Monthly water situation report: Hertfordshire and North London Area

1 Summary - June 2024

The prolonged period of wet weather over the last 8 months ended in June with the Hertfordshire and North London area receiving only 32% of the long term average rainfall. Soil moisture deficits increased to levels well above the long term average. River flows varied according to geology, with Chalk River levels high and clay river levels low. Groundwater levels still remained high with sites recording their highest and second highest levels on record.

1.1 Rainfall

The prolonged period of wet weather over the last 8 months ended in June with the Hertfordshire and North London area ("the Area") receiving only 32% of the long term average (LTA) rainfall. The Area's 5 areal rainfall units ended June in the notably low band except Lee Chalk which was in the below normal band. Chilterns East Colne and Lee Chalk, the Areal rainfall units in the chalk, received more rainfall than the three that are in the clay. On average there was a total of 21 dry days (with less than 0.2mm of rainfall recorded). The wettest day of the month was 14 June, with 13.4mm of rain recorded at Lilley Manor (Lee Chalk) and 13.2mm at Runley Wood (Lee Chalk). Over the summer period (April to June), the Area recorded 164mm of rainfall, 106% of the LTA.

1.2 Soil moisture deficit and recharge

With the lower rainfall in June, there was a large increase in soil moisture deficits (SMD) across the Area from 16mm at the end of May to 80mm at the end of June, reaching well above the end of June LTA (68mm). The dry weather meant that there was no recharge (0mm of effective rainfall) on average across the Area. Despite a dry June, the Area's effective rainfall for the summer period from April to June remained well above average at 135% of the LTA.

1.3 River flows

This month, there was a clear difference between the river flows in the chalk and clay catchments. The rivers of the Upper Lee and Colne are predominately fed by chalk groundwater, while the north London and Essex rivers run over urban and clay areas and are more responsive to rainfall. The 8 sites in the chalk catchments experienced monthly mean flows that ranged from the above normal to exceptionally high bands whereas the clay rivers were in the normal, below normal, and exceptionally low bands. The Ver at Colney Street which flows over a chalk catchment recorded the highest river flows on record (records start 1956). Also flowing over the chalk, the River Lee at Howe Green and the River Misbourne at Denham Lodge recorded the second highest flows since 2001 (records start 1959 and 1984 respectively). In the clay, the River Brent at Brent (Monks Park) recorded the second lowest flows since 2015 (records start 1979) and the River Crane at Cranford (Cranford Park) recorded

the third lowest flows after 2015 and 2018 (records start 1979 and 1978 respectively). There were no flood alerts issued across the Area during June.

1.4 Groundwater levels

Groundwater levels were making a slow decline for the time of year and still remained high at the end of the month. All sites recorded levels in the notably high and exceptionally high bands. Lilley Bottom (Upper Lee Chalk) recorded the highest June levels on record (records start 1979) with Wapseys Wood (Mid Chilterns Chalk) and Hixham Hall (Upper Lee Chalk) recording their second highest level since 2001 (records start 1988 and 1964 respectively).

1.5 Reservoir stocks

The Lower Thames and Lee Valley reservoir stocks both reduced from 98% to 95% but remained above the LTA for the end of June.

1.6 Environmental impact

The sources of the Chalk Rivers in the Colne catchment remained in similar locations to May.

- The River Ver started flowing at Markyate Cell.
- The River Gade started flowing at Hudnall Corner.
- The River Bulbourne started flowing upstream of Dudswell village.
- The River Chess started flowing a good distance above Chesham.
- The River Misbourne started flowing at Mobwell pond.

Some of the sources of the Chalk Rivers in the Upper Lee catchment were at different locations to May.

- The River Mimram started flowing at the lakes upstream of Whitwell.
- The River Beane started flowing upstream of Cromer.
- The River Rib started flowing at Slate Hall Farm then lost flow temporarily until Buntingford.
- The River Ash (Herts) started flowing at Little Hadham.
- The River Stort started flowing around Clavering losing flow at Potash Farm and returning at Standstead Springs.

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

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

Contact Details: 03708 506 506

2 Rainfall

2.1 Rainfall map

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

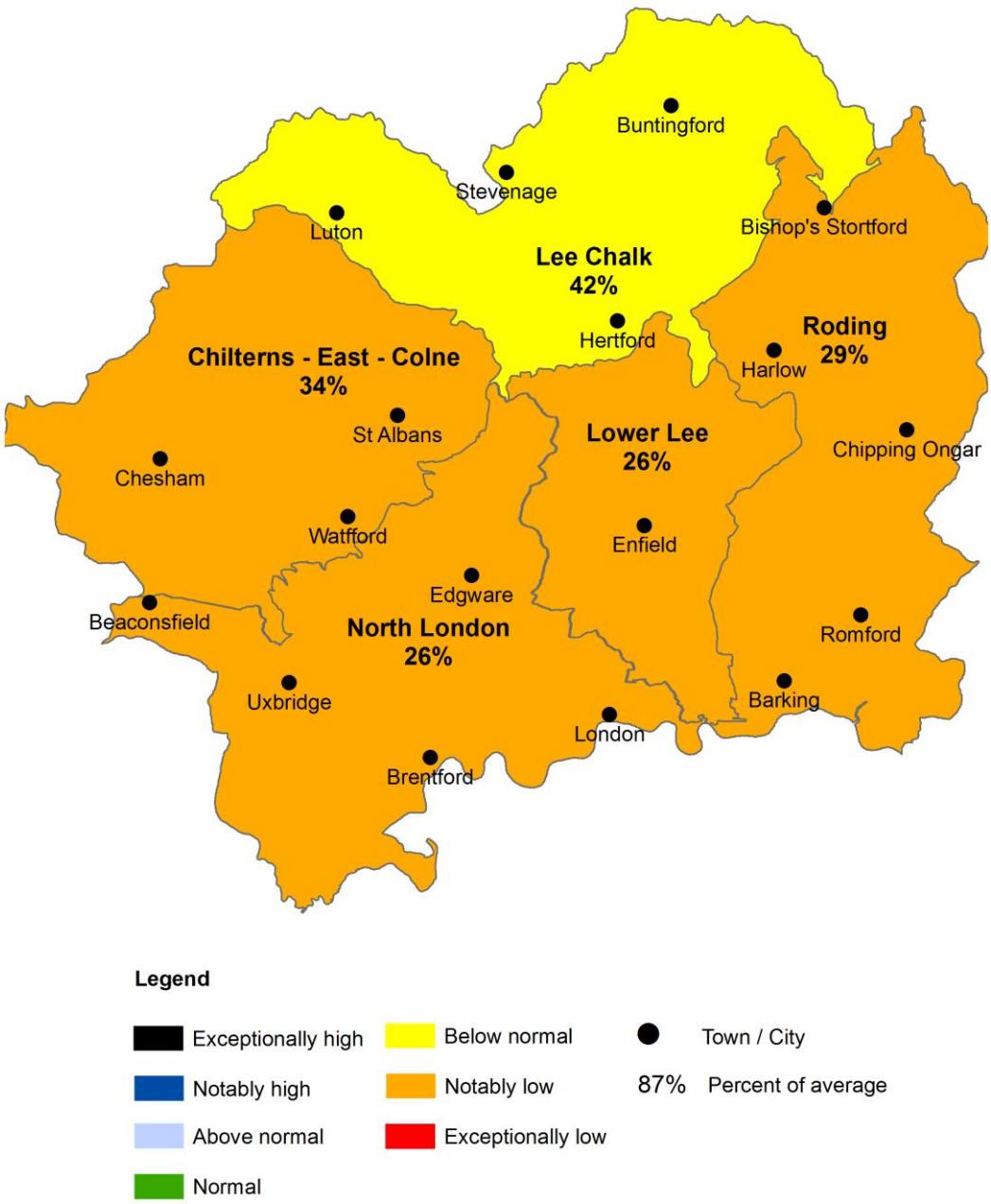
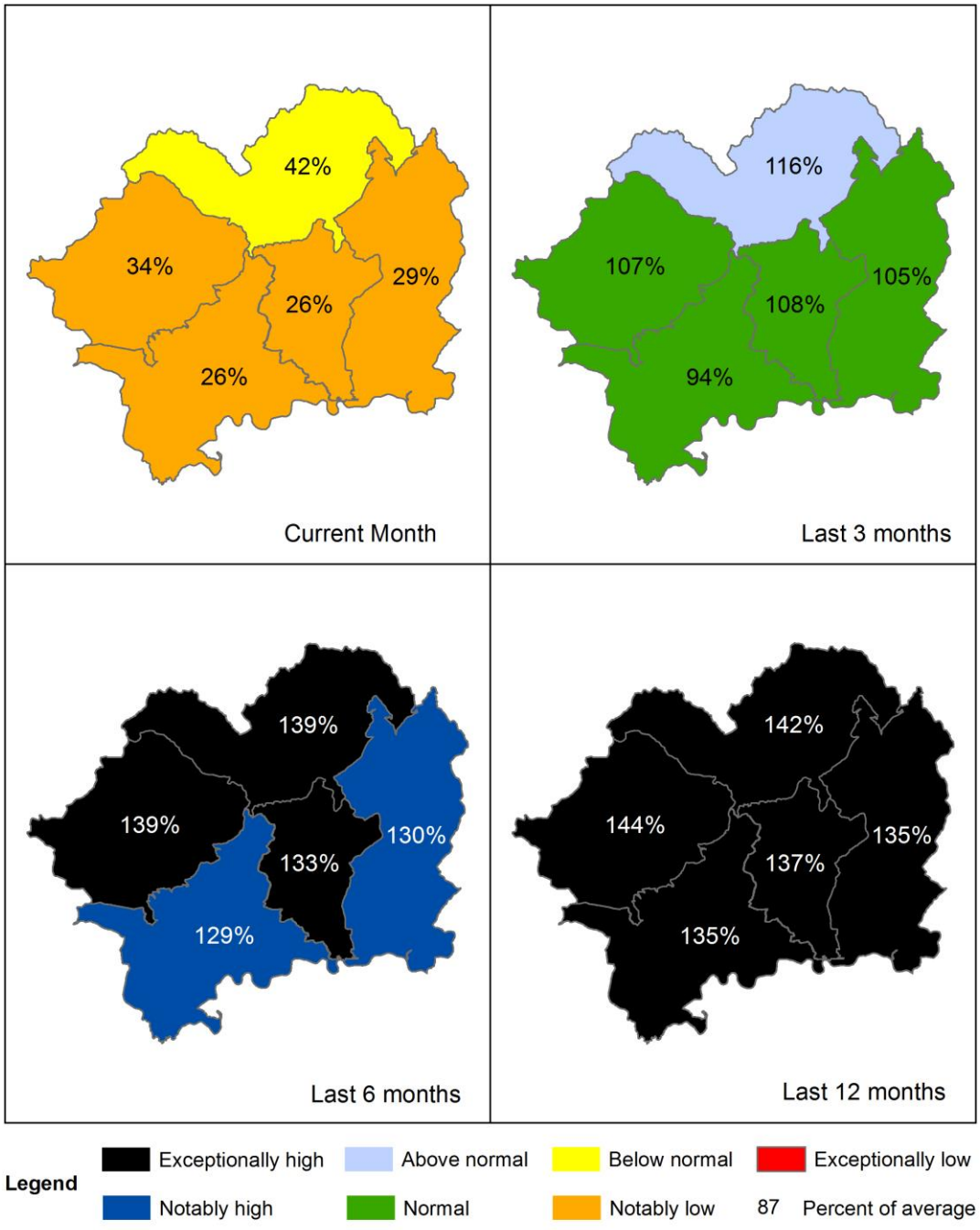


Figure 2.2: Total rainfall for hydrological areas for the current month (up to 30 June 2024), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.

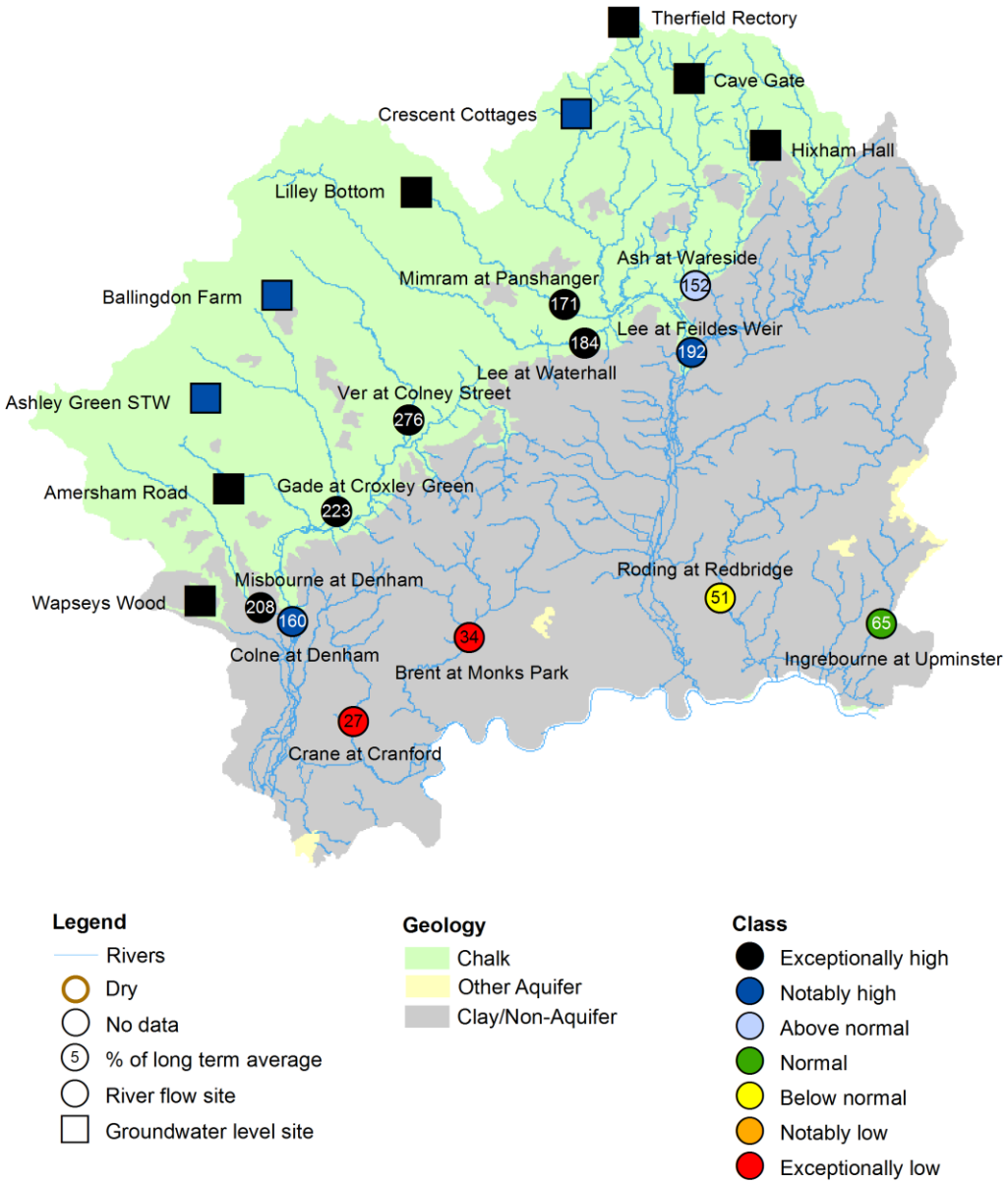


HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2024). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved.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

3 River flows and Groundwater levels

3.1 River flows and Groundwater level map

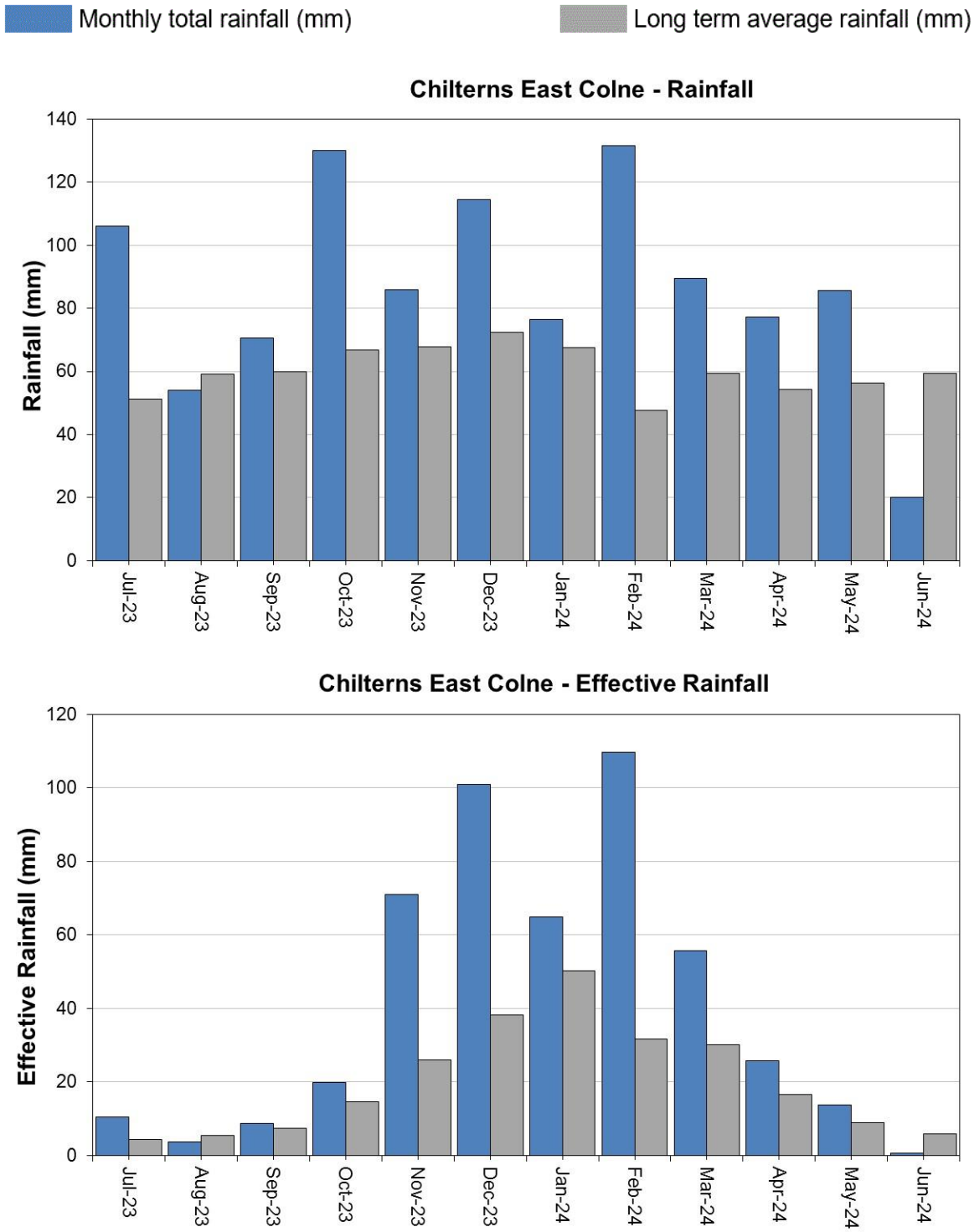
Figure 3.1: Monthly mean river flow and groundwater levels at our indicator sites for June 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic June monthly means. Table available in the appendices with detailed information.



4 Colne Catchment

4.1 Colne Rainfall and effective rainfall charts

Figure 4.1: Monthly rainfall and effective rainfall totals for the past 24 months compared to the 1961 to 1990 long term average for the Colne.

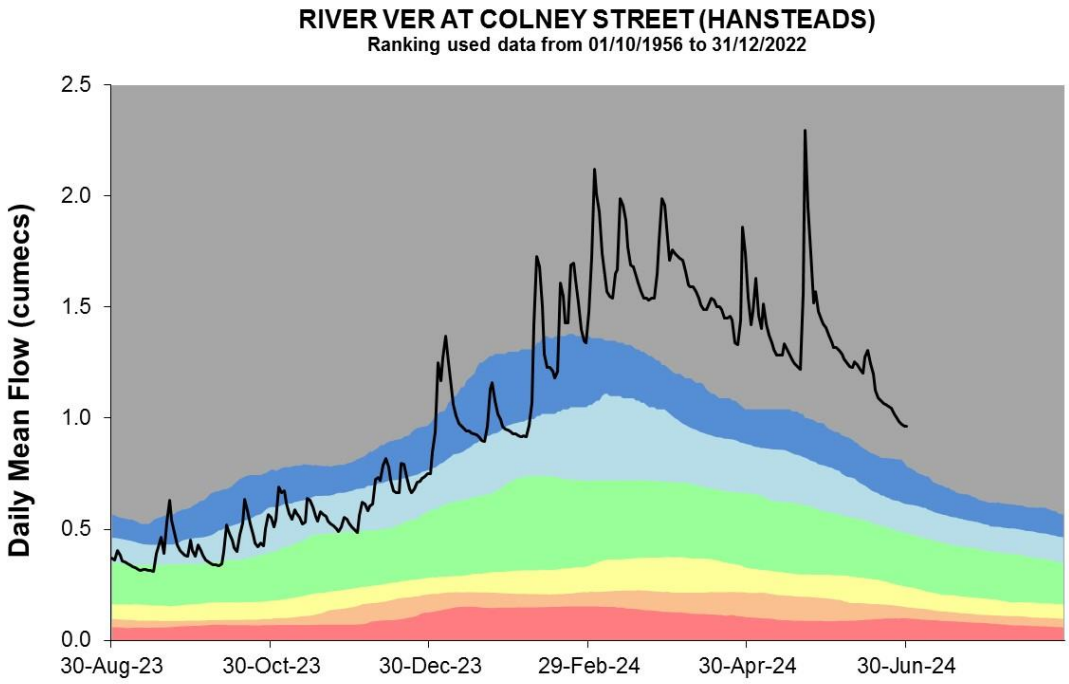


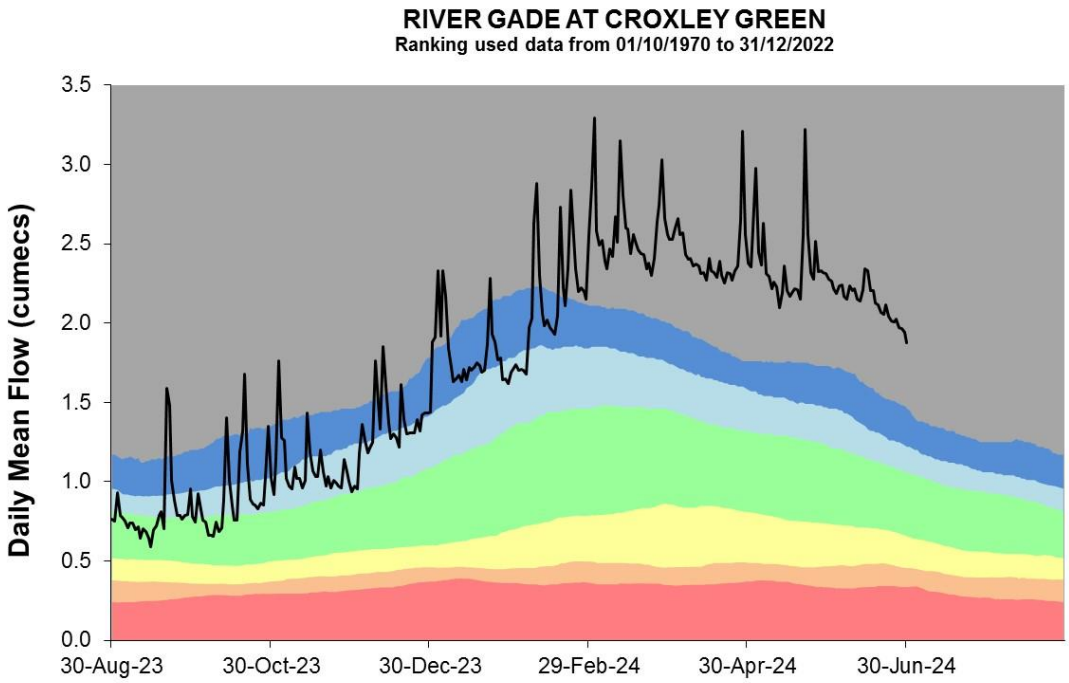
HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

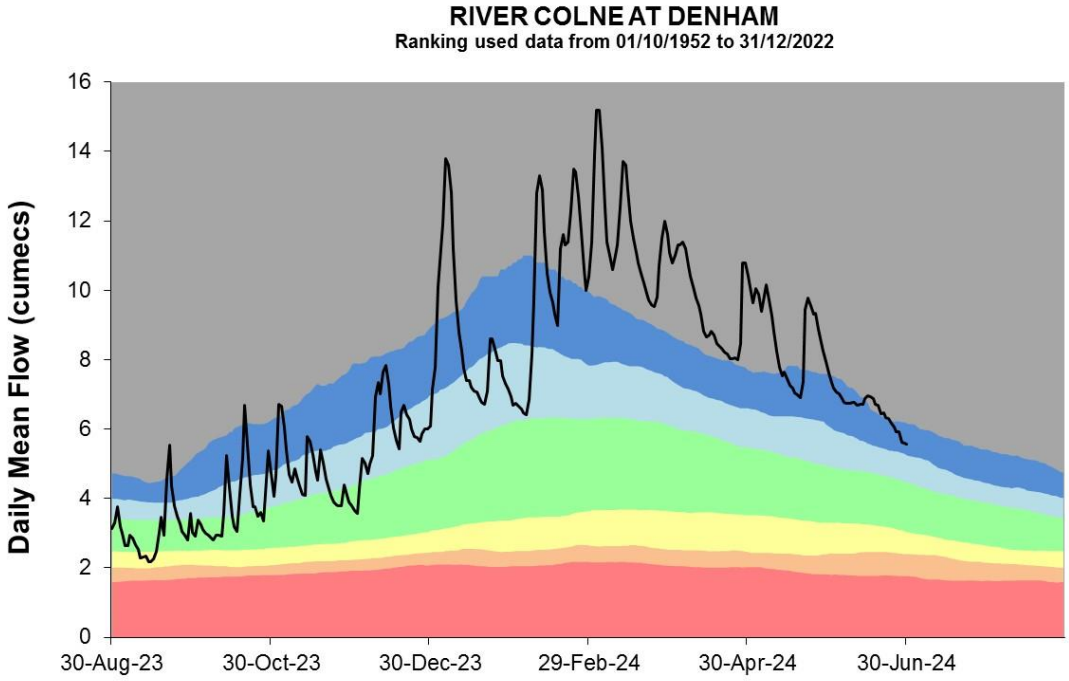
EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2024)

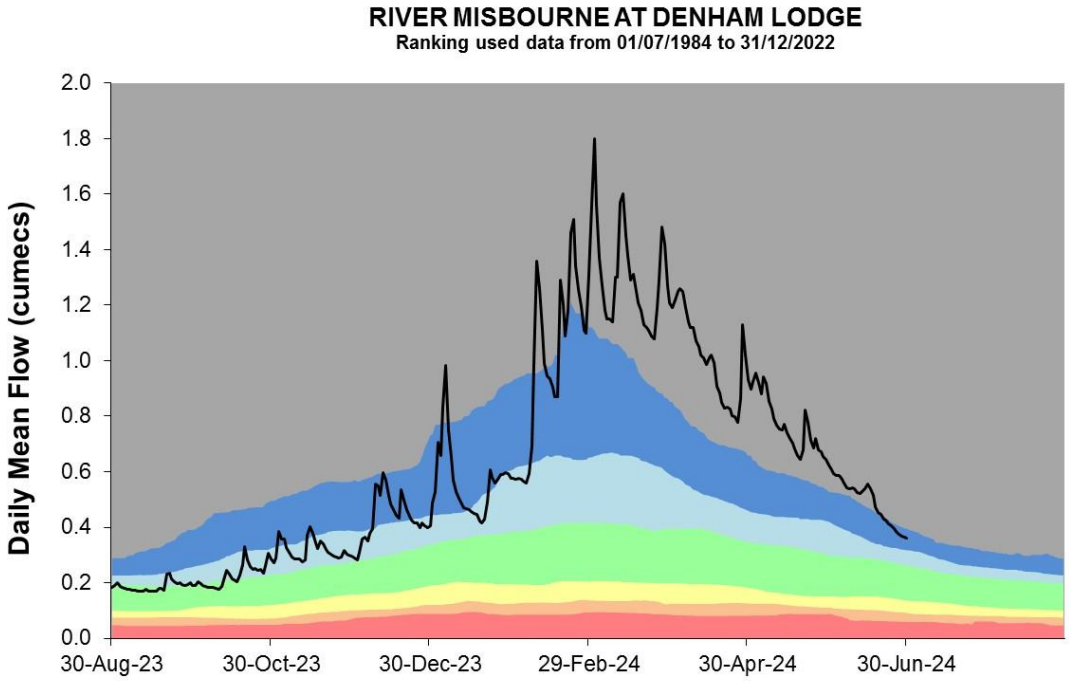
4.2 Colne River flow charts

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.





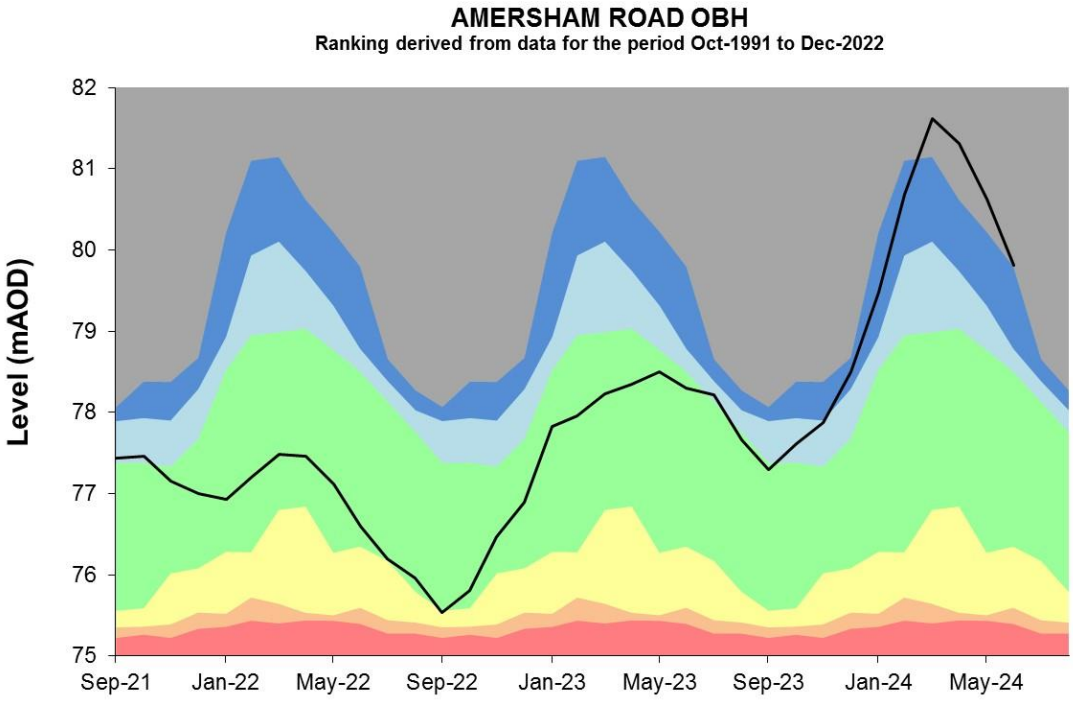


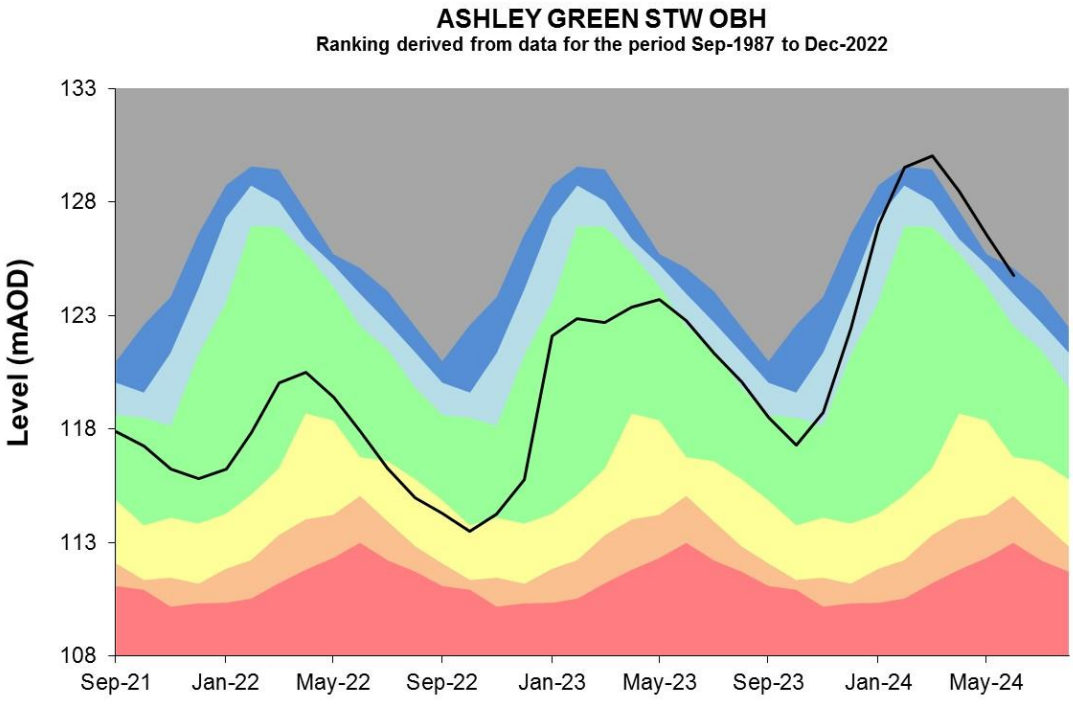


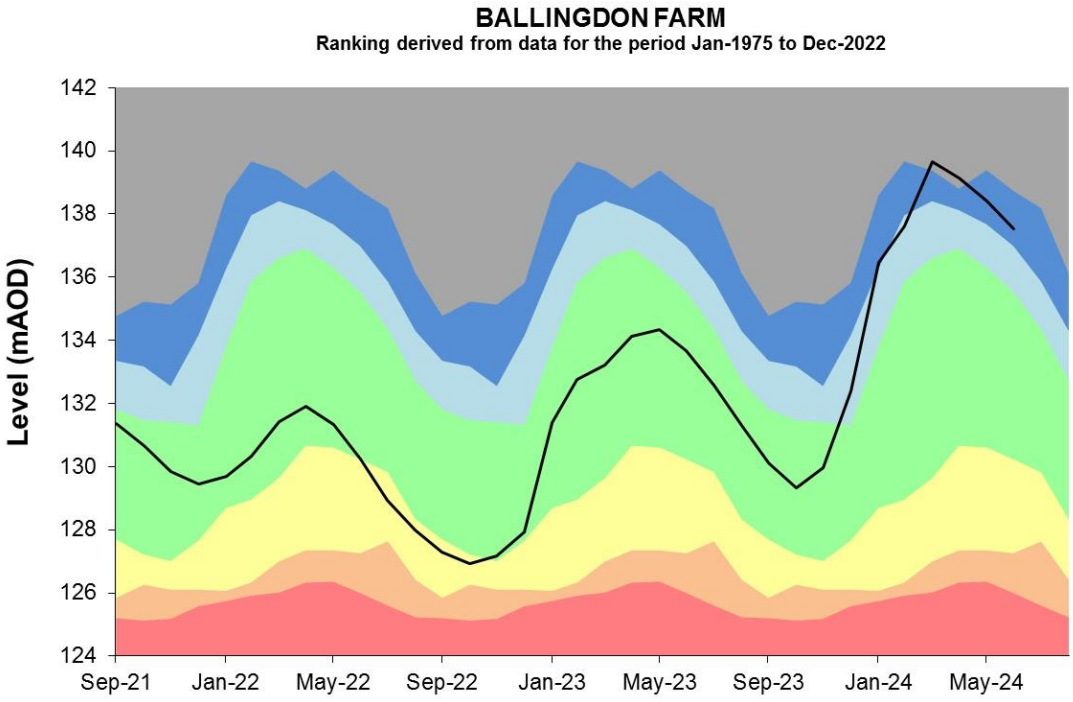
Source: Environment Agency, 2024

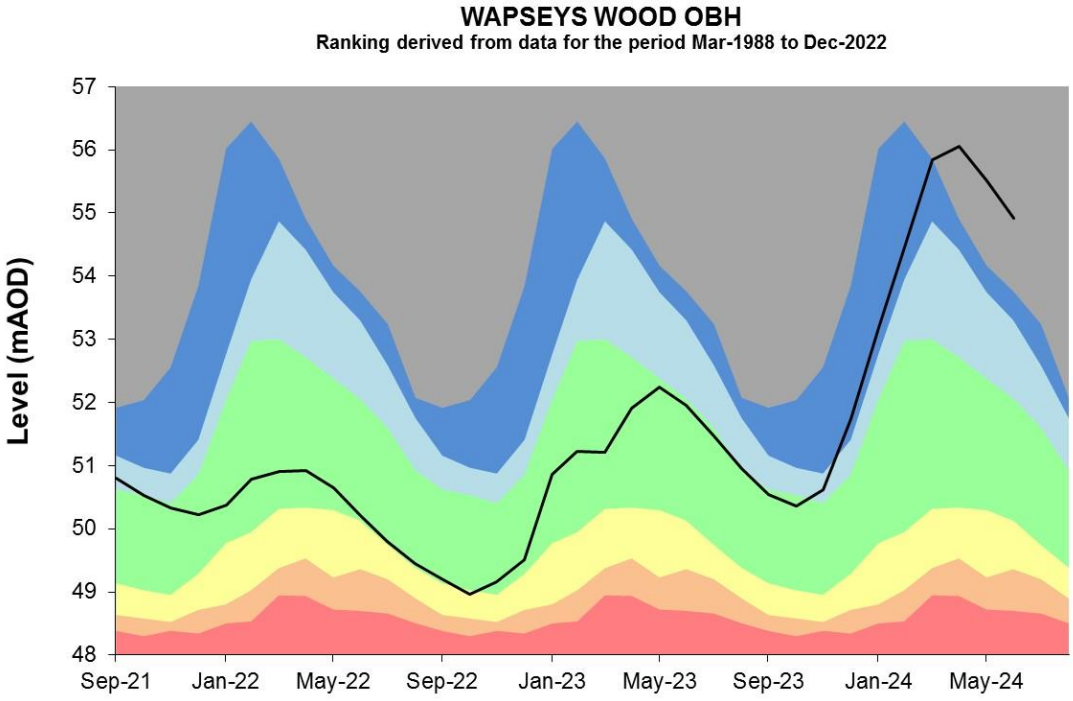
4.3 Colne Groundwater level charts

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







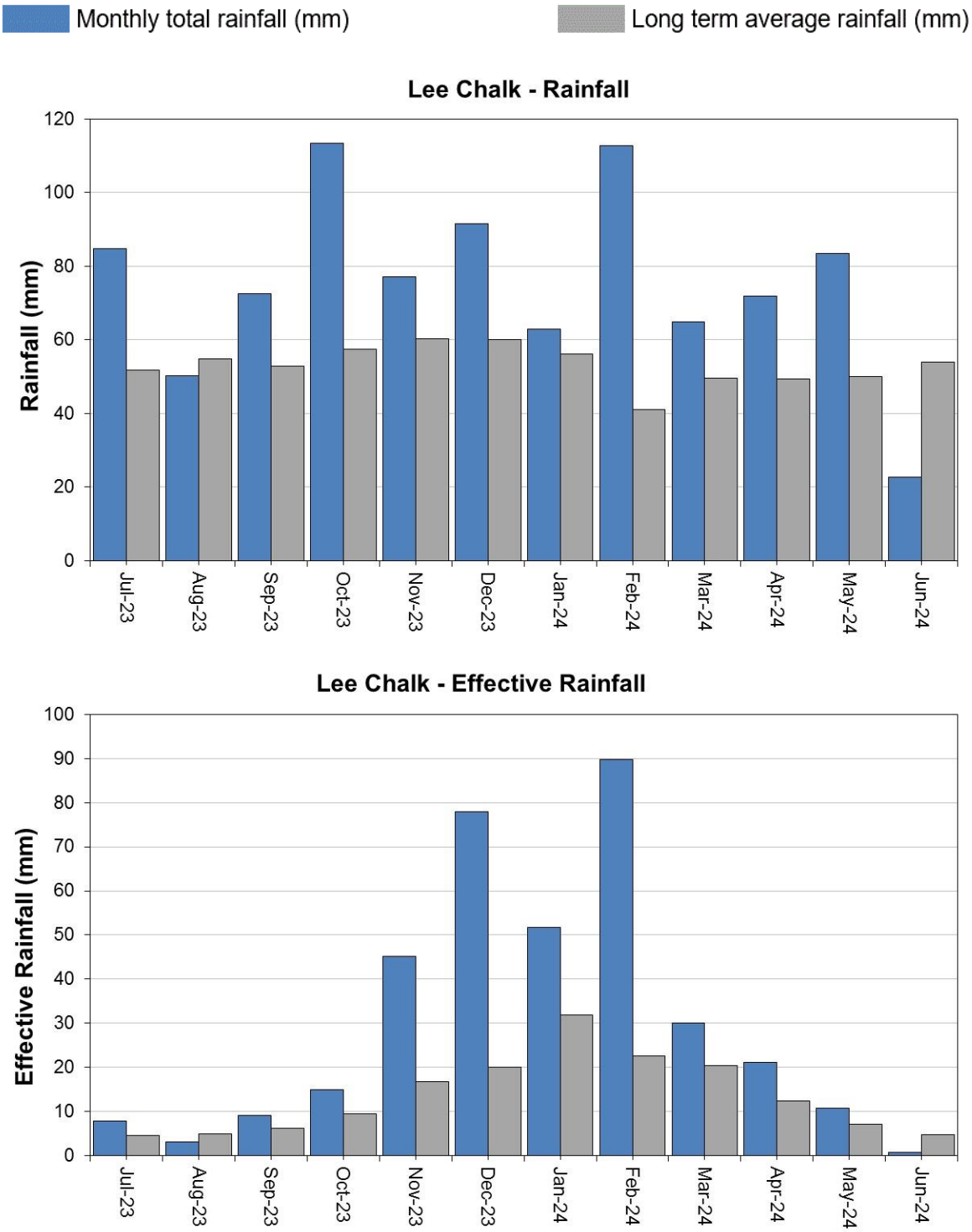


Source: Environment Agency, 2024

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 24 months compared to the 1961 to 1990 long term average for each region and for England.

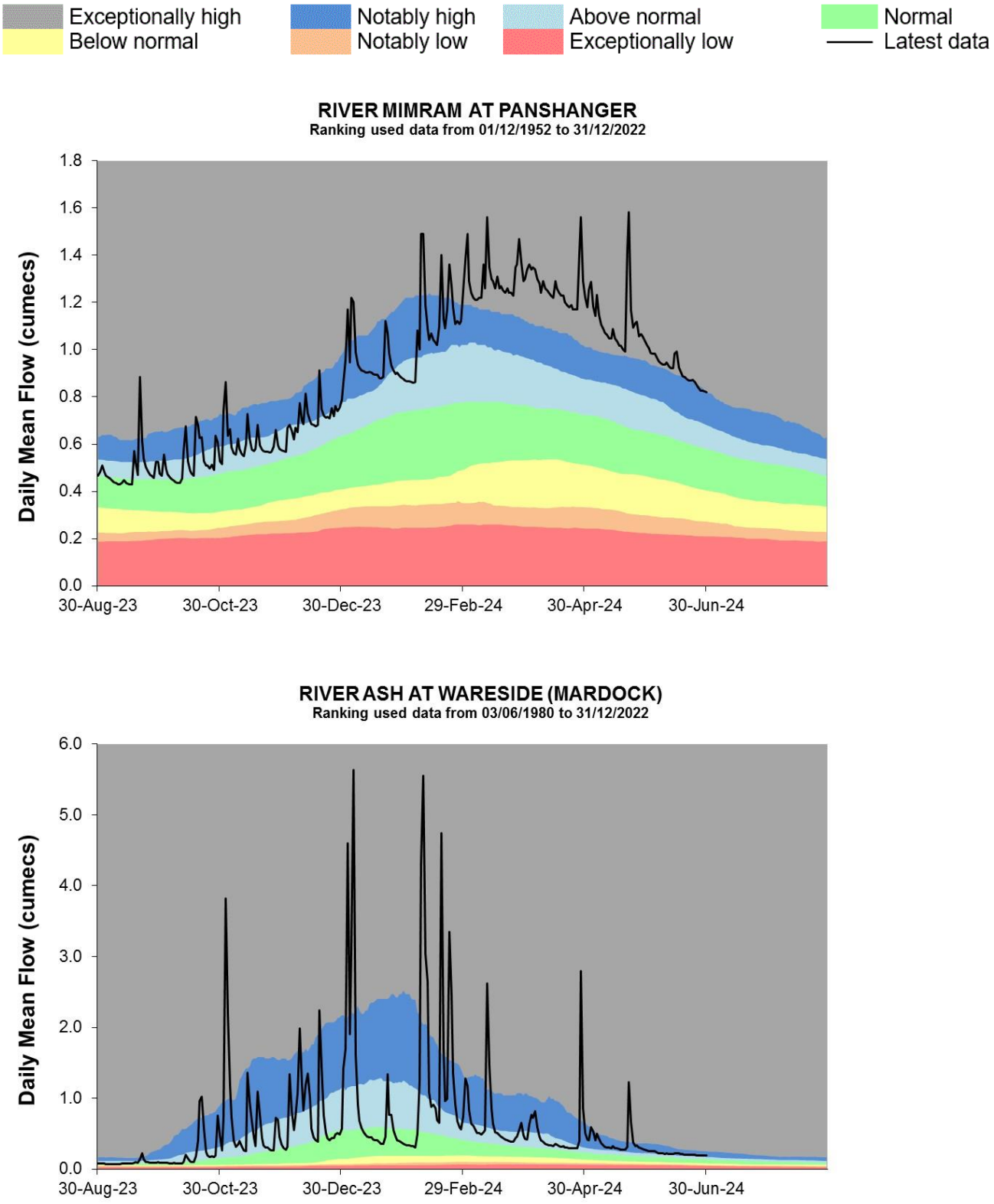


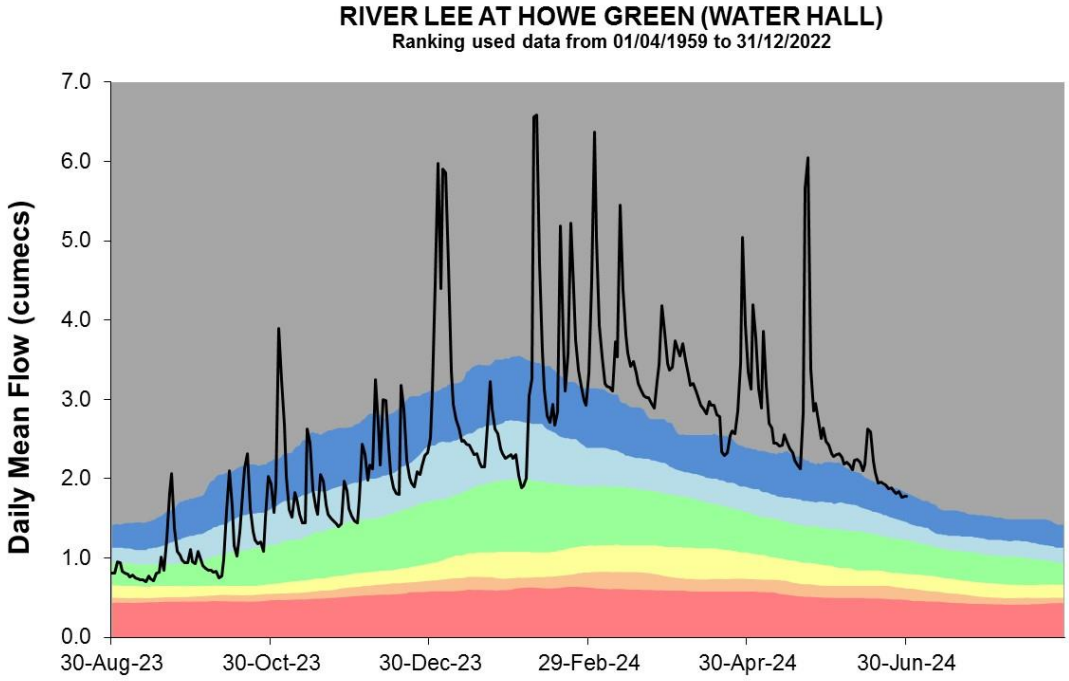
HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

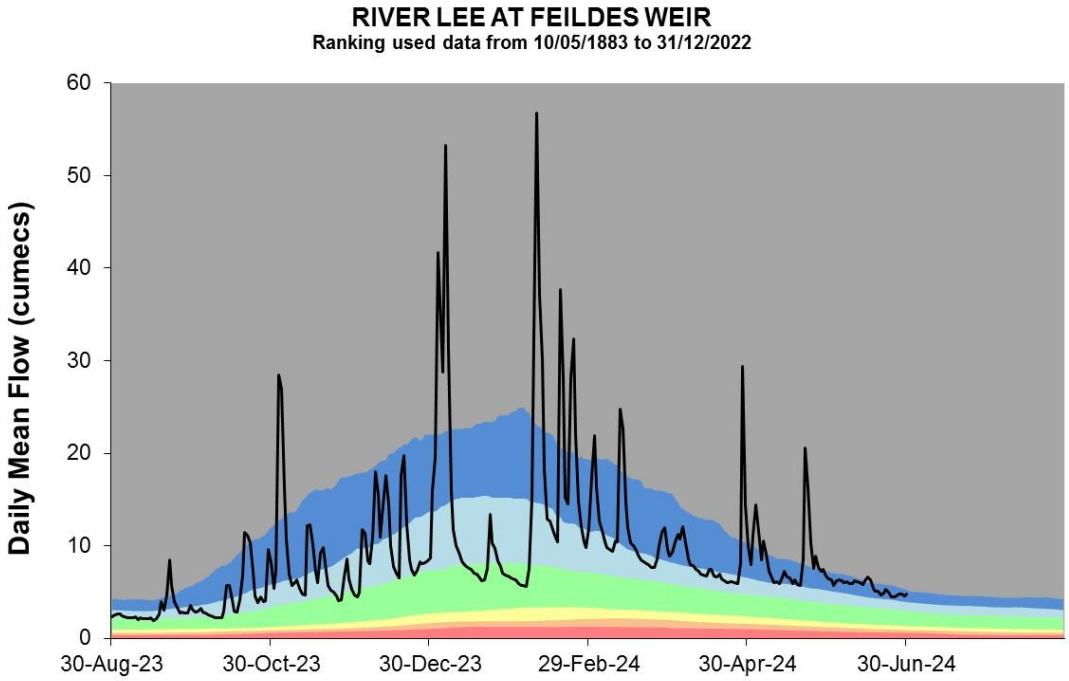
EA Soil Moisture Model effective rainfall data (Source: Environment Agency, 2024)

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.



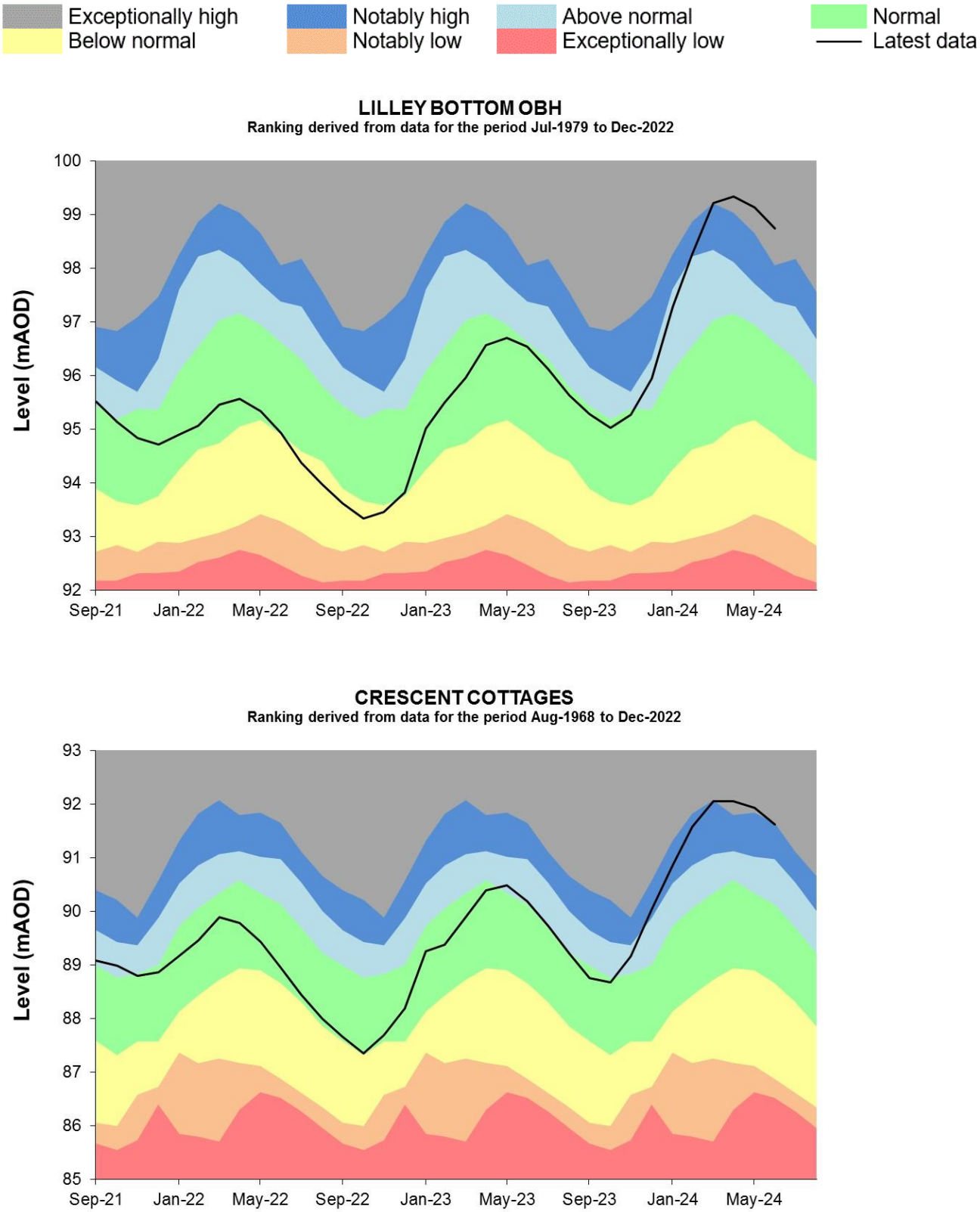




Source: Environment Agency, 2024

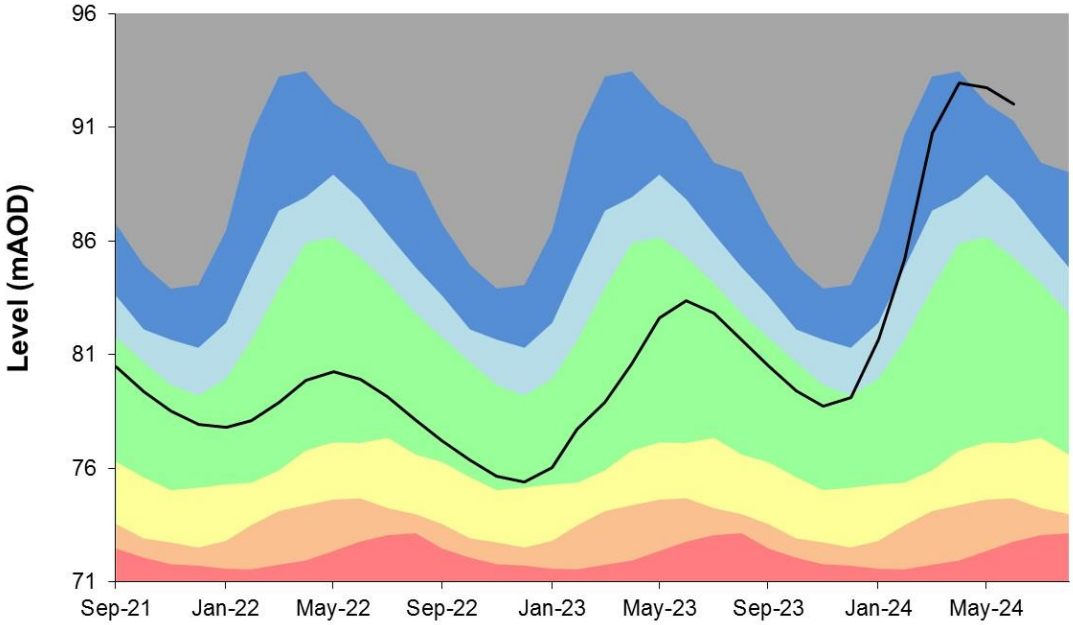
5.3 Upper Lee Groundwater level charts

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



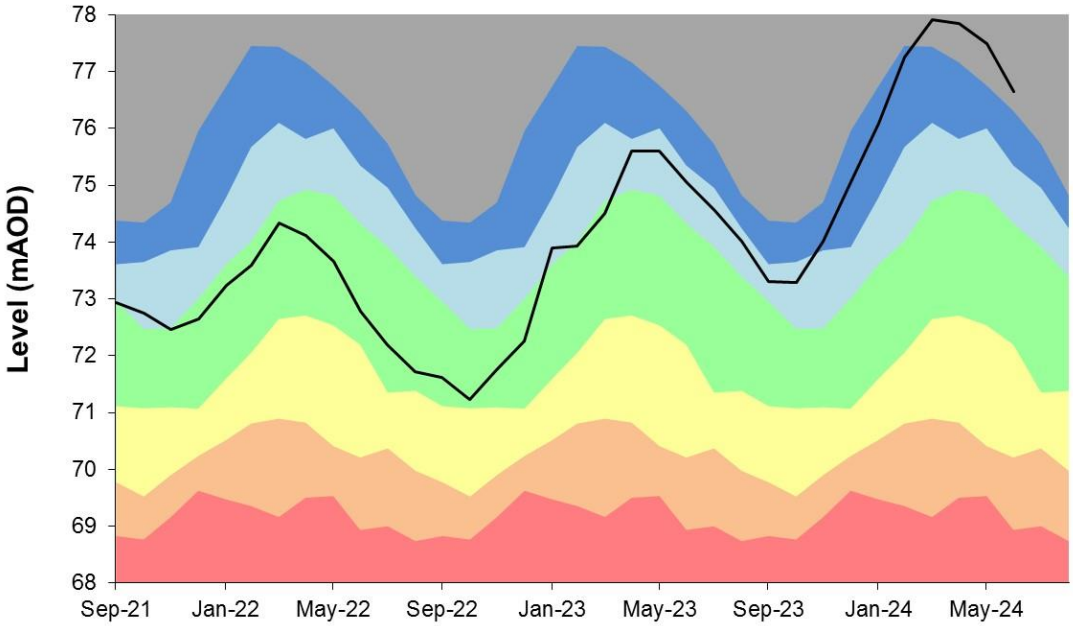
THERFIELD RECTORY

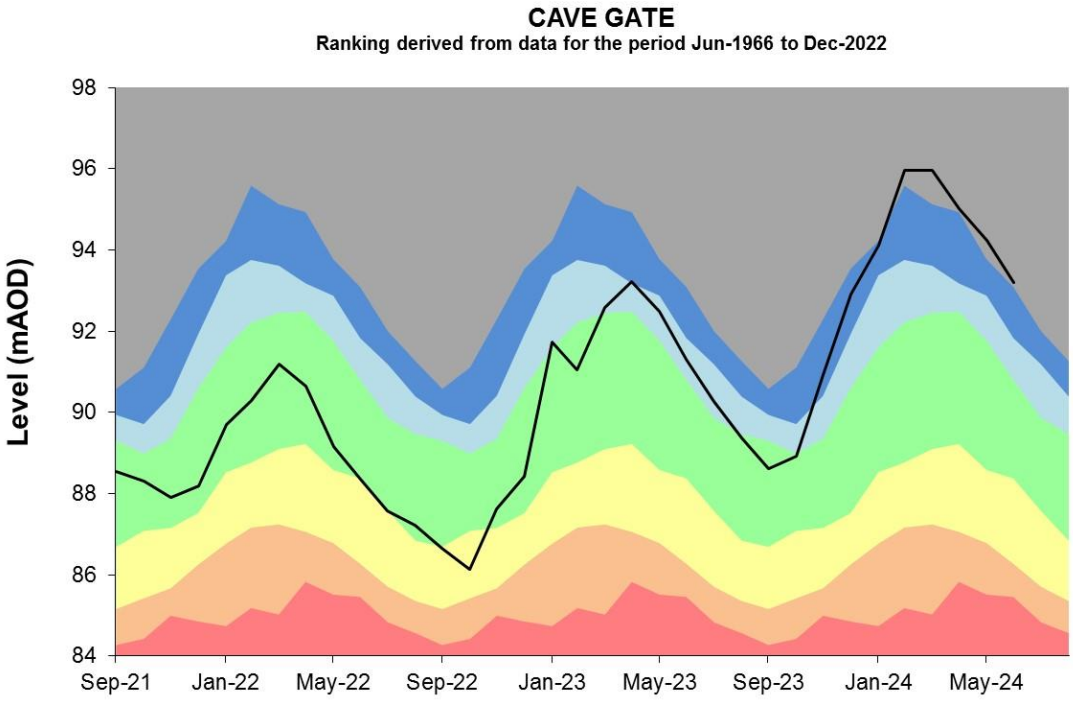
Ranking derived from data for the period Jan-1883 to Dec-2022



HIXHAM HALL

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



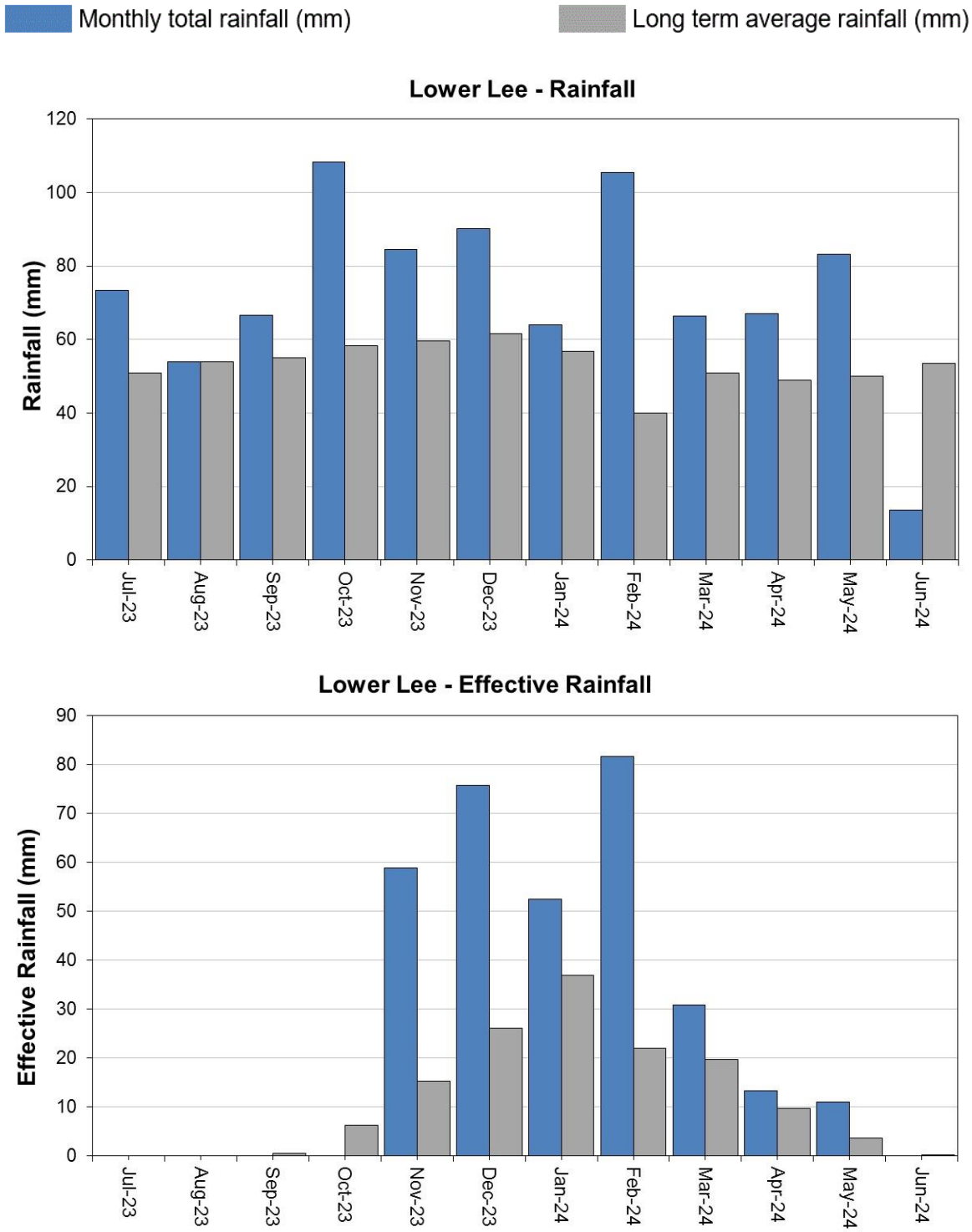


Source: Environment Agency, 2024

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.

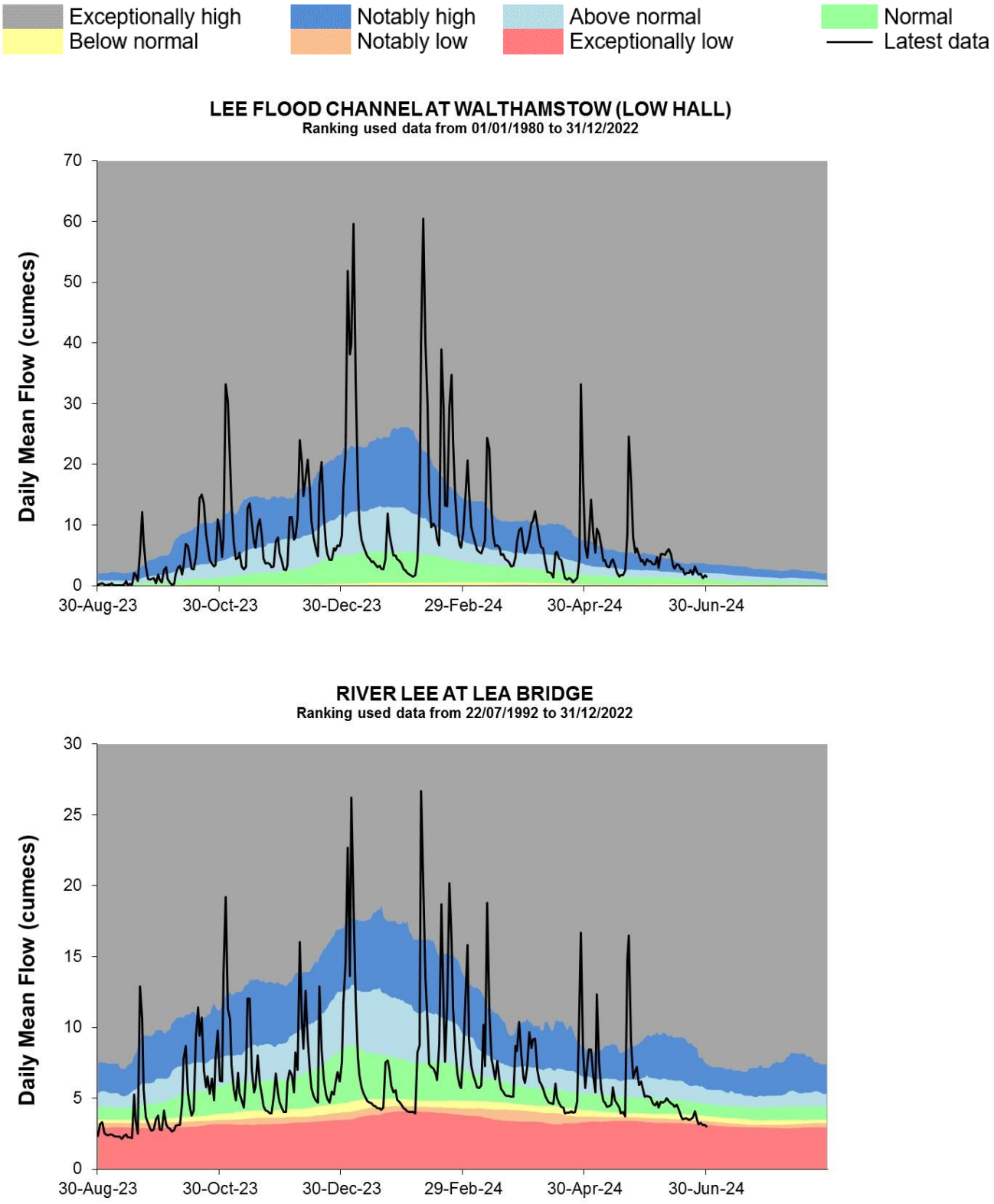


HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

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.

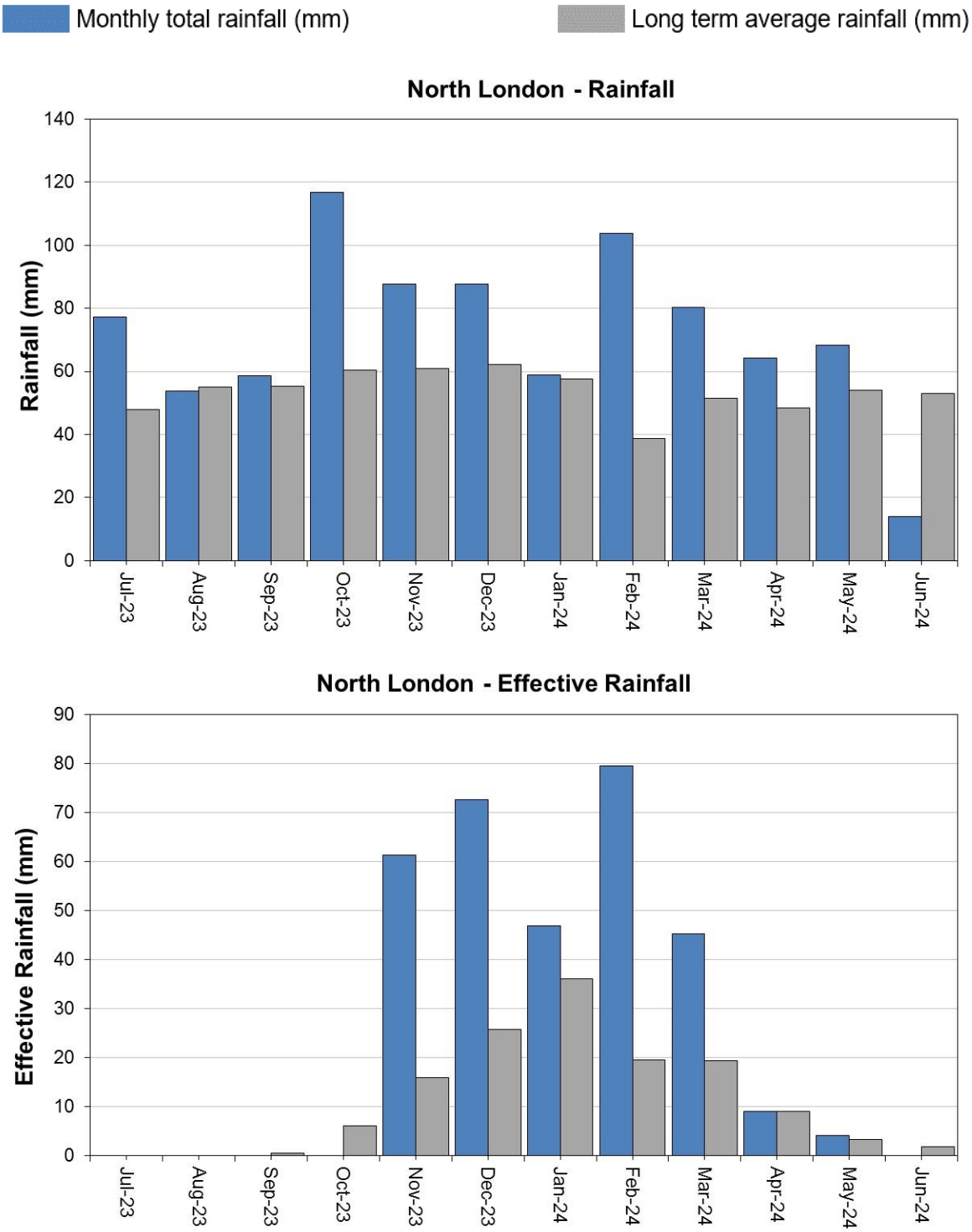


Source: Environment Agency, 2024

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 24 months compared to the 1961 to 1990 long term average for each region and for England.

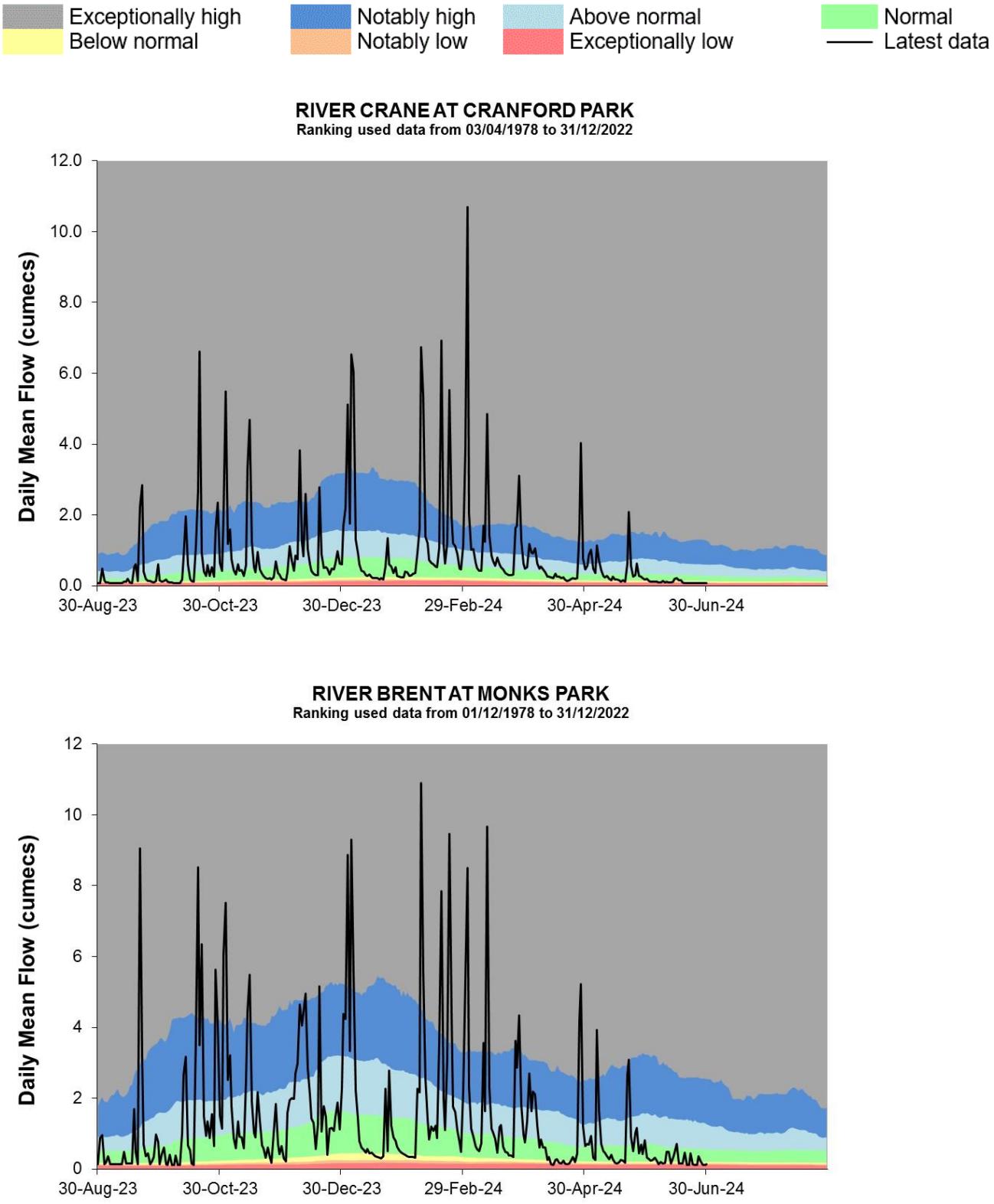


HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

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.

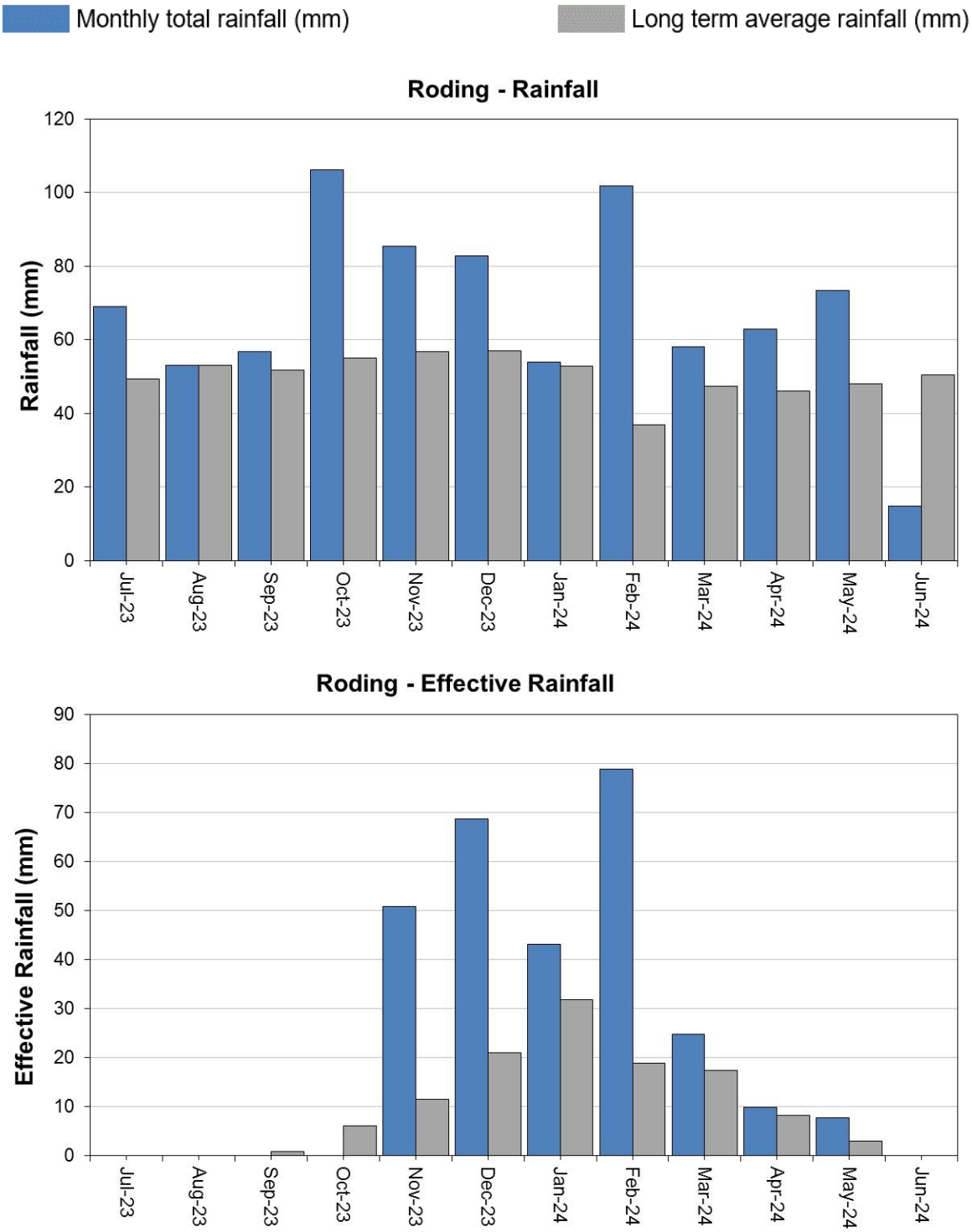


Source: Environment Agency, 2024

8 Roding Catchment

8.1 Roding Rainfall and Recharge chart

Figure 8.1: Monthly rainfall and recharge totals for the past 24 months compared to the 1961 to 1990 long term average for each region and for England.

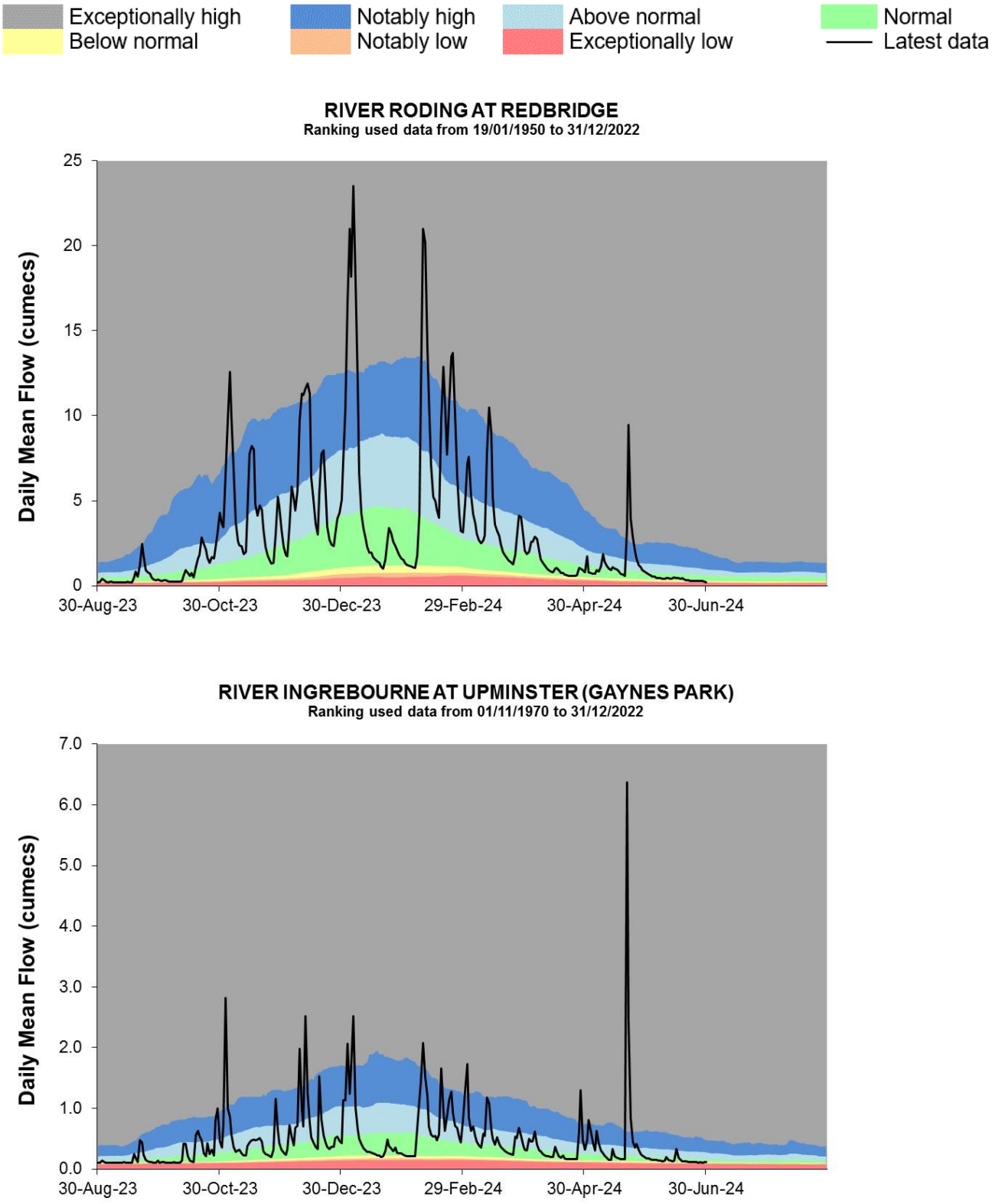


HadUK rainfall data (Source: Met Office. Crown copyright, 2024)

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

8.2 Roding River flow charts

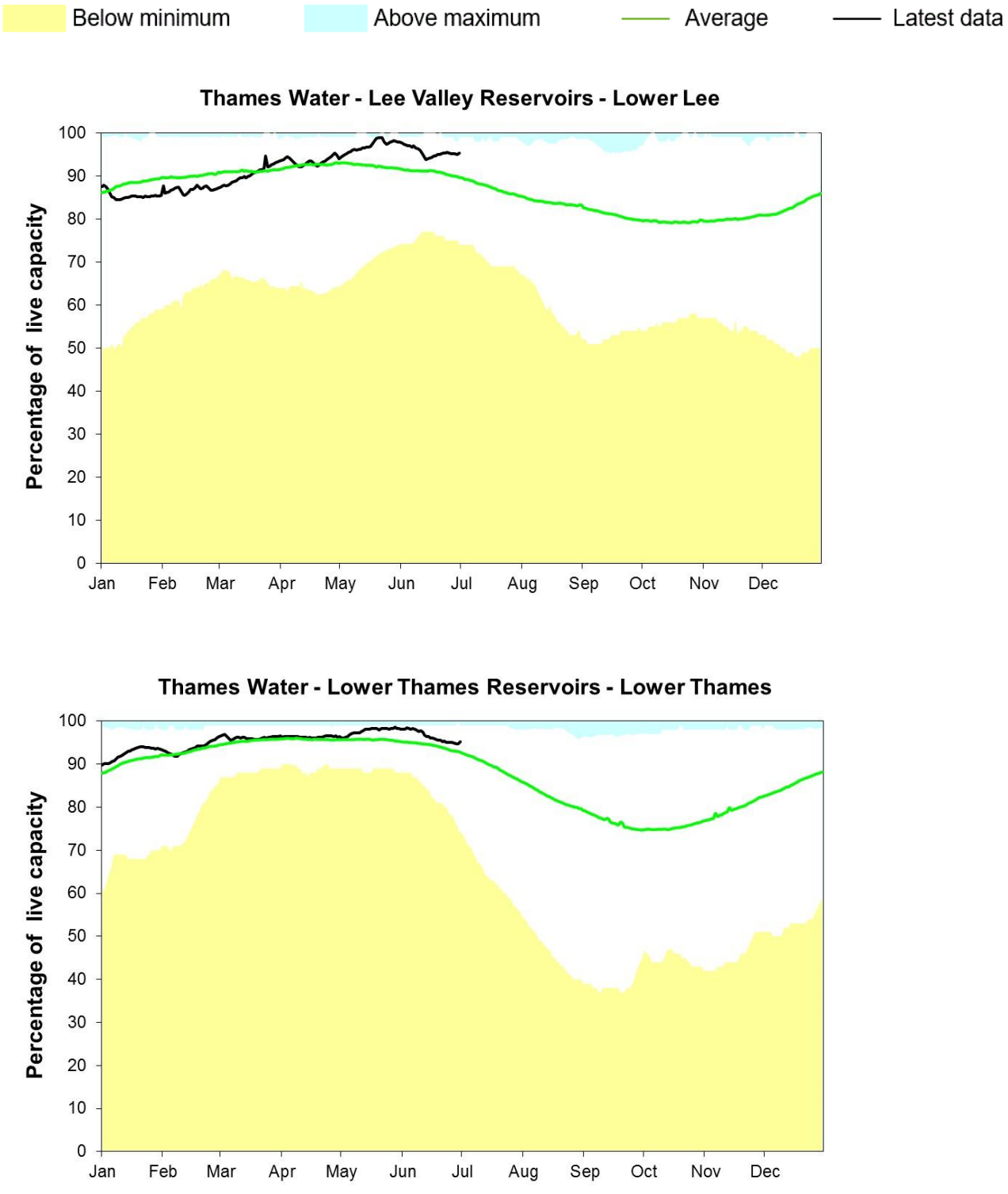
Figure 8.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2024

9 Reservoir stocks

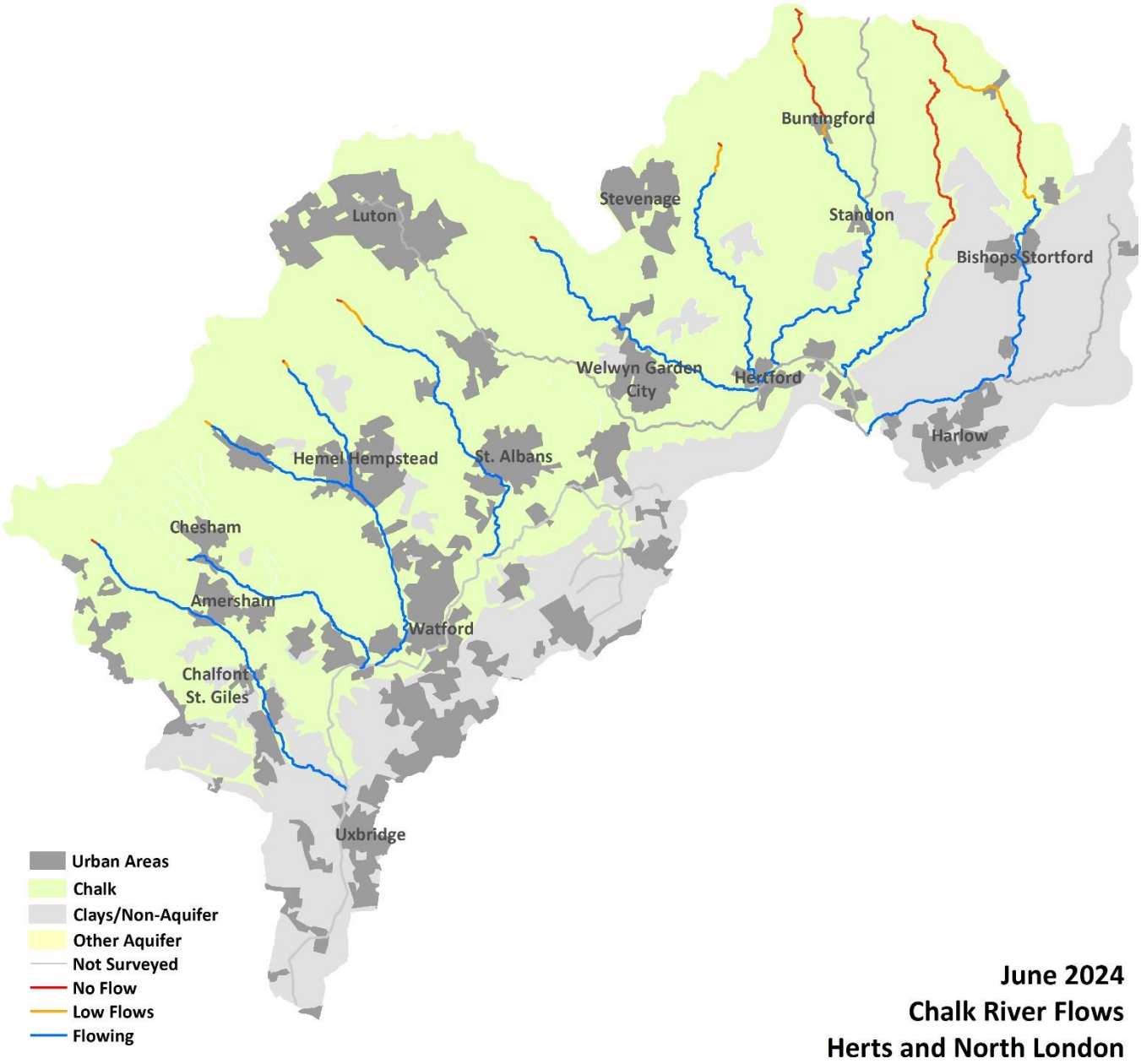
Figure 9.1: End of month reservoir stocks for the Lower Thames reservoir group and the Lee Valley reservoir group compared to long term maximum, minimum and average stocks. Note: Historic records of individual reservoirs and reservoir groups making up the regional values vary in length.



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	Jun 2024 total rainfall in mm	Jun 2024 rainfall long term average 1961 to 1990	Jun 2024 rainfall % of long term average 1961 to 1990	Summer Apr 2024 to Jun 2024 total rainfall in mm	Summer Apr 2024 to Jun 2024 rainfall % of long term average 1961 to 1990
Chilterns East Colne	20	59	34	183	108
Lee Chalk	23	54	42	178	116
Lower Lee	14	53	26	164	108
North London	14	53	26	147	95
Roding	15	50	29	151	105
Herts and North London total	17	54	31	164	106

12.2 Rainfall banding table

Hydrological area	Jun 2024 band	Apr 2024 to Jun 2024 cumulative band	Jan 2024 to Jun 2024 cumulative band	Jul 2023 to Jun 2024 cumulative band
Chilterns East Colne	Notably low	Normal	Exceptionally high	Exceptionally high
Lee Chalk	Below normal	Above normal	Exceptionally high	Exceptionally high
Lower Lee	Notably low	Normal	Exceptionally high	Exceptionally high
North London	Notably low	Normal	Notably high	Exceptionally high
Roding	Notably low	Normal	Notably high	Exceptionally high

12.3 Effective Rainfall table

Hydrological area	Jun 2024 total effective rainfall in mm	Jun 2024 effective rainfall long term average 1961 to 1990 in mm	Jun 2024 effective rainfall % of long term average 1961 to 1990	Summer Apr 2024 to Jun 2024 total effective rainfall in mm	Summer Apr 2024 to Jun 2024 effective rainfall % of long term average 1961 to 1990
Chilterns East Colne	1	6	11	40	128
Lee Chalk	1	5	15	32	134
Lower Lee	0	0	0	24	181
North London	0	2	0	13	92
Roding	0	0	0	17	157
Herts and North London total	0	2	11	25	135

12.4 Soil Moisture Deficit table

Hydrological area	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	May 2024 end of month Soil Moisture Deficit in mm	May 2024 end of month Soil Moisture Deficit long term average 1961 to 1990 in mm
Chilterns East Colne	76	63	10	38
Lee Chalk	76	73	11	47
Lower Lee	80	68	25	43
North London	84	68	25	44
Roding	81	69	19	44
Herts and North London total	80	68	16	43

12.5 River flows table

Site name	River	Catchment	Jun 2024 band	May 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	Notably 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	Exceptionally low	Normal
Cranford (Cranford Park)	Crane	North London	Exceptionally low	Normal
Redbridge	Roding	Roding, Beam and Ingrebourne	Below normal	Above normal
Upminster (Gaynes Park)	Ingrebourne	Roding, Beam and Ingrebourne	Normal	Exceptionally high

12.6 Groundwater table

Site name	Aquifer	Jun 2024 band	May 2024 band
Ashley Green	Mid-Chilterns Chalk	Notably high	Exceptionally 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	Notably 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 3 and 10 June 2024	Number of flow constraints in force between 10 and 17 June 2024	Number of flow constraints in force between 17 and 24 June 2024	Number of flow constraints in force between 24 and 30 June 2024
2	1	1	2