Monthly water situation report: Hertfordshire and North London Area

1 Summary - July 2024

After a relatively dry June, July resumed the trend of high rainfall in the Hertfordshire and North London area over the last year. July recorded 180% of the long term average rainfall over the month and in response, soil moisture deficits were again below the long term average. As a result, river flows were high for the time of year, with a few sites experiencing month mean flows at their highest levels on record. Groundwater levels mostly decreased but also remained high for the time of year, with most sites recording end of month values in the exceptionally high band.

1.1 Rainfall

Overall, July was a much wetter month in the Hertfordshire and North London area ("the Area") than June, having received 180% of the long term average (LTA) rainfall. Rainfall units further to the west of the Area received the most rain on the whole, with Chilterns East Colne, North London and the Lower Lee ending July in the notably high band. Meanwhile, the Upper Lee and Roding areal rainfall units ended the month in the above normal band. Despite high rainfall totals, there were 16 dry days during July (less than 0.2mm of rain recorded). The wettest day of the month was 5 July, with 46.2mm of rain recorded at Epping Forest (Roding) and 44mm of rain recorded at Prestwood Reservoir (Chilterns East Colne). Over the summer period (April to July), the Area has received 255mm of rainfall (124% of the LTA).

1.2 Soil moisture deficit and recharge

Due to higher than average rainfall this month, soil moisture deficits ended July below the LTA. Across the clay and urban catchments in the Area, there was no effective rainfall during July. In contrast, the effective rainfall received in the two chalk units (Lee Chalk and Chilterns East Colne) were far above the LTA.

1.3 River flows

July saw a general decrease in chalk river baseflows in the Area, despite the high rainfall total. In response to the biggest storms during the month, notable flow peaks occurred around 5 and 15 July, particularly in urban catchments. Nine indicator sites experienced monthly mean flows in the exceptionally high band. These included the majority of the sites in the chalk catchments, in addition to both sites in the North London unit. Two other sites recorded monthly flows in the notably high band, while Upminster (River Ingrebourne) was the only site recording in the above normal band. This month, Colney Street (River Ver), Monks Park (River Brent) and Howe Green (River Lee) experienced their highest July flows on record (records start in 1956, 1979 and 1959 respectively). During July, nine flood alerts and two flood warnings were issued – eight of these were on the 15 July in response to the heavy rainfall, mostly in urbanised catchments within Greater London.

1.4 Groundwater levels

Groundwater levels generally declined over July, which is expected for this time of year. Seven indicator sites in the Area recorded an end of month groundwater level in the exceptionally high band, while two other sites recorded levels in the notably high band. In the Mid-Chilterns Chalk aquifer, Amersham Road and Wapseys Wood recorded their second highest end of month groundwater levels on record, both only exceeded in 2001 (records start in 1991 and 1988 respectively). In the Upper Lee Chalk, Cave Gate and Hixham Hall recorded their second highest groundwater levels on record, exceeded only in 1979 and 2001 respectively (records began in 1966 for Cave Gate and in 1964 for Hixham Hall). Cave Gate was the only indicator site to record a higher end of month groundwater level than June.

1.5 Reservoir stocks

The Lee Valley reservoir stocks increased slightly during July, from 95% to 96% of live capacity, while in the Lower Thames reservoirs, the water level decreased from 95% to 90% of live capacity. Water levels in both reservoir groups finished the month above the LTA.

1.6 Environmental impact

The sources of chalk rivers in the Colne catchment remained in similar locations to June.

- The River Ver started flowing at Markyate Cell before drying and flowing again at Markyate STW.
- The River Gade was still flowing upstream of Hudnall Corner.
- The source of the River Bulbourne moved slightly further down but was still upstream of Dudswell village.
- The source of the River Chess also moved slightly further down but was still a good distance above Chesham.
- The River Misbourne was still flowing continuously from Mobwell pond.

All of the sources of the chalk rivers in the Upper Lee catchment were at slightly different locations to June.

- The River Mimram started flowing just above Whitwell Gas Compound.
- The source of the River Beane moved slightly downstream to just above Walkern village.
- The River Rib flowed intermittently from Reed End, before gaining a steadier flow at Buntingford.
- The River Ash (Herts) started flowing at Blackhall before drying and regaining flow upstream of Hadham Ford.
- The River Stort started flowing at its source above Langley Lower Green, although, flows were very low at Manuden.

To protect the environment during July a number of abstraction license flow constraints were in force. This ranged between one and two per week, out of a maximum of 35.

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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 July 2024), classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.

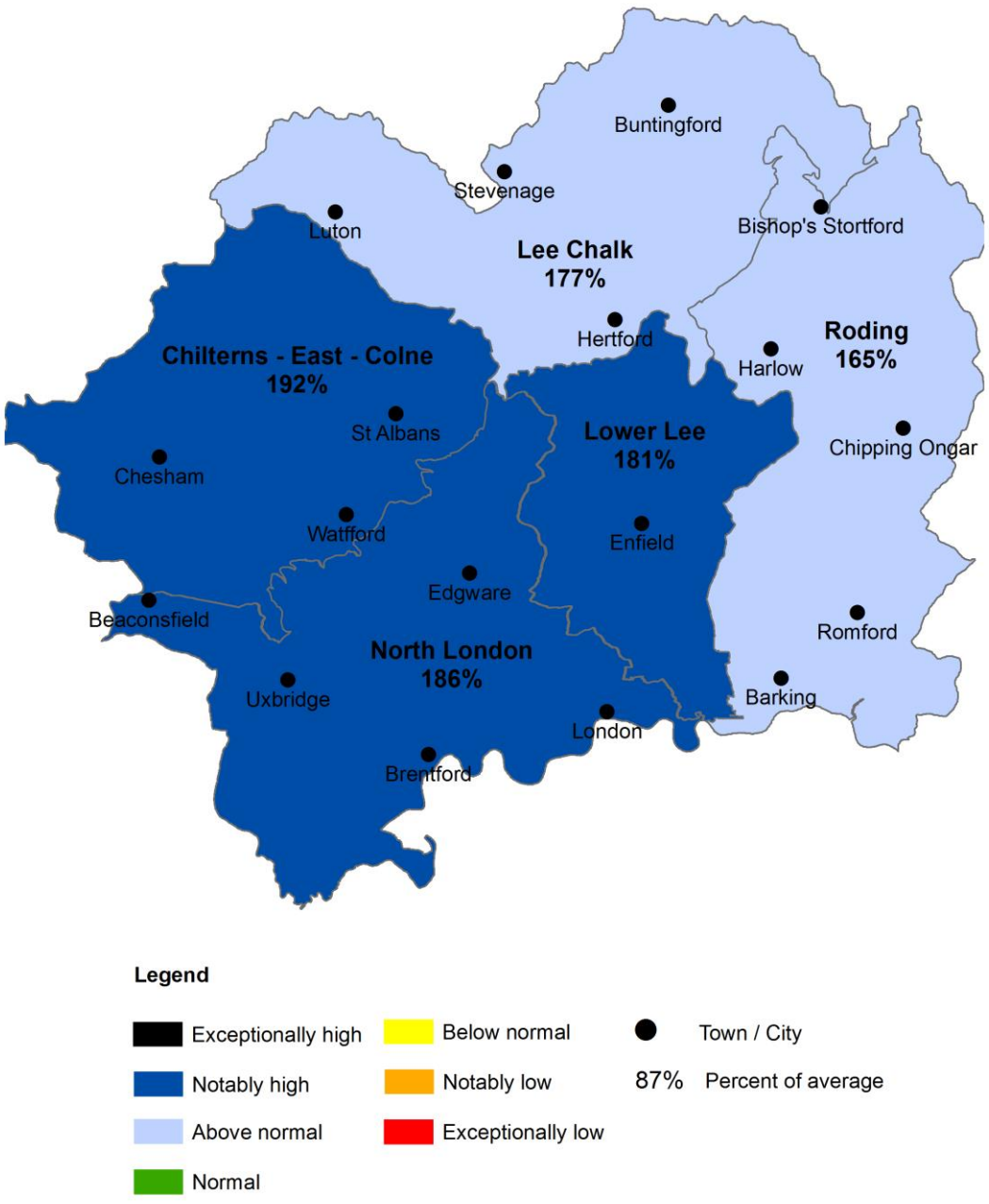
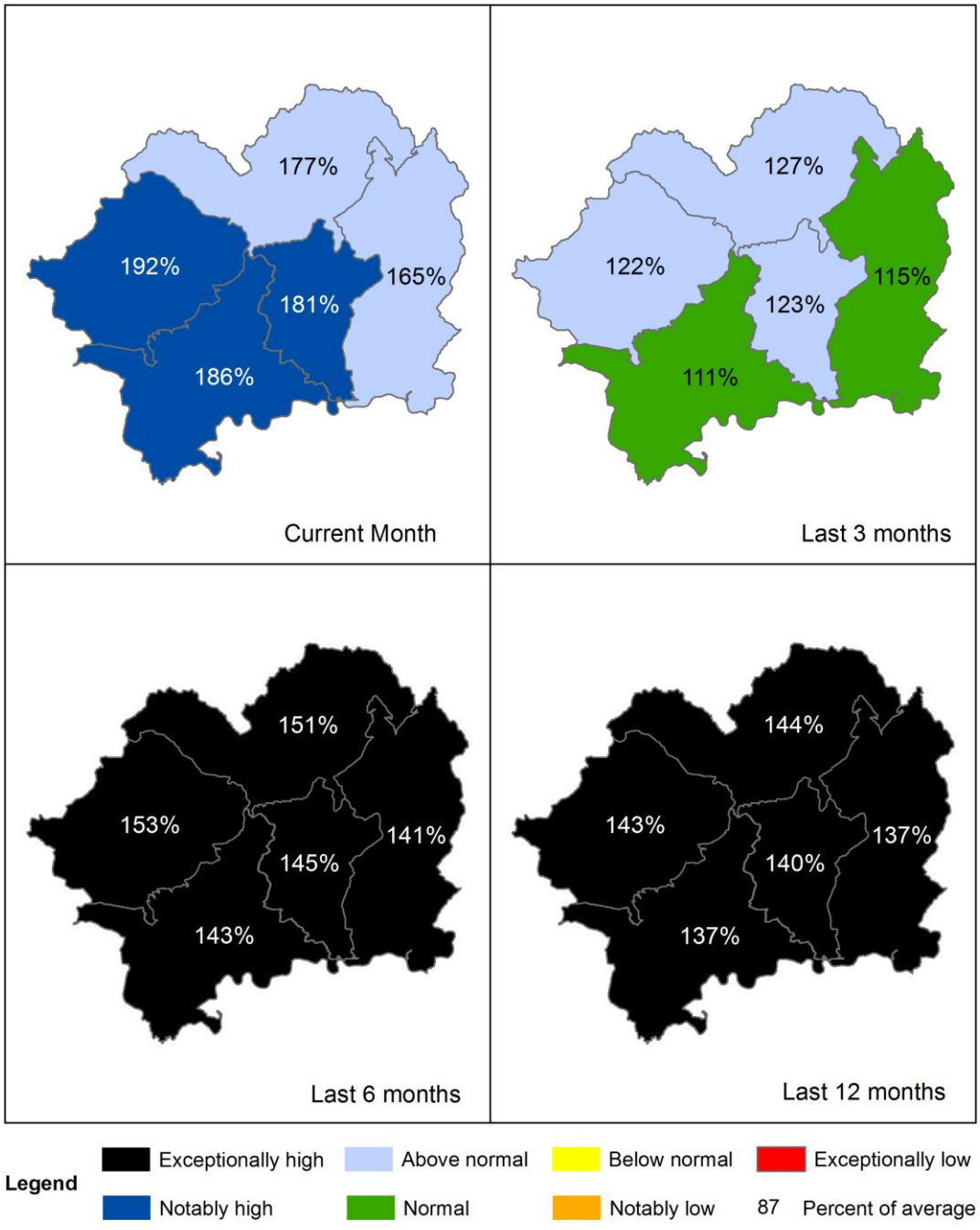


Figure 2.2: Total rainfall for hydrological areas for the current month (up to 31 July 2024), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.

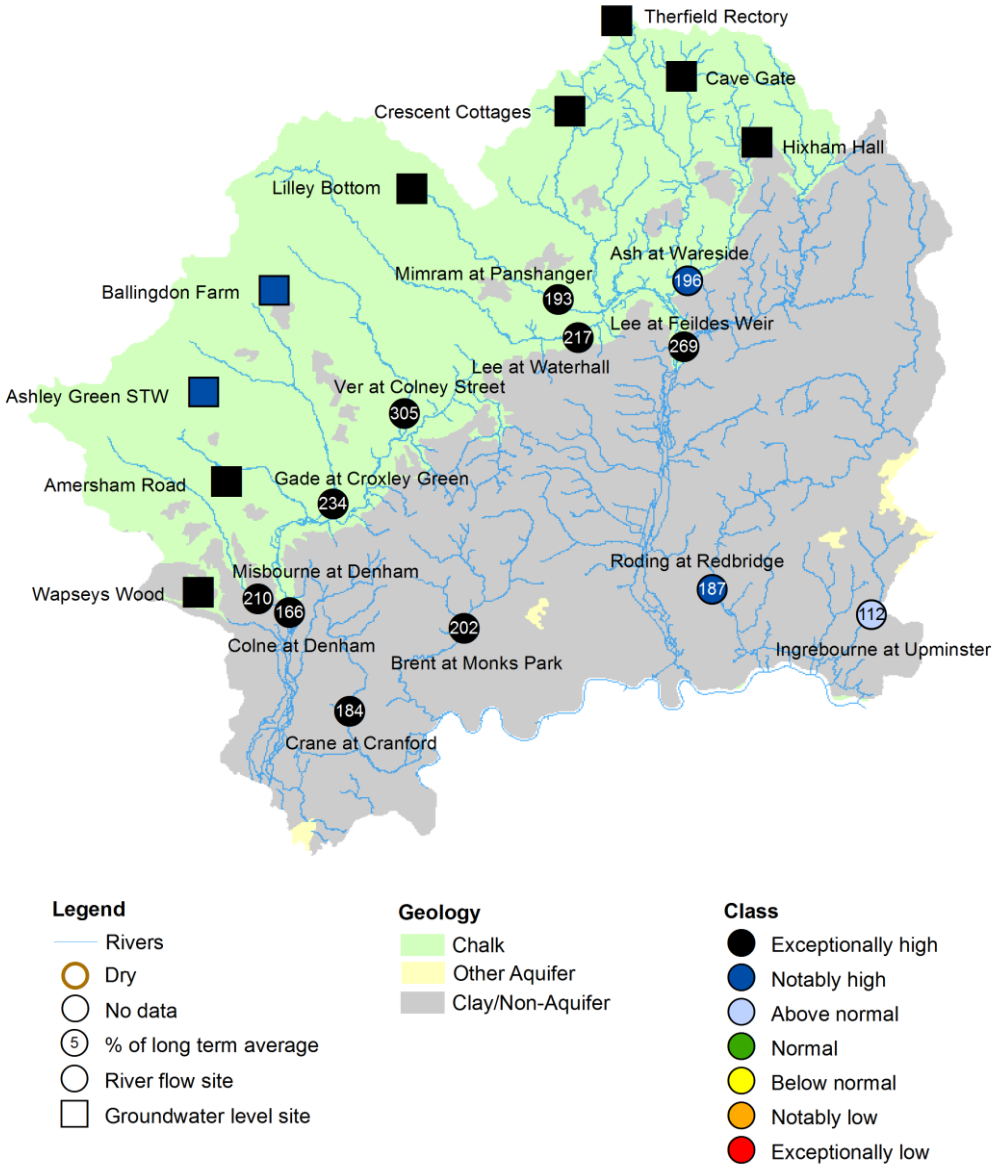


HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2024). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved.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

3 River flows and Groundwater levels

3.1 River flows and Groundwater level map

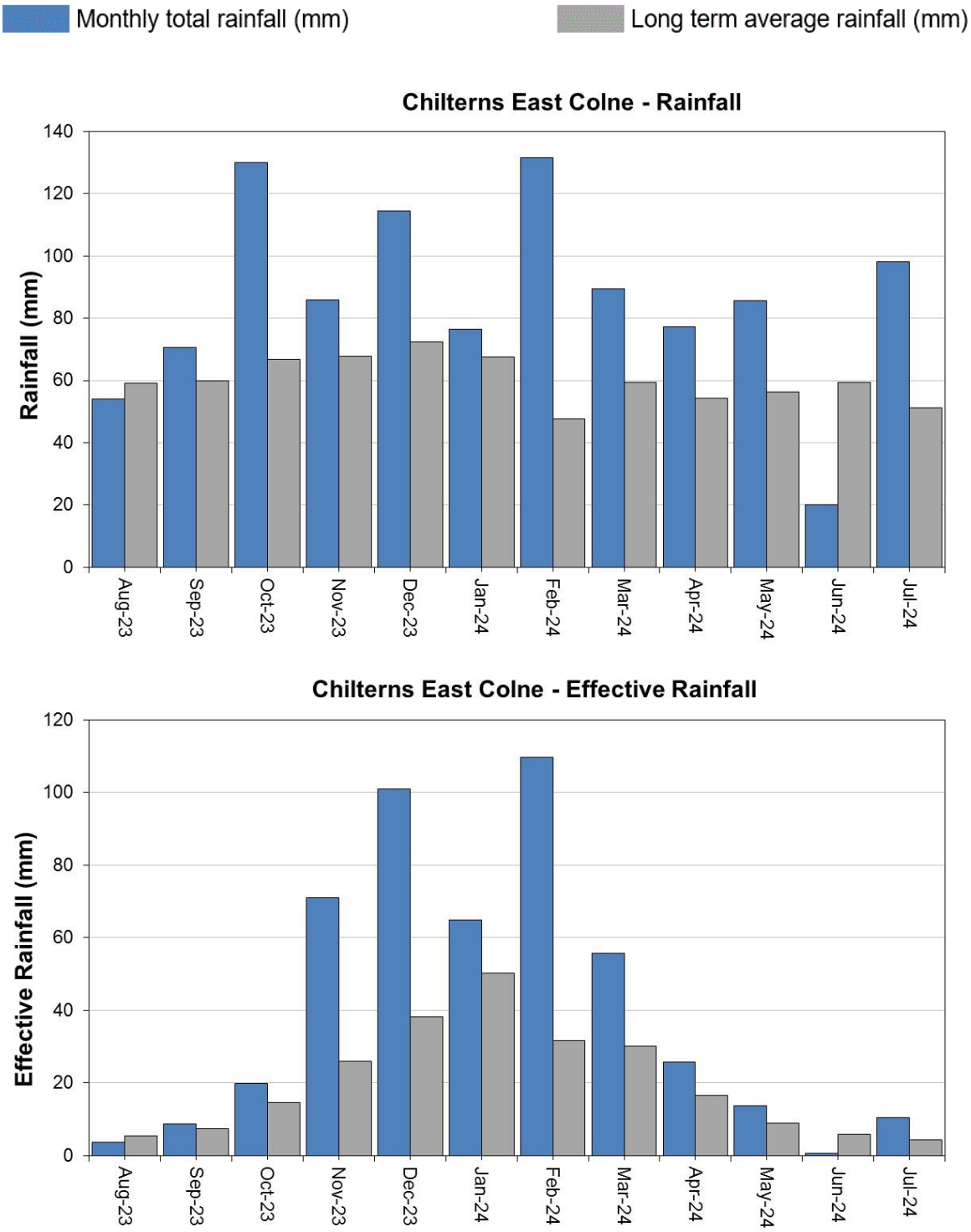
Figure 3.1: Monthly mean river flow and groundwater levels at our indicator sites for July 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic July monthly means. Table available in the appendices with detailed information.



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.

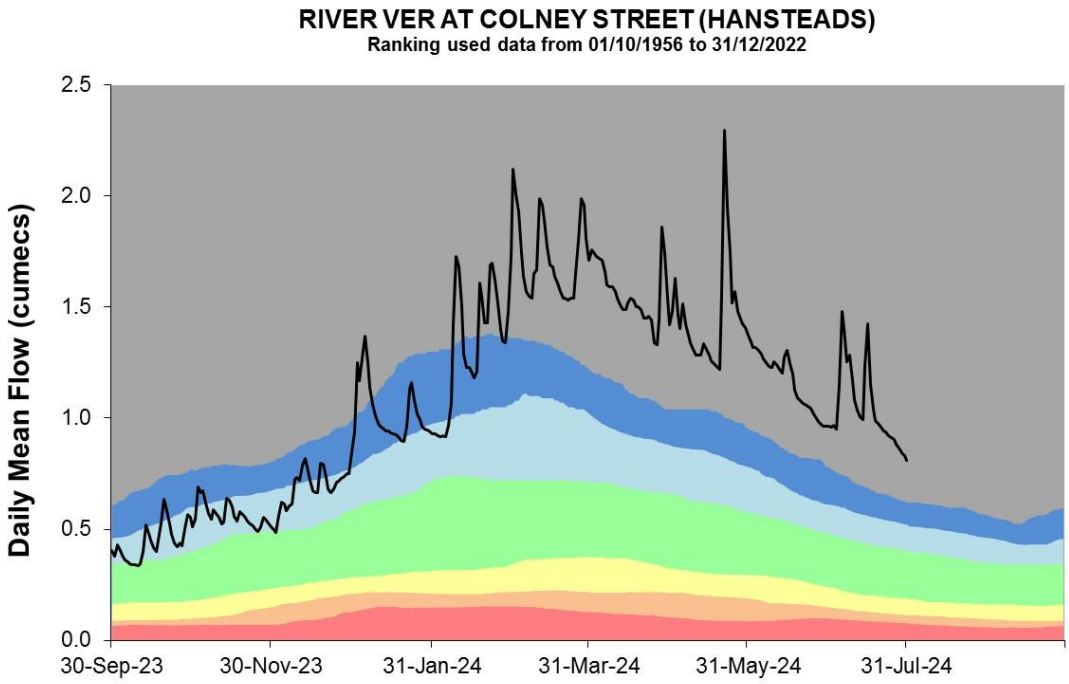


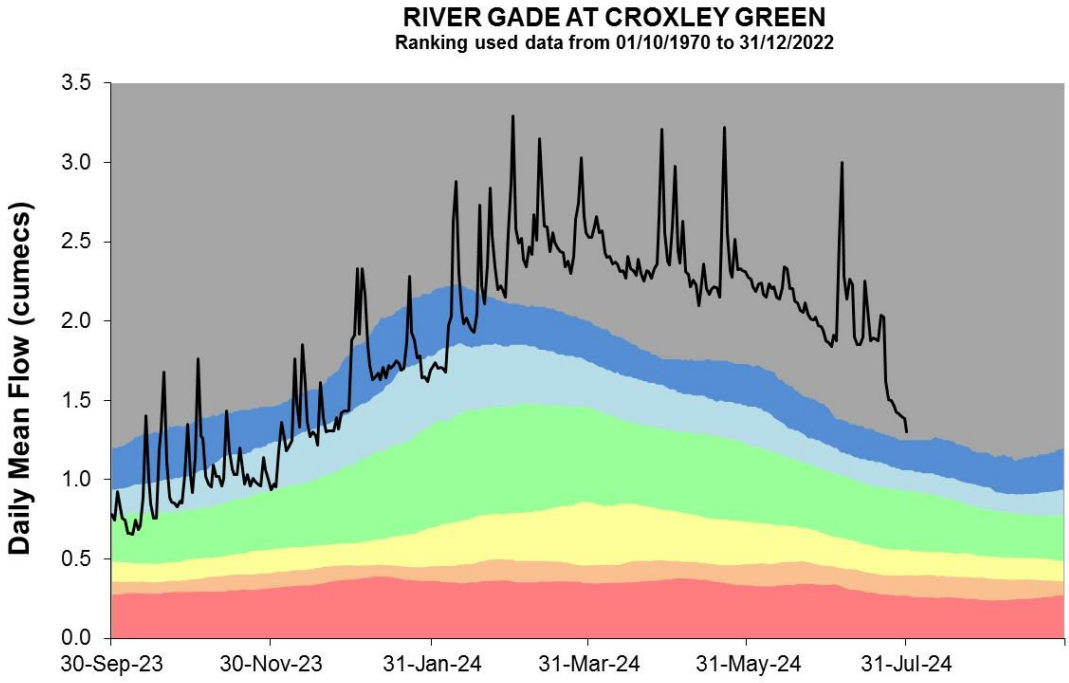
HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

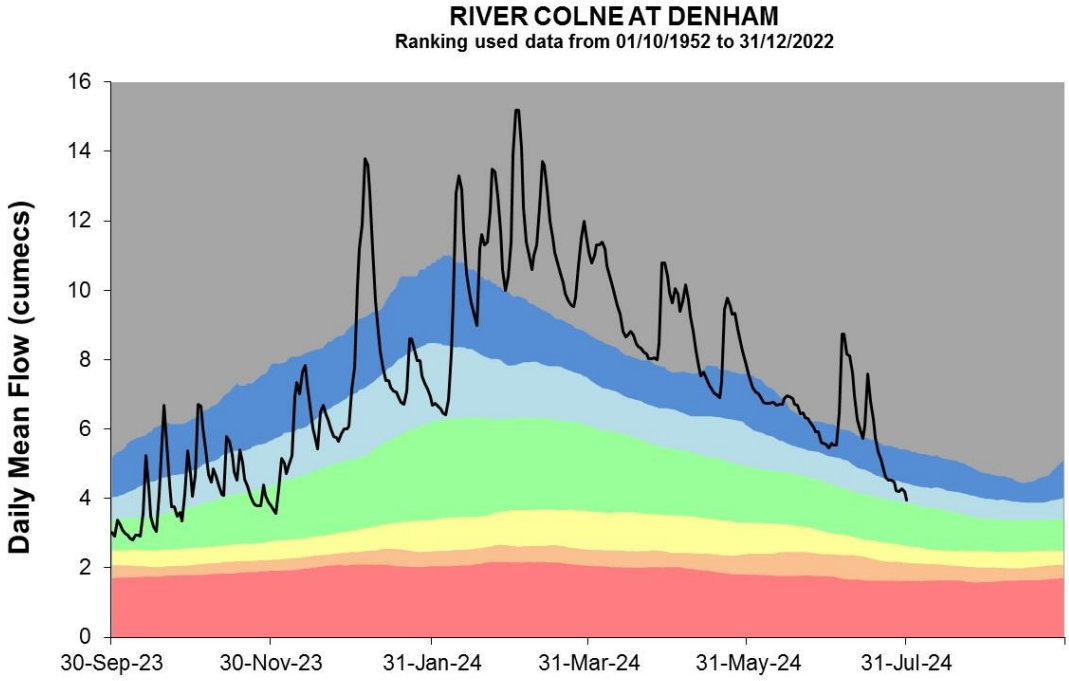
EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2024)

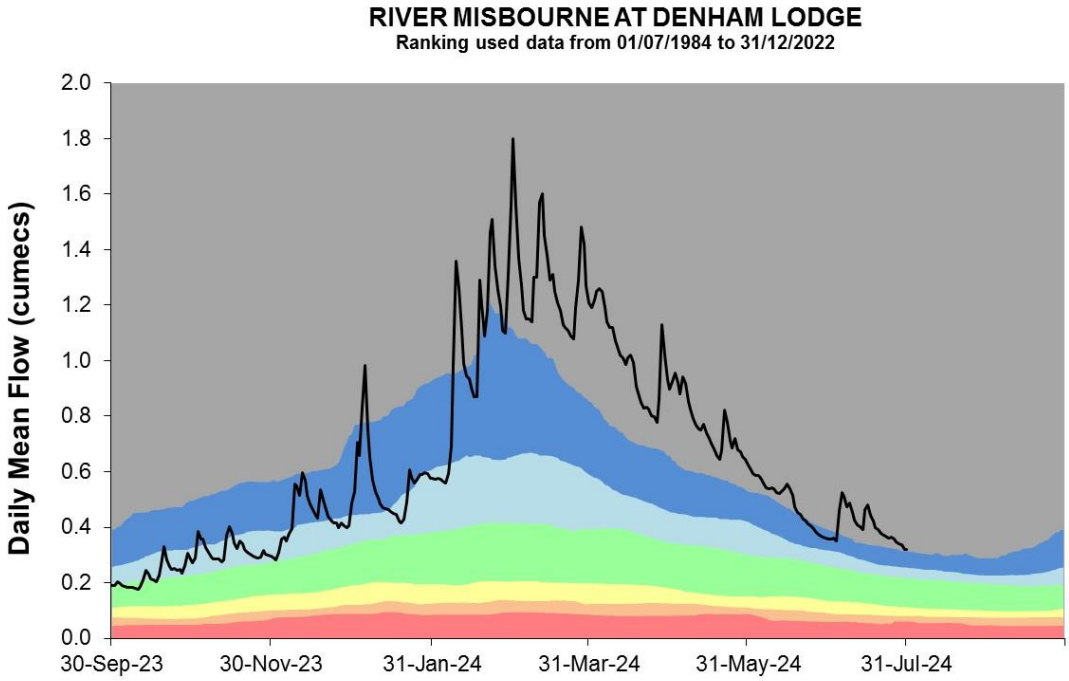
4.2 Colne River flow charts

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.





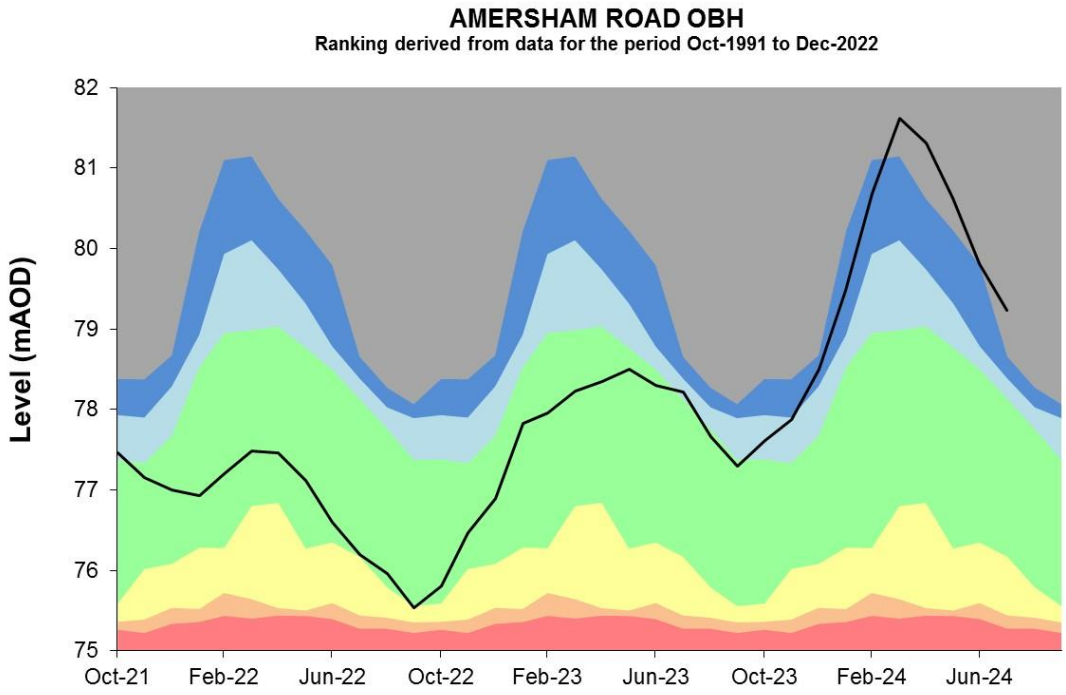


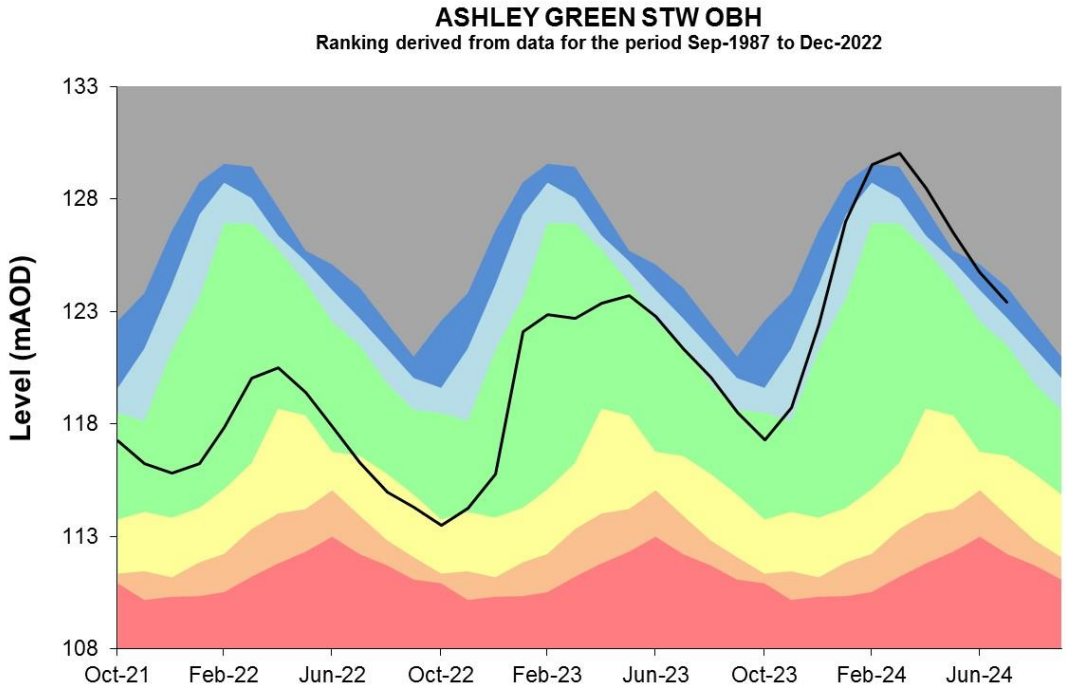


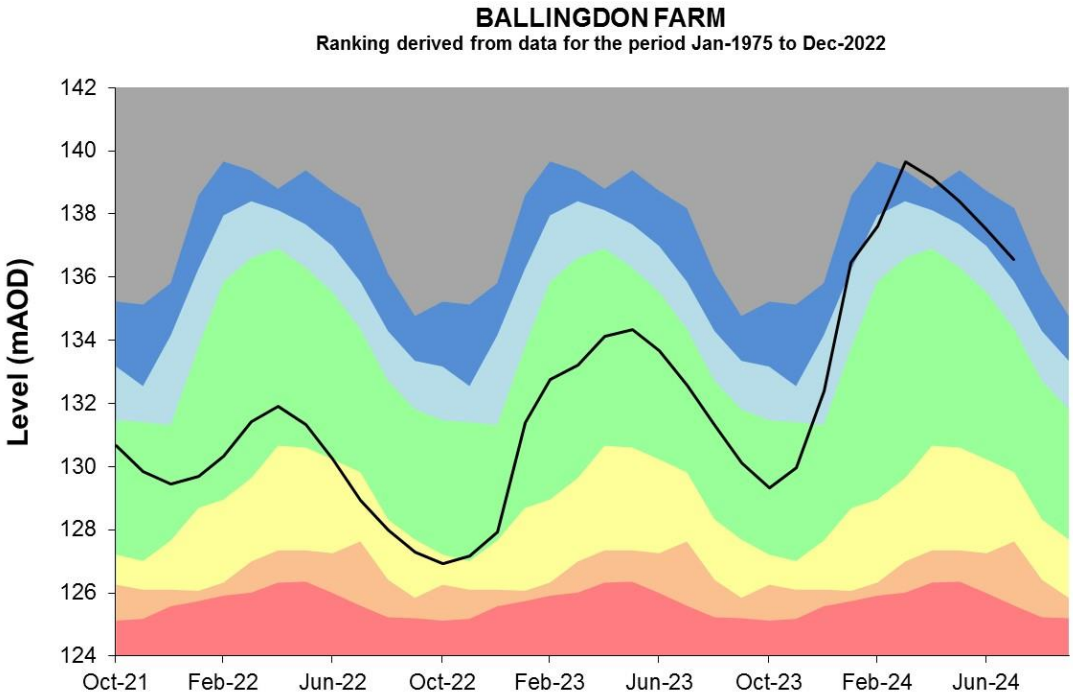
Source: Environment Agency, 2024

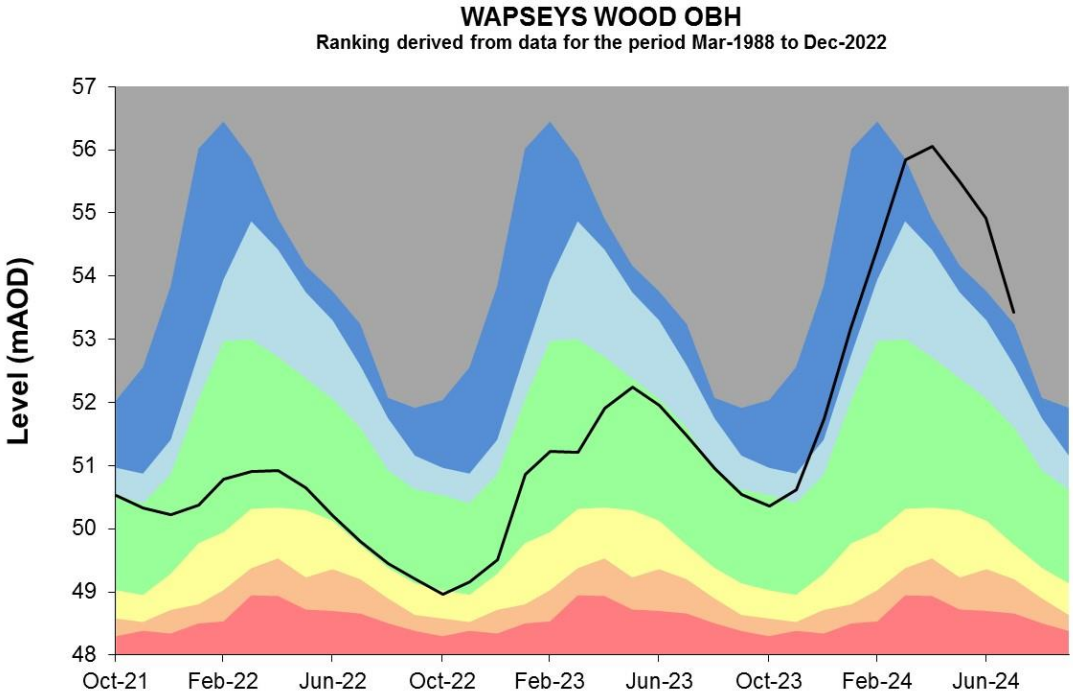
4.3 Colne Groundwater level charts

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.







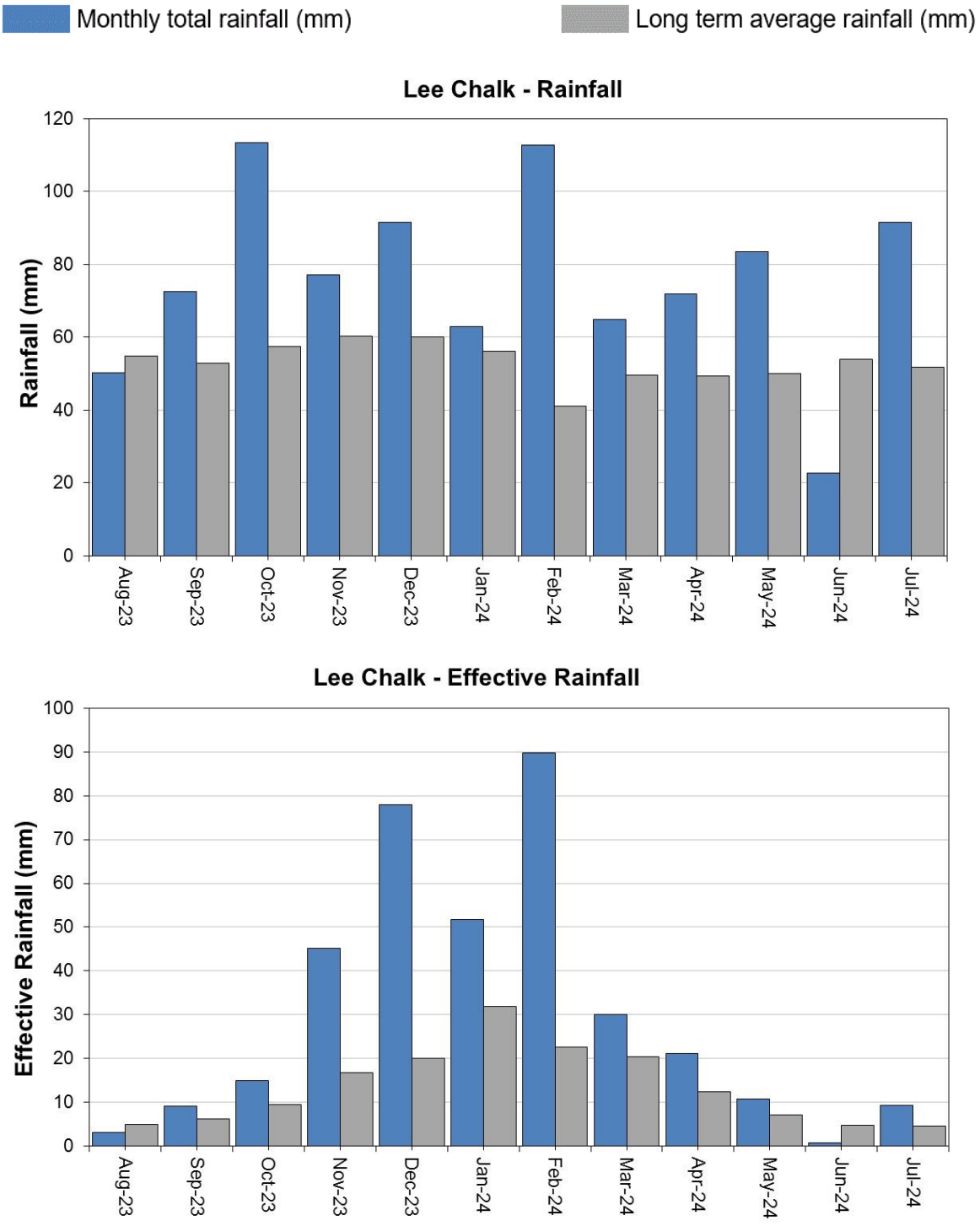


Source: Environment Agency, 2024

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.

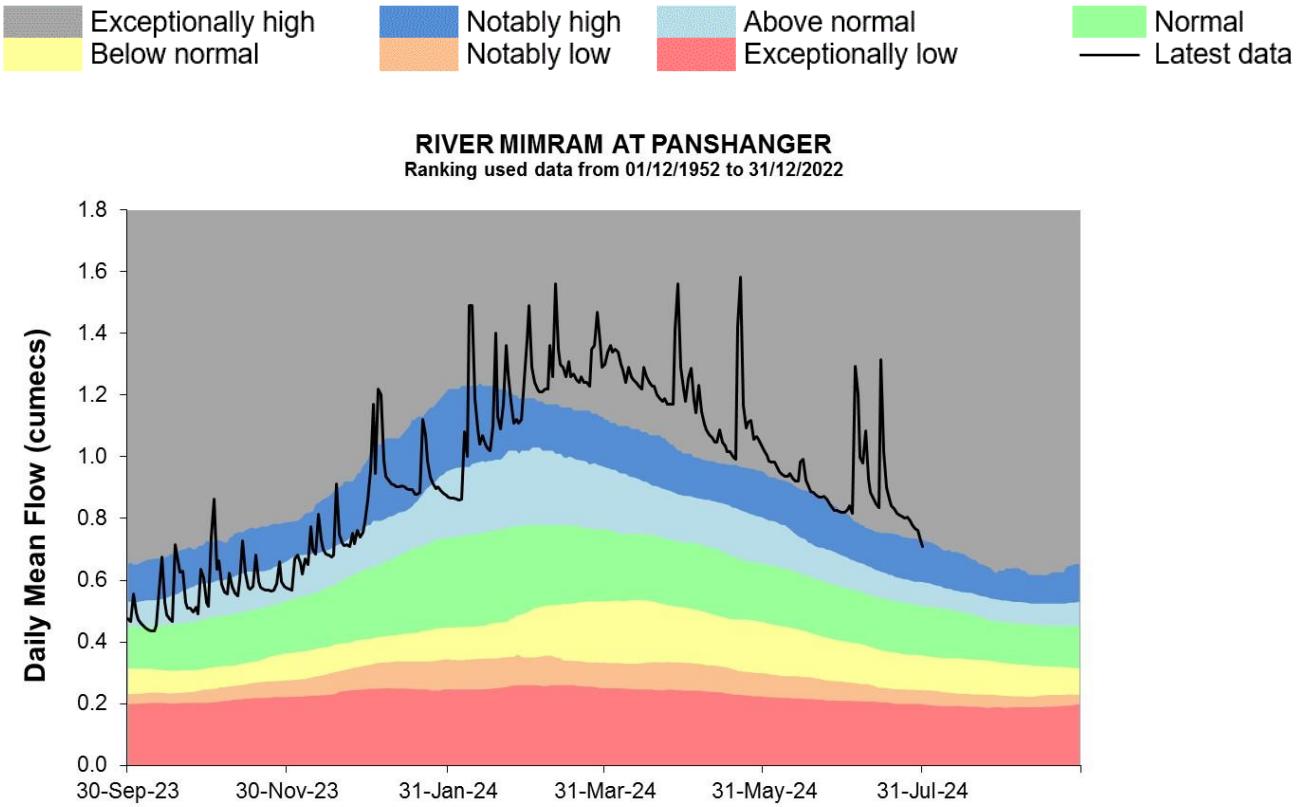


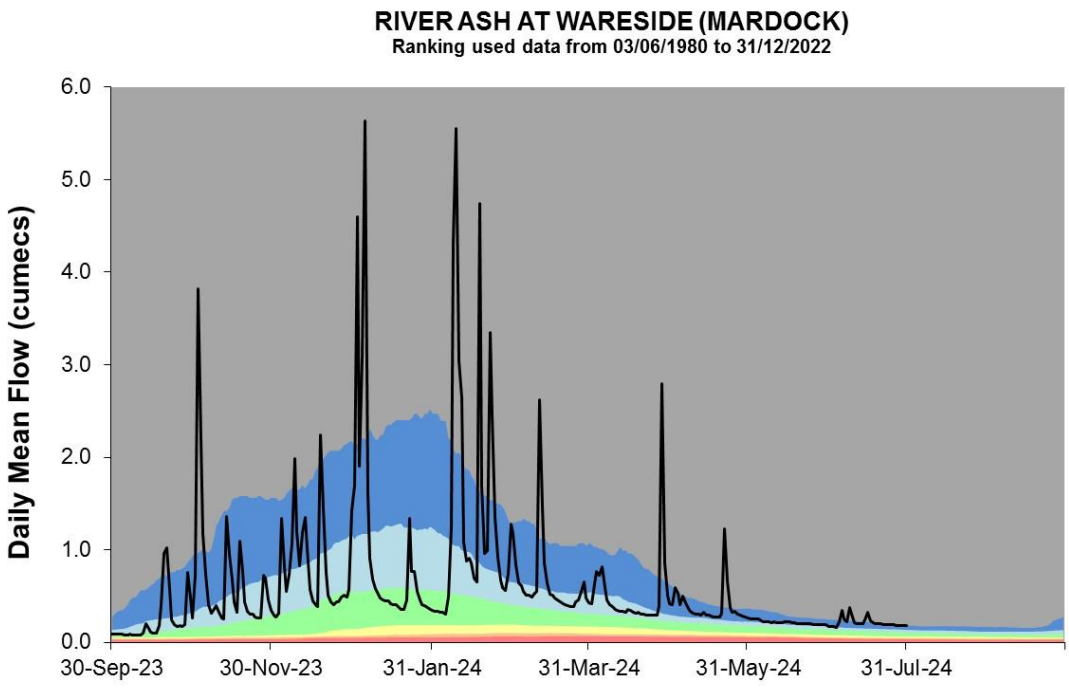
HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

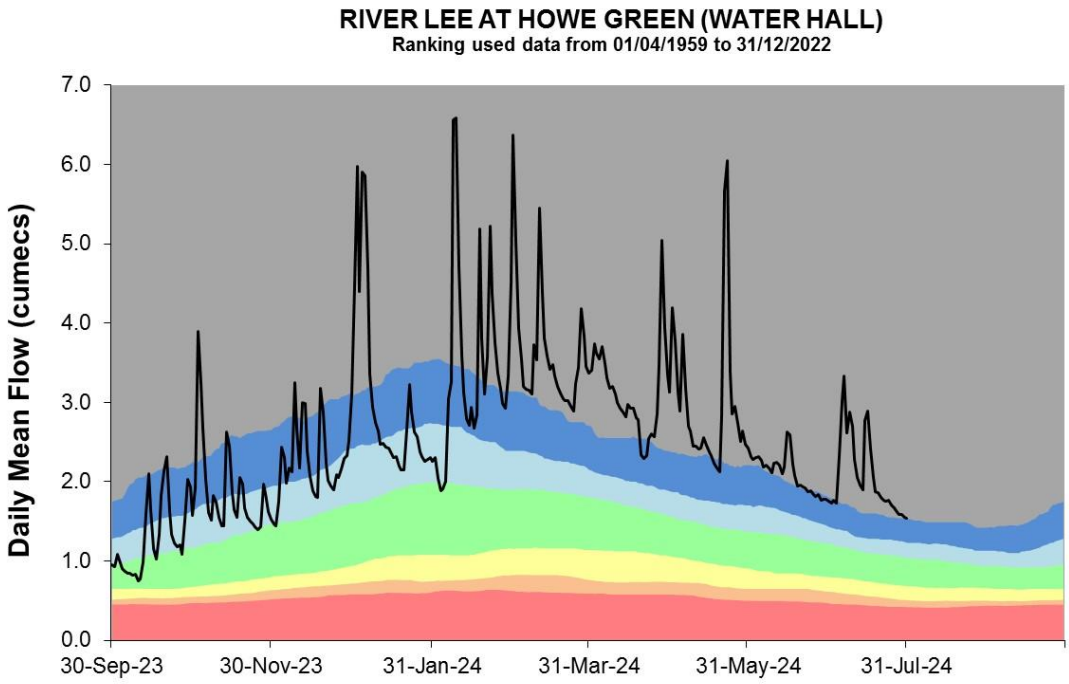
EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2024)

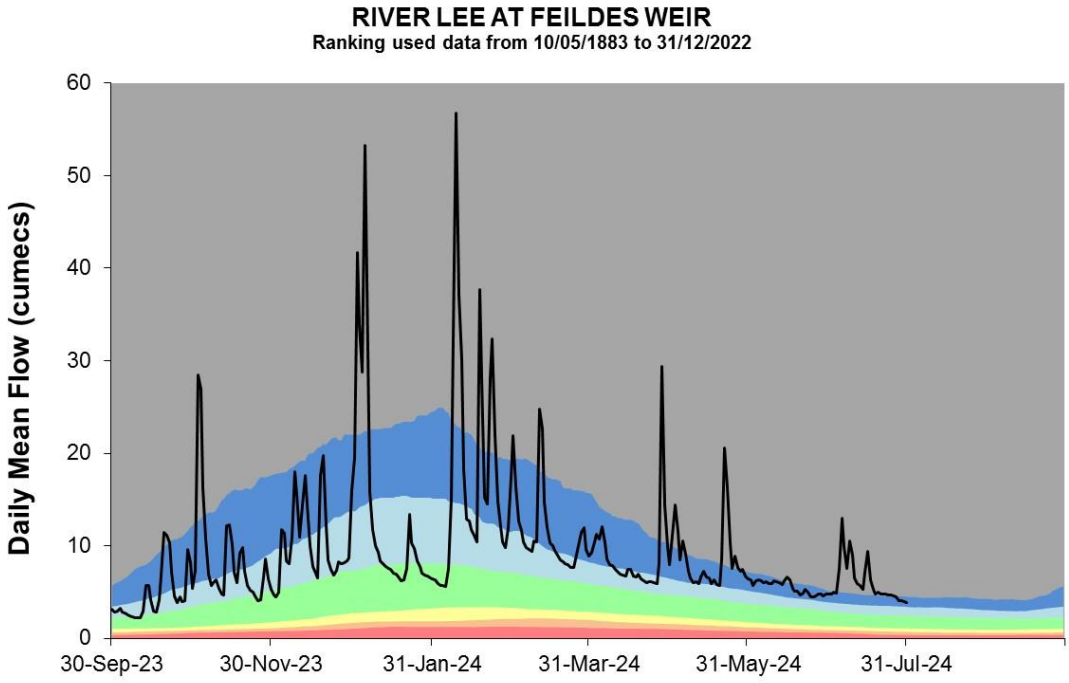
5.2 Upper Lee River flow charts

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.





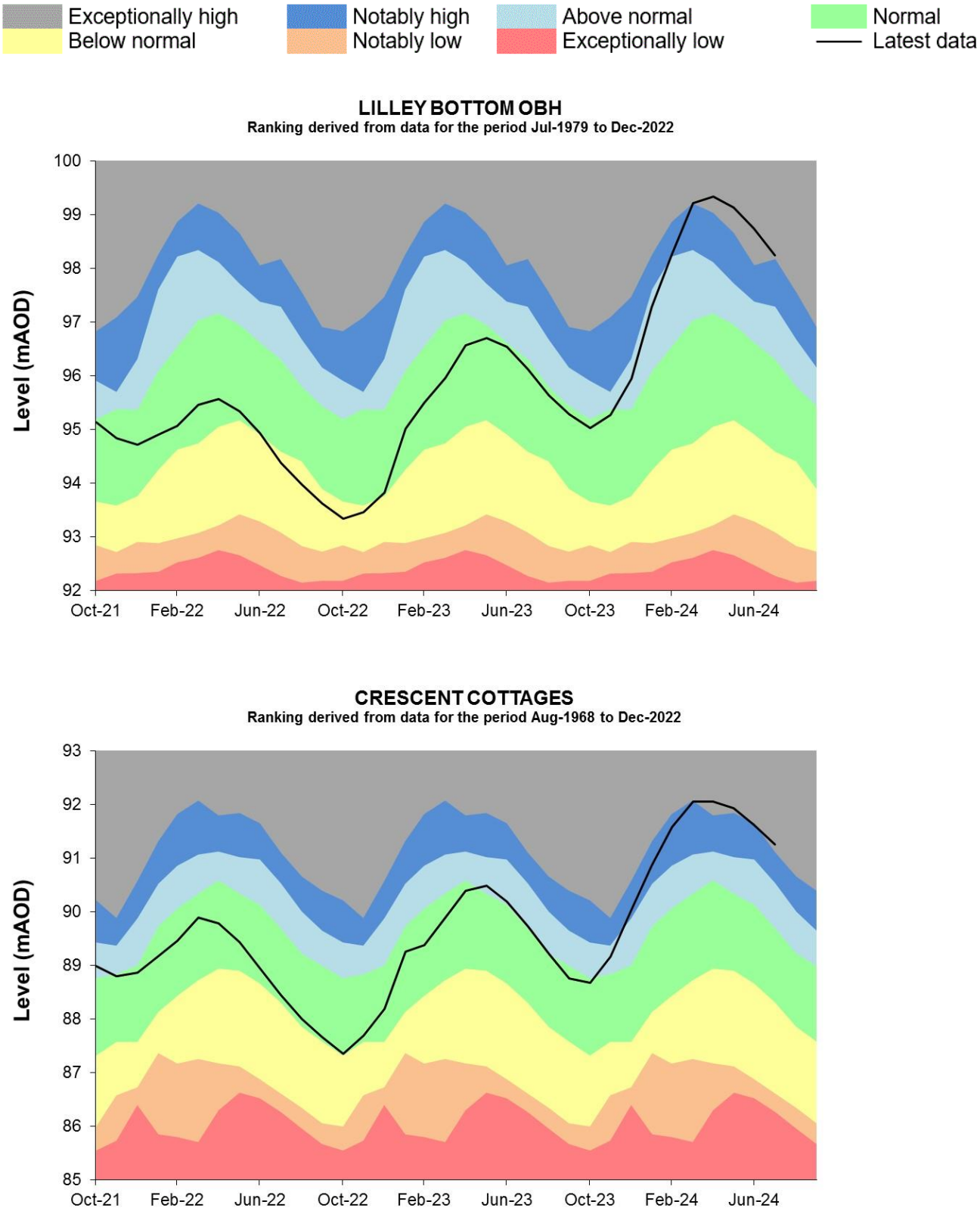




Source: Environment Agency, 2024

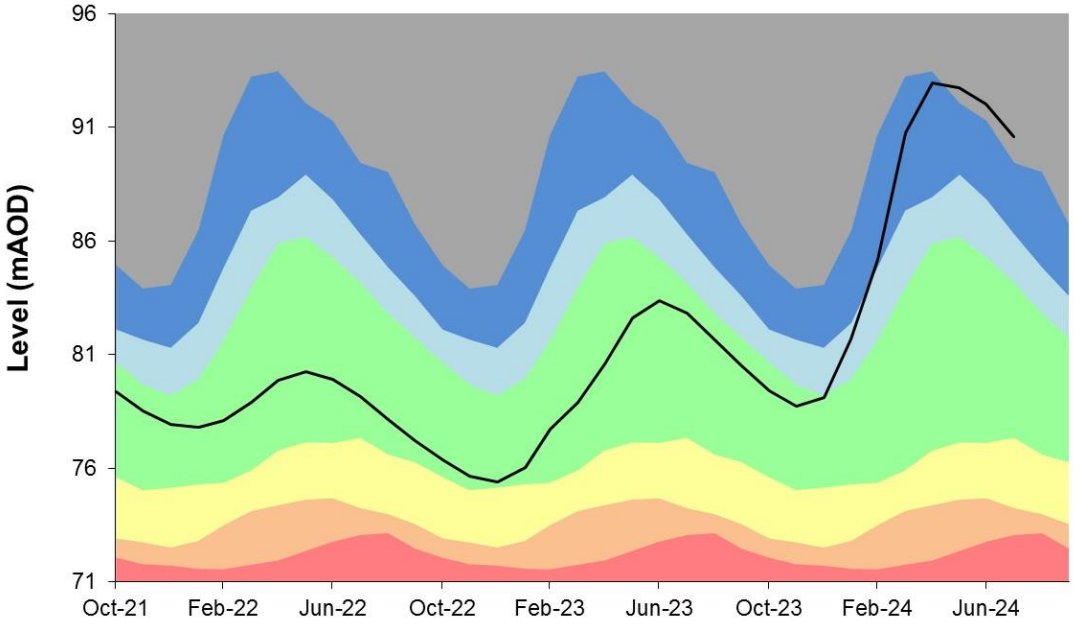
5.3 Upper Lee Groundwater level charts

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.



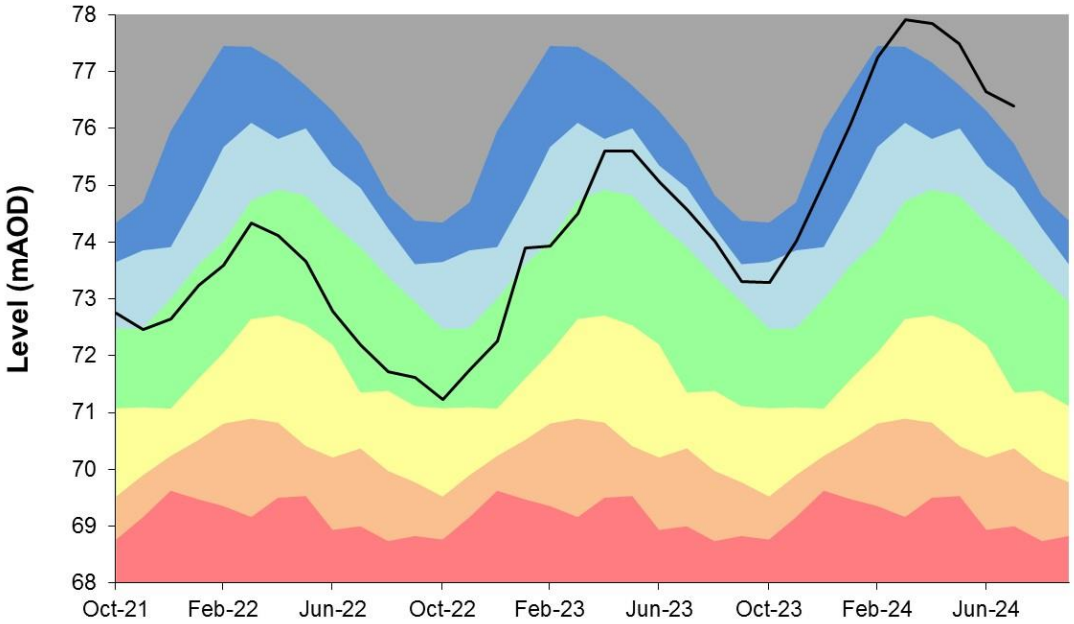
THERFIELD RECTORY

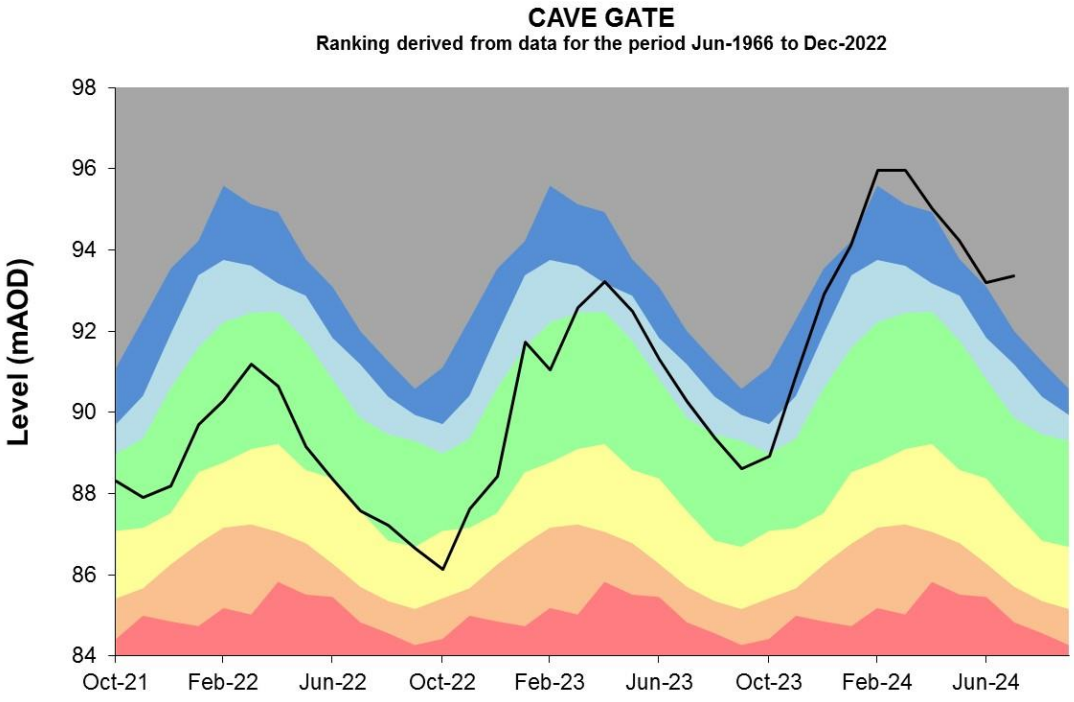
Ranking derived from data for the period Jan-1883 to Dec-2022



HIXHAM HALL

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



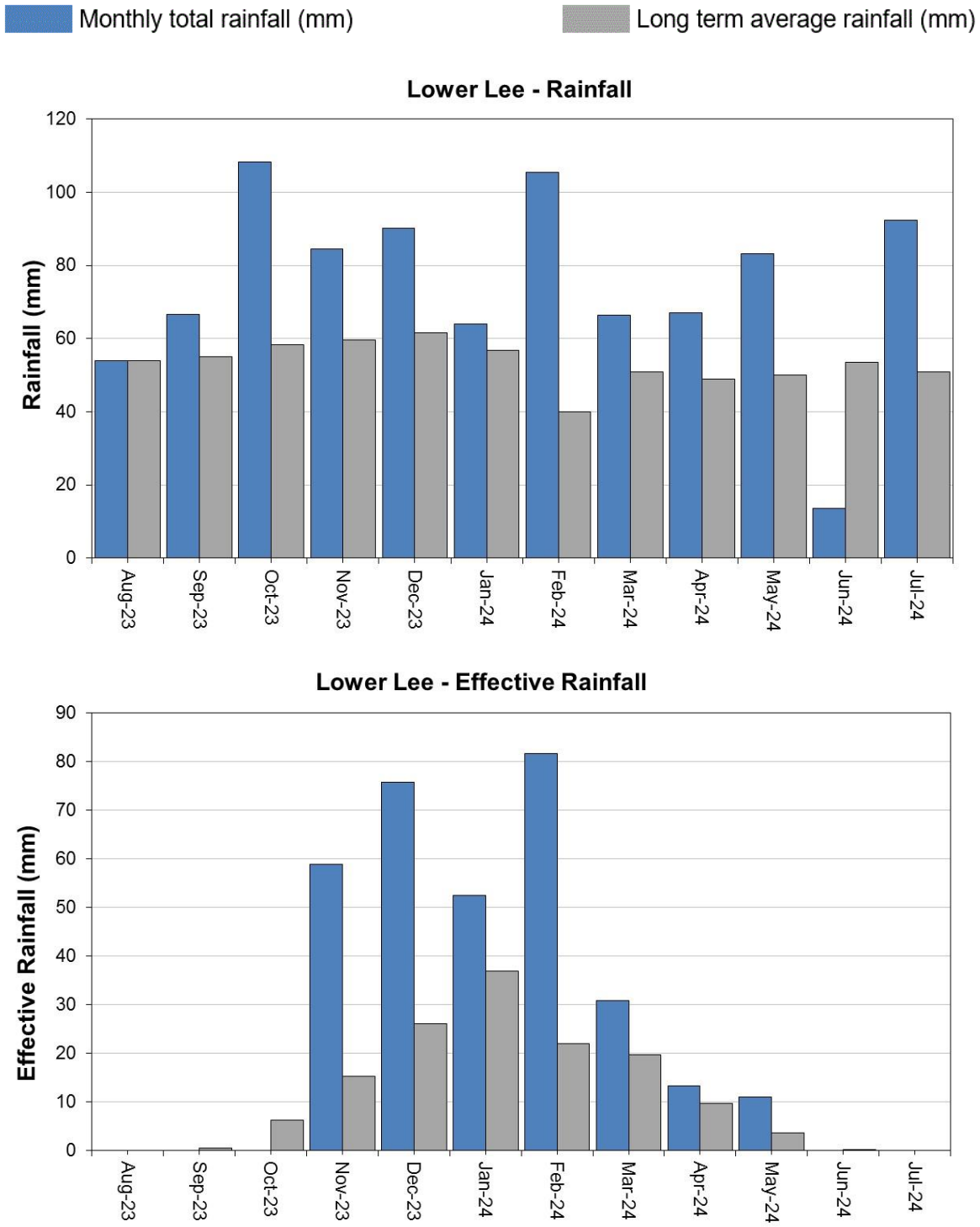


Source: Environment Agency, 2024

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.

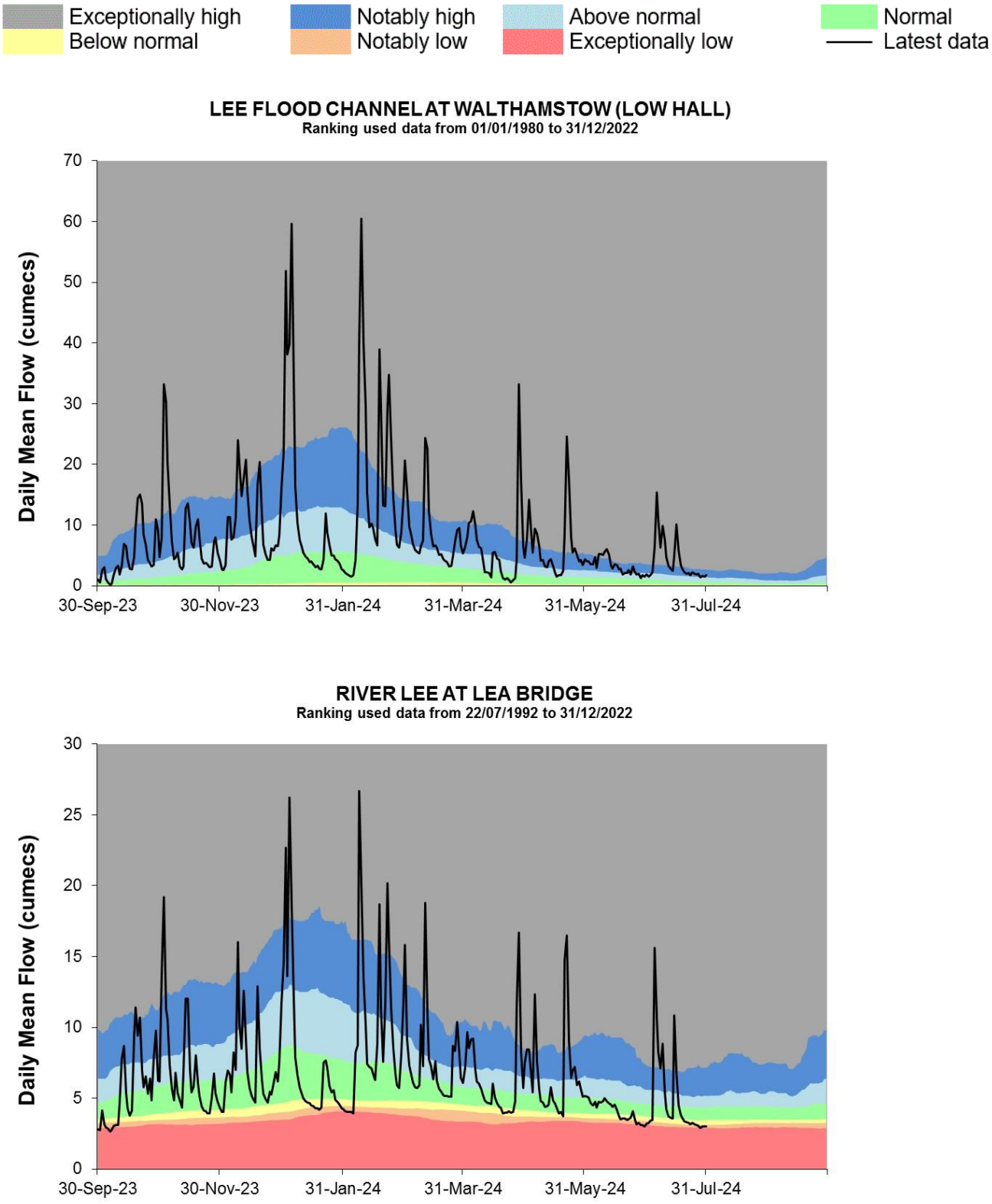


HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

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.

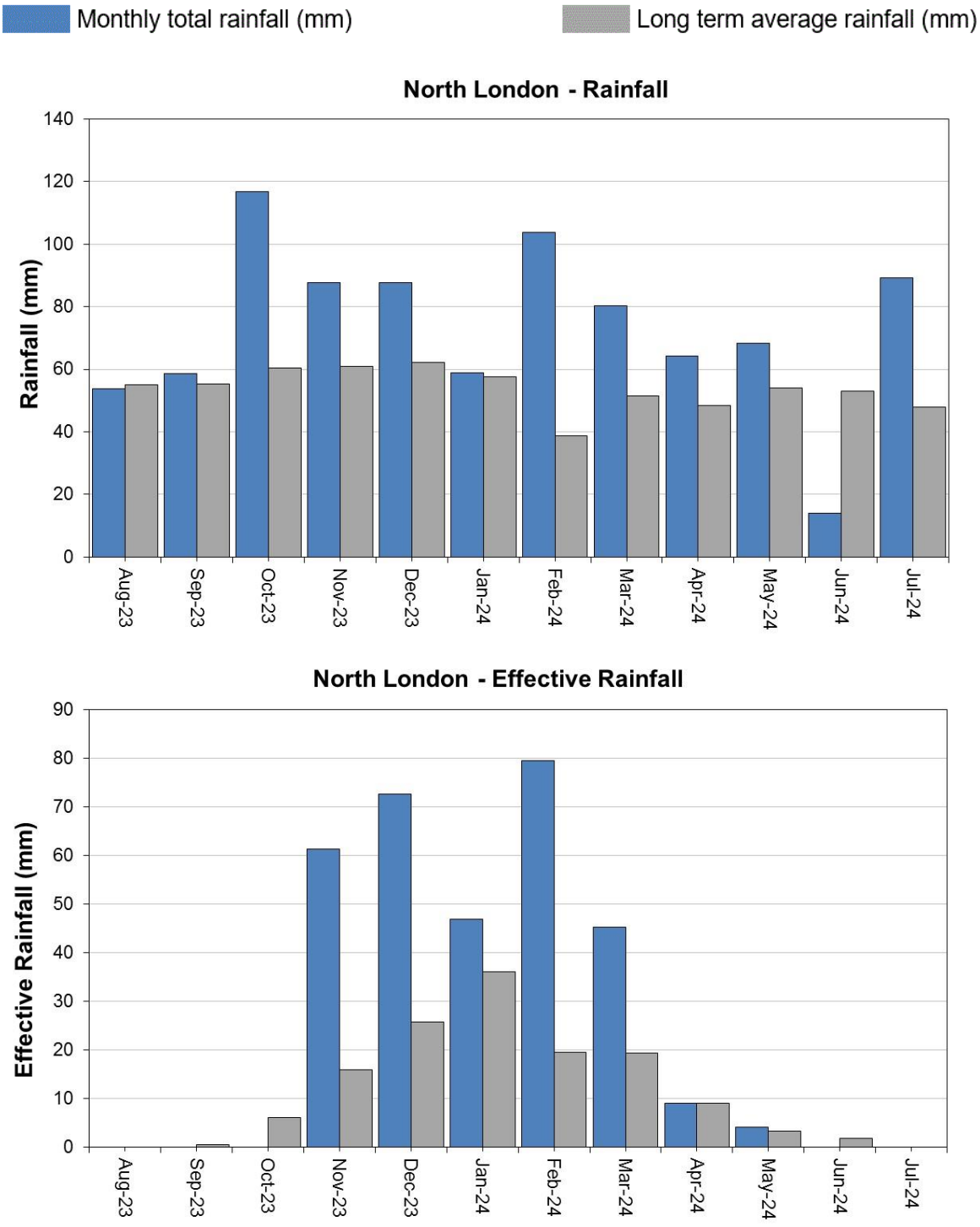


Source: Environment Agency, 2024

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.

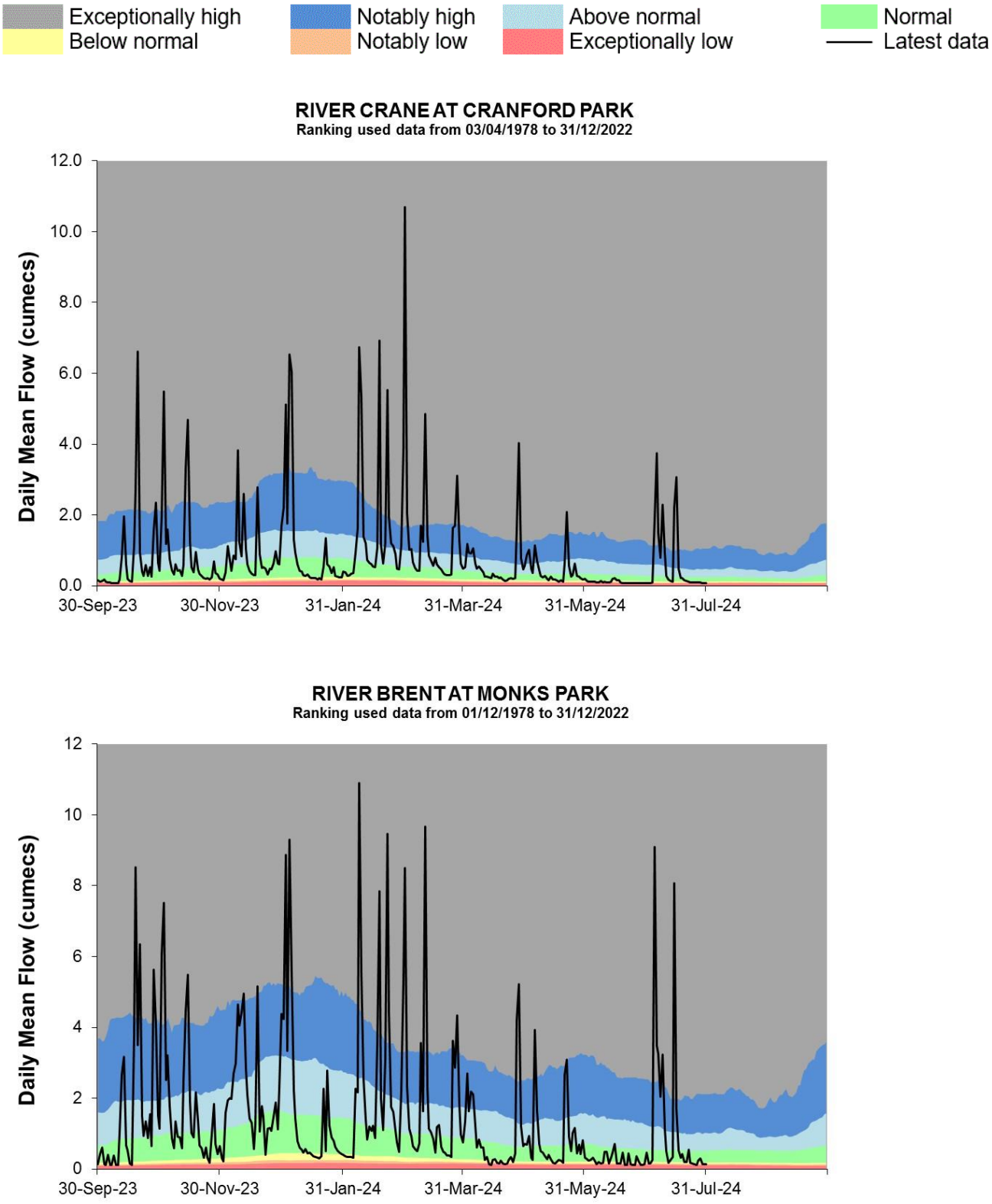


HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

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.

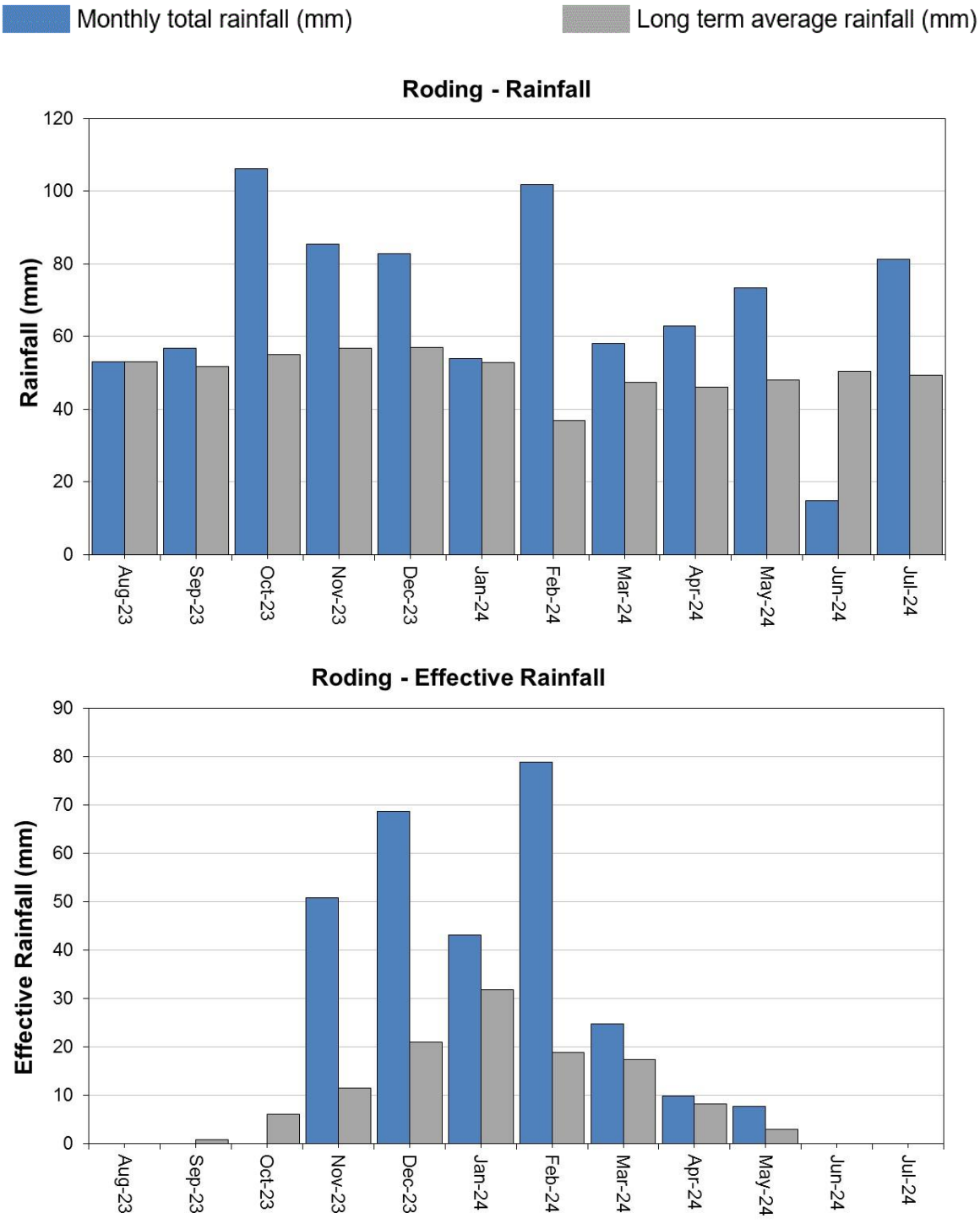


Source: Environment Agency, 2024

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.

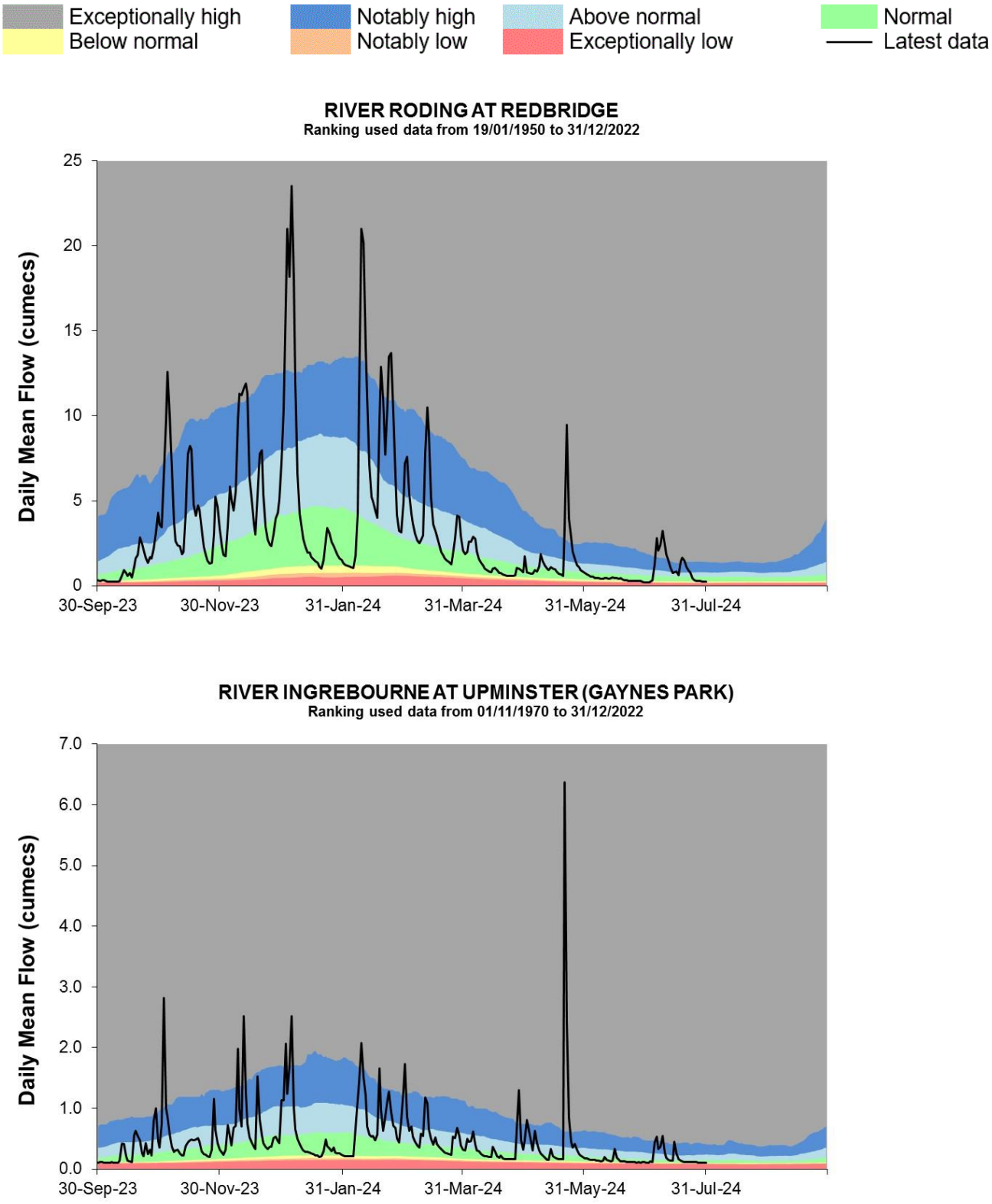


HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

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

8.2 Roding River flow charts

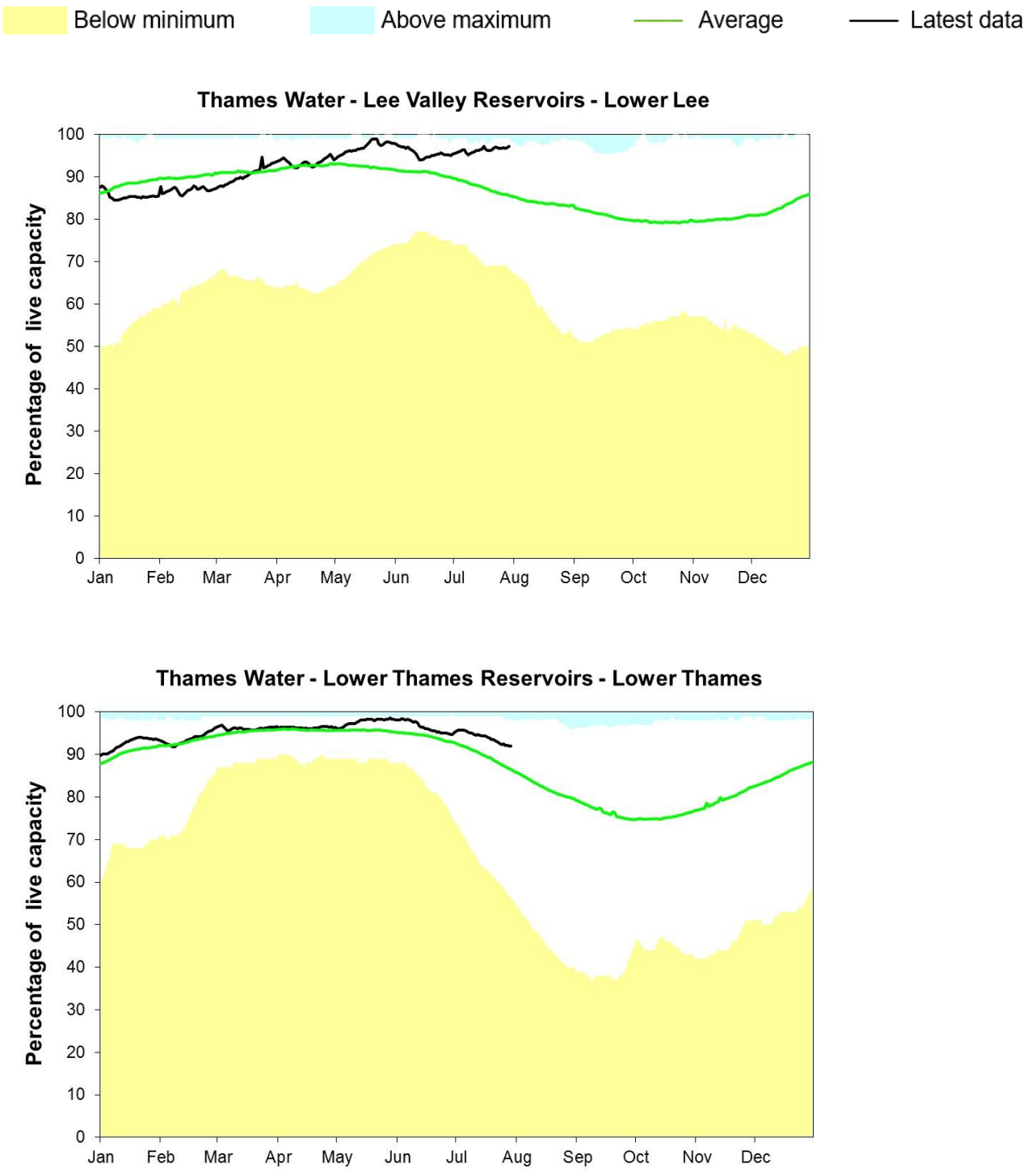
Figure 8.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2024

9 Reservoir stocks

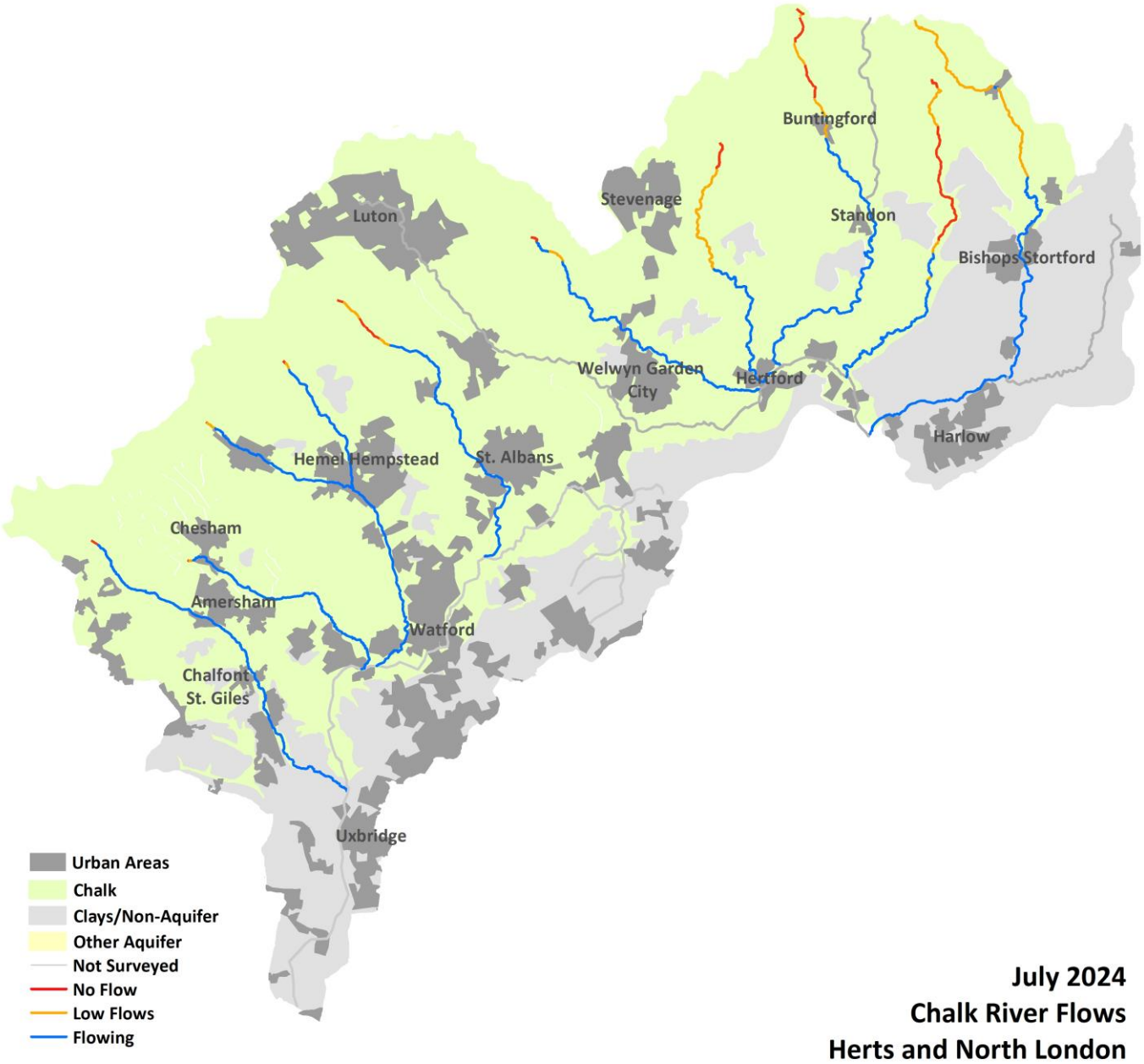
Figure 9.1: End of month reservoir stocks for the Lower Thames reservoir group and the Lee Valley reservoir group compared to long term maximum, minimum and average stocks. Note: Historic records of individual reservoirs and reservoir groups making up the regional values vary in length.



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	Jul 2024 total rainfall in mm	Jul 2024 rainfall long term average 1961 to 1990	Jul 2024 rainfall % of long term average 1961 to 1990	Summer Apr 2024 to Jul 2024 total rainfall in mm	Summer Apr 2024 to Jul 2024 rainfall % of long term average 1961 to 1990
Chilterns East Colne	98	51	192	281	127
Lee Chalk	92	52	177	270	132
Lower Lee	92	51	181	256	126
North London	89	48	186	236	116
Roding	81	49	165	232	120
Herts and North London total	90	50	180	255	124

12.2 Rainfall banding table

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

12.3 Effective Rainfall table

Hydrological area	Jul 2024 total effective rainfall in mm	Jul 2024 effective rainfall long term average 1961 to 1990 in mm	Jul 2024 effective rainfall % of long term average 1961 to 1990	Summer Apr 2024 to Jul 2024 total effective rainfall in mm	Summer Apr 2024 to Jul 2024 effective rainfall % of long term average 1961 to 1990
Chilterns East Colne	11	4	239	51	141
Lee Chalk	9	5	201	42	145
Lower Lee	0	0	0	24	181
North London	0	0	0	13	92
Roding	0	0	0	17	157
Herts and North London total	4	2	220	29	142

12.4 Soil Moisture Deficit table

Hydrological area	Jul 2024 end of month Soil Moisture Deficit in mm	Jul 2024 end of month Soil Moisture Deficit long term average 1961 to 1990 in mm	Jun 2024 end of month Soil Moisture Deficit in mm	Jun 2024 end of month Soil Moisture Deficit long term average 1961 to 1990 in mm
Chilterns East Colne	76	84	76	63
Lee Chalk	80	91	76	73
Lower Lee	81	88	84	68
North London	88	91	84	68
Roding	85	89	81	69
Herts and North London total	82	89	80	68

12.5 River flows table

Site name	River	Catchment	Jul 2024 band	Jun 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	Notably 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	Notably high	Above normal
Feildes Weir (naturalised)	Lee	Upper Lee	Exceptionally high	Notably high
Brent (Monks Park)	Brent	North London	Exceptionally high	Exceptionally low
Cranford (Cranford Park)	Crane	North London	Exceptionally high	Exceptionally low
Redbridge	Roding	Roding, Beam and Ingrebourne	Notably high	Below normal
Upminster (Gaynes Park)	Ingrebourne	Roding, Beam and Ingrebourne	Above normal	Normal

12.6 Groundwater table

Site name	Aquifer	Jul 2024 band	Jun 2024 band
Ashley Green	Mid-Chilterns Chalk	Notably high	Notably high
Ballingdon Farm	Mid-Chilterns Chalk	Notably high	Notably high
Amersham Road	Mid-Chilterns Chalk	Exceptionally 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	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	Exceptionally high	Exceptionally high

12.7 Abstraction licence flow constraints

Number of flow constraints in force between 1 and 7 July 2024	Number of flow constraints in force between 8 and 14 July 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
1	2	1	2