Monthly water situation report:

South-east England

1 Summary - June 2024

There was only 36% of the long term average (LTA) rainfall for June across the South east of England. This was the first month in a year when there was significantly below average rainfall. There were also, on average, 23 'dry' days when there was less than 0.2mm rainfall recorded. The low rainfall led to there being little to no effective rainfall. As a consequence the soil moisture deficits (SMD) rose steadily to end above the LTA for June. River flows generally declined through the month, although there were some small responses to the rainfall in the middle of the month at many of the sites. There were no fluvial flood alerts issued during June and the last groundwater alerts were also removed. Groundwater levels have declined during the month as is expected at this time of year. However, the high rainfall over the previous months has maintained high groundwater levels for June.

1.1 Rainfall

There was only 36% of the LTA rainfall for June across the South east of England. This was the first month in a year when there was significantly below average rainfall. The wettest days were 13, 14 and 15 June when on average, there was over 60% of the monthly total rainfall recorded. The highest daily total was 22.9mm recorded at Poverty Bottom (SSD) on 14 June. There were also, on average, 23 'dry' days when there was less than 0.2mm rainfall recorded. This has been the driest June since 2018 for the:

- South-east
- Thames (THM)
- Hertfordshire and North London (HNL)
- Kent and South London (KSL)
- Thames catchment (THM)

1.2 Soil moisture deficit and recharge

The significantly below average rainfall led to there being little to no effective rainfall. As a consequence the SMDs rose steadily to end above the LTA for June. This was the first time SMDs were above the LTA since August 2023.

1.3 River flows

River flows generally declined through the month, although there were some small responses to the rainfall in the middle of the month at many of the sites. Generally, the Chalk baseflow-fed rivers in HNL and Solent and South Downs (SSD) in particular, were at higher flows, being

at notably high and exceptionally high flows for June. The Ver at Colney Street (HNL) recorded the highest June flow on record and the Mimram at Panshanger (HNL) was at the fourth highest June flow on record, since 1983. Flows from the Upper Thames catchments (THM) were normal for the time of year. The Clay rivers, primarily around the Weald across KSL and SSD recorded lower flows and were at normal to above normal flows. The exception was the Arun at Alfodean (SSD) that recorded below normal flows.
There were no fluvial flood alerts issued during June and the last groundwater alerts were also removed.

1.4 Groundwater levels

Groundwater levels have declined during the month as is expected at this time of year. However, the high rainfall over the previous months has maintained high groundwater levels for June. All of the key indicator sites ranged from above normal levels to exceptionally high. There was one exception at Jackaments (THM) that was normal for June, but it is a site that responds quickly to recent conditions.
Levels at Lilley Bottom (HNL) and Wolverton (KSL) were their highest for June on record. Groundwater levels at Stonor and Gibbet Cottages(both THM) were the second highest on record for June since 2001. There were also levels at their third highest, also since 2001 at:

- Ashley Green (HNL)
- Little Bucket (KSL)
- Clanville Lodge (KSL)

1.5 Reservoir stocks

The reservoirs remain above average for June at all of the reservoirs across the South east with just two exceptions. Both Arlington (SSD) and Powdermill (KSL) ended the month just below the monthly LTA.

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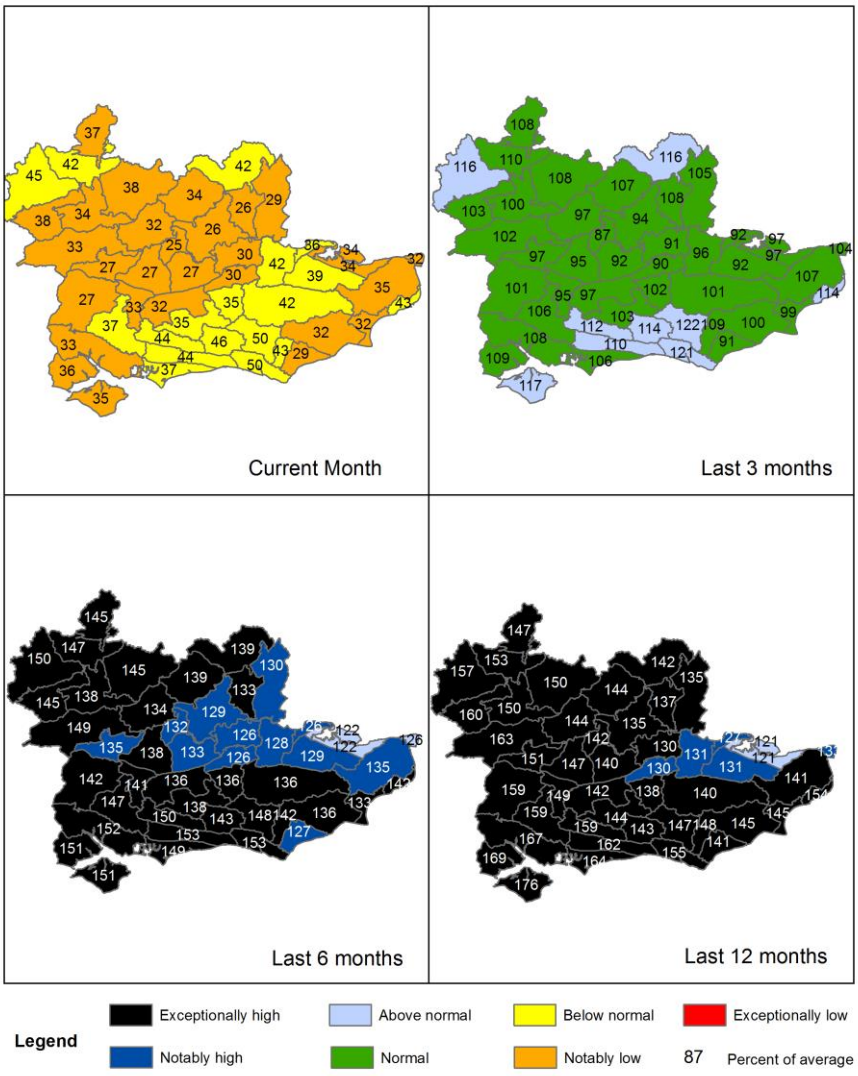
2 Maps

2.1 Rainfall map

Figure 2.1: 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. A table is available in the appendices with detailed information.

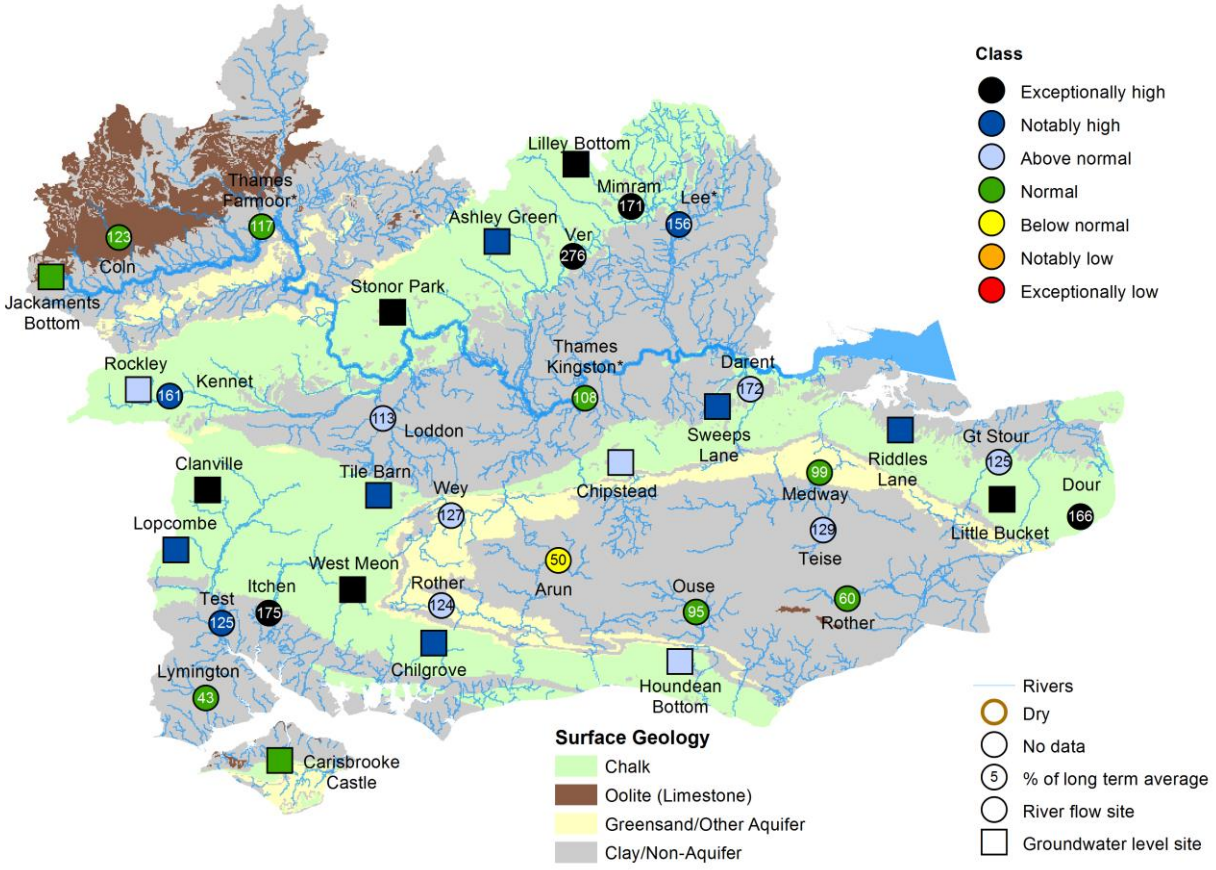


Rainfall data for 2024, extracted from Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. (Source: Environment Agency. Crown Copyright, 100024198, 2024). Rainfall data prior to 2024 was extracted from the Met Office HadUK 1km gridded rainfall dataset derived from registered rain gauges. (Source: Met Office. Crown copyright, 2024).

2.2 River flows and groundwater levels map

Figure 2.2: Monthly mean river flow for 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. A table is available in the appendices with detailed information. Groundwater levels for indicator sites at the end of June 2024 are classed relative to an analysis of respective historic June levels. A table is available in the appendices with detailed information.

Flows at gauging stations in the Medway catchment (KSL) might be affected by upstream reservoir releases.



3 Rainfall, effective rainfall and soil moisture deficit tables

3.1 Rainfall, effective rainfall and soil moisture deficit table

Figure 3.1: This is a second estimate of areal rainfall, effective rainfall (percolation or runoff) and SMDs for a selection of the hydrological areas across the south-east of England. There may be significant variation within each area which must be considered when interpreting these data. When additional meteorological data is available, estimates are revised which will affect the period totals in Figure 3.2.

Number	Hydrological Area	Rainfall (mm) 30 day Total	June % LTA	Effective Rainfall (mm) 30 day total	June % LTA	SMD (mm) Day 30	End Jun LTA
6010TH	Cotswolds - West (A)	26	45%	1	16%	44	39
6070TH	Berkshire Downs (G)	19	33%	1	9%	78	62
6130TH	Chilterns - West (M)	19	32%	0	5%	79	64
6162TH	North Downs - Hampshire (P)	19	33%	1	12%	82	63
6190TH	Wey - Greensand (S)	17	32%	1	9%	83	62
	Thames Average	18	34%	0	8%	76	61
	Thames Catchment Average	18	34%	0	8%	76	61
6140TH	Chilterns - East - Colne (N)	20	34%	1	11%	76	63
6600TH	Lee Chalk	23	42%	1	15%	76	73
6507TH	North London	14	26%	0	0%	84	68
6509TH	Roding	15	29%	0	-	81	69
	Herts and North London	17	32%	0	11%	80	68
6230TH	North Downs - South London (W)	17	30%	0	6%	81	59
6706So	Darent	22	42%	1	20%	82	66

6707So	North Kent Chalk	21	39%	1	18%	82	66
6708So	Stour	18	35%	0	2%	81	68
6809So	Medway	22	42%	0	0%	79	59
	Kent & South London Average	18	36%	0	7%	83	69
6701So	Test Chalk	15	27%	0	5%	80	62
6702So	East Hampshire Chalk	21	36%	1	16%	78	61
6703So	West Sussex Chalk	26	44%	2	21%	76	60
6804So	Arun	19	35%	0	0%	80	60
6805So	Adur	26	46%	0	0%	77	59
	Solent & South Downs Average	22	39%	1	12%	78	61
	South East Average	19	36%	0	9%	79	64

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

EA effective rainfall and soil moisture deficit data (Source EA Soil Moisture Model 2024.)

3.2 Seasonal summary table of rainfall and effective rainfall

Figure 3.2 This is a seasonal estimate of areal rainfall and effective rainfall (percolation or runoff) for a selection of the hydrological areas across the south-east of England, expressed as totals and as a percentage of the LTA. There may be significant variation within each area which must be considered when interpreting these data. When additional meteorological data is available estimates are revised, which will affect the period totals.

Summer period 01/04/2024 to 30/06/2024

Number	Hydrological Area	Seasonal Rainfall (mm) Total	Seasonal Rainfall as % LTA	Seasonal Effective Rainfall (mm) Total	Seasonal Effective Rainfall as % LTA
6010TH	Cotswolds - West (A)	205	116%	56	141%
6070TH	Berkshire Downs (G)	174	103%	37	121%
6130TH	Chilterns - West (M)	162	97%	27	88%
6162TH	North Downs - Hampshire (P)	166	95%	42	119%
6190TH	Wey - Greensand (S)	169	97%	51	134%
	Thames Average	164	101%	30	129%
	Thames Catchment Average	165	101%	32	130%
6140TH	Chilterns - East - Colne (N)	183	108%	40	128%
6600TH	Lee Chalk	178	116%	32	134%
6507TH	North London	147	95%	13	92%
6509TH	Roding	151	105%	17	157%
	Herts and North London	164	106%	25	135%
6230TH	North Downs - South London (W)	157	90%	36	97%

6706So	Darent	151	97%	28	99%
6707So	North Kent Chalk	144	92%	24	81%
6708So	Stour	159	106%	32	135%
6809So	Medway	161	101%	36	154%
	Kent & South London Average	149	99%	25	119%
6701So	Test Chalk	170	101%	41	138%
6702So	East Hampshire Chalk	188	106%	54	149%
6703So	West Sussex Chalk	195	110%	61	143%
6804So	Arun	175	103%	50	166%
6805So	Adur	191	114%	57	196%
	Solent & South Downs Average	180	109%	47	168%
	South East Average	165	103%	33	141%

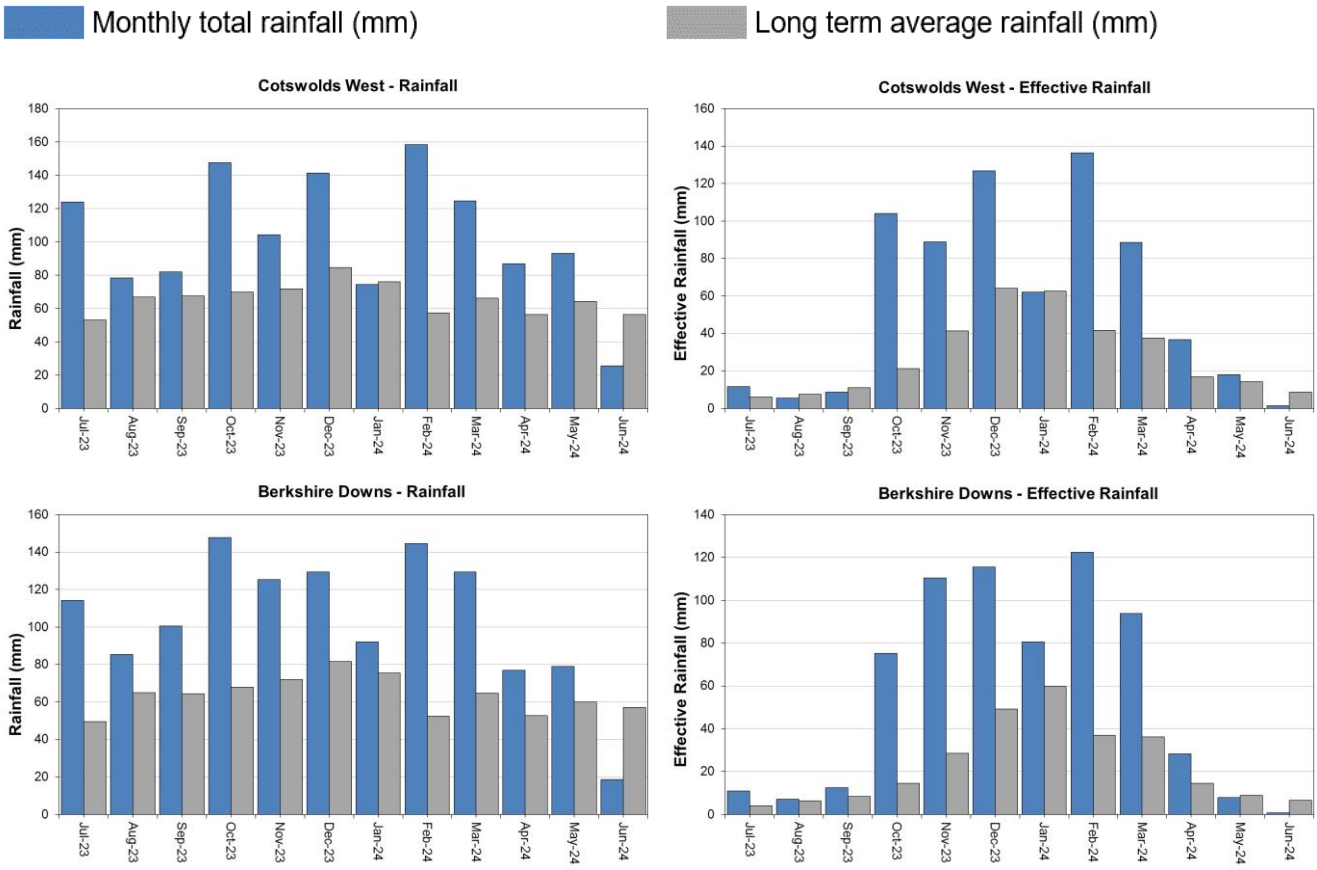
HadUK rainfall data. (Source: Met Office. Crown copyright, 2024).

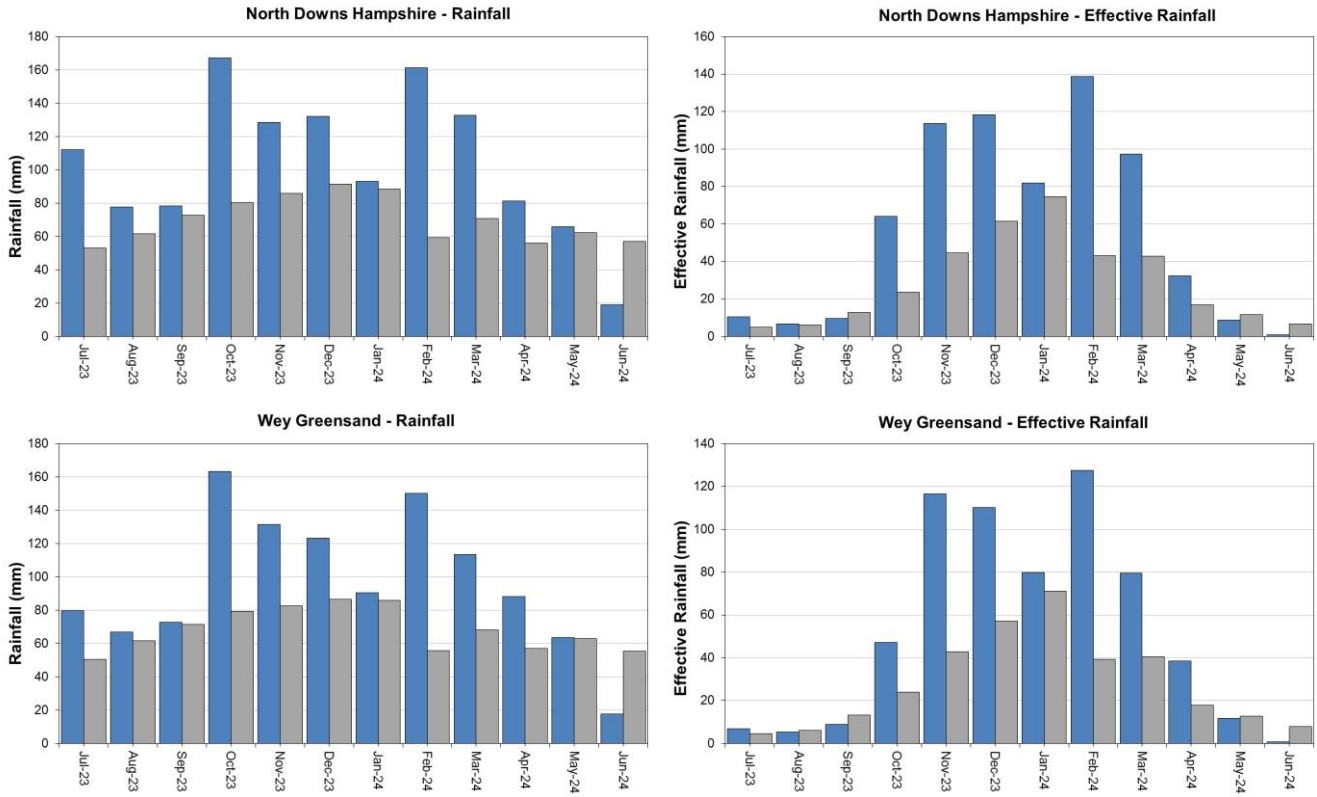
EA effective rainfall data (Source EA Soil Moisture Model 2024.)

4 Thames

4.1 Thames 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 a selection of areal units.



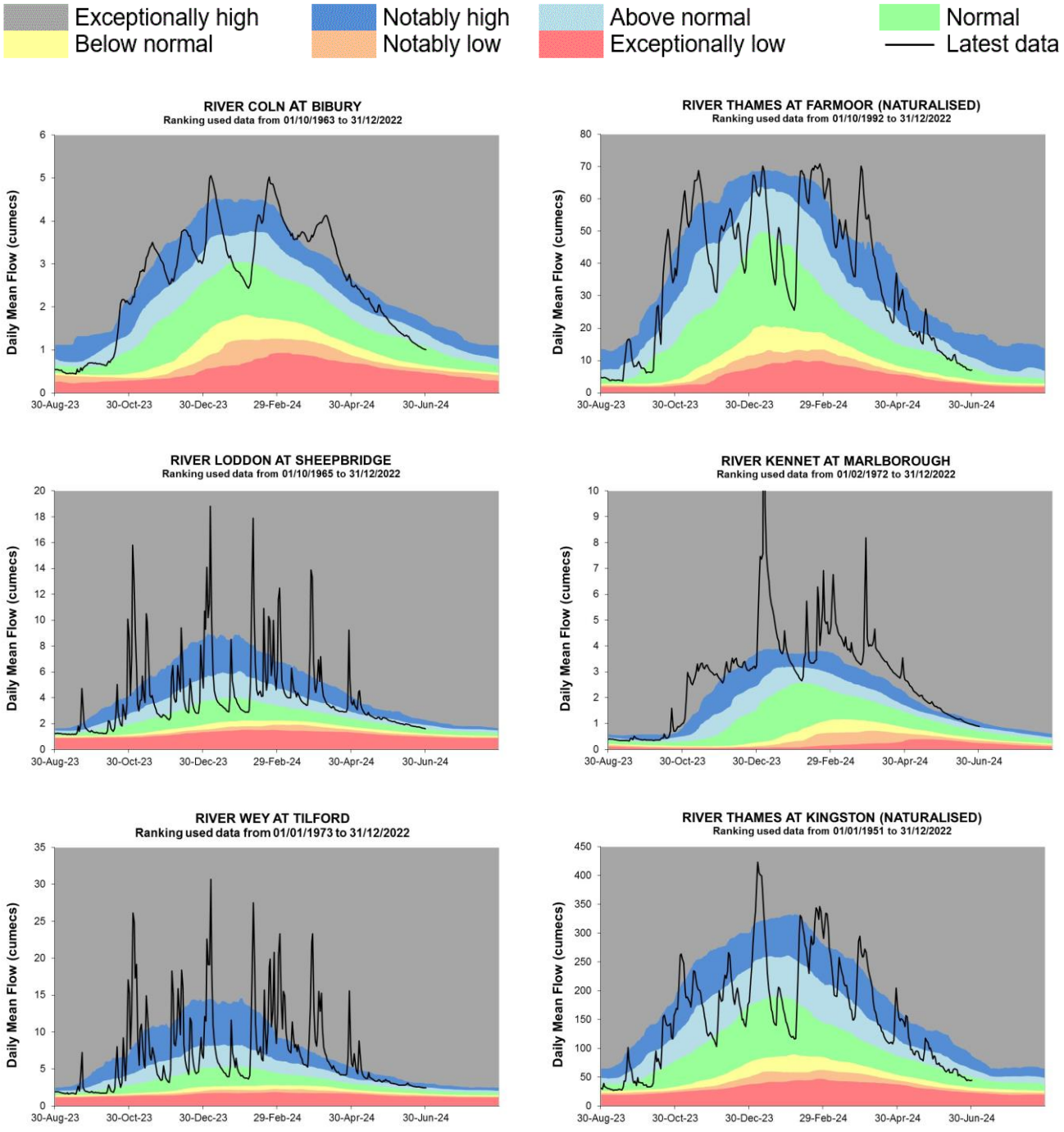


HadUK rainfall data. (Source: Met Office. Crown copyright, 2024).

EA effective rainfall data (Source EA Soil Moisture Model, 2024).

4.2 Thames River flow charts

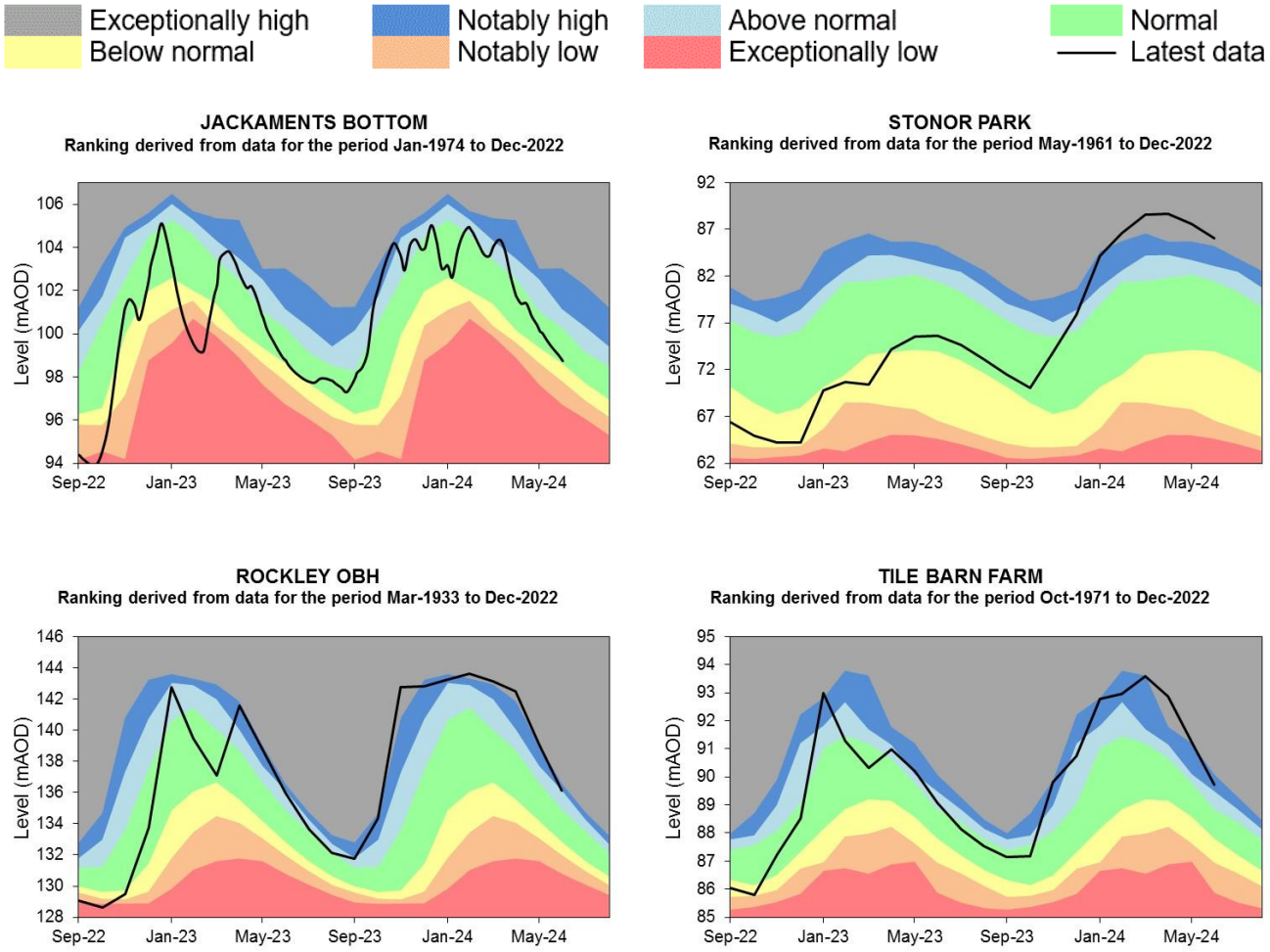
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency. 2024

4.3 Thames Groundwater level charts

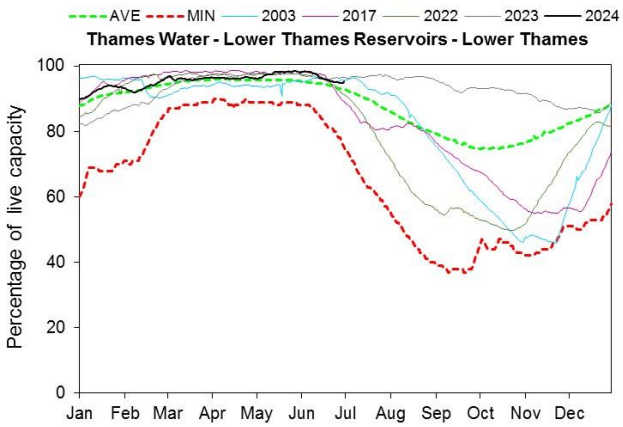
Figure 4.3: End of month groundwater levels at index groundwater level sites for major aquifers. 22 months compared to an analysis of historic end of month levels and long term maximum and minimum levels. Tile Barn Farm data has been estimated from 2 local sites since April 2022. A replacement is planned.

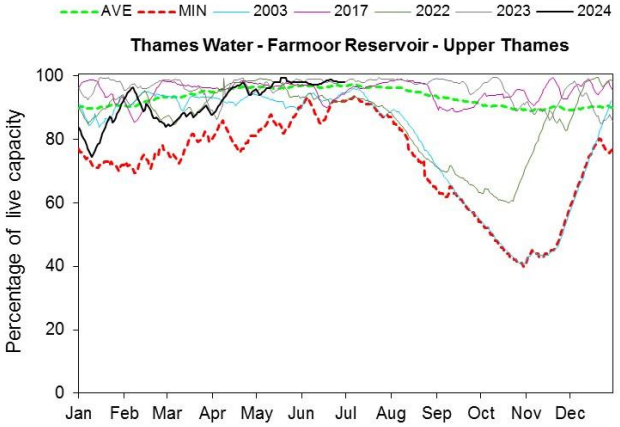


Source: Environment Agency, 2024.

4.4 Thames Reservoir stocks

Figure 4.4: End of month regional reservoir stocks 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.



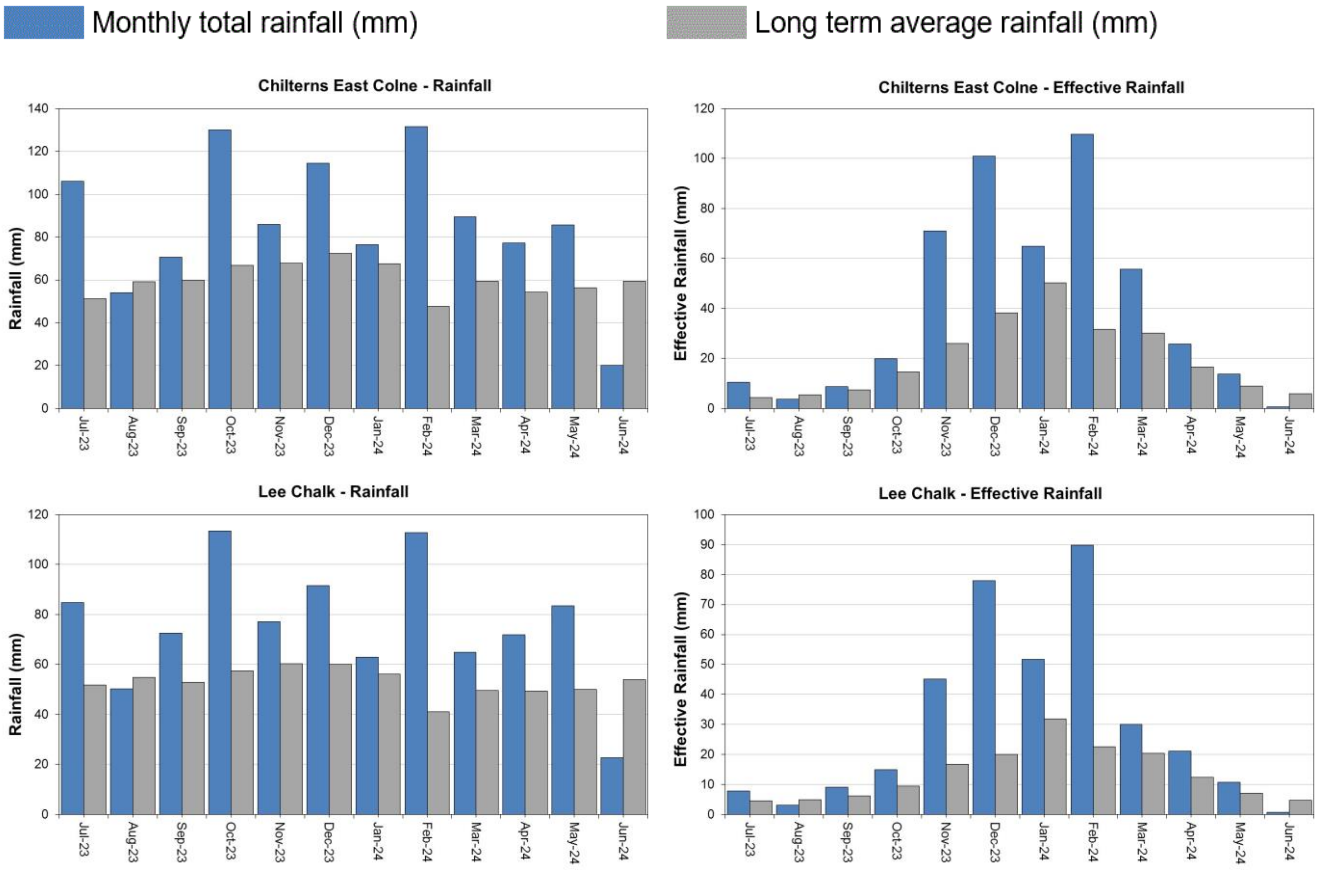


(Source: water companies).

5 Hertfordshire and North London (HNL)

5.1 HNL 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 a selection of areal units.

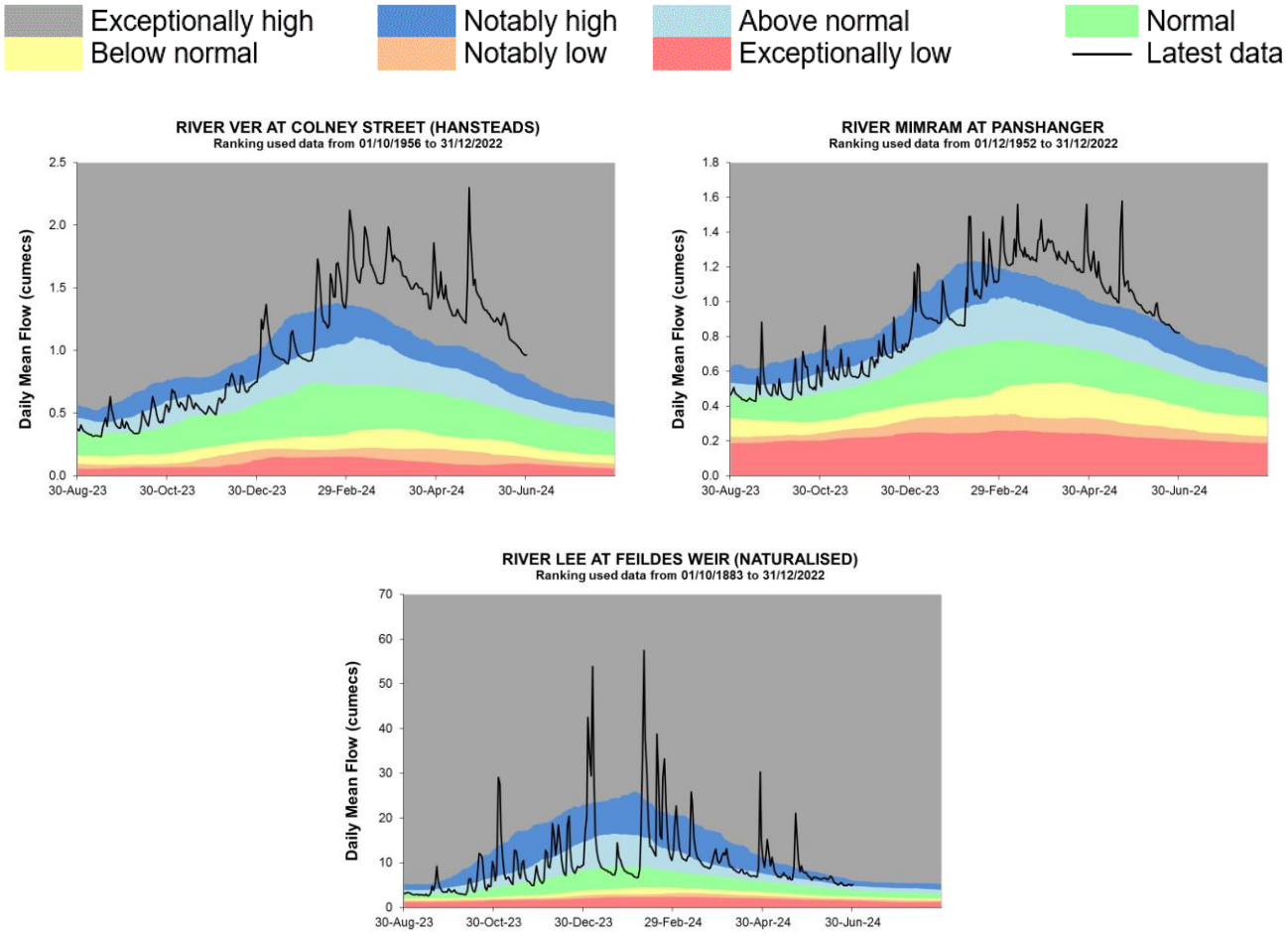


HadUK rainfall data. (Source: Met Office. Crown copyright, 2024).

EA effective rainfall data (Source EA Soil Moisture Model, 2024).

5.2 HNL River flow charts

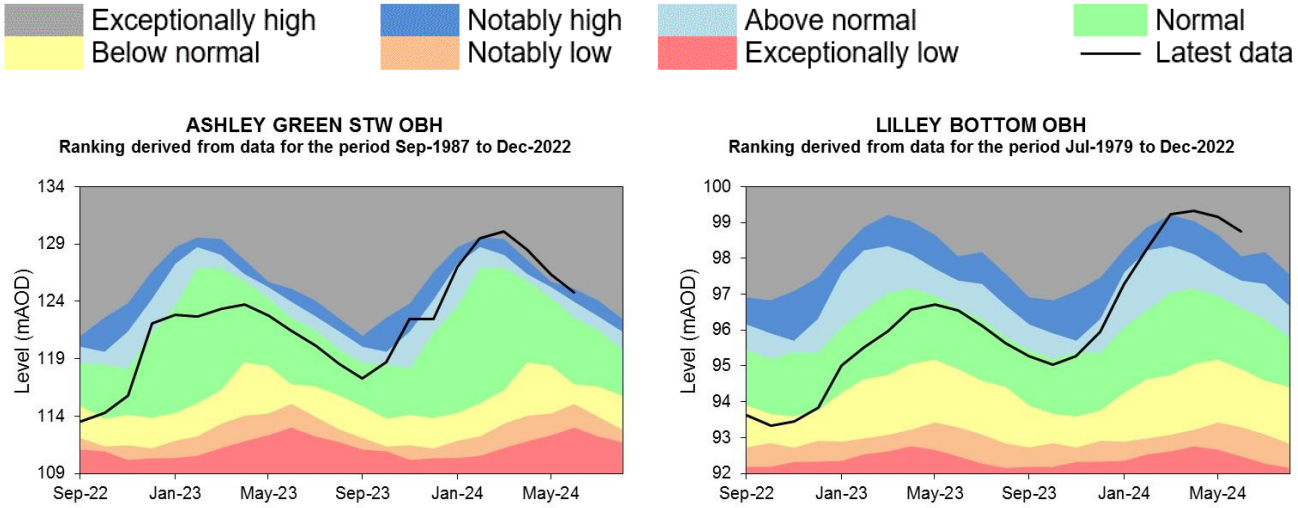
Figure 5.2 Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency. 2024

5.3 HNL Groundwater level charts

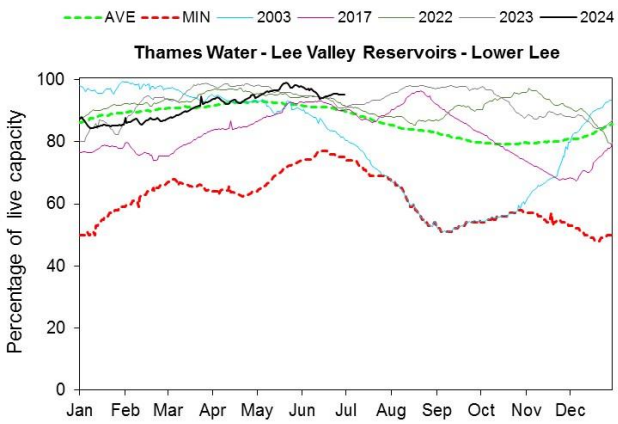
Figure 5.3: End of month groundwater levels at index groundwater level sites for major aquifers. 22 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



Source: Environment Agency, 2024.

5.4 HNL Reservoir stocks

Figure 5.4: End of month regional reservoir stocks 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.

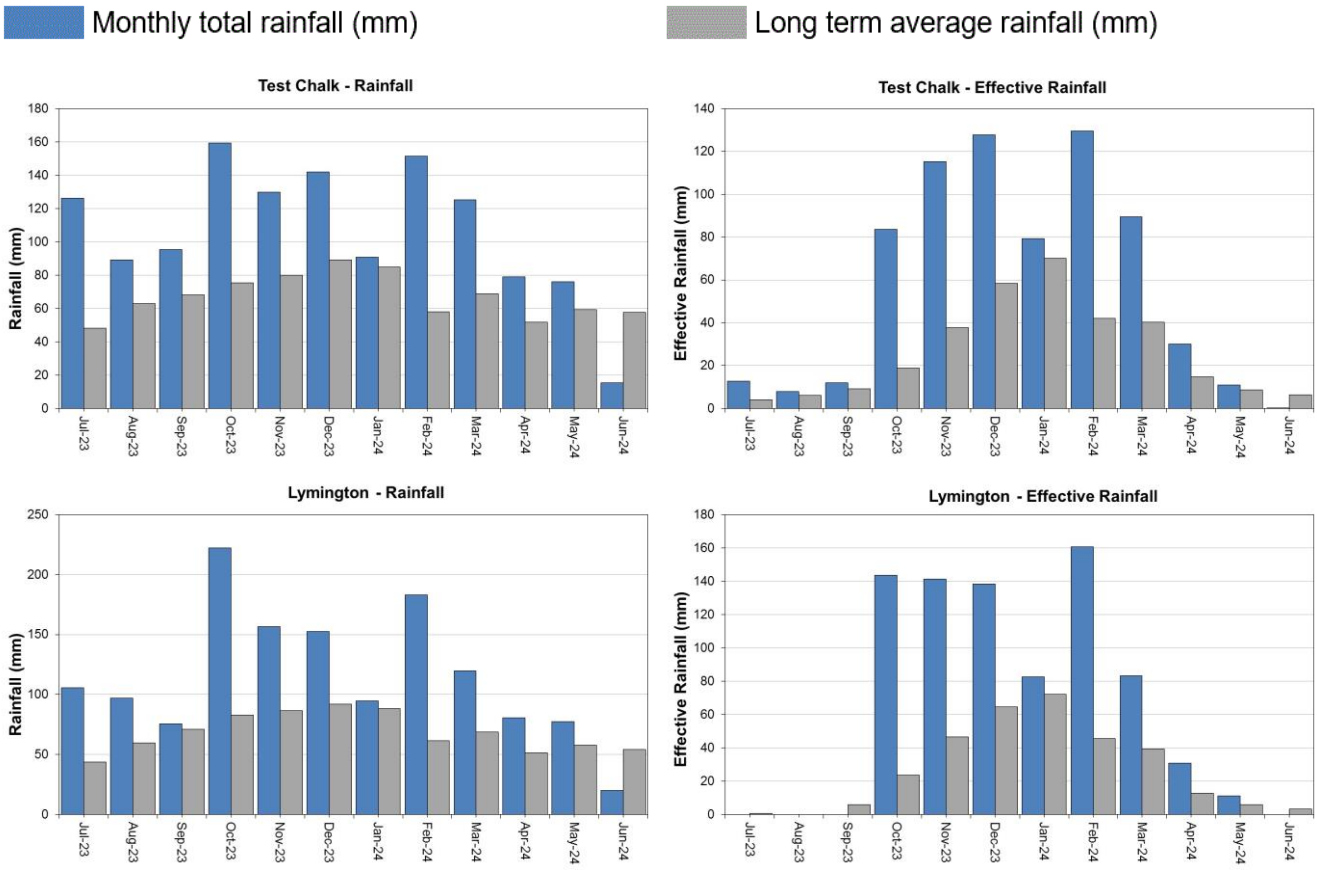


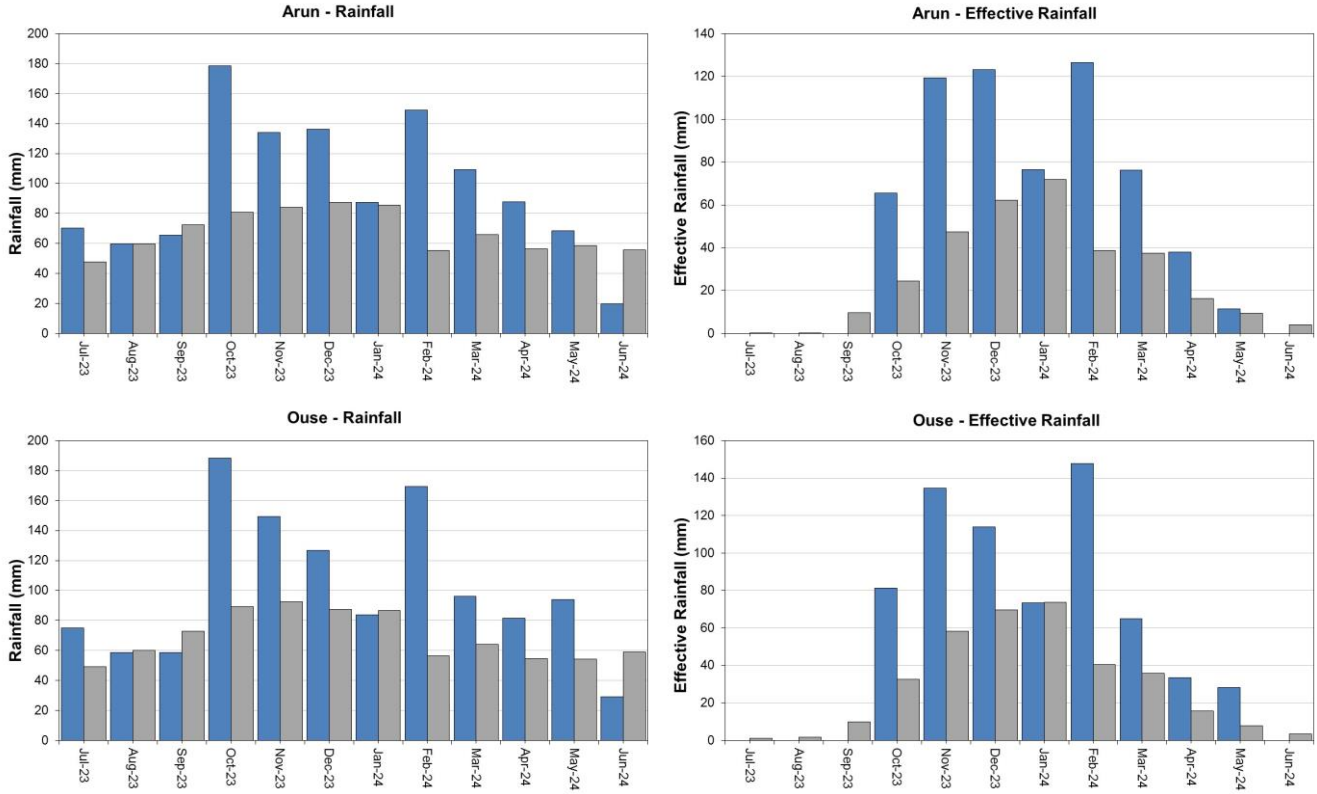
(Source: water companies).

6 Solent and South Downs (SSD)

6.1 SSD 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 a selection of areal units.



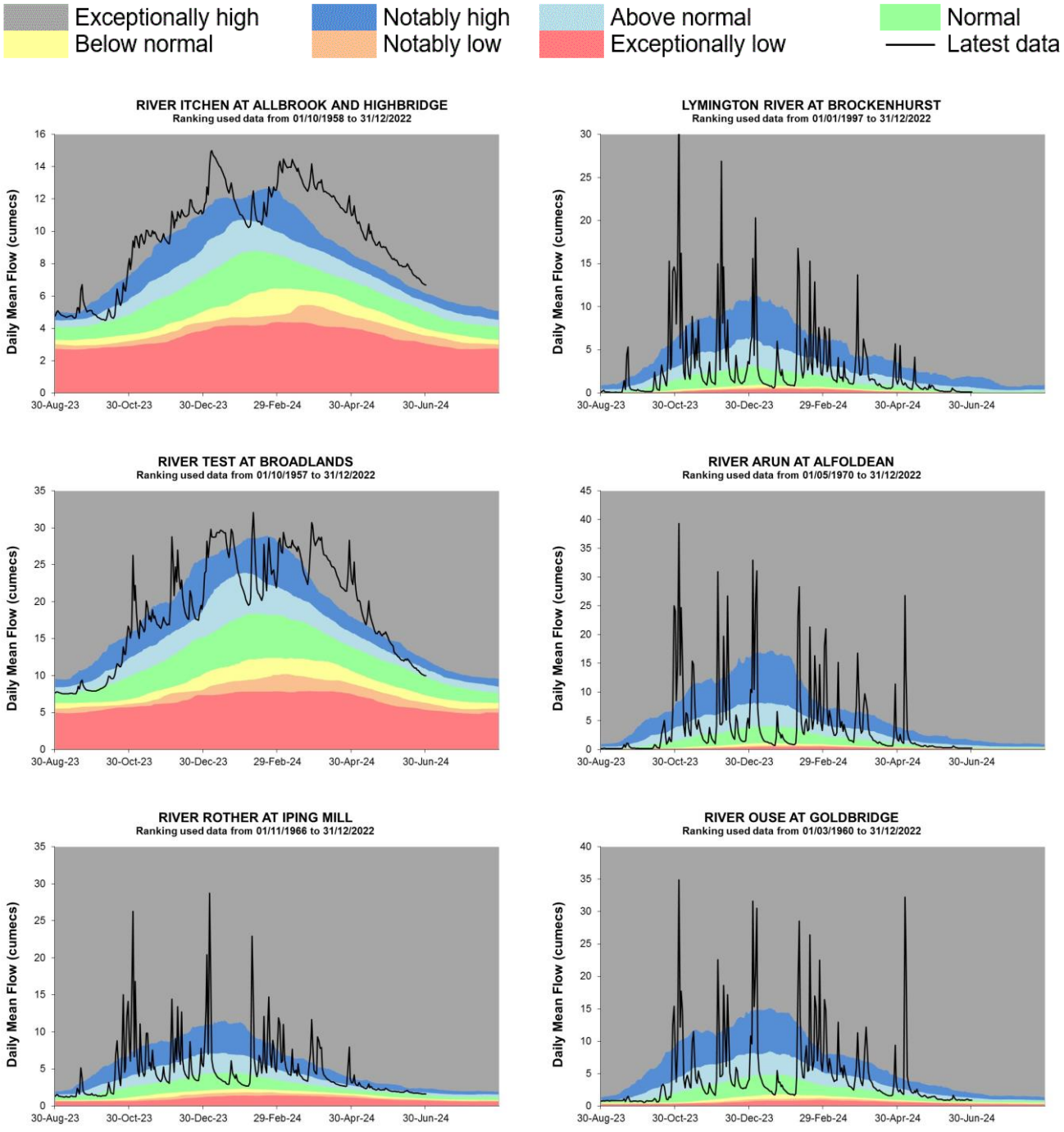


HadUK rainfall data. (Source: Met Office. Crown copyright, 2024).

EA effective rainfall data (Source EA Soil Moisture Model, 2024).

6.2 SSD River flow charts

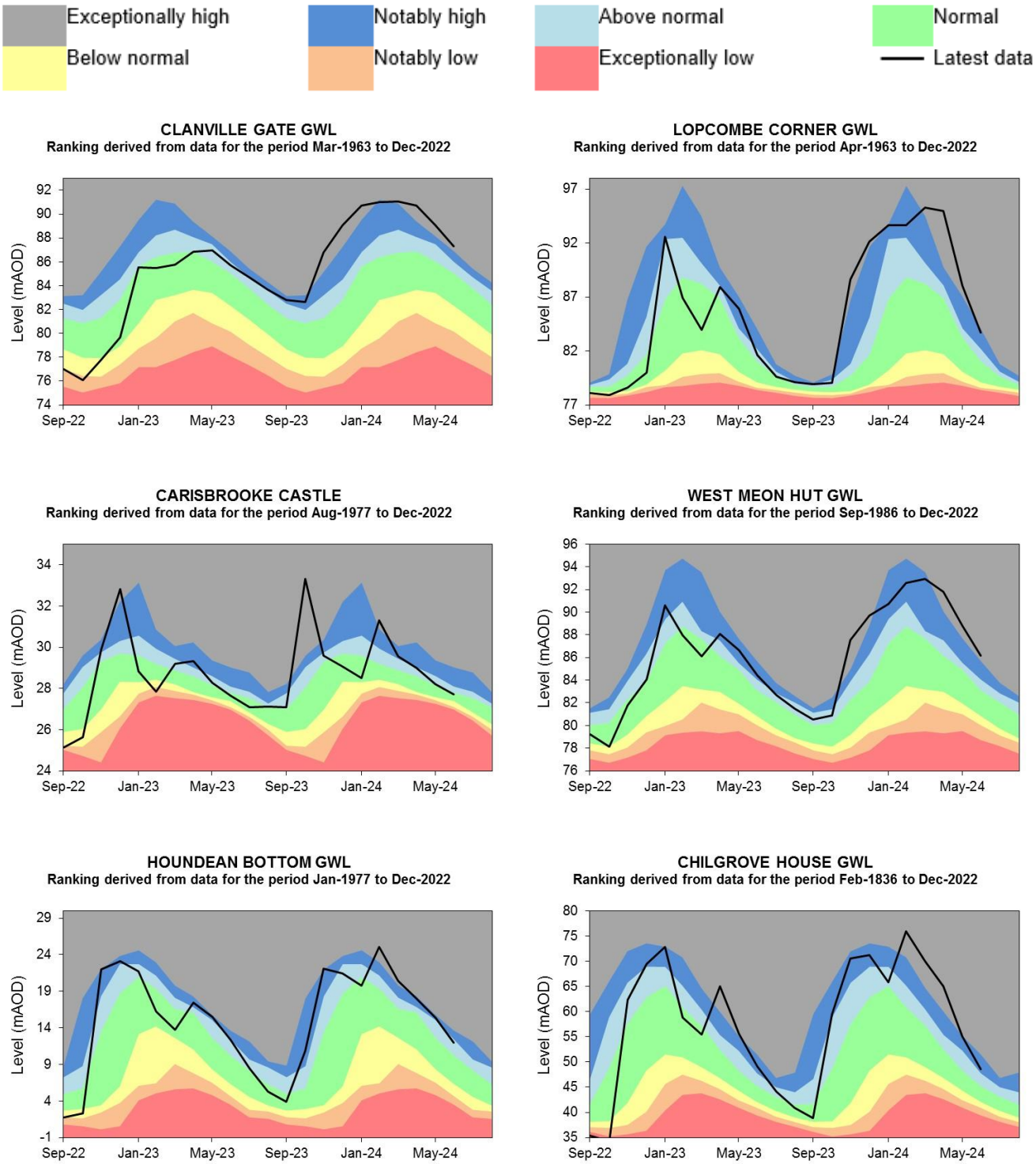
Figure 6.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency. 2024

6.3 SSD Groundwater levels

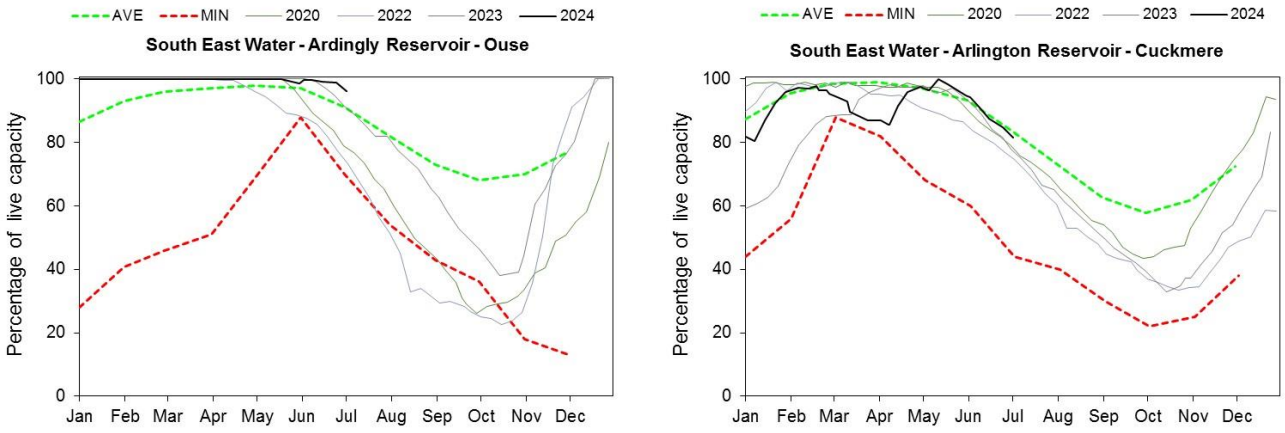
Figure 6.3: End of month groundwater levels at index groundwater level sites for major aquifers. 22 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



Source: Environment Agency, 2024.

6.4 SSD Reservoir stocks

Figure 6.4: End of month regional reservoir stocks 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.

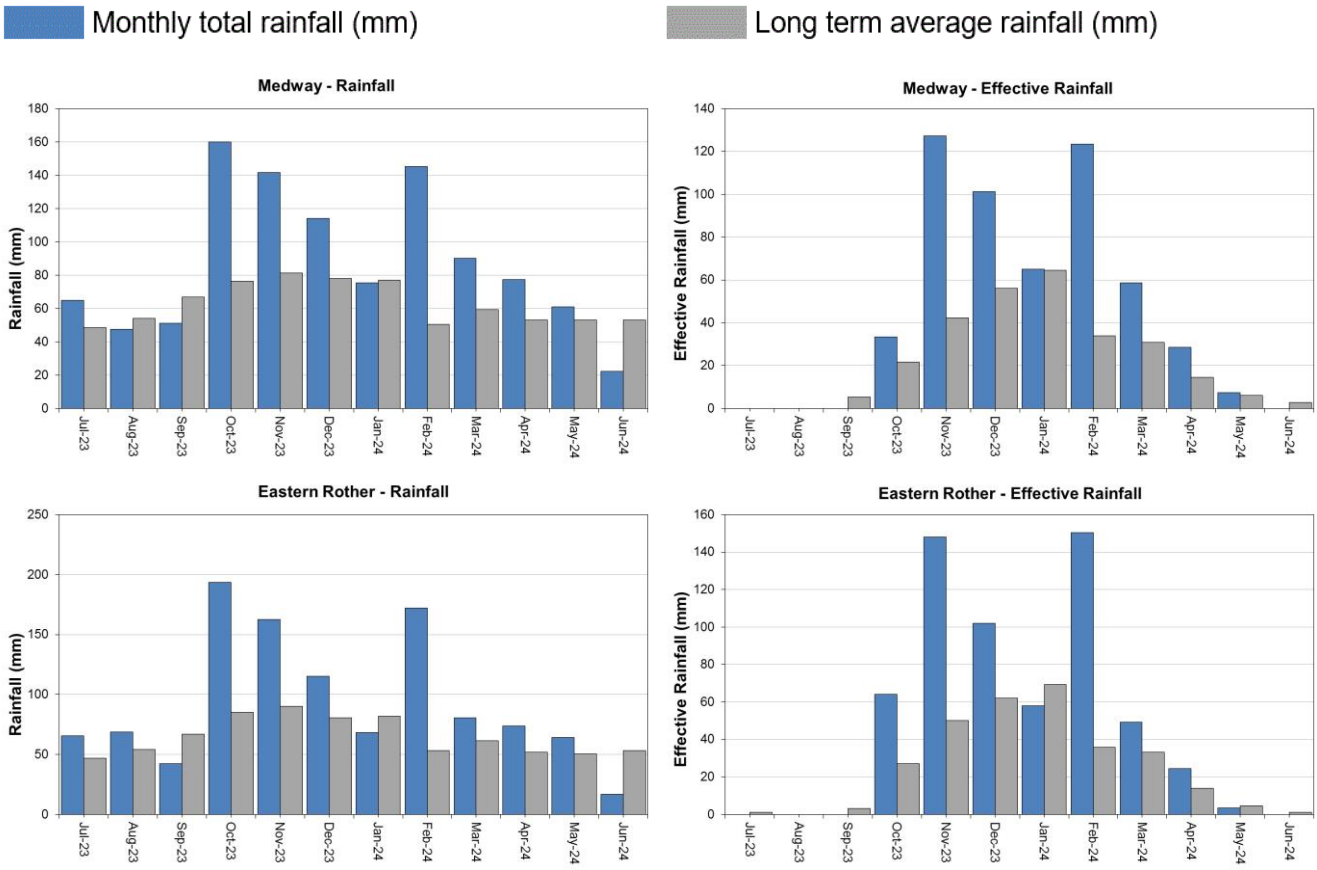


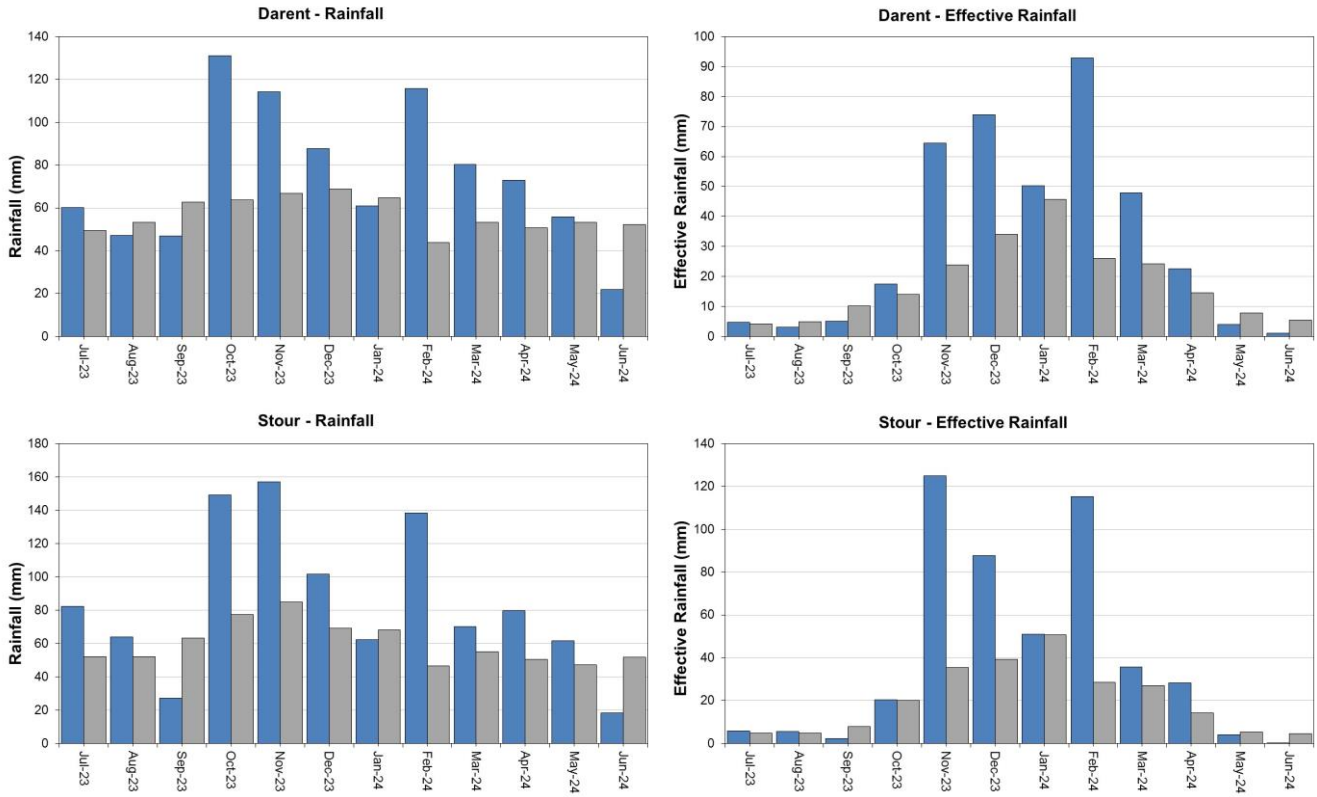
(Source: water companies).

7 Kent and South London (KSL)

7.1 KSL 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 a selection of areal units.



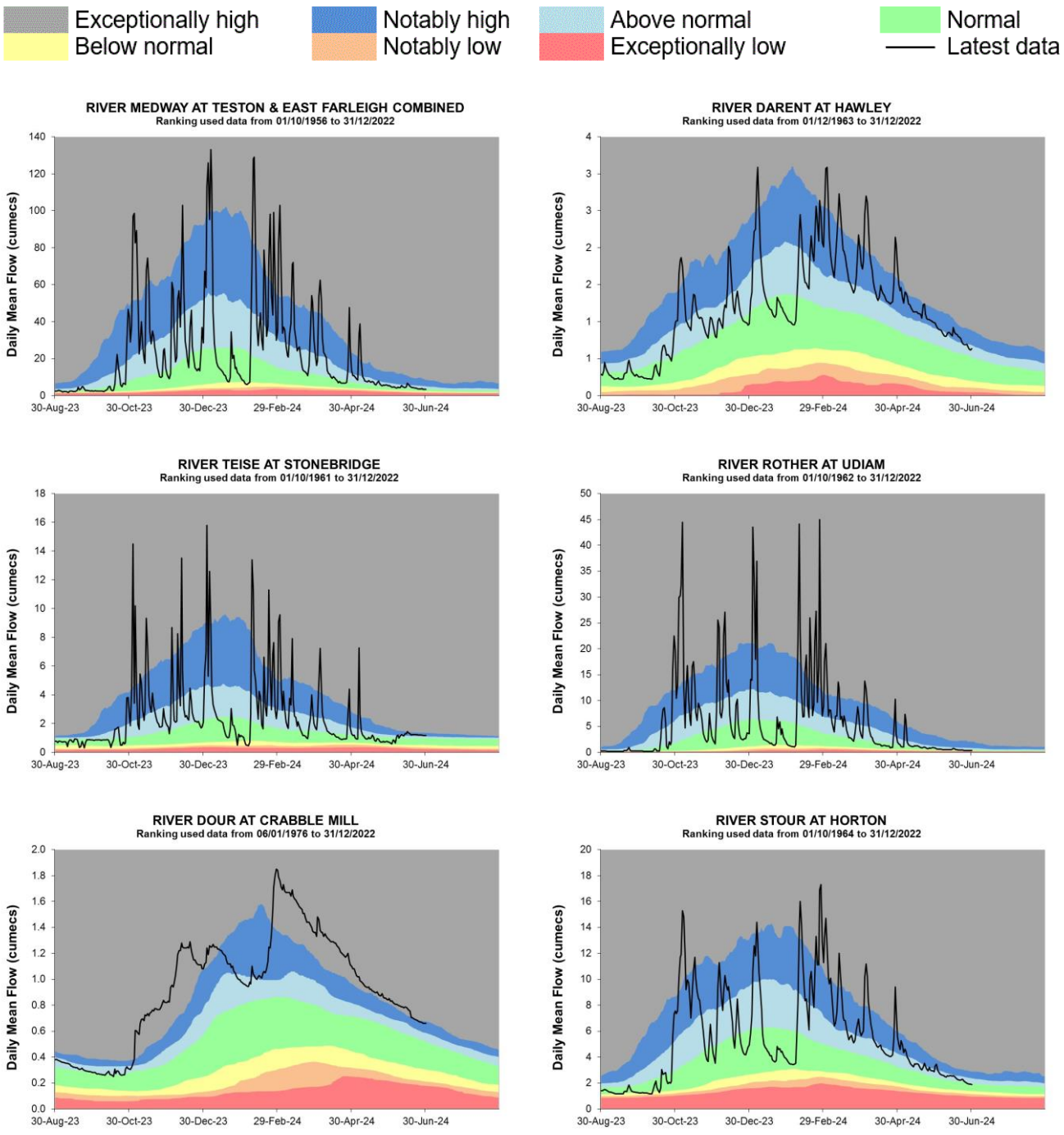


HadUK rainfall data. (Source: Met Office. Crown copyright, 2024).

EA effective rainfall data (Source EA Soil Moisture Model, 2024).

7.2 KSL River flow charts

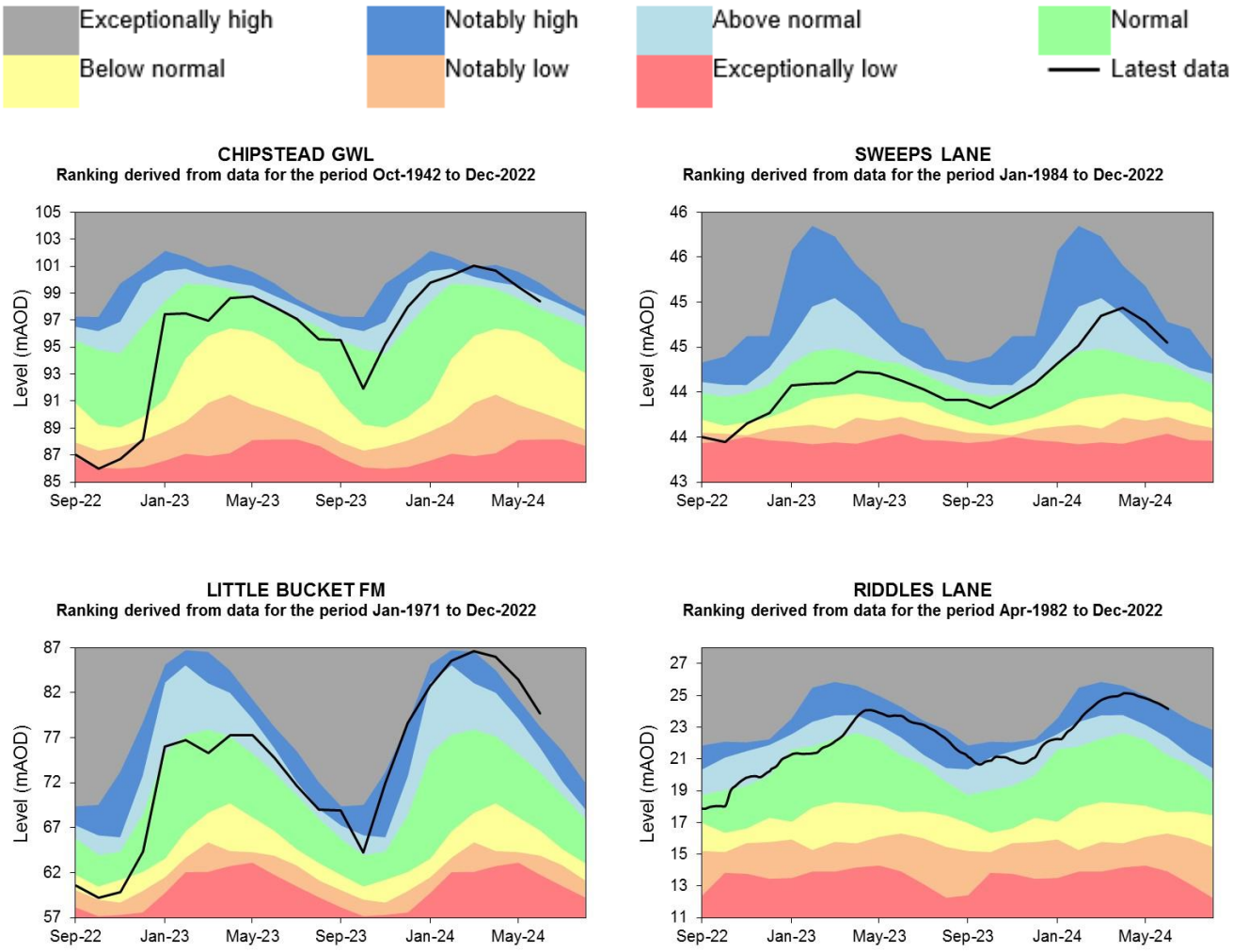
Figure 7.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency. 2024 .

7.3 KSL Groundwater levels

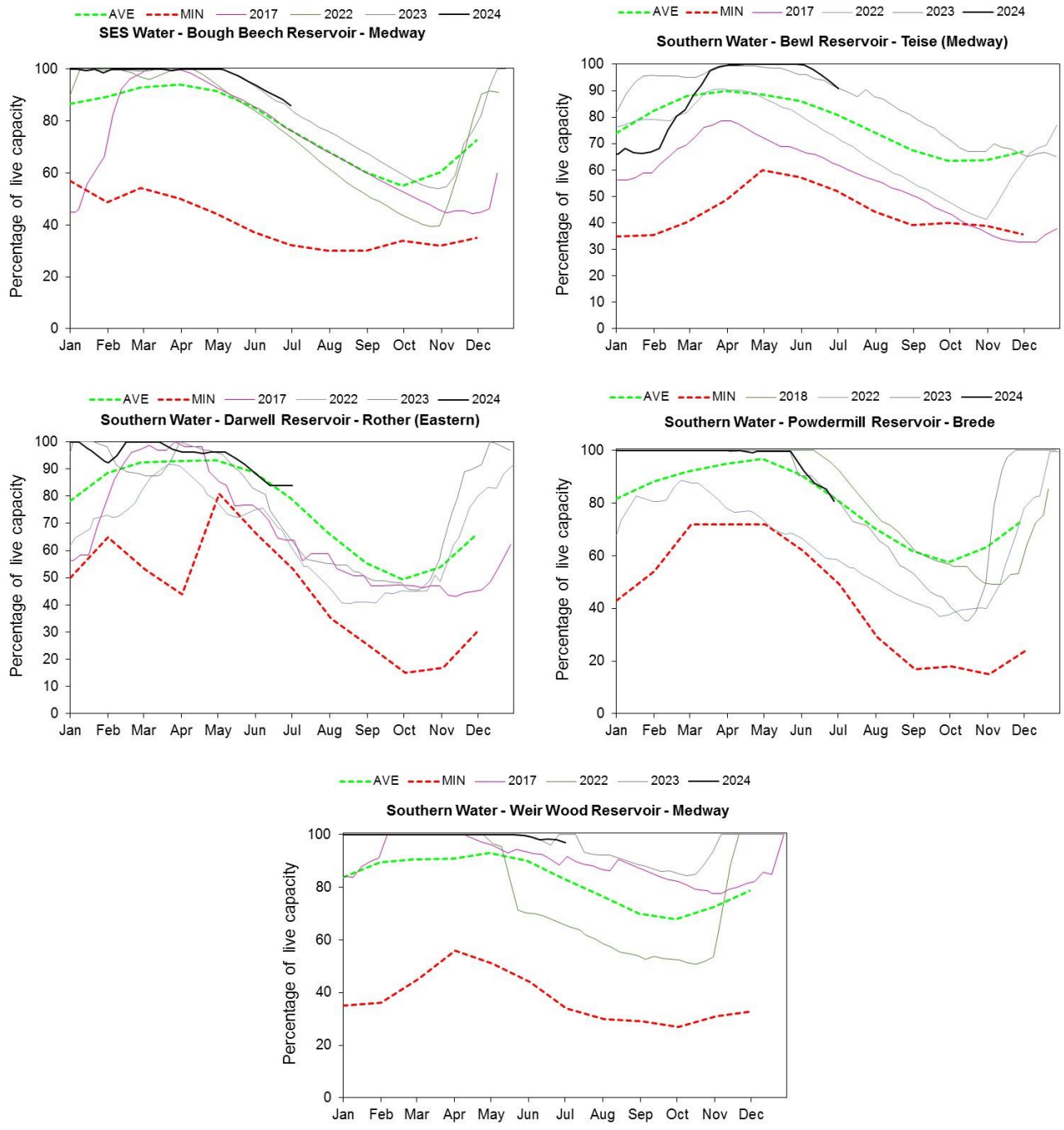
Figure 7.3: End of month groundwater levels at index groundwater level sites for major aquifers. 22 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



Source: Environment Agency. 2024

7.4 KSL Reservoir stocks

Figure 7.4: End of month regional reservoir stocks 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).

8 Glossary

8.1 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).

8.2 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.

9 Appendices

9.1 Rainfall table

Hydrological area	Jun 2024 rainfall % of long term average 1961 to 1990	Jun 2024 band	Apr 2024 to June cumulative band	Jan 2024 to June cumulative band	Jul 2023 to June cumulative band
Cotswold West	45	Below Normal	Above normal	Exceptionally high	Exceptionally high
Cotswold East	42	Below Normal	Normal	Exceptionally high	Exceptionally high
Berkshire Downs	33	Notably Low	Normal	Exceptionally high	Exceptionally high
Chilterns West	32	Notably Low	Normal	Exceptionally high	Exceptionally high
Chilterns East Colne	34	Notably Low	Normal	Exceptionally high	Exceptionally high
North Downs - Hampshire	33	Notably Low	Normal	Exceptionally high	Exceptionally high
North Downs - South London	30	Notably Low	Normal	Notably high	Notably high
Upper Thames	38	Notably Low	Normal	Exceptionally high	Exceptionally high
Upper Cherwell	37	Notably Low	Normal	Exceptionally high	Exceptionally high
Thame	38	Notably Low	Normal	Exceptionally high	Exceptionally high
Loddon	27	Notably Low	Normal	Exceptionally high	Exceptionally high
Lower Wey	27	Notably Low	Normal	Notably high	Exceptionally high
Upper Mole	35	Below Normal	Normal	Exceptionally high	Exceptionally high
Lower Lee	26	Notably Low	Normal	Exceptionally high	Exceptionally high
North London	26	Notably Low	Normal	Notably high	Exceptionally high
South London	30	Notably Low	Normal	Notably high	Exceptionally high

Roding	29	Notably Low	Normal	Notably high	Exceptionally high
Ock	34	Notably Low	Normal	Exceptionally high	Exceptionally high
Enborne	27	Notably Low	Normal	Notably high	Exceptionally high
Cut	25	Notably Low	Normal	Notably high	Exceptionally high
Lee Chalk	42	Below Normal	Above normal	Exceptionally high	Exceptionally high
River Test	27	Notably Low	Normal	Exceptionally high	Exceptionally high
East Hampshire Chalk	37	Below Normal	Normal	Exceptionally high	Exceptionally high
West Sussex Chalk	44	Below Normal	Above normal	Exceptionally high	Exceptionally high
East Sussex Chalk	50	Below Normal	Above normal	Exceptionally high	Exceptionally high
Sw Isle Of Wight	35	Notably Low	Above normal	Exceptionally high	Exceptionally high
River Darent	42	Below Normal	Normal	Notably high	Notably high
North Kent Chalk	39	Below Normal	Normal	Notably high	Notably high
Stour	35	Notably Low	Normal	Notably high	Exceptionally high
Dover Chalk	43	Below Normal	Above normal	Exceptionally high	Exceptionally high
Thanet Chalk	32	Notably Low	Normal	Above normal	Notably high
Western Rother Greensand	44	Below Normal	Above normal	Exceptionally high	Exceptionally high
Hampshire Tertiaries	33	Notably Low	Normal	Exceptionally high	Exceptionally high
Lymington River Avon Water And O	36	Notably Low	Normal	Exceptionally high	Exceptionally high
Sussex Coast	37	Below Normal	Normal	Exceptionally high	Exceptionally high
River Arun	35	Below Normal	Normal	Exceptionally high	Exceptionally high
River Adur	46	Below Normal	Above normal	Exceptionally high	Exceptionally high
River Ouse	50	Below Normal	Above normal	Exceptionally high	Exceptionally high

Cuckmere River	43	Below Normal	Normal	Exceptionally high	Exceptionally high
Pevensey Levels	29	Notably Low	Normal	Notably high	Exceptionally high
River Medway	42	Below Normal	Normal	Exceptionally high	Exceptionally high
Eastern Rother	32	Notably Low	Normal	Exceptionally high	Exceptionally high
Romney Marsh	32	Notably Low	Normal	Exceptionally high	Exceptionally high
North West Grain	36	Below Normal	Normal	Notably high	Notably high
Sheppy	34	Notably Low	Normal	Above normal	Above normal

9.2 River flows table

Site name	River	Catchment	Jun 2024 band	May 2024 band
Colney Street_hansteads	Ver	Colne	Exceptionally high	Exceptionally high
Feildes Weir (nat)	Lee (middle)	Lee	Notably high	Notably high
Panshanger	Mimram	Lee	Exceptionally high	Exceptionally high
Crabble Mill Gs	Dour	Little Stour	Exceptionally high	Exceptionally high
Hawley Gs	Darent	Darent and Cray	Above normal	Notably high
Horton Gs	Great Stour	Stour Kent	Above normal	Above normal
Stonebridge Gs	Teise	Teise	Above normal	Normal
Teston Farleigh Combined	Medway100	Medway Estuary	Normal	Above normal
Udiam Gs	Rother	Rother Kent Lower	Normal	Normal
Alfoldean Gs	Arun	Arun	Below normal	Notably high
Allbrook Gs And Highbridge	Itchen (so)	Itchen	Exceptionally high	Exceptionally high
Broadlands	Test	Test Lower	Notably high	Exceptionally high
Brockenhurst Gs	Lymington	New Forest	Normal	Above normal
Goldbridge Gs	Ouse (so)	Ouse Sussex	Normal	Exceptionally high
Iping Mill Gs	Rother	West Rother	Above normal	Notably high
Farmoor (naturalised)	River Thames	Thames	Normal	Notably high
Kingston (naturalised)	River Thames	Thames North Bank	Normal	Notably high
Marlborough	River Kennet	Kennet	Notably high	Exceptionally high
Sheepbridge	River Loddon	Loddon	Above normal	Notably high
Tilford	River Wey	Wey Addleston Bourne	Above normal	Exceptionally high

9.3 Groundwater table

Site name	Aquifer	End of Jun 2024 band	End of May 2024 band
Ashley Green Stw	Mid-chilterns Chalk	Notably high	Exceptionally high
Lilley Bottom	Upper Lee Chalk	Exceptionally high	Exceptionally high
Little Bucket Fm	East Kent Chalk - Stour	Exceptionally high	Exceptionally high
Chipstead Gwl	Epsom North Downs Chalk	Above normal	Above normal
Riddles Lane	North Kent Swale Chalk	Notably high	Notably high
Sweeps Lane Gwl	West Kent Chalk	Notably high	Notably high
Houndean Bottom Gwl	Brighton Chalk Block	Above normal	Notably high
Chilgrove House Gwl	Chichester-worthing-portsdown Chalk	Notably high	Notably high
Carisbrooke Castle	Isle Of Wight Central Downs Chalk	Normal	Above normal
West Meon Hut Gwl	River Itchen Chalk	Exceptionally high	Exceptionally high
Clanville Gate Gwl	River Test Chalk	Exceptionally high	Exceptionally high
Lopcombe Corner Gwl	River Test Chalk	Notably high	Exceptionally high
Tile Barn Farm	Basingstoke Chalk	Notably high	Exceptionally high
Rockley Obh	Berkshire Downs Chalk	Above normal	Exceptionally high
Jackaments Bottom Obh	Burford Oolitic Limestone (inferior)	Normal	Normal
Stonor Estate	South-west Chilterns Chalk	Exceptionally high	Exceptionally high

9.4 South-east England areal units for reference