

Monthly water situation report: Hertfordshire and North London Area

1 Summary - April 2024

The Hertfordshire and North London area recorded 69mm of rain during April, 139% of the long term average rainfall for the month. Soil moisture deficits increased but remained well below the month end long term average. River flows started to decline, but many baseflow-dominated rivers had flows that were exceptionally high for the time of year. Groundwater levels also remained high, with most sites in the exceptionally high band and recording their highest April level since 2001.

1.1 Rainfall

During April, the Hertfordshire and North London area (“the Area”) continued to receive rainfall above the long term average (LTA). In total, 69mm of rain fell across the Area, 139% of the April LTA rainfall. All 5 areal rainfall units ended the month in the above normal band. Despite the large monthly total, nearly half the month’s rainfall fell on 27 April, particularly in the Roding, Lee Chalk and Lower Lee catchments. This was the wettest day with rain gauges recording totals of 35.4mm at Moreton STW (Roding), 33.2mm at Weston STW (Lee Chalk), 32.5mm at Runley Wood Pumping Station (Chilterns East), 32.4mm at Nazeing Golf Course (Lower Lee) and 32.2mm at Lilley Manor (Lee Chalk). The rest of the month saw much smaller but relatively consistent rainfall totals. There was an average of 11 dry days (less than 0.2mm of rain) during April.

1.2 Soil moisture deficit and recharge

April marked the start of the summer period, which usually sees soils beginning to dry out and a decline in recharge and runoff. Soil moisture deficits (SMD) across the Area did increase as soils dried from 2mm to 5mm but remained well below the month end LTA of 22mm. As a result, the Area received 142% of the LTA effective rainfall for April and the summer period so far.

1.3 River flows

River flows remained much higher than normal during April despite beginning their seasonal decline. Six river flow indicator sites recorded monthly flows in the exceptionally high band, all being Chalk rivers or those with a high baseflow component. Each of these sites recorded their second highest flows on record for April (exceeded only by 2001). These sites were the River Gade at Croxley Green (records start in 1970), the River Ver at Colney Street (records start in 1956), the River Colne at Denham (records start in 1952), the River Misbourne at Denham Lodge (records start in 1984), the River Lee at Howe Green (records start in 1959), and the River Mimram at Panshanger (records start in 1952).

The River Ash at Wareside was the only Chalk river to record flows in the above normal band, while the River Crane at Cranford Park experienced above normal flows and the River Lee at Feildes Weir had monthly mean flows in the notably high band. A total of 8 flood alerts were issued during this month across the Area, all on the 27 and 28 April in response to high rainfall around this time.

1.4 Groundwater levels

Groundwater remained high in April despite many sites plateauing or starting their seasonal decline. All indicator sites recorded end of month levels in the exceptionally high band other than Therfield Rectory (Upper Lee Chalk), which recorded in the notably high band. The majority of groundwater indicator sites recorded their second highest end of April level on record, exceeded only by 2001. Exceptions were Lilley Bottom, which recorded its third highest April level behind 2001 and 1994 (records start in 1980) and Therfield Rectory, which typically has a delayed response compared to other indicator sites.

1.5 Reservoir stocks

Lower Thames Reservoir levels started April at 96% of live capacity, while the Lower Lee Reservoirs started April at 94% of live capacity. Reservoir stocks in both the Lower Thames and Lee Valley ended April around the LTA, remaining at 96% and 94% of live capacity respectively.

1.6 Environmental impact

The sources of Chalk rivers in the Colne catchment remained in similar locations to March. The River Ver continued to flow upstream of Markyate Cell, while the River Gade was still flowing at Hudnall Corner. Sources of the River Chess and River Misbourne also remained at the same locations, flowing far above Chesham and at Mobwell Pond respectively. The source of the River Bulbourne moved slightly downstream but still remained in the fields above Dudswell village. Most of the sources of Chalk rivers in the Upper Lee catchment remained in similar locations to March. The River Mimram started flowing at the lakes upstream of Whitwell, while the River Beane started flowing at its source upstream of Cromer. The River Stort also continued to flow above the village of Langley Lower Green. The River Rib started flowing upstream of Hay Green, temporarily losing flow around Chipping, while the River Ash (Herts) started flowing at Meesden, temporarily losing flow around Clapgate.

To protect the environment during March a number of abstraction licence flow constraints were in force. This ranged between 0 and 2 per week, out of a maximum of 32.

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

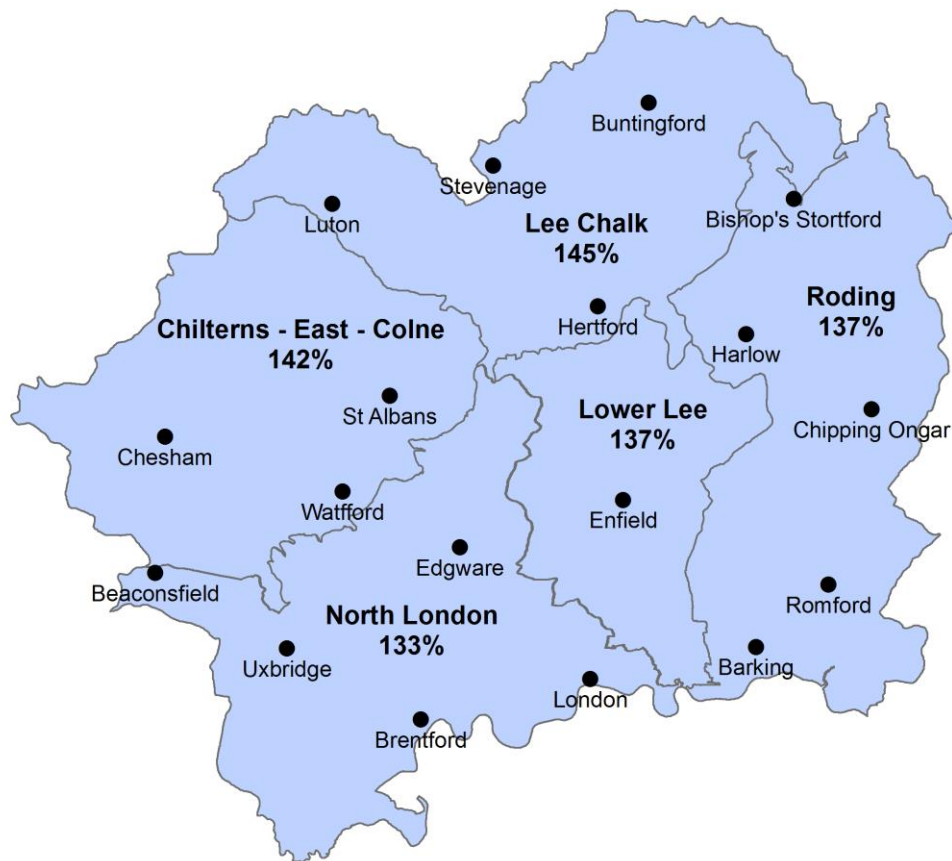
Contact Details: 03708 506 506

All data are provisional and may be subject to revision. The views expressed in this document are not necessarily those of the Environment Agency. Its officers, servants or agents accept no liability for any loss or damage arising from the interpretation or use of the information, or reliance upon views contained within.

2 Rainfall

2.1 Rainfall map

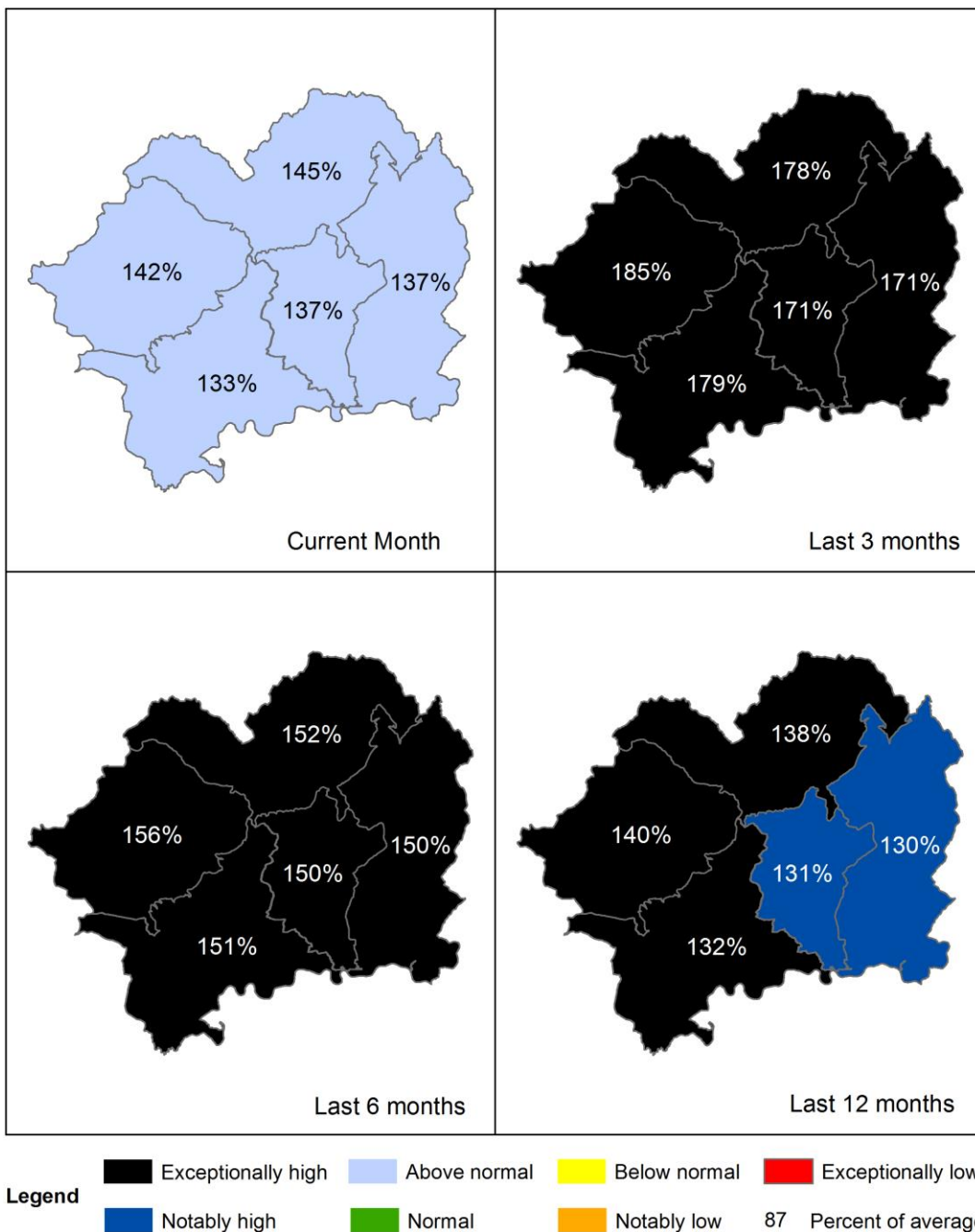
Figure 2.1: Total rainfall for hydrological areas for the current month (up to 30 April 2024), classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.



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 30 April 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.

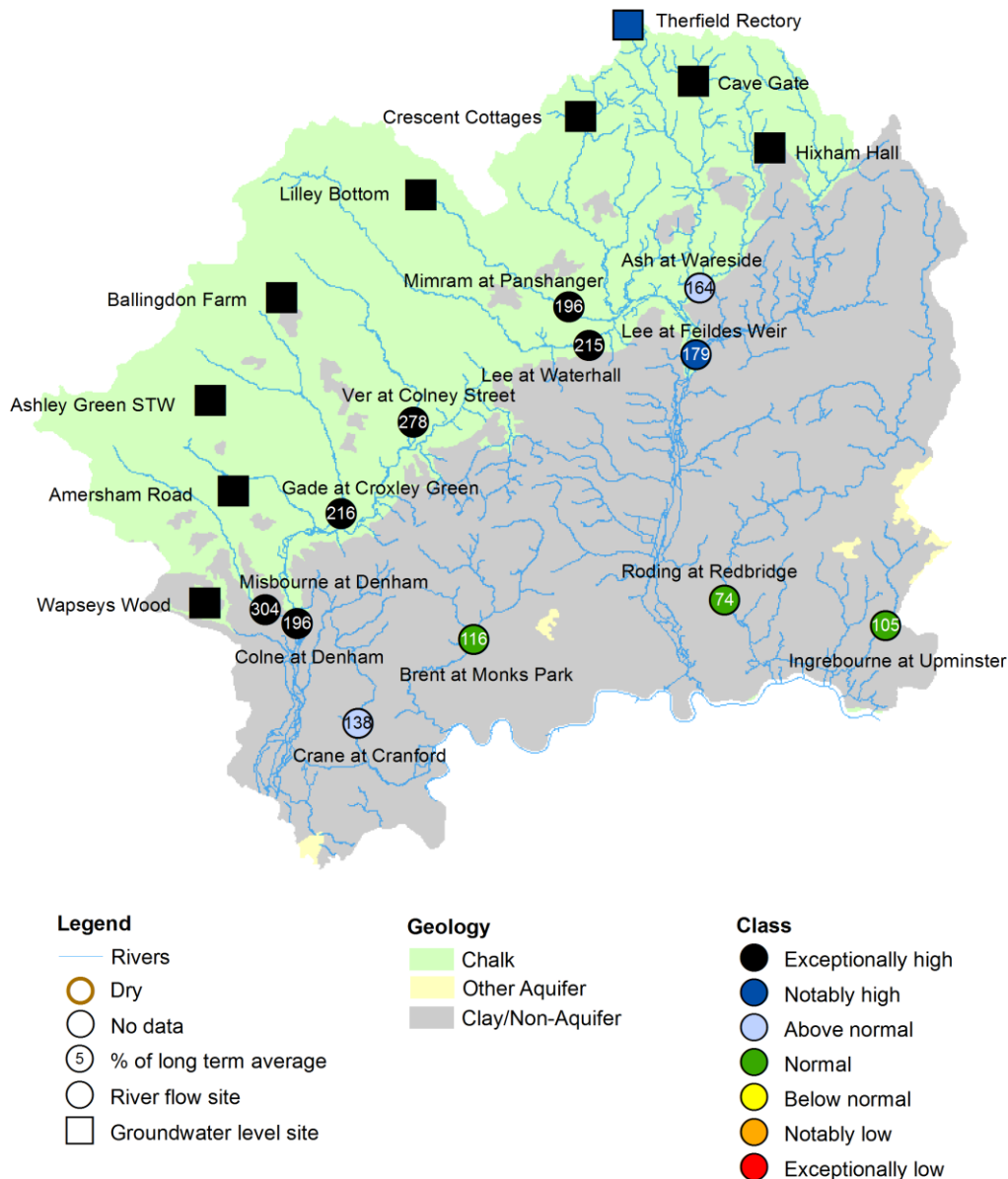


HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2024). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved. 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 April 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic April monthly means. Table available in the appendices with detailed information.



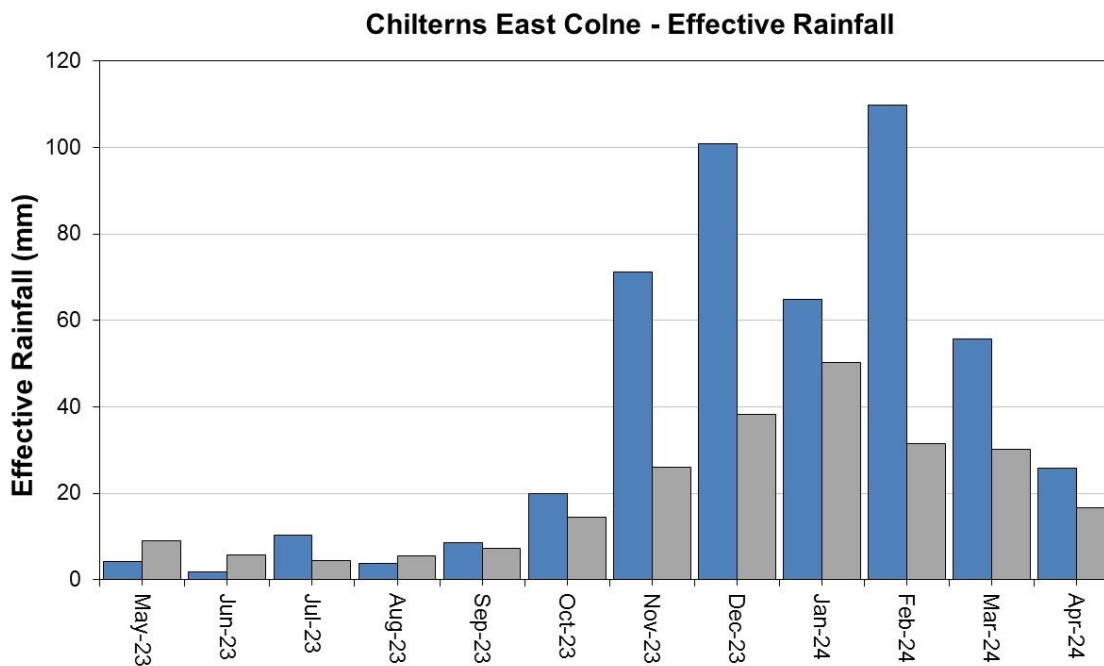
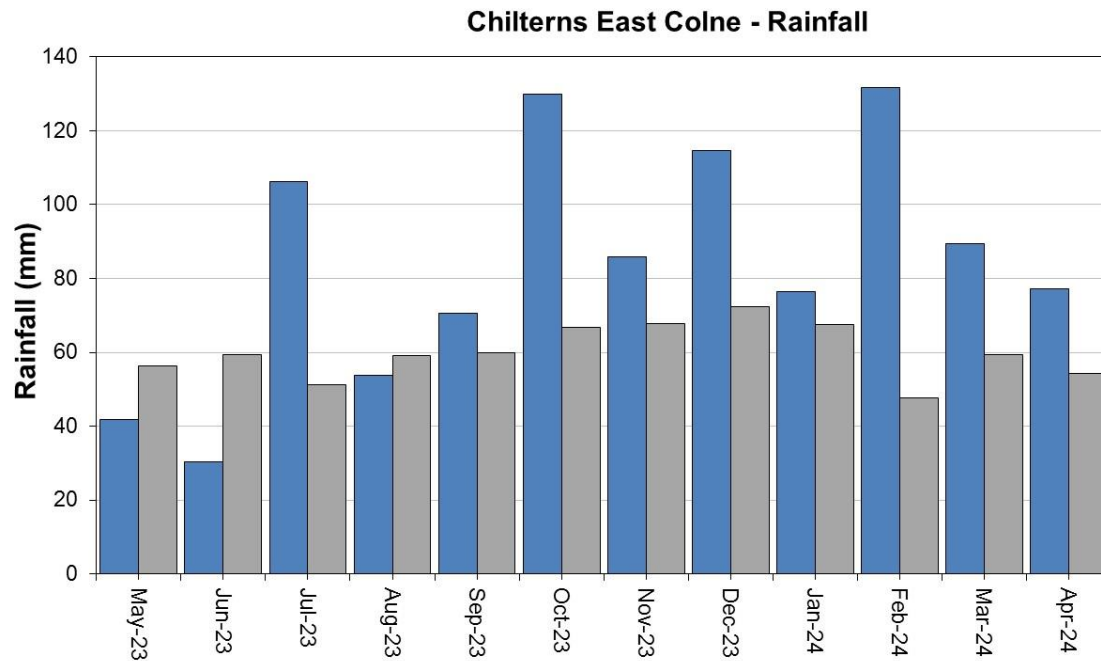
(Source: Environment Agency). Crown copyright. All rights reserved. Environment Agency, 100024198, 2024. Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2024.

4 Colne Catchment

4.1 Colne Rainfall and effective rainfall charts

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

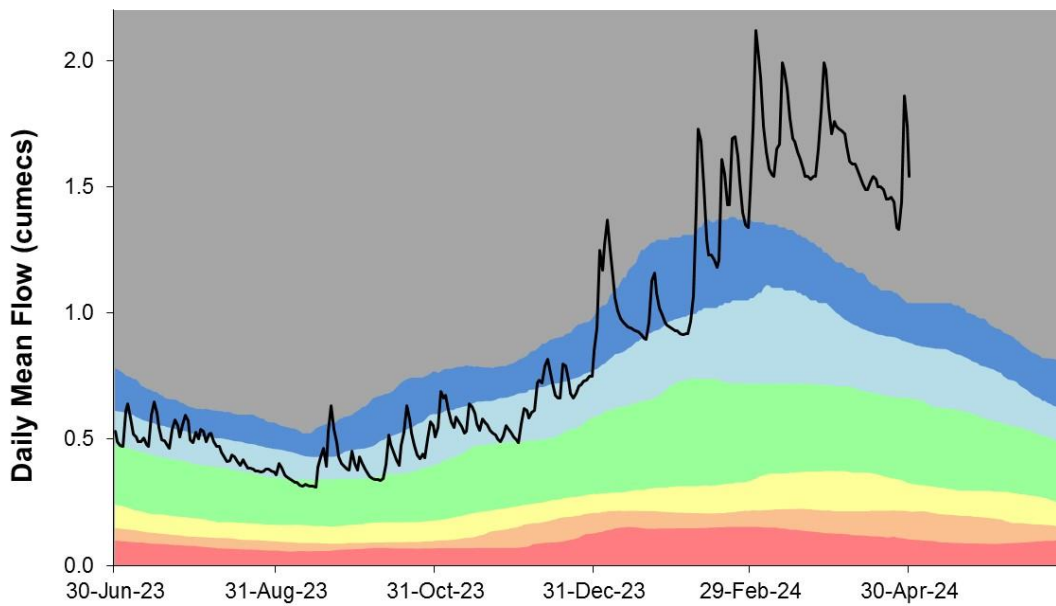
4.2 Colne River flow charts

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.



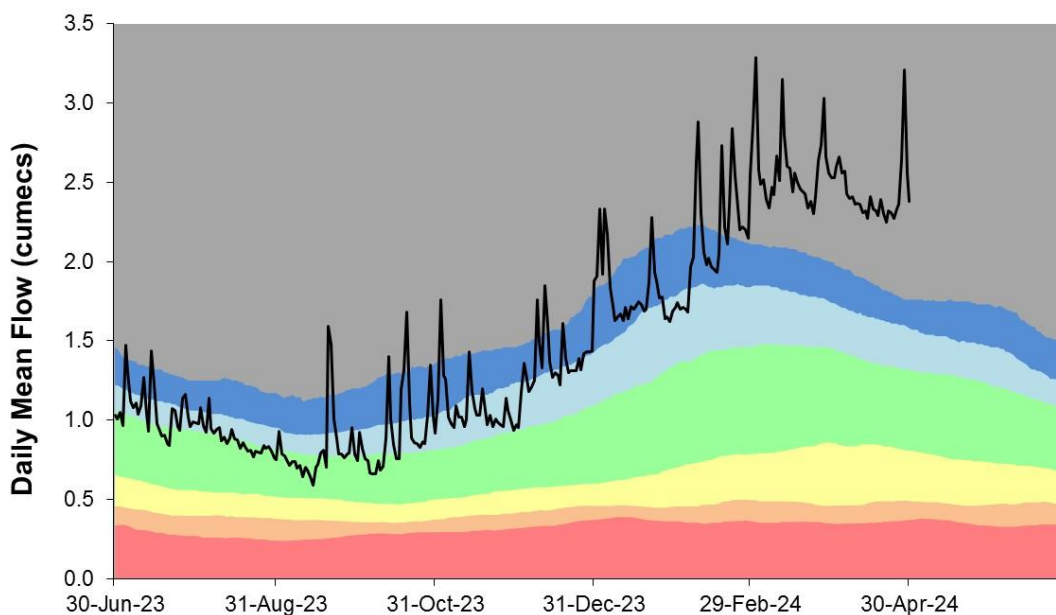
RIVER VER AT COLNEY STREET (HANSTEDS)

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

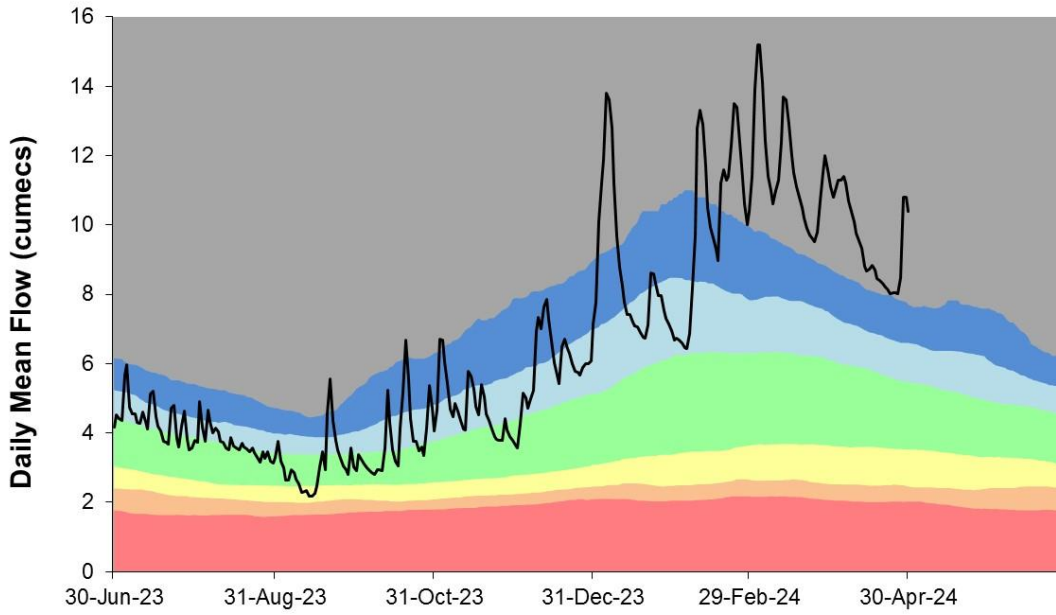


RIVER GADE AT CROXLEY GREEN

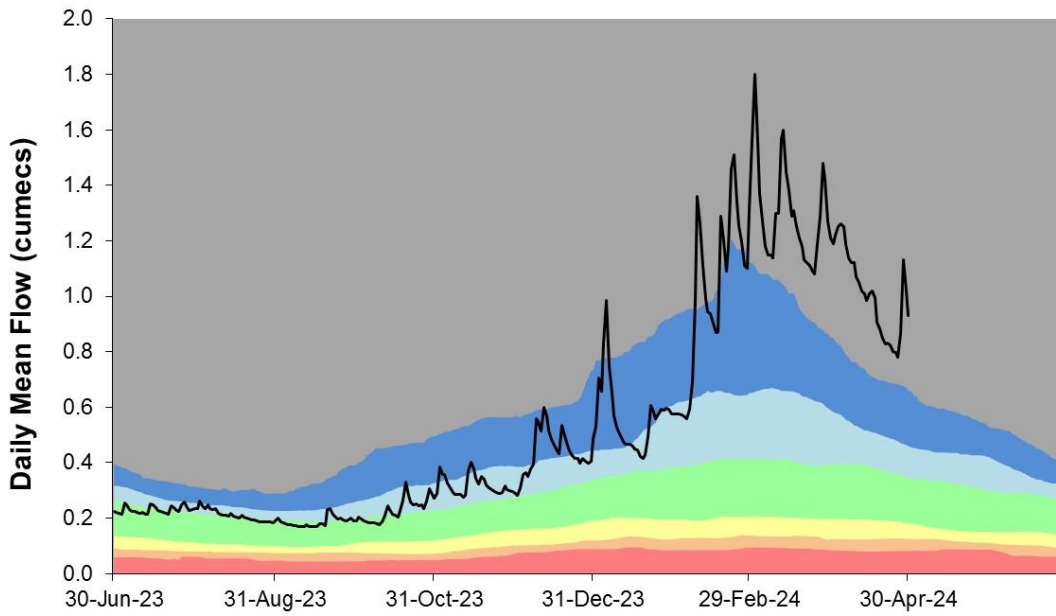
Ranking used data from 01/10/1970 to 31/12/2022



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



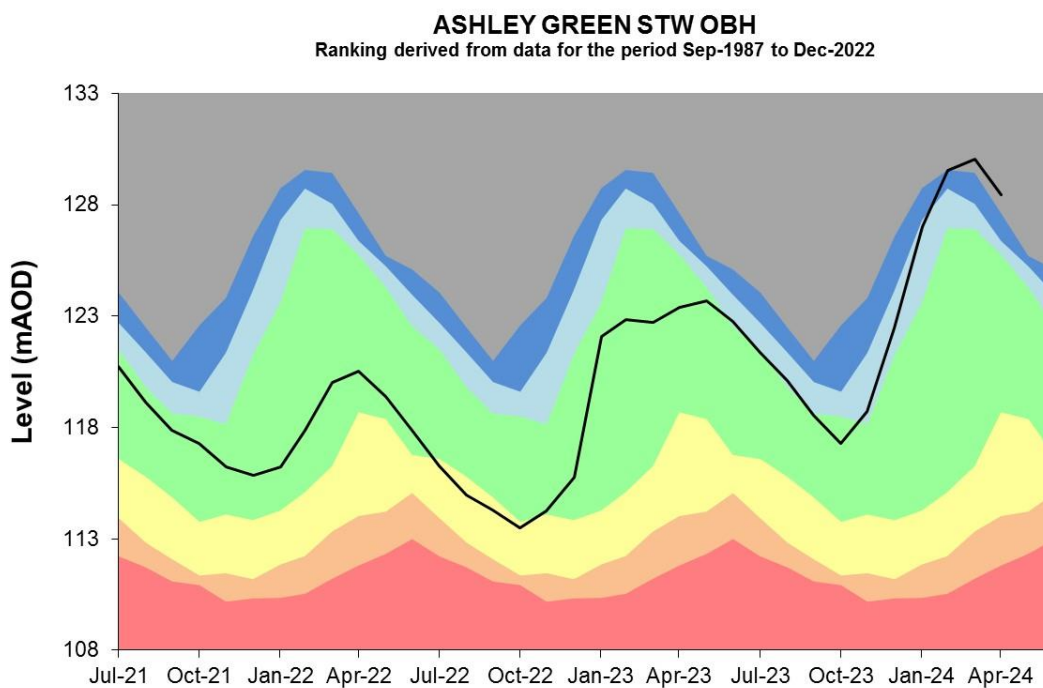
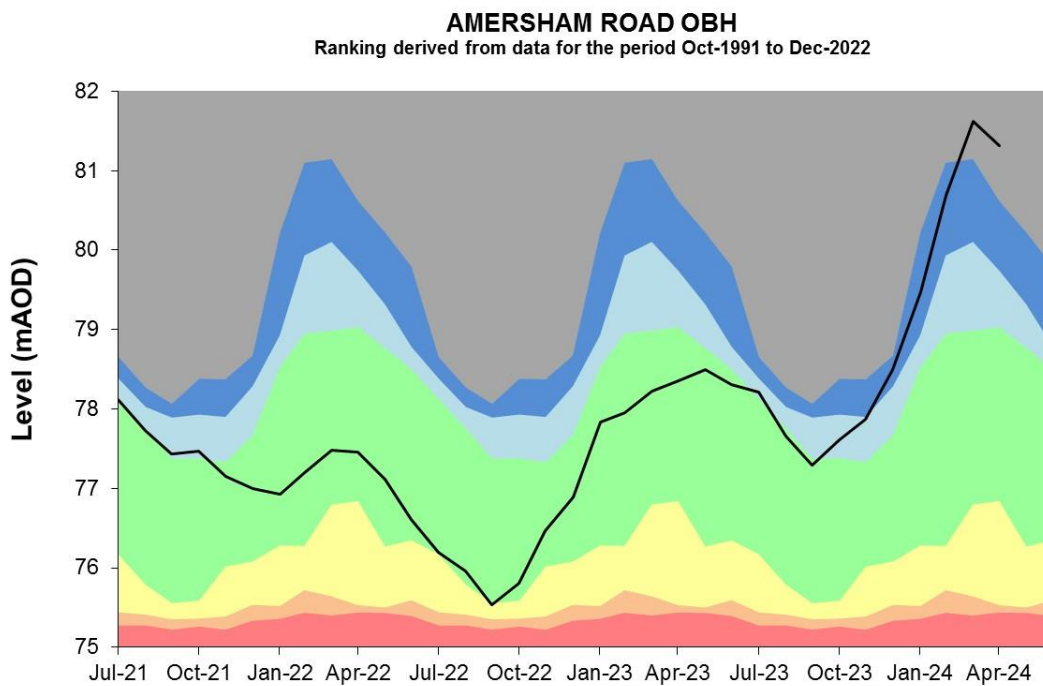
RIVER MISBOURNE AT DENHAM LODGE
Ranking used data from 01/07/1984 to 31/12/2022



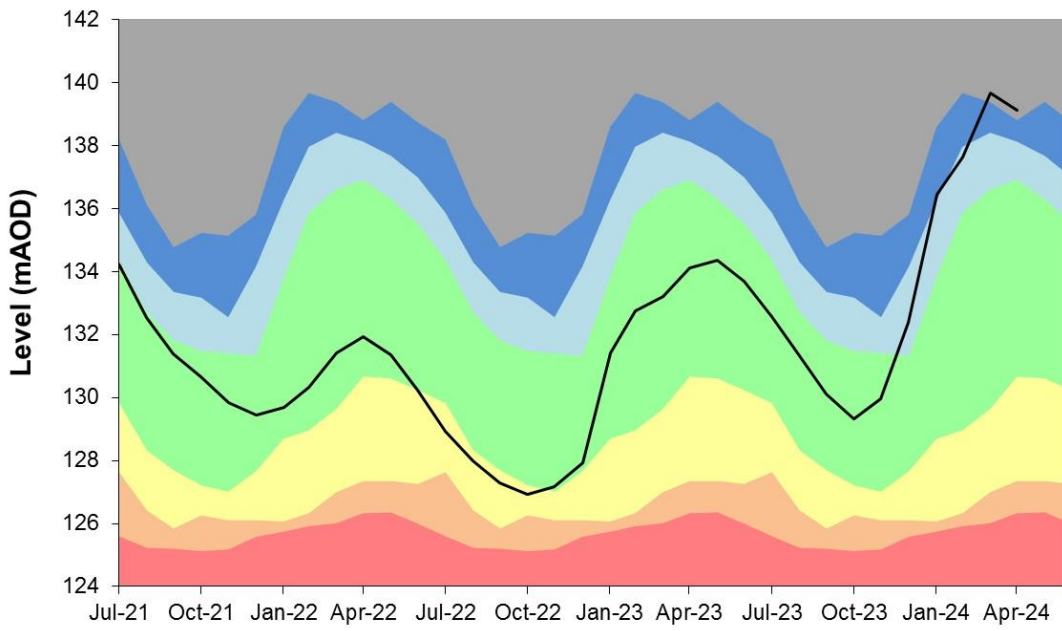
Source: Environment Agency, 2024

4.3 Colne Groundwater level charts

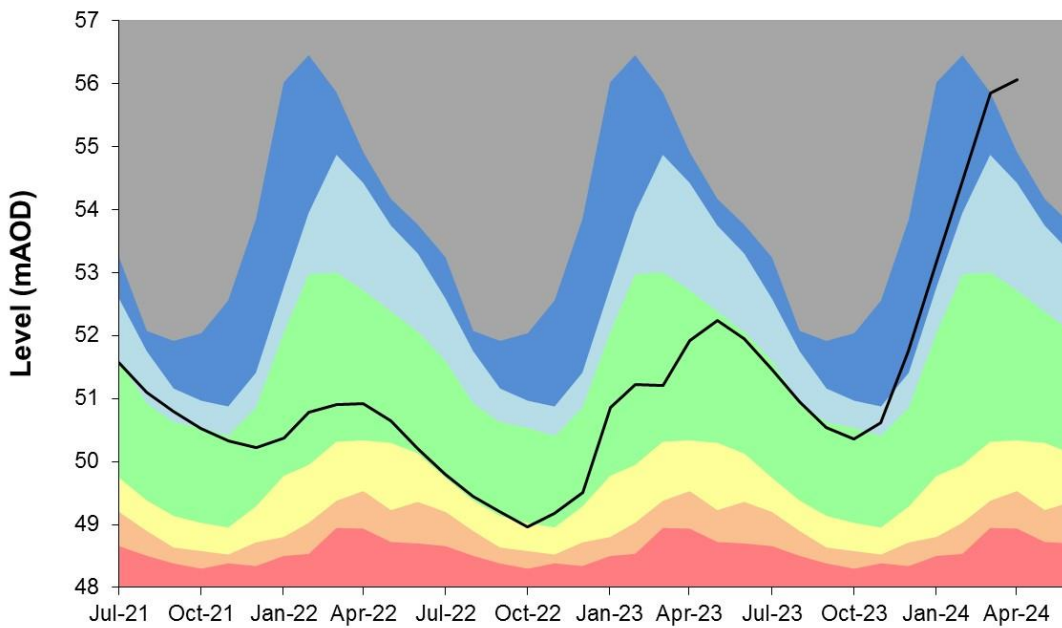
Figure 4.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



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



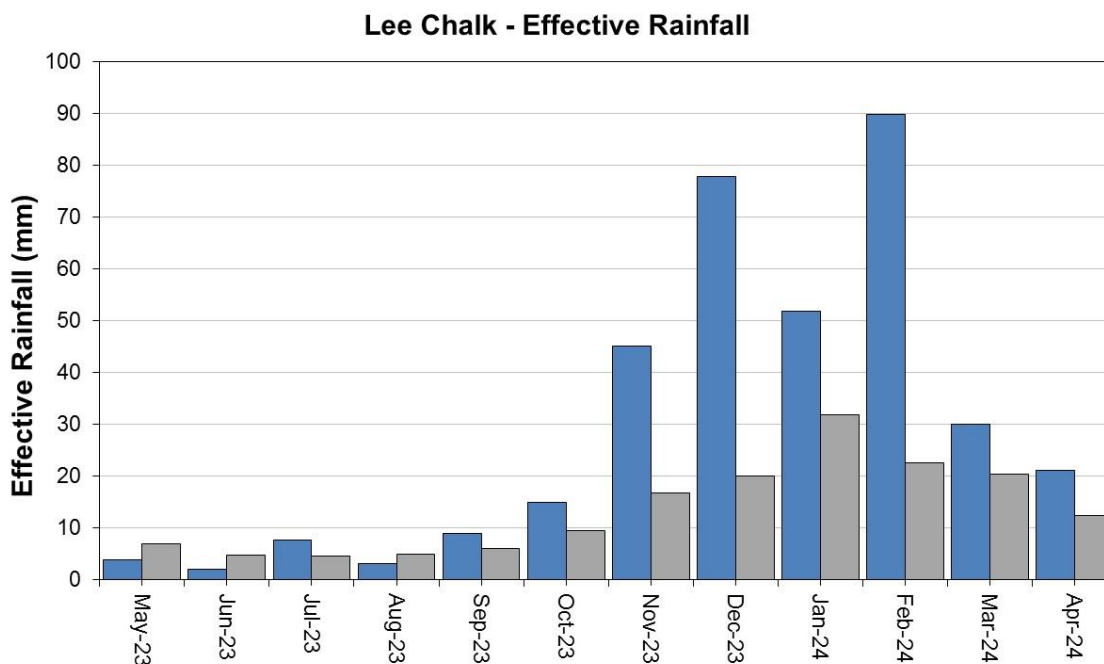
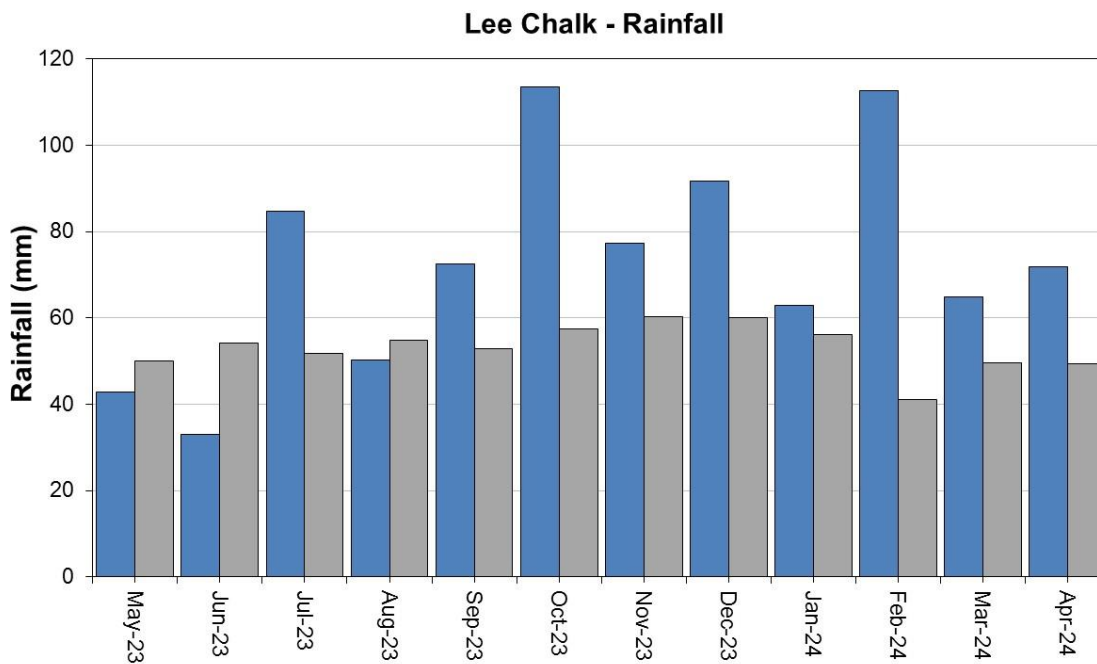
Source: Environment Agency, 2024

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 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)

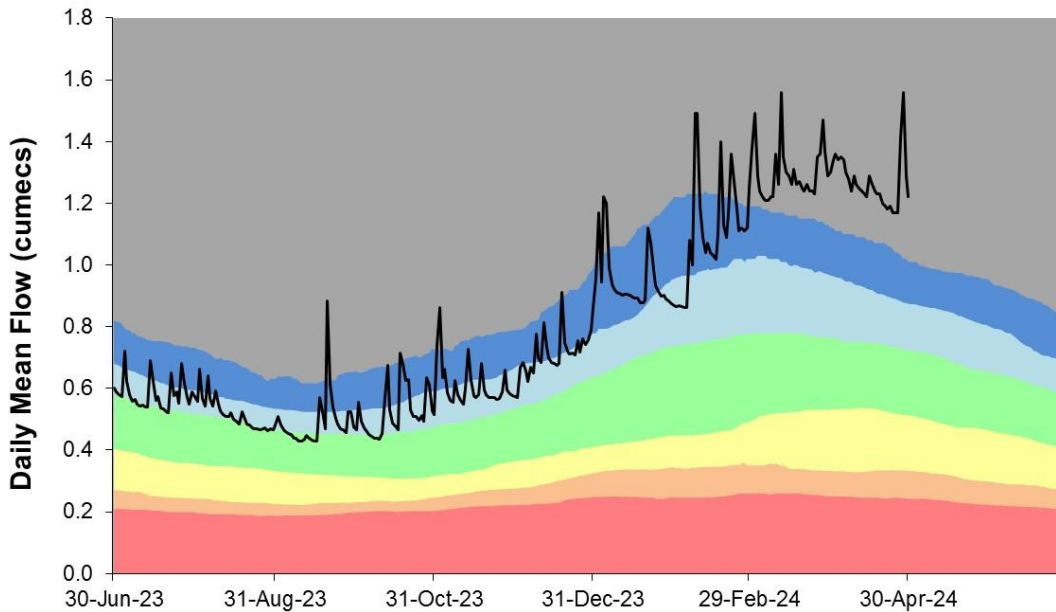
EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2024)

5.2 Upper Lee River flow charts

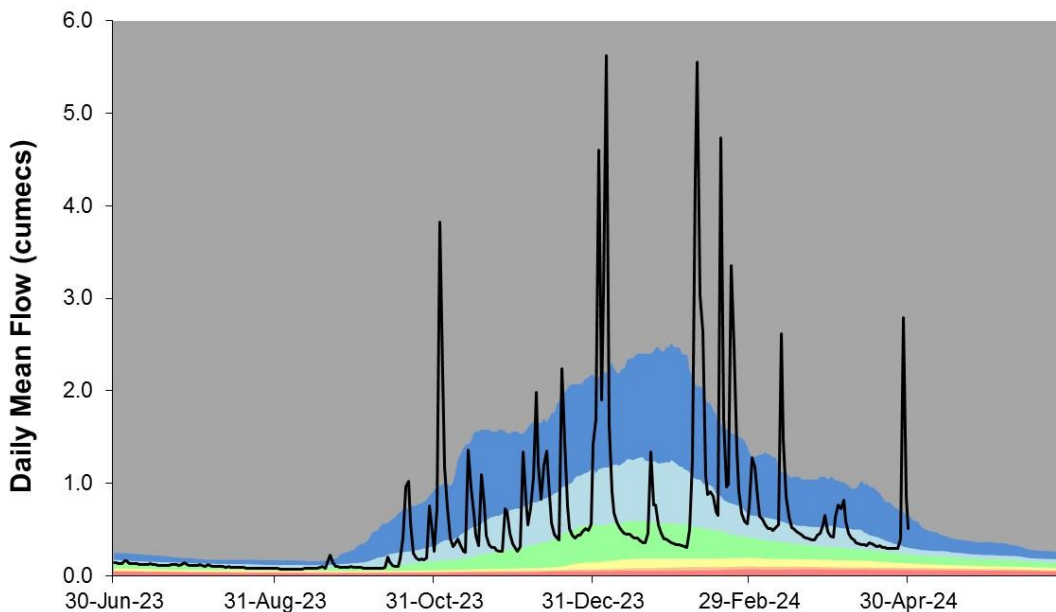
Figure 5.2 Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



RIVER MIMRAM AT PANSHANGER
Ranking used data from 01/12/1952 to 31/12/2022

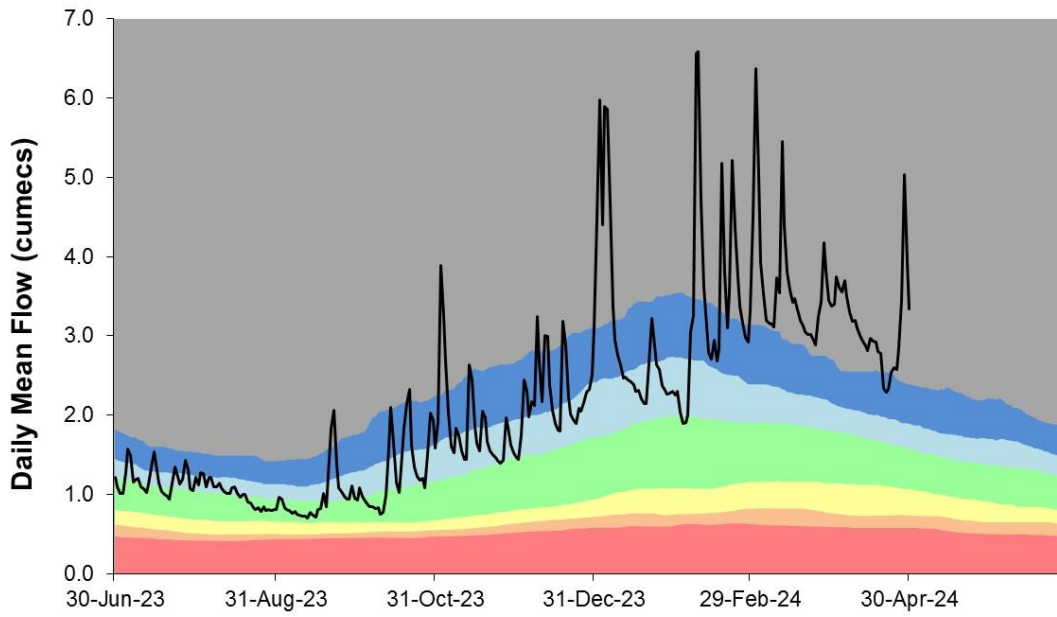


RIVER ASH AT WARESIDE (MARDOCK)
Ranking used data from 03/06/1980 to 31/12/2022



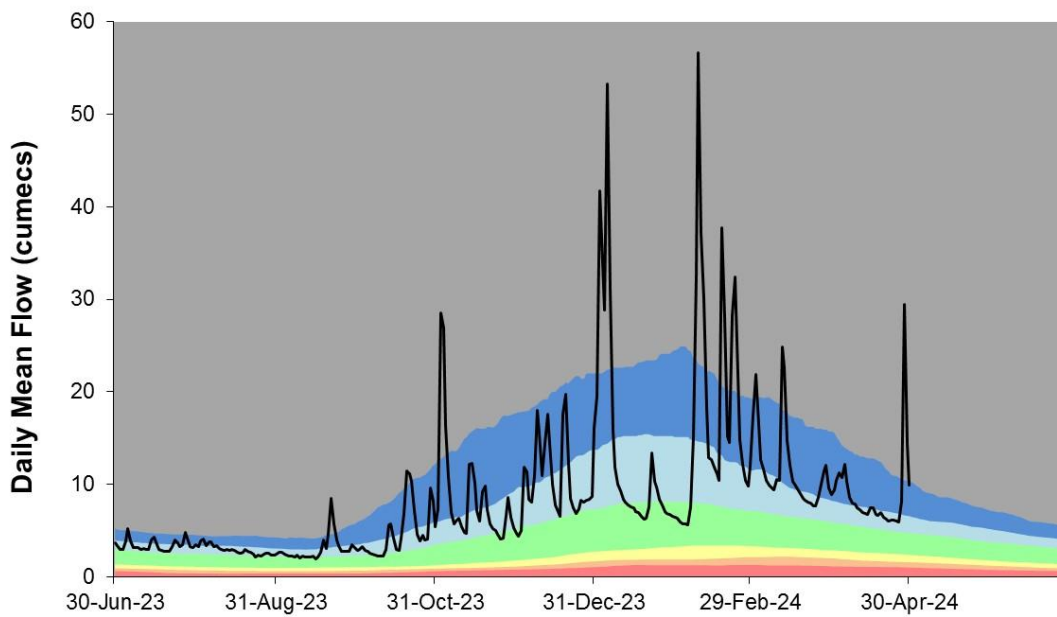
RIVER LEE AT HOWE GREEN (WATER HALL)

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



RIVER LEE AT FEILDES WEIR

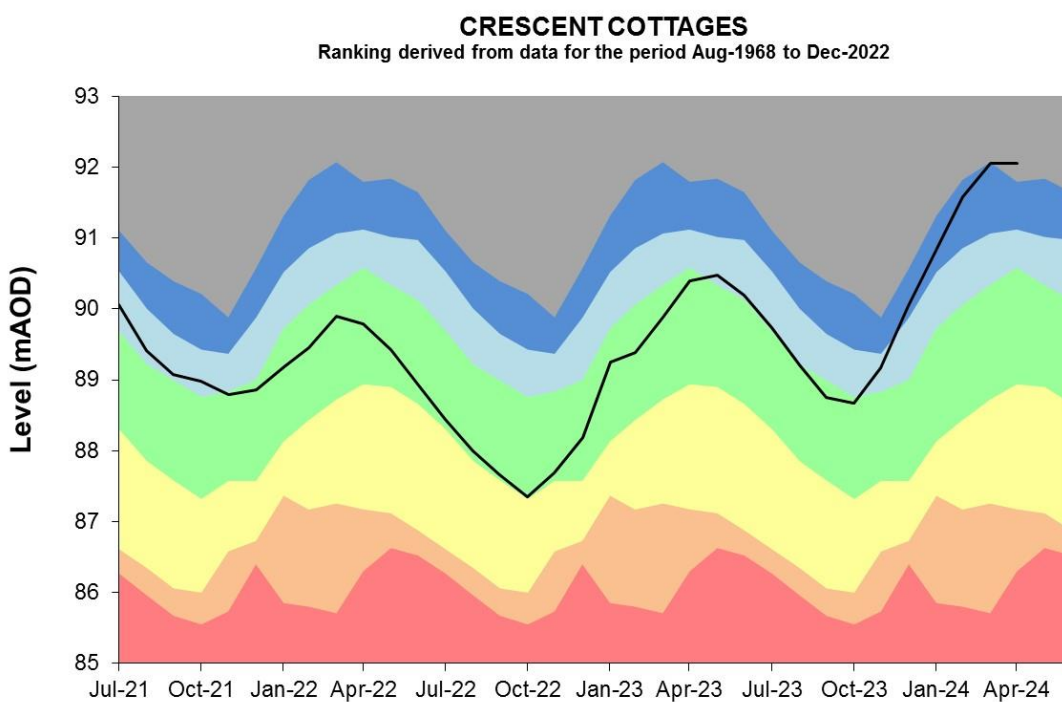
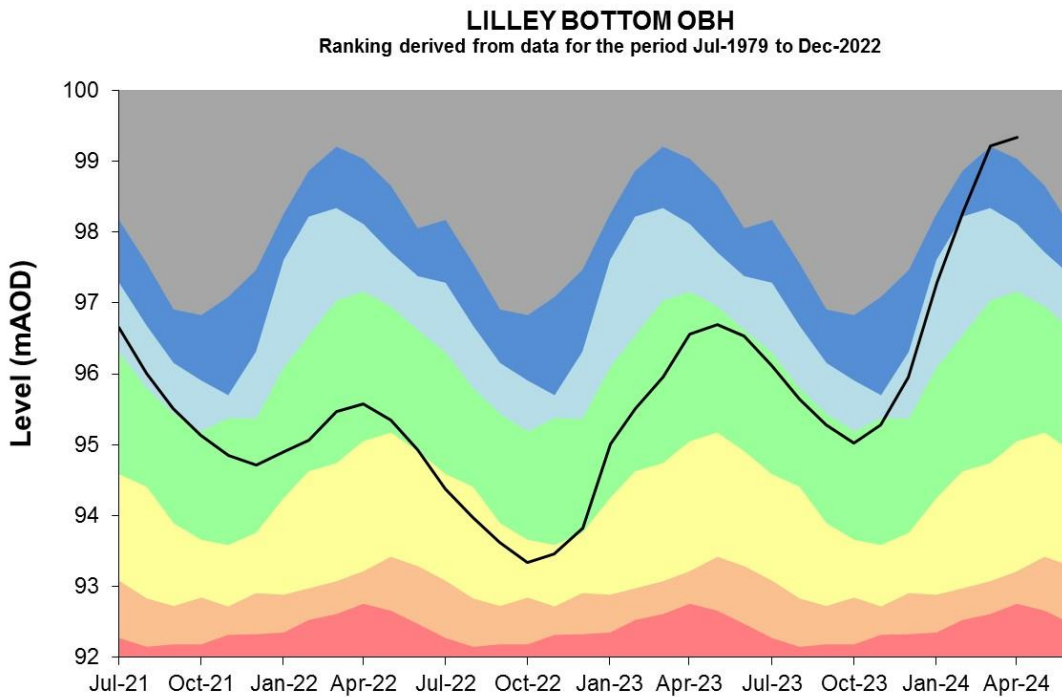
Ranking used data from 10/05/1883 to 31/12/2022



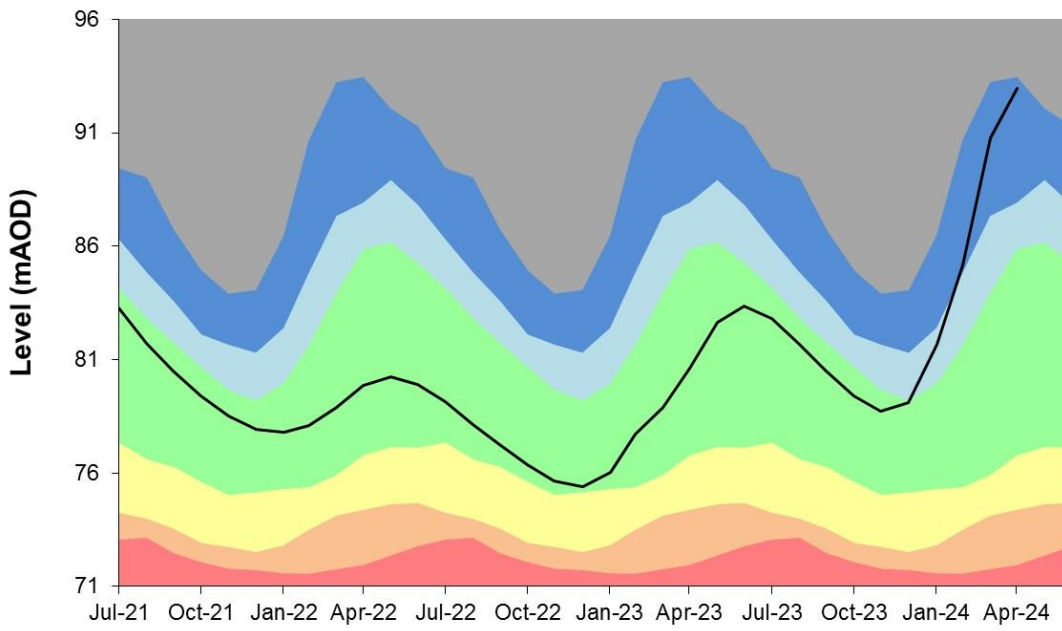
Source: Environment Agency, 2024

5.3 Upper Lee Groundwater level charts

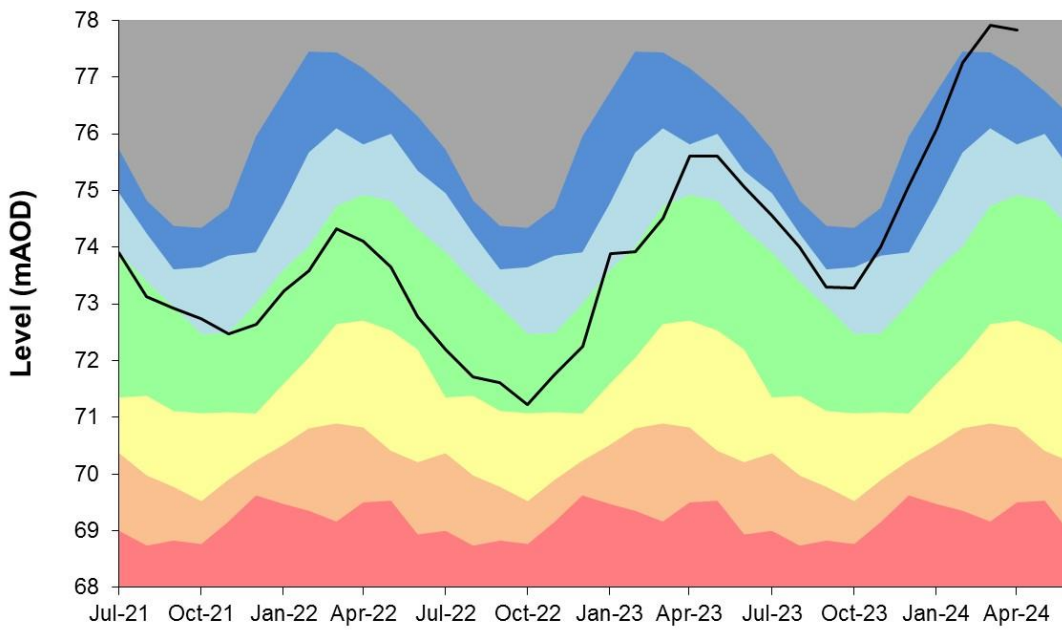
Figure 5.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



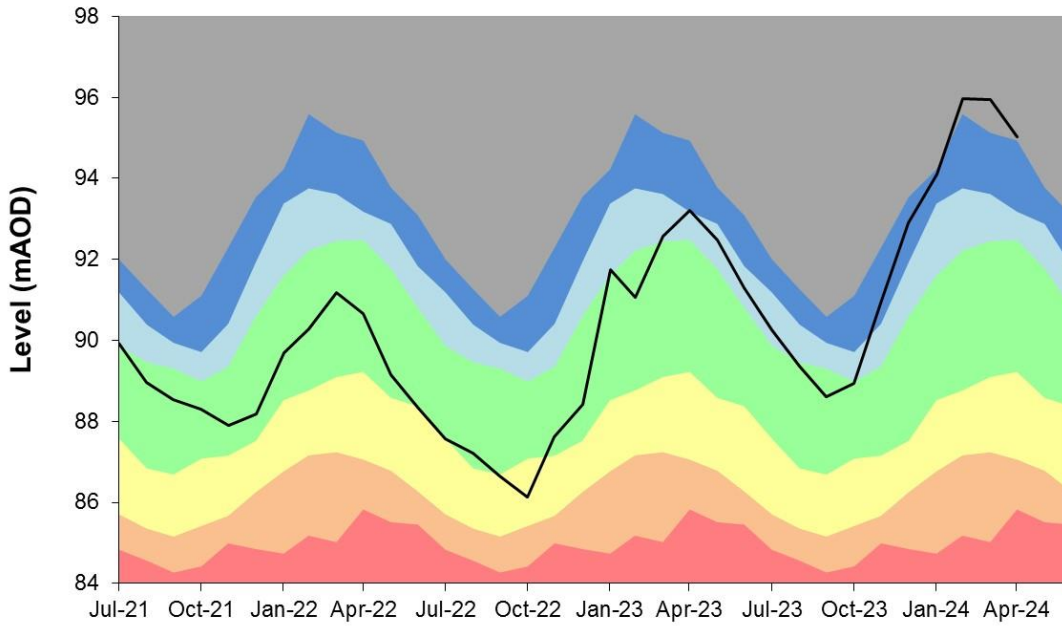
THERFIELD RECTORY
Ranking derived from data for the period Jan-1883 to Dec-2022



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



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



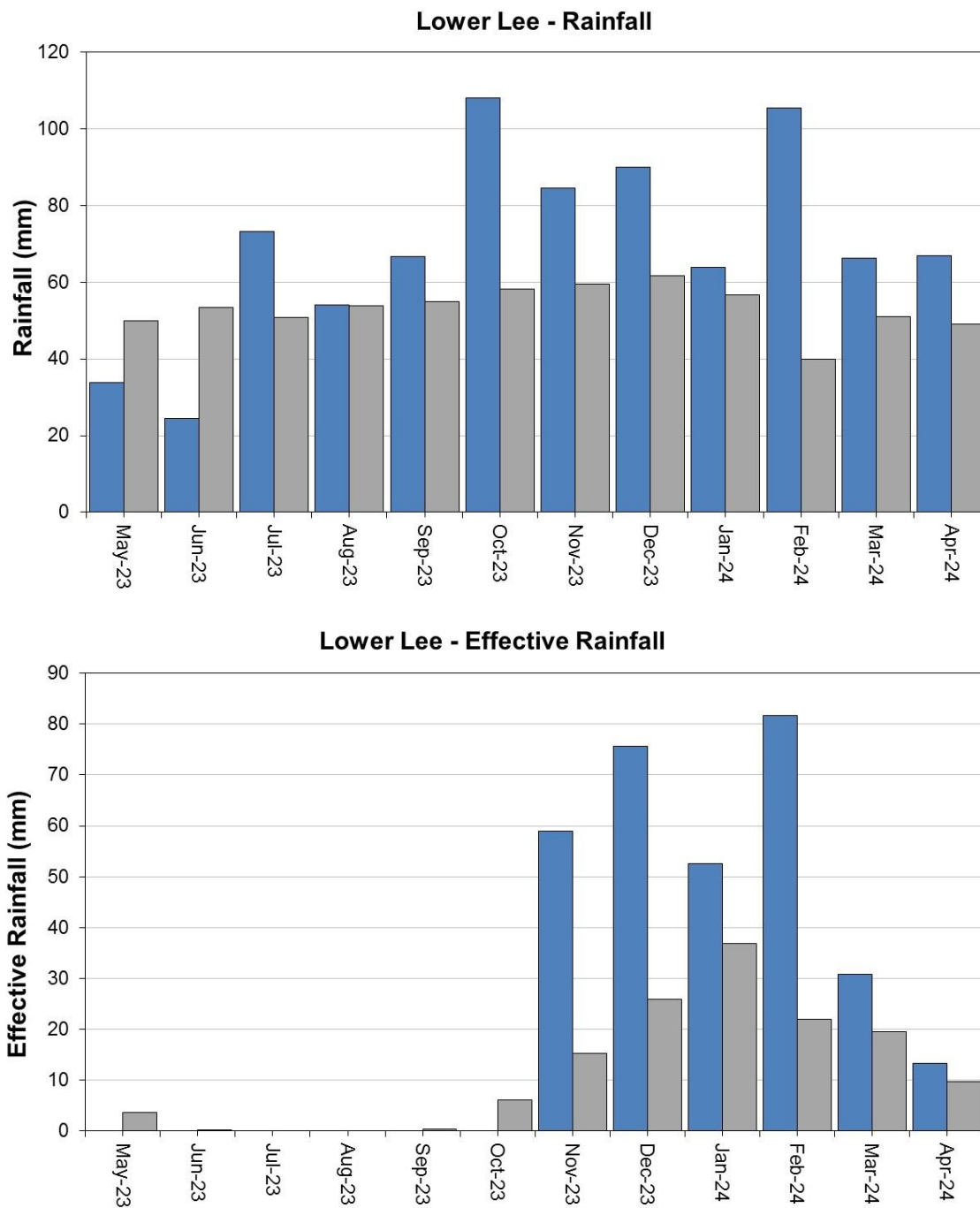
Source: Environment Agency, 2024

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 12 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)

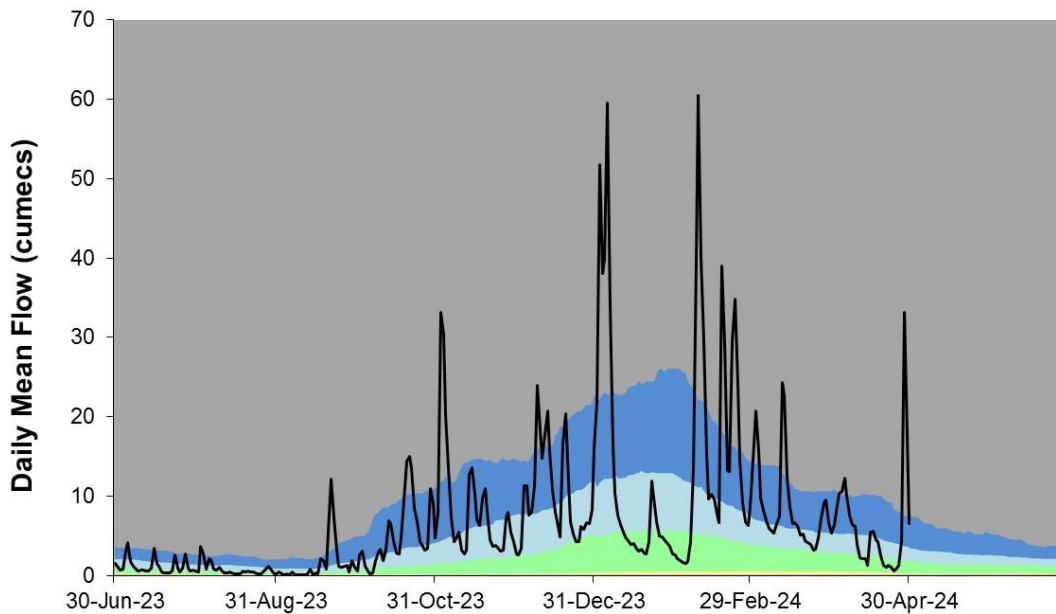
6.2 Lower Lee River flow charts

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.



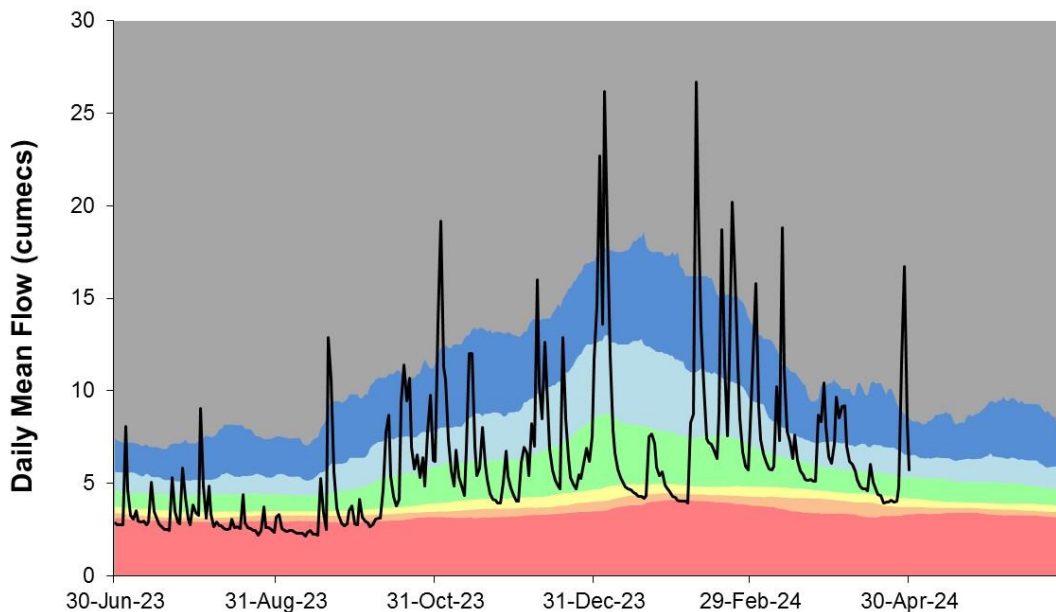
LEE FLOOD CHANNEL AT WALTHAMSTOW (LOW HALL)

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



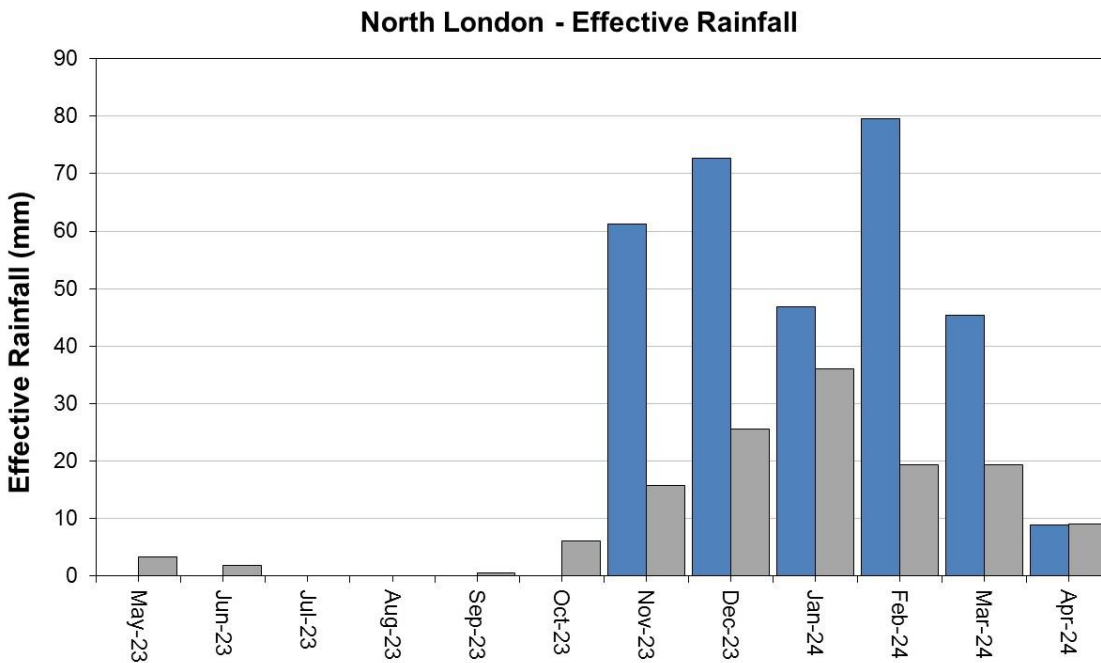
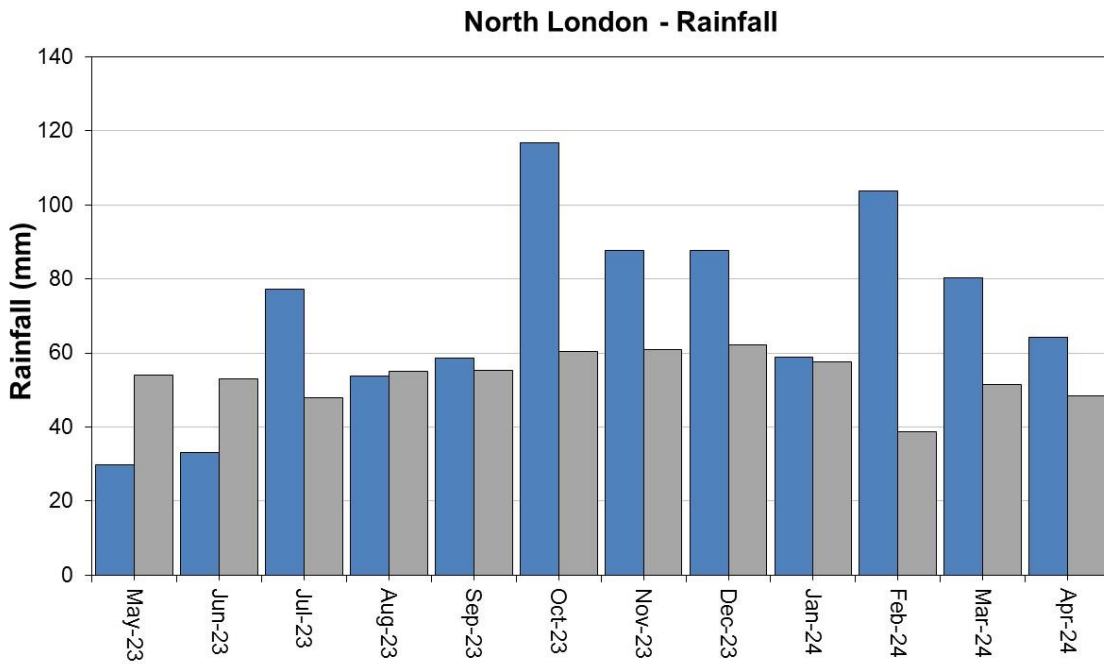
Source: Environment Agency, 2024

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 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)

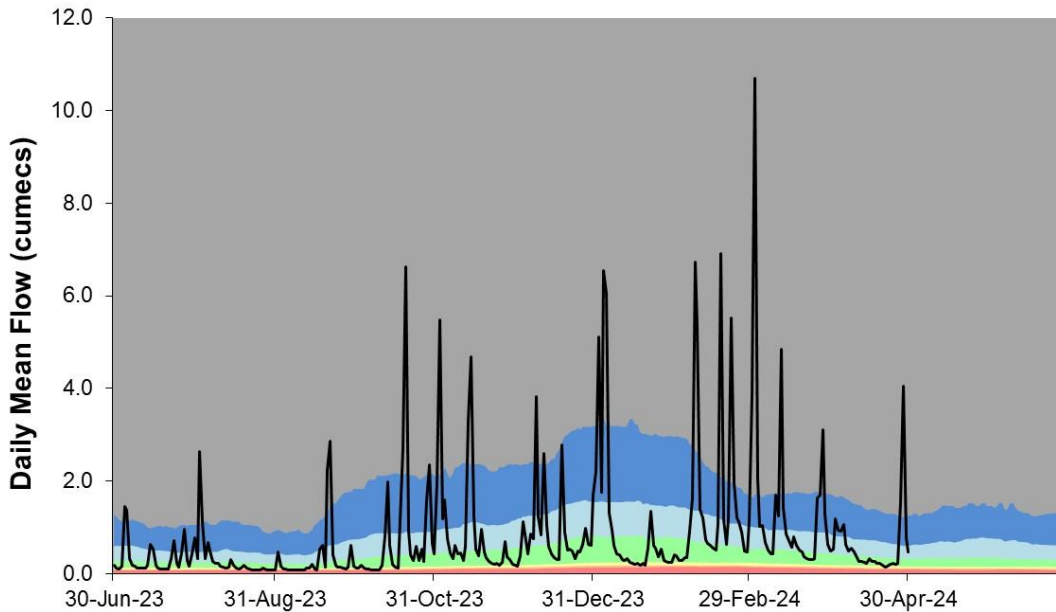
EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2024)

7.2 North London River flow charts

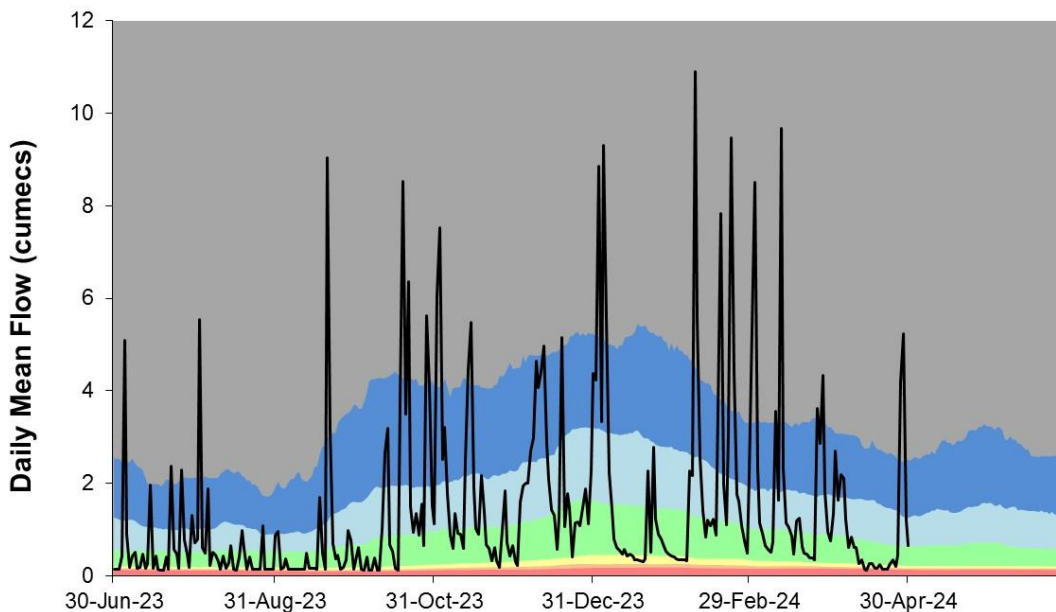
Figure 7.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



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



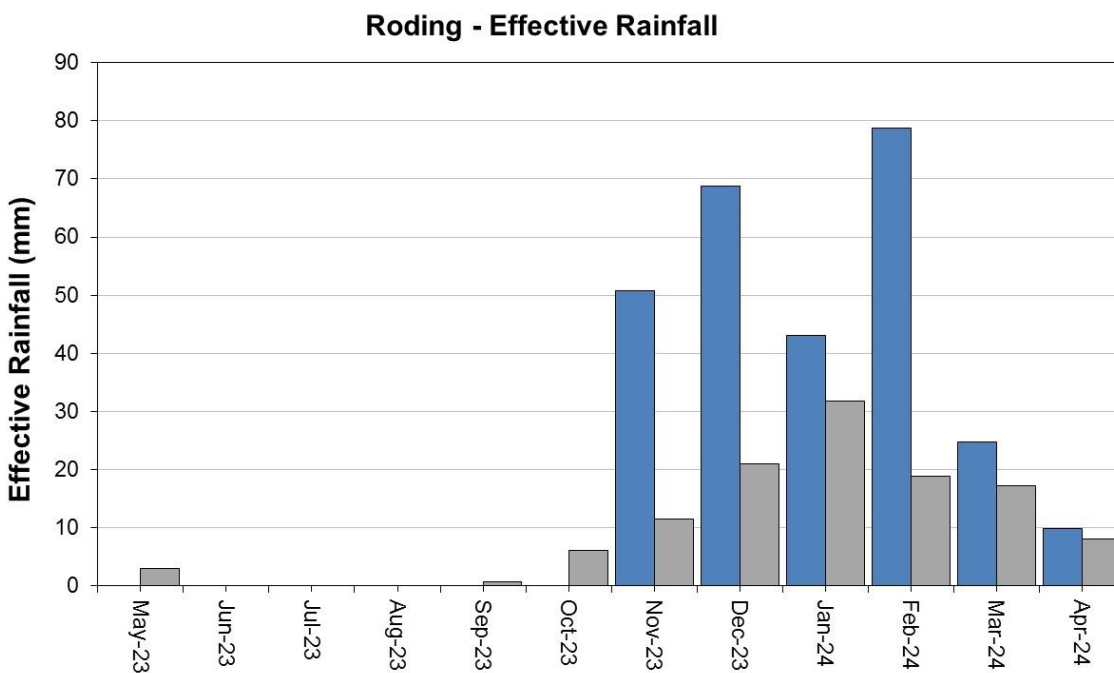
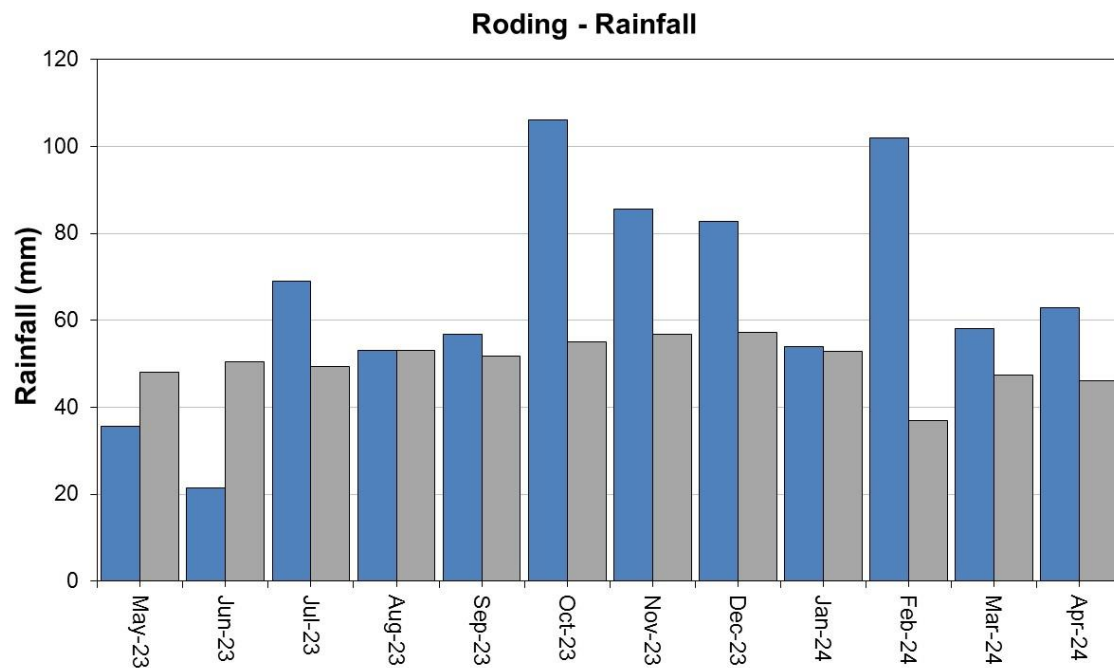
Source: Environment Agency, 2024

8 Roding Catchment

8.1 Roding Rainfall and Recharge chart

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

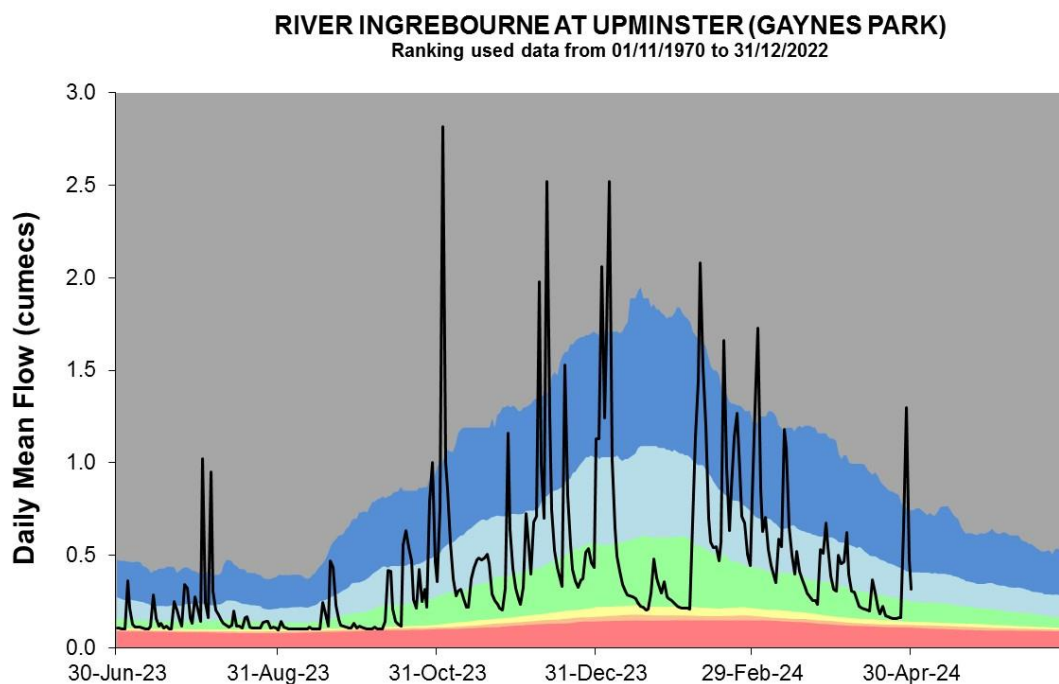
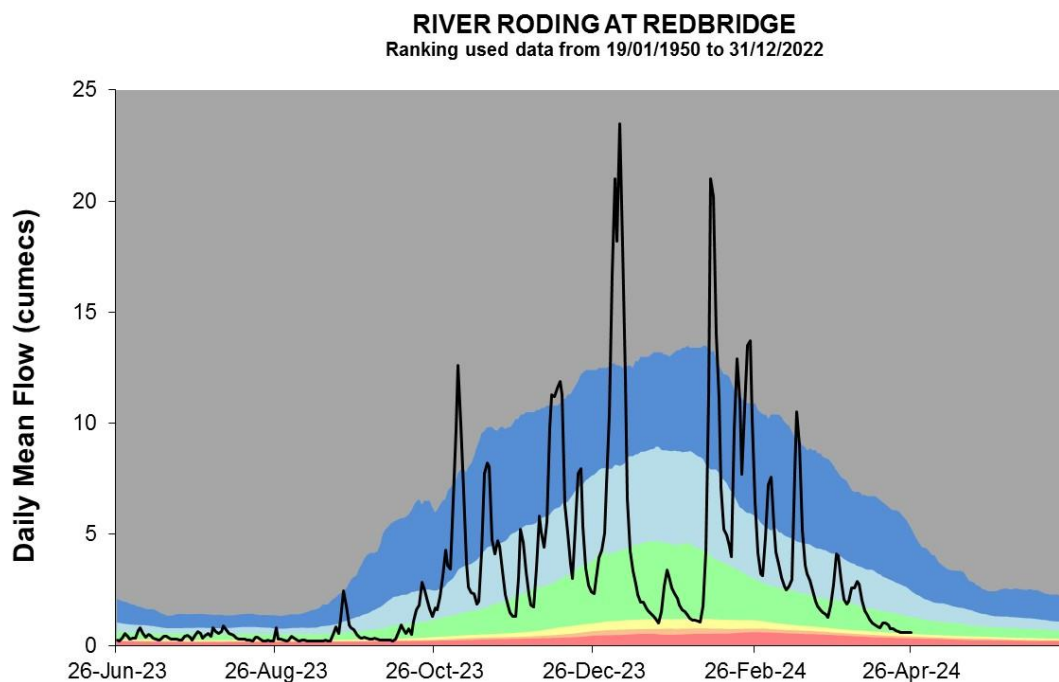


HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

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.

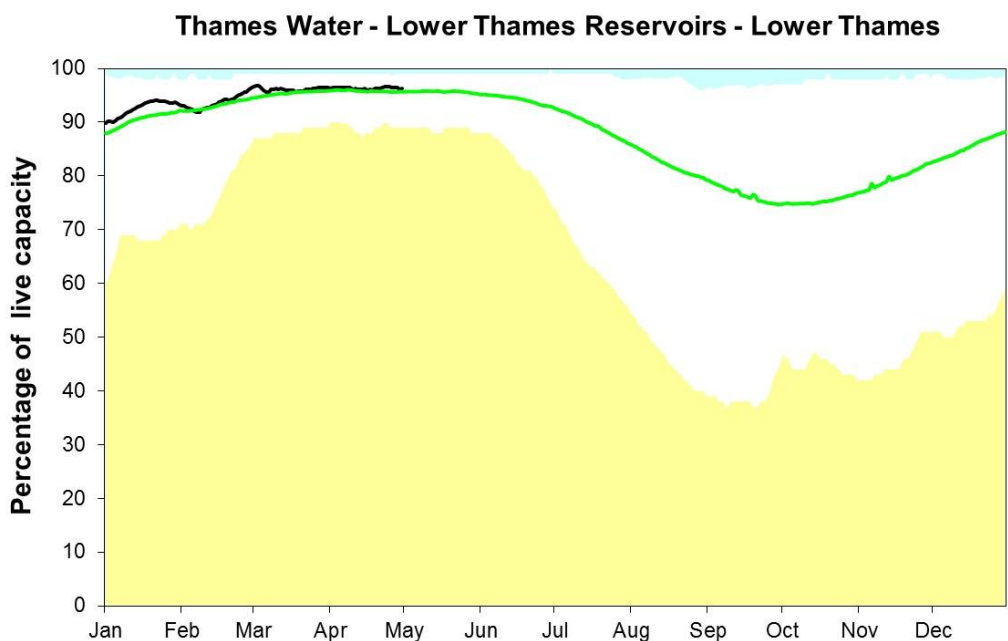
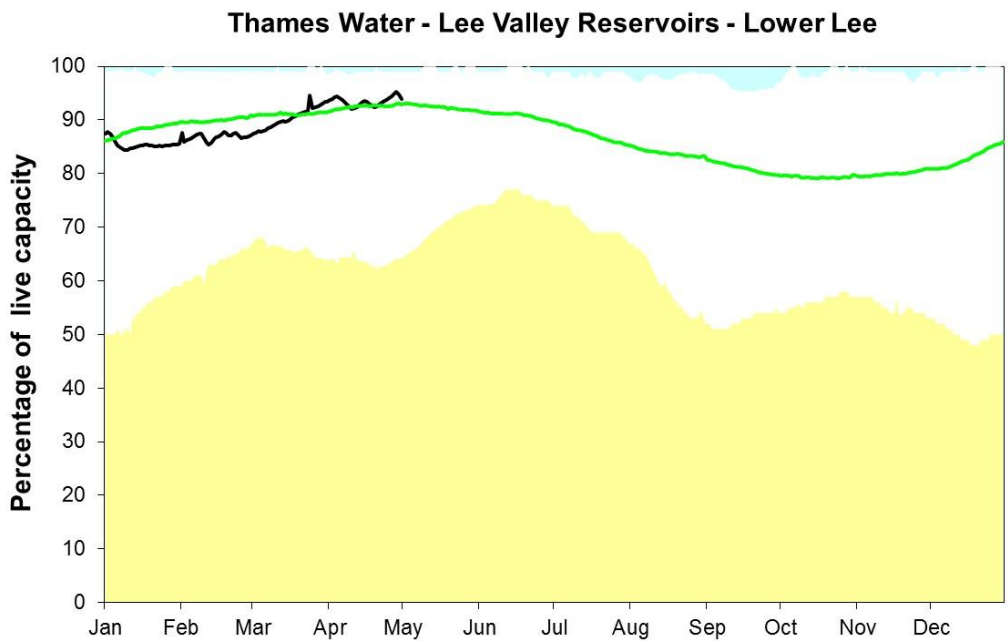


Source: Environment Agency, 2024

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.

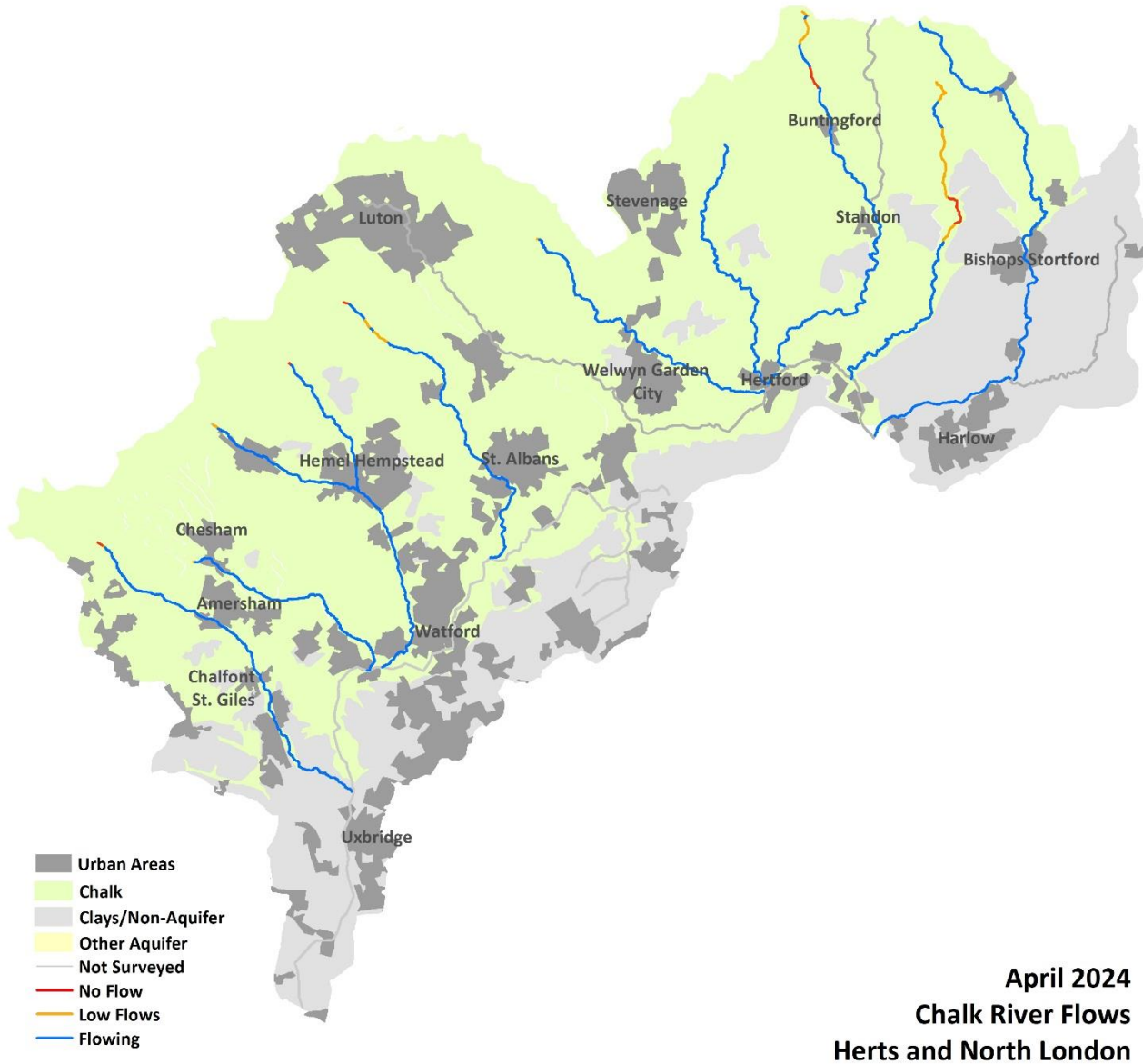
Below minimum Above maximum Average Latest data



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	Apr 2024 total rainfall in mm	Apr 2024 rainfall long term average 1961 to 1990	Apr 2024 rainfall % of long term average 1961 to 1990	Summer Apr 2024 to Apr 2024 total rainfall in mm	Summer Apr 2024 to Apr 2024 rainfall % of long term average 1961 to 1990
Chilterns East Colne	77	54	142	77	142
Lee Chalk	72	49	145	72	145
Lower Lee	67	49	137	67	137
North London	64	48	133	64	133
Roding	63	46	137	63	137
Herts and North London total	69	49	139	69	139

12.2 Rainfall banding table

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

12.3 Effective Rainfall table

Hydrological area	Apr 2024 total effective rainfall in mm	Apr 2024 effective rainfall long term average 1961 to 1990 in mm	Apr 2024 effective rainfall % of long term average 1961 to 1990	Summer Apr 2024 to Apr 2024 total effective rainfall in mm	Summer Apr 2024 to Apr 2024 effective rainfall % of long term average 1961 to 1990
Chilterns East Colne	26	17	155	26	155
Lee Chalk	21	12	170	21	170
Lower Lee	13	10	137	13	138
North London	9	9	99	9	99
Roding	10	8	121	10	121
Herts and North London total	16	11	141	16	141

12.4 Soil Moisture Deficit table

Hydrological area	Apr 2024 end of month Soil Moisture Deficit in mm	Apr 2024 end of month Soil Moisture Deficit long term average 1961 to 1990 in mm	Mar 2024 end of month Soil Moisture Deficit in mm	Mar 2024 end of month Soil Moisture Deficit long term average 1961 to 1990 in mm
Chilterns East Colne	4	19	2	8
Lee Chalk	5	24	1	12
Lower Lee	5	22	3	10
North London	6	23	3	11
Roding	5	22	3	11
Herts and North London total	5	22	2	10

12.5 River flows table

Site name	River	Catchment	Apr 2024 band	Mar 2024 band
Colney Street (Hansteads)	Ver	Colne	Exceptionally high	Exceptionally high
Croxley Green	Gade	Colne	Exceptionally high	Exceptionally high
Denham Lodge	Misbourne	Colne	Exceptionally 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	Notably high
Brent (Monks Park)	Brent	North London	Normal	Notably high
Cranford (Cranford Park)	Crane	North London	Above normal	Exceptionally high
Redbridge	Roding	Roding, Beam and Ingrebourne	Normal	Above normal
Upminster (Gaynes Park)	Ingrebourne	Roding, Beam and Ingrebourne	Normal	Notably high

12.6 Groundwater table

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

12.7 Abstraction licence flow constraints

Number of flow constraints in force between 1 and 7 April 2024	Number of flow constraints in force between 8 and 14 April 2024	Number of flow constraints in force between 15 and 21 April 2024	Number of flow constraints in force between 22 and 28 April 2024
2	1	0	2