recorded during February. Over the winter period (October to February), the Area recorded 253% of the LTA effective rainfall.

1.3 River flows

During the month there was an increase in river baseflows across the Area in response to the heavy rainfall, with notable flow peaks on 9, 18 and 22 February. Upminster (River Ingrebourne) was the only site that recorded in the above normal band. Eight indicator sites recorded monthly values in the notably high band, while Croxley Green (River Gade), Howe Green (River Lee) and Redbridge (River Roding) recorded monthly flows in the exceptionally high band. Monthly flows at Denham Lodge (River Misbourne), Cranford Park (River Crane), Howe Green and Wareside (River Ash) were the third highest of any February on record (record periods beginning in 1985, 1979, 1960 and 1981 respectively).

A total of 38 flood alerts were issued in February, which were spread across the area – 16 of these alerts were issued on 8 and 9 February in response to the high rainfall. Despite the high river flows, no flood warnings were issued this month.

1.4 Groundwater levels

Groundwater levels in the Area continued increasing at all indicator sites, with 7 sites recording end of month levels in the notably high band. Cave Gate (Upper Lee Chalk) recorded groundwater levels in the exceptionally high band. Amersham Road, Ashley Green (both Mid Chilterns Chalk) and Cave Gate recorded the third highest February groundwater levels on record (record periods beginning in 1991, 1987 and 1967 respectively).

1.5 Reservoir stocks

Lee Valley Reservoir levels were below the LTA throughout February, starting at 88% of live capacity and ending the month at 87%. The lower levels likely relate to ongoing operational works. The water level in the Lower Thames Reservoirs ended February above the LTA, increasing from 93% to 96% of live capacity.

1.6 Environmental impact

The sources of the Chalk rivers in the Colne catchment continued their upstream migration during February. The River Ver started flowing through Markyate, while the River Gade's source moved 1km upstream to Hudnall Corner. The River Bulbourne continued to flow upstream of Dudswell village at the top of the field near Cow Roast and the sources of the River Chess remained upstream of Chesham. The River Misbourne flowed from Mobwell Pond (above Great Missenden) with high flows and flooding throughout the lower valley below Amersham. Most of the sources of the Chalk rivers in the Upper Lee catchment remained in similar locations to January. The River Mimram started flowing upstream of the lakes by Lilley Bottom Road (Whitwell) and the River Beane started flowing upstream of Cromer. The River Rib started flowing upstream of Hay Green, while River Ash (Herts) started flowing at Meesden, although it temporarily lost flow around Clapgate. The reduced flows in the Ash reflect the lower rainfall towards the end of February when surveyed and the river's flashy nature compared to some of the other chalk rivers. The River Stort continued to flow from its source above the village of Langley Lower Green.

To protect the environment, during February a number of abstraction licence flow constraints were in force. This ranged between 1 and 10 per week, out of a maximum of 54.

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2 Rainfall

2.1 Rainfall map

Figure 2.1: Total rainfall for hydrological areas for the current month (up to 29 February 2024), classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.

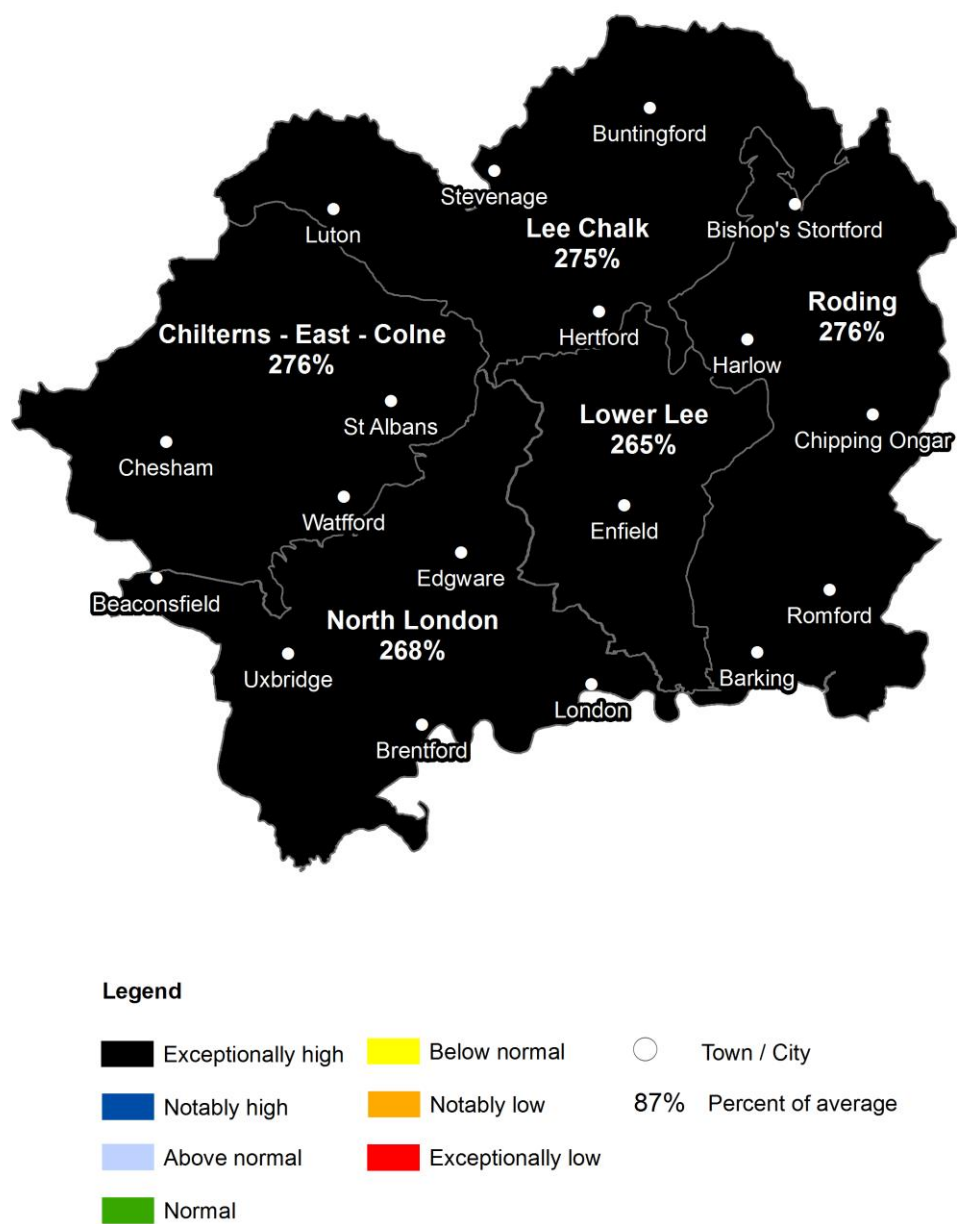
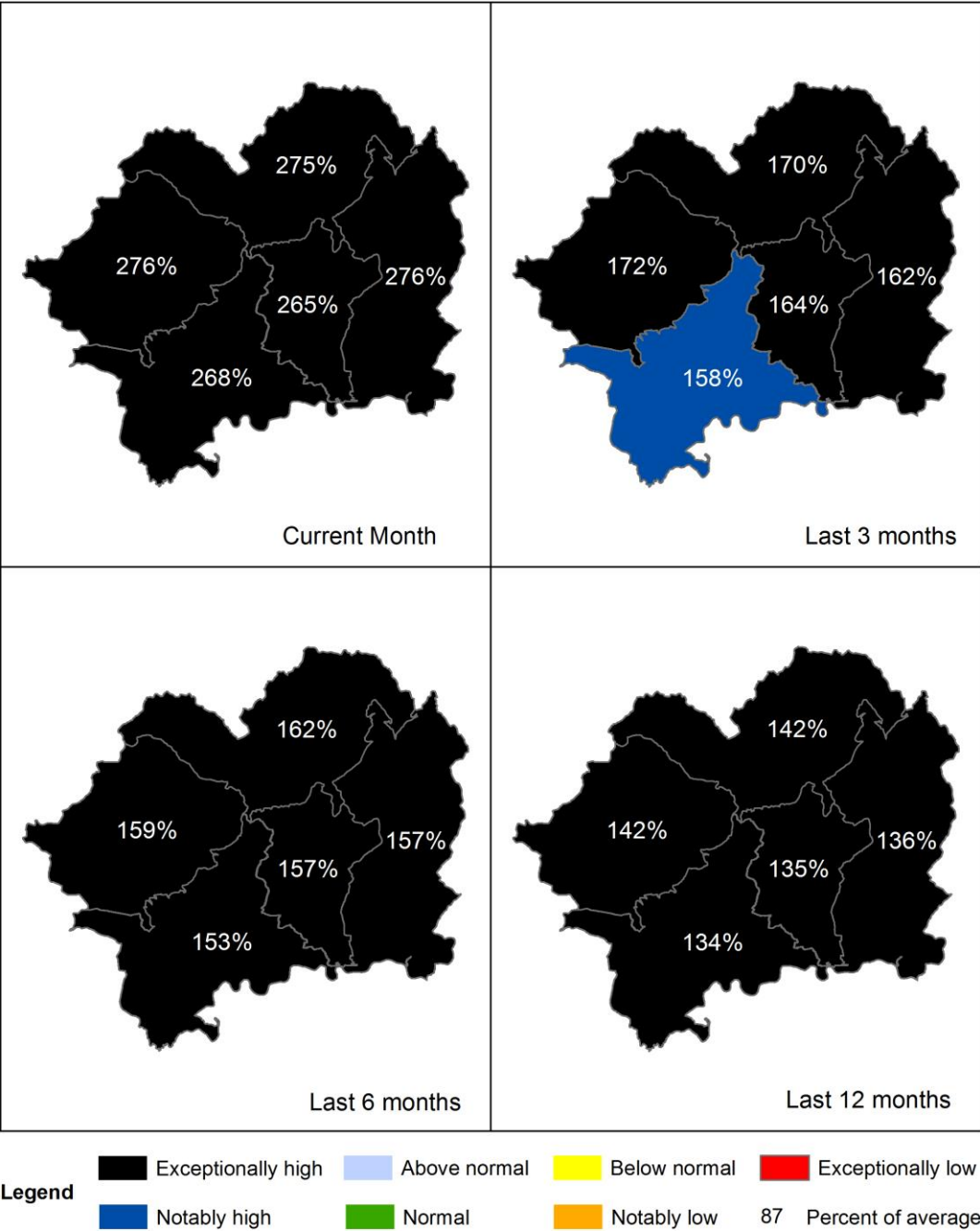


Figure 2.2: Total rainfall for hydrological areas for the current month (up to 29 February 2024), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.



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

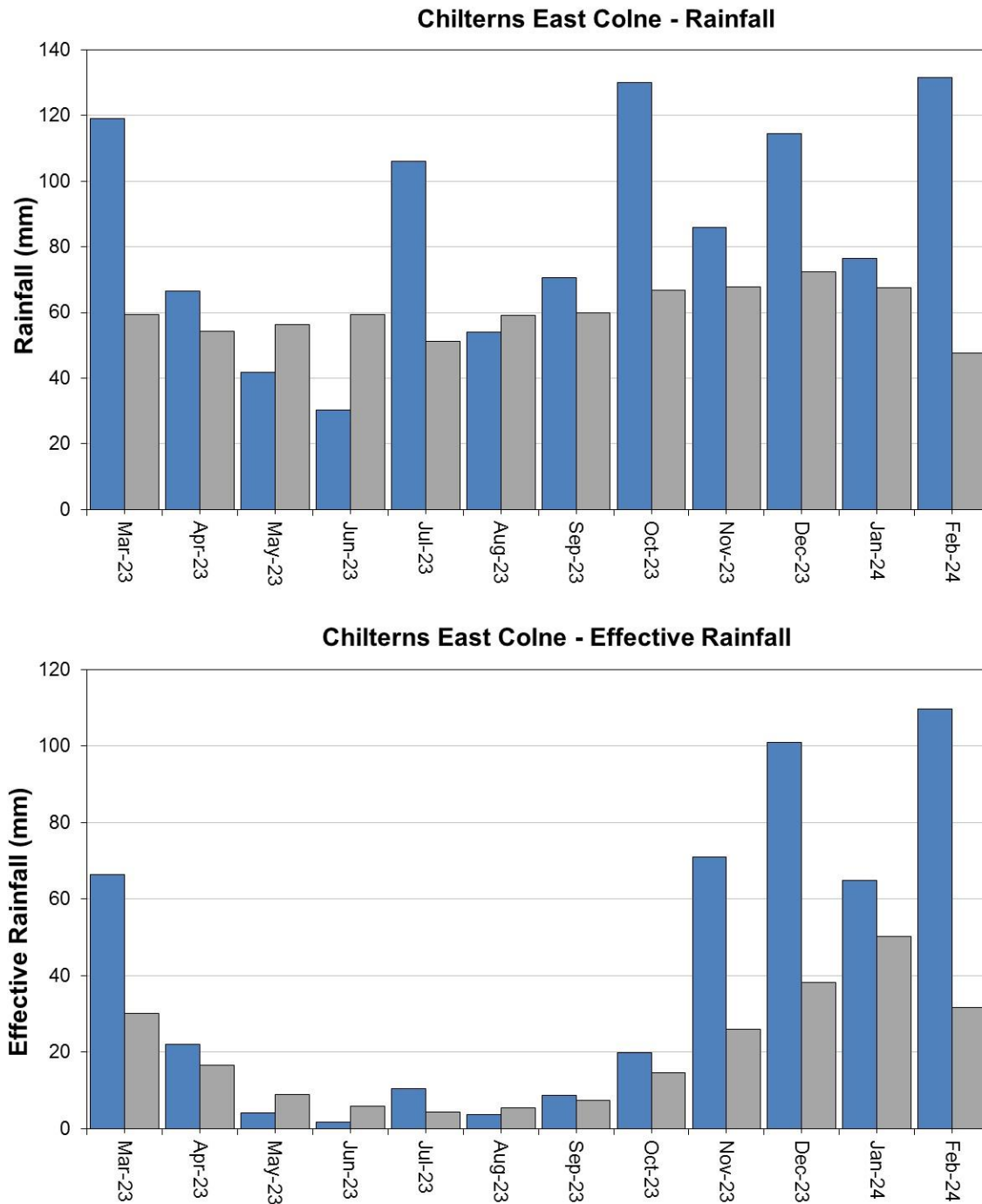
(Source: Environment Agency). Crown copyright. All rights reserved. Environment Agency, 100024198, 2024. Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2024.

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.

Monthly total rainfall (mm) Long term average rainfall (mm)

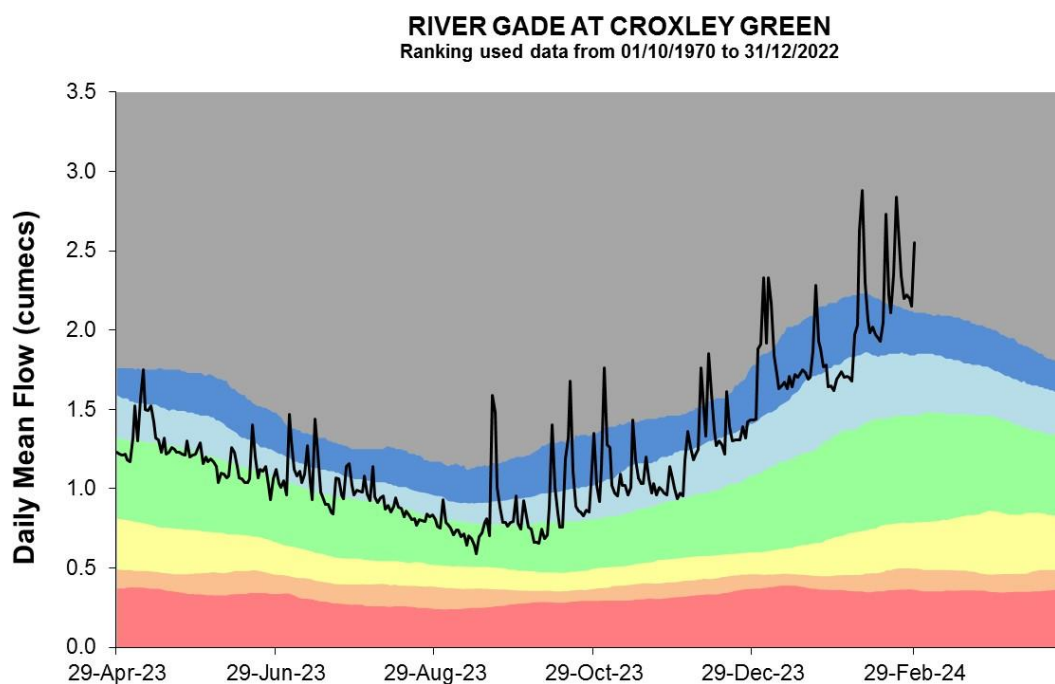
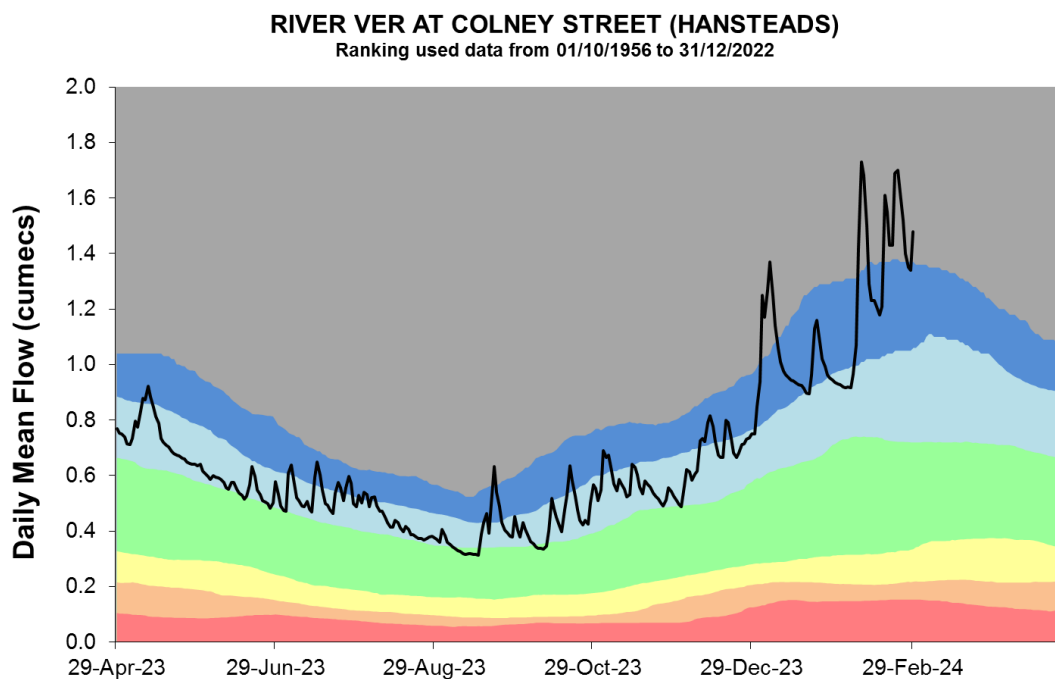


HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

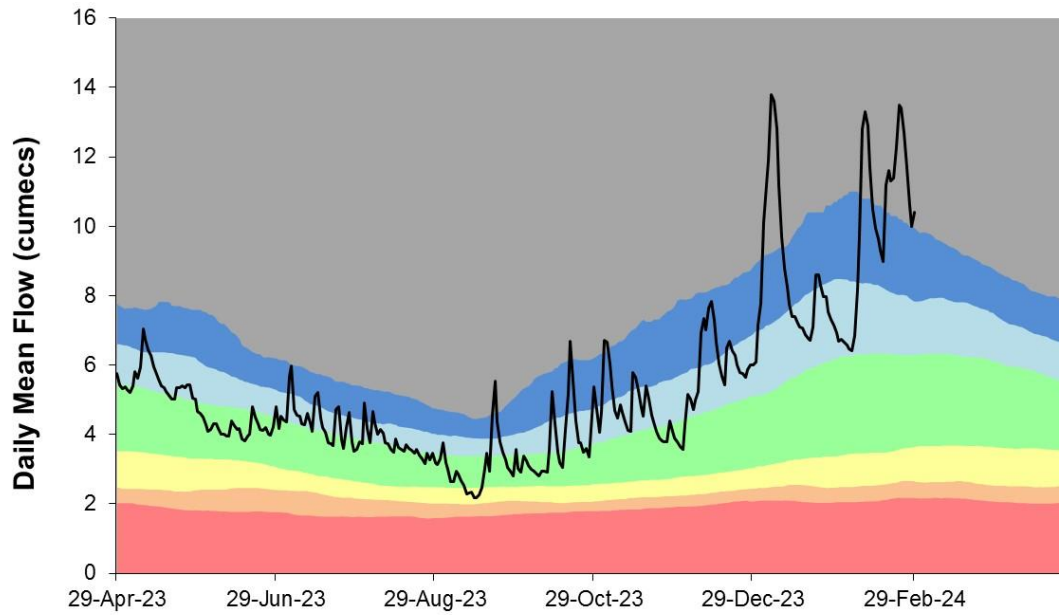
EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2024)

4.2 Colne River flow charts

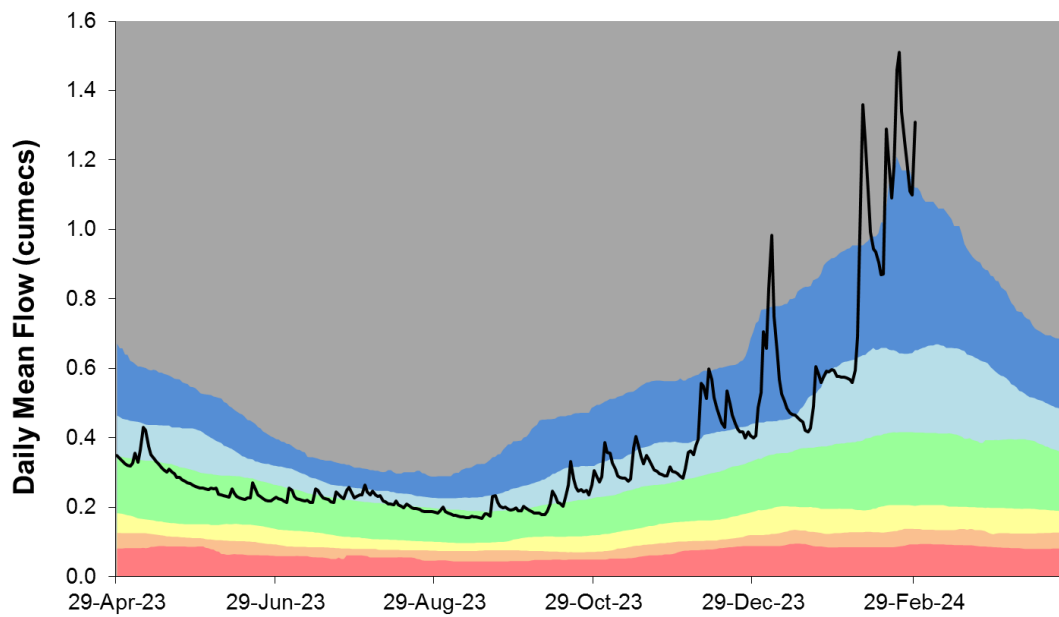
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



RIVER COLNE AT DENHAM
Ranking used data from 01/10/1952 to 31/12/2022



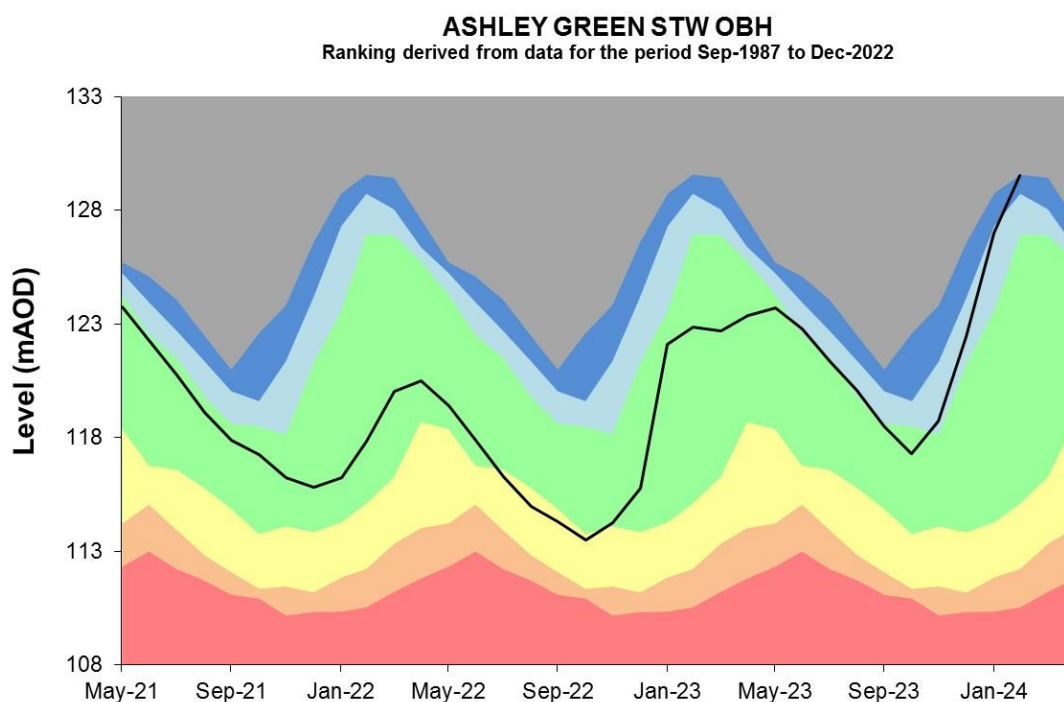
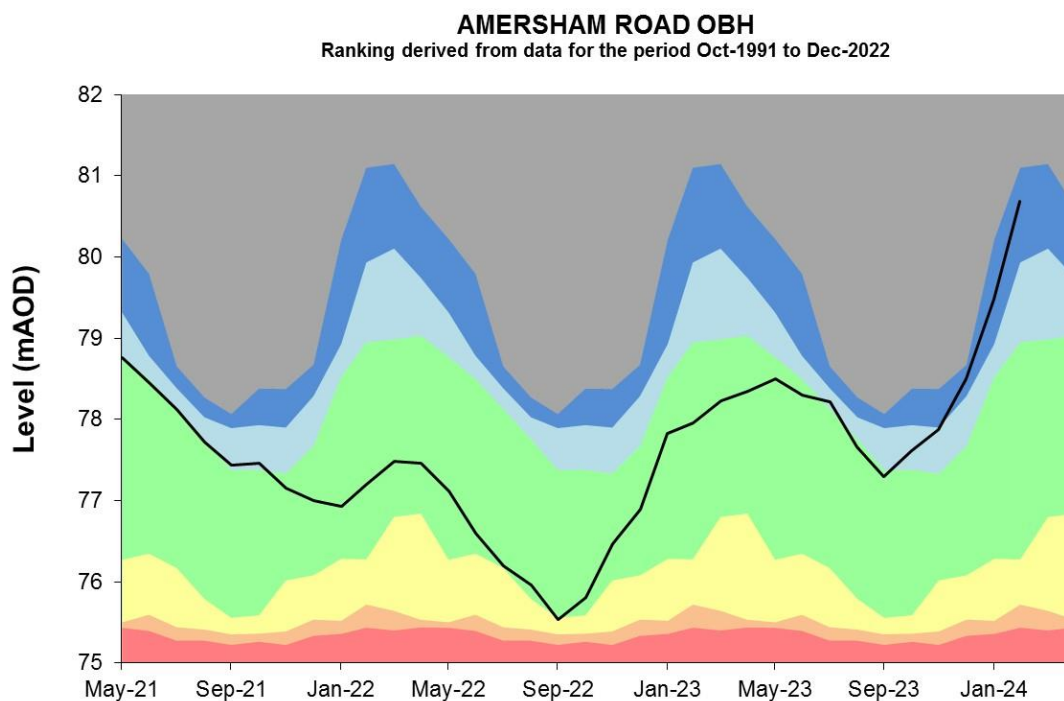
RIVER MISBOURNE AT DENHAM LODGE
Ranking used data from 01/07/1984 to 31/12/2022

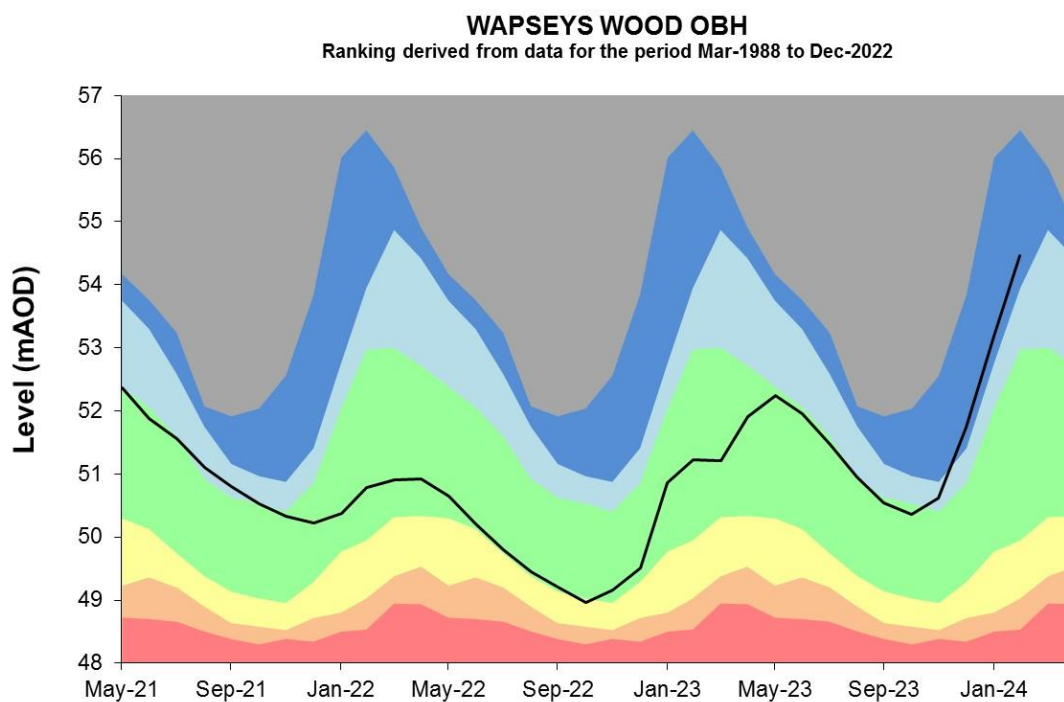
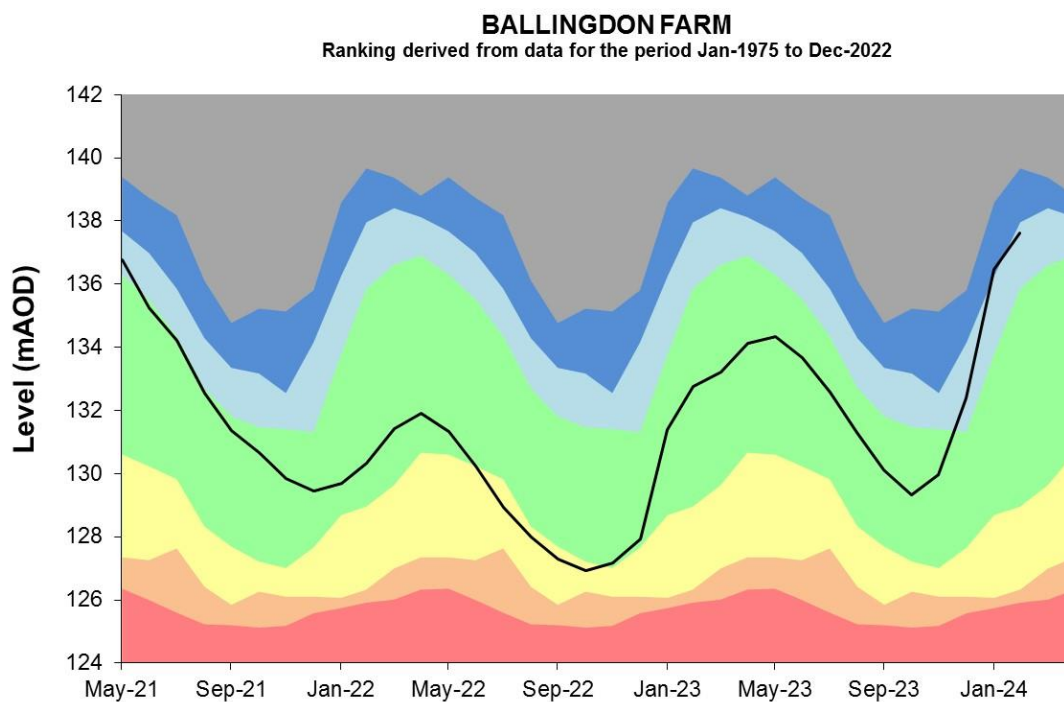


Source: Environment Agency, 2024

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.





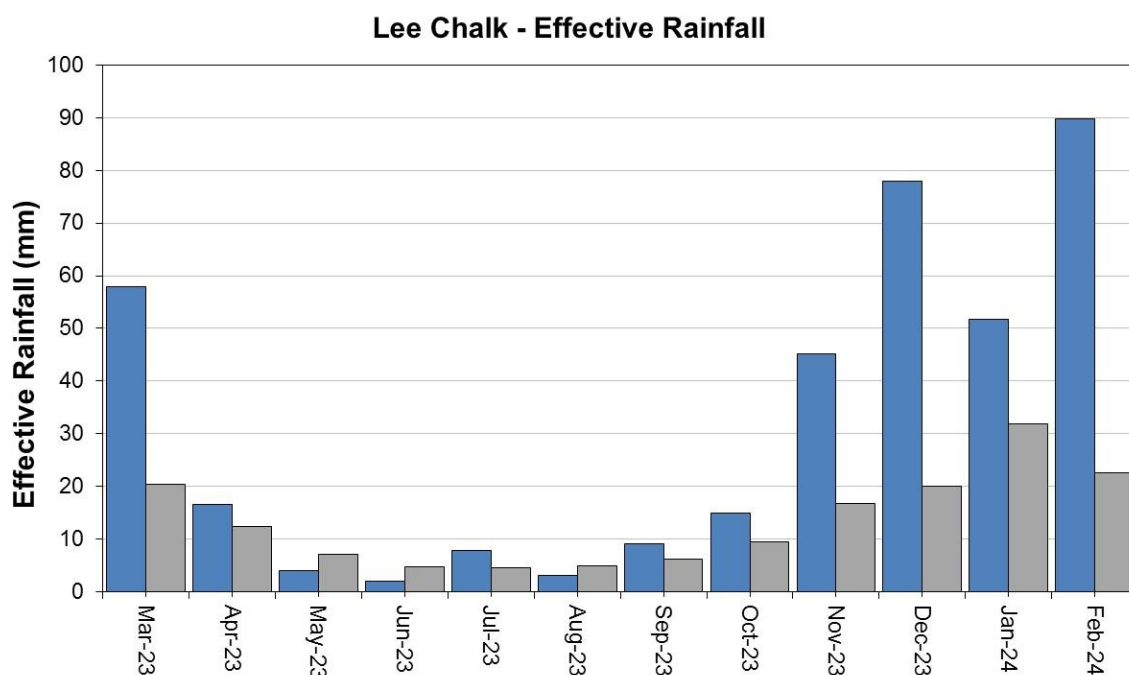
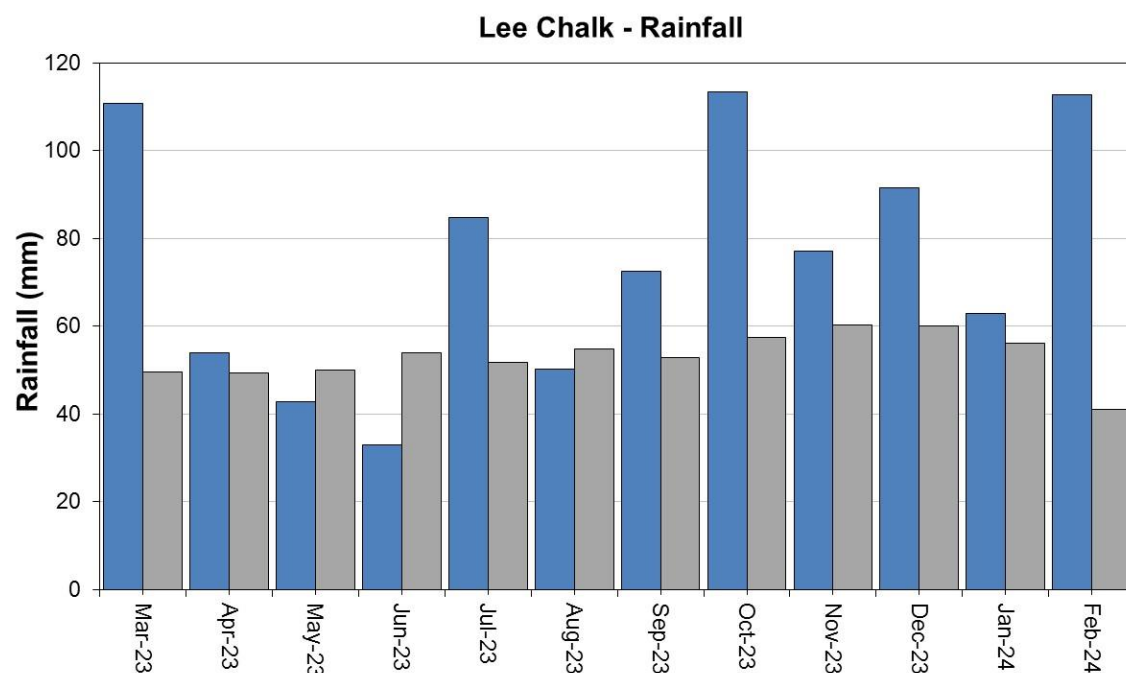
Source: Environment Agency, 2024

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.

Monthly total rainfall (mm) Long term average rainfall (mm)

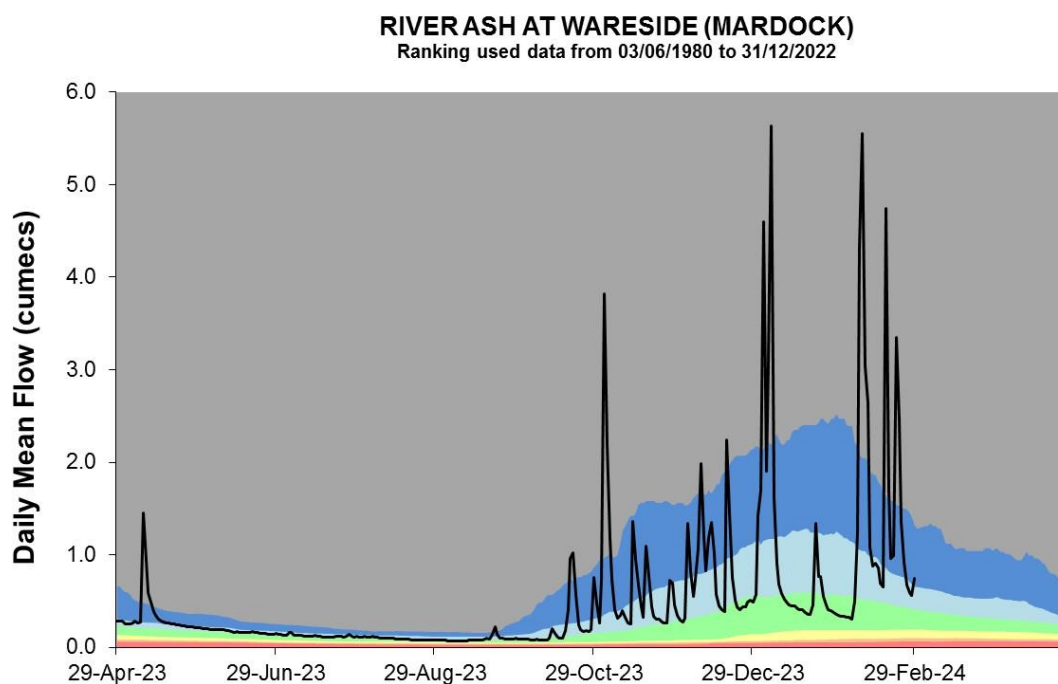
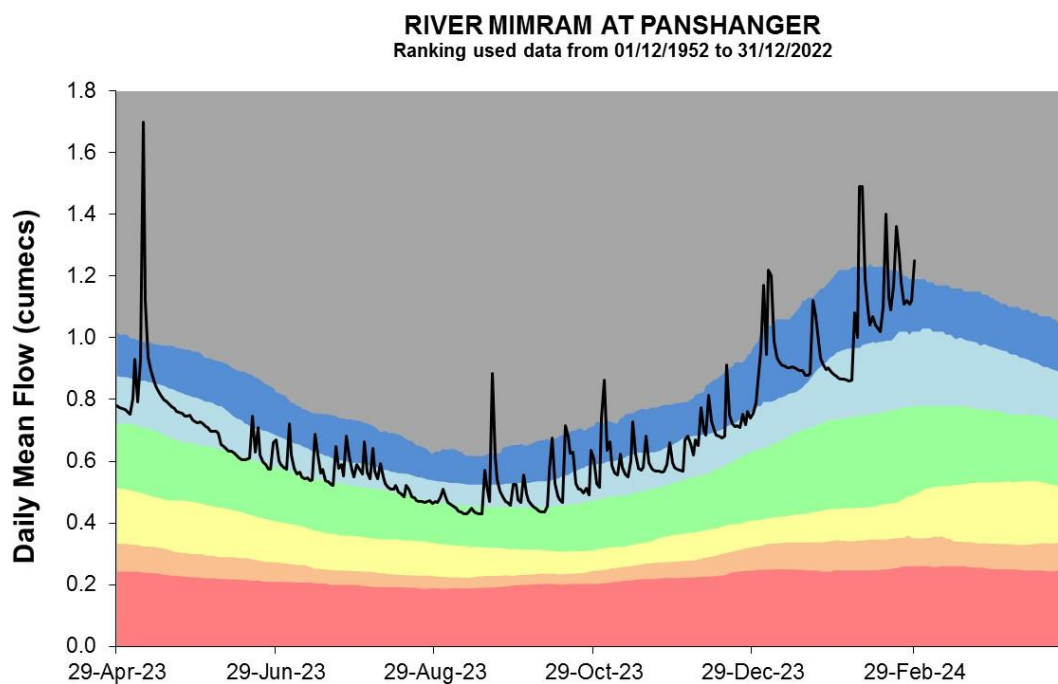


HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

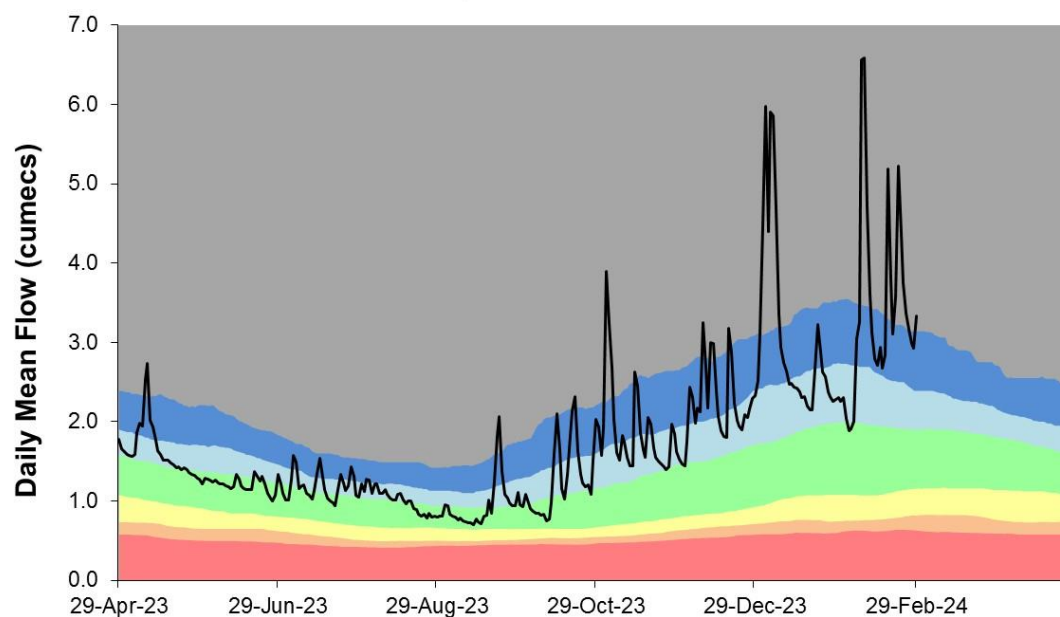
EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2024)

5.2 Upper Lee River flow charts

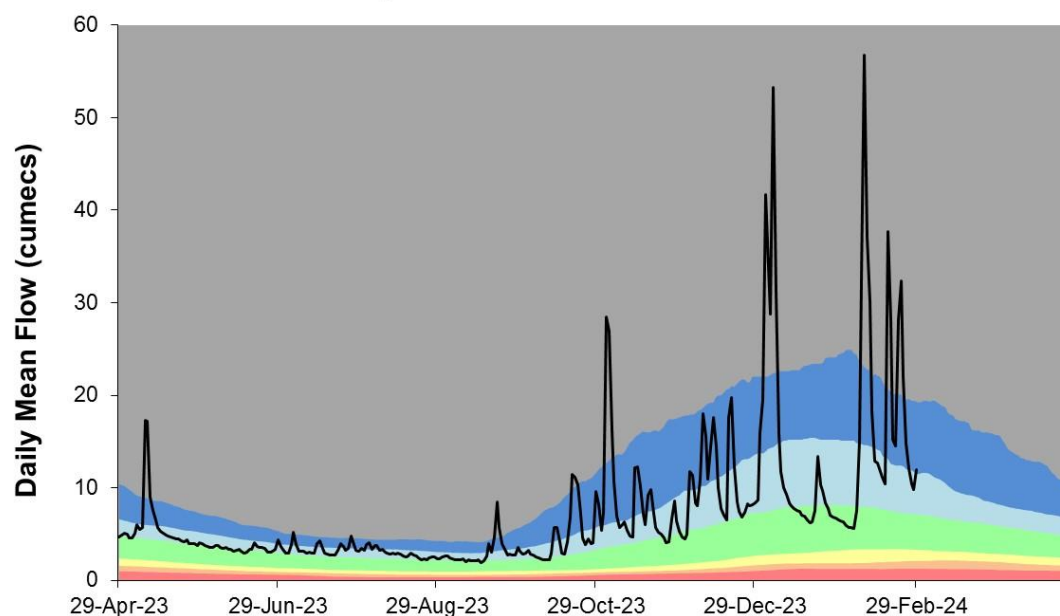
Figure 5.2 Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



RIVER LEE AT HOWE GREEN (WATER HALL)
Ranking used data from 01/04/1959 to 31/12/2022



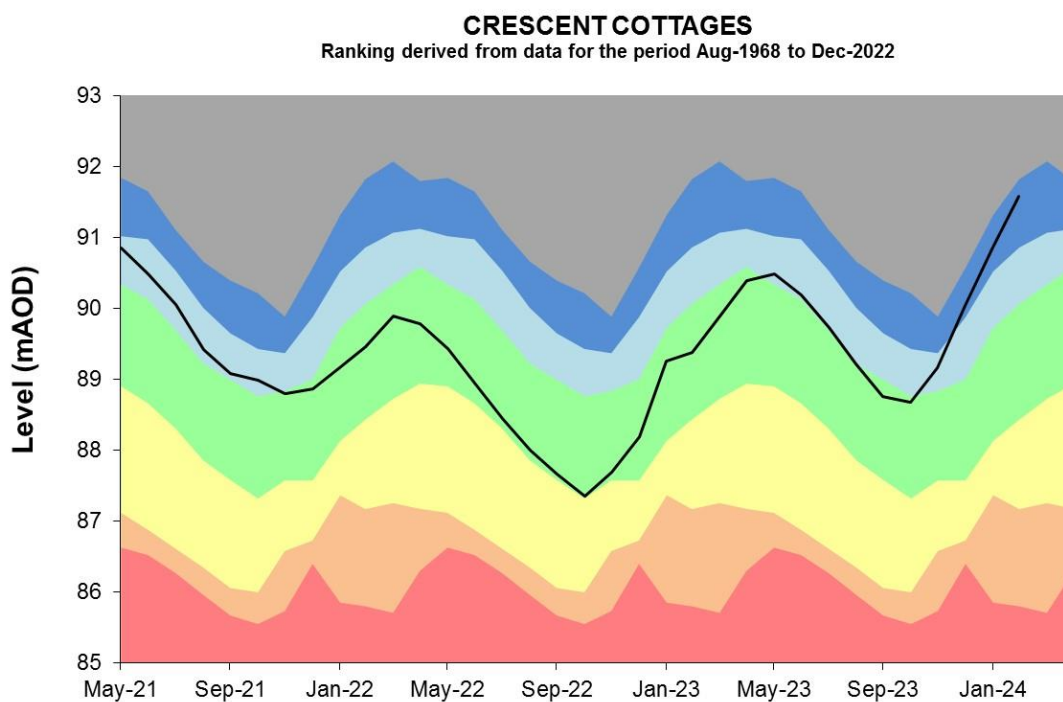
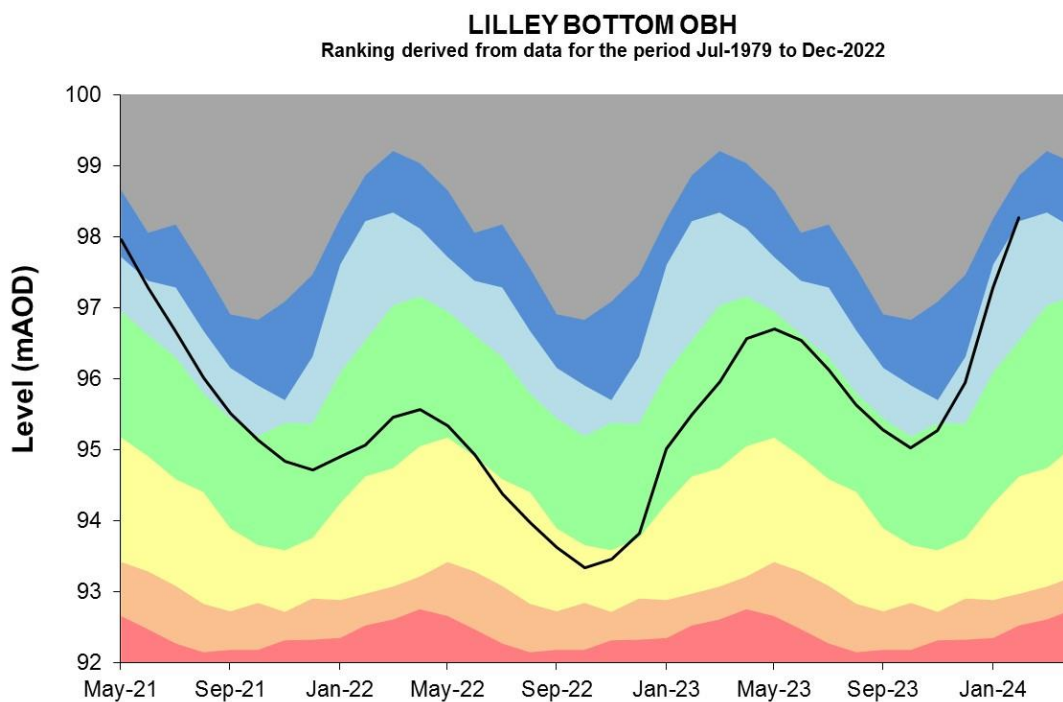
RIVER LEE AT FEILDES WEIR
Ranking used data from 10/05/1883 to 31/12/2022



Source: Environment Agency, 2024

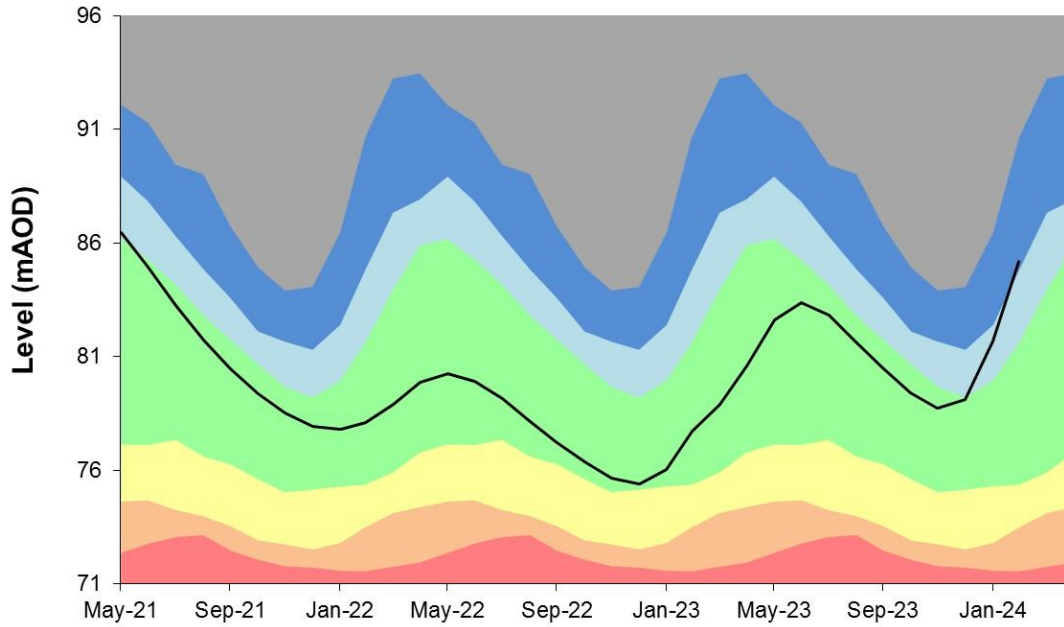
5.3 Upper Lee Groundwater level charts

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.



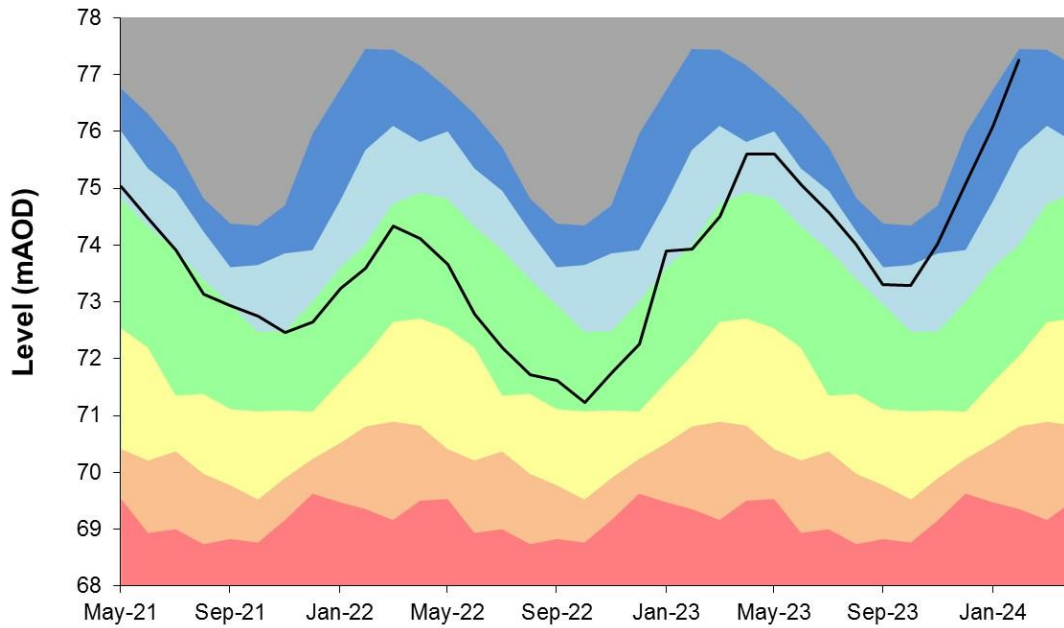
THERFIELD RECTORY

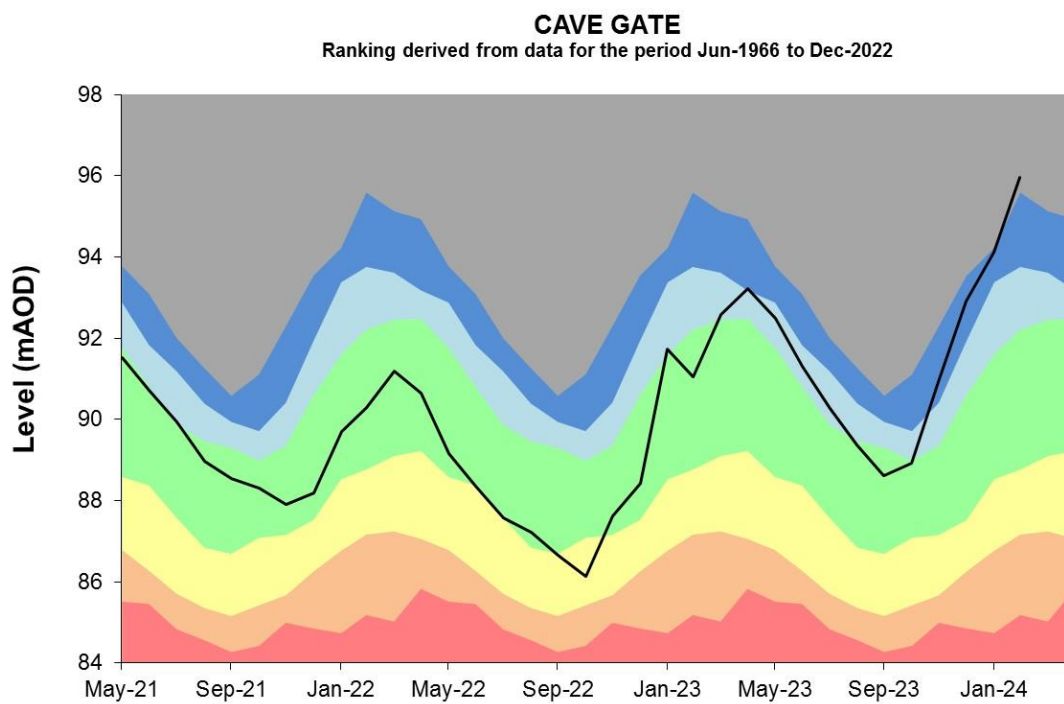
Ranking derived from data for the period Jan-1883 to Dec-2022



HIXHAM HALL

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



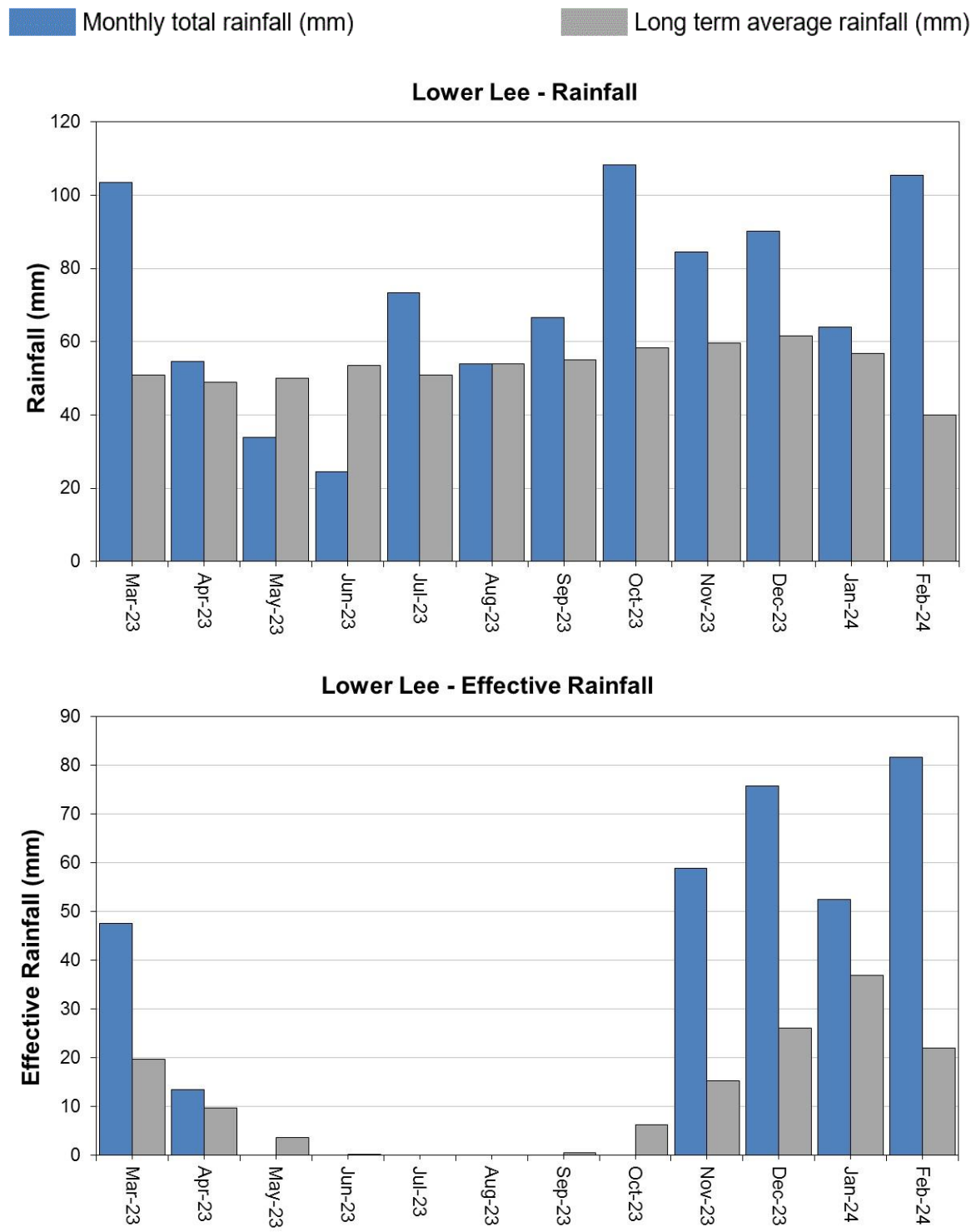


Source: Environment Agency, 2024

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.

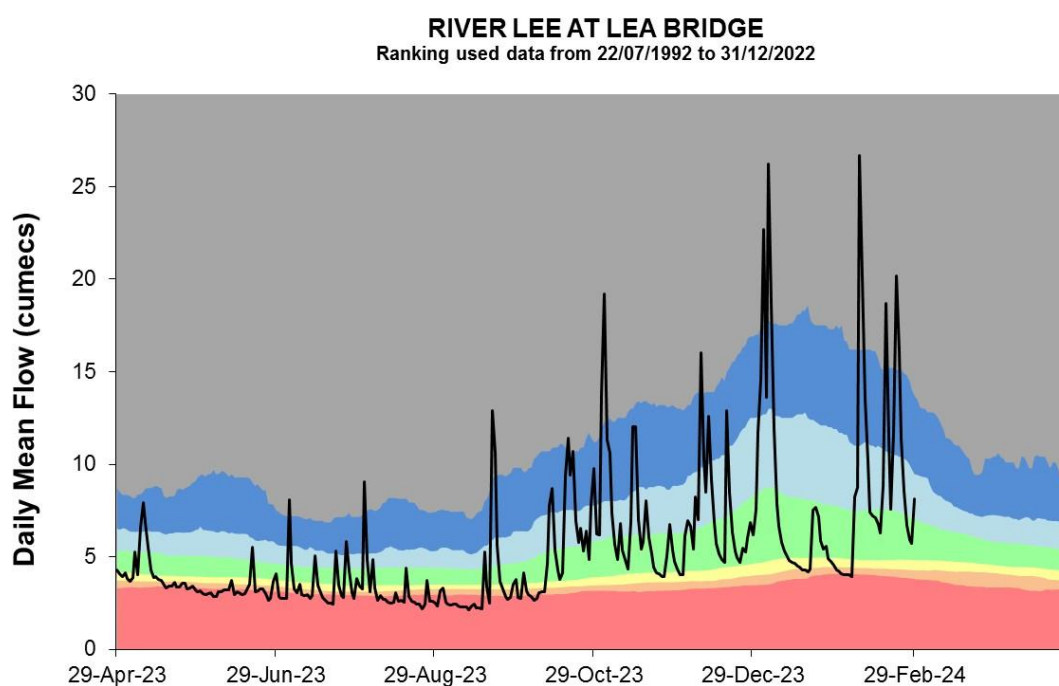
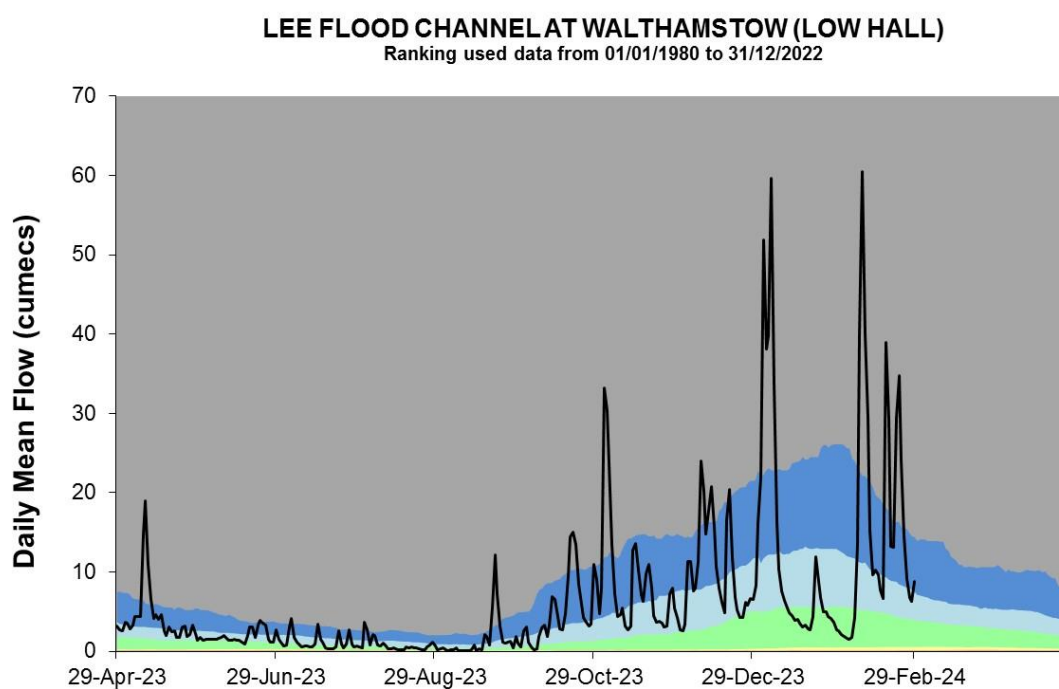


HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2024)

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.



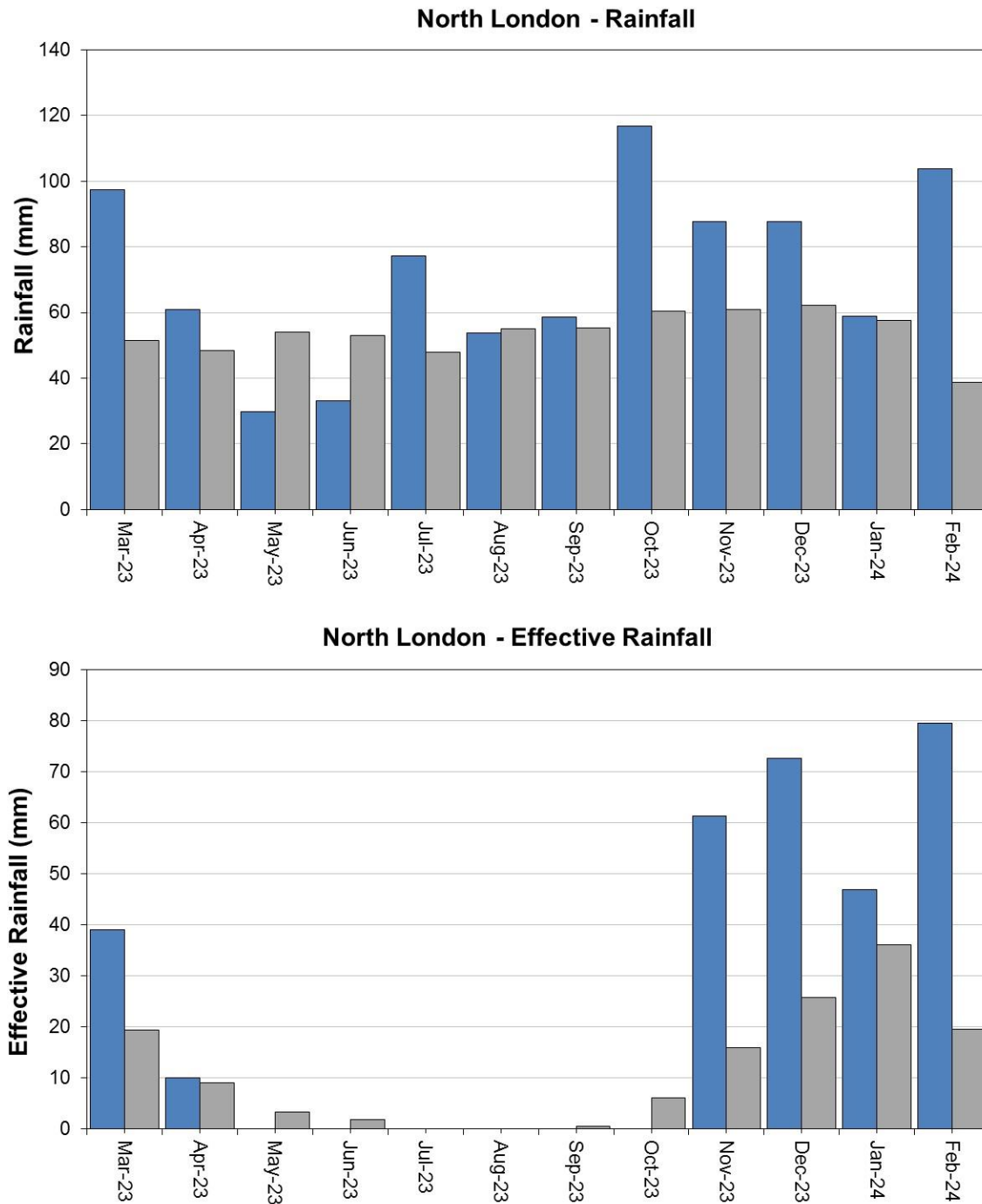
Source: Environment Agency, 2024

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.

Monthly total rainfall (mm) Long term average rainfall (mm)

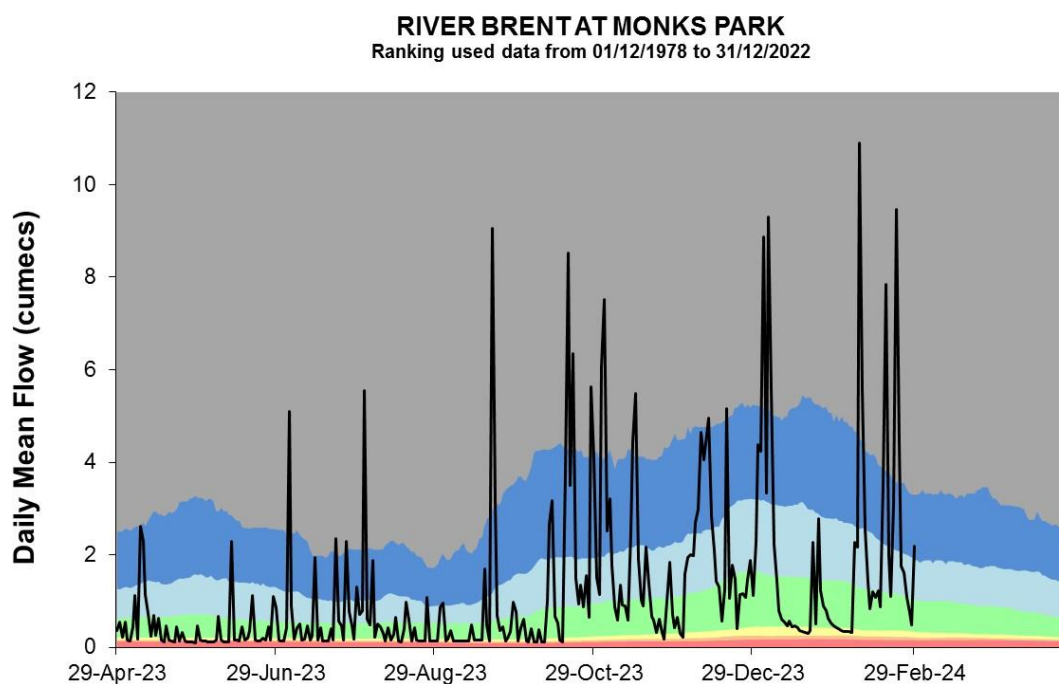
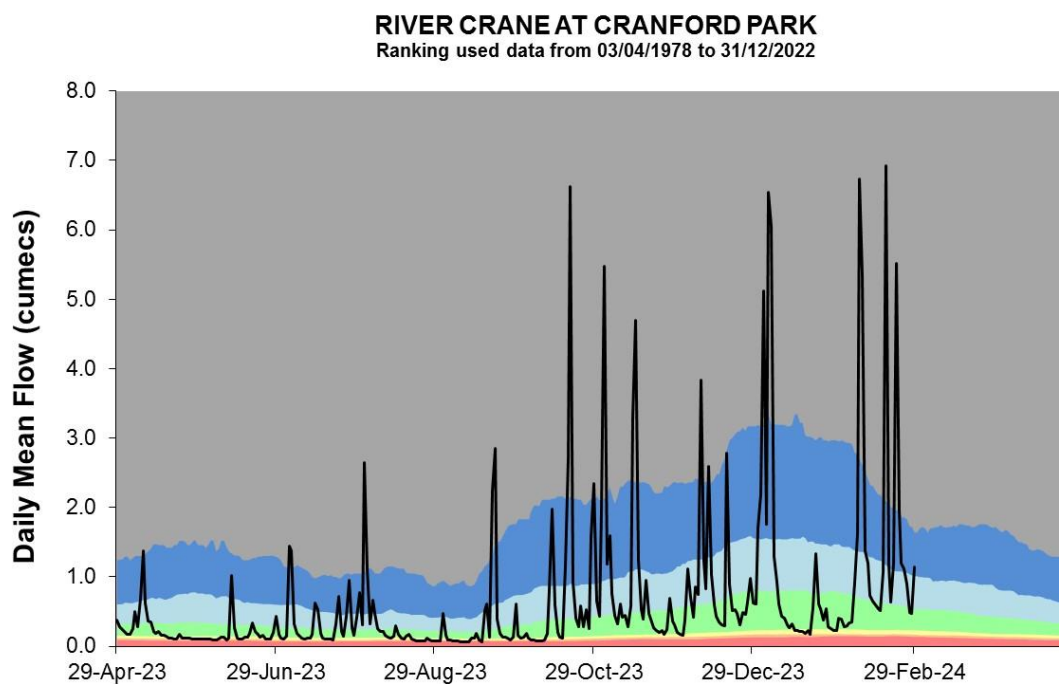


HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2024)

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.



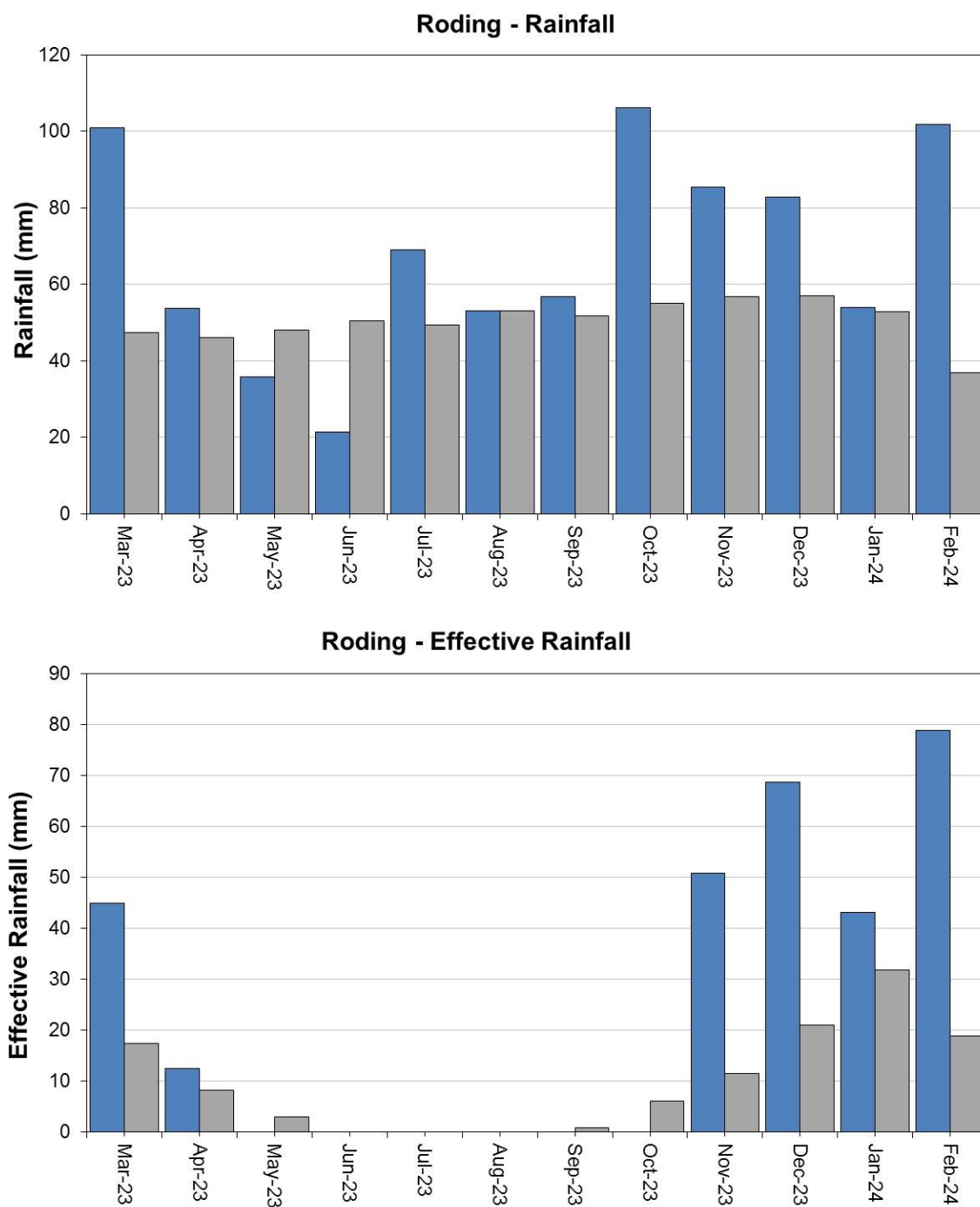
Source: Environment Agency, 2024

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.

Monthly total rainfall (mm) Long term average rainfall (mm)

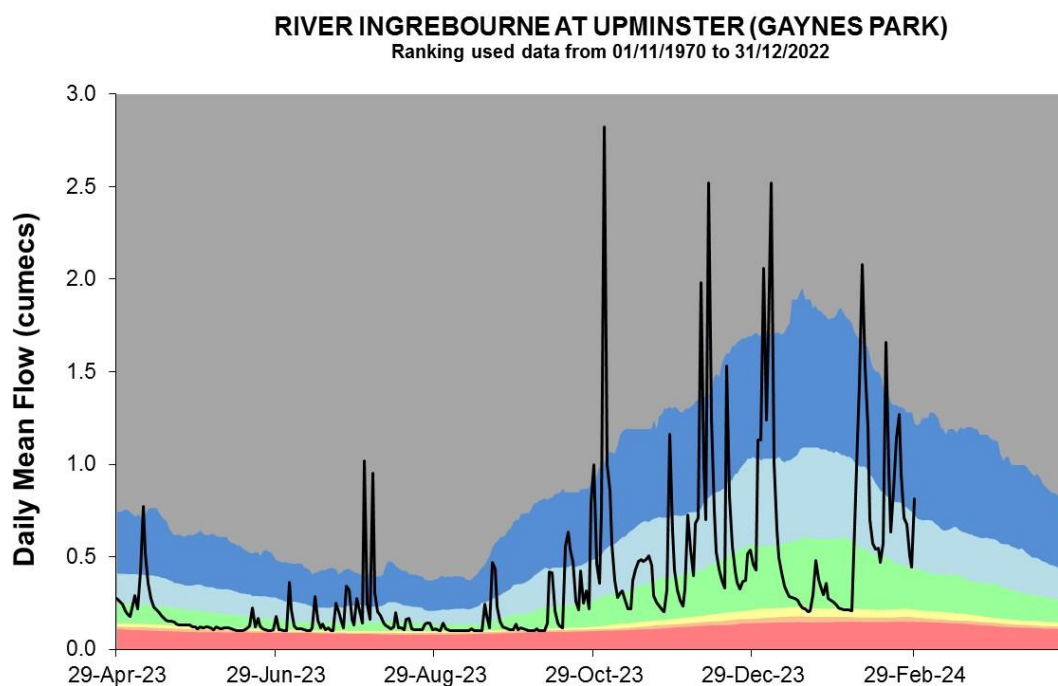
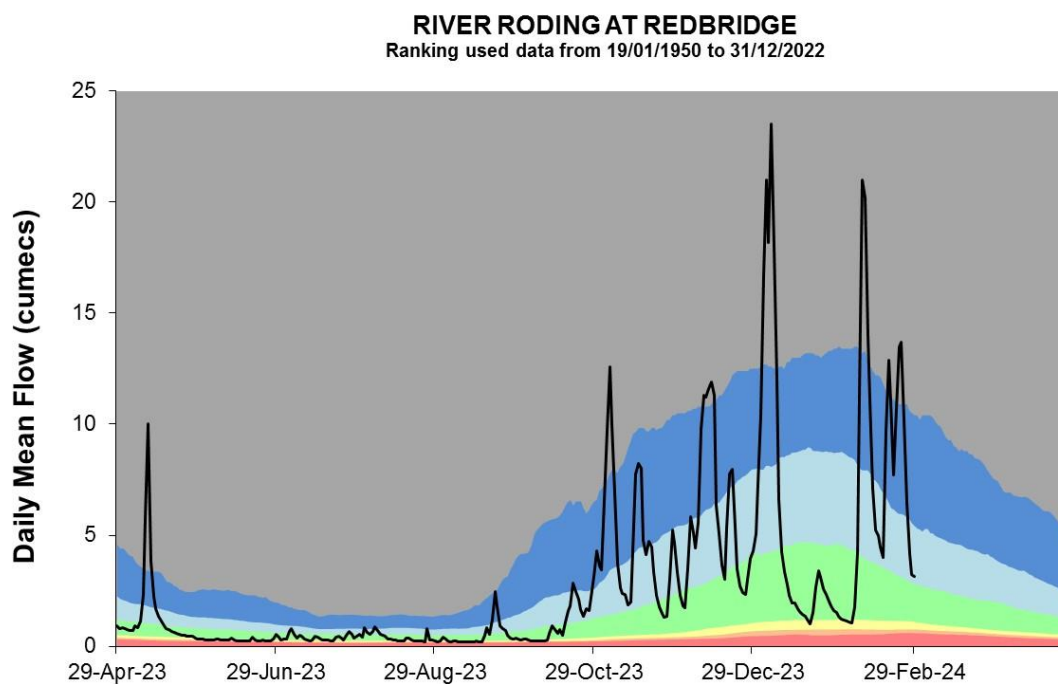


HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2024)

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.

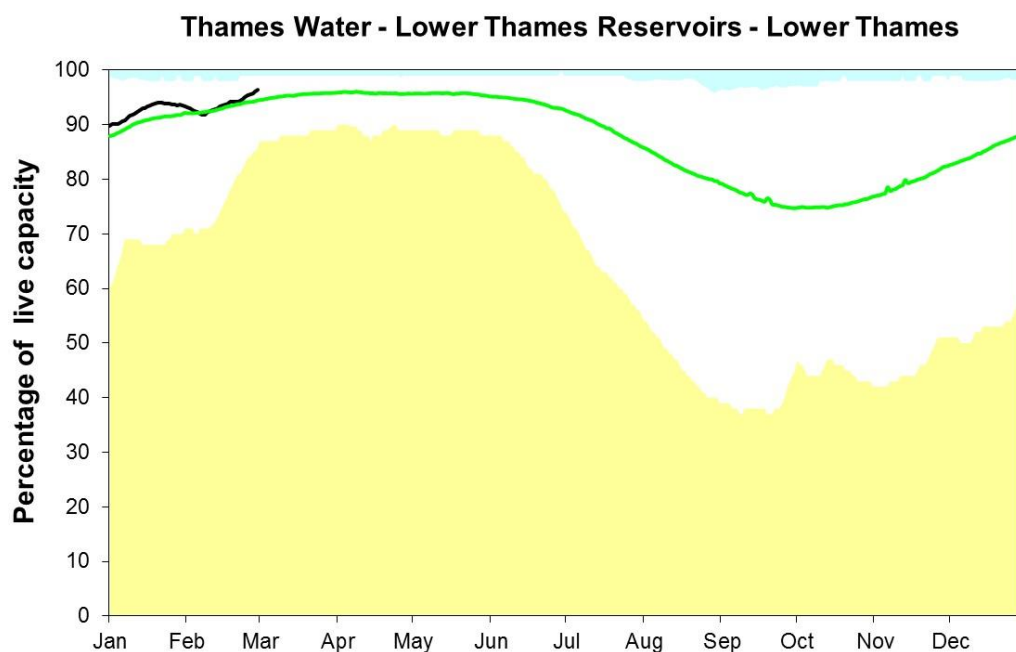
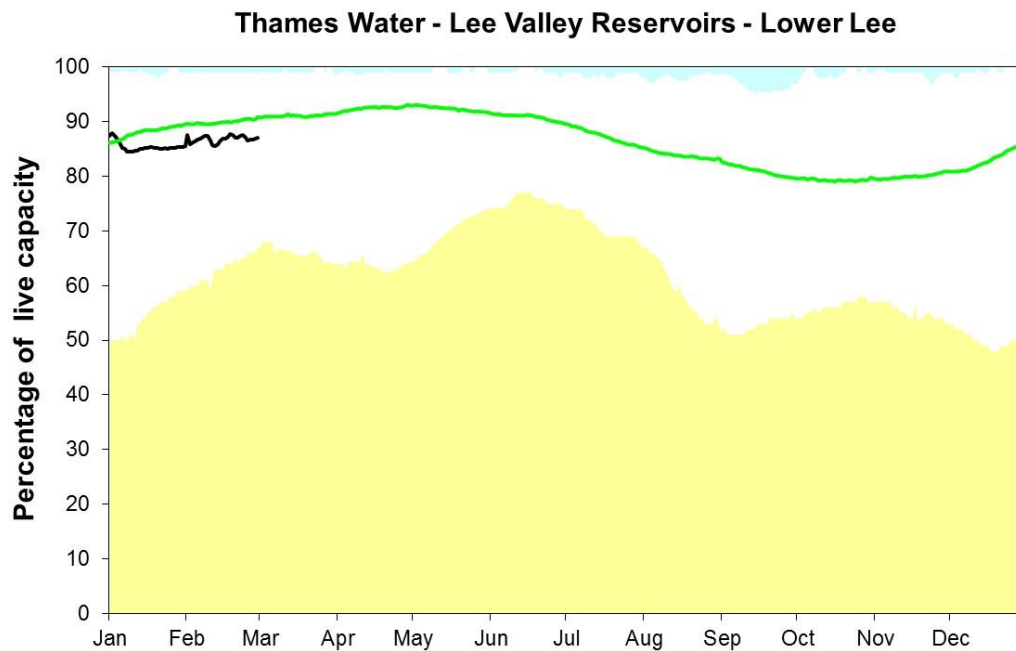


Source: Environment Agency, 2024

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.

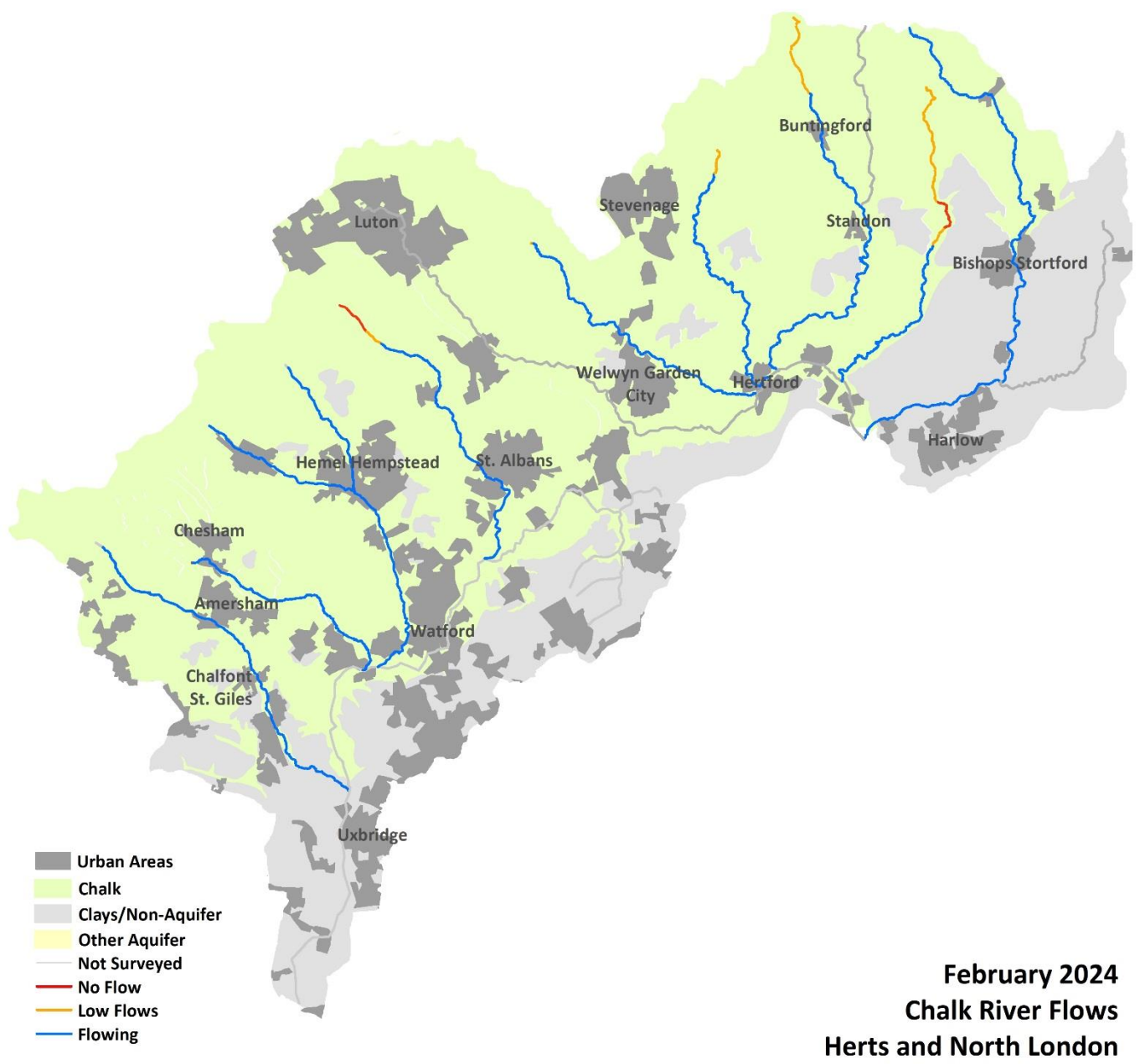
Below minimum Above maximum Average Latest data



Source: water companies, 2024

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, 2024

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	Feb 2024 total rainfall in mm	Feb 2024 rainfall long term average 1961 to 1990	Feb 2024 rainfall % of long term average 1961 to 1990	Winter Oct 2023 to Feb 2024 total rainfall in mm	Winter Oct 2023 to Feb 2024 rainfall % of long term average 1961 to 1990
Chilterns East Colne	132	48	276	539	167
Lee Chalk	113	41	275	458	167
Lower Lee	106	40	265	452	164
North London	104	39	268	455	162
Roding	102	37	276	431	167
Herts and North London total	111	41	272	467	165

12.2 Rainfall banding table

Hydrological area	Feb 2024 band	Dec 2023 to Feb 2024 cumulative band	Sep 2023 to Feb 2024 cumulative band	Mar 2023 to Feb 2024 cumulative band
Chilterns East Colne	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
Lee Chalk	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
Lower Lee	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
North London	Exceptionally high	Notably high	Exceptionally high	Exceptionally high
Roding	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high

12.3 Effective Rainfall table

Hydrological area	Feb 2024 total effective rainfall in mm	Feb 2024 effective rainfall long term average 1961 to 1990 in mm	Feb 2024 effective rainfall % of long term average 1961 to 1990	Winter Oct 2023 to Feb 2024 total effective rainfall in mm	Winter Oct 2023 to Feb 2024 effective rainfall % of long term average 1961 to 1990
Chilterns East Colne	110	32	348	367	228
Lee Chalk	90	23	399	280	278
Lower Lee	82	22	373	269	254
North London	79	19	>400	260	253
Roding	79	19	>400	241	271
Herts and North London total	88	23	385	283	253

12.4 Soil Moisture Deficit table

Hydrological area	Feb 2024 end of month Soil Moisture Deficit in mm	Feb 2024 end of month Soil Moisture Deficit long term average 1961 to 1990 in mm	Jan 2024 end of month Soil Moisture Deficit in mm	Jan 2024 end of month Soil Moisture Deficit long term average 1961 to 1990 in mm
Chilterns East Colne	0	4	2	4
Lee Chalk	0	9	3	13
Lower Lee	0	5	3	6
North London	0	6	3	7
Roding	0	7	3	8
Herts and North London total	0	6	3	8

12.5 River flows table

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

12.6 Groundwater table

Site name	Aquifer	Feb 2024 band	Jan 2024 band
Ashley Green	Mid-Chilterns Chalk	Notably high	Above normal
Ballington Farm	Mid-Chilterns Chalk	Above normal	Notably high
Amersham Road	Mid-Chilterns Chalk	Notably high	Notably high
Wapseys Wood	Mid-Chilterns Chalk	Notably high	Notably high
Lilley Bottom	Upper Lee Chalk	Notably high	Above normal
Crescent Cottages	Upper Lee Chalk	Notably high	Notably high
Cave Gate	Upper Lee Chalk	Exceptionally high	Notably high
Hixham Hall	Upper Lee Chalk	Notably high	Notably high
Therfield Rectory	Upper Lee Chalk	Notably high	Above normal

12.7 Abstraction licence flow constraints

Number of flow constraints in force between 5 and 11 February 2024	Number of flow constraints in force between 12 and 18 February 2024	Number of flow constraints in force between 19 and 25 February 2024	Number of flow constraints in force between 26 and 29 August 2023
10	2	1	2