Monthly water situation report: Solent and South Downs Area

Summary - January 2024

Solent and South Downs (SSD) had average rainfall in January, receiving 100% (87mm) of the long term average (LTA) rainfall (87.3mm). Monthly mean river flows and groundwater levels across SSD ranged from normal to exceptionally high. Soils across SSD ended the month slightly drier than the average for January. End of month reservoir stocks were above average at Ardingly Reservoir (Ouse) and were below average at Arlington Reservoir (Cuckmere).

1.1 Rainfall

SSD had average rainfall in January, receiving 100% (87mm) of the LTA rainfall (87.3mm). Even though all areal rainfall unit across SSD for January had average (normal) rainfall, the rainfall pattern for January shows the slightly higher totals in the western area of SSD. Hampshire and the Isle of Wight, received about 106% of the LTA rainfall, while the east of the area, Sussex, received about 96% of the LTA rainfall. The lowest rainfall was received at the most eastern edge of SSD, in the Pevensey Levels, where rainfall amounted to 76% (62mm) of LTA (82.2mm).

The 5 highest daily totals were all measured on the 4 January and the highest daily total of 43.1mm, was recorded at Otterbourne (East Hampshire Chalk). More than 70% of the month total rain fell between the 1-4 January. There was another wet period between 20-25 January with over 25% of the month total rain. The other days of the month were mostly dry.

During this winter season, from October to January, the area received a significant amount of rain, and the total rainfall was the second highest on record for the Isle of Wight, Sussex Coast and West Sussex Chalk, while Lymington had the third highest total rainfalls in the last four months.

1.2 Soil moisture deficit and recharge

Soils across SSD ended the month slightly drier than the average for January.

1.3 River flows

Monthly mean river flows across SSD ranged from normal to exceptionally high.

Flows were normal:

- River Medina at Blackwater
- River Arun at Alfoldean
- River Cuckmere at Cowbeech

Flows were above normal:

- River Lymington at Brockenhurst
- River Wallington at North Fareham
- River Rother at Iping Mill
- River Adur at Sakeham
- River Ouse at Goldbridge

Flows were notably high:

- River Test at Chilbolton
- River Meon at Mislingford

Flows were exceptionally high:

- River Test at Broadlands
- River Itchen at Allbrook & Highbridge

The monthly mean flows on the River Test at Broadlands were the third highest in January since 1958. The River Test at Chilbolton and the River Itchen at Allbrook & Highbridge had their fourth highest monthly mean flows since 1989 and 1959, respectively.

1.4 Groundwater levels

End of month groundwater levels ranged from normal to exceptionally high.

Groundwater levels were normal at:

- Carisbrooke Castle (Isle of Wight)
- Beeding Hill (West Sussex Chalk)
- Houndean Bottom (East Sussex Chalk)

Groundwater levels were above normal at:

- Harting Common (Western Rother Greensand)
- Chilgrove (West Sussex Chalk)
- Cornish Farm (East Sussex Chalk)

Groundwater levels were notably high at:

- Lopcombe Corner (Test Chalk)
- West Meon (East Hampshire Chalk)
- Catherington (East Hampshire Chalk)

Groundwater levels were exceptionally high at:

- Clanville Gate (Test Chalk)
- Preston Candover (East Hampshire Chalk)
- Youngwoods Copse (Isle of Wight)

Groundwater levels for January were the highest on record since 1978 at Youngwoods Copse, the third highest on record at Clanville Gate and at Preston Candover since 1966 and 1975, respectively. Also, groundwater levels were the fourth highest on their record at West Meon since 1986.

1.5 Reservoir stocks

End of month reservoir stocks were above average at Ardingly Reservoir (Ouse) with 100% of total capacity (LTA 93%) and were below average at Arlington Reservoir (Cuckmere) with 94.9% of total capacity (LTA 95.4%).

1.6 Environmental impact

No licence restrictions were in force in January.

There were 39 Flood Alerts issued in January. In Hampshire 3 groundwater and 16 fluvial, on the Isle of Wight 5 fluvial and in Sussex 1 groundwater and 14 fluvial Flood Alerts were issued.

There were 31 Flood Warnings issued in January. In Hampshire 13, on the Isle of Wight 4 and in Sussex 14; all fluvial.

Author: HydrologySSD@environment-agency.gov.uk

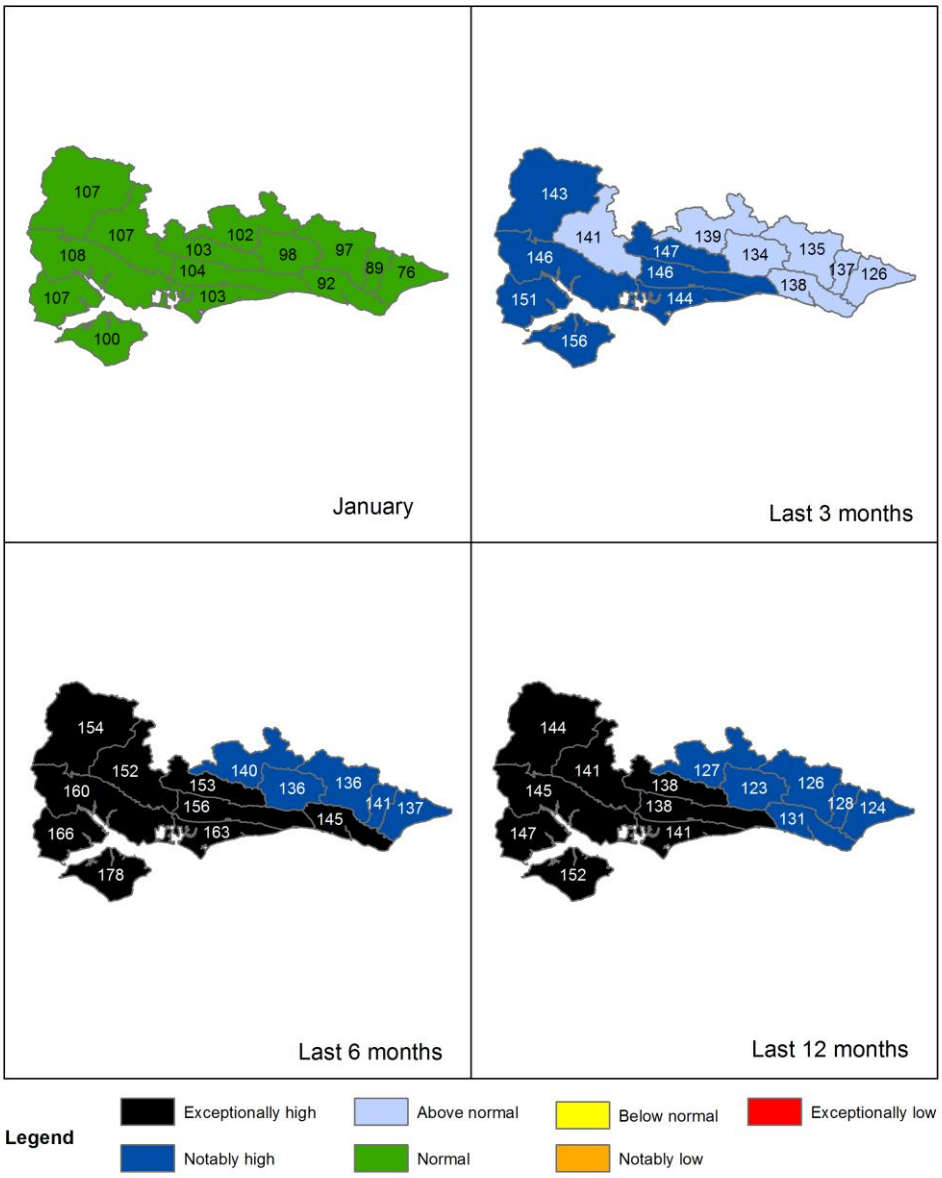
Contact Details: 03708 506 506

All data are provisional and may be subject to revision. The views expressed in this document are not necessarily those of the Environment Agency. Its officers, servants or agents accept no liability for any loss or damage arising from the interpretation or use of the information, or reliance upon views contained in this report.

2. Rainfall

2.1 Rainfall map

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

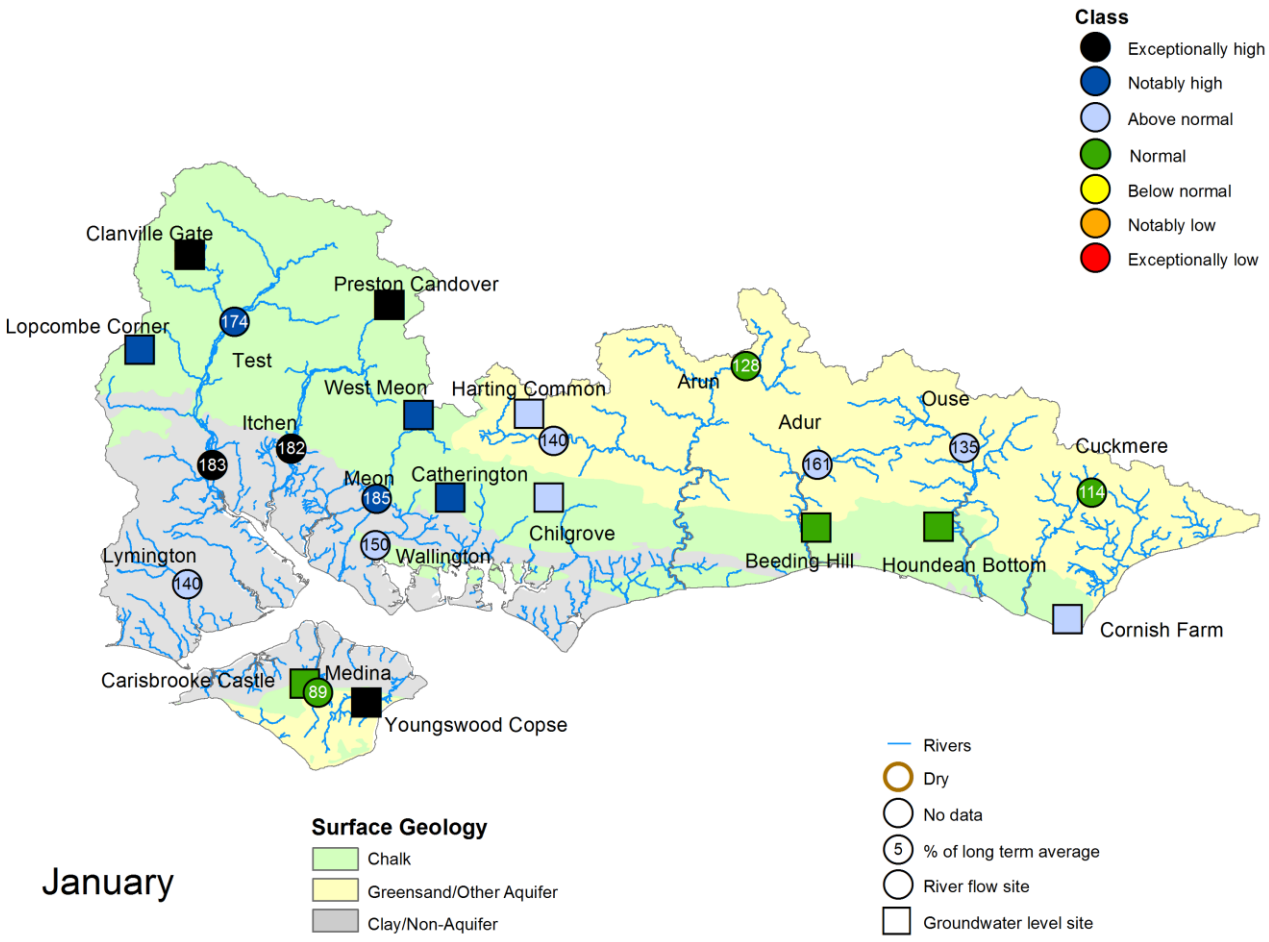


Rainfall data for 2023, extracted from Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. (Source: Environment Agency. Crown Copyright, 100024198, 2024). Rainfall data prior to 2023, extracted from Met Office HadUK 1km gridded rainfall dataset derived from registered rain gauges (Source: Met Office. Crown copyright, 2024).

3. River flows and Groundwater levels

3.1 River flows and Groundwater level map

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

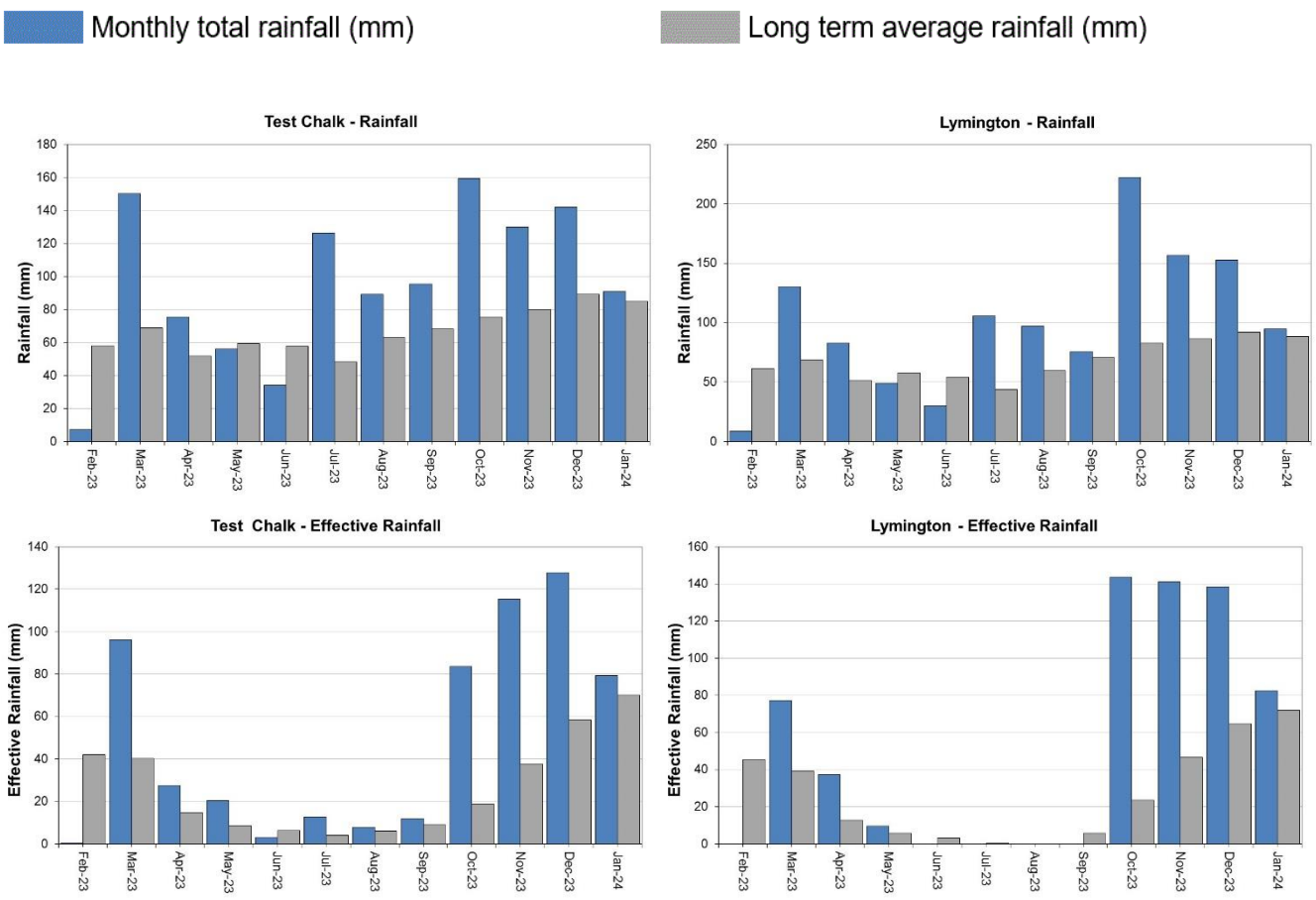


(Source: Environment Agency). Crown copyright. All rights reserved. Environment Agency, 100024198, 2024. Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2024.

4. West Hampshire

4.1 West Hampshire Rainfall and effective rainfall charts

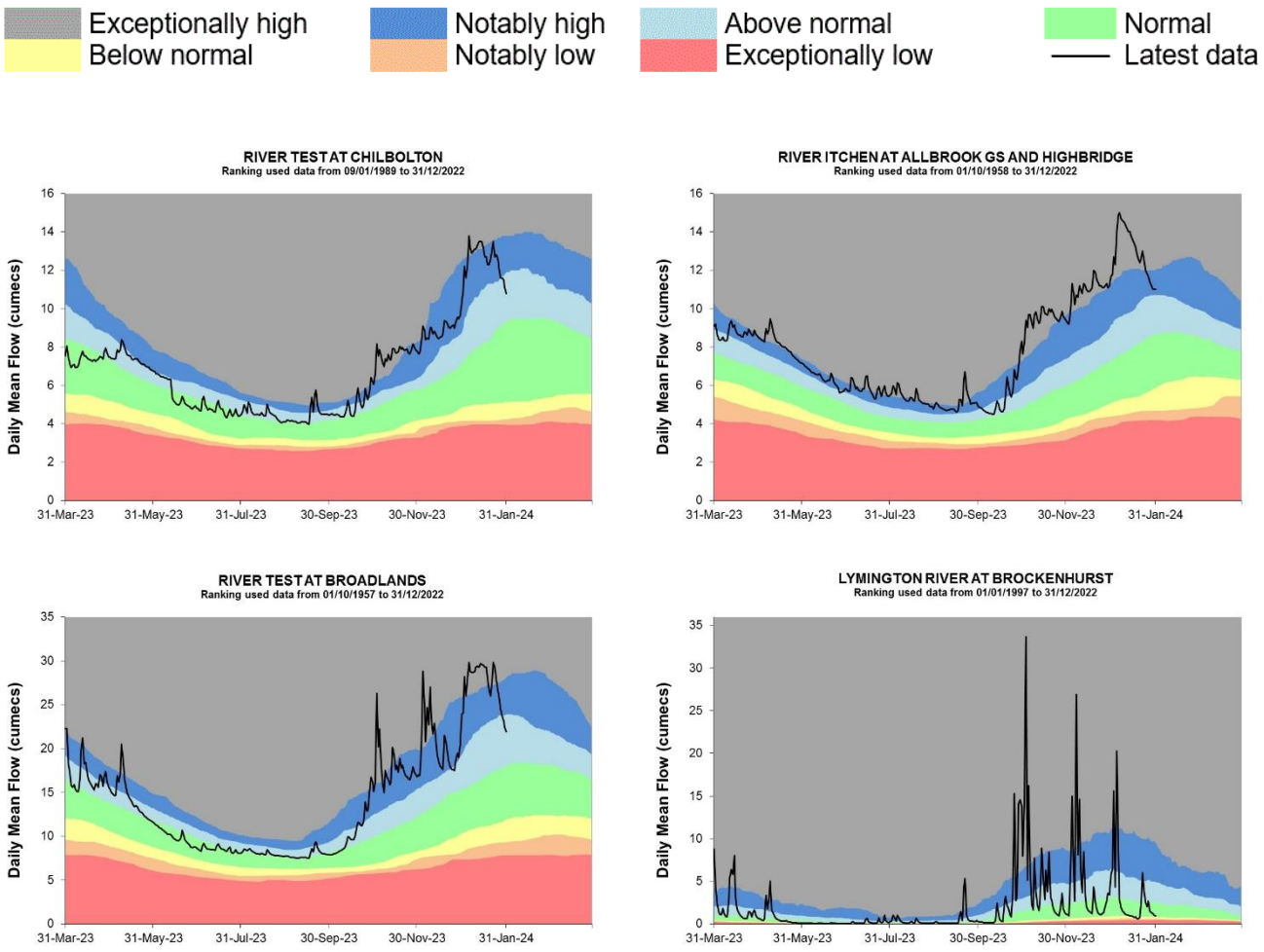
Figure 4.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

4.2 West Hampshire River flow charts

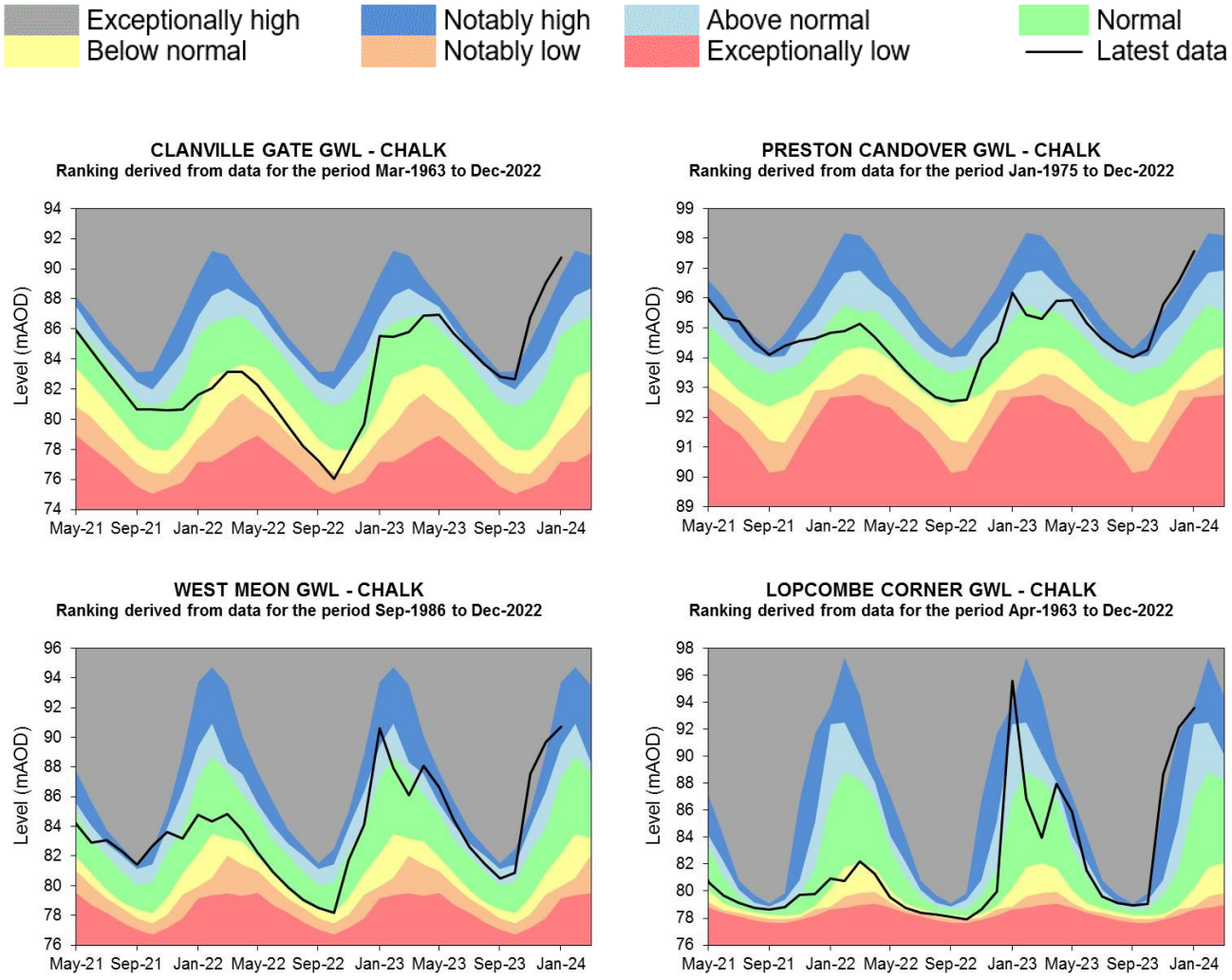
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2024.

4.3 West Hampshire Groundwater level charts

Figure 4.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.

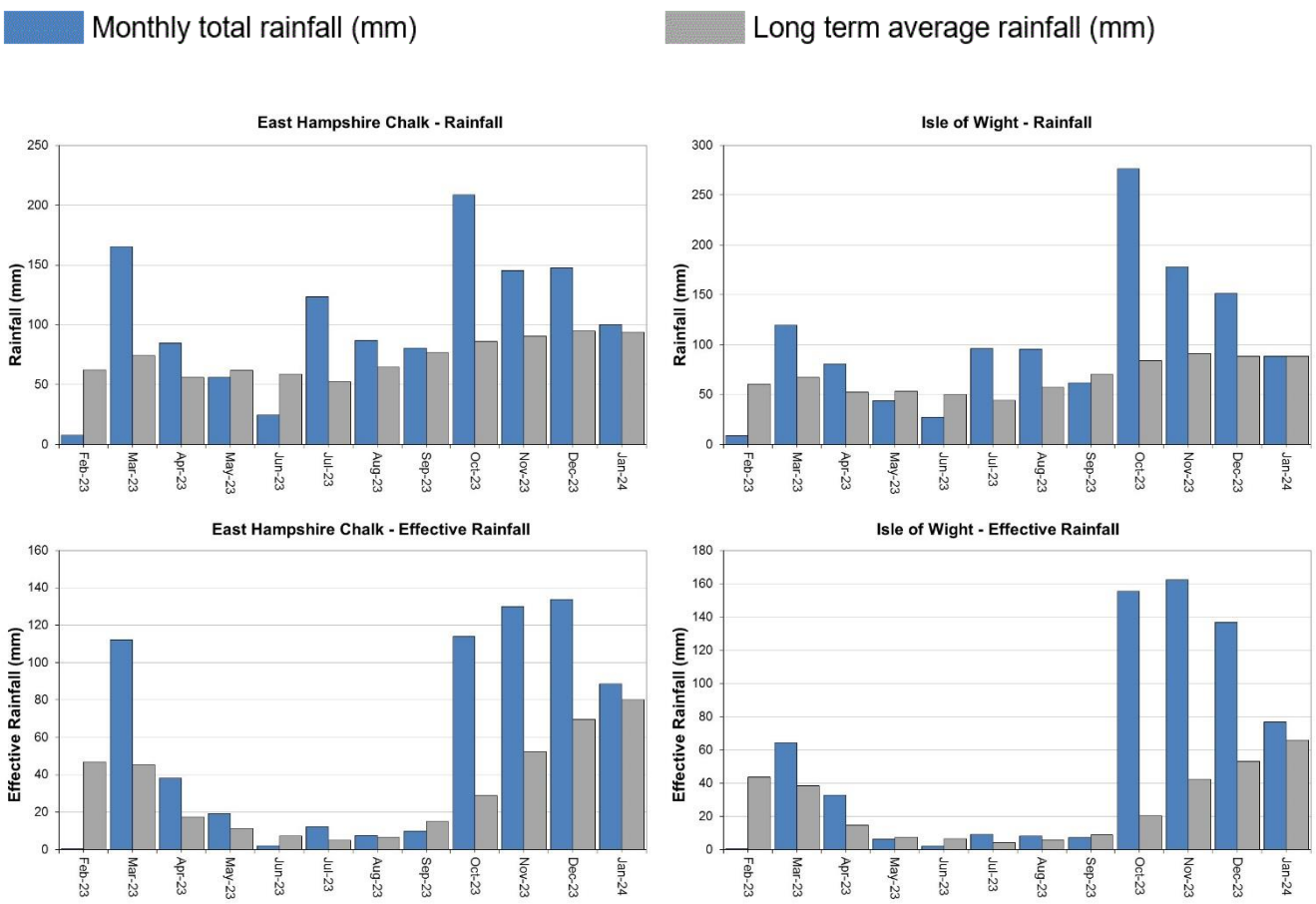


Source: Environment Agency, 2024.

5. East Hampshire and Isle of Wight

5.1 East Hampshire and Isle of Wight Rainfall and Effective rainfall charts

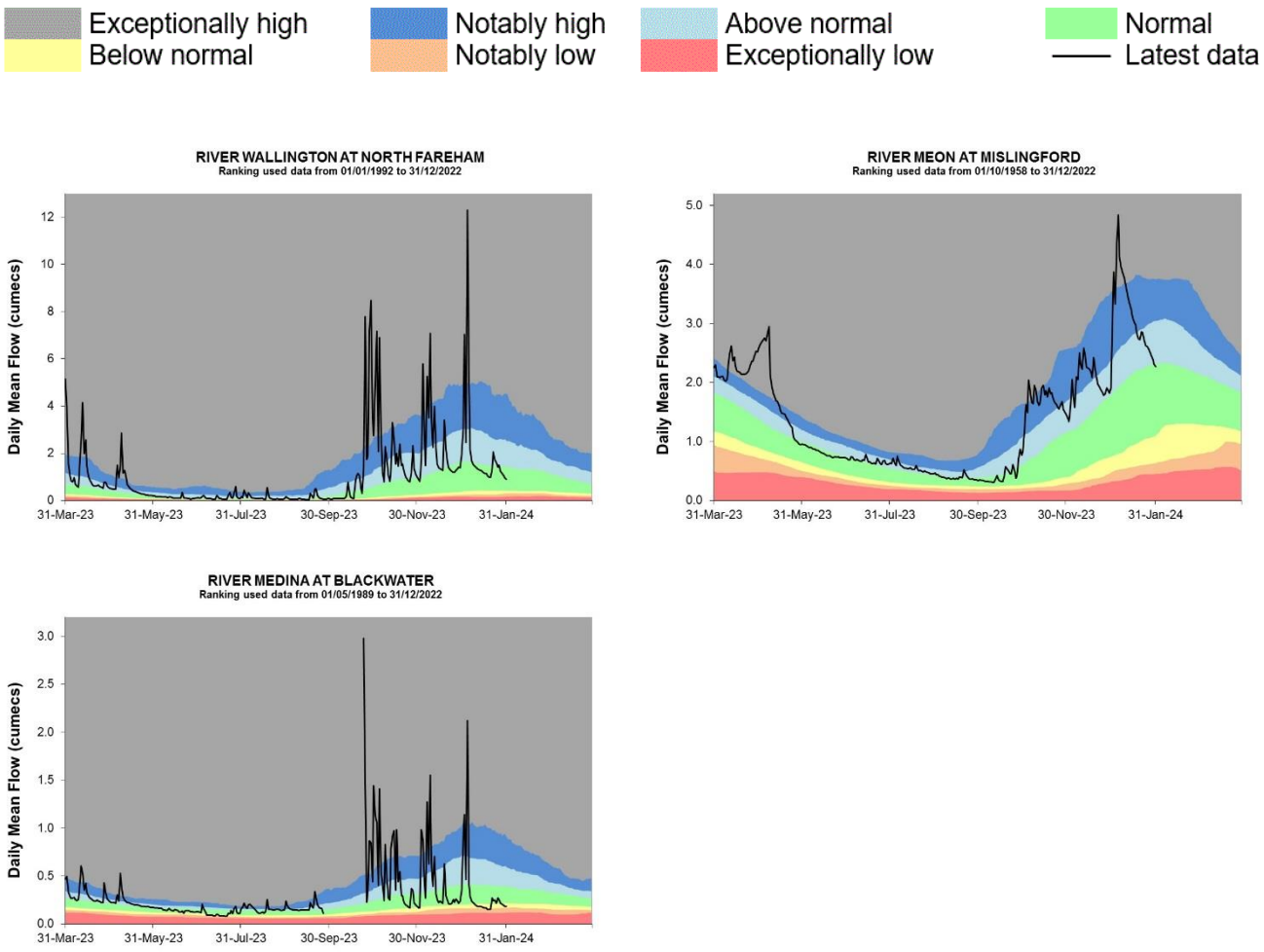
Figure 5.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

5.2 East Hampshire and Isle of Wight River flow charts

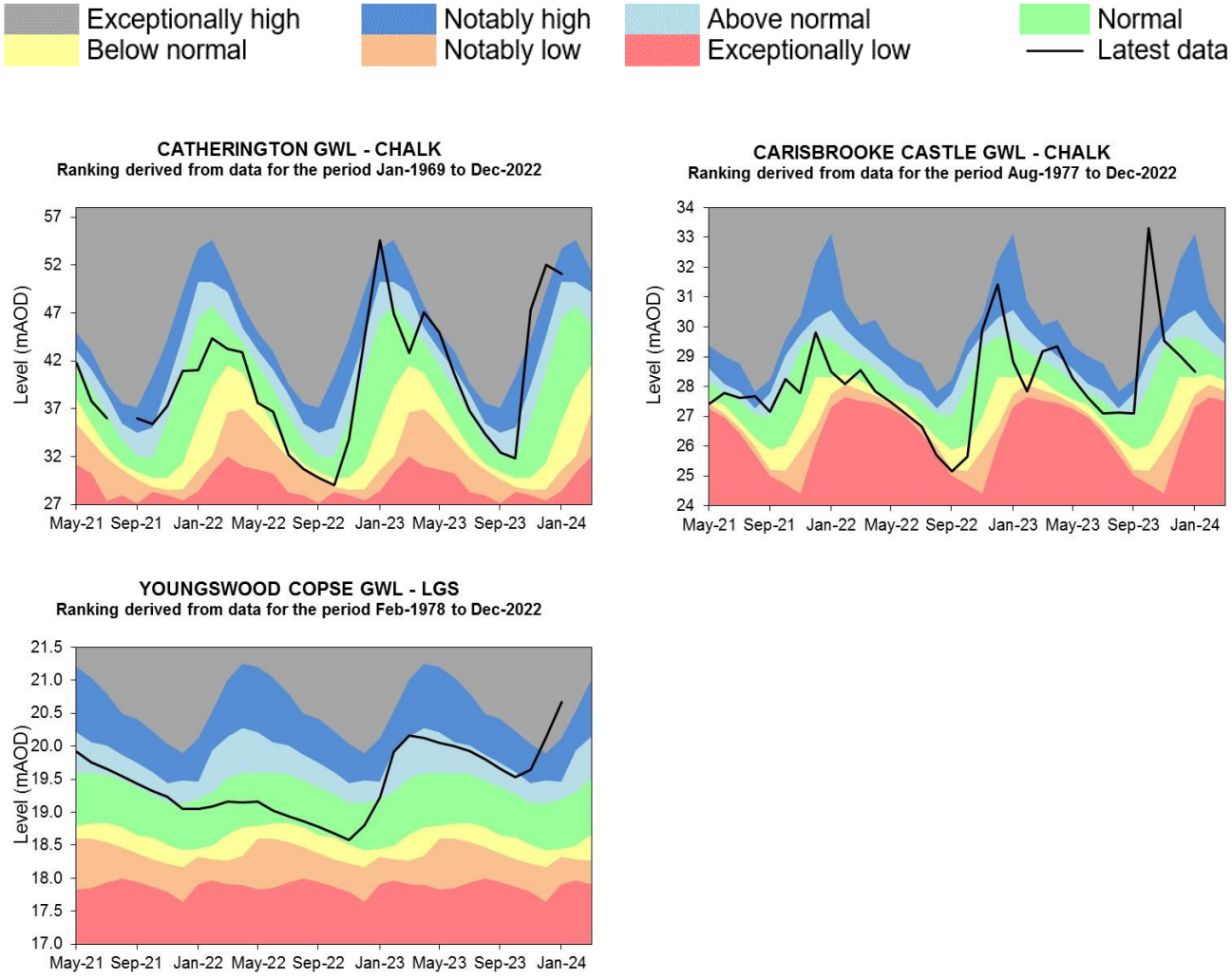
Figure 5.2 Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2024.

5.3 East Hampshire and Isle of Wight Groundwater level charts

Figure 5.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.

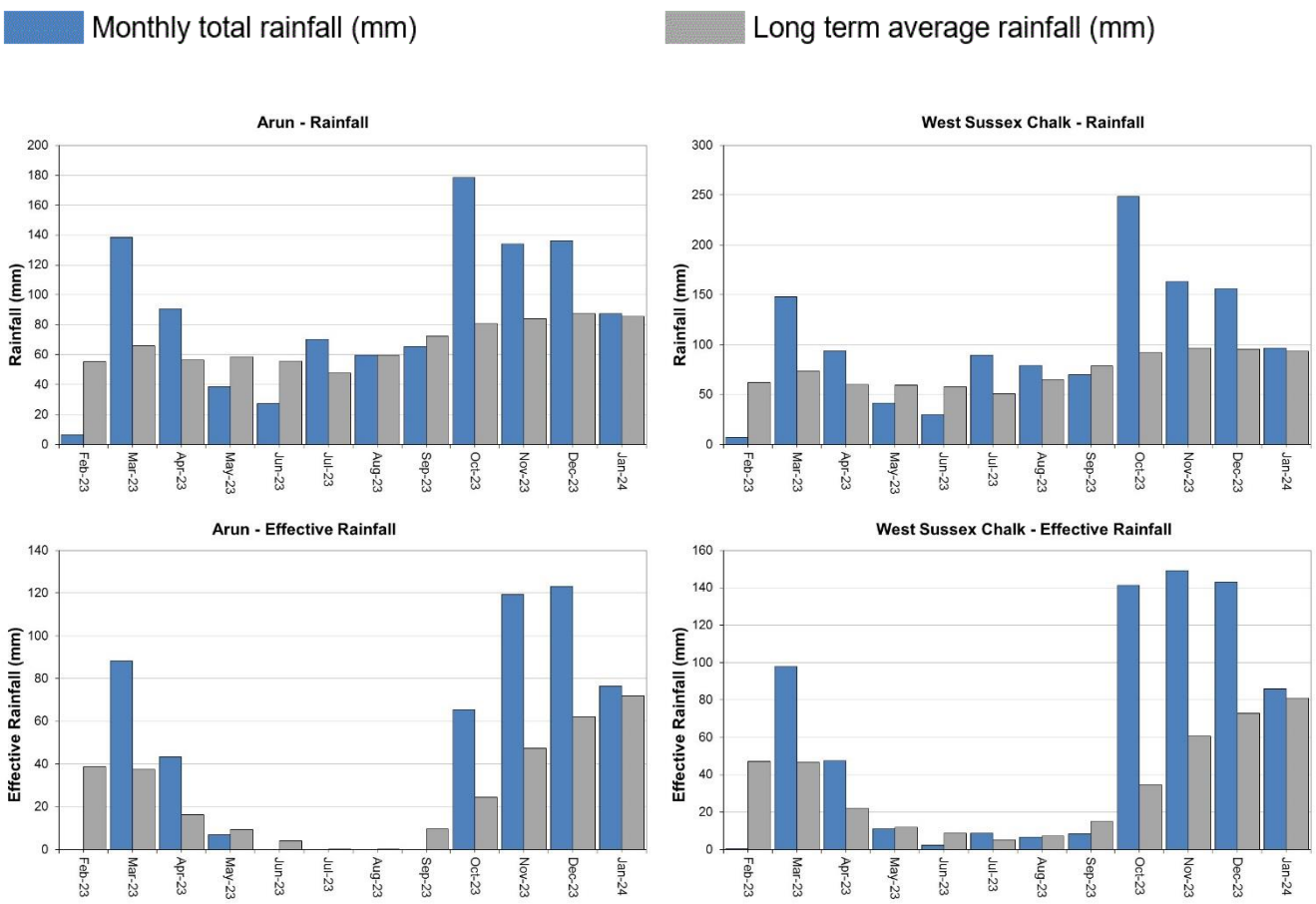


Source: Environment Agency, 2024.

6. West Sussex

6.1 West Sussex Rainfall and Effective Rainfall charts

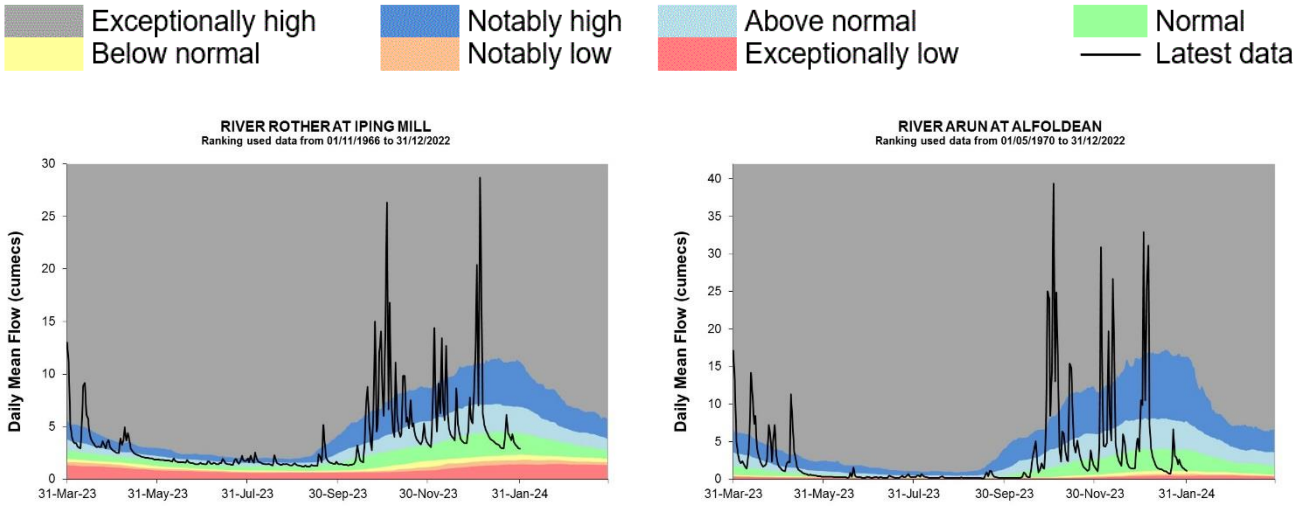
Figure 6.1: Monthly rainfall and effective rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average.



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

6.2 West Sussex River flow charts

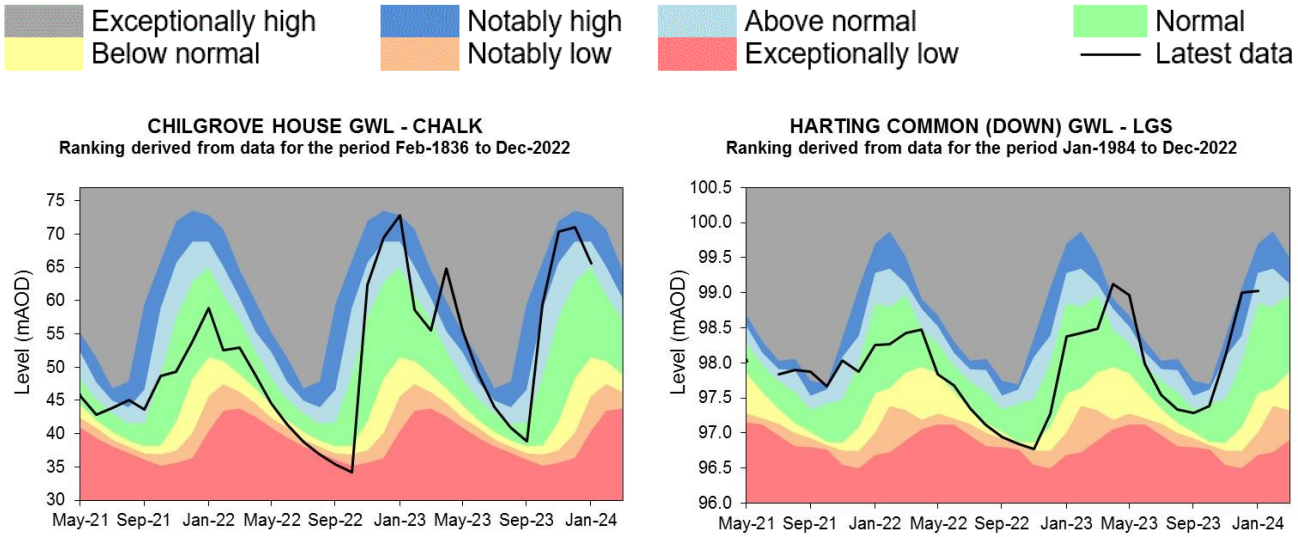
Figure 6.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2024.

6.3 West Sussex Groundwater level charts

Figure 6.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.

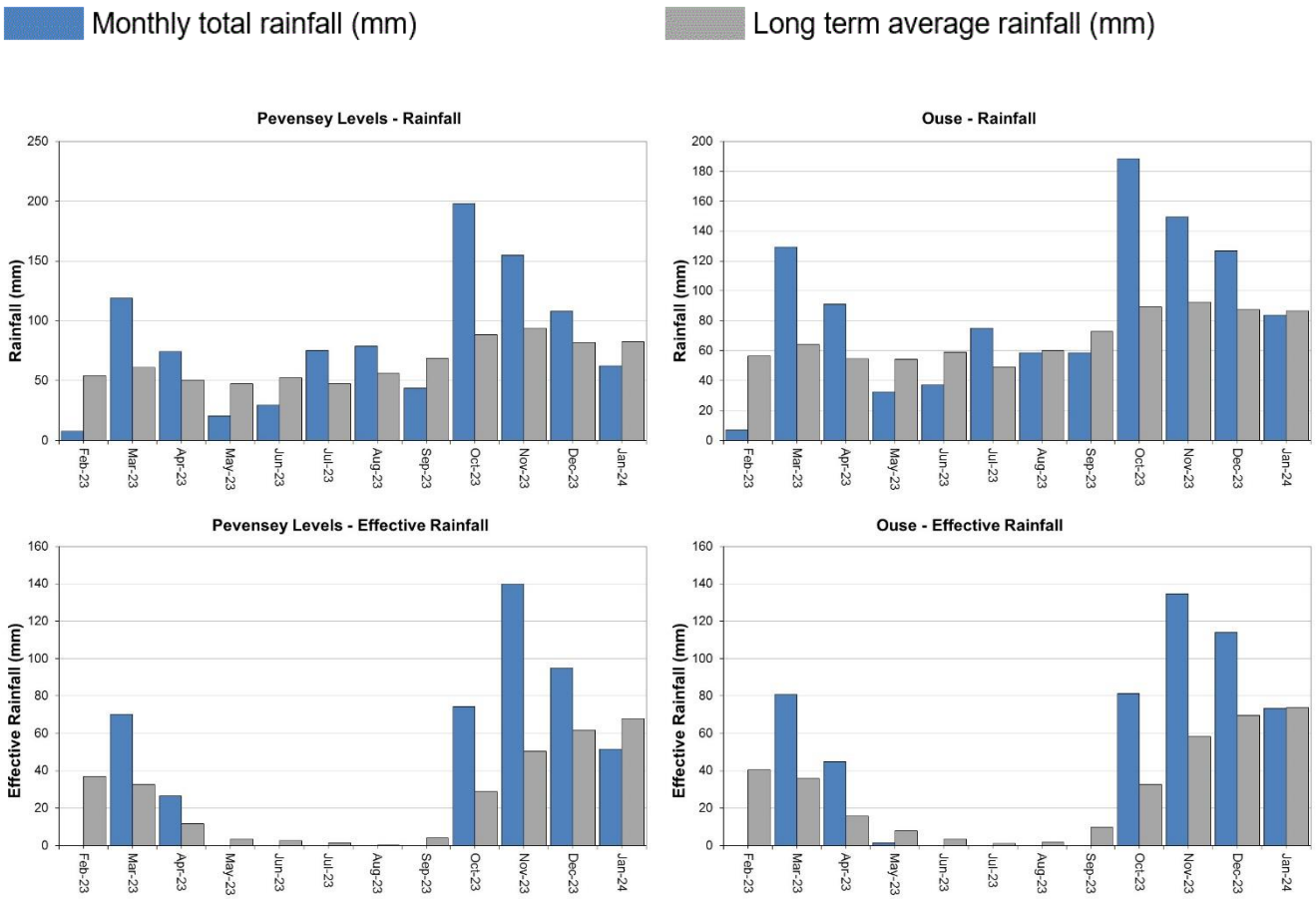


Source: Environment Agency, 2024.

7. East Sussex

7.1 East Sussex Rainfall and Effective Rainfall charts

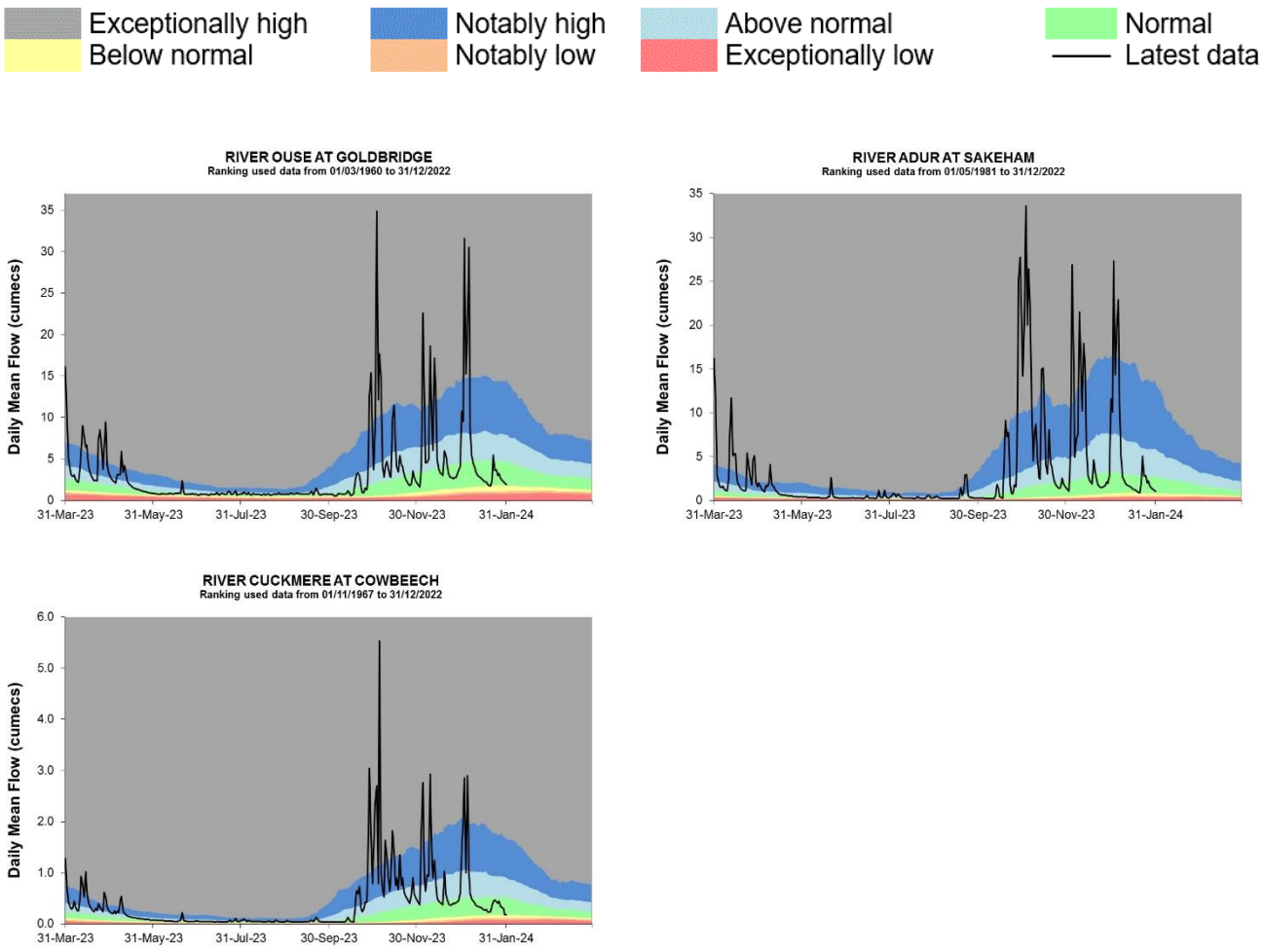
Figure 7.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

7.2 East Sussex River flow charts

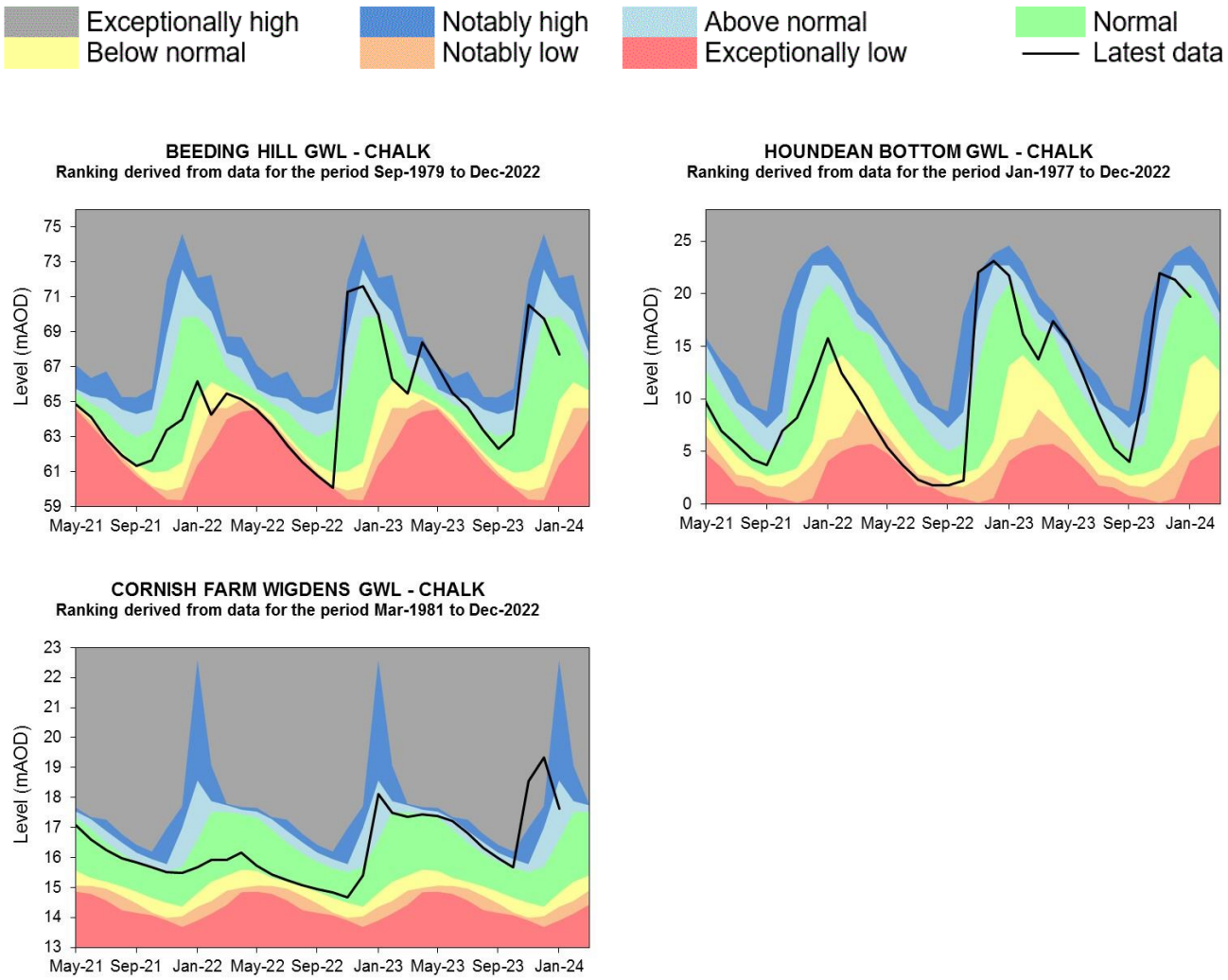
Figure 7.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2024.

7.3 East Sussex Groundwater level charts

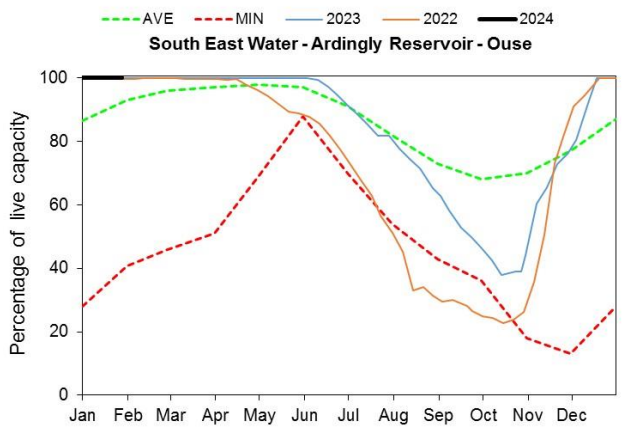
Figure 7.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.

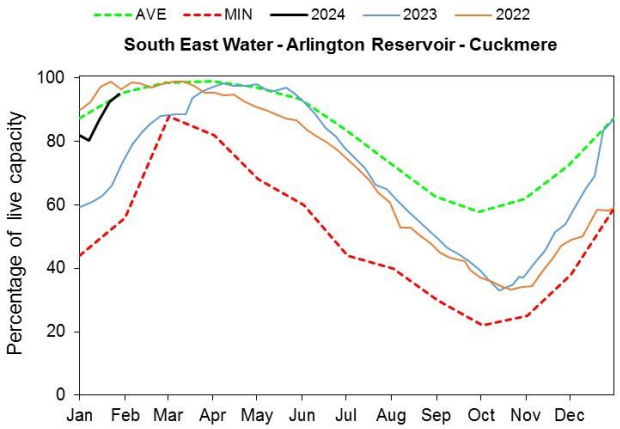


Source: Environment Agency, 2024.

8. Reservoir stocks

Figure 8.1: End of month 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).

9. Glossary

9.1 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).

9.2 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.

10. Appendices

10.1 Rainfall, effective rainfall and soil moisture deficit table

(Source: Met Office. Crown copyright, 2024). All rights reserved. Environment Agency, 100024198, 2024

Figure 10.1: This is areal rainfall, effective rainfall (percolation or runoff) and soil moisture deficit for the hydrological areas across the SSD. 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 10.2

Hydrological Area	Rainfall (mm) 30 day Total	Rainfall January as %LTA	Effective Rainfall (mm) 30 day Total	Effective Rainfall January as %LTA	Soil Moisture Deficit (SMD) Day 30	SMD End of January LTA
Test Chalk	91	107%	79	113%	2	2
East Hampshire Chalk	100	107%	89	110%	2	1
West Sussex Chalk	97	103%	86	106%	2	1
East Sussex Chalk	80	92%	69	97%	3	1
Isle of Wight	88	100%	77	116%	3	4
Western Rother Greensand	103	103%	92	107%	2	1
Hampshire Tertiaries	93	108%	80	116%	2	1
Lymington	95	107%	83	115%	2	1
Sussex Coast	79	103%	67	113%	3	2
Arun	87	102%	76	106%	3	1
Adur	83	98%	73	101%	3	1
Ouse	84	97%	73	100%	3	1
Cuckmere	76	89%	65	90%	3	1
Pevensey Levels	62	76%	52	76%	3	1
SSD Average	87	100%	76	105%	3	1

10.2 Seasonal summary table of rainfall and effective rainfall

Winter season: 01/10/2023 to 31/03/24

Hydrological Area	Seasonal Rainfall (mm) Total	Seasonal Rainfall as % LTA	Seasonal Effective Rainfall (mm) Total	Seasonal Effective Rainfall as % LTA
Test Chalk	522	159%	406	219%
East Hampshire Chalk	601	164%	466	202%
West Sussex Chalk	665	176%	520	209%
East Sussex Chalk	589	161%	438	195%
Isle of Wight	694	197%	531	292%
Western Rother Greensand	653	170%	511	202%
Hampshire Tertiaries	583	173%	443	236%
Lymington	625	179%	506	245%
Sussex Coast	580	185%	407	265%
Arun	536	159%	385	186%
Adur	530	154%	376	172%
Ouse	548	154%	403	172%
Cuckmere	564	159%	423	179%
Pevensey Levels	523	151%	361	173%
SSD Average	587	167%	441	207%

10.3 Rainfall banding table

Hydrological area	Jan 2024 band	Nov 2023 to Jan 2024 cumulative band	Aug 2023 to Jan 2024 cumulative band	Feb 2023 to Jan 2024 cumulative band
Test Chalk	Normal	Notably high	Exceptionally high	Exceptionally high
East Hampshire Chalk	Normal	Above normal	Exceptionally high	Exceptionally high
West Sussex Chalk	Normal	Notably high	Exceptionally high	Exceptionally high
East Sussex Chalk	Normal	Above normal	Exceptionally high	Notably high
Isle of Wight	Normal	Notably high	Exceptionally high	Exceptionally high
Western Rother Greensand	Normal	Notably high	Exceptionally high	Exceptionally high
Hampshire Tertiaries	Normal	Notably high	Exceptionally high	Exceptionally high
Lymington	Normal	Notably high	Exceptionally high	Exceptionally high
Sussex Coast	Normal	Notably high	Exceptionally high	Exceptionally high
Arun	Normal	Above normal	Notably high	Notably high
Adur	Normal	Above normal	Notably high	Notably high
Ouse	Normal	Above normal	Notably high	Notably high
Cuckmere	Normal	Above normal	Notably high	Notably high
Pevensey Levels	Normal	Above normal	Notably high	Notably high

10.4 River flows table

Site name	River	Catchment	Jan 2024 band	Dec 2023 band
Alfoldean GS	Arun	Arun	Normal	Notably high
Allbrook GS + Highbridge	Itchen (so)	Itchen	Exceptionally high	Exceptionally high
Blackwater	Medina	Isle of Wight	Normal	Normal
Broadlands	Test	Test Lower	Exceptionally high	Notably high
Brockenhurst GS	Lymington	New Forest	Above normal	Exceptionally high
Chilbolton GS	Test	Test Upper	Notably high	Notably high
Cowbeech GS	Cuckmere	Cuckmere	Normal	Above normal
Goldbridge GS	Ouse [so]	Ouse Sussex	Above normal	Above normal
Iping Mill GS	Rother	West Rother	Above normal	Notably high
Mislingford GS	Meon	Meon	Notably high	Notably high
North Fareham GS	Wallington	Wallington	Above normal	Notably high
Sakeham GS	Adur	Adur	Above normal	Notably high

10.5 Groundwater table

Site name	Aquifer	End of Jan 2024 band	End of Dec 2023 band
Houndean Bottom Gwl	Brighton Chalk Block	Normal	Above normal
Chilgrove House Gwl	Chichester-Worthing-Portsdown Chalk	Above normal	Notably high
Carisbrooke Castle	Isle Of Wight Central Downs Chalk	Normal	Normal
West Meon Hut Gwl	River Itchen Chalk	Notably high	Exceptionally high
Clanville Gate Gwl	River Test Chalk	Exceptionally high	Exceptionally high
Lopcombe Corner Gwl	River Test Chalk	Notably high	Exceptionally high
Beeding Hill Gwl	Brighton Chalk Block	Normal	Normal
Catherington	River Meon Chalk	Notably high	Exceptionally high
Cornish Wigdens Gwtr	Eastbourne Chalk Block	Above normal	Exceptionally high
Harting Common Down	Western Rother Lower Greensand	Above normal	Notably high
Preston Candover	River Itchen Chalk	Exceptionally high	Exceptionally high
Youngwoods Copse	Isle of Wight Lower Greensand	Exceptionally high	Exceptionally high

10.6 Abstraction licence flow constraints

Number of flow constraints in force between 1 to 8 January 2024	Number of flow constraints in force between 9 to 15 January 2024	Number of flow constraints in force between 16 to 22 January 2024	Number of flow constraints in force between 23 to 31 January 2024
0	0	0	0

10.7 Solent and South Downs Areal Rainfall Units Map

10.8 SSD Areal Rainfall Monthly Long Term Averages

Hydrological Area	Jan LTA mm	Feb LTA mm	Mar LTA mm	Apr LTA mm	May LTA mm	Jun LTA mm	Jul LTA mm	Aug LTA mm	Sep LTA mm	Oct LTA mm	Nov LTA mm	Dec LTA mm
Test Chalk	84.8	57.9	68.7	51.7	59.0	57.3	47.9	62.5	67.9	75.4	79.9	89.1
East Hampshire Chalk	93.8	62.5	73.9	56.2	61.9	58.7	51.7	64.6	77.0	86.2	90.5	94.8
West Sussex Chalk	93.5	62.5	73.9	60.2	59.5	57.6	50.7	64.8	78.5	92.0	97.0	95.5
East Sussex Chalk	87.1	56.9	65.1	53.5	51.5	57.4	48.9	60.3	72.7	92.9	97.9	88.7
Isle of Wight	88.2	60.4	67.0	52.3	53.2	50.2	44.1	57.4	70.2	84.3	91.2	88.1
Western Rother Greensand	99.5	64.5	75.5	60.6	62.6	57.3	50.4	65.6	78.8	90.8	94.7	99.7
Hampshire Tertiaries	86.1	59.2	67.0	50.4	56.8	52.8	44.5	58.7	69.6	78.8	83.4	88.7
Lymington	88.5	61.2	68.5	51.5	57.9	54.3	43.4	59.3	71.0	83.0	86.8	91.8
Sussex Coast	76.6	51.3	60.7	50.2	50.2	47.7	41.9	53.0	63.7	77.2	80.8	78.9
Arun	85.5	55.1	65.5	56.5	58.5	55.6	47.2	59.4	72.4	80.5	83.9	86.9
Adur	84.8	55.1	63.8	55.3	56.2	55.6	46.0	59.6	71.5	85.7	88.8	86.0
Ouse	86.6	56.4	64.0	54.4	54.0	58.6	48.7	60.0	72.5	89.1	92.9	87.6
Cuckmere	84.8	55.2	61.8	51.2	50.1	57.5	48.5	59.8	71.5	90.8	93.7	85.0
Pevensey Levels	82.2	54.0	60.9	50.6	47.5	52.2	47.3	55.6	68.5	88.1	93.6	82.0
SSD Average	**87.3**	**58.0**	**66.9**	**53.9**	**55.6**	**55.2**	**47.2**	**60.0**	**71.8**	**85.3**	**89.6**	**88.8**