Monthly water situation report: Kent and South London Area

1 Summary - April 2024

The whole of the Kent and South London area received 143% of the long-term average rainfall during April. Rainfall received across catchments in the area ranged from above normal to notably high for this time of the year. Across the assessment areas, soil moisture deficits were consistently below and mostly three times below the long-term average for April. Monthly mean river flows for April ranged from normal to exceptionally high in the Kent and South London area. Groundwater levels ranged from above normal to exceptionally high in the Chalk aquifers and were exceptionally high in the Lower Greensand aquifers at Riverhead. Levels at the five water company reservoirs ranged from normal exceptionally high in the Kent and South London area.

1.1 Rainfall

The whole of the Kent and South London (KSL) area received 143% of the long-term average (LTA) rainfall during April. Rainfall received across catchments in the area ranged from above normal to notably high. All catchments in the west of KSL received rainfall above normal, while catchments in the east received notably high amounts of rain for this time of year. The highest daily rainfall total of 30.4mm for April occurred on the twenty seventh day of the month and was recorded at Orpington PS rain gauge in the Darent catchment. Days 1, 2, 3 and 26 had the next highest daily rainfall totals that ranged from 28.4mm to 10.6mm. During the previous three months, which spanned from February to April, rainfall was exceptionally high across all catchments. In the previous 6 months, spanning November to April, rainfall across the Kent and South London area was exceptionally high in all catchments except for Sheppey in the north. The last twelve months saw rainfall that was exceptionally high in catchments in the south and notably high and above normal in catchments in the north. KSL area saw the sixth wettest six months since records began in 1872. The last 3 months saw catchments in the top ten wettest 3 months; Medway, Dover chalk and Upper Mole held the second wettest 3 months with 312.6mm, 348.6mm and 324mm rainfall, respectively. The last 6 months saw Dover chalk had the wettest 6 months with 763.3 mm rainfall. The last 12 months also saw Dover chalk catchment hold the 2nd wettest 12 months with 1214.4 mm rainfall

1.2 Soil moisture deficit and recharge

Across the assessment areas, soil moisture deficits (SMDs) were consistently below and mostly three times below the long-term average (LTA) for the month of April. Compared to the LTA for the month of April, SMDs continue to be considerably lower, meaning that by this month, soils were wetter than they would be under average conditions; although, when compared to March, SMDs increased marginally. This is consistent with the amount of effective rainfall KSL received this month, which was 167% of the LTA across the whole area, dryer than March. Aquifers continue to remain highly responsive, and depending on their intensity, rainfall events are resulting in groundwater levels rising after relatively short time periods.

1.3 River flows

Monthly mean river flows (MMFs) for March ranged from normal to exceptionally high. The majority of these were notably high with two flow sites, Dour at Crabble and Darent at Hawley being exceptionally high, Medway at Teston, Rother at Udiam and Teise at Stonebridge were above normal, and Ravensbourne at Catford was the only flow site that was in the normal category. The key flow site with the highest MMF banding was Dour at Crabble which saw 205% of the LTA for the month of April. The lowest percentage of LTA monthly mean river flow was observed at Ravensbourne at Catford, which recorded 105% of the LTA.

1.4 Groundwater levels

Groundwater levels in the Chalk across KSL area in April 2024 were exceptionally high at Wolverton and Little Bucket. Riddles Lane and Fleete Reservoir, Sweeps Lane and Chipstead in the north were notably high for this time of year. Groundwater levels in the Greensand at Riverhead were exceptionally high. Due to the continued above average effective rainfall and low SMDs across the KSL area, groundwater levels in the Chalk and Lower Greensand aquifers remain high throughout April. The majority of groundwater sites show a slight decrease in levels with the exception of Riddles Lane and Sweeps Lane which saw a slight increase. Aquifers continue to be highly responsive, and spells of heavy, intensive rainfall would have the potential for groundwater to rise more rapidly, within relatively short time periods. During the next month, we expect periods of weather with sunnier and warmer conditions, alongside the onset of vegetation growth. As a result of these conditions, it is likely, effective rainfall/aquifer recharge will diminish, which in turn will lead to all monitoring locations indicating a fall in groundwater levels and the fall will continue until the onset of the next recharge season.

Due to the rise in groundwater levels in East Surrey and South London that occurred since February, a flood alert for groundwater flooding was issued on the 6 of March, and it is still in effect for South East London area. The flood alert for the area of East Kent issued in December 2023 is also still in effect. Given that groundwater levels in most areas are falling and that the start of groundwater levels to fall in the remaining areas is imminent, flood alerts are currently under review and are likely to be removed within the month of May.

1.5 Reservoir stocks

At the end of April, reservoir levels were normal at Darwell at 95% and Powdermill at 100%, above normal at Weirwood with 100% and exceptionally high for this time of year at Bewl and Bough Beech both at 100%. Most of the levels in the reservoirs remained unchanged throughout the month of April, however water levels in Darwell reservoir have minimally decreased and levels in Powdermill had a slight decrease before returning to 100% at the end of the month.

1.6 Environmental impact

Five flood alerts were issued throughout April on 3, 8, and 28 of the month. The groundwater flooding alert issued for South London East in March 2024 and the groundwater flooding alert for East Kent has remained in force.

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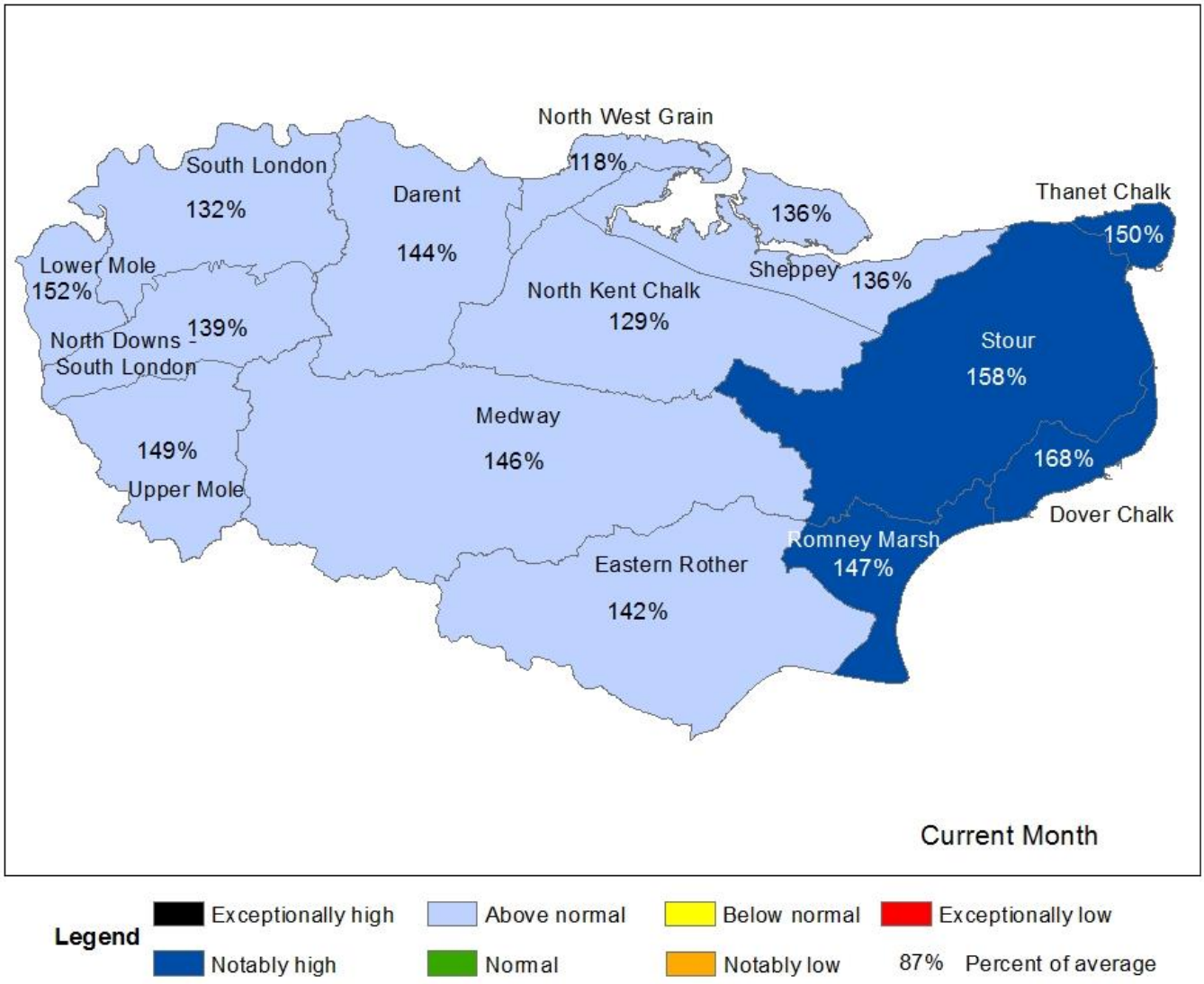
Contact Details: 03708506506

2 Rainfall

2.1 Rainfall map one

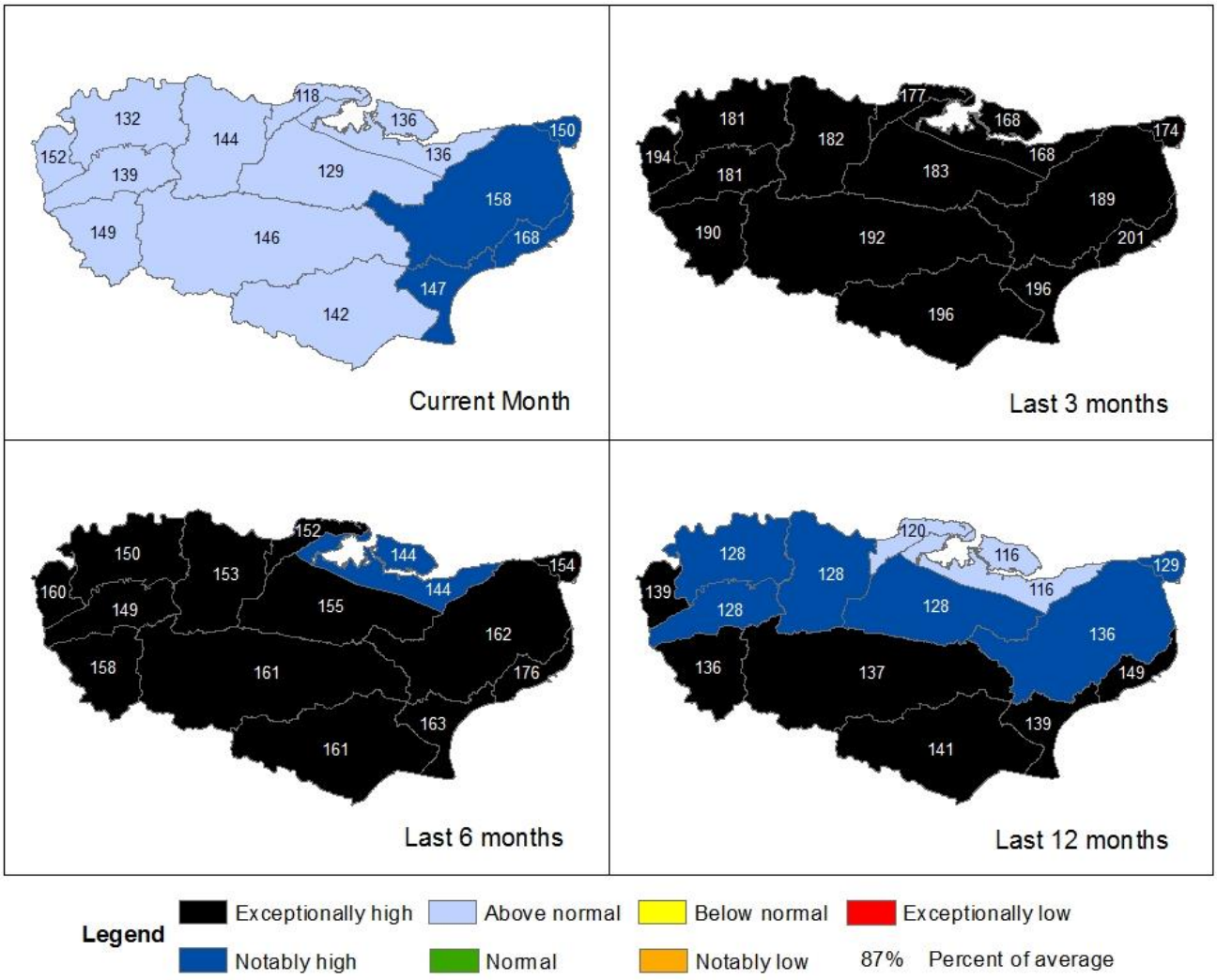
Figure 2.1: Total rainfall for hydrological areas across Kent and South London for the current month (up to 30 April 2024), classed relative to an analysis of respective historic totals. Table available in the appendices with more detailed information.



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

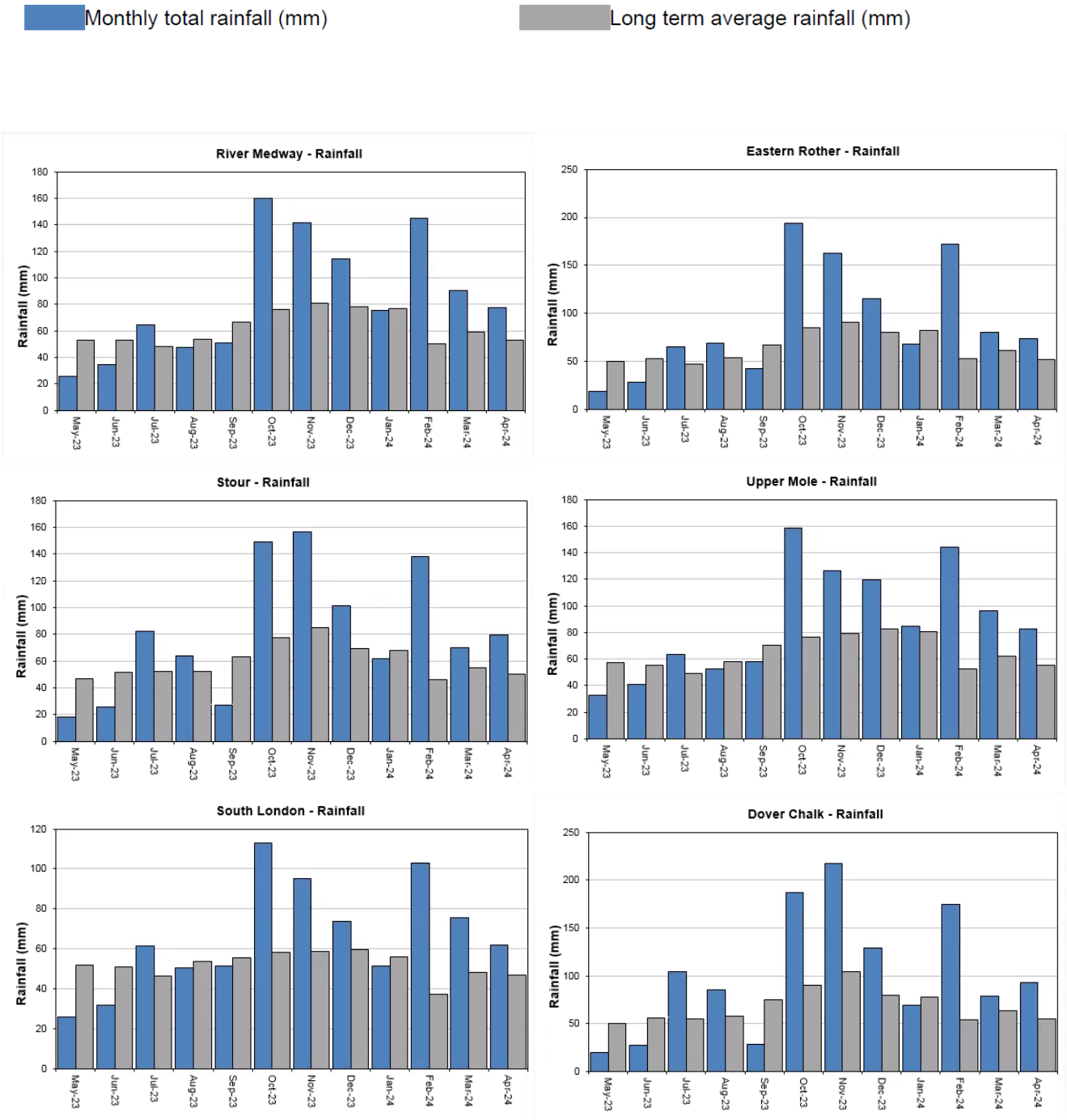
Figure 2.2: Total rainfall for hydrological areas for the current month (up to 30 April 2024), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.

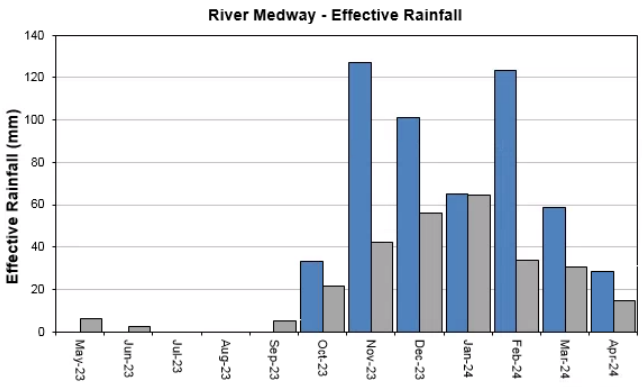


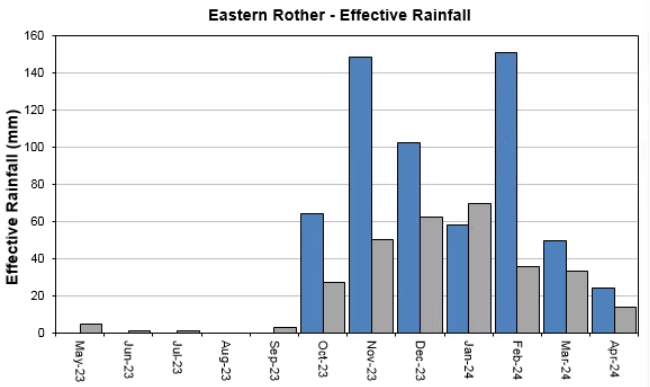
HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2024). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Includes material based on Ordnance Survey 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.

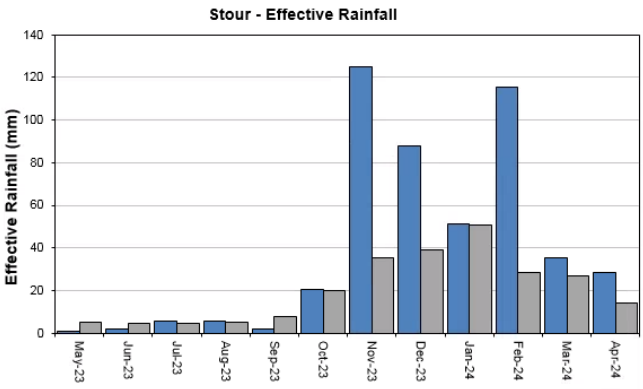
2.3 Rainfall and effective rainfall charts

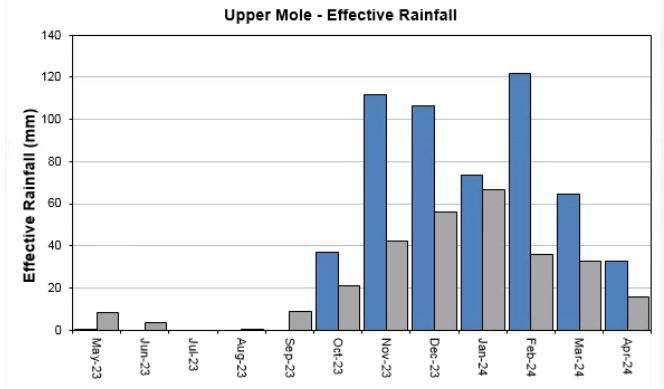
Figure 2.3: : Monthly rainfall and effective rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average (LTA) for a selection of areal units. HadUK rainfall data. (Source: Met Office. Crown copyright, 2024). EA effective rainfall data (Source EA Soil Moisture Model).

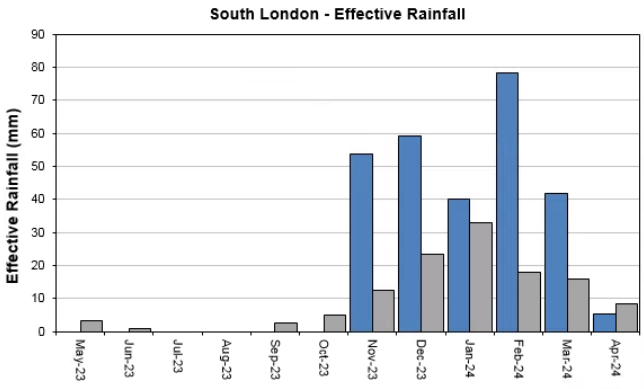


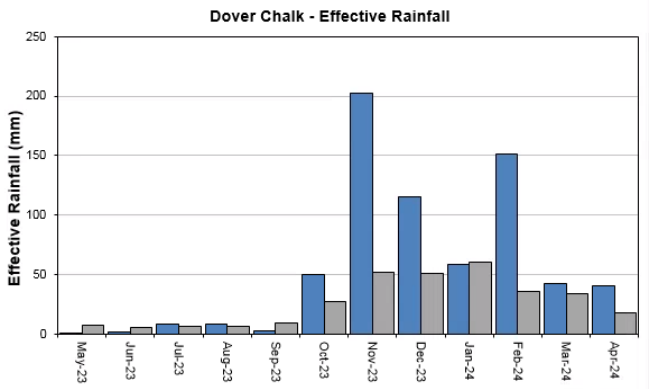

River Medway - Effective Rainfall
Effective Rainfall (mm)
0
20
40
60
80
100
120
140
May-23
Jun-23
Jul-23
Aug-23
Sep-23
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24


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


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


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


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


Dover Chalk - Effective Rainfall
Effective Rainfall (mm)
0
50
100
150
200
250
May-23
Jun-23
Jul-23
Aug-23
Sep-23
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-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	April % LTA	Effective Rainfall (mm) 30 day Total	April % LTA
6230TH	North Downs - South London (W)	78	139%	29	152%
6505TH	Upper Mole	83	149%	33	210%
6508TH	South London	62	132%	5	63%
6706So	Darent	73	144%	23	156%
6707So	North Kent Chalk	68	129%	19	118%
6708So	Stour	79	157%	28	200%
6709So	Dover Chalk	93	169%	40	225%
6710So	Thanet Chalk	62	149%	7	122%
6809So	Medway	77	146%	29	198%
6810So	Eastern Rother	74	143%	24	175%

6811So	Romney Marsh	70	146%	21	205%
6812So	North West Grain	50	118%	6	101%
6813So	Sheppey	58	134%	6	105%
	Kent & South London Average	71	143%	21	167%

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 30/04/2024

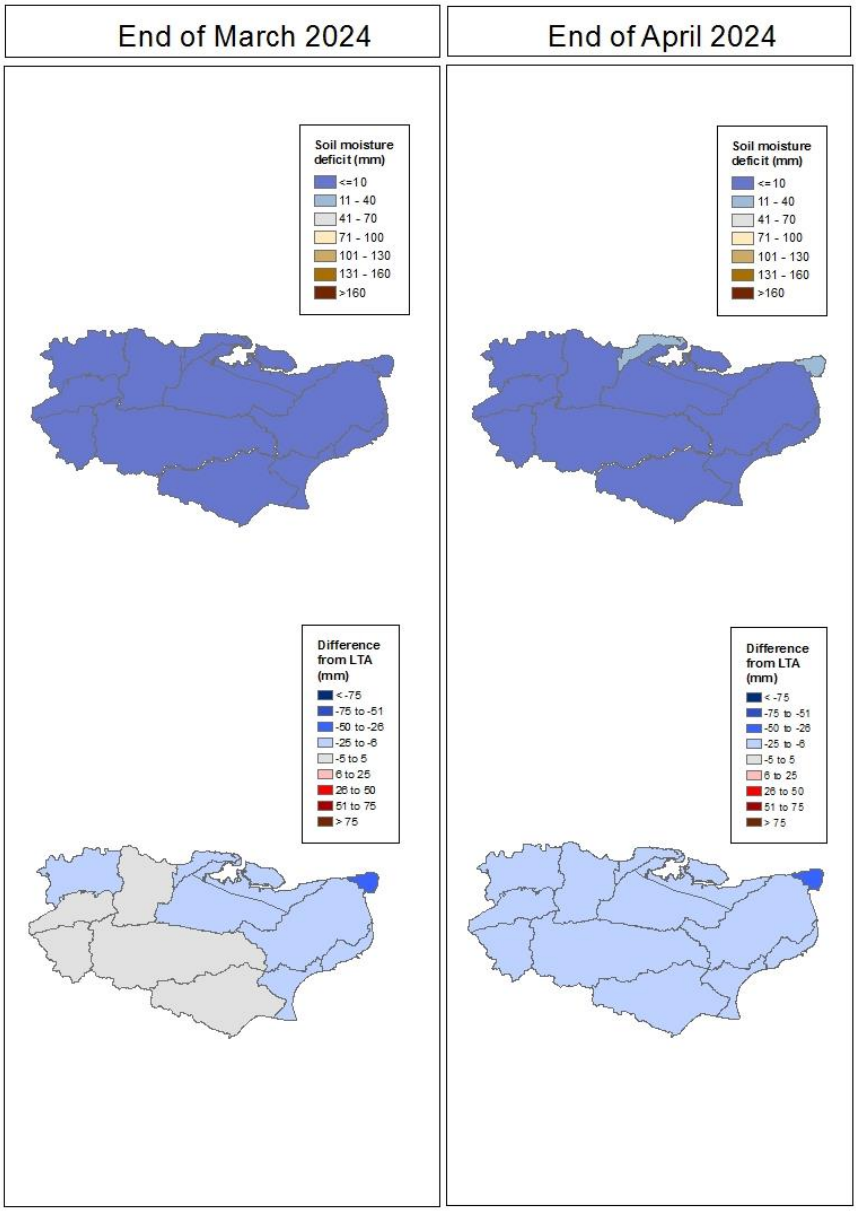
Number	Hydrological Area	Seasonal Rainfall (mm) Total	% LTA	Seasonal Effective Rainfall (mm) Total	% LTA
6230TH	North Downs - South London (W)	78	139%	29	151%
6505TH	Upper Mole	83	149%	33	210%
6508TH	South London	62	132%	5	63%
6706So	Darent	73	144%	23	156%
6707So	North Kent Chalk	68	129%	19	117%
6708So	Stour	79	157%	28	200%
6709So	Dover Chalk	93	169%	40	225%
6710So	Thanet Chalk	62	149%	7	122%
6809So	Medway	77	146%	29	198%
6810So	Eastern Rother	74	143%	24	175%

6811So	Romney Marsh	70	146%	21	205%
6812So	North West Grain	50	118%	6	101%
6813So	Sheppey	58	134%	6	104%
	Kent & South London Average	71	143%	21	167%

3 Soil moisture deficit

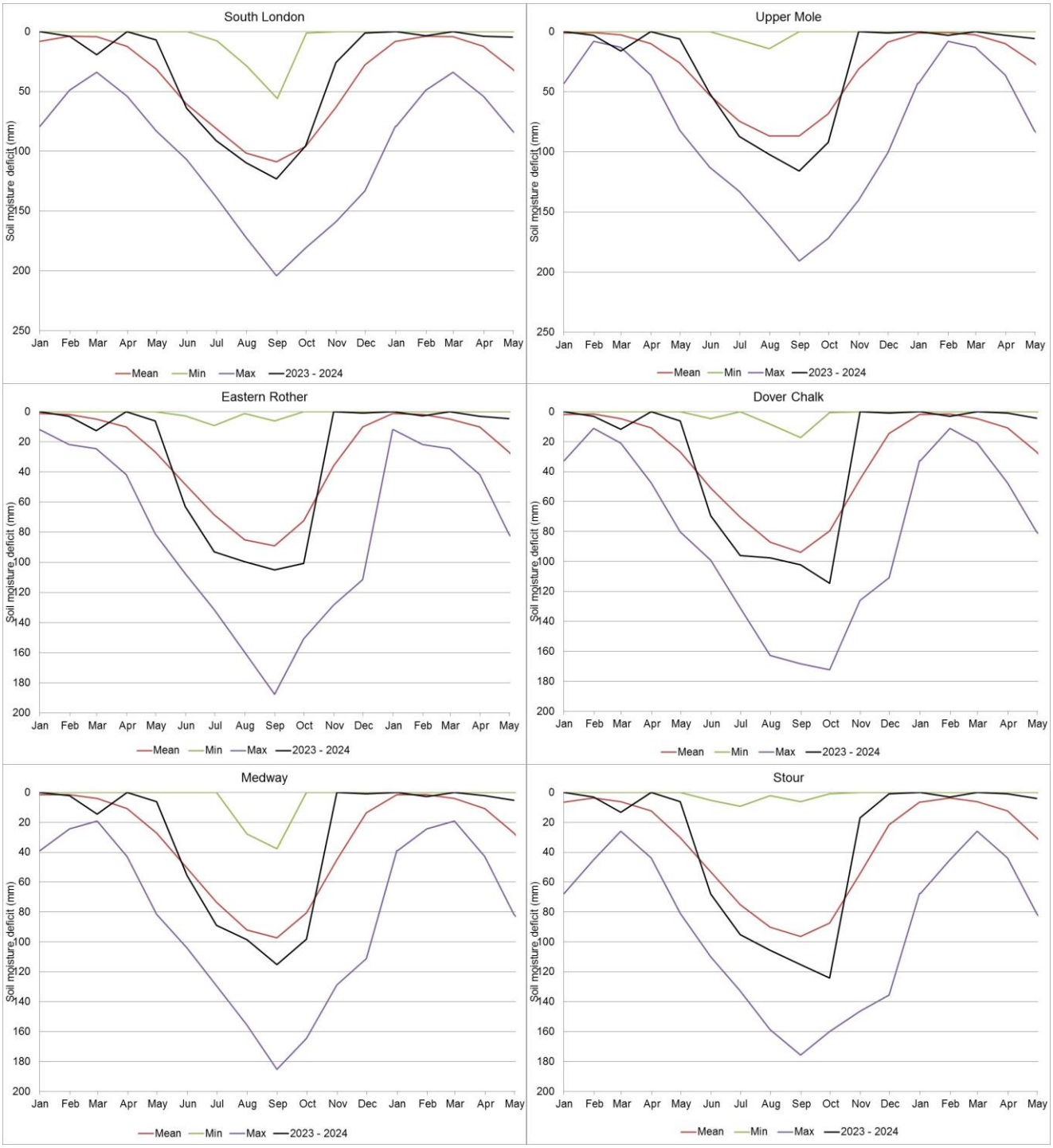
3.1 Soil moisture deficit map

Figure 3.1: Soil moisture deficits for weeks ending 31 March (left panel) and 30 April 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

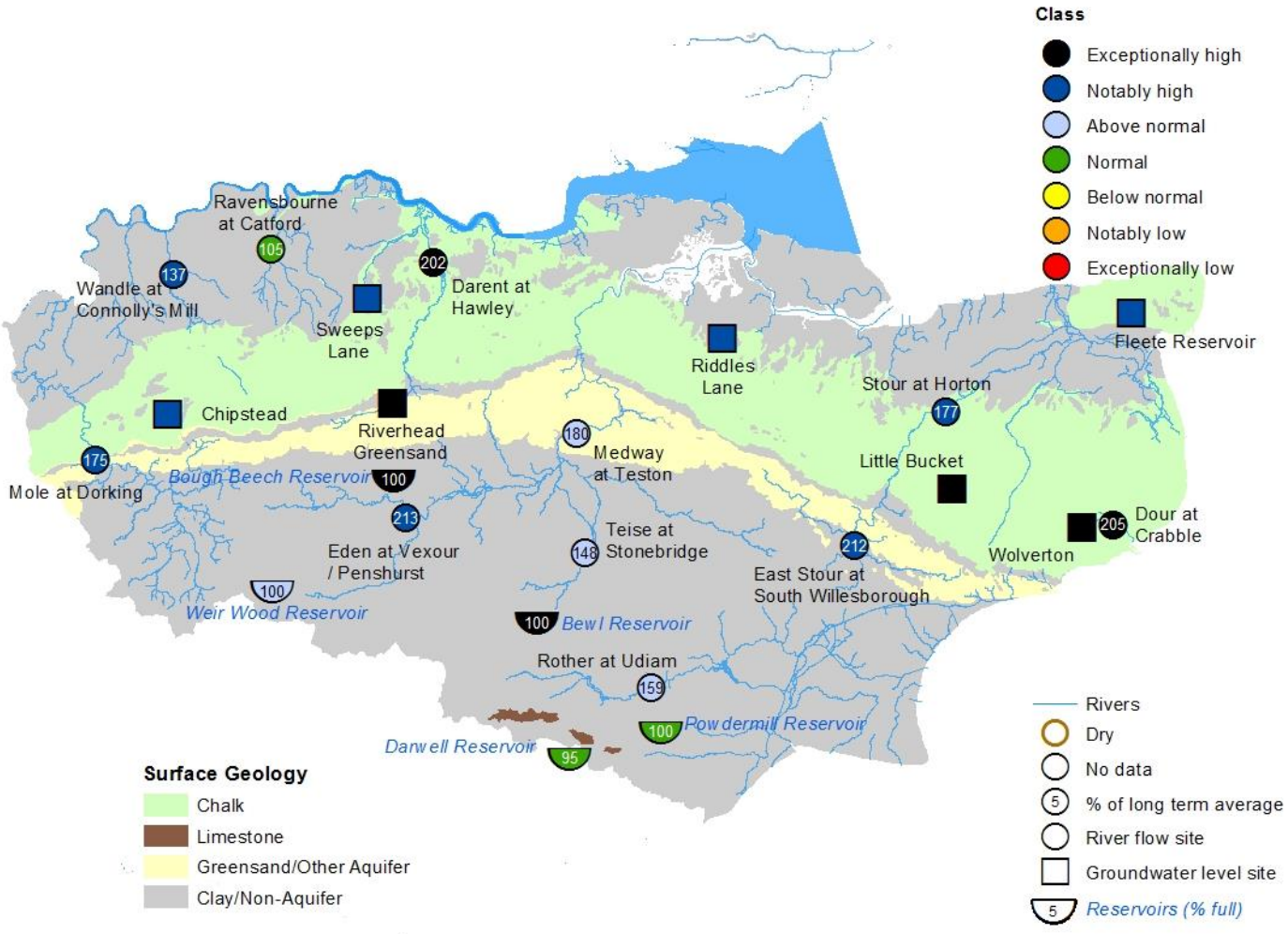
Figure 3.3: This is a second estimate of soil moisture deficit for the hydrological areas across the Kent and South London area. There may be significant variation within each area which must be considered when interpreting these data. EA soil moisture deficit data (Source EA Soil Moisture Model).

Number	Hydrological Area	SMD (mm) Day 30	End April LTA
6230TH	North Downs - South London (W)	5	17
6505TH	Upper Mole	6	16
6508TH	South London	5	24
6706So	Darent	5	19
6707So	North Kent Chalk	6	18
6708So	Stour	4	18
6709So	Dover Chalk	4	17
6710So	Thanet Chalk	17	54
6809So	Medway	5	16
6810So	Eastern Rother	5	16
6811So	Romney Marsh	5	18
6812So	North West Grain	15	25
6813So	Sheppey	9	25
	Kent & South London Average	7	22

4 River flows, groundwater levels and reservoir stocks

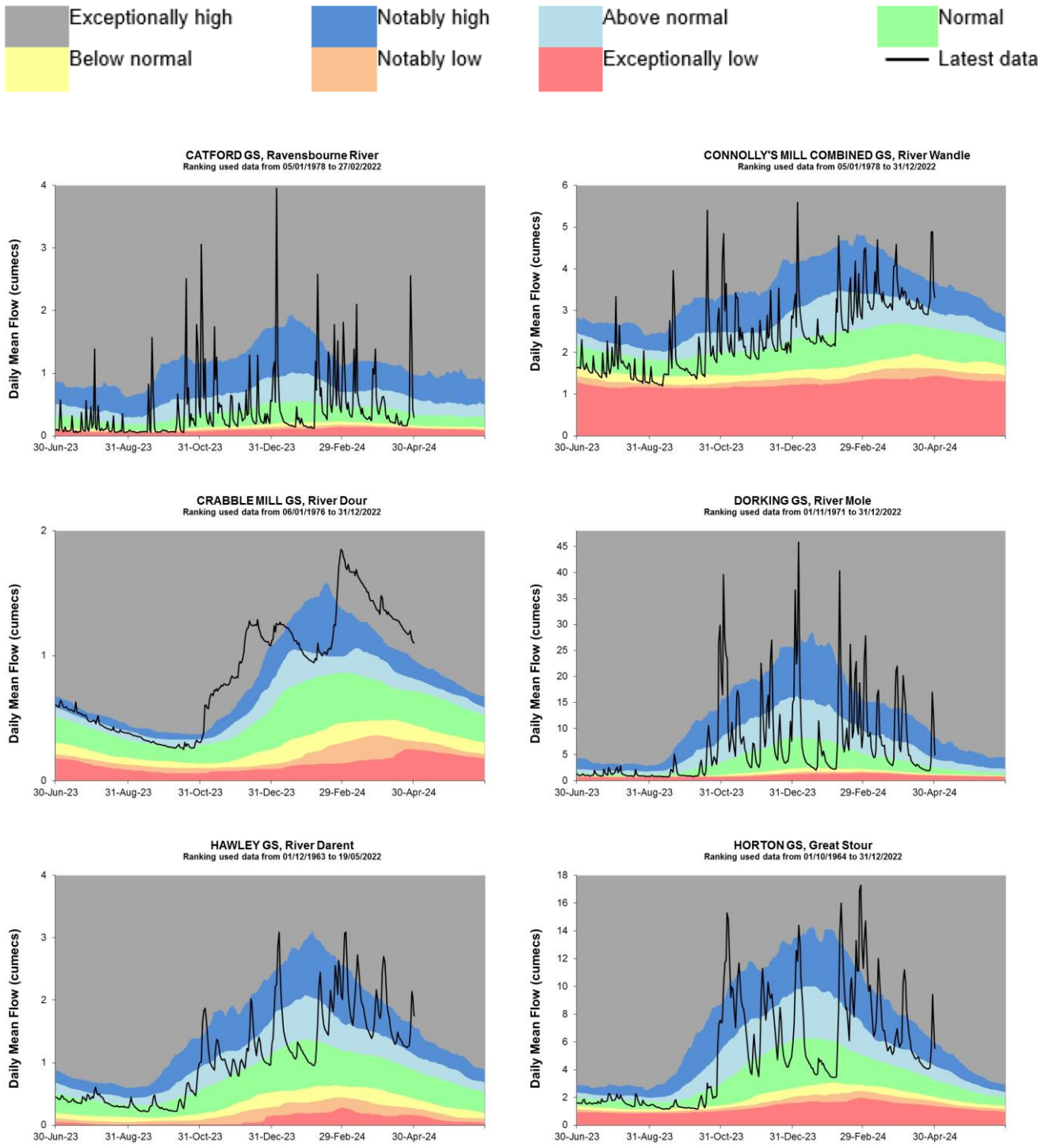
4.1 River flows, groundwater levels and reservoir stocks map

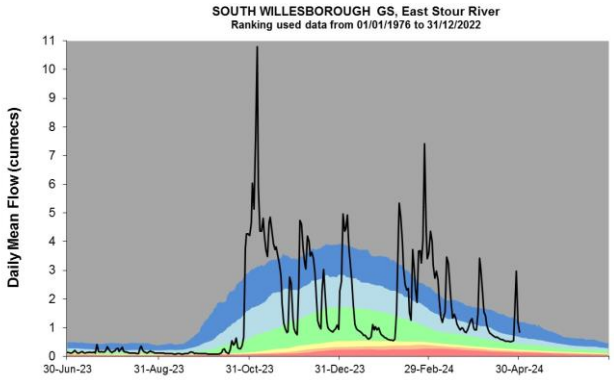
Figure 4.1: Monthly mean river flows for indicator sites for April 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic April monthly means. End of month groundwater levels for indicator sites for April 2024, expressed as a percentage of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

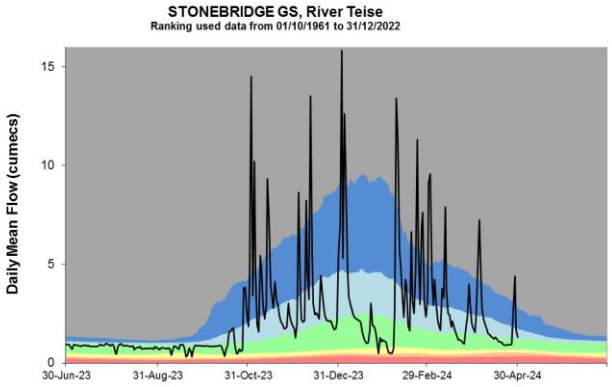


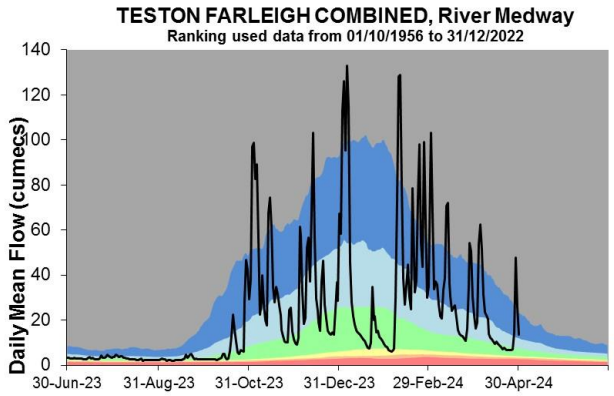
4.2 River flow charts

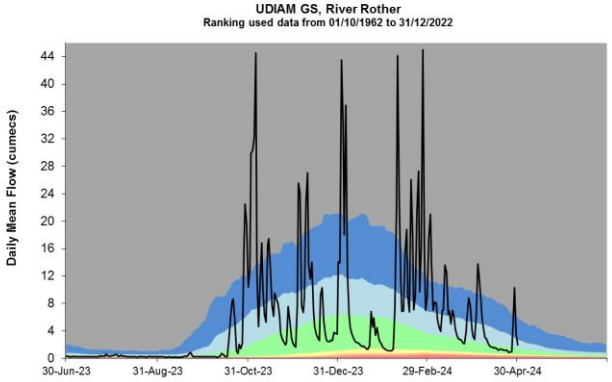
Figure 4.1: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.

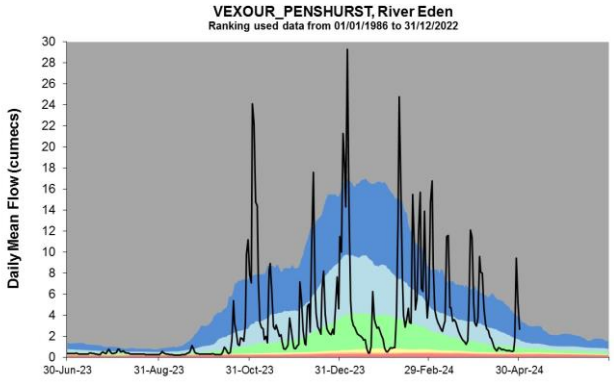










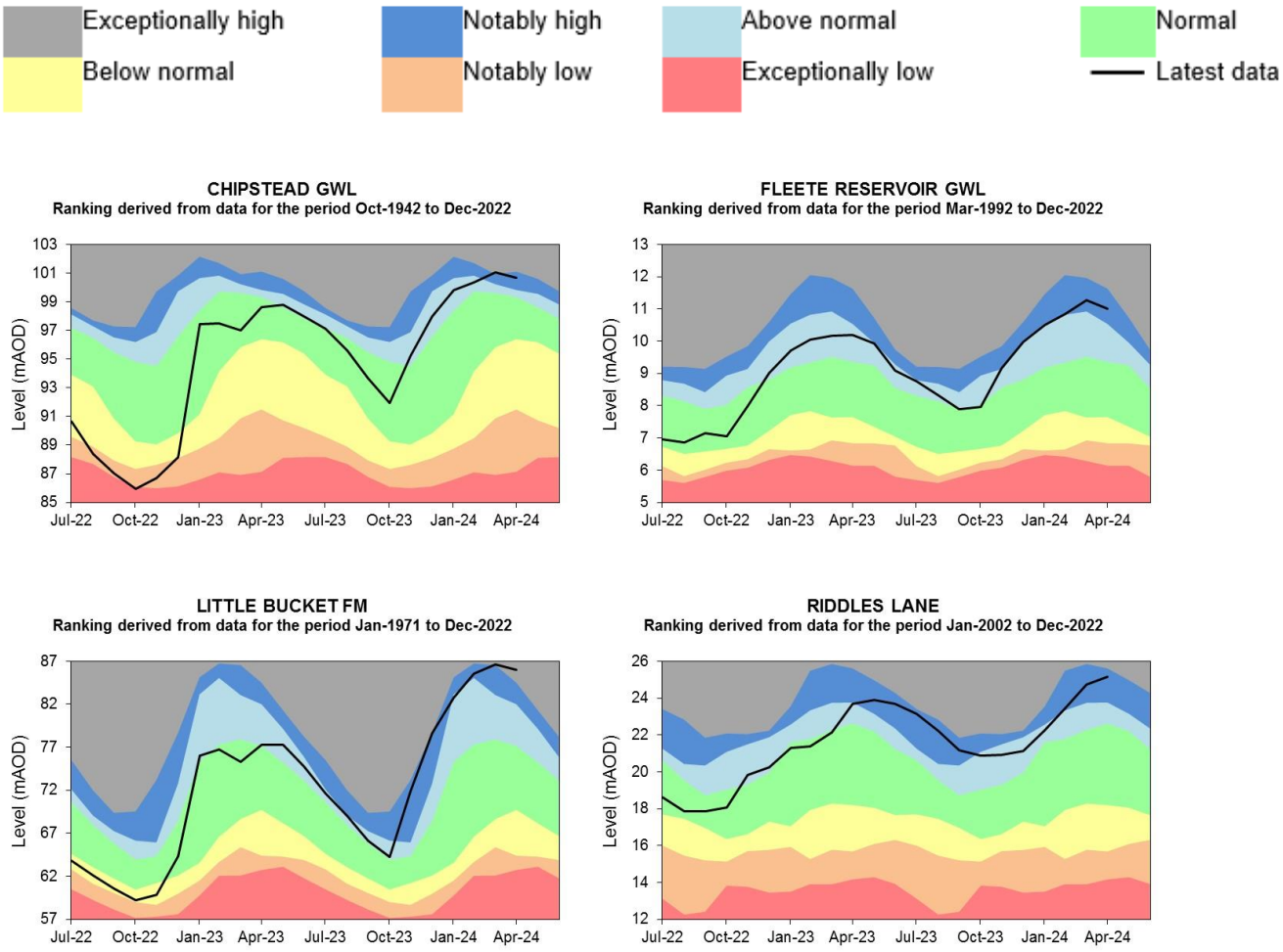


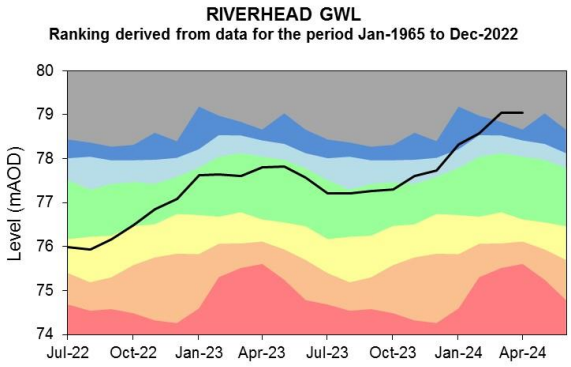
Source: Environment Agency.

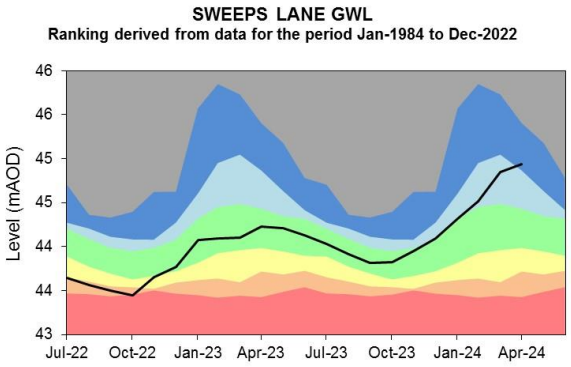
5 Groundwater levels

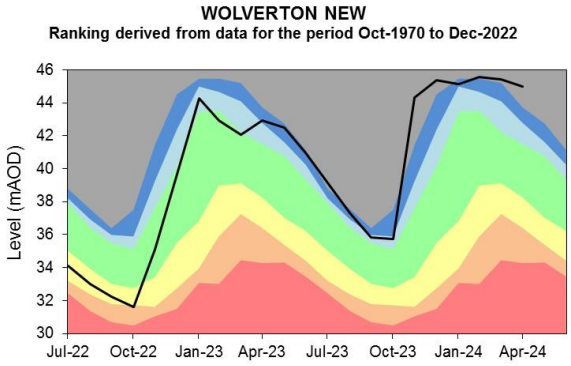
5.1 Groundwater level charts

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.







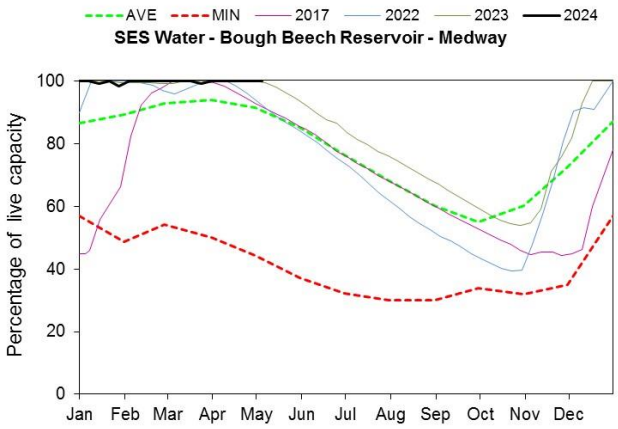


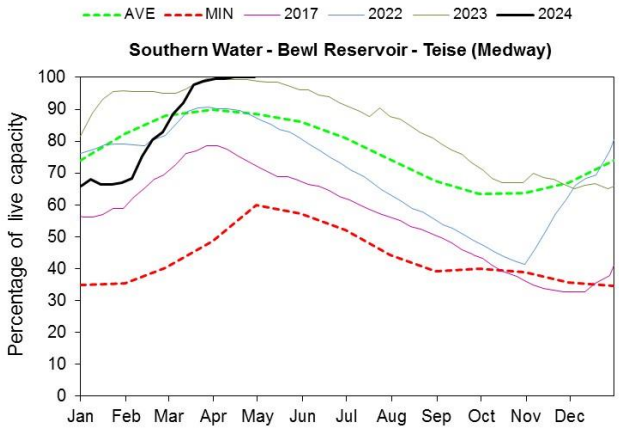
Source: Environment Agency, 2024.

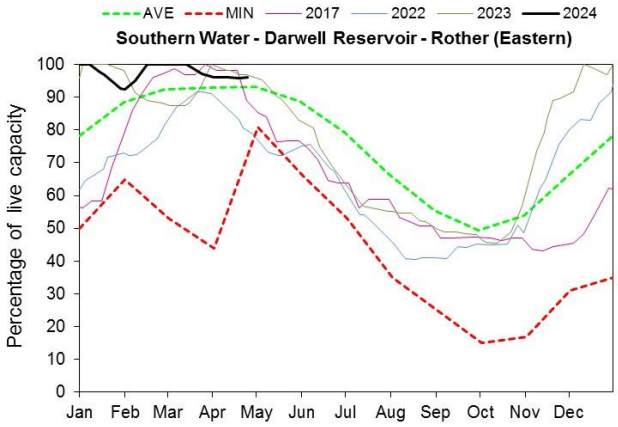
6 Reservoir stocks

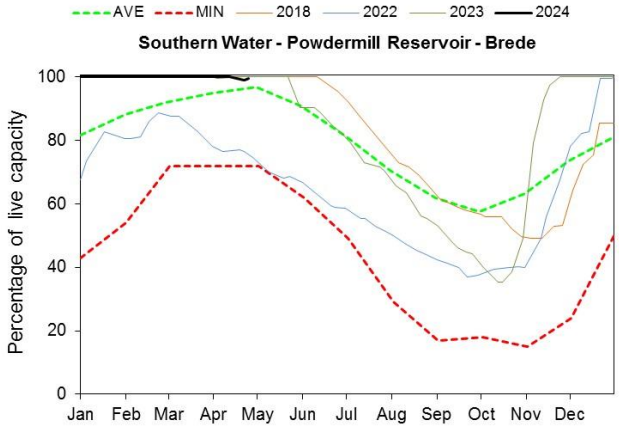
6.1 Reservoir stocks charts

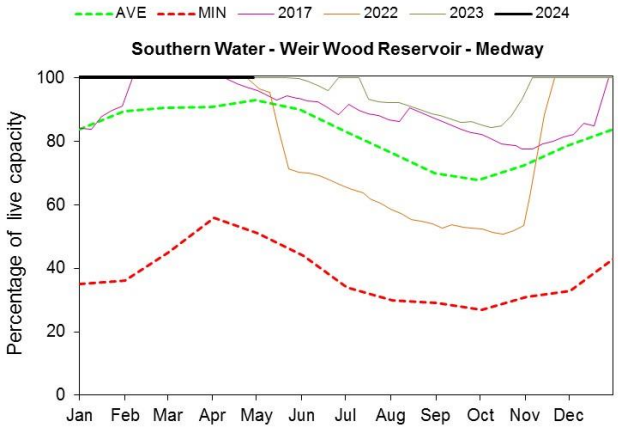
Figure 7.1: End of month regional reservoir stocks compared to long term maximum, minimum and average stocks. (Source: Water Companies). Note: Historic records of individual reservoirs and reservoir groups making up the regional values vary in length.











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	Apr 2024 rainfall % of long term average 1961 to 1990	Apr 2024 band	Feb 2024 to April cumulative band	Nov 2023 to April cumulative band	May 2023 to April cumulative band
North Downs - South London	139	Above Normal	Exceptionally high	Exceptionally high	Notably high
Upper Mole	149	Above Normal	Exceptionally high	Exceptionally high	Exceptionally high
South London	132	Above Normal	Exceptionally high	Exceptionally high	Notably high
River Darent	144	Above Normal	Exceptionally high	Exceptionally high	Notably high
North Kent Chalk	129	Above Normal	Exceptionally high	Exceptionally high	Notably high
Stour	158	Notably High	Exceptionally high	Exceptionally high	Notably high
Dover Chalk	168	Notably High	Exceptionally high	Exceptionally high	Exceptionally high
Thanet Chalk	150	Notably High	Exceptionally high	Exceptionally high	Notably high
River Medway	146	Above Normal	Exceptionally high	Exceptionally high	Exceptionally high

Eastern Rother	142	Above Normal	Exceptionally high	Exceptionally high	Exceptionally high
Romney Marsh	147	Notably High	Exceptionally high	Exceptionally high	Exceptionally high
North West Grain	119	Above Normal	Exceptionally high	Exceptionally high	Above normal
Sheppy	136	Above Normal	Exceptionally high	Notably high	Above normal

8.2 River flows table

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

8.3 Groundwater table

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