

Monthly water situation report: Hertfordshire and North London Area

1 Summary - October 2024

In contrast to the previous month, October was neither particularly wet nor dry in the Hertfordshire and North London area, with 100% of the long term average rainfall recorded. The first half of October was significantly wetter than the rest of the month. Despite remaining high, river base flows decreased during October because of the lower rainfall. Following the recharge that occurred during September's rainfall, groundwater levels for October were mostly in the exceptionally high band, with some sites recording their highest end of October levels on record.

1.1 Rainfall

Despite the exceptionally wet September in the Hertfordshire and North London area ("the Area"), October's rainfall was very normal compared to the long term average (LTA). The Area received 60mm of rainfall, or 100% of the LTA, with all five rainfall units ending October in the normal band. The wettest day of the month was 1 October, with 31.2mm of rain recorded at Weston STW and 27.2mm at Chipping, both in the Lee Chalk unit. Other Lee Chalk rain gauges recording over 20mm on 1 October included Stevenage, Whitwell STW, Dane End STW and Braughing. During October, there were a total of 13 dry days (less than 0.2mm of rain), with the first half of the month being wetter than the second half.

1.2 Soil moisture deficit and recharge

Thanks to the heavy rainfall in September and the first half of October, soil moisture deficits (SMDs) across the Area remained well below the LTA at the end of the month. Despite this, the clay and urban rainfall units in the Area received no effective rainfall during October. Meanwhile, the Lee Chalk and Chilterns East Colne rainfall units both received effective rainfall far above their LTA for the month.

1.3 River flows

October generally saw a decline in river base flows across the Area from their September levels, although still remained high for the time of year, particularly in chalk catchments. Both Panshanger (River Mimram) and Colney Street (River Ver) recorded their highest monthly mean flows for October on record (records start in 1952 and 1956 respectively). Apart from three gauging stations, all chalk indicator sites recorded flows in the exceptionally high band for October. The three outliers in chalk catchments were Wareside (River Ash), which recorded flows in the above normal band, and Denham Lodge (River Misbourne) and Feildes Weir (River Lee) which were both in the notably high band. Despite the high flows in chalk catchments, all of the clay and urban indicator sites recorded mean flows in the normal band for October. Overall, the most notable flow peak during the month was seen around 1 and 2 October in response to the heavy rainfall.

During October, there were 11 flood alerts, most of which were issued on the 1 October across the area, including, the:

- Tidal River Crane
- River Beane catchment
- River Stort and Stansted Brook catchment
- Coln Brook at Iver and Colnbrook
- Upper Colne and Radlett Brook
- River Rib and Quin catchment
- River Lee at Luton, Harpenden and Wheathampstead

Despite the various flood alerts, no flood warnings were issued during October.

1.4 Groundwater levels

Groundwater levels in the Area remained high during October, supported by the recharge seen during September. For October, the majority of indicator sites showed end of month groundwater levels higher than in September, or a slowed decline. With the exception of Therfield Rectory, all groundwater sites in the Upper Lee Chalk showed an increase in groundwater level. All indicator sites recorded groundwater levels in the exceptionally high band, other than Ashley Green and Amersham Road (both in the Mid-Chilterns Chalk) which were in the notably high band.

Some sites recorded their highest end of month groundwater levels on record for October, including:

- Lilley Bottom (Upper Lee Chalk) – records began in 1979
- Crescent Cottages (Upper Lee Chalk) – records began in 1968
- Cave Gate (Upper Lee Chalk) – records began in 1966
- Ballingdon Farm (Mid-Chilterns Chalk) – records began in 1975
- Wapseys Wood (Mid-Chilterns Chalk) – records began in 1988

Therfield Rectory, which has a much longer record than the other abovementioned sites was at its highest end of October level since 1918 (records start in 1883).

1.5 Reservoir stocks

October saw very little change in reservoir levels, with the Lower Thames reservoirs starting the month at 80% of live capacity and ending at 79%. The Lee Valley reservoirs both started and ended October at 94% of live capacity. Both reservoir groups remained above the LTA for October.

1.6 Environmental impact

In the Colne catchment, all chalk river sources moved upstream from their locations in September, the:

- River Ver started flowing at Markyate STW
- Source of the River Gade moved slightly upstream but still below Hudnall
- River Bulbourne was flowing upstream of Dudswell village
- Source of the River Chess moved further upstream from Chesham
- River Misbourne flowed continuously from Mobwell pond

Most of the chalk river sources in the Upper Lee moved upstream compared to September, the:

- River Mimram started flowing at the lakes above Whitwell
- Source of the River Beane was around the village of Walkern
- River Rib started flowing at Reed End but temporarily lost flow around Chipping Bridge
- River Ash (Herts) started flowing upstream of Brent Pelham, although it temporarily lost flow around Clapgate
- Source of the River Stort moved upstream of Langley Lower Green

To protect the environment, during September a number of abstraction licence flow constraints were in force. This ranged between 1 and 2 per week, out of a maximum of 35.

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

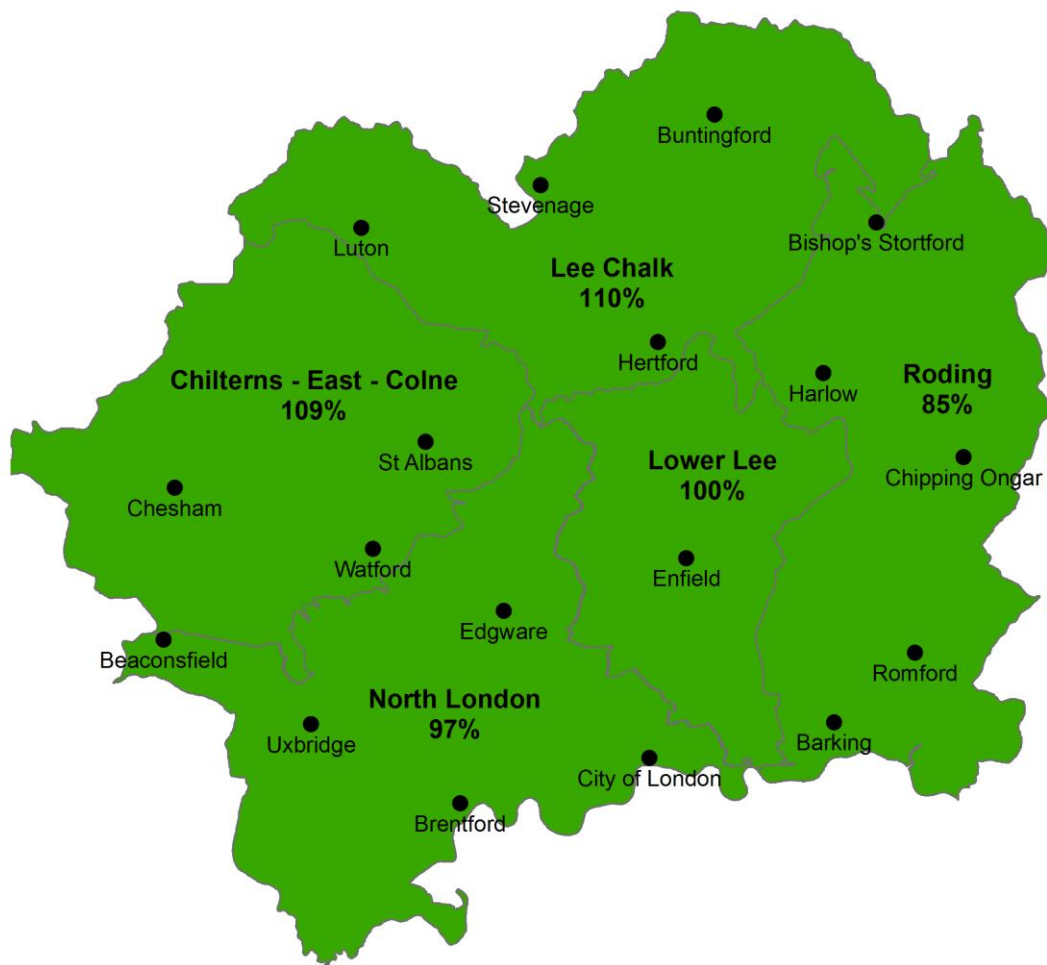
Contact Details: 03708 506 506

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2 Rainfall

2.1 Rainfall map

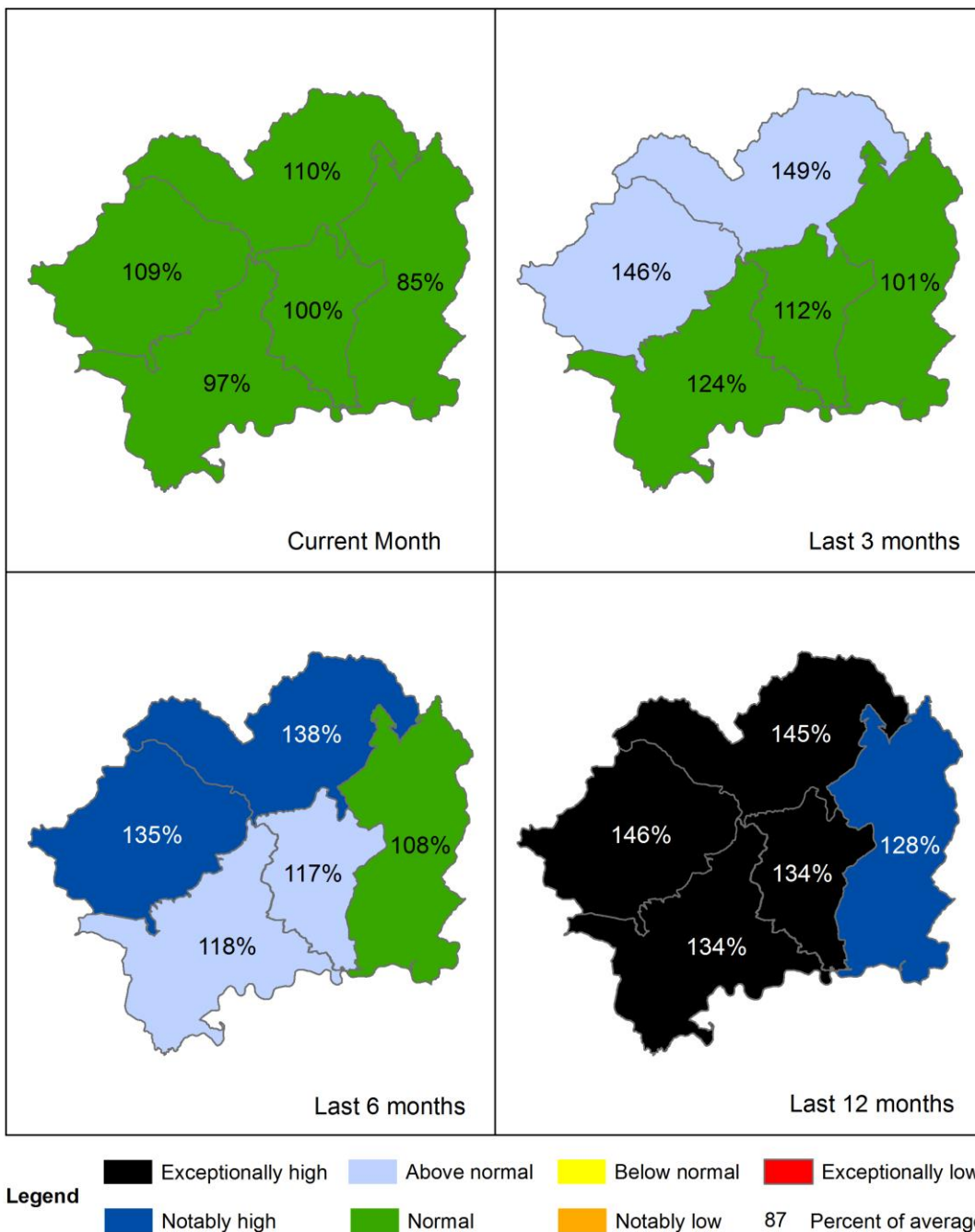
Figure 2.1: Total rainfall for hydrological areas for the current month (up to 31 October 2024), classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.



Legend

Exceptionally high	Below normal	Town / City
Notably high	Notably low	87% Percent of average
Above normal	Exceptionally low	
Normal		

Figure 2.2: Total rainfall for hydrological areas for the current month (up to 31 October 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.

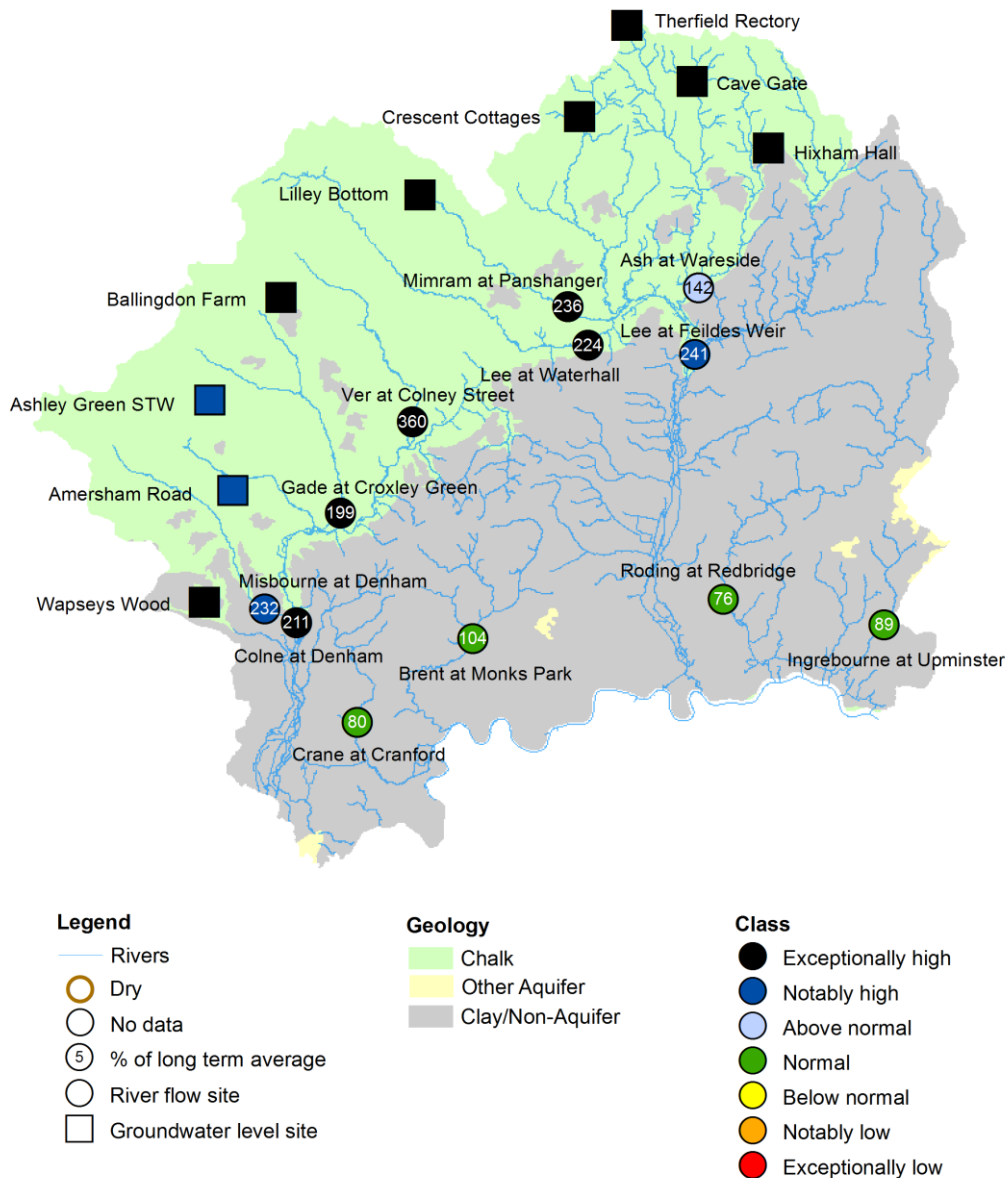


HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2024). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved.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

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 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.



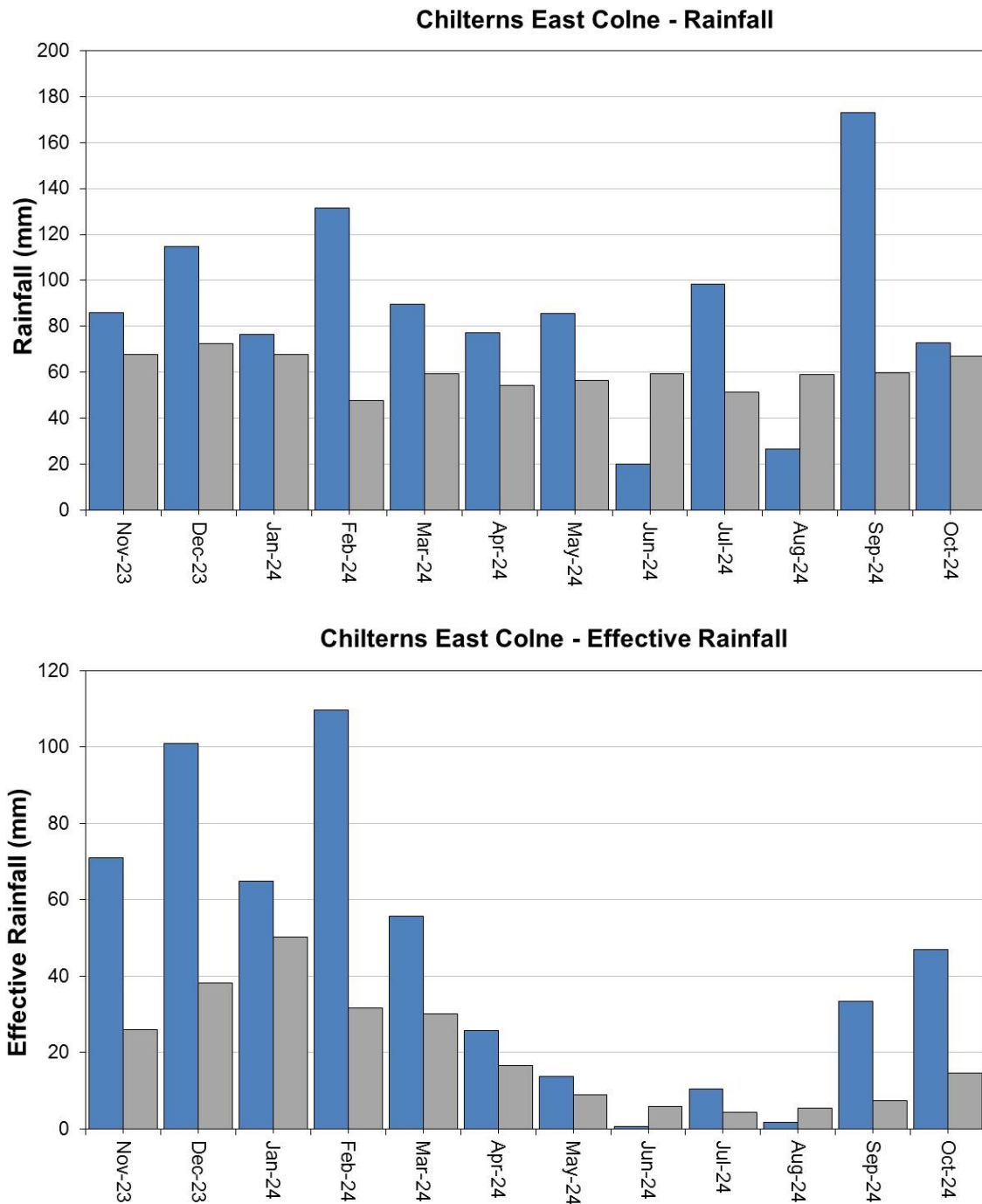
(Source: Environment Agency). Crown copyright. All rights reserved. Environment Agency, 100024198, 2024. Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2024.

4 Colne Catchment

4.1 Colne Rainfall and effective rainfall charts

Figure 4.1: Monthly rainfall and effective rainfall totals for the past 24 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)

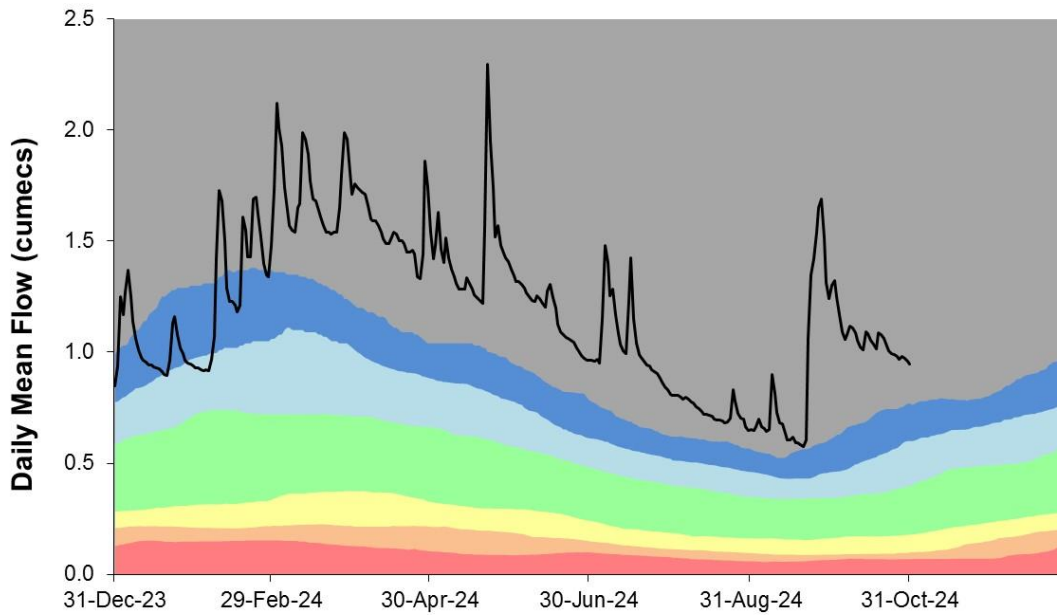
4.2 Colne River flow charts

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.



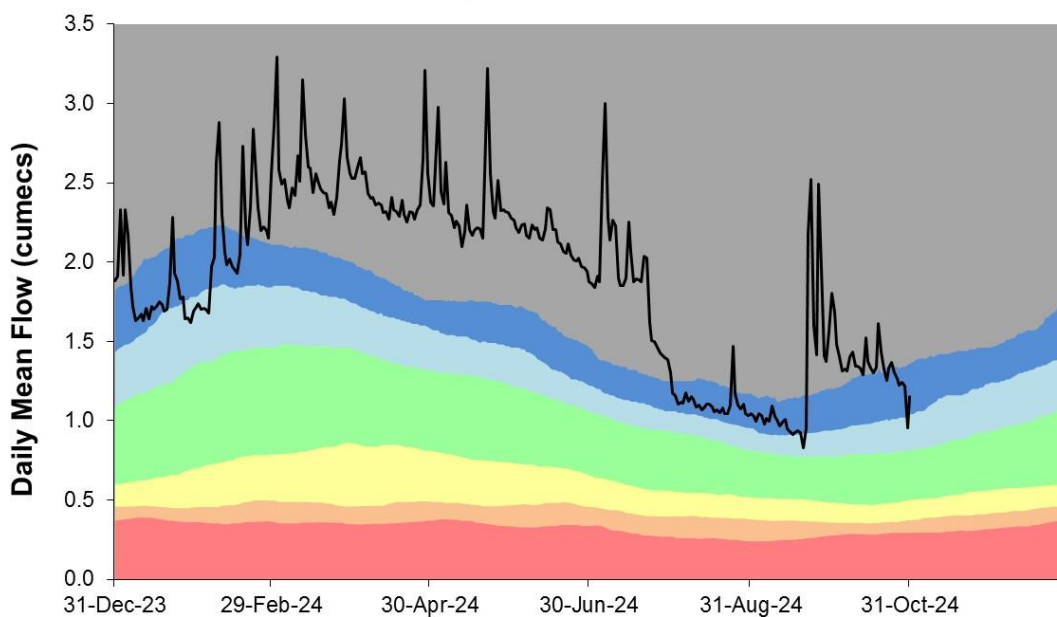
RIVER VER AT COLNEY STREET (HANSTEADS)

Ranking used data from 01/10/1956 to 31/12/2022

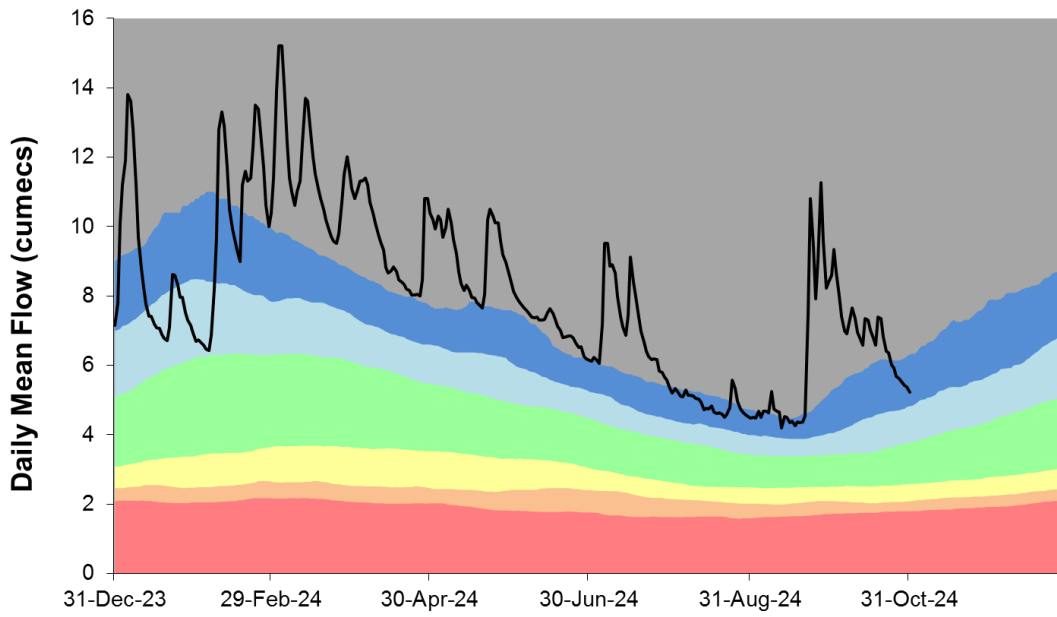


RIVER GADE AT CROXLEY GREEN

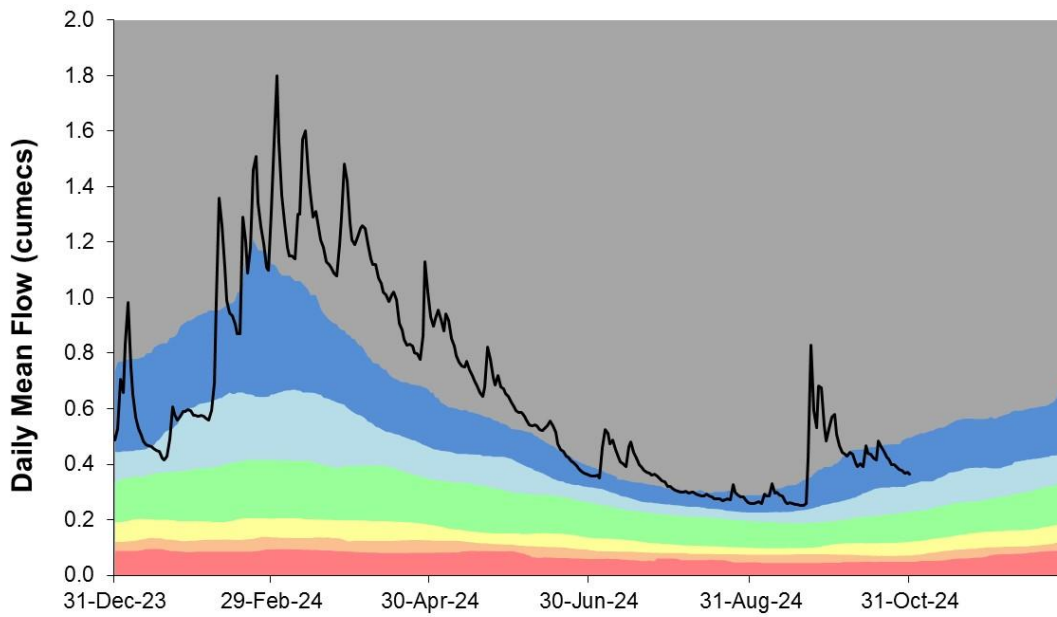
Ranking used data from 01/10/1970 to 31/12/2022



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



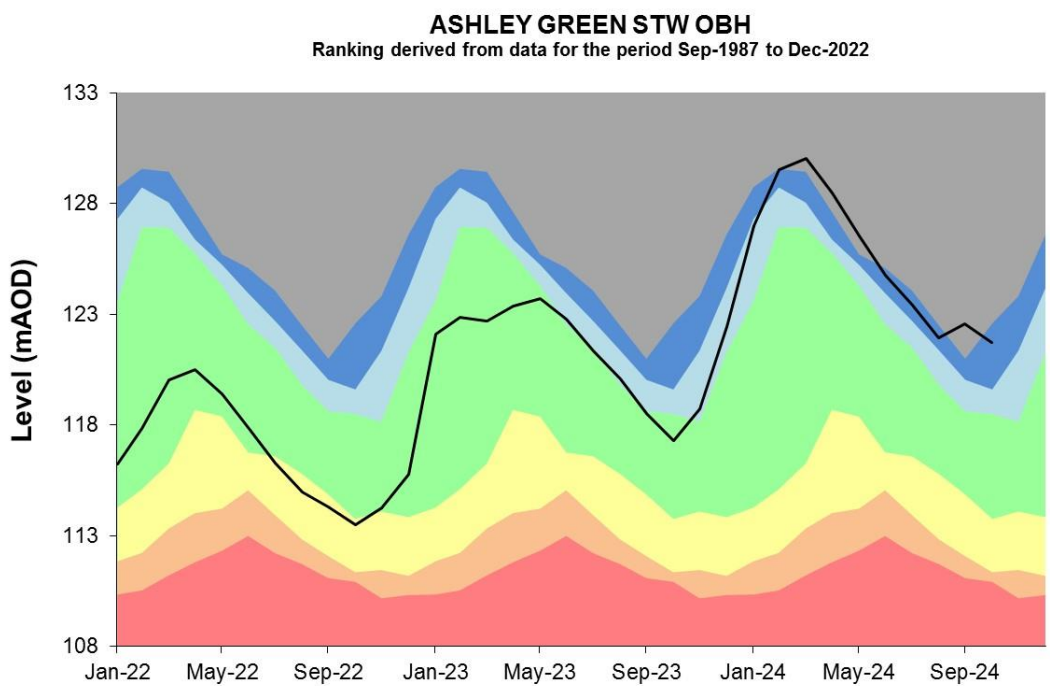
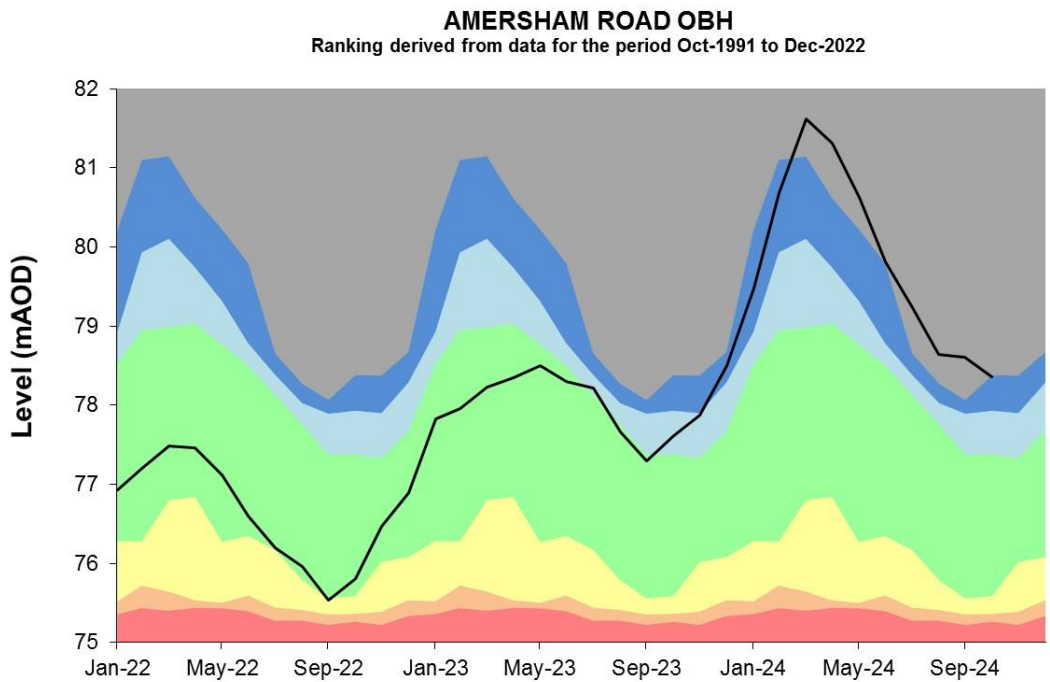
RIVER MISBOURNE AT DENHAM LODGE
Ranking used data from 01/07/1984 to 31/12/2022



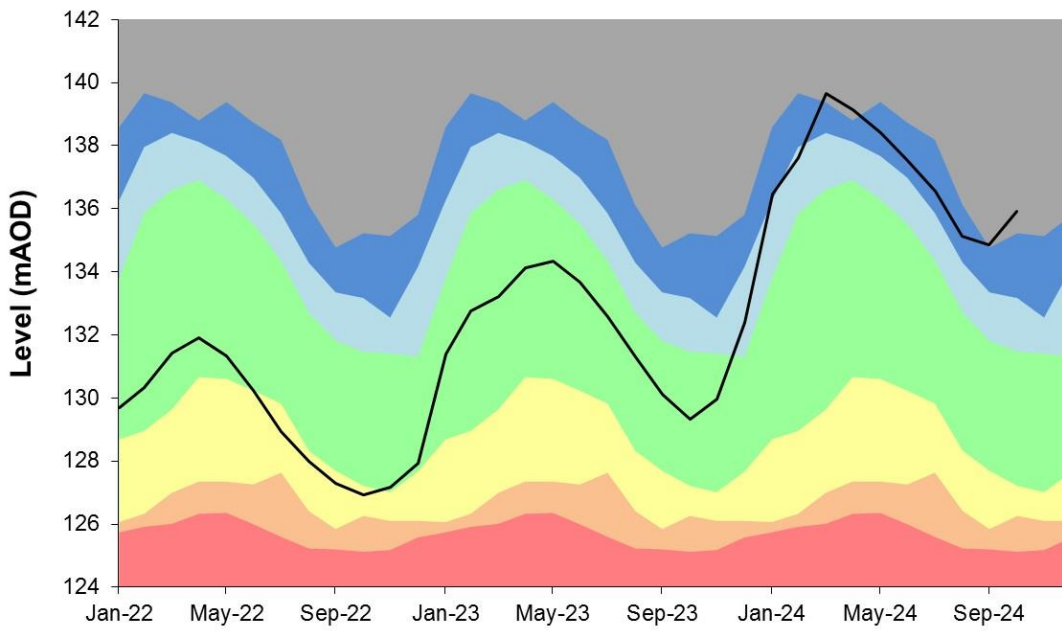
Source: Environment Agency, 2024

4.3 Colne Groundwater level charts

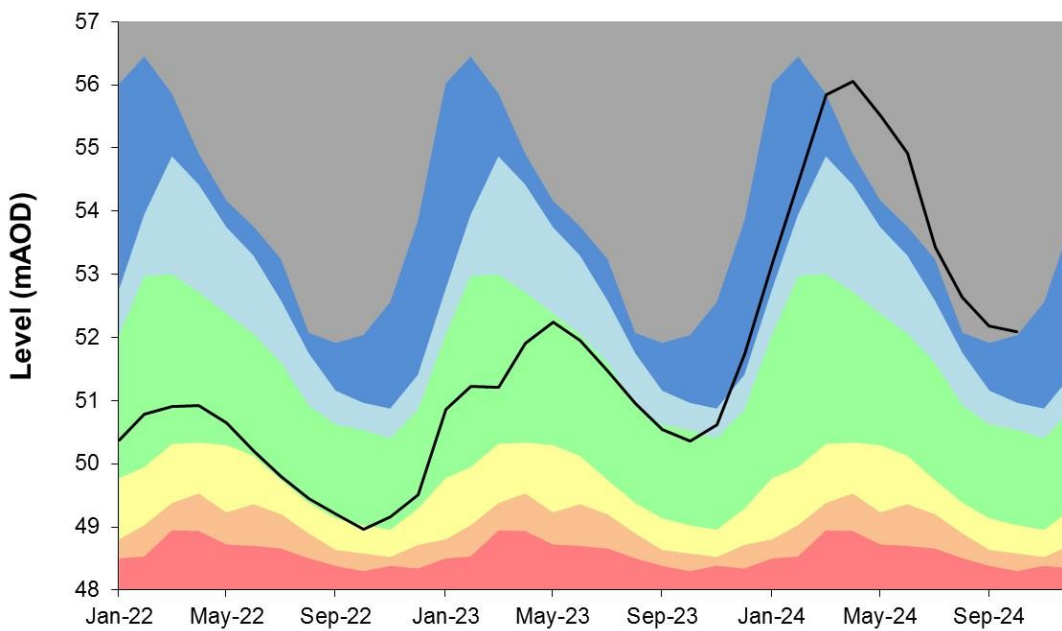
Figure 4.3: End of month groundwater levels at index groundwater level sites for major aquifers. 22 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



BALLINGDON FARM
Ranking derived from data for the period Jan-1975 to Dec-2022



WAPSEYS WOOD OBH
Ranking derived from data for the period Mar-1988 to Dec-2022



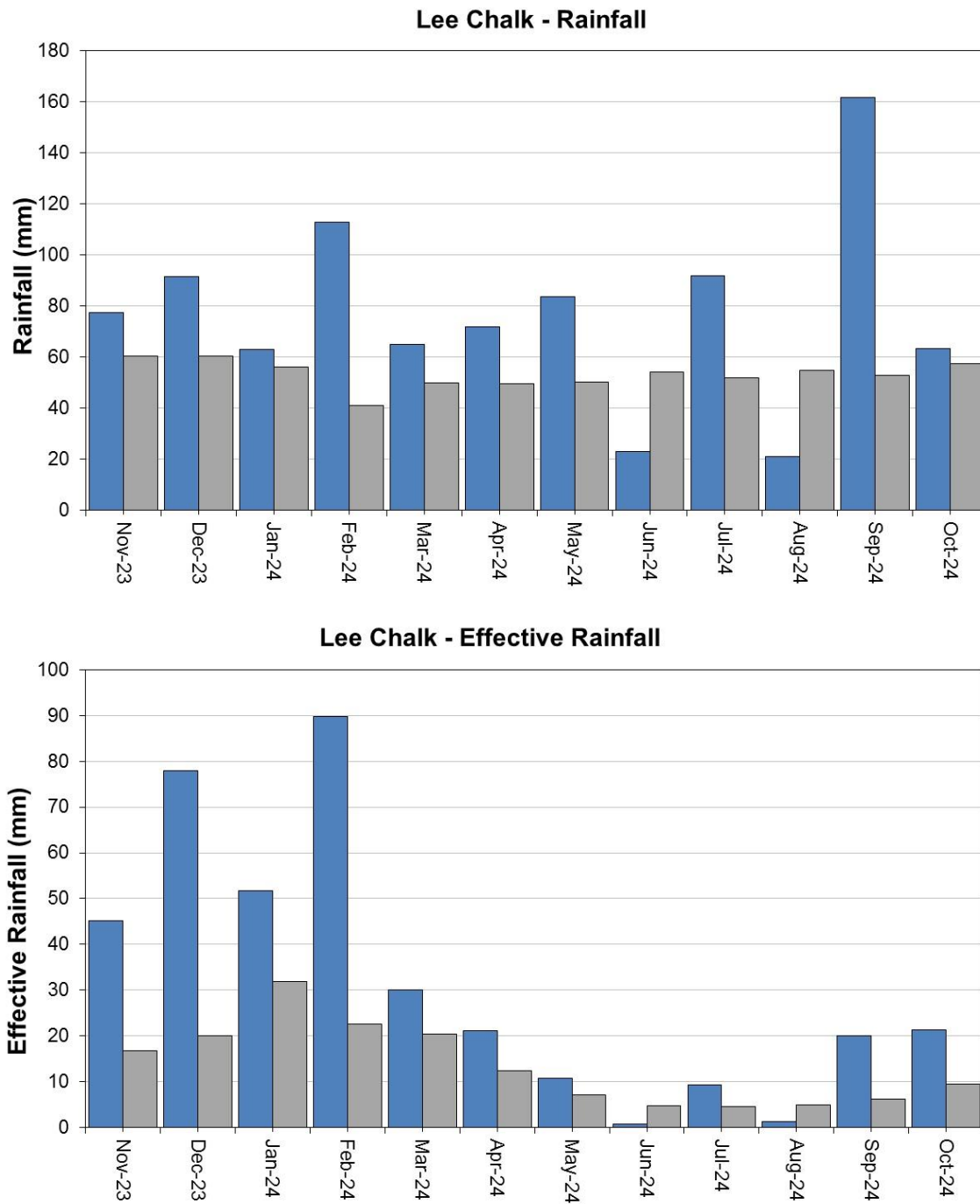
Source: Environment Agency, 2024

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 24 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)

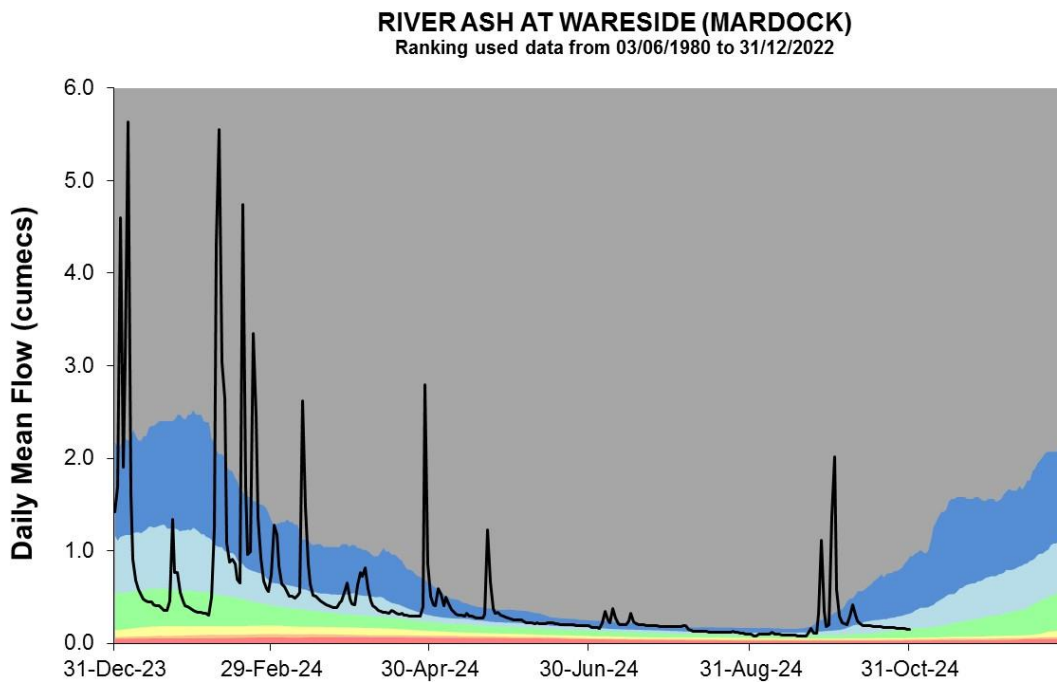
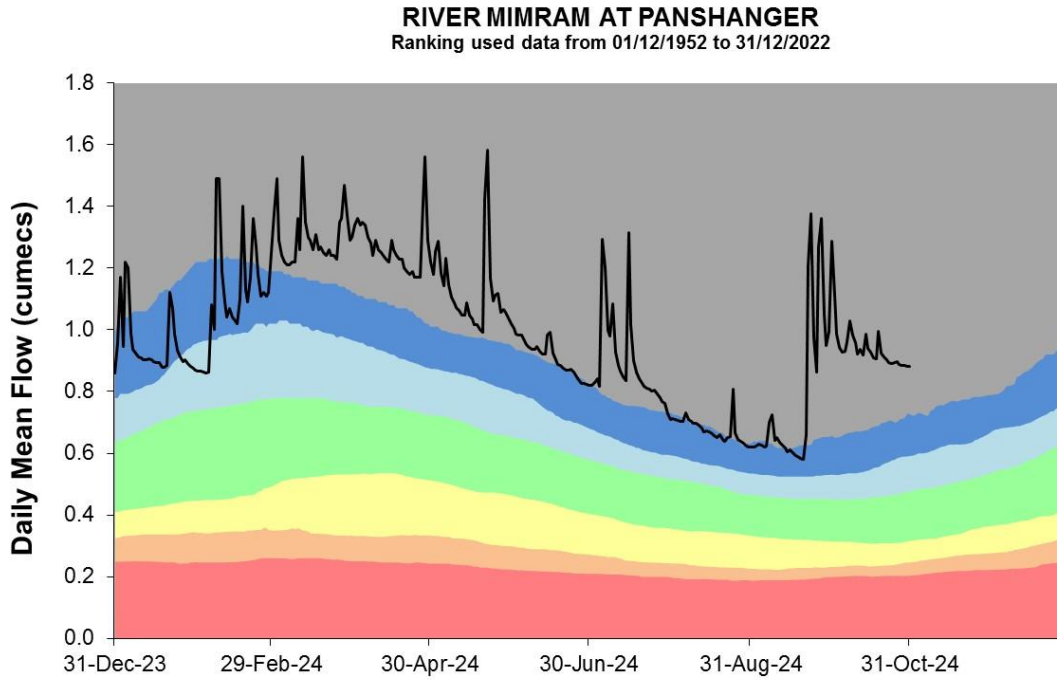


HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

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

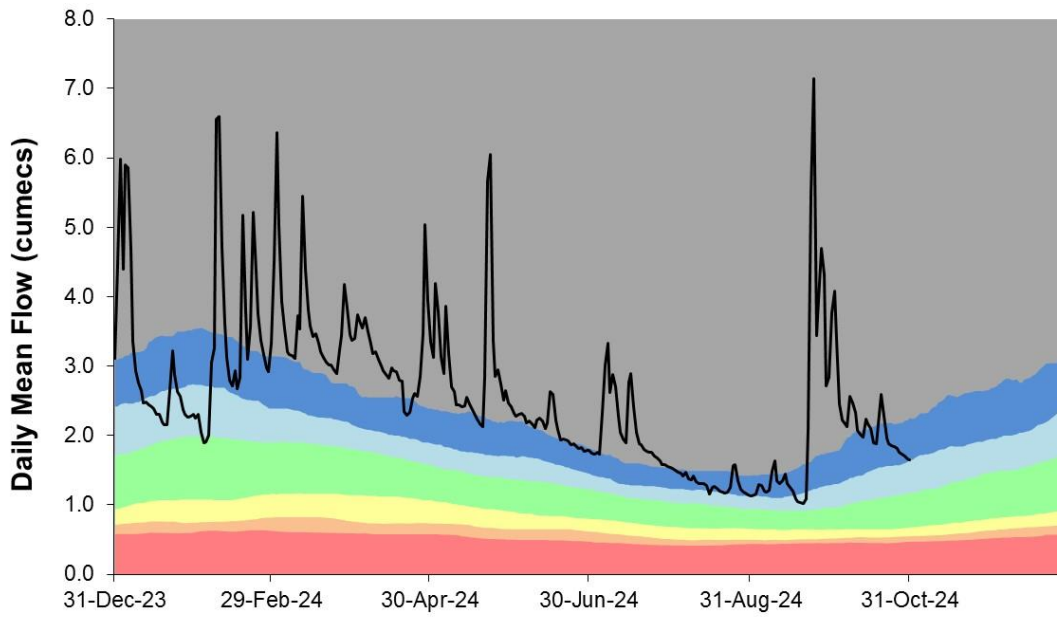
5.2 Upper Lee River flow charts

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.



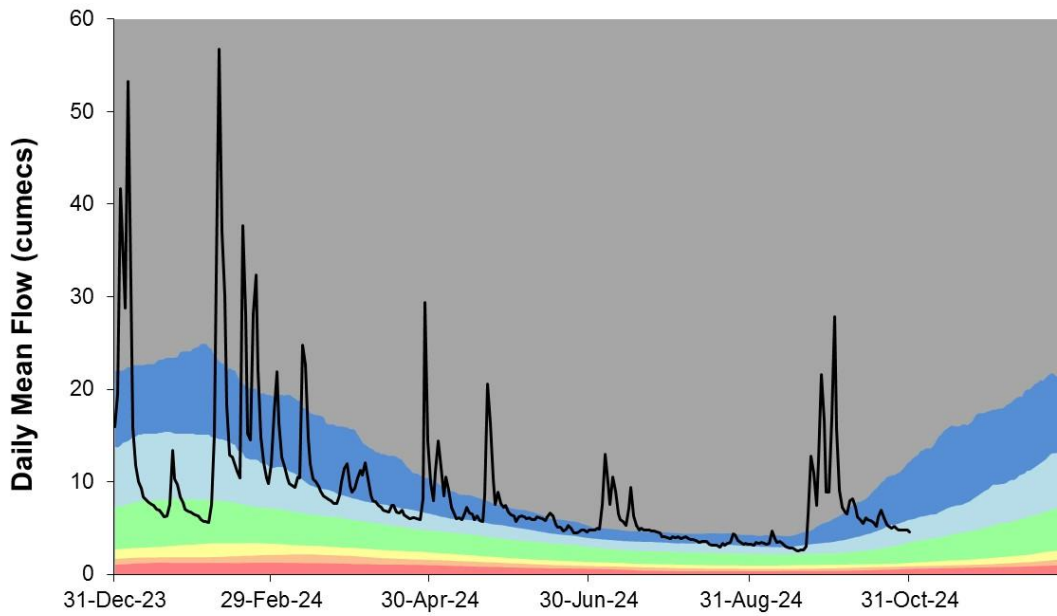
RIVER LEE AT HOWE GREEN (WATER HALL)

Ranking used data from 01/04/1959 to 31/12/2022



RIVER LEE AT FEILDES WEIR

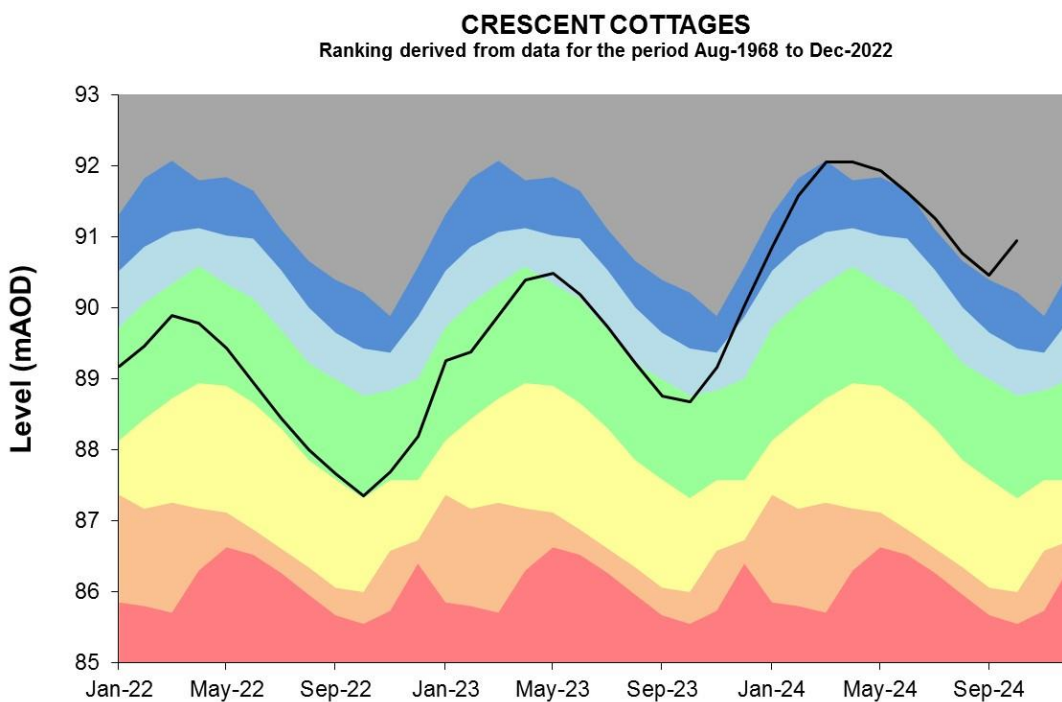
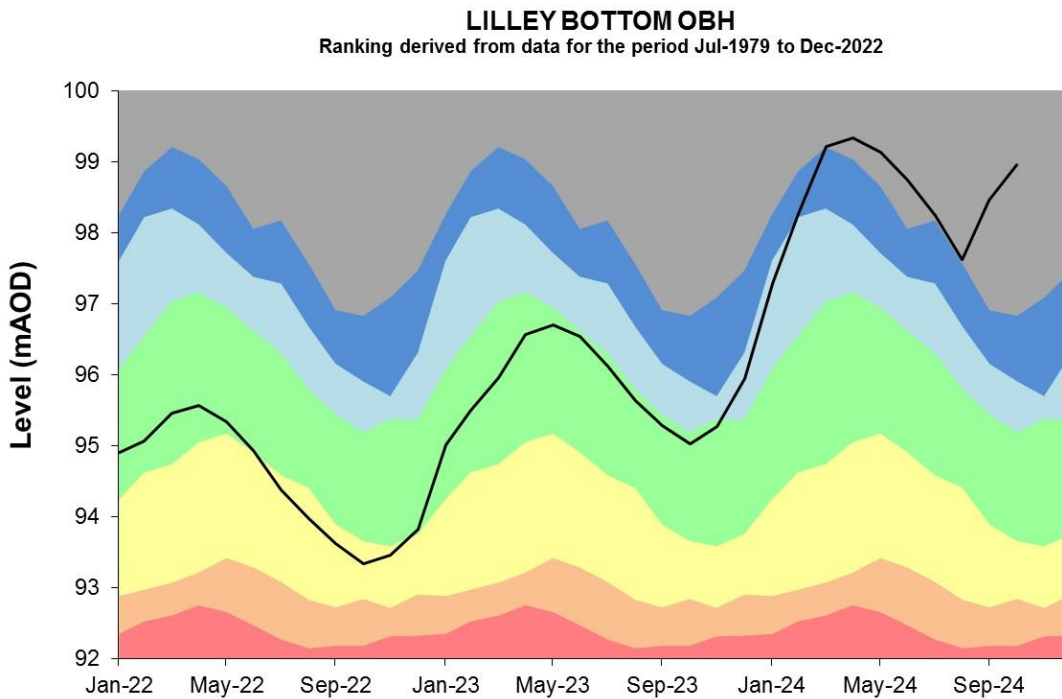
Ranking used data from 10/05/1883 to 31/12/2022



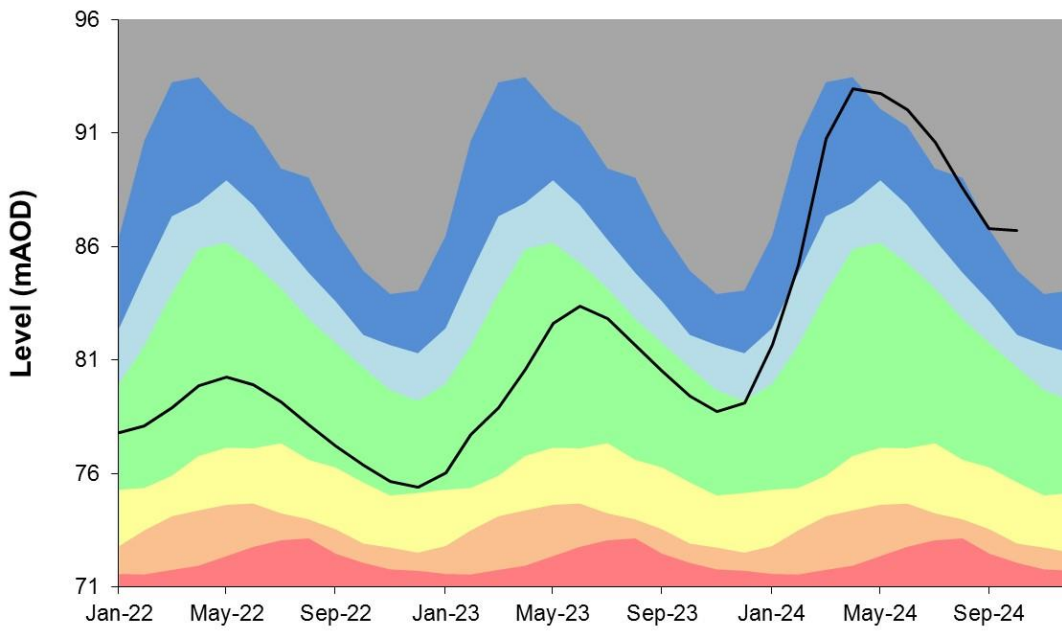
Source: Environment Agency, 2024

5.3 Upper Lee Groundwater level charts

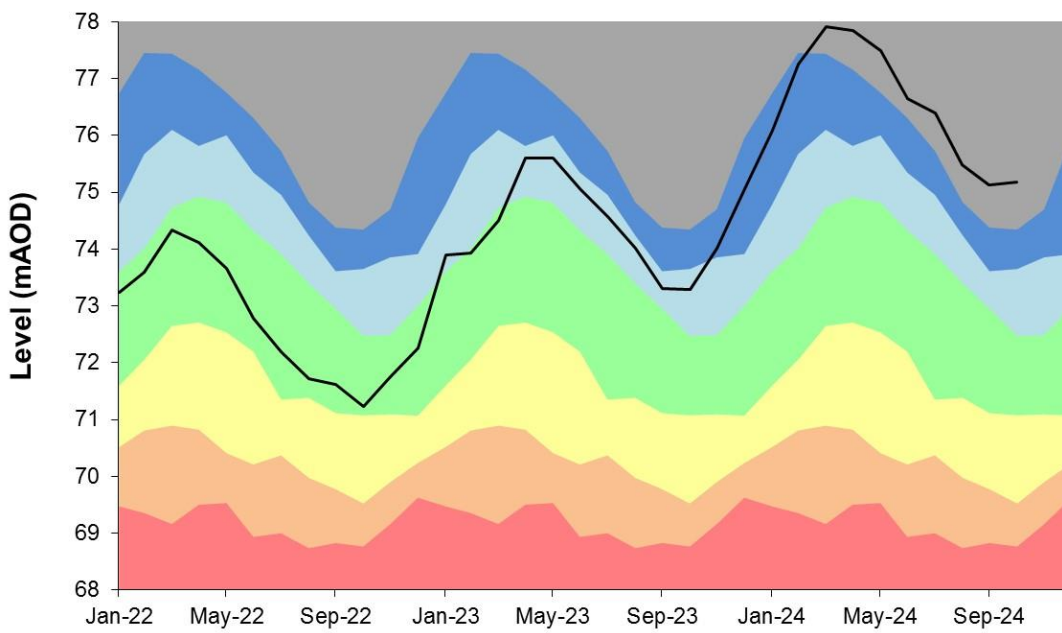
Figure 5.3: End of month groundwater levels at index groundwater level sites for major aquifers. 22 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



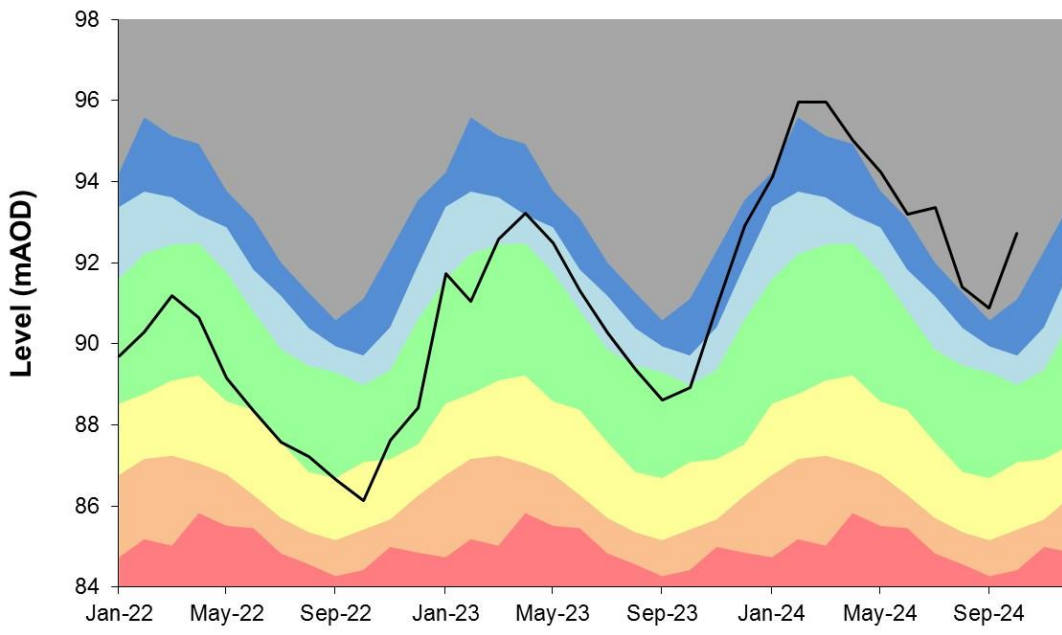
THERFIELD RECTORY
Ranking derived from data for the period Jan-1883 to Dec-2022



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



CAVE GATE
Ranking derived from data for the period Jun-1966 to Dec-2022



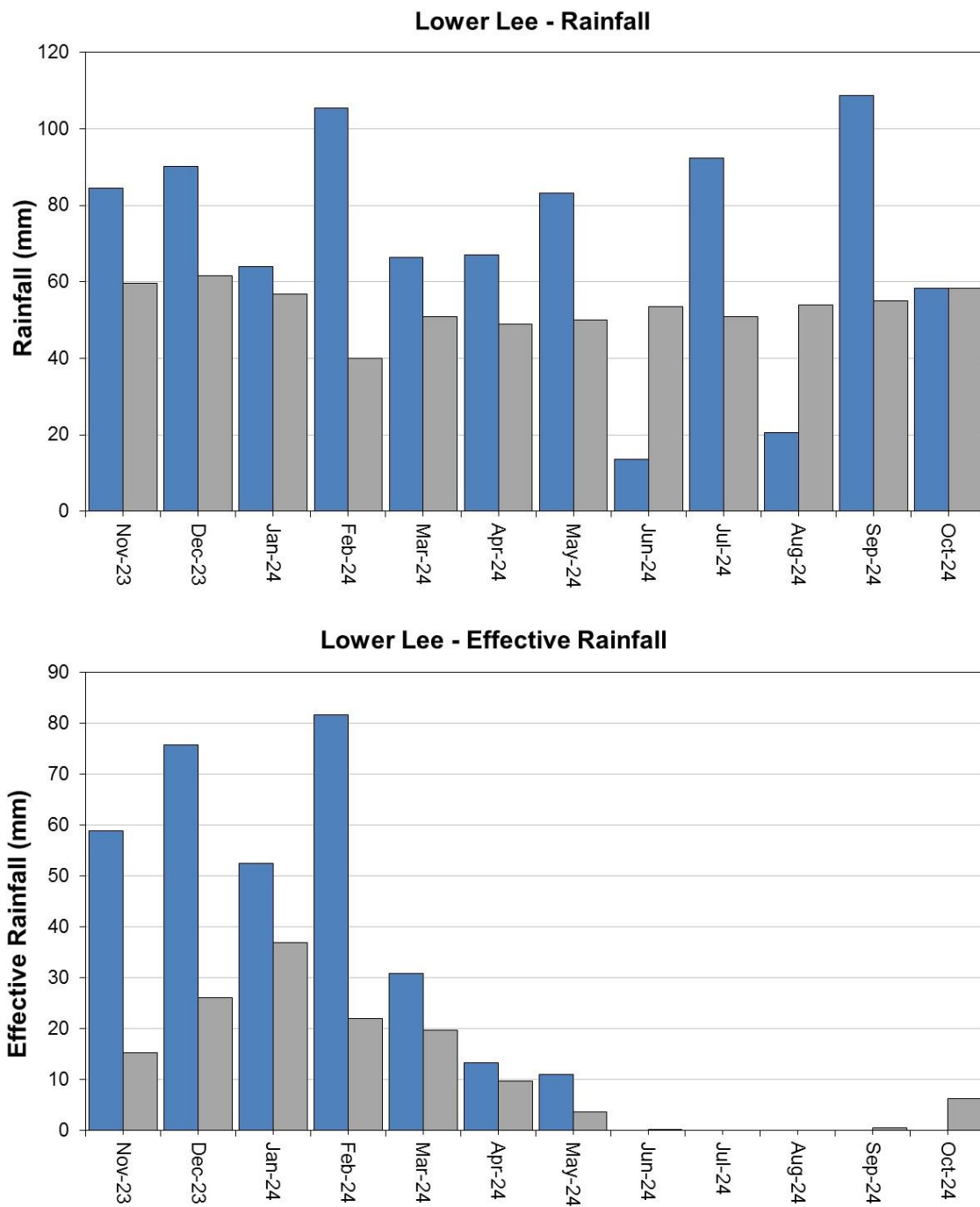
Source: Environment Agency, 2024

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 24 months as a percentage of the 1961 to 1990 long term average for the Lower Lee.

■ 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)

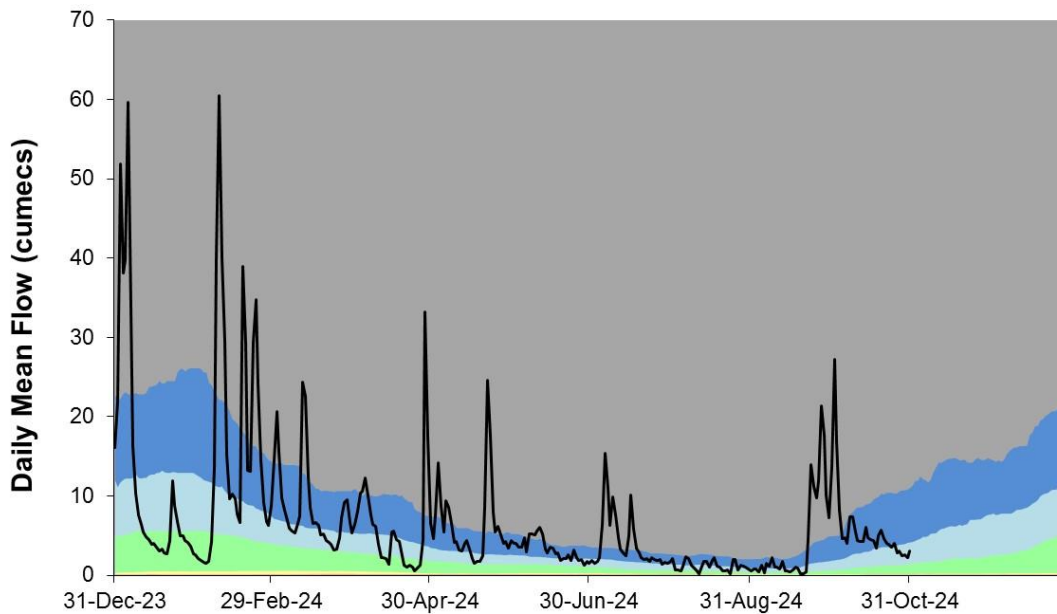
6.2 Lower Lee River flow charts

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.



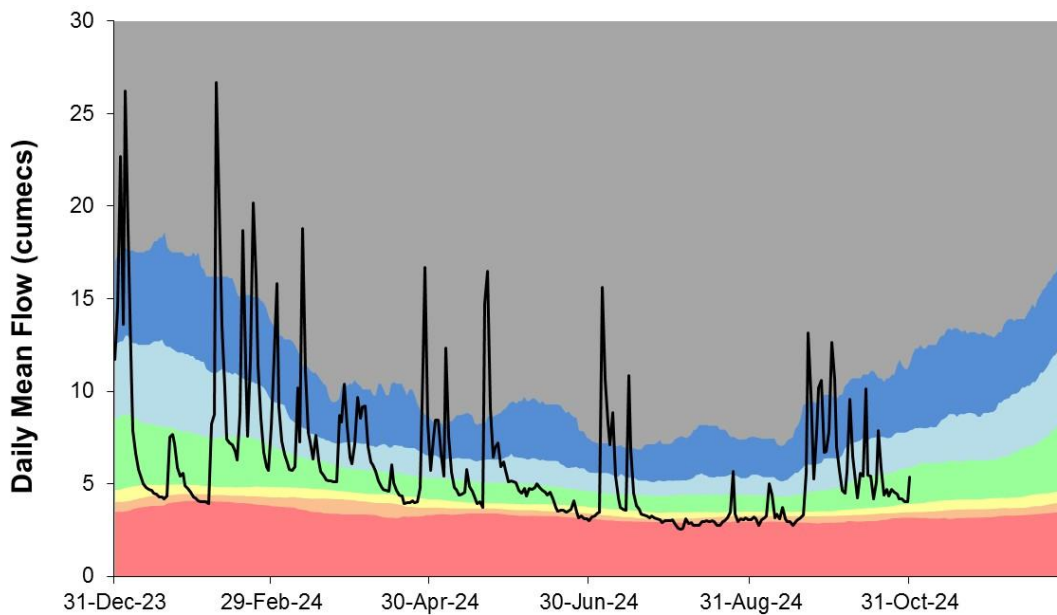
LEE FLOOD CHANNEL AT WALTHAMSTOW (LOW HALL)

Ranking used data from 01/01/1980 to 31/12/2022



RIVER LEE AT LEA BRIDGE

Ranking used data from 22/07/1992 to 31/12/2022



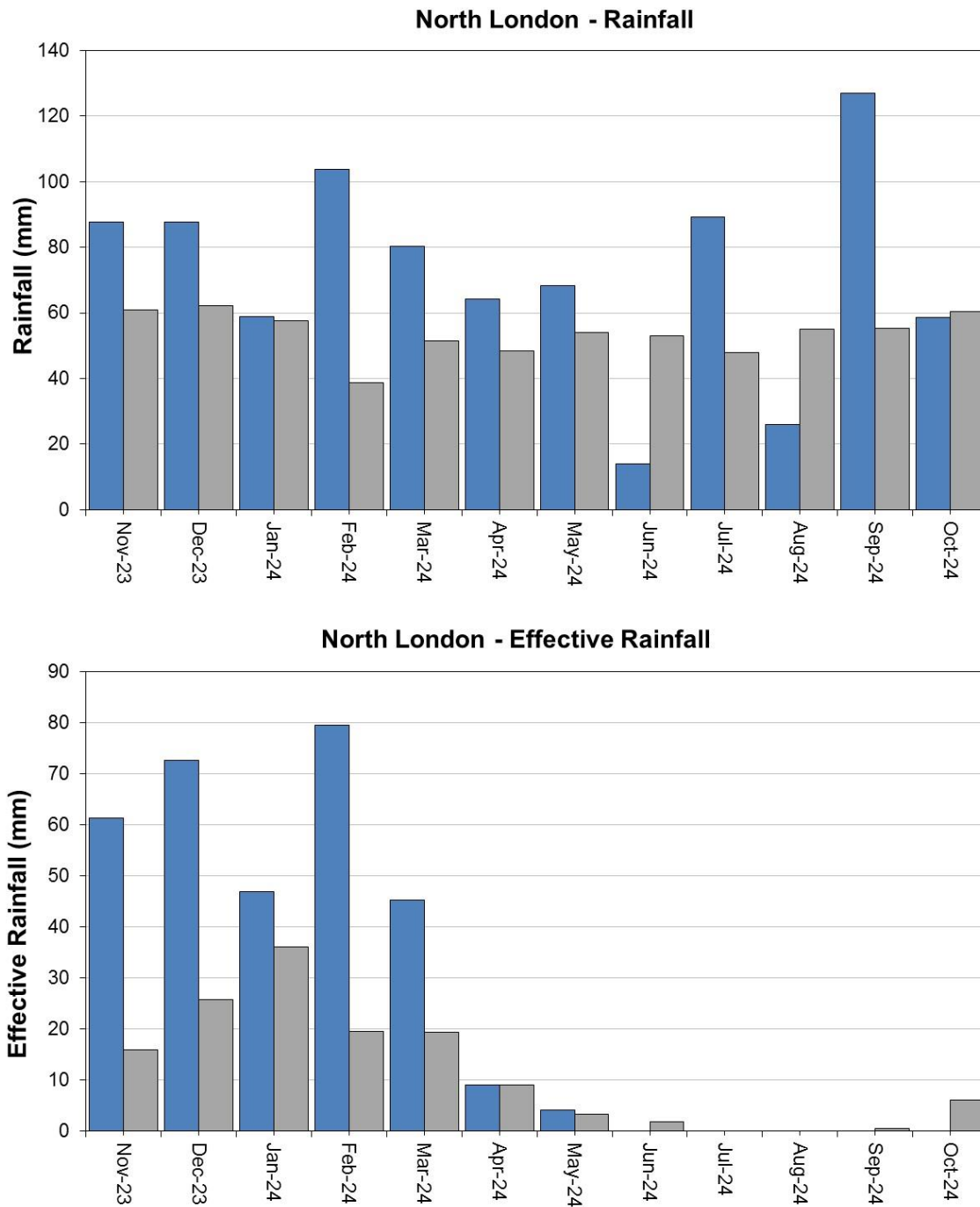
Source: Environment Agency, 2024

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 24 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)

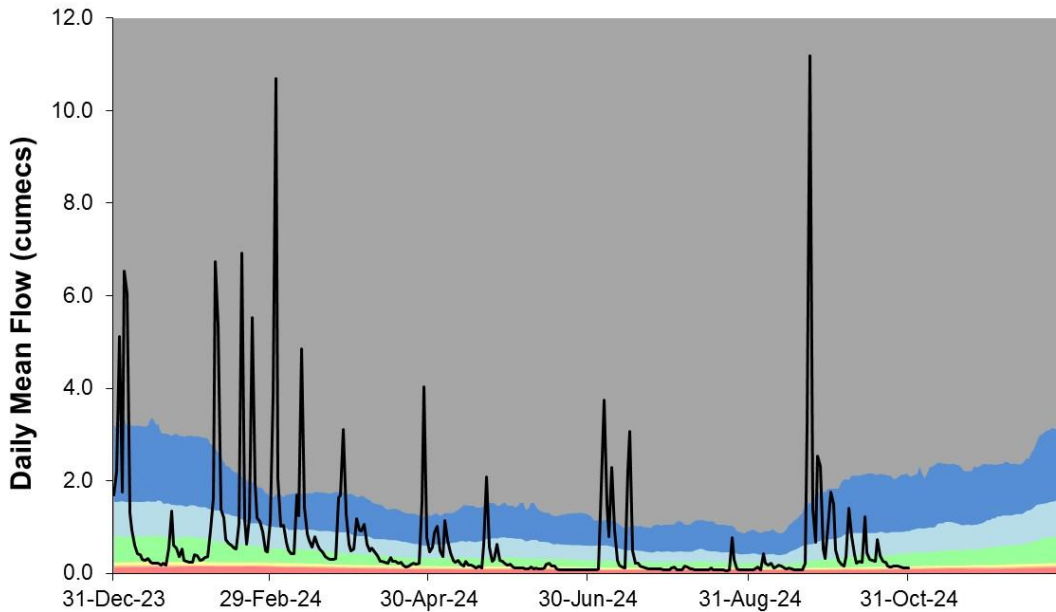
EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2024)

7.2 North London River flow charts

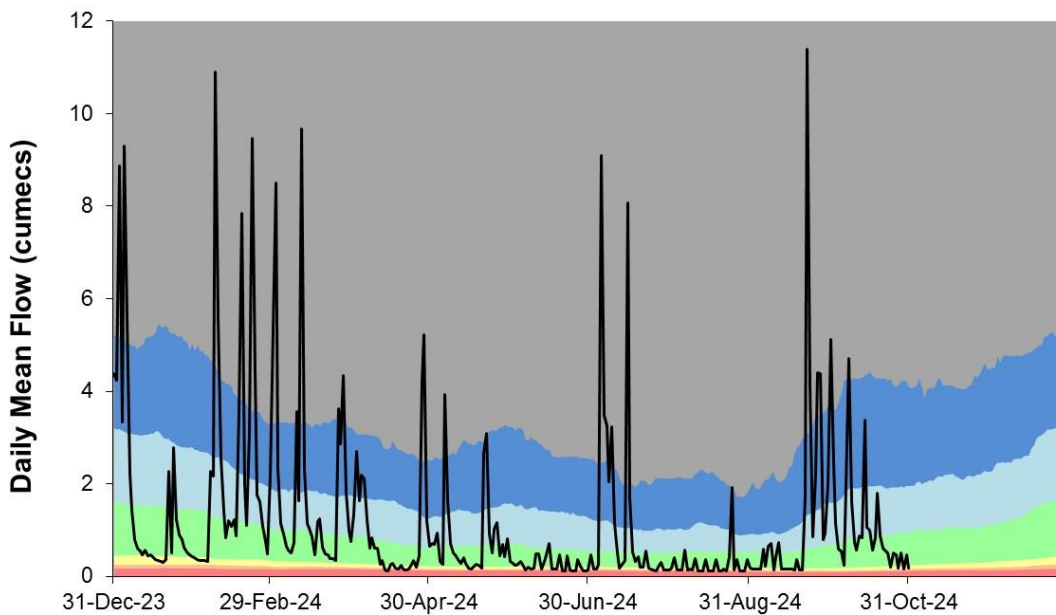
Figure 7.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



RIVER CRANE AT CRANFORD PARK
Ranking used data from 03/04/1978 to 31/12/2022



RIVER BRENT AT MONKS PARK
Ranking used data from 01/12/1978 to 31/12/2022



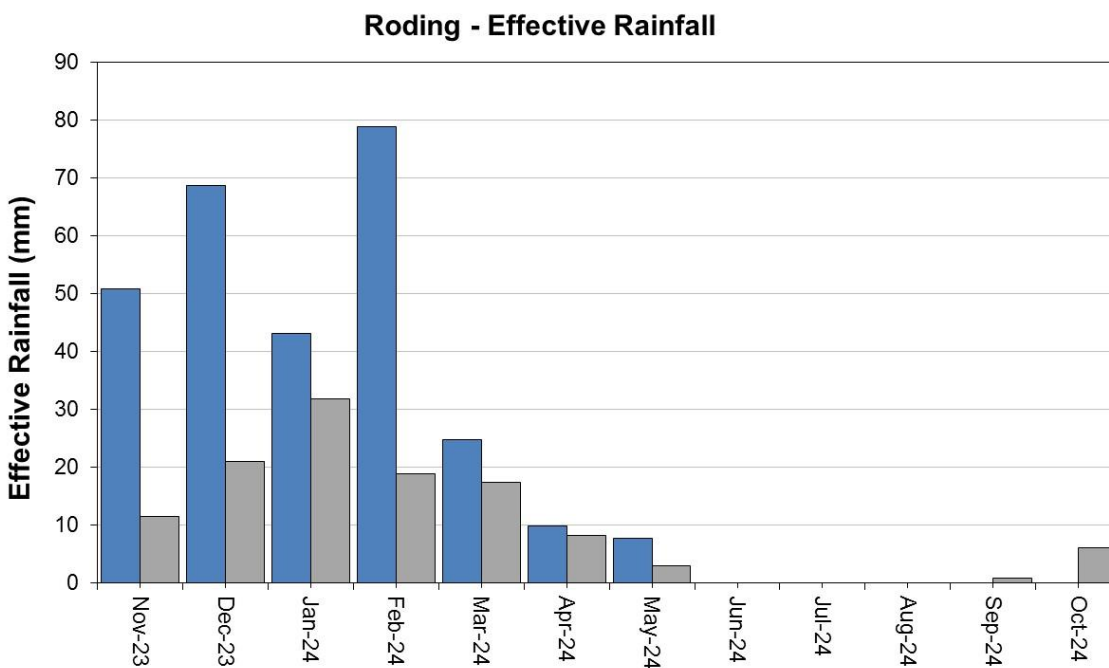
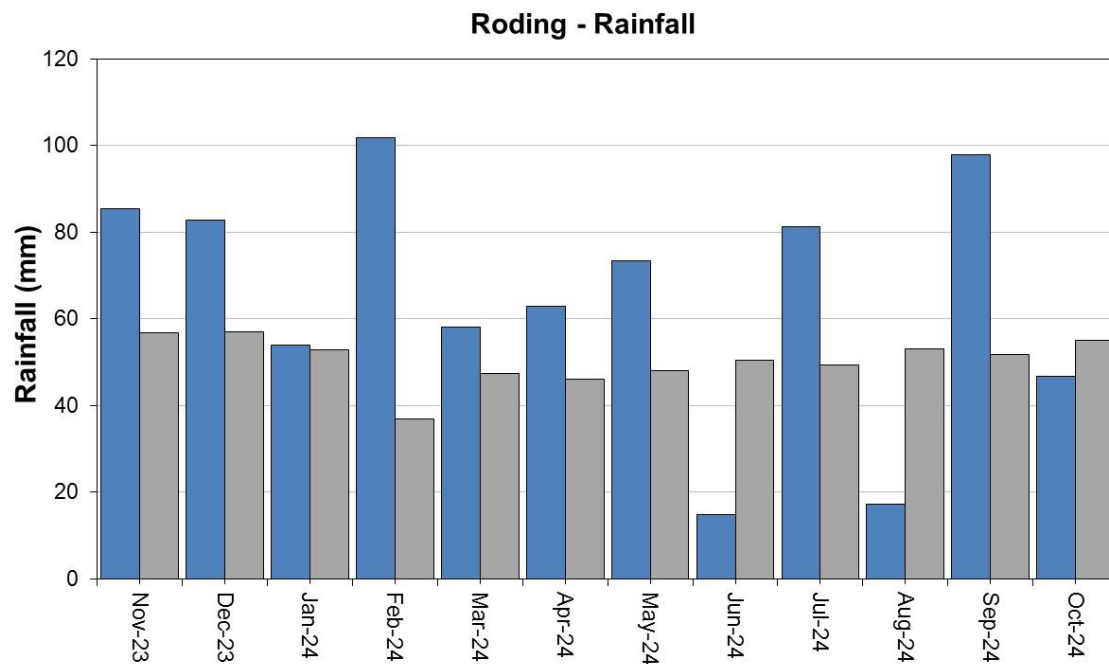
Source: Environment Agency, 2024

8 Roding Catchment

8.1 Roding Rainfall and Recharge chart

Figure 8.1: Monthly rainfall and recharge totals for the past 24 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)

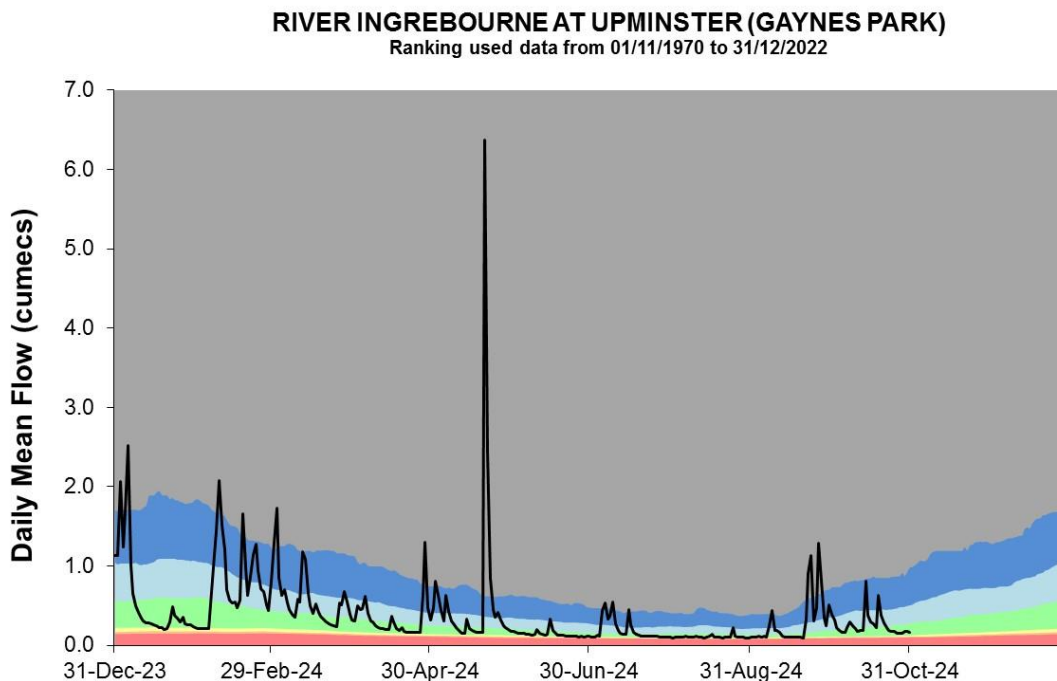
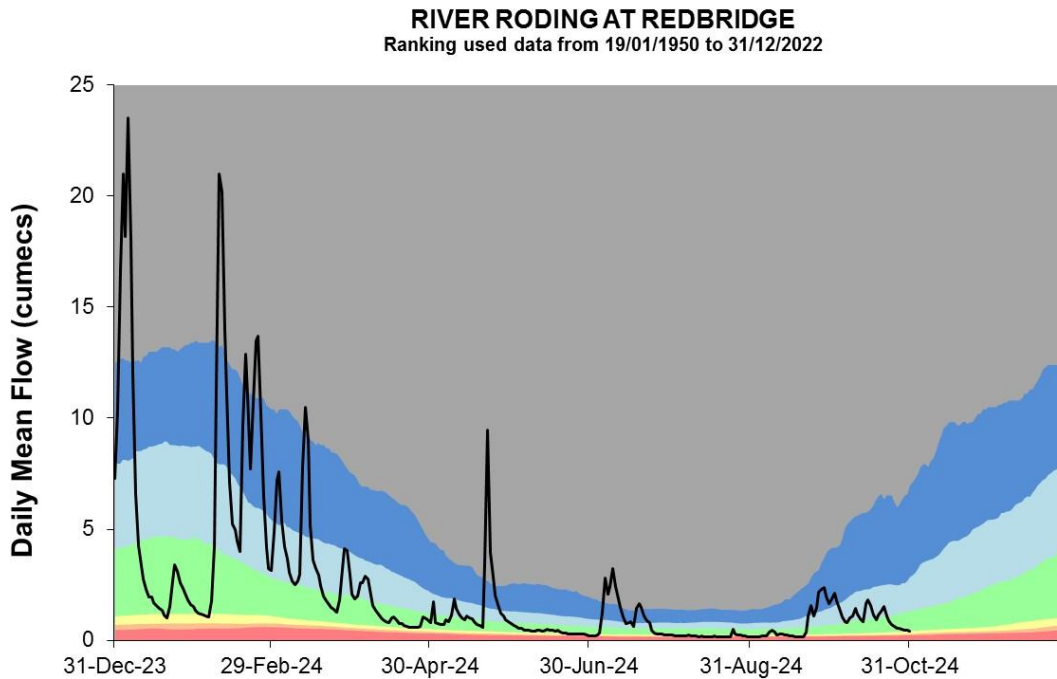


HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

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.

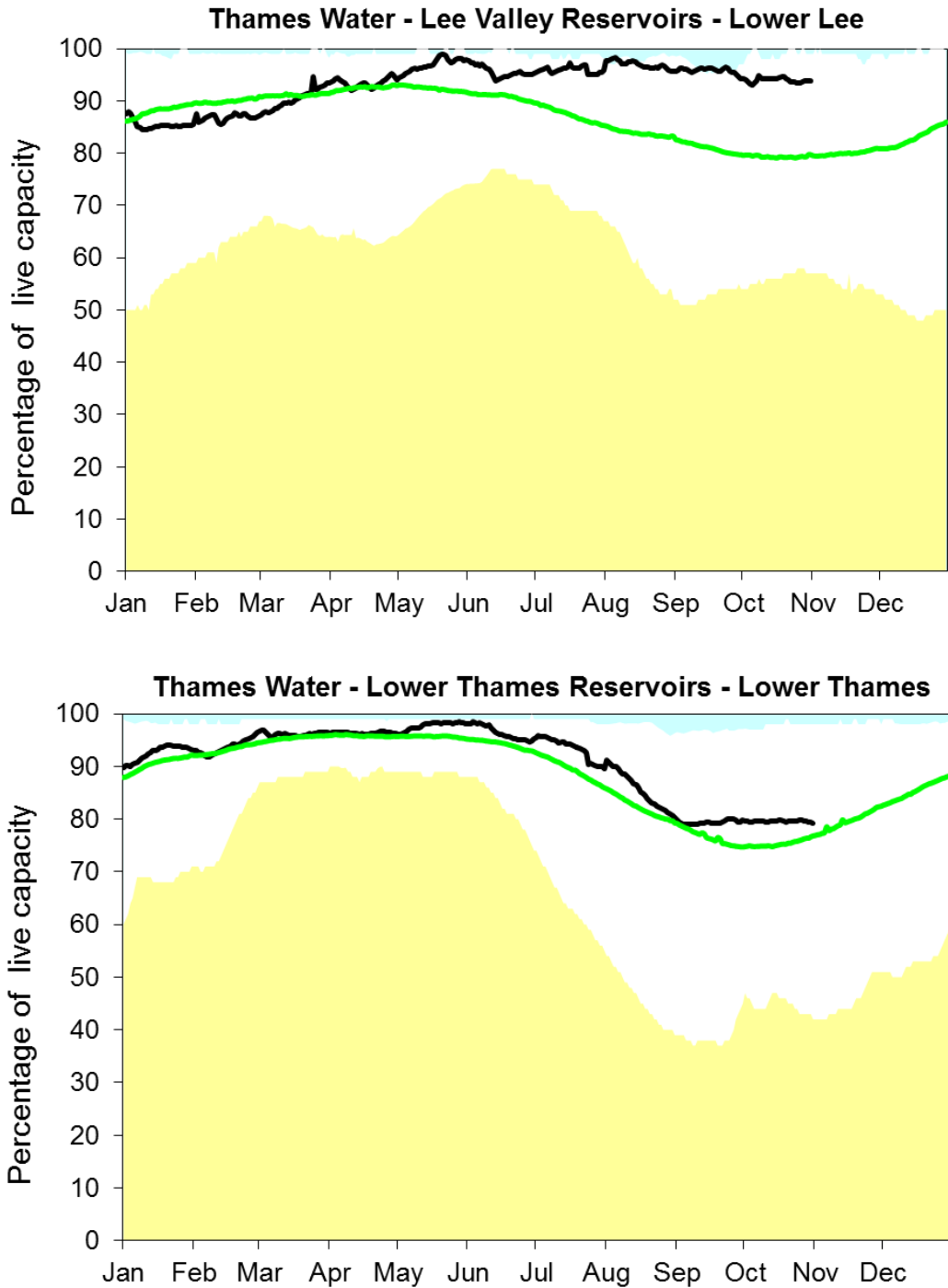


Source: Environment Agency, 2024

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.

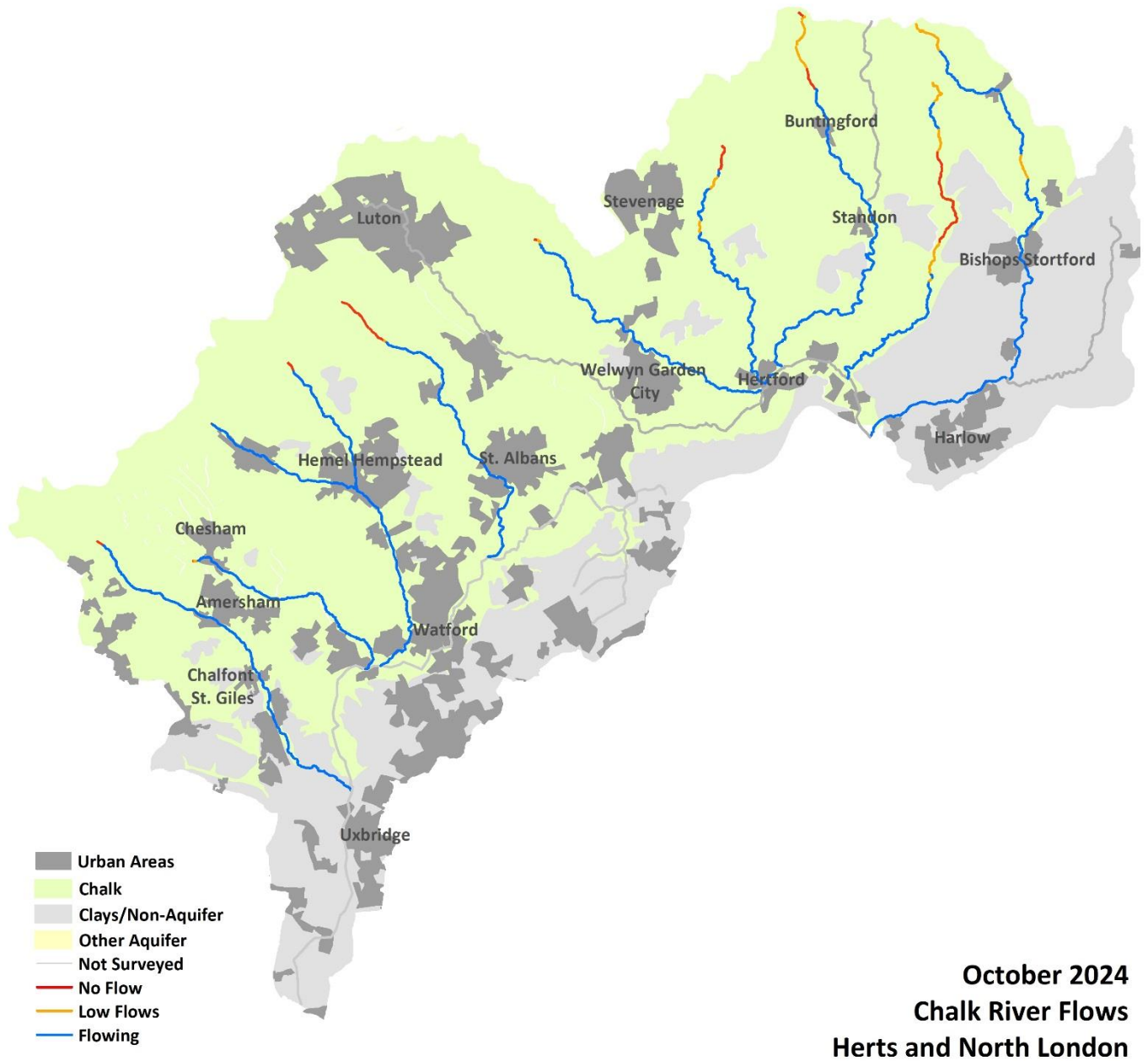
Below minimum
 Above maximum
 Average
 Latest data



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	Oct 2024 total rainfall in mm	Oct 2024 rainfall long term average 1961 to 1990	Oct 2024 rainfall % of long term average 1961 to 1990	Winter Oct 2024 to Oct 2024 total rainfall in mm	Winter Oct 2024 to Oct 2024 rainfall % of long term average 1961 to 1990
Chilterns East Colne	73	67	109	73	109
Lee Chalk	63	57	110	63	110
Lower Lee	58	58	100	58	100
North London	59	60	97	58	96
Roding	47	55	85	47	85
Herts and North London total	60	60	100	60	100

12.2 Rainfall banding table

Hydrological area	Oct 2024 band	Aug 2024 to Oct 2024 cumulative band	May 2024 to Oct 2024 cumulative band	Nov 2023 to Oct 2024 cumulative band
Chilterns East Colne	Normal	Above normal	Notably high	Exceptionally high
Lee Chalk	Normal	Above normal	Notably high	Exceptionally high
Lower Lee	Normal	Normal	Above normal	Exceptionally high
North London	Normal	Normal	Above normal	Exceptionally high
Roding	Normal	Normal	Normal	Notably high

12.3 Effective Rainfall table

Hydrological area	Oct 2024 total effective rainfall in mm	Oct 2024 effective rainfall long term average 1961 to 1990 in mm	Oct 2024 effective rainfall % of long term average 1961 to 1990	Winter Oct 2024 to Oct 2024 total effective rainfall in mm	Winter Oct 2024 to Oct 2024 effective rainfall % of long term average 1961 to 1990
Chilterns East Colne	47	15	324	47	323
Lee Chalk	21	9	224	21	224
Lower Lee	0	6	0	0	0
North London	0	6	0	0	0
Roding	0	6	0	0	0
Herts and North London total	14	8	162	14	161

12.4 Soil Moisture Deficit table

Hydrological area	Oct 2024 end of month Soil Moisture Deficit in mm	Oct 2024 end of month Soil Moisture Deficit long term average 1961 to 1990 in mm	Sep 2024 end of month Soil Moisture Deficit in mm	Sep 2024 end of month Soil Moisture Deficit long term average 1961 to 1990 in mm
Chilterns East Colne	6	71	0	94
Lee Chalk	6	88	3	104
Lower Lee	18	73	27	97
North London	7	76	27	100
Roding	44	79	48	99
Herts and North London total	16	77	23	99

12.5 River flows table

Site name	River	Catchment	Oct 2024 band	Sep 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	Exceptionally high
Denham Colne	Colne	Colne	Exceptionally high	Exceptionally high
Howe Green (Water Hall)	Lee	Upper Lee	Exceptionally high	Exceptionally high
Panshanger	Mimram	Upper Lee	Exceptionally high	Exceptionally high
Wareside (Mardock)	Ash	Upper Lee	Above normal	Notably high
Feildes Weir (naturalised)	Lee	Upper Lee	Notably high	Exceptionally high
Brent (Monks Park)	Brent	North London	Normal	Notably high
Cranford (Cranford Park)	Crane	North London	Normal	Exceptionally high
Redbridge	Roding	Roding, Beam and Ingrebourne	Normal	Above normal
Upminster (Gaynes Park)	Ingrebourne	Roding, Beam and Ingrebourne	Normal	Exceptionally high

12.6 Groundwater table

Site name	Aquifer	Oct 2024 band	Sep 2024 band
Ashley Green	Mid-Chilterns Chalk	Notably high	Exceptionally high
Ballingdon Farm	Mid-Chilterns Chalk	Exceptionally high	Exceptionally high
Amersham Road	Mid-Chilterns Chalk	Notably high	Exceptionally high
Wapseys Wood	Mid-Chilterns Chalk	Exceptionally high	Exceptionally 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	Exceptionally 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 30 September and 6 October 2024	Number of flow constraints in force between 7 and 13 October 2024	Number of flow constraints in force between 14 and 20 October 2024	Number of flow constraints in force between 21 and 27 October 2024	Number of flow constraints in force between 28 October and 3 November 2024
1	2	1	1	1