Monthly water situation report: Kent and South London Area

1 Summary - September 2024

The whole of the Kent and South London (KSL) area received 193% of the long-term average (LTA) rainfall during September. Rainfall received across catchments in the area ranged from normal to exceptionally high. Soil moisture deficits (SMDs) decreased in most catchments in September due to the increase in the effective rainfall received. Monthly mean flows (MMFs) ranged from notably high to exceptionally high in September. Groundwater levels during September continued to fall across most of the KSL area and are still ranging from normal to exceptionally high for this time of the year. Levels in 3 of 5 reservoirs in KSL decreased in September; Bewl, Darwell and Bough Beech. Powdermill and Weirwood reservoirs levels increased slightly.

1.1 Rainfall

The whole of the Kent and South London (KSL) area received 193% of the long-term average (LTA) rainfall during September. Rainfall received across catchments in the area ranged from normal to exceptionally high. Exceptionally high rainfall was recorded in 8 of the 13 catchments in across the south and west of KSL. Notably high rainfall was recorded in North Kent Chalk, while above normal rainfall was recorded in Northwest Grain, Stour and Dover Chalk. Normal rainfall was recorded in Sheppey and Thanet Chalk catchments. The percentage of LTA rainfall received across catchments ranged from 95% across Thanet Chalk rainfall area to 278% in the Medway rainfall area. The highest daily rainfall total of 60.3mm for September was recorded at Sundridge PS rain gauge in the Darent catchment on the 22 September. The next highest daily rainfall totals were on 5, 8, 20 and 29 September and ranged from 31.3mm to 60.3mm. In September, 2 dry days where less than 0.2mm of rainfall was received were recorded on 17 and 31 September. The Medway and Eastern Rother catchments recorded the wettest September on record since records began in 1871. The Lower Mole catchment saw the third wettest September on record. Analysis of the rainfall over the last 12 months from September 2024 to October 2023 shows that the whole KSL area recorded the second wettest 12 months since records began in 1871. Individual catchments saw lower Mole, Darent, Medway, Eastern Rother and Romney Marsh recorded the second wettest 12 months on record.

1.2 Soil moisture deficit and recharge

At the end of September, SMDs in the south and west of the patch ranged from less than 10mm to 40mm. SMDs in the north and east of the patch were higher and ranged from 41mm to 130mm. SMDs decreased in most catchments in September due to the increase in the effective rainfall received. Across the whole area, on average, effective rainfall received this month was at 208% of the LTA.

1.3 River flows

MMFs ranged from notably high to exceptionally high in September. Three key flow sites saw notably high MMFs all located in the east of the patch. Eight flow sites across the remaining areas of the catchment saw exceptionally high MMFs during September. Rother at Udiam recorded the highest percentage LTA of 622% for the month of September. Stour at Horton recorded the lowest percentage LTA of 142%. The Rother at Udiam recorded the second highest flows for the month of September since records began in 1961 with 4m3/s. The Medway at Teston recorded the third highest flows for the month of September since records began in 1961 with 15.3m3/s.

1.4 Groundwater levels

Generally, groundwater levels continued to fall across the KSL area. This is with the exception of Riverhead and Fleet Reservoir, where the fall of groundwater levels has discontinued. The fall in groundwater levels has also slowed down at Sweeps Lane and Wolverton. In general, the slowdown or discontinuation of the fall of groundwater levels is consistent with the effective rainfall that in September was relatively high.

At the end of September, groundwater levels across the whole KSL area were still ranging from normal to exceptionally high. The Lower Greensand aquifer at Riverhead continues to register groundwater levels that for this time of the year are notably high, with a slight rise this month. Groundwater levels in the Chalk aquifer are also mostly notably high. An exception are the key monitoring points in the west of the patch registering levels in the Chalk at Chipstead and Sweeps Lane that are assessed as normal and above normal, respectively.

1.5 Reservoir stocks

Levels in 3 of the 5 reservoirs in KSL decreased in September; Bewl, Darwell and Bough Beech. Powdermill and Weirwood reservoir levels increased. Weirwood reservoir is currently offline.

At the end of September, reservoir levels were:

- normal at Powdermill with 61% and Bewl with 64%
- notably high at Darwell with 67% and Bough Beech with 66%
- exceptionally high at Weirwood with 100%

1.6 Environmental impact

Hands off flow constraints were removed for certain licensed abstractions within the Rother, Medway and Stour catchments during September. Eighteen fluvial flood alerts and nine flood warnings were issued from 22 September to 30 September.

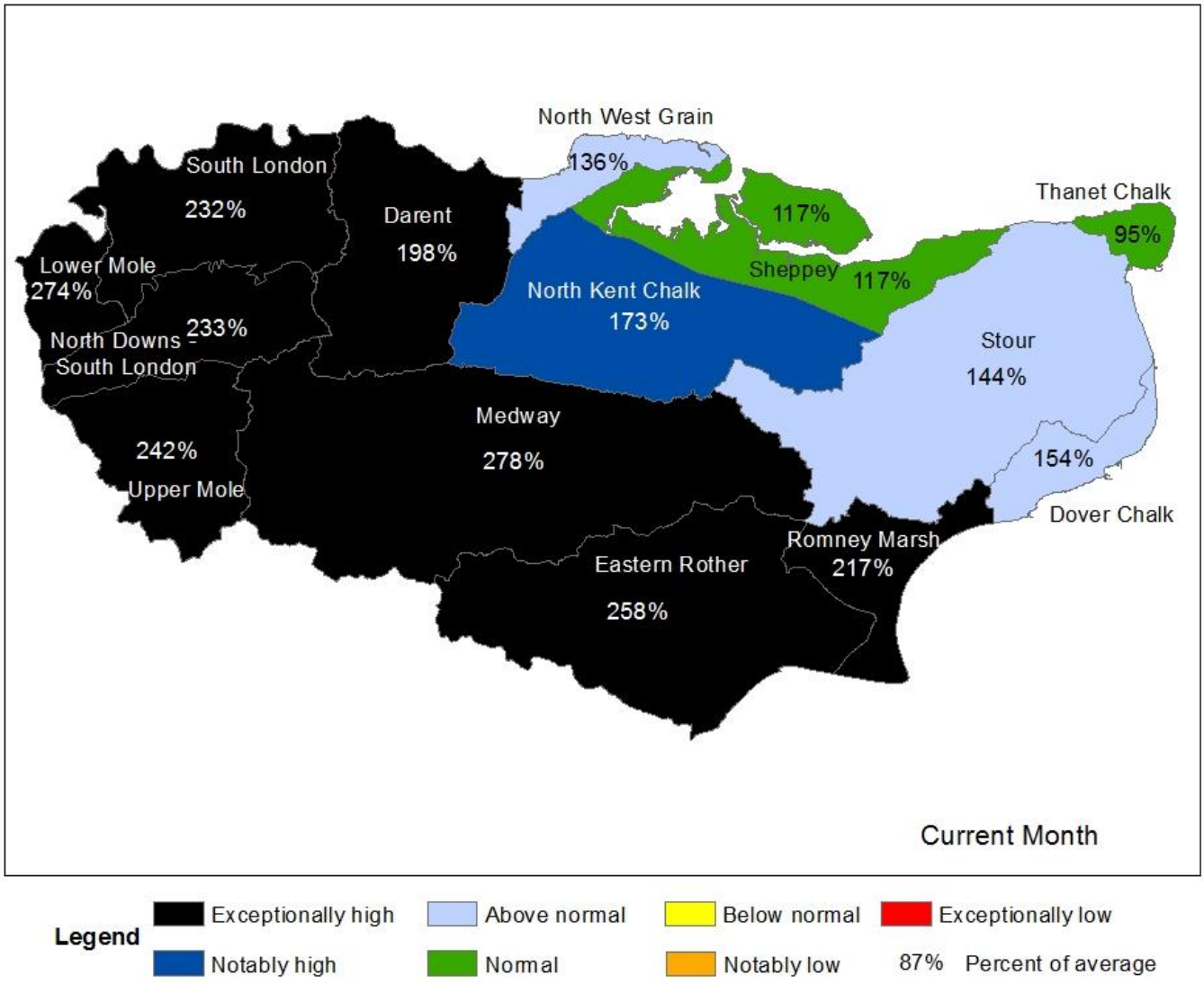
Author: Groundwater and Hydrology Team, ksl.gwh@environment-agency.gov.uk

Contact details: 03708506506

2 Rainfall

2.1 Rainfall map one

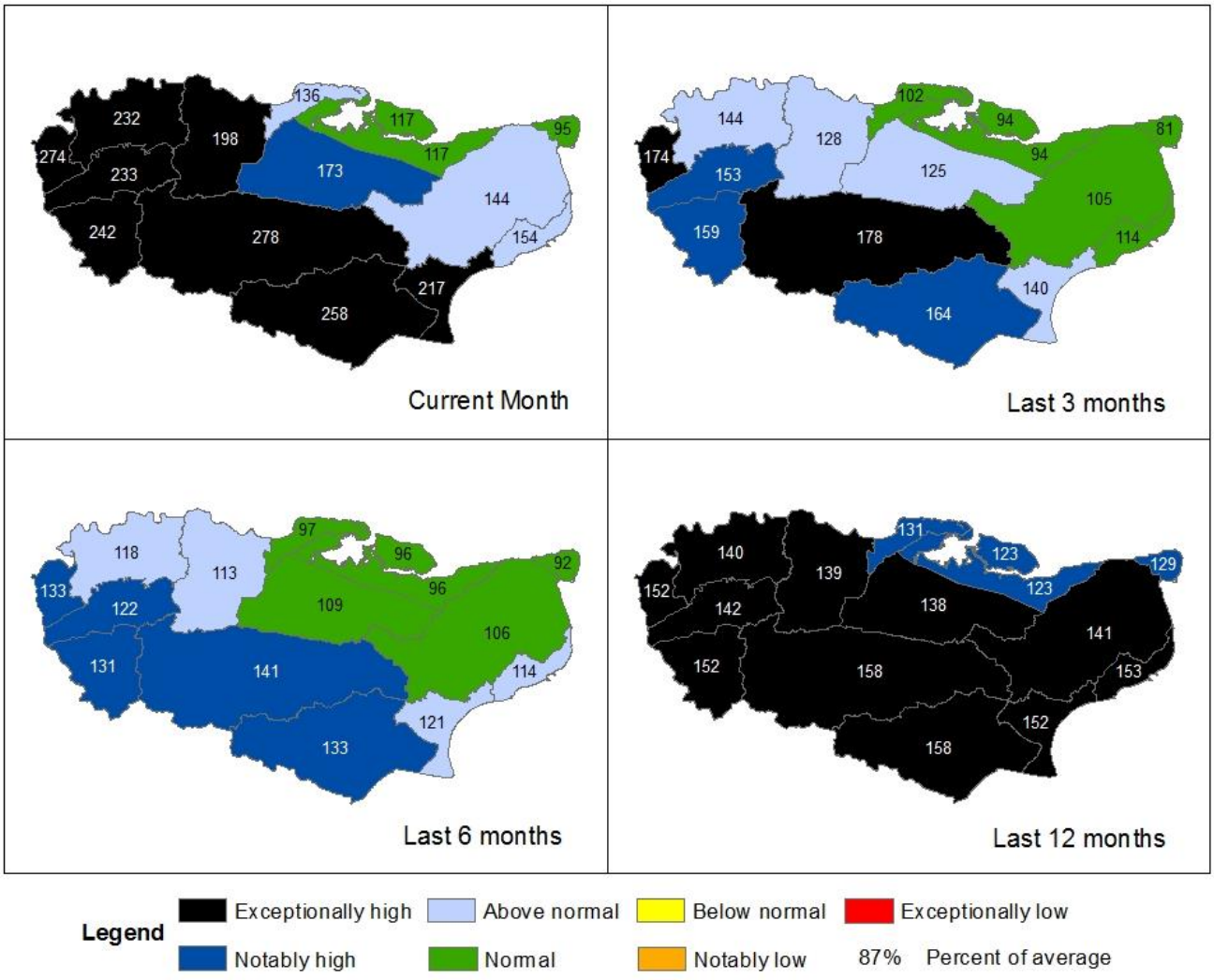
Figure 2.1: Total rainfall for hydrological areas across Kent and South London for the current month (up to 30 September 2024), classed relative to an analysis of respective historic totals. Table available in the appendices with more detailed information.



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. Includes material based on Ordnance Survey 1:50 000 maps with the permission of the controller of His Majesty's Stationery Office © Crown copyright. All rights reserved. Environment Agency, 100026380, 2024.

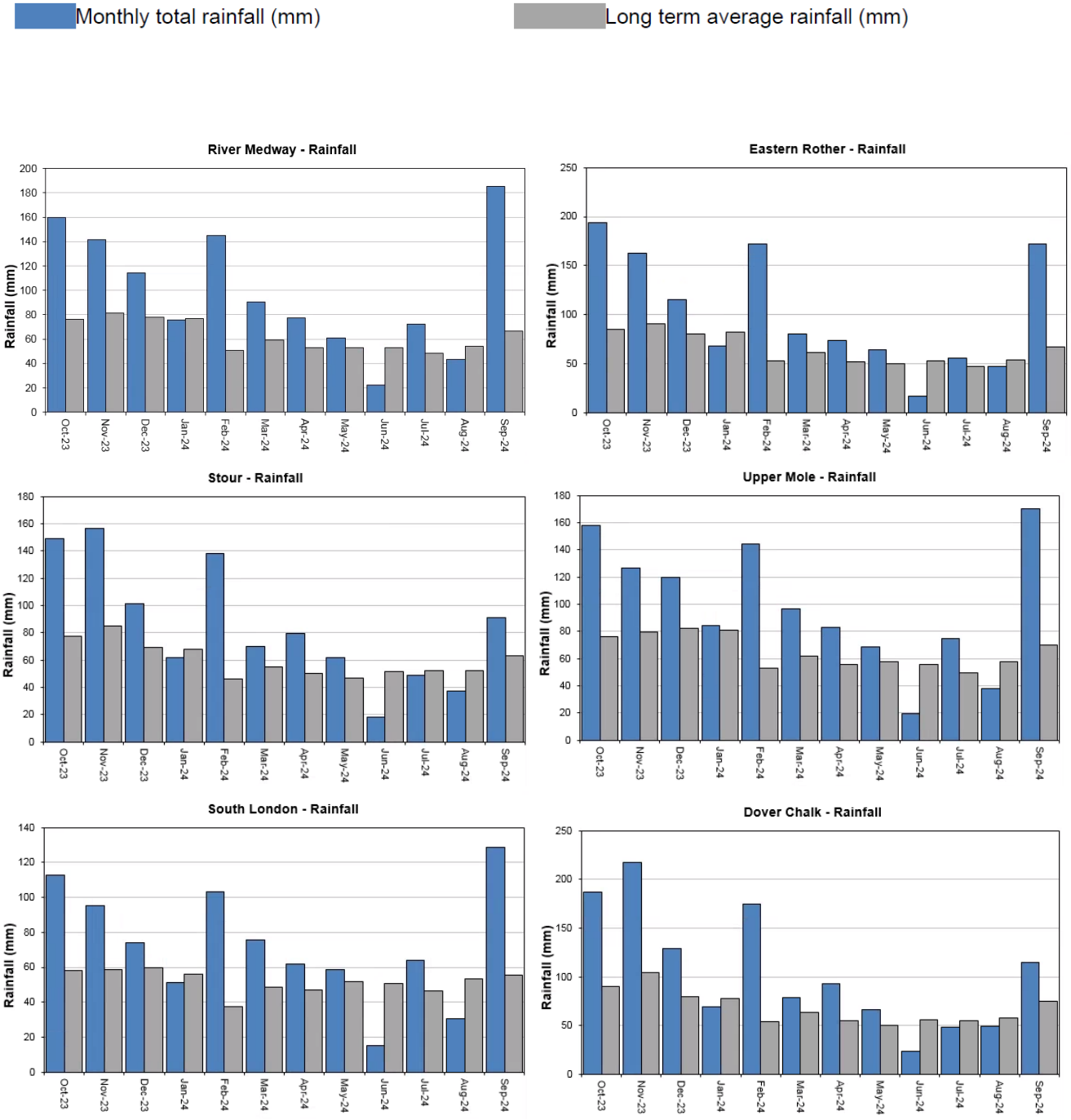
2.2 Rainfall map two

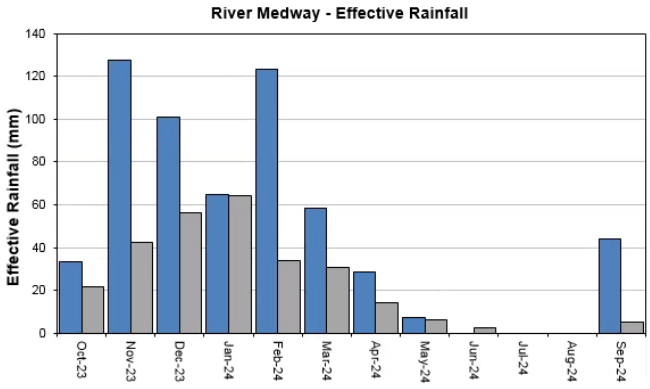
Figure 2.2: Total rainfall for hydrological areas for the current month (up to 30 September 2024), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.

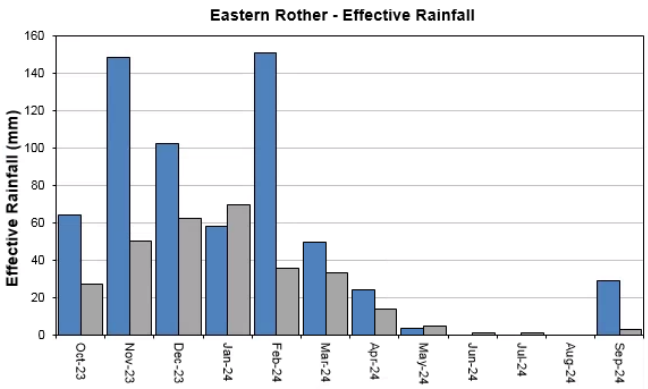


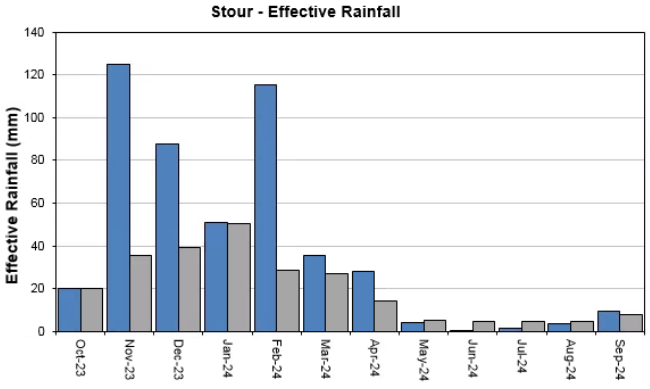
2.3 Rainfall and effective rainfall charts

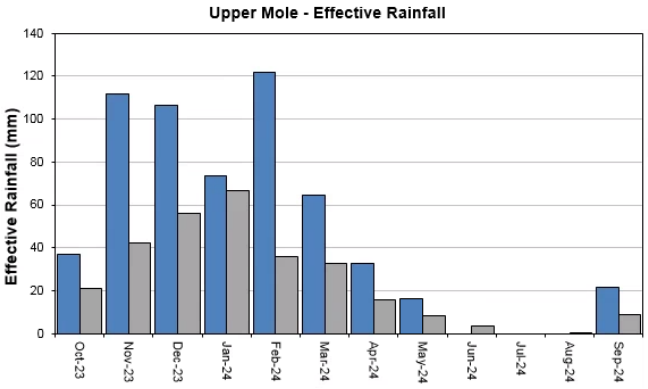
Figure 2.3: : Monthly rainfall and effective rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average (LTA) for a selection of areal units. HadUK rainfall data. (Source: Met Office. Crown copyright, 2024). EA effective rainfall data (Source EA Soil Moisture Model).

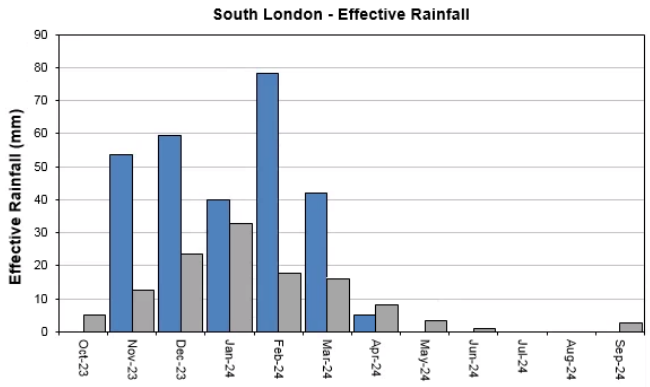


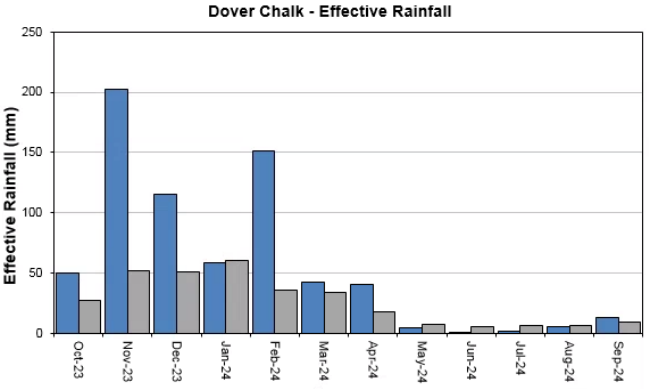

River Medway - Effective Rainfall
Effective Rainfall (mm)
0
20
40
60
80
100
120
140
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sep-24


Eastern Rother - Effective Rainfall
Effective Rainfall (mm)
0
20
40
60
80
100
120
140
160
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sep-24


Stour - Effective Rainfall
Effective Rainfall (mm)
0
20
40
60
80
100
120
140
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sep-24


Upper Mole - Effective Rainfall
Effective Rainfall (mm)
0
20
40
60
80
100
120
140
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sep-24


South London - Effective Rainfall
Effective Rainfall (mm)
0
10
20
30
40
50
60
70
80
90
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sep-24


Dover Chalk - Effective Rainfall
Effective Rainfall (mm)
0
50
100
150
200
250
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sep-24

2.4 Rainfall and effective rainfall table

Figure 2.4: This is a second estimate of areal rainfall and effective rainfall (percolation or runoff) for a selection of the hydrological areas across the Kent and South London area. 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 section 2.5.

Number	Hydrological Area	Rainfall (mm) 30 day Total	September % LTA	Effective Rainfall (mm) 30 day Total	September % LTA
6230TH	North Downs - South London (W)	161	232%	20	146%
6505TH	Upper Mole	170	243%	22	248%
6508TH	South London	129	233%	0	0%
6706So	Darent	124	198%	15	142%
6707So	North Kent Chalk	114	174%	13	124%
6708So	Stour	91	143%	9	123%
6709So	Dover Chalk	115	156%	13	140%
6710So	Thanet Chalk	54	96%	5	82%
6809So	Medway	185	277%	44	>400%
6810So	Eastern Rother	172	258%	29	>400%

6811So	Romney Marsh	129	219%	0	0%
6812So	North West Grain	72	134%	0	0%
6813So	Sheppey	64	117%	0	0%
	Kent & South London Average	121	193%	13	208%

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

EA effective rainfall data (Source EA Soil Moisture Model)

2.5 Seasonal summary table of rainfall and effective rainfall

Figure 2.5: This is a seasonal estimate of areal rainfall and effective rainfall (percolation or runoff) for a selection of the hydrological areas across the Kent and South London area, 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 30/09/2024

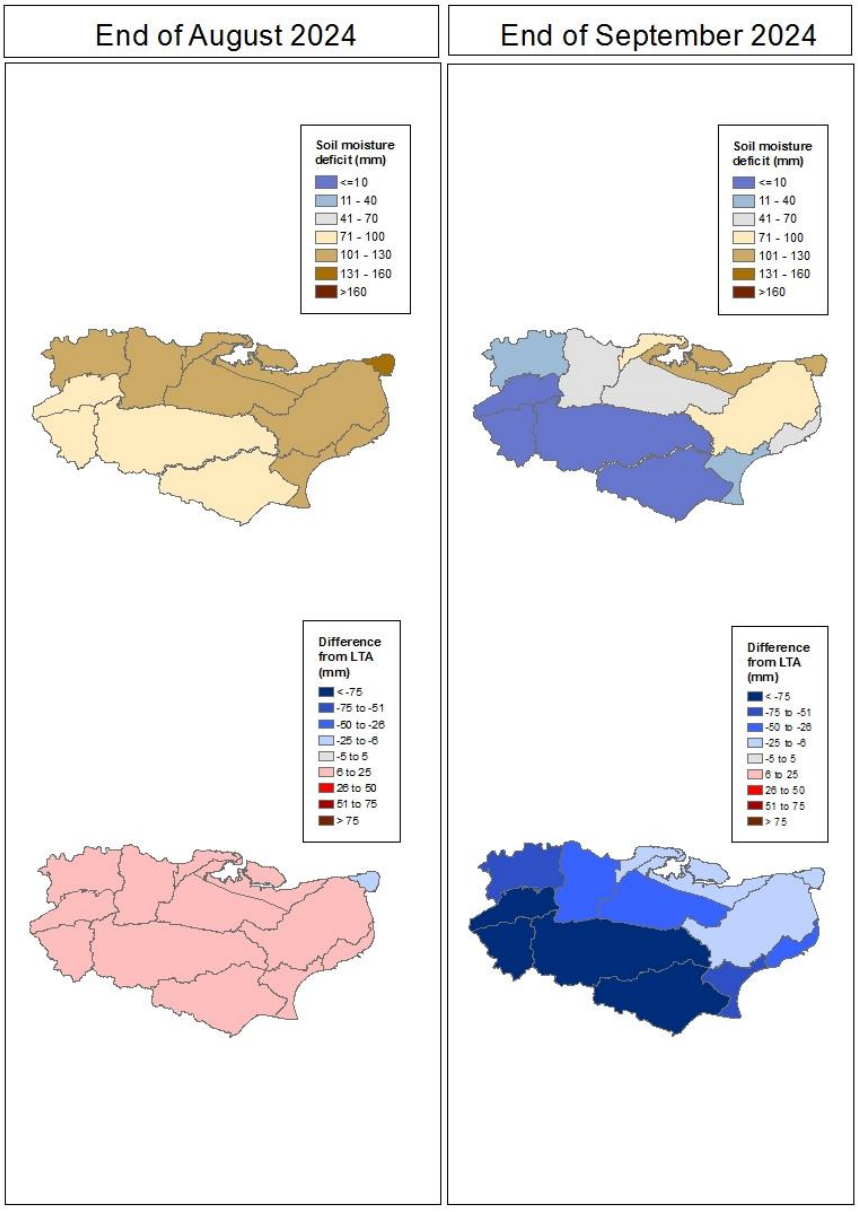
Number	Hydrological Area	Seasonal Rainfall (mm) Total	% LTA	Seasonal Effective Rainfall (mm) Total	% LTA
6230TH	North Downs - South London (W)	434	122%	66	107%
6505TH	Upper Mole	454	131%	70	194%
6508TH	South London	359	118%	5	34%
6706So	Darent	362	113%	49	104%
6707So	North Kent Chalk	355	109%	44	90%
6708So	Stour	336	106%	47	114%
6709So	Dover Chalk	396	114%	65	126%
6710So	Thanet Chalk	258	92%	18	65%
6809So	Medway	460	140%	80	278%
6810So	Eastern Rother	430	133%	57	238%

6811So	Romney Marsh	360	121%	21	165%
6812So	North West Grain	266	97%	6	54%
6813So	Sheppey	267	95%	6	64%
	Kent & South London Average	364	116%	41	129%

3 Soil moisture deficit

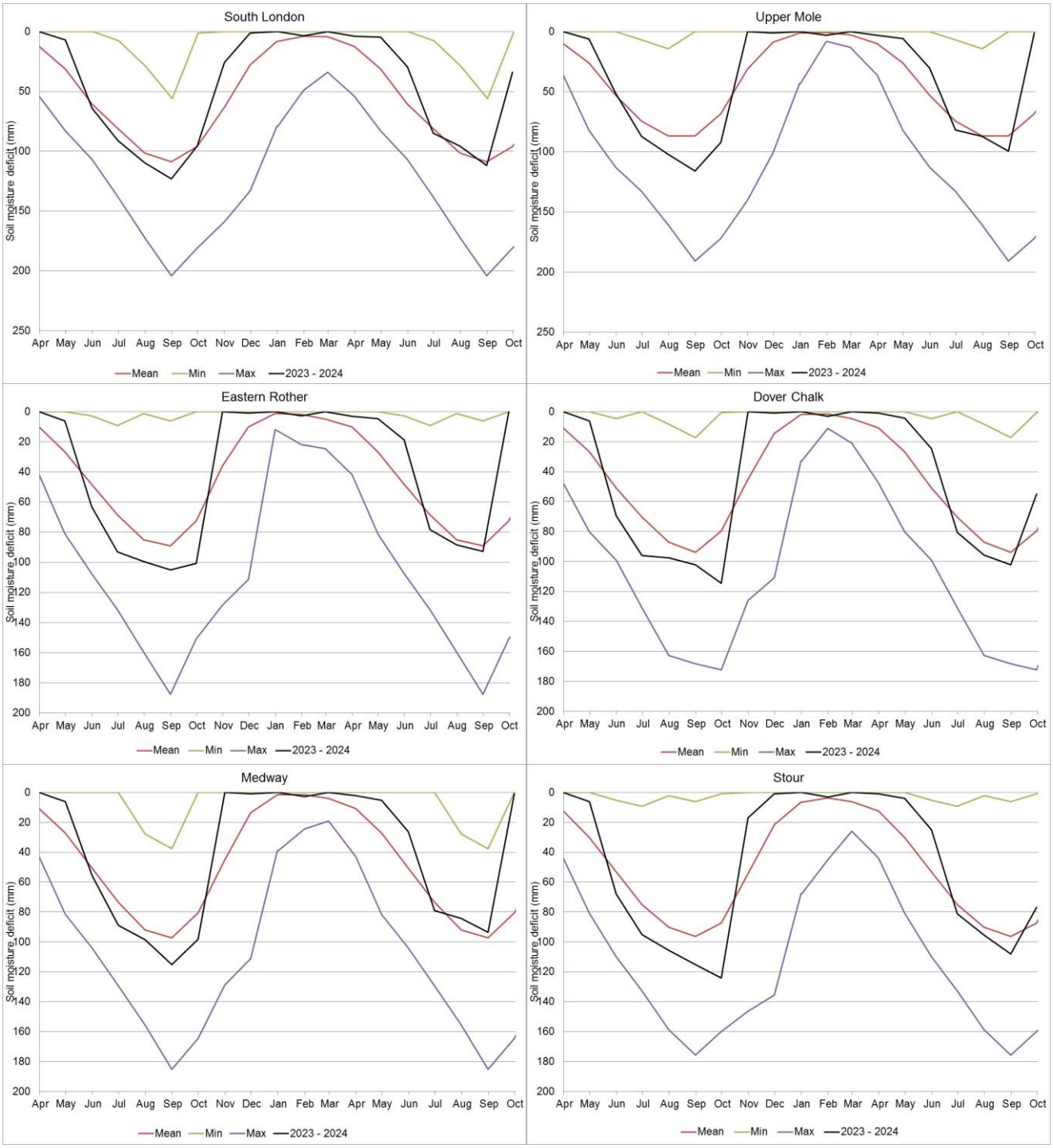
3.1 Soil moisture deficit map

Figure 3.1: Soil moisture deficits for weeks ending 31 August (left panel) and 30 September 2024 (right panel). Top row shows actual soil moisture deficits (mm) and bottom row shows the difference (mm) of the actual from the 1961 to 90 long term average soil moisture deficits. EA Soil Moisture Deficit data (Source EA Soil Moisture Model).



3.2 Soil moisture deficit charts

Figure 3.2: Latest soil moisture deficit compared to maximum, minimum, and 1961 to 1990 long term average. EA soil moisture deficit data (Source EA Soil Moisture Model).



3.3 Soil moisture deficit table

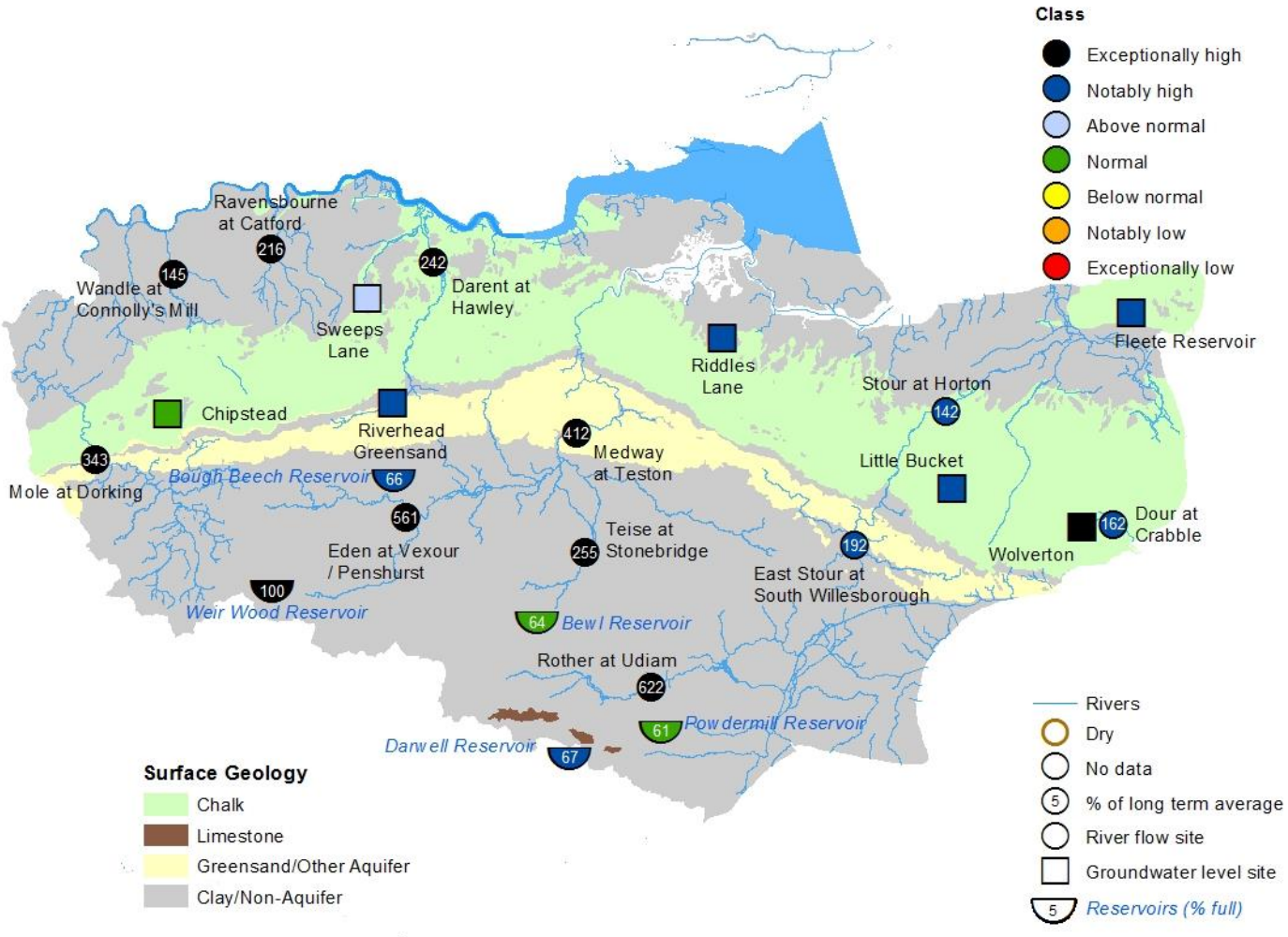
Figure 3.3: This is a second estimate of soil moisture deficit for the hydrological areas across the Kent and South London area. There may be significant variation within each area which must be considered when interpreting these data. EA soil moisture deficit data (Source EA Soil Moisture Model).

Number	Hydrological Area	SMD (mm) Day 30	End September LTA
6230TH	North Downs - South London (W)	7	84
6505TH	Upper Mole	1	77
6508TH	South London	34	103
6706So	Darent	48	96
6707So	North Kent Chalk	53	94
6708So	Stour	77	95
6709So	Dover Chalk	55	90
6710So	Thanet Chalk	130	150
6809So	Medway	1	78
6810So	Eastern Rother	0	78
6811So	Romney Marsh	26	91
6812So	North West Grain	88	110
6813So	Sheppey	102	109
	Kent & South London Average	48	97

4 River flows, groundwater levels and reservoir stocks

4.1 River flows, groundwater levels and reservoir stocks map

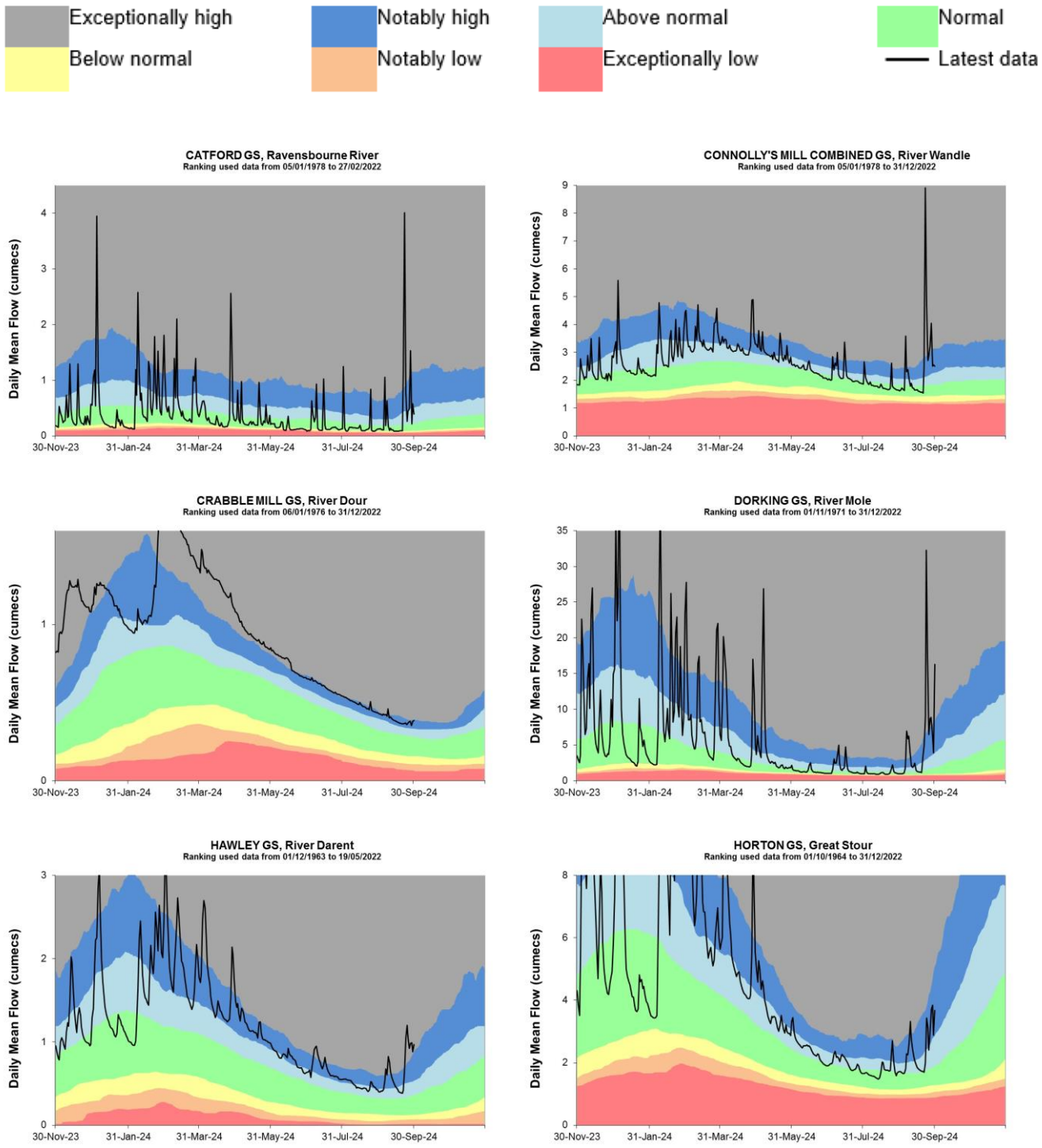
Figure 4.1: Monthly mean river flows* ** *** for indicator sites for September 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic September monthly means. End of month groundwater levels for indicator sites for September 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic September levels. Tables available in the appendices with detailed information. End of month levels for reservoirs for September 2024, expressed as percent full. (Source: Water Companies).

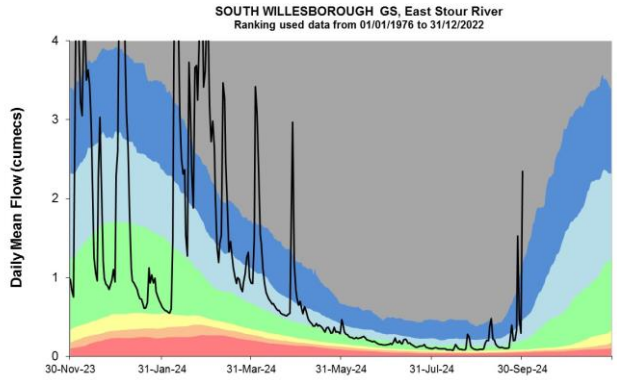


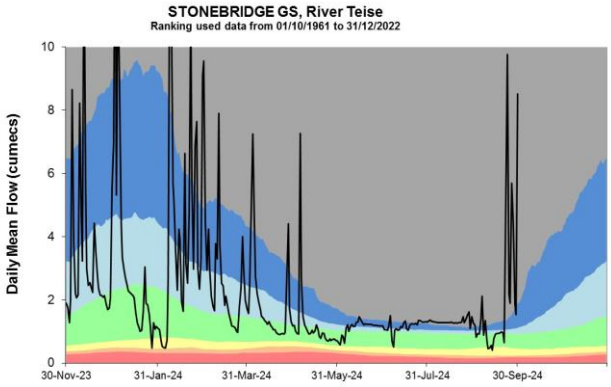
*Flows at some sites might be affected by overestimation due to weed growth at this time of year
**Weir Wood Reservoir is currently offline
***Flows at gauging stations in the Medway catchment might be affected by upstream reservoir releases

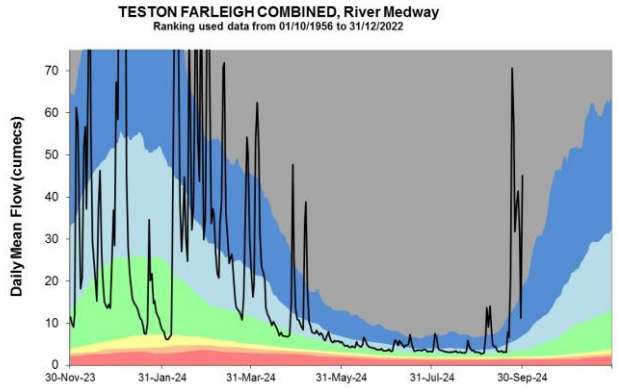
4.2 River flow charts

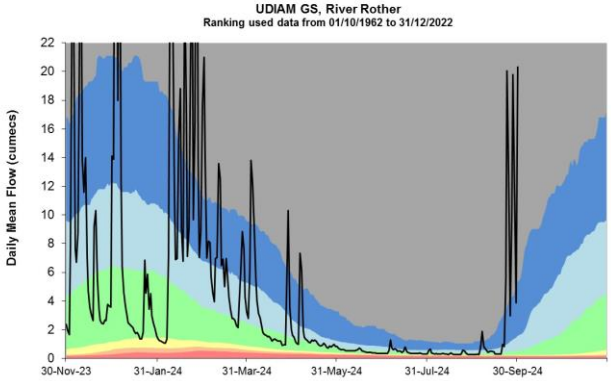
Figure 4.1: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.

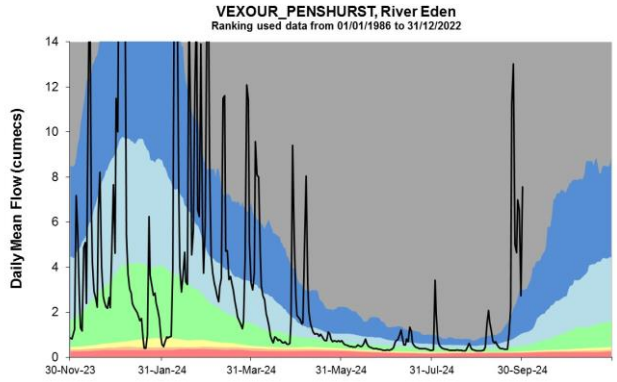










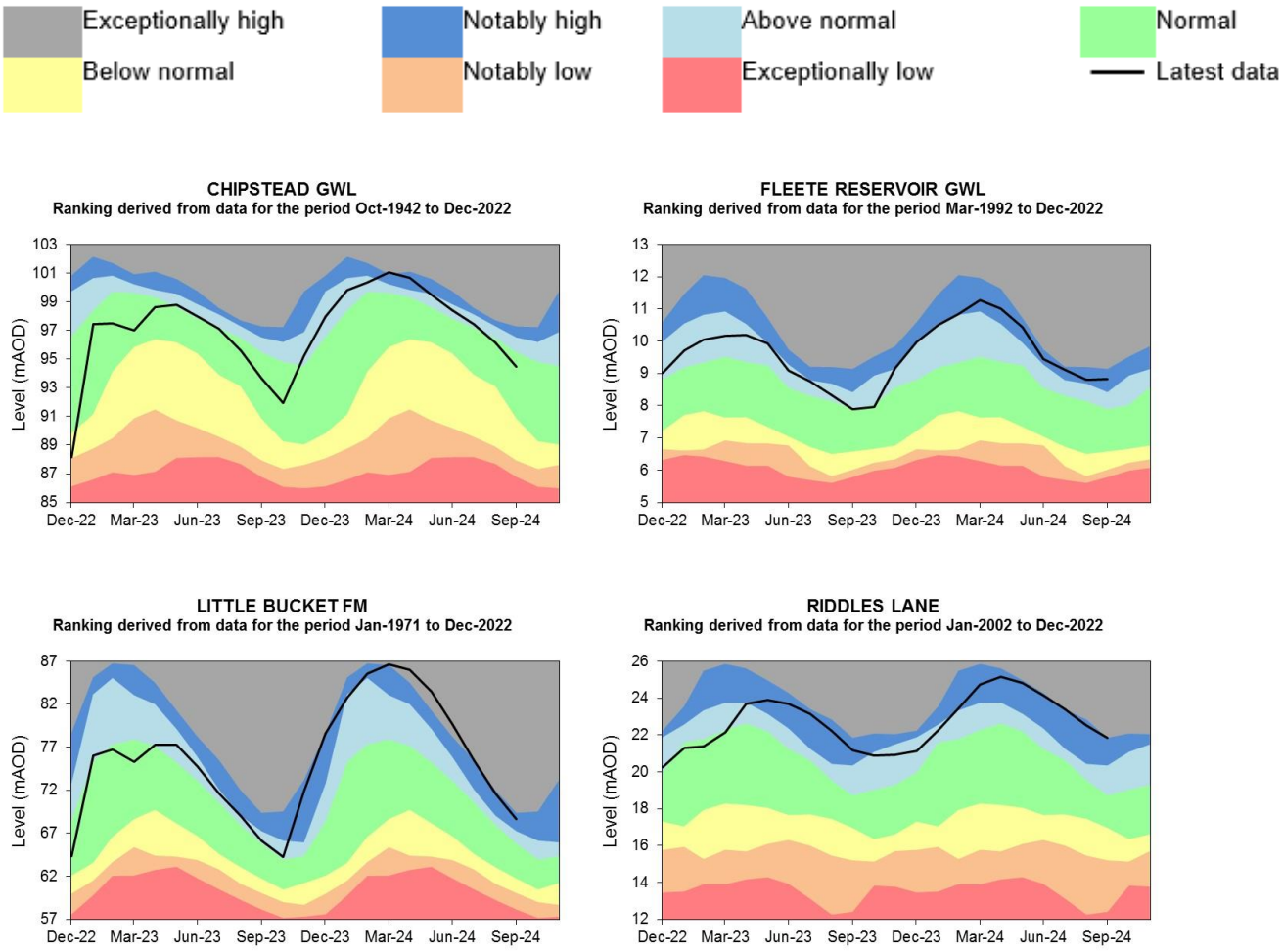


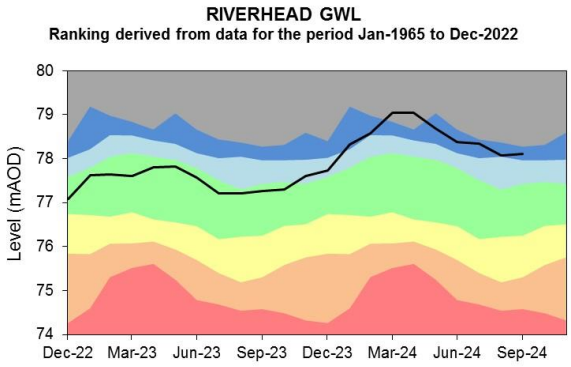
Source: Environment Agency.

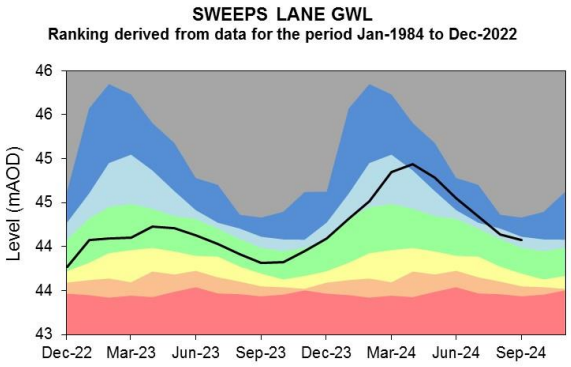
5 Groundwater levels

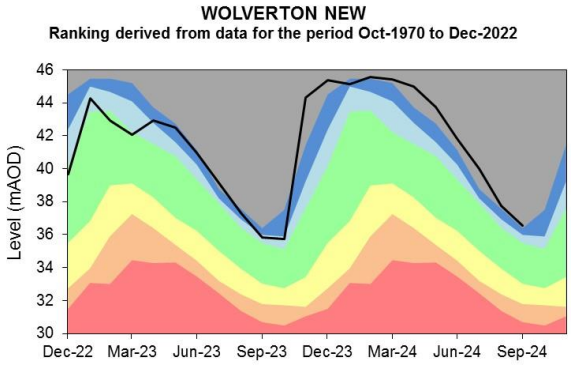
5.1 Groundwater level charts

Figure 5.1: 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.







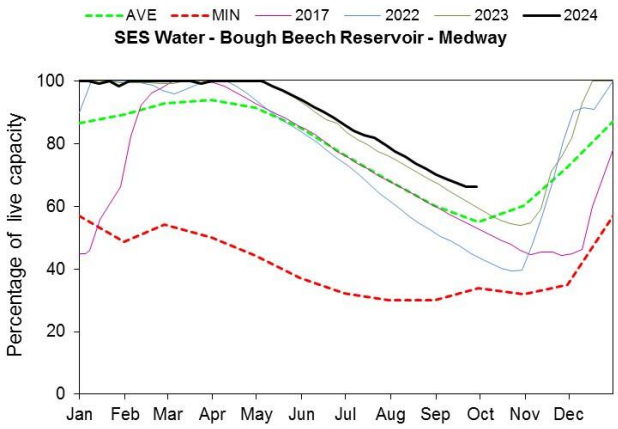


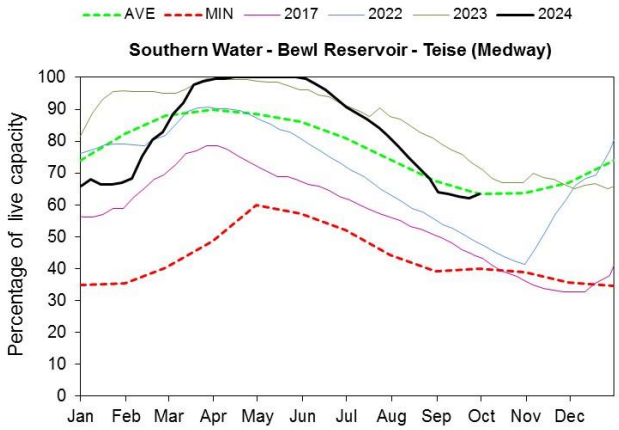
Source: Environment Agency, 2024.

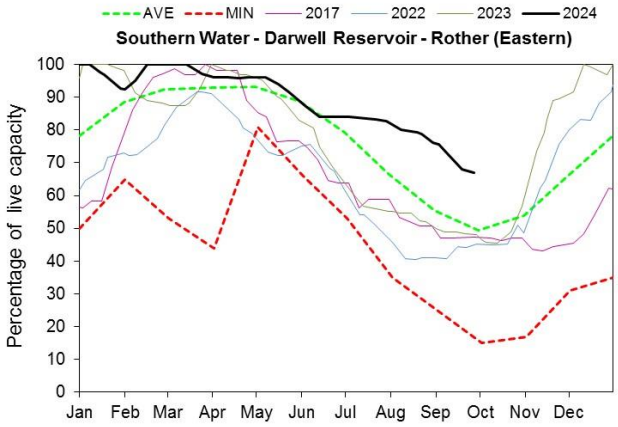
6 Reservoir stocks

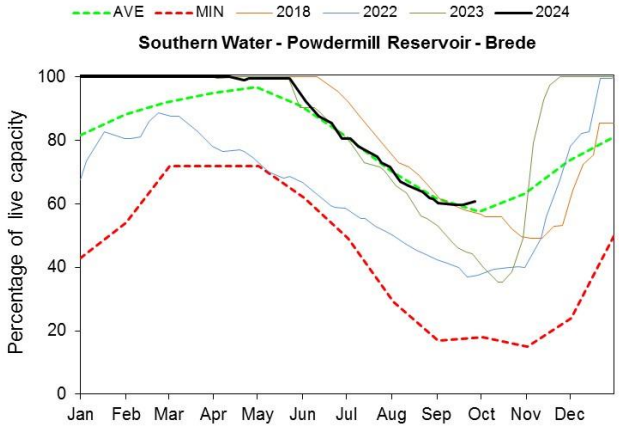
6.1 Reservoir stocks charts

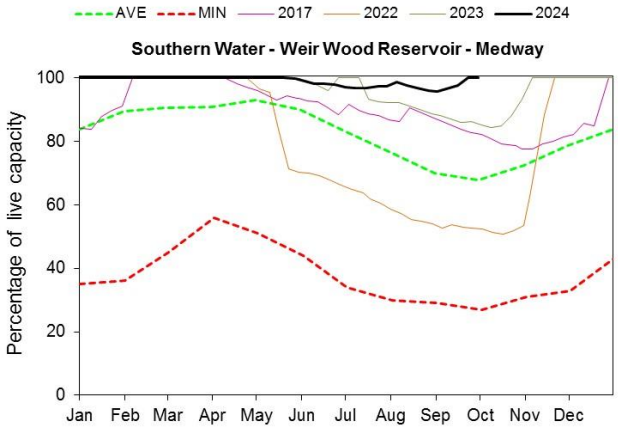
Figure 7.1: End of month regional reservoir stocks compared to long term maximum, minimum and average stocks. (Source: Water Companies). Note: Historic records of individual reservoirs and reservoir groups making up the regional values vary in length.











7 Glossary

7.1 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).

7.2 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.

8 Appendices

8.1 Rainfall table

Hydrological area	Sep 2024 rainfall % of long term average 1961 to 1990	Sep 2024 band	Jul 2024 to September cumulative band	Apr 2024 to September cumulative band	Oct 2023 to September cumulative band
North Downs - South London	233	Exceptionally High	Notably high	Notably high	Exceptionally high
Upper Mole	243	Exceptionally High	Notably high	Notably high	Exceptionally high
South London	233	Exceptionally High	Above normal	Above normal	Exceptionally high
Darent	198	Exceptionally High	Above normal	Above normal	Exceptionally high
North Kent Chalk	173	Notably High	Above normal	Normal	Exceptionally high
Stour	144	Above Normal	Normal	Normal	Exceptionally high
Dover Chalk	155	Above Normal	Normal	Above normal	Exceptionally high
Thanet Chalk	95	Normal	Normal	Normal	Notably high
Medway	278	Exceptionally High	Exceptionally high	Notably high	Exceptionally high

Eastern Rother	258	Exceptionally High	Notably high	Notably high	Exceptionally high
Romney Marsh	218	Exceptionally High	Above normal	Above normal	Exceptionally high
North West Grain	136	Above Normal	Normal	Normal	Notably high
Sheppey	117	Normal	Normal	Normal	Notably high

8.2 River flows table

Site name	River	Catchment	Sep 2024 band	Aug 2024 band
Catford Gs	River Ravensbourne	Ravensbourne	Exceptionally high	Below normal
Connolly's Mill Combined Gs	River Wandle	Wandle	Exceptionally high	Normal
Crabble Mill Gs	River Dour	Dour	Notably high	Notably high
Dorking Gs	River Mole	Mole Surrey	Exceptionally high	Normal
Hawley Gs	River Darent and Cray	Darent and Cray	Exceptionally high	Notably high
Horton Gs	Great Stour River	Great Stour	Notably high	Normal
South Willesborough Gs	East Stour River	East Stour	Notably high	Normal
Stonebridge Gs	River Teise	Teise	Exceptionally high	Exceptionally high
Teston Farleigh Combined	River Medway	Medway (Middle)	Exceptionally high	Above normal
Udiam Gs	River Rother	Rother (Kent)	Exceptionally high	Normal
Vexour_penshurst	River Eden	Eden (Kent)	Exceptionally high	Notably high

8.3 Groundwater table

Site name	Aquifer	End of Sep 2024 band	End of Aug 2024 band
Fleete Reservoir Gwl	Isle Of Thanet Chalk	Notably high	Notably high
Chipstead Gwl	Epsom North Downs Chalk	Normal	Normal
Little Bucket Fm	East Kent Chalk - Stour	Notably high	Notably high
Riddles Lane	North Kent Swale Chalk	Notably high	Notably high
Riverhead Gwl	Kent Greensand	Notably high	Notably high
Sweeps Lane Gwl	West Kent Chalk	Above normal	Above normal
Wolverton New	East Kent Chalk - Stour	Exceptionally high	Exceptionally high