

Monthly water situation report: South-east England

1 Summary - December 2024

There was 71% of the long term average (LTA) rainfall received in December for the southeast of England. It was the first month since August to record below average rainfall. For the 12 months ending December, Thames (THM) and half of the areal units in THM recorded the highest rainfall on record. The soil moisture deficits (SMDs) were all but wiped out by Storm Darragh in the first week of the month. Thereafter, the drier weather throughout the rest of the month allowed the SMDs the build but were still well below the LTA for the end of December. Recharge was below average for December. River flows responded to the rainfall brought by Storm Darragh and then fell for the rest of the month. The additional rainfall and recharge ensured that the Chalk groundwater fed rivers across Hertfordshire and North London (HNL), THM and Solent and South Downs (SSD) all ended December at notably high or exceptionally high flows. There were 34 fluvial flood alerts issued across the south-east during the month. Groundwater levels rose at most of the key indicator sites across the south-east as would be expected at this time of year. Levels did fall at three sites, at Jackaments (THM), Carisbrooke Castle (Isle of Wight, SSD) and Riddles Lane, Kent and South London (KSL).

1.1 Rainfall

There was 71% of the LTA rainfall received in December for the south-east of England. It was the first month since August to record below average rainfall. This ranged from below normal rainfall for December along the Thames Valley and western part of (SSD) to normal rainfall across THM, HNL, KSL and the remainder of SSD. The wettest day was on 4 December when the highest daily total was 28.5mm, recorded at Plumpton (SSD) and also when around 16% of the monthly total fell. Storm Darragh then followed on 6 to 8 December, that affected the highest daily totals only in HNL. Higher daily totals were recorded on 4, 5 and 9 December in THM, SSD and KSL. There was no significant rainfall during the last week of the year across the south-east of England. For the 12 months ending December, THM and half of the areal units in THM recorded the highest rainfall on record. In addition, Chilterns West and Ock areal units, both THM, were the second highest totals after 1903.

1.2 Soil moisture deficit and recharge

The SMDs were all but wiped out by Storm Darragh in the first week of the month. Thereafter, the drier weather throughout the rest of the month allowed the SMDs the build, albeit slowly to end the month with some deficits, but were still well below the LTA for the end of December. Whilst recharge was below average for December, for the winter period so far (October to

December) the combination of a very wet start to the winter and the ongoing very low SMDs has allowed around one and a half times the LTA recharge to occur across the south-east.

1.3 River flows

River flows responded to the rainfall brought by Storm Darragh and then fell for the rest of the month. The additional rainfall and recharge ensured that the Chalk groundwater fed rivers across HNL, THM and SSD all ended December at notably high or exceptionally high flows. The Ver at Colney Street was the second highest flow on record after 2000 and the Mimram at Panshanger reached its highest flow ever recorded. Both sites are in HNL. Key indicator sites across the eastern part of SSD and across much of KSL ended December mainly at normal flows. There were 34 fluvial flood alerts issued across the south-east during the month.

	HNL	тнм	SSD	KSL	Total
Fluvial Alerts	6	13	4	5	28
Fluvial Warnings	0	0	0	0	0
GW alerts	2	3	1	0	6
Total	8	16	5	5	34

1.4 Groundwater levels

Groundwater levels rose at most of the key indicator sites across the south-east as would be expected at this time of year. Levels did fall at three sites, at Jackaments (Oolites, THM), Carisbrooke Castle (Isle of Wight, SSD) and Riddles Lane (North Downs, KSL). Levels ended the month at exceptionally high and notably high levels across the Chilterns, Berkshire Downs and the Test Chalk. Stonor and Gibbet Cottages (both Chilterns West, THM) were at the second highest level on record since 2000 and Lilley Bottom (Lee Chalk, HNL) was the highest ever December level on record. Throughout SSD and KSL, levels ranged from above normal to below normal. The only site that was below normal for December was Carisbrooke Castle on the Isle of Wight, SSD.

1.5 Reservoir stocks

Reservoir storage for December was above the LTA at all reservoirs across the south-east with the exception of Arlington (SSD) which is well below the LTA and Bewl (both KSL) which is just at the LTA.

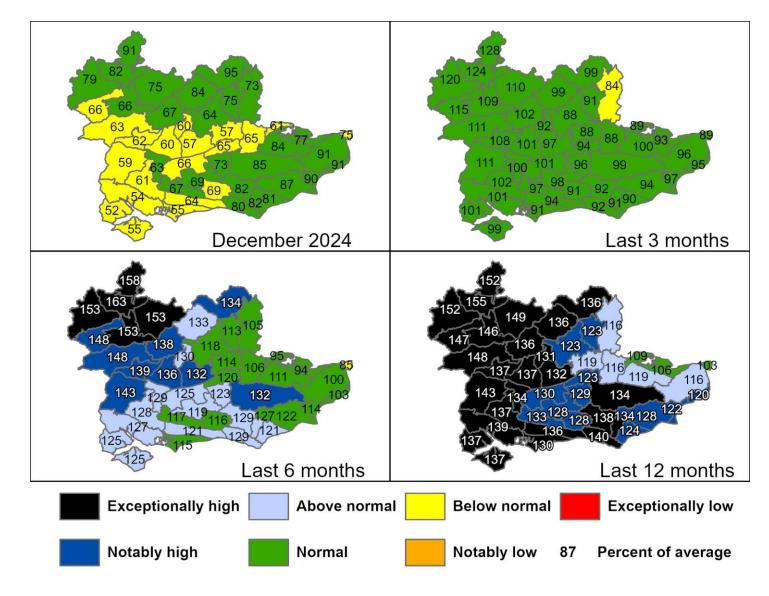
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2 Maps

2.1 Rainfall map

Figure 2.1: Total rainfall for hydrological areas for the current month (up to 31 December 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.

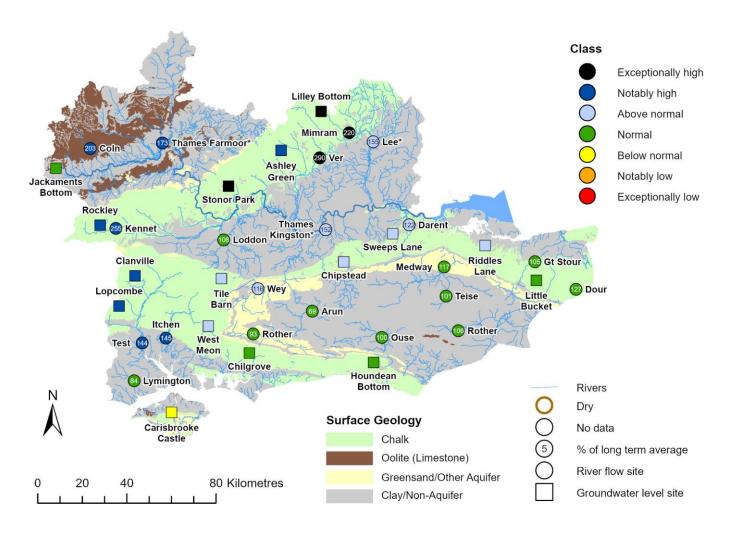


Rainfall data for 2025, extracted from Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. (Source: Environment Agency. Crown Copyright, 100024198, 2025). Rainfall data prior to 2025, extracted from Met Office HadUK 1km gridded rainfall dataset derived from registered rain gauges. (Source: Met Office. Crown copyright, 2025).

2.2 River flows and groundwater levels map

Figure 2.2: Monthly mean river flow for indicator sites for December 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic December monthly means Table available in the appendices with detailed information. Groundwater levels for indicator sites at the end of December 2024, classed relative to an analysis of respective historic December levels. Table available in the appendices with detailed information.

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



(Source: Environment Agency). Crown copyright. All rights reserved. Environment Agency, 100024198, 2025. Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2025.

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) 31 day Total	December % LTA	Effective Rainfall (mm) 31 day total	December % LTA	SMD (mm) Day 31	End Dec LTA
6010TH	Cotswolds - West (A)	66	79%	54	84%	0	6
6070TH	Berkshire Downs (G)	51	63%	40	82%	2	15
6130TH	Chilterns - West (M)	49	67%	38	94%	2	19
6162TH	North Downs - Hampshire (P)	57	62%	46	74%	2	10
6190TH	Wey - Greensand (S)	57	65%	45	79%	1	11
	Thames Average	50	68%	39	92%	2	16
	Thames Catchment Average	51	69%	40	93%	2	15
6140TH	Chilterns - East - Colne (N)	61	84%	50	130%	2	19
6600TH	Lee Chalk	57	95%	47	234%	3	35
6507TH	North London	39	63%	28	109%	3	23
6509TH	Roding	41	72%	25	119%	3	25
	Herts and North London	49	78%	37	141%	3	25
6230TH	North Downs - South London (W)	51	65%	40	84%	2	13
6706So	Darent	45	65%	34	99%	2	22

6707So	North Kent Chalk	59	83%	47	122%	2	15
6708So	Stour	63	91%	50	128%	1	13
6809So	Medway	67	85%	54	97%	0	5
	Kent & South London Average	53	78%	36	96%	9	21
6701So	Test Chalk	52	58%	41	70%	2	11
6702So	East Hampshire Chalk	58	61%	46	66%	1	7
6703So	West Sussex Chalk	61	63%	48	67%	0	5
6804So	Arun	60	69%	47	76%	0	6
6805So	Adur	59	69%	47	72%	0	4
	Solent & South Downs Average	59	66%	47	73%	0	7
	South East Average	54	71%	40	88%	4	15

HadUK rainfall data. (Source: Met Office. Crown copyright, 2025).

EA effective rainfall and soil moisture deficit data (Source EA Soil Moisture Model 2025.)

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.

Winter period 01/10/2024 to 31/12/2024

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)	271	120%	212	168%
6070TH	Berkshire Downs (G)	246	111%	189	205%
6130TH	Chilterns - West (M)	211	102%	155	194%
6162TH	North Downs - Hampshire (P)	258	100%	198	153%
6190TH	Wey - Greensand (S)	251	101%	177	143%
	Thames Average	222	108%	162	204%
	Thames Catchment Average	221	106%	160	193%
6140TH	Chilterns - East - Colne (N)	205	99%	147	186%
6600TH	Lee Chalk	176	99%	103	222%
6507TH	North London	161	88%	68	143%
6509TH	Roding	141	84%	25	65%
	Herts and North London	169	92%	81	156%

6230TH	North Downs - South London (W)	213	93%	137	129%
6706So	Darent	174	88%	55	76%
6707So	North Kent Chalk	212	100%	87	102%
6708So	Stour	223	96%	74	78%
6809So	Medway	233	99%	178	148%
	Kent & South London Average	202	94%	94	113%
6701So	Test Chalk	272	111%	215	187%
6702So	East Hampshire Chalk	276	102%	214	142%
6703So	West Sussex Chalk	267	94%	203	121%
6804So	Arun	248	99%	182	136%
6805So	Adur	235	90%	180	122%
	Solent & South Downs Average	254	96%	188	134%
	South East Average	220	99%	142	148%

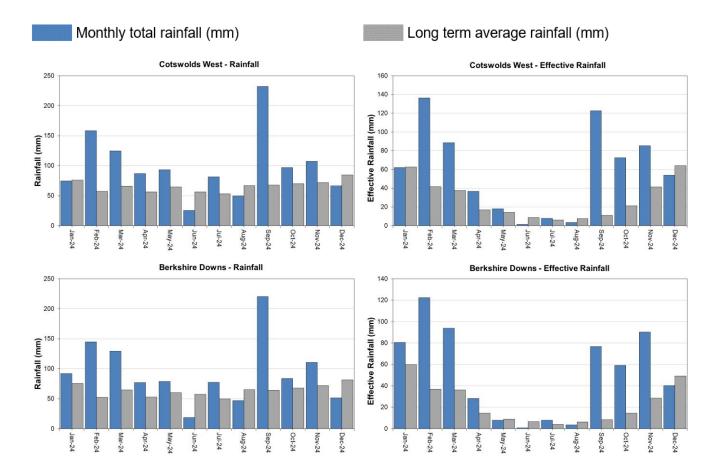
HadUK rainfall data. (Source: Met Office. Crown copyright, 2025).

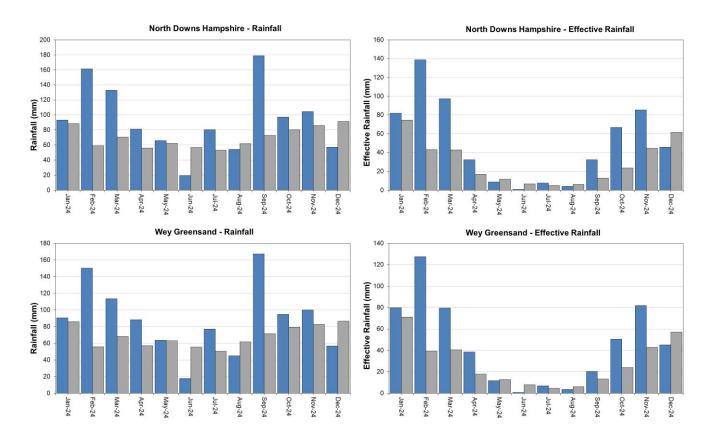
EA effective rainfall data (Source EA Soil Moisture Model 2025.)

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.



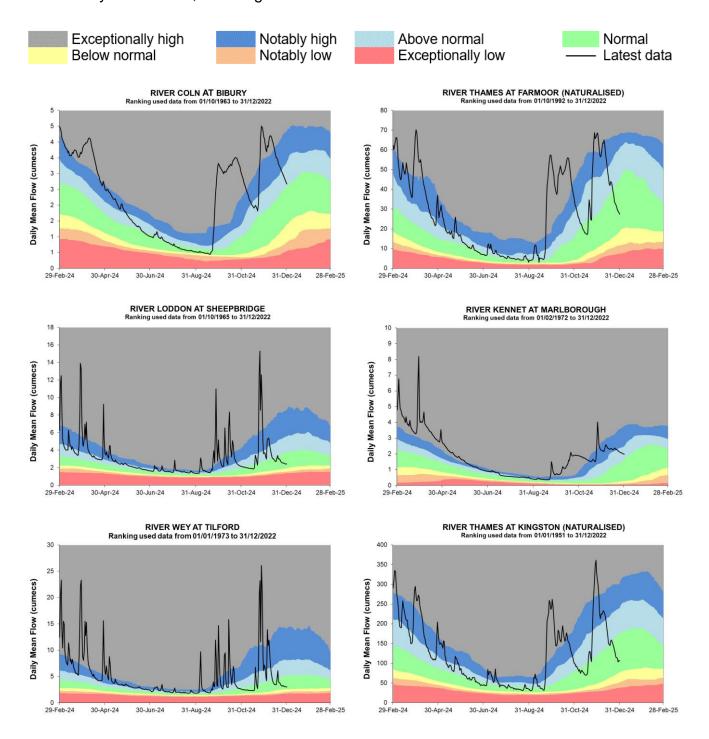


HadUK rainfall data. (Source: Met Office. Crown copyright, 2025).

EA effective rainfall data (Source EA Soil Moisture Model, 2025).

4.2 Thames River flow charts

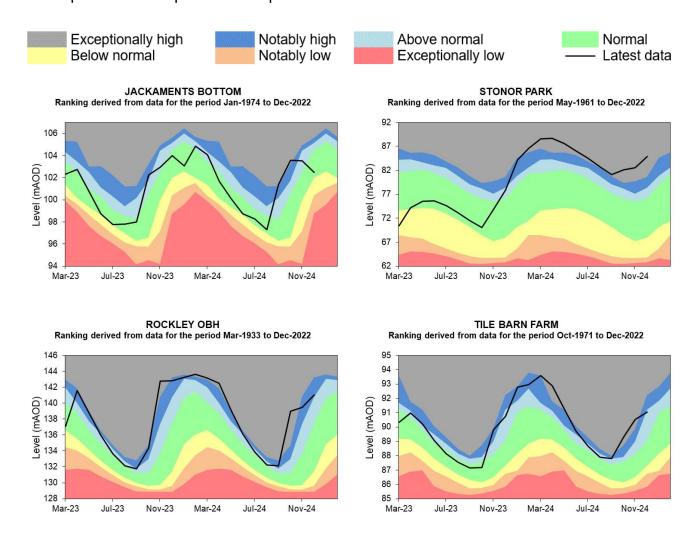
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency. 2025

4.3 Thames Groundwater level charts

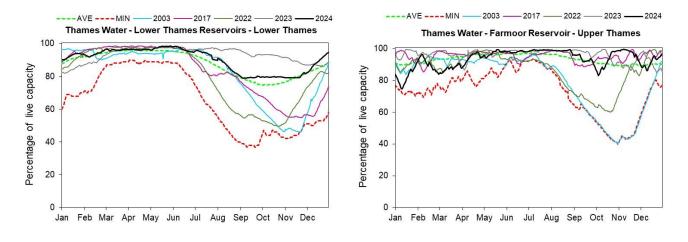
Figure 4.3: End of month groundwater levels at index groundwater level sites for major aquifers. 22 months compared to an analysis of historic end of month levels and long term maximum and minimum levels. Tile Barn Farm data has been estimated from 2 local sites since April 2022. A replacement is planned.



Source: Environment Agency, 2025.

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.

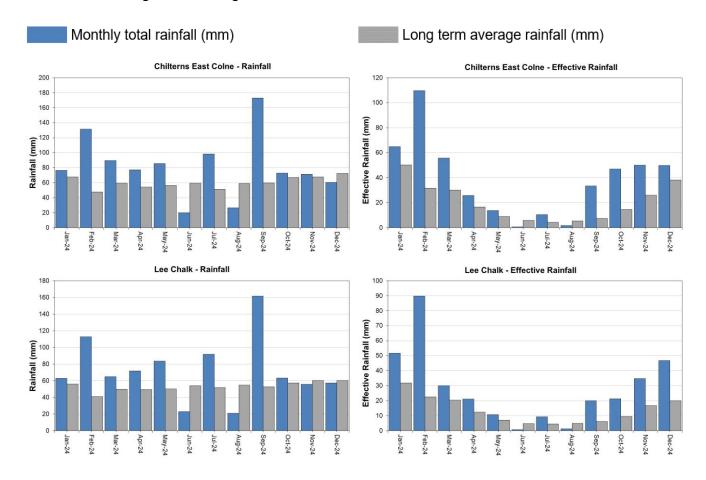


(Source: water companies).

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.

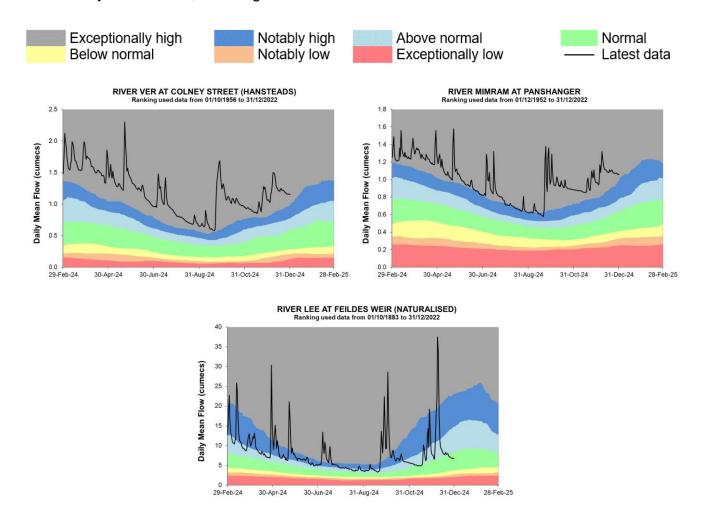


HadUK rainfall data. (Source: Met Office. Crown copyright, 2025).

EA effective rainfall data (Source EA Soil Moisture Model, 2025).

5.2 HNL River flow charts

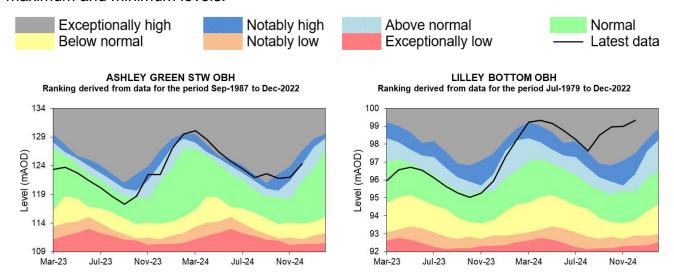
Figure 5.2 Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency. 2025

5.3 HNL Groundwater level charts

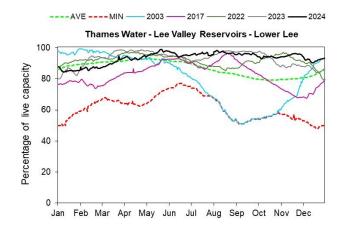
Figure 5.3: End of month groundwater levels at index groundwater level sites for major aquifers. 22 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



Source: Environment Agency, 2025.

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.

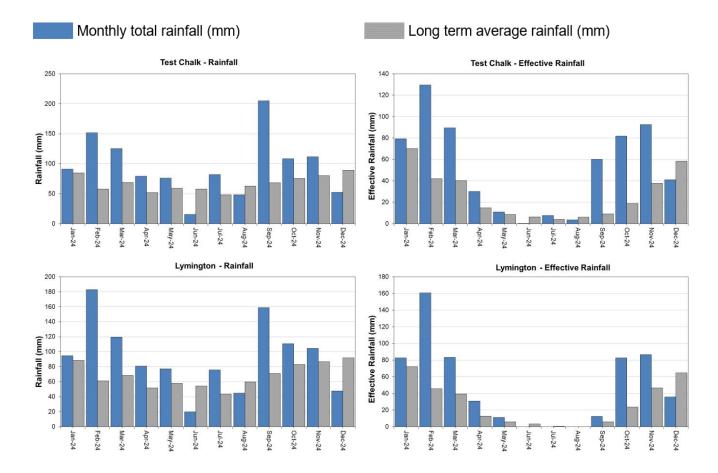


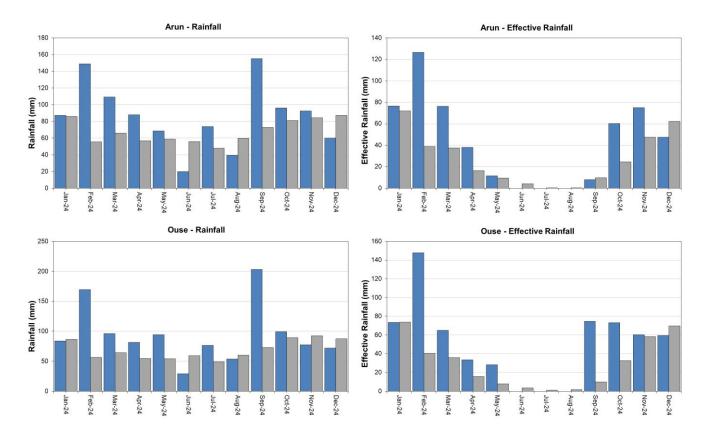
(Source: water companies).

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.



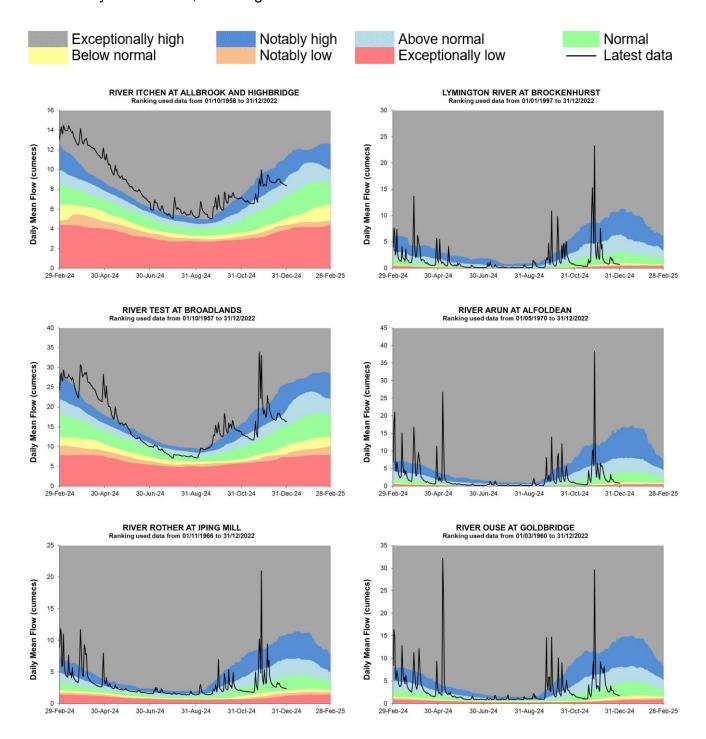


HadUK rainfall data. (Source: Met Office. Crown copyright, 2025).

EA effective rainfall data (Source EA Soil Moisture Model, 2025).

6.2 SSD River flow charts

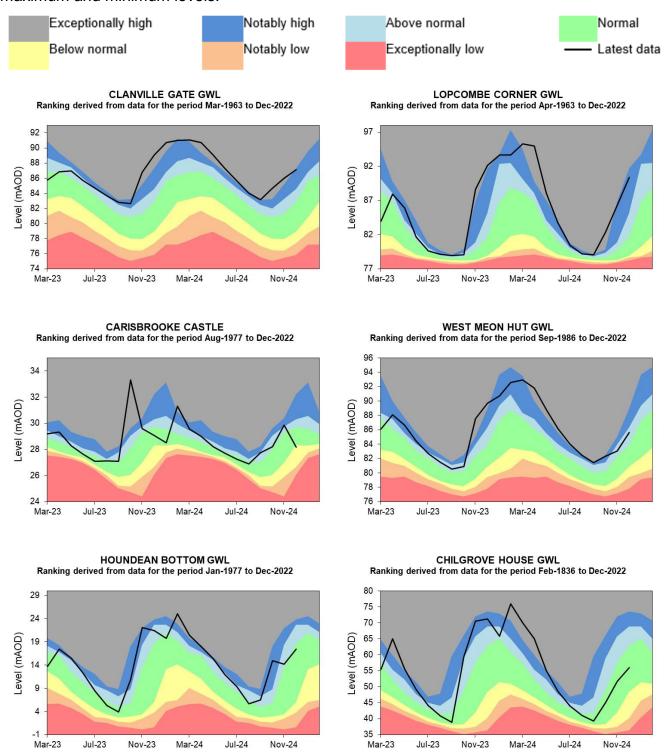
Figure 6.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency. 2025

6.3 SSD Groundwater levels

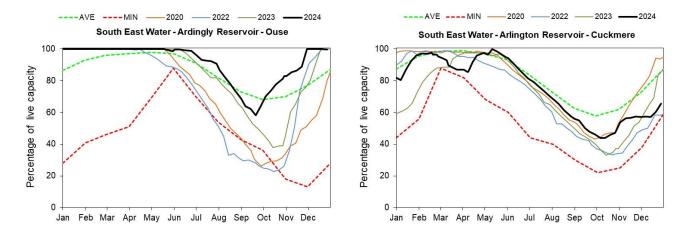
Figure 6.3: End of month groundwater levels at index groundwater level sites for major aquifers. 22 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



Source: Environment Agency, 2025.

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.

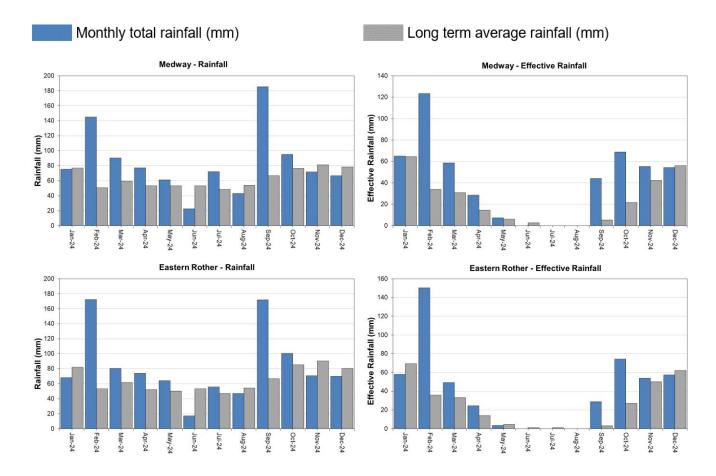


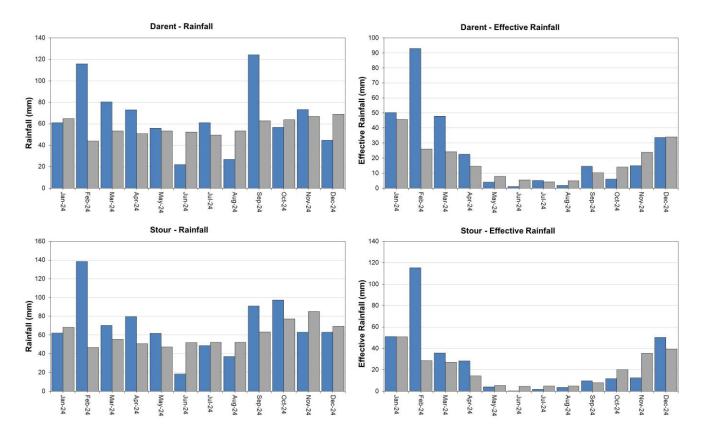
(Source: water companies).

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.



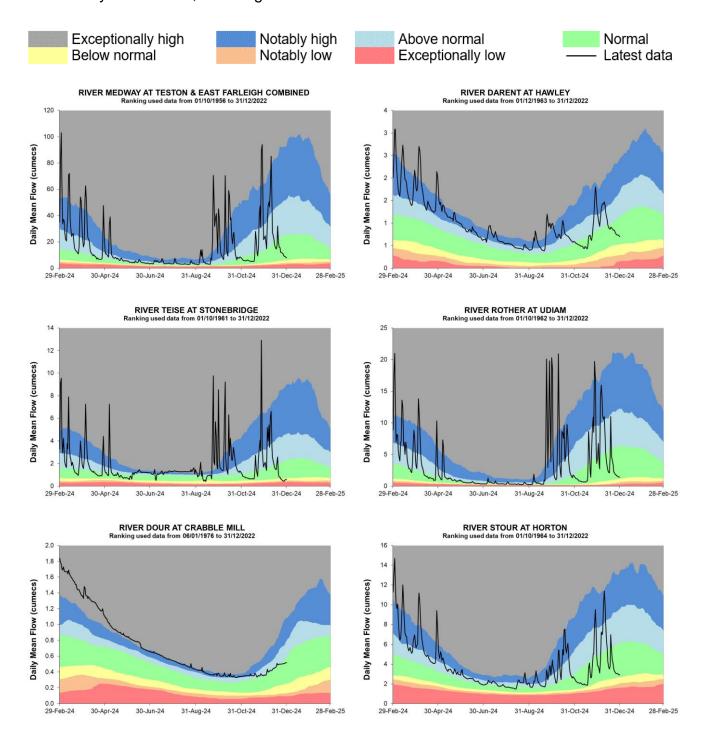


HadUK rainfall data. (Source: Met Office. Crown copyright, 2025).

EA effective rainfall data (Source EA Soil Moisture Model, 2025).

7.2 KSL River flow charts

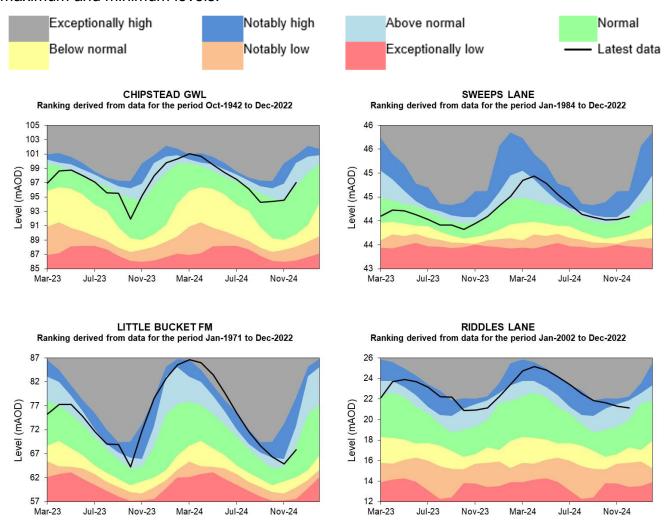
Figure 7.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency. 2025

7.3 KSL Groundwater levels

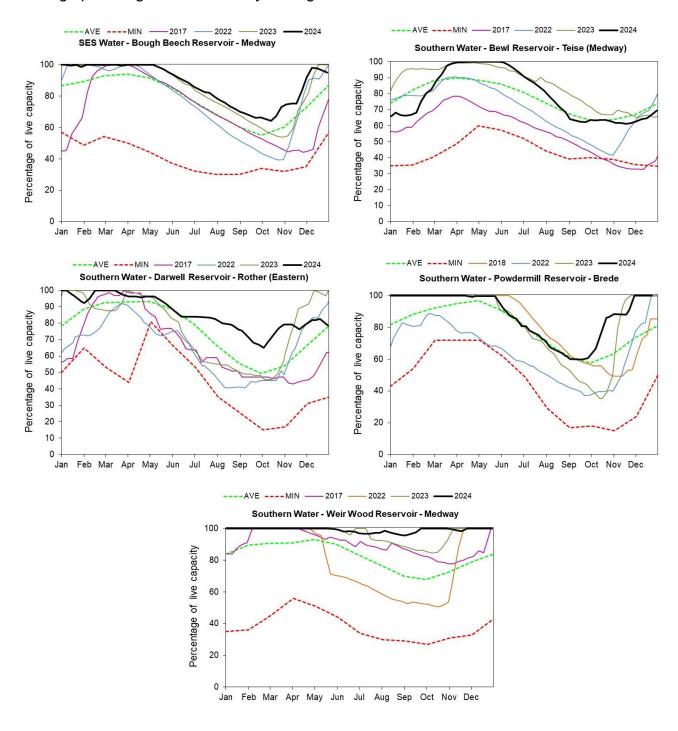
Figure 7.3: End of month groundwater levels at index groundwater level sites for major aquifers. 22 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



Source: Environment Agency. 2025

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 (m³s⁻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	Dec 2024 rainfall % of long term average 1961 to 1990	Dec 2024 band	Oct 2024 to December cumulative band	Jul 2024 to December cumulative band	Jan 2024 to December cumulative band
Cotswold West	79	Normal	Normal	Exceptionally high	Exceptionally high
Cotswold East	82	Normal	Normal	Exceptionally high	Exceptionally high
Berkshire Downs	63	Below Normal	Normal	Notably high	Exceptionally high
Chilterns West	67	Normal	Normal	Notably high	Exceptionally high
Chilterns East Colne	84	Normal	Normal	Above normal	Exceptionally high
North Downs - Hampshire	63	Normal	Normal	Above normal	Exceptionally high
North Downs - South London	65	Below Normal	Normal	Normal	Notably high
Upper Thames	66	Below Normal	Normal	Notably high	Exceptionally high
Upper Cherwell	91	Normal	Normal	Exceptionally high	Exceptionally high
Thame	75	Normal	Normal	Exceptionally high	Exceptionally high
Loddon	60	Below Normal	Normal	Notably high	Exceptionally high
Lower Wey	57	Below Normal	Normal	Notably high	Exceptionally high
Upper Mole	73	Normal	Normal	Above normal	
Lower Lee	75	Normal	Normal	Normal	Notably high
North London	64	Normal	Normal	Normal	Notably high
South London	57	Below Normal	Normal	Normal	Above normal
Roding	73	Normal	Below normal	Normal	Above normal
Ock	66	Normal	Normal	Exceptionally high	Exceptionally high

Enborne	62	Below Normal	Normal	Notably high	Exceptionally high
Cut	60	Below Normal	Normal	Above normal	Exceptionally high
Lee Chalk	95	Normal	Normal	Notably high	Exceptionally high
River Test	59	Below Normal	Normal	Notably high	Exceptionally high
East Hampshire Chalk	61	Below Normal	Normal	Above normal	Exceptionally high
West Sussex Chalk	64	Below Normal	Normal	Above normal	Exceptionally high
East Sussex Chalk	80	Normal	Normal	Above normal	Exceptionally high
Sw Isle Of Wight	55	Below Normal	Normal	Above normal	Exceptionally high
River Darent	65	Below Normal	Normal	Normal	Above normal
North Kent Chalk	84	Normal	Normal	Normal	Above normal
Stour	91	Normal	Normal	Normal	Above normal
Dover Chalk	91	Normal	Normal	Normal	Notably high
Thanet Chalk	75	Below Normal	Normal	Below normal	Normal
Western Rother Greensand	67	Normal	Normal	Normal	Notably high
Hampshire Tertiaries	54	Below Normal	Normal	Above normal	Exceptionally high
Lymington River Avon Water And O	52	Below Normal	Normal	Above normal	Exceptionally high
Sussex Coast	55	Below Normal	Normal	Normal	Exceptionally high
River Arun	69	Normal	Normal	Above normal	Notably high
River Adur	69	Below Normal	Normal	Normal	Notably high
River Ouse	82	Normal	Normal	Above normal	Exceptionally high
Cuckmere River	82	Normal	Normal	Above normal	Exceptionally high
Pevensey Levels	81	Normal	Normal	Above normal	Notably high
River Medway	85	Normal	Normal	Notably high	Exceptionally high

Eastern	87	Normal	Normal	Normal	Notably high
Rother					
Romney	90	Normal	Normal	Normal	Notably high
Marsh					
North West	61	Below	Normal	Normal	Normal
Grain		Normal			
Sheppy	77	Normal	Normal	Normal	Normal

9.2 River flows table

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

9.3 Groundwater table

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

9.4 South-east England areal units for reference



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