Monthly water situation report: Solent and South Downs Area

Summary - February 2024

This month was the wettest February on record for Solent and South Downs (SSD) since 1891 and the area received 300% (174mm) of the (LTA) rainfall (58 mm). Monthly mean river flows and groundwater levels across SSD ranged from above normal to exceptionally high. Soils across SSD ended the month wetter than the average. End of month reservoir stocks were above average at Ardingly Reservoir (Ouse) and were below average at Arlington Reservoir (Cuckmere).

1.1 Rainfall

This month was the wettest February on record for SSD since 1891 and the area received 300% (174mm) of the (LTA) rainfall (58 mm). The rainfall pattern across SSD for February shows the largest totals in the south-east of the area (Isle of Wight, south-east of Sussex), which received more than three times the average rainfall. The East Sussex Chalk areal unit received the most rainfall with 343% (195mm) of LTA (56.9mm), which is the highest on its record.

Even the areal units with lower totals received far above average rainfall in February. In the Test Chalk areal unit rainfall amounted to 262% (152mm) of the LTA rainfall (57.9mm) and in the Arun to 270% (149mm) of the LTA rainfall (55.1mm)

The recorded amounts were in the top five highest rainfall totals for February in all areal units.

The highest rainfall total on record were recorded:

- Sussex Coast
- West Sussex Chalk
- East Sussex Chalk
- Cuckmere
- Pevensey Levels

Areal units with their second highest rainfall totals on record:

- East Hampshire Chalk
- Hampshire Tertiaries
- Lymington
- Isle of Wight
- Western Rother Greensand
- Ouse.

Adur areal unit had its third highest rainfall totals on record while Test Chalk and Arun had the fifth highest rainfall totals.

The wettest day was the 25 February and the highest daily total of 43.8mm was recorded at Hastings Baldslow (Pevensey Levels). The first five days of the month were mostly dry, while the rest of the month was wet with only a few odd days when it was relatively dry.

1.2 Soil moisture deficit and recharge

Soils across SSD ended the month wetter than the average for February, which means catchments are more responsive to run off.

1.3 River flows

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

Flows were above normal:

- River Test at Chilbolton
- River Test at Broadlands

Flows were notably high:

- River Itchen at Allbrook & Highbridge
- River Meon at Mislingford
- River Wallington at North Fareham
- River Medina at Blackwater
- River Rother at Iping Mill
- River Arun at Alfoldean

Flows were exceptionally high:

- River Lymington at Brockenhurst
- River Adur at Sakeham
- River Ouse at Goldbridge
- River Cuckmere at Cowbeech

The monthly mean flows on the River Lymington at Brockenhurst, on the River Adur at Sakeham and on the River Cuckmere at Cowbeech were the second highest on record in February since 1960, 1967 and 1968, respectively. The River Itchen at Allbrook & Highbridge, River Arun at Alfoldean and River Ouse at Goldbridge had their fourth highest monthly mean flows.

1.4 Groundwater levels

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

Groundwater levels were above normal at:

- Cornish Farm (East Sussex Chalk)

Groundwater levels were notably high at:

- Clanville Gate (Test Chalk)
- Preston Candover (East Hampshire Chalk).
- Lopcombe Corner (Test Chalk)
- West Meon (East Hampshire Chalk)
- Catherington (East Hampshire Chalk)

Groundwater levels were exceptionally high at:

- Carisbrooke Castle (Isle of Wight)
- Youngwoods Copse (Isle of Wight)
- Harting Common (Western Rother Greensand)
- Chilgrove (West Sussex Chalk)
- Beeding Hill (West Sussex Chalk)
- Houndean Bottom (East Sussex Chalk)

Groundwater levels for February were the highest on record at Youngwoods Copse and at Beeding Hill since 1978 and 1979, respectively. Groundwater levels were the second highest on record at Carisbrooke Castle, at Harting Common, at Chilgrove and at Houndean Bottom. Also, groundwater levels were were third highest on record at Preston Candover and West Meon.

1.5 Reservoir stocks

End of month reservoir stocks were above average at Ardingly Reservoir (Ouse) with 100% of total capacity (LTA 96%) and were below average at Arlington Reservoir (Cuckmere) with 93.9% of total capacity (LTA 98.6%).

1.6 Environmental impact

No licence restrictions were in force in February.

There were 50 Flood Alerts issued in February. In Hampshire 14 fluvial, on the Isle of Wight 4 fluvial and in Sussex 1 groundwater and 31 fluvial Flood Alerts were issued.

There were 18 Flood Warnings issued in February. In Hampshire 5 and in Sussex 13; all fluvial.

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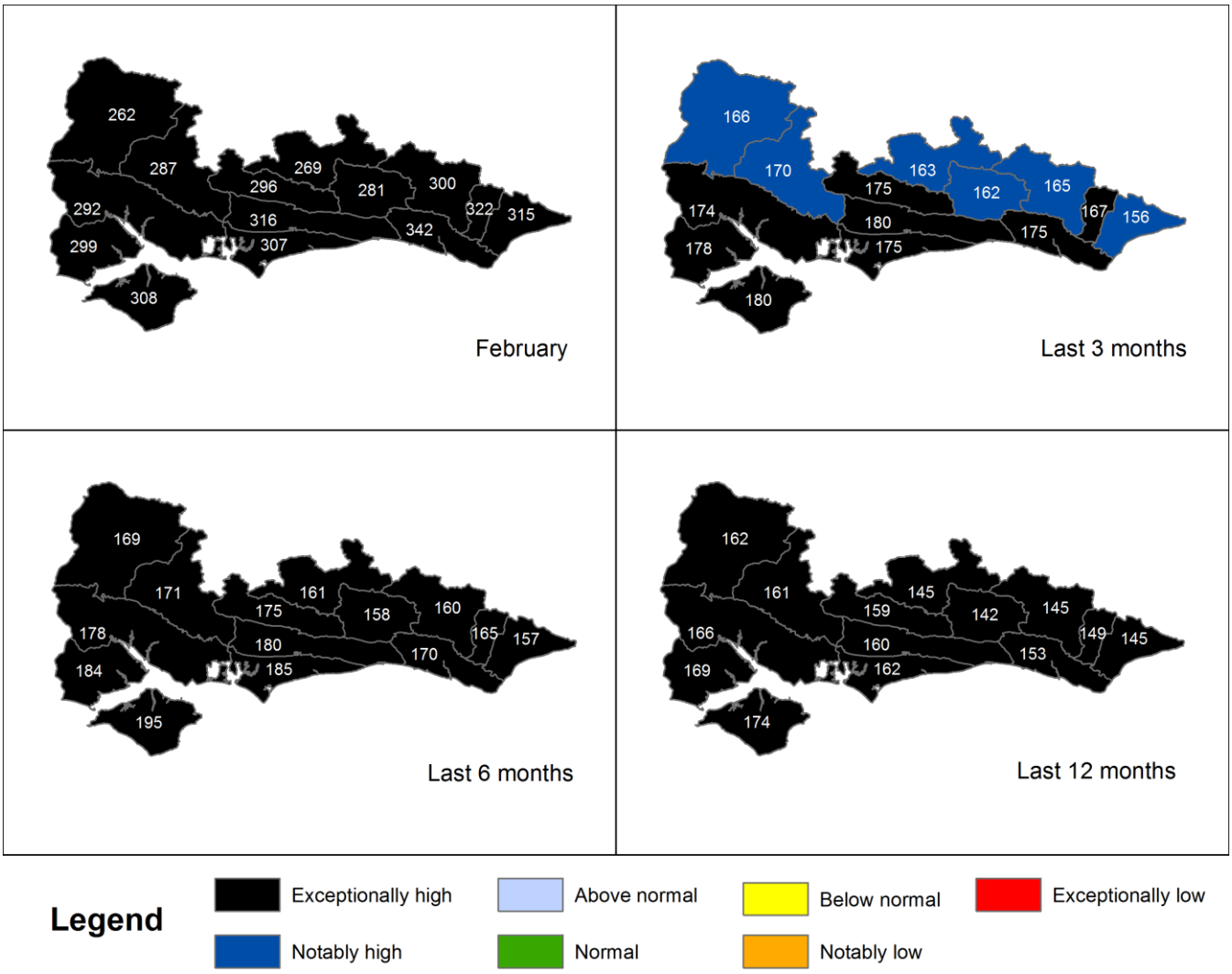
2. Rainfall

2.1 Rainfall map

Figure 2.1: Total rainfall for hydrological areas for the current month (up to 29 February 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.

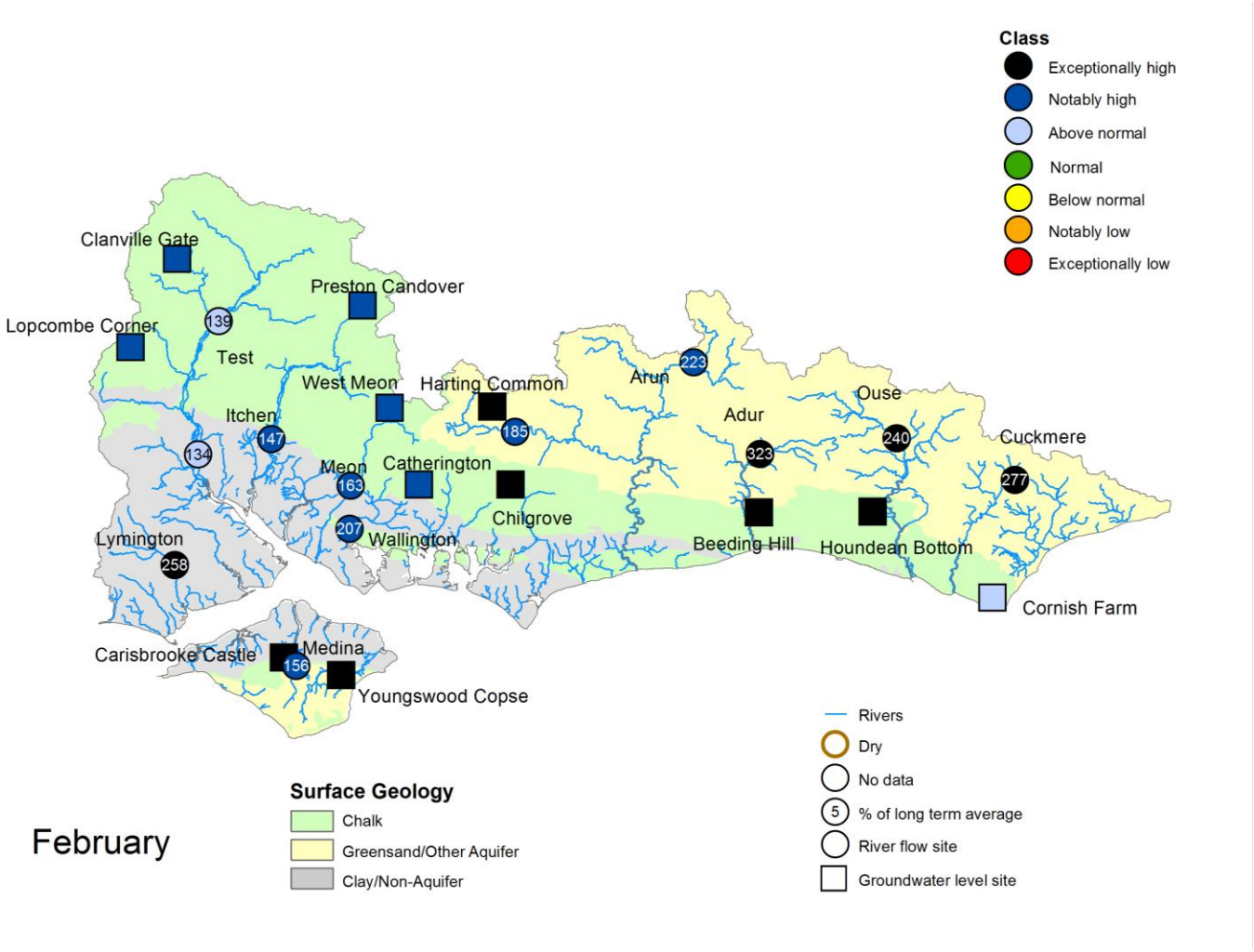


Rainfall data for 2024, extracted from Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. (Source: Environment Agency. Crown Copyright, 100024198, 2024). Rainfall data prior to 2024, extracted from Met Office HadUK 1km gridded rainfall dataset derived 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 February 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic February monthly means. Table available in the appendices with detailed information.

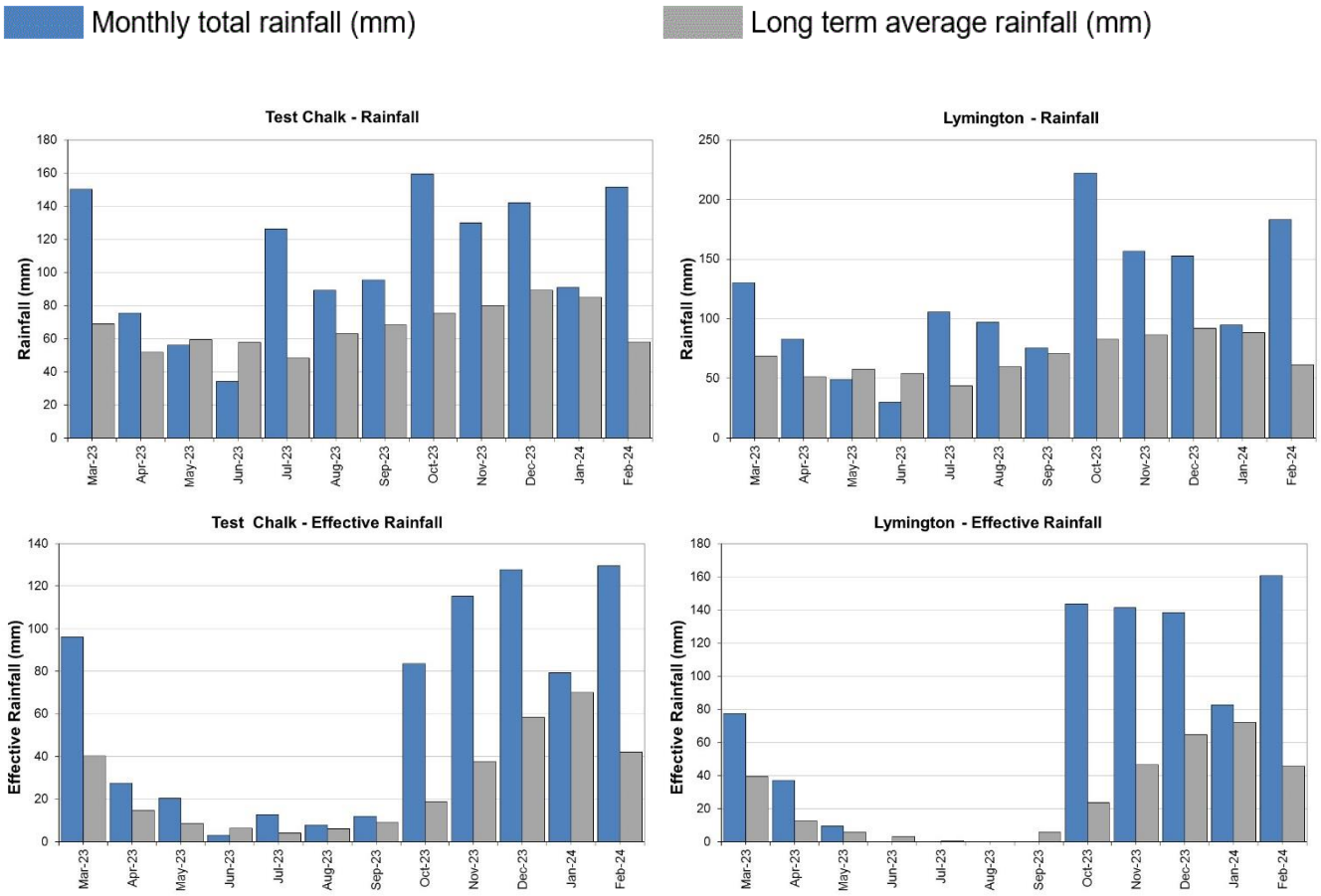


(Source: Environment Agency). Crown copyright. All rights reserved. Environment Agency, 100024198, 2024. Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2024.

4. West Hampshire

4.1 West Hampshire Rainfall and effective rainfall charts

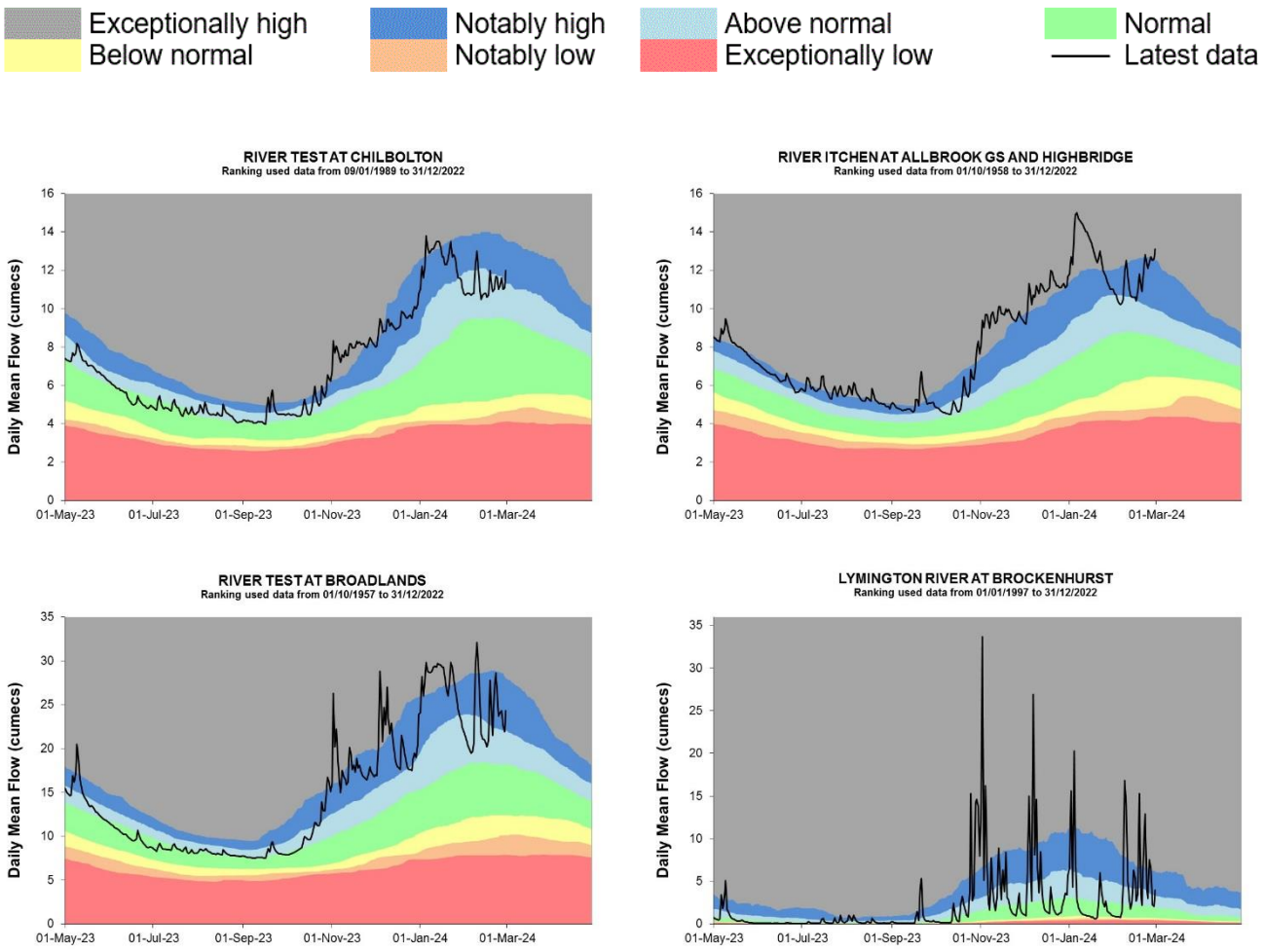
Figure 4.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

4.2 West Hampshire River flow charts

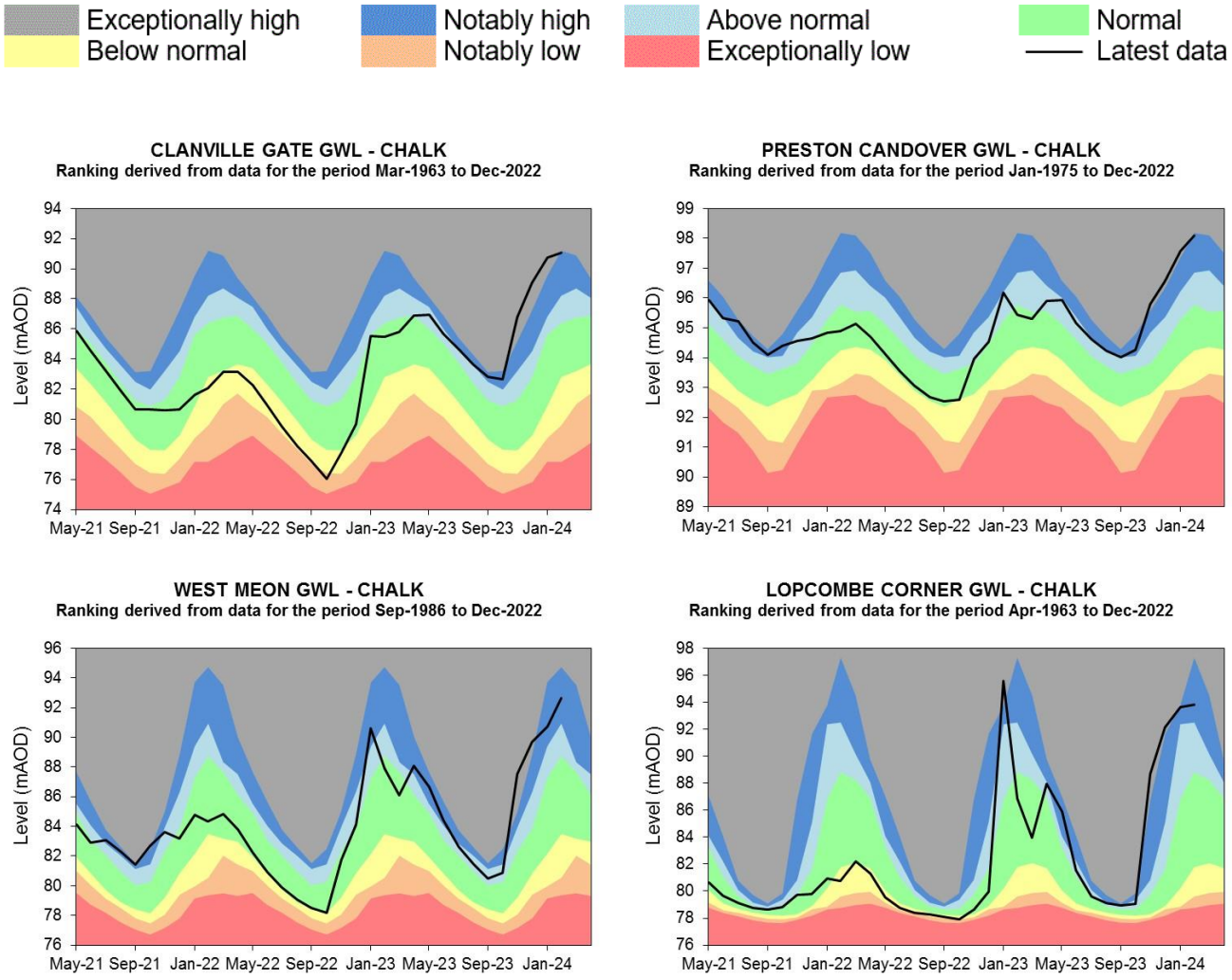
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



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.

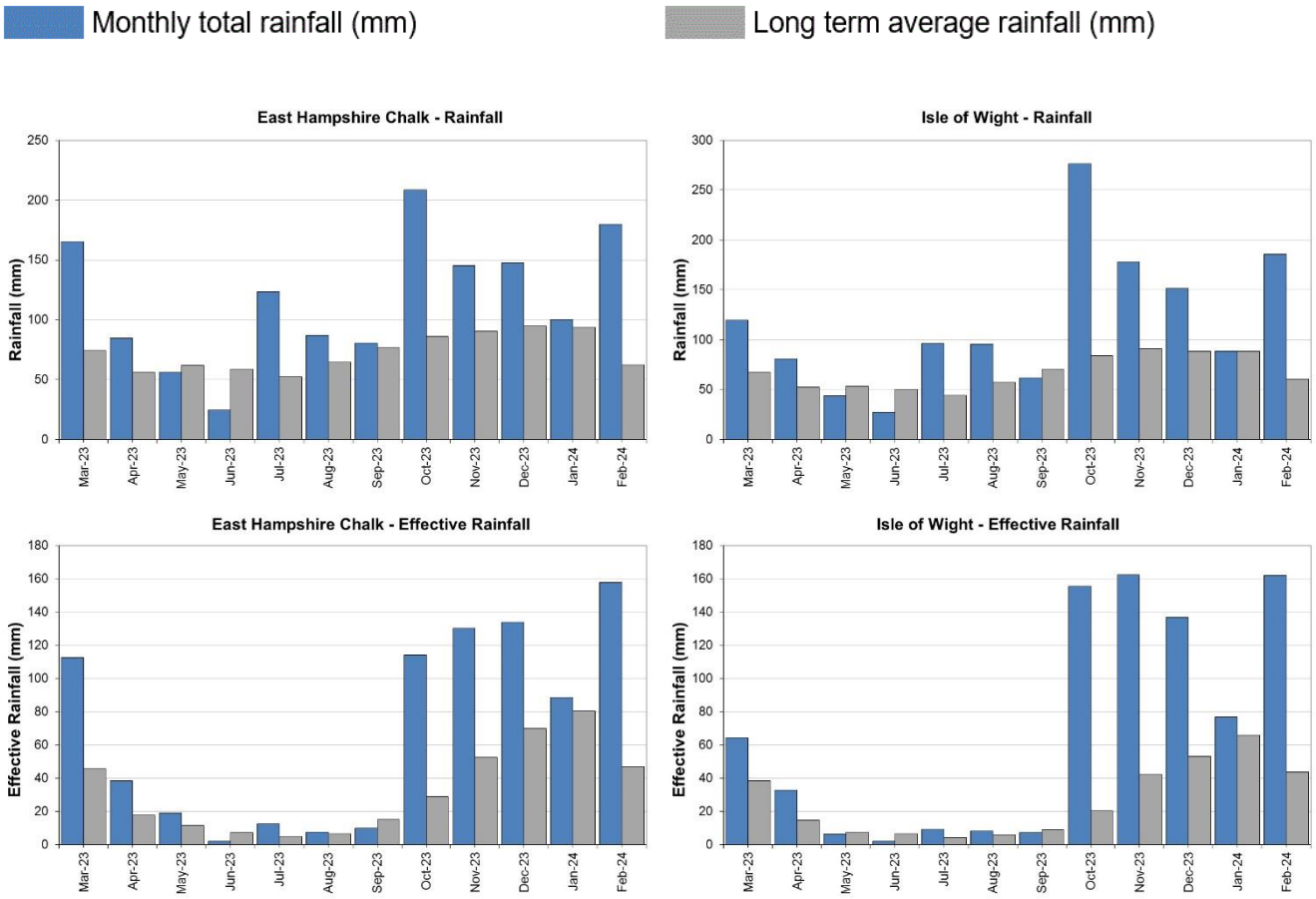


Source: Environment Agency, 2024.

5. East Hampshire and Isle of Wight

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

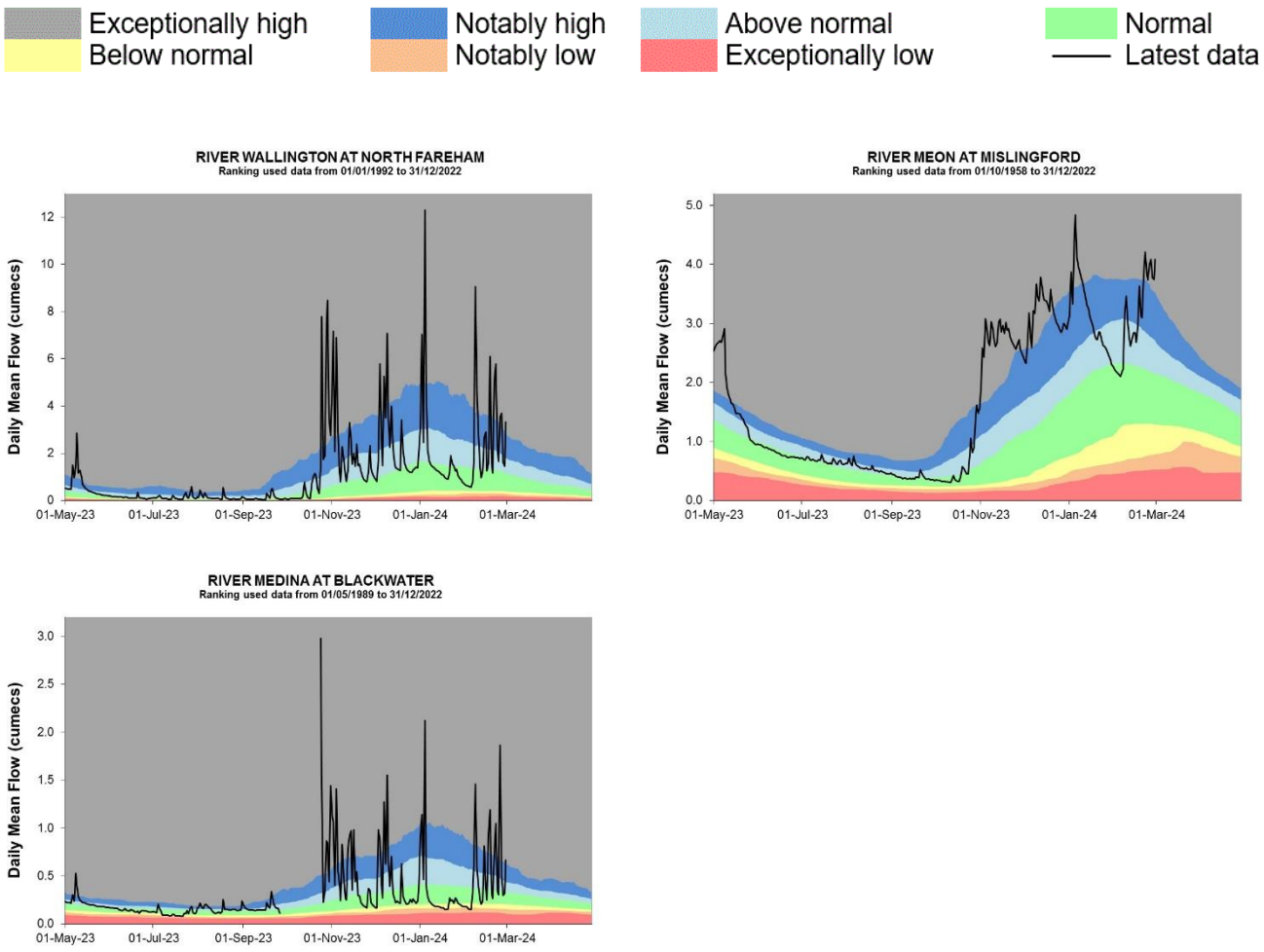
Figure 5.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

5.2 East Hampshire and Isle of Wight River flow charts

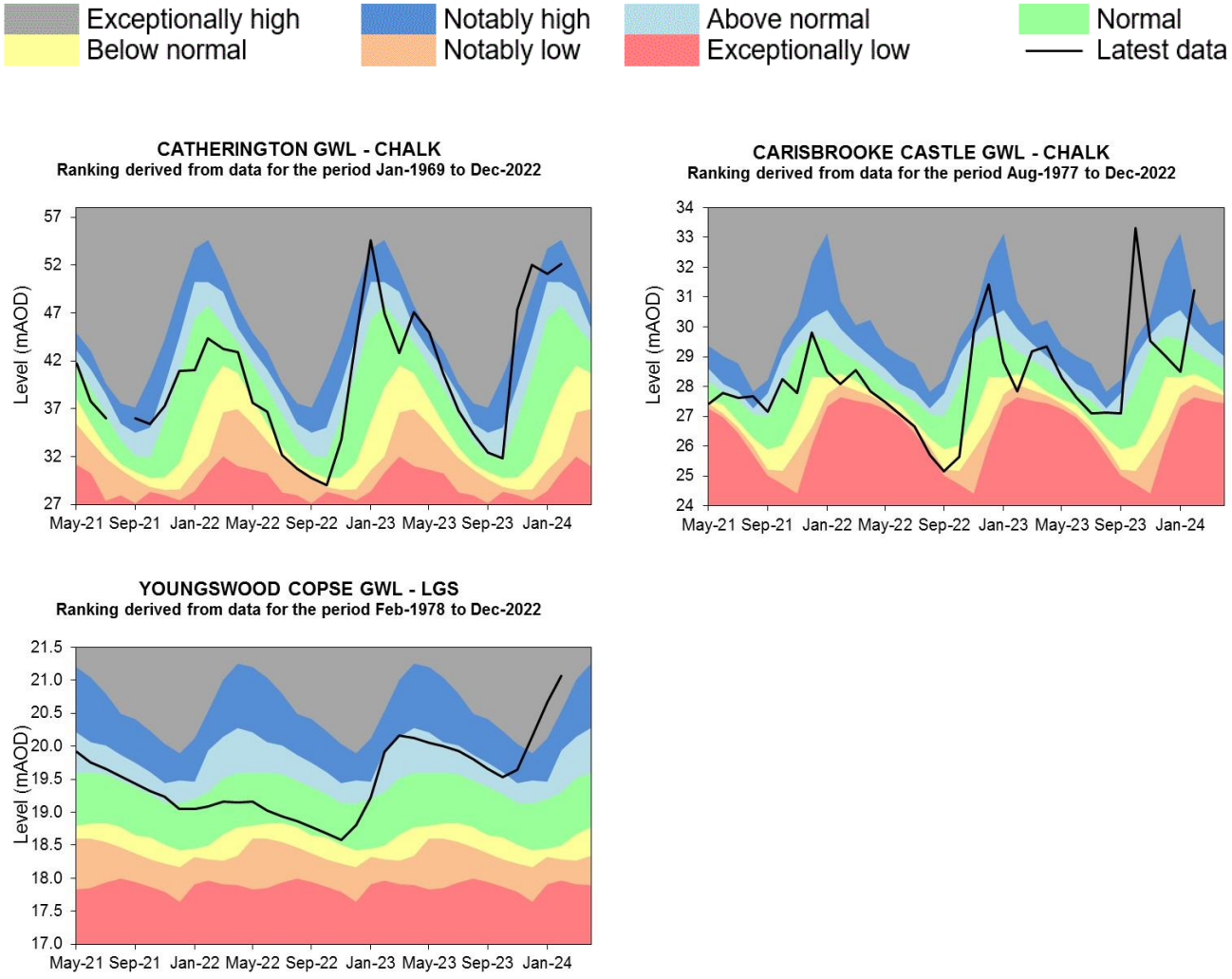
Figure 5.2 Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



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.

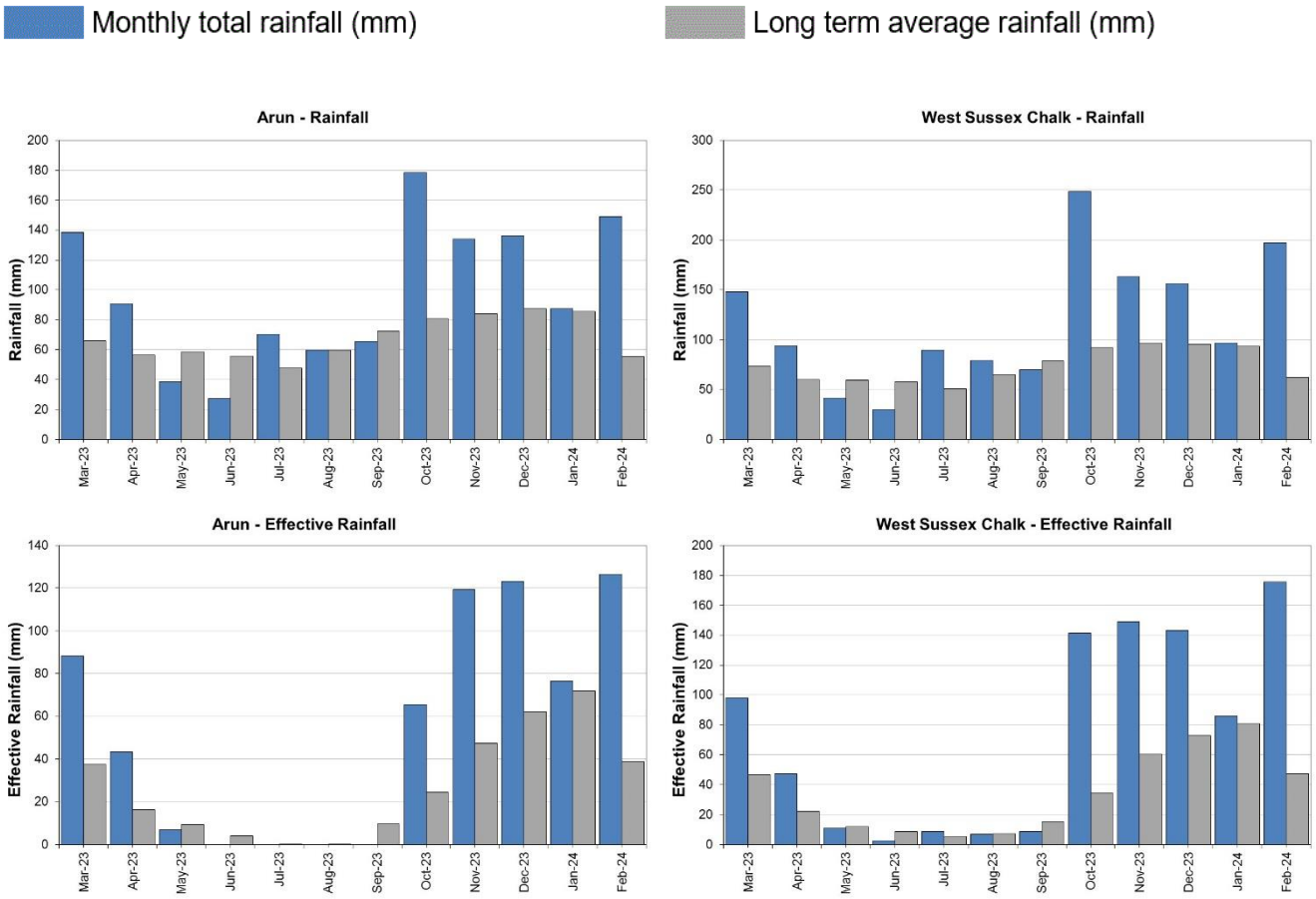


Source: Environment Agency, 2024.

6. West Sussex

6.1 West Sussex Rainfall and Effective Rainfall charts

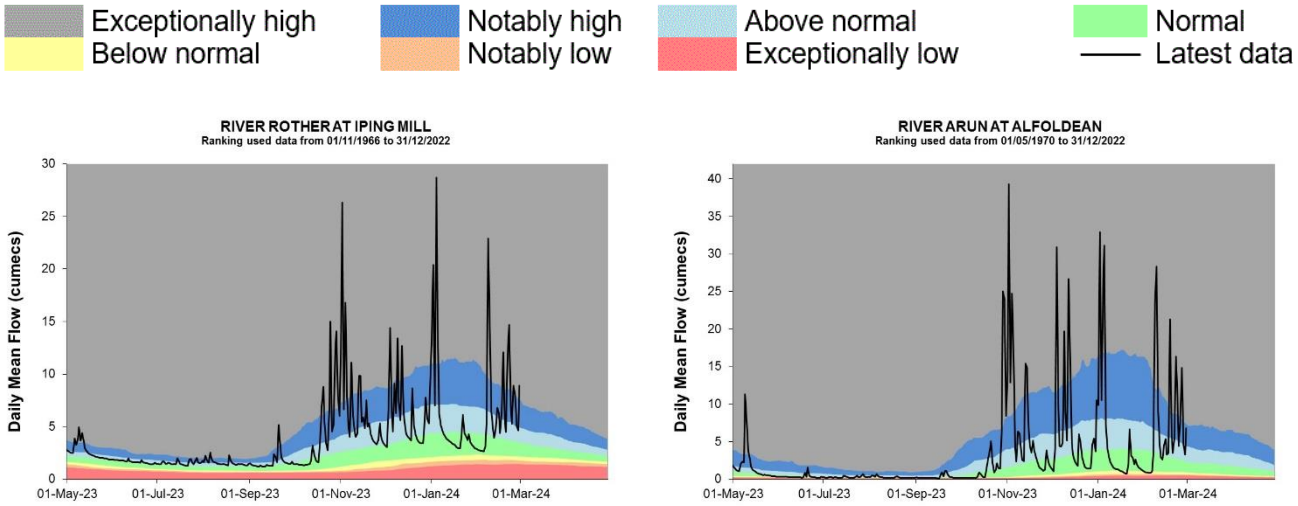
Figure 6.1: Monthly rainfall and effective rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average.



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

6.2 West Sussex River flow charts

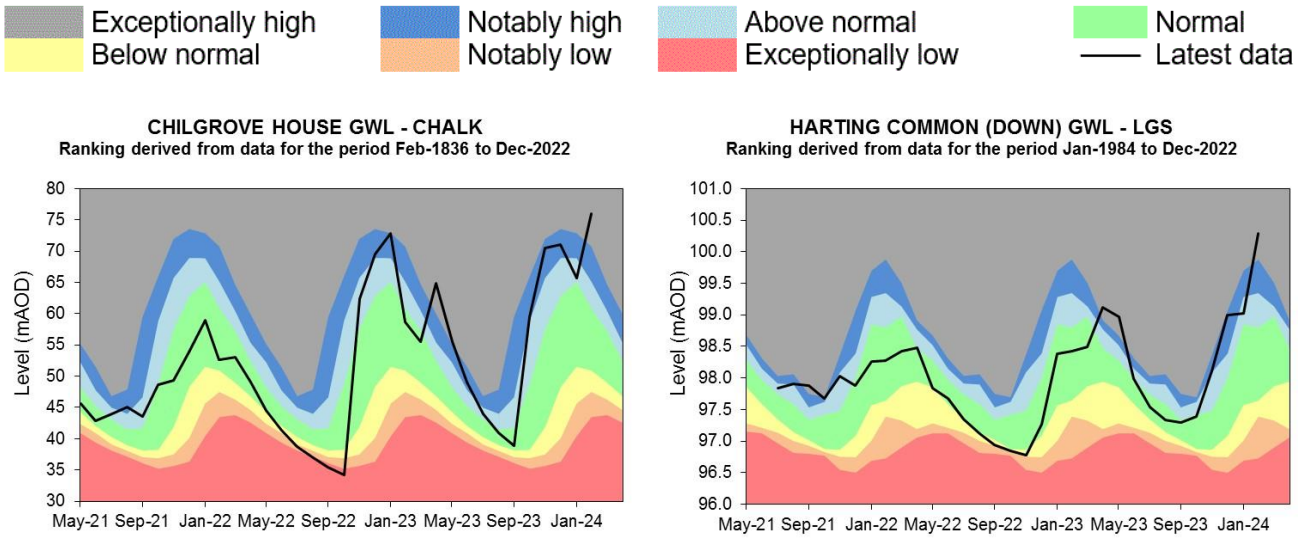
Figure 6.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



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.

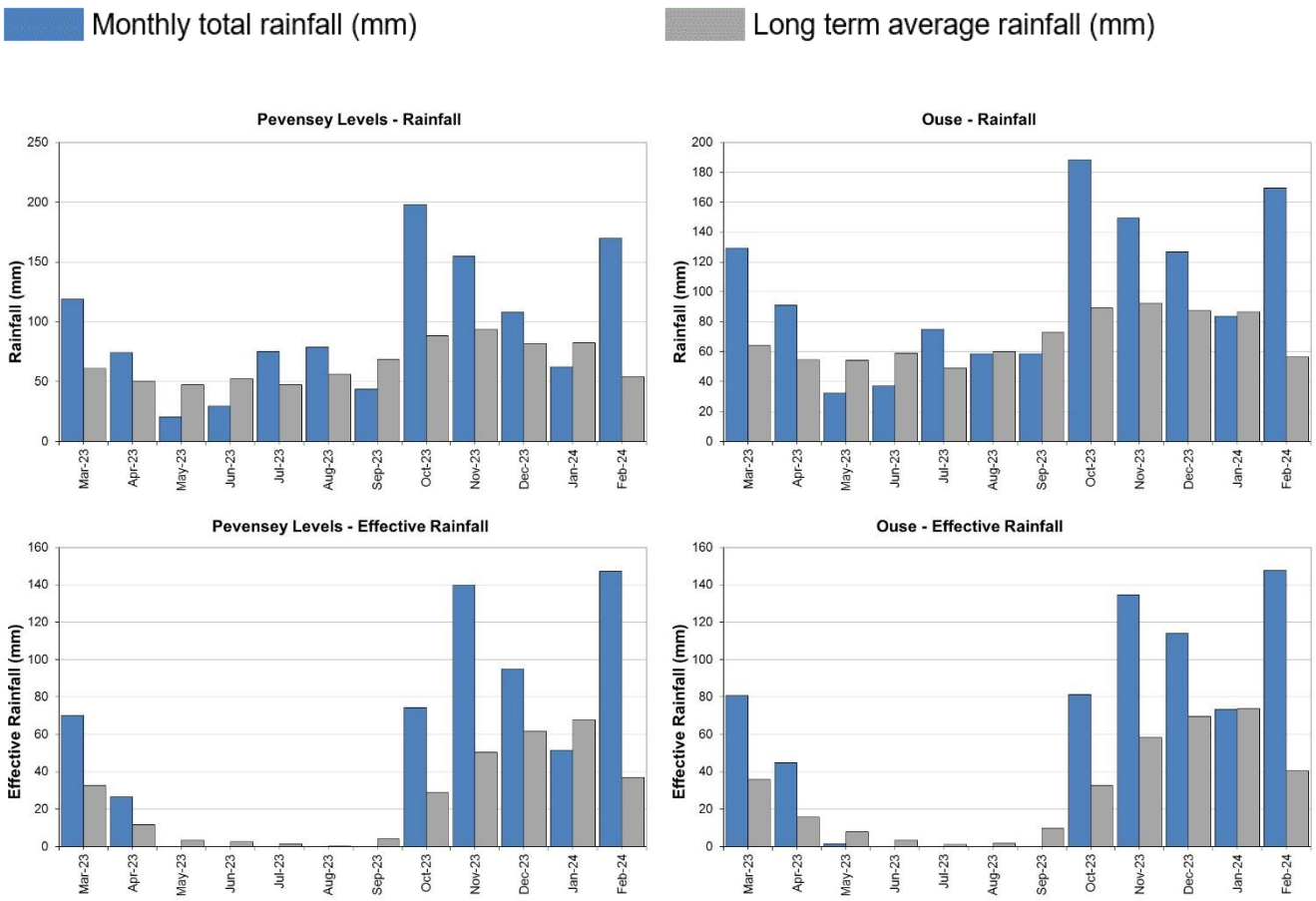


Source: Environment Agency, 2024.

7. East Sussex

7.1 East Sussex Rainfall and Effective Rainfall charts

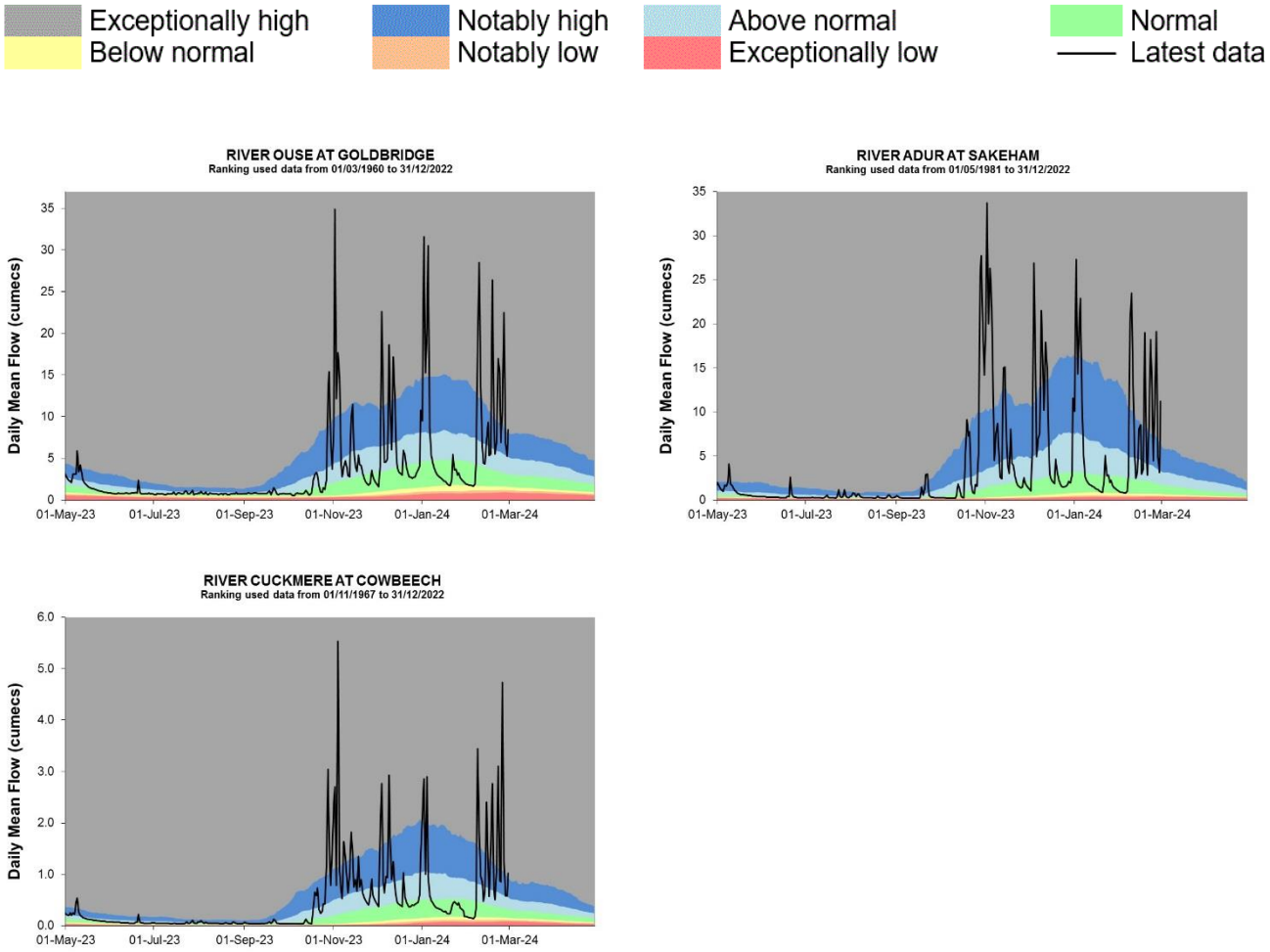
Figure 7.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

7.2 East Sussex River flow charts

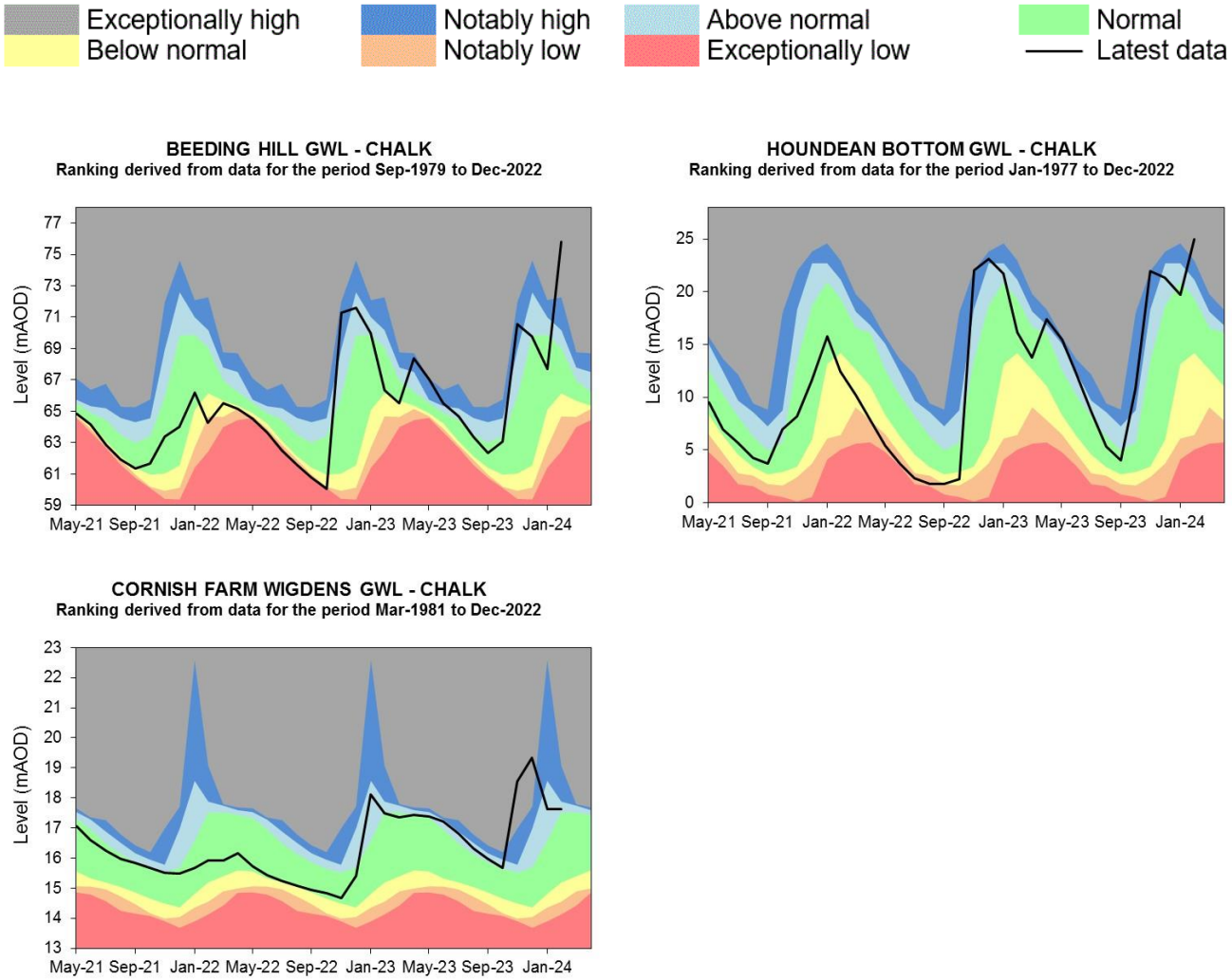
Figure 7.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2024.

7.3 East Sussex Groundwater level charts

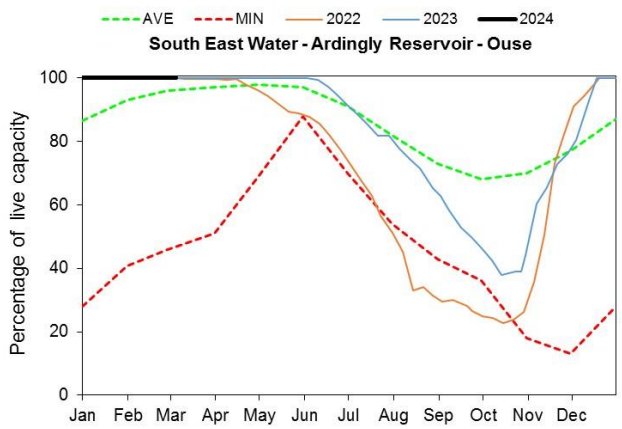
Figure 7.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.

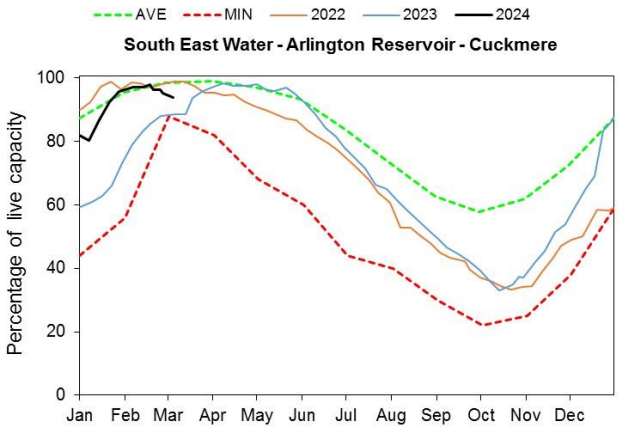


Source: Environment Agency, 2024.

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) 29 day Total	Rainfall February as %LTA	Effective Rainfall (mm) 29 day Total	Effective Rainfall February as %LTA	Soil Moisture Deficit (SMD) Day 29	SMD End of February LTA
Test Chalk	152	262%	130	307%	0	3
East Hampshire Chalk	180	287%	158	336%	0	2
West Sussex Chalk	197	315%	176	373%	0	2
East Sussex Chalk	195	343%	173	428%	0	3
Isle of Wight	186	308%	162	373%	0	3
Western Rother Greensand	191	296%	169	348%	0	2
Hampshire Tertiaries	173	293%	151	357%	0	3
Lymington	183	299%	161	354%	0	3
Sussex Coast	158	307%	134	399%	0	3
Arun	149	270%	126	328%	0	2
Adur	154	280%	133	339%	0	2
Ouse	169	300%	148	366%	0	2
Cuckmere	178	322%	156	395%	0	2
Pevensey Levels	170	314%	147	398%	0	3
SSD Average	174	300%	152	363%	0	3

10.2 Seasonal summary table of rainfall and effective rainfall

Winter season: 01/10/2023 to 31/03/2024

Hydrological Area	Seasonal Rainfall (mm) Total	Seasonal Rainfall as % LTA	Seasonal Effective Rainfall (mm) Total	Seasonal Effective Rainfall as % LTA
Test Chalk	674	174%	535	236%
East Hampshire Chalk	780	182%	624	224%
West Sussex Chalk	862	196%	695	235%
East Sussex Chalk	785	185%	611	231%
Isle of Wight	880	213%	693	308%
Western Rother Greensand	843	188%	680	226%
Hampshire Tertiaries	756	191%	593	259%
Lymington	808	196%	667	264%
Sussex Coast	737	202%	541	289%
Arun	685	175%	511	209%
Adur	685	171%	509	197%
Ouse	717	174%	551	201%
Cuckmere	742	181%	579	210%
Pevensey Levels	693	173%	508	207%
SSD Average	760	186%	593	233%

10.3 Rainfall banding table

Hydrological area	Feb 2024 band	Dec 2023 to Feb 2024 cumulative band	Sept 2023 to Feb 2024 cumulative band	Marc 2023 to Feb 2024 cumulative band
Test Chalk	Exceptionally high	Notably high	Exceptionally high	Exceptionally high
East Hampshire Chalk	Exceptionally high	Notably high	Exceptionally high	Exceptionally high
West Sussex Chalk	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
East Sussex Chalk	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
Isle of Wight	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
Western Rother Greensand	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
Hampshire Tertiaries	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
Lymington	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
Sussex Coast	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
Arun	Exceptionally high	Notably high	Exceptionally high	Exceptionally high
Adur	Exceptionally high	Notably high	Exceptionally high	Exceptionally high
Ouse	Exceptionally high	Notably high	Exceptionally high	Exceptionally high
Cuckmere	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
Pevensey Levels	Exceptionally high	Notably high	Exceptionally high	Exceptionally high

10.4 River flows table

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

10.5 Groundwater table

Site name	Aquifer	End of Feb 2024 band	End of Jan 2024 band
Houndean Bottom Gwl	Brighton Chalk Block	Exceptionally high	Normal
Chilgrove House Gwl	Chichester-Worthing-Portsdown Chalk	Exceptionally high	Above normal
Carisbrooke Castle	Isle Of Wight Central Downs Chalk	Exceptionally high	Normal
West Meon Hut Gwl	River Itchen Chalk	Notably high	Notably high
Clanville Gate Gwl	River Test Chalk	Notably high	Exceptionally high
Lopcombe Corner Gwl	River Test Chalk	Notably high	Notably high
Beeding Hill Gwl	Brighton Chalk Block	Exceptionally high	Normal
Catherington	River Meon Chalk	Notably high	Notably high
Cornish Wigdens Gwtr	Eastbourne Chalk Block	Above normal	Above normal
Harting Common Down	Western Rother Lower Greensand	Exceptionally high	Above normal
Preston Candover	River Itchen Chalk	Notably 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 5 February 2024	Number of flow constraints in force between 6 to 12 February 2024	Number of flow constraints in force between 13 to 19 February 2024	Number of flow constraints in force between 20 to 29 February 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**