

# Monthly water situation report: Solent and South Downs Area

## Summary - March 2024

Solent and South Downs (SSD) had above average rainfall in March, receiving 165% (110mm) of the long term average (LTA) rainfall (67mm). Monthly mean river flows ranged from above normal to exceptionally high and groundwater levels ranged from notably high 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 below average at Arlington Reservoir (Cuckmere).

### 1.1 Rainfall

SSD had above average rainfall in March, receiving 165% (110mm) of the LTA rainfall (67mm). There were four days (1, 4, 27 and 31) when the highest total was greater than 20mm. The gauge at Chiddingfold (Arun) recorded 26.8mm on 1 March which was the highest daily total in the month. During March there were no completely dry days.

Over the last year and a half the majority of monthly rainfall totals have been higher than average so there are some significant cumulative rainfall totals across SSD in the rainfall record that dates back to 1871.

Rainfall for the Jan 2024 - Mar 2024 period (3 month Jan-Mar) ranks as 4<sup>th</sup> wettest for SSD as a whole and the wettest on record for the East Hants Chalk, Test Chalk and West Sussex Chalk areal rainfall units.

For the Oct 2023 - Mar 2024 period (6 month Oct-Mar) SSD received 184% of the LTA which ranks as 2<sup>nd</sup> on wettest on record behind the Oct 2000-Mar 2001 total. The totals for the Isle of Wight and Lymington areal units were the wettest on record.

For the Apr 2023 - Mar 2024 (12 month Apr-Mar) the SSD total ranks as 2<sup>nd</sup> on record (behind the Apr 2000 – Mar 2001 total) with the Lymington areal unit the wettest on record.

The 18 month period from Oct 2022 – Mar 2024 is the wettest on record for SSD and all the Hampshire and West Sussex areal units. For the East Sussex areal units Oct 1999 – Mar 2001 was the wettest 18 month period on record for an 18 month period starting in the month of October.

### 1.2 Soil moisture deficit and recharge

Soils across SSD ended the month wetter than the average for March, 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 Medina at Blackwater

Flows were notably high:

- River Lymington at Brockenhurst

Flows were exceptionally high:

- River Adur at Sakeham
- River Arun at Alfoldean
- River Cuckmere at Cowbeech
- River Itchen at Allbrook & Highbridge
- River Meon at Misingford
- River Ouse at Goldbridge
- River Rother at Iping Mill
- River Test at Broadlands
- River Test at Chilbolton
- River Wallington at North Fareham

The monthly mean flows for March for the River Adur at Sakeham and for the River Arun at Alfoldean were the highest on record since 1967 and 1970 respectively. Flows were the second highest on record for the River Cuckmere at Cowbeech, the River Itchen at Allbrook & Highbridge, the River Test at Broadlands and the River Test at Chilbolton since 1968, 1958, 1957 and 1989 respectively.

### 1.4 Groundwater levels

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

Groundwater levels were notably high at:

- Carisbrooke Castle (Isle of Wight)
- West Meon (East Hampshire Chalk)

Groundwater levels were exceptionally high at:

- Beeding Hill (West Sussex Chalk)
- Catherington (East Hampshire Chalk)
- Chilgrove (West Sussex Chalk)
- Clanville Gate (Test Chalk)
- Cornish Farm (East Sussex Chalk)
- Harting Common (Western Rother Greensand)
- Houndean Bottom (East Sussex Chalk)

- Lopcombe Corner (Test Chalk)
- Preston Candover (East Hampshire Chalk)
- Youngwoods Copse (Isle of Wight)

Groundwater levels for March were the second highest on record at Beeding Hill, Houndean Bottom, Lopcombe Corner and Youngwoods Copse and since 1979, 1977, 1963 and 1978 respectively.

## **1.5 Reservoir stocks**

End of month reservoir stocks were above average at Ardingly Reservoir (Ouse) with 100% of total capacity (LTA 97%) and were below average at Arlington Reservoir (Cuckmere) with 86.9% of total capacity (LTA 99%).

## **1.6 Environmental impact**

No licence restrictions were in force in March.

There were 29 Flood Alerts issued in SSD during March. 18 fluvial and 2 groundwater Flood Alerts in Hampshire and 9 fluvial Flood Alerts in Sussex.

There were 3 fluvial Flood Warnings issued in Hampshire during March.

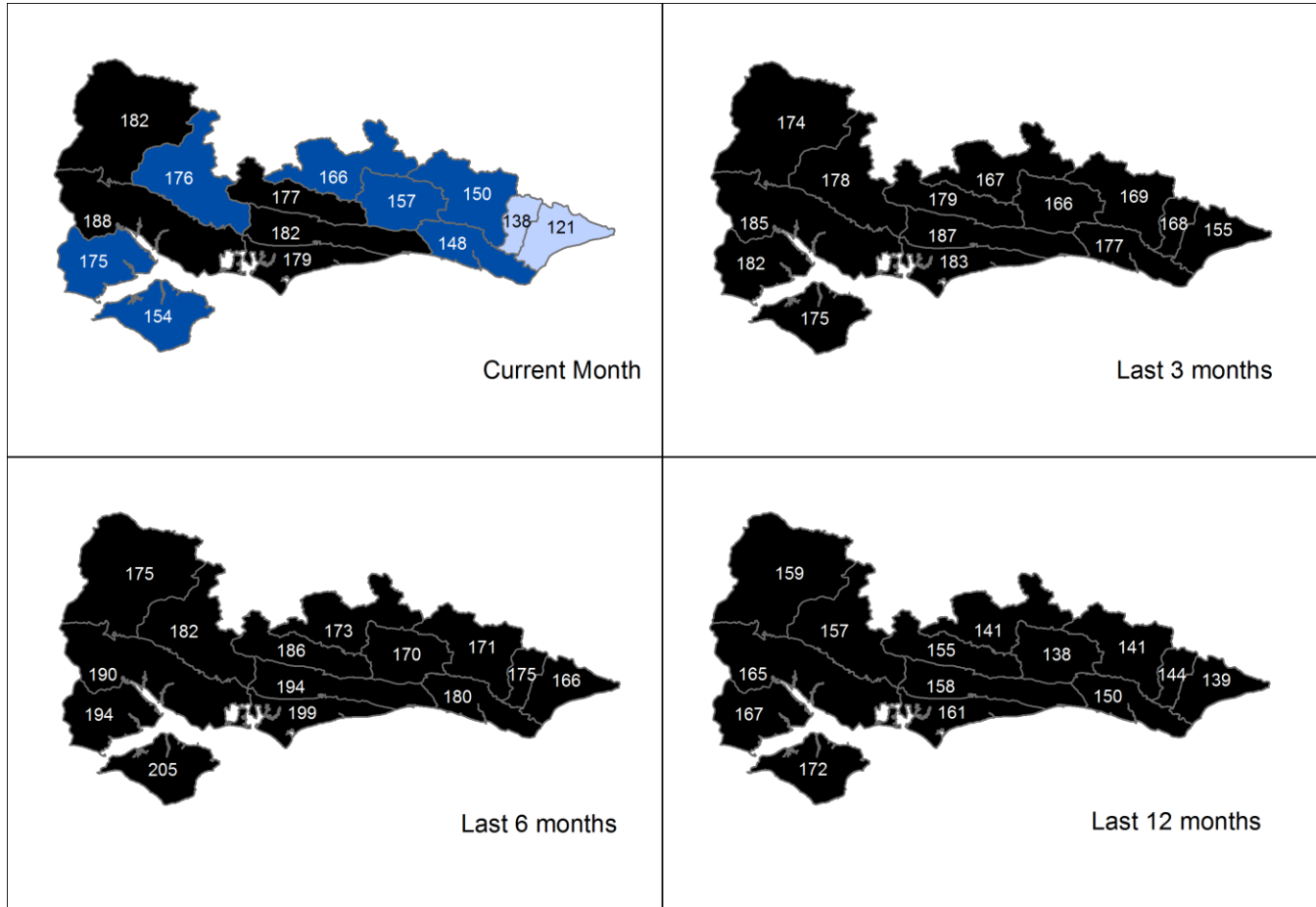
Author: [HydrologySSD@environment-agency.gov.uk](mailto:HydrologySSD@environment-agency.gov.uk)

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## 2. Rainfall

### 2.1 Rainfall map

Figure.1: Total rainfall for hydrological areas for the current month (up to 31 March 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.



**Legend**

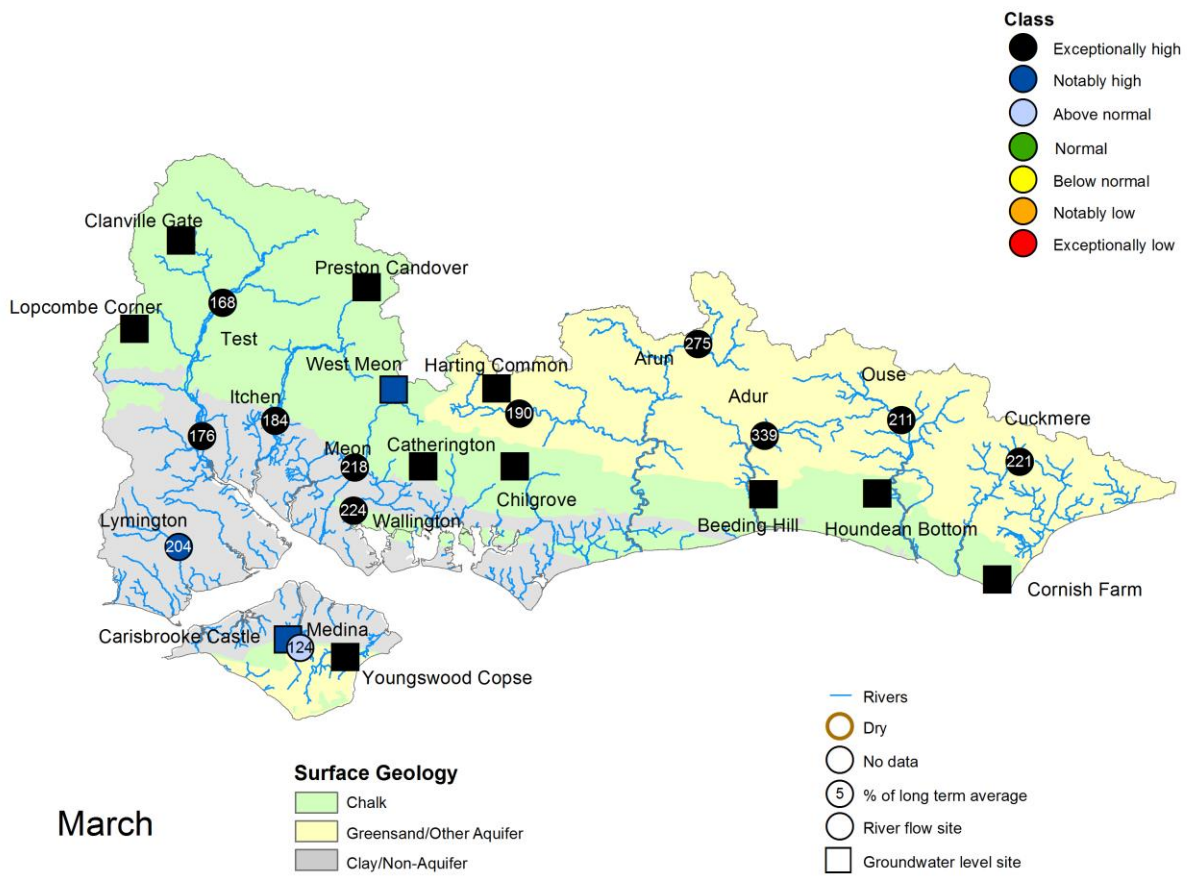
<span style="display: inline-block; width: 15px; height: 15px; background-color: black; margin-right: 5px;"></span> Exceptionally high	<span style="display: inline-block; width: 15px; height: 15px; background-color: lightblue; margin-right: 5px;"></span> Above normal	<span style="display: inline-block; width: 15px; height: 15px; background-color: yellow; margin-right: 5px;"></span> Below normal	<span style="display: inline-block; width: 15px; height: 15px; background-color: red; margin-right: 5px;"></span> Exceptionally low
<span style="display: inline-block; width: 15px; height: 15px; background-color: blue; margin-right: 5px;"></span> Notably high	<span style="display: inline-block; width: 15px; height: 15px; background-color: green; margin-right: 5px;"></span> Normal	<span style="display: inline-block; width: 15px; height: 15px; background-color: orange; margin-right: 5px;"></span> Notably low	

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 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 March 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.

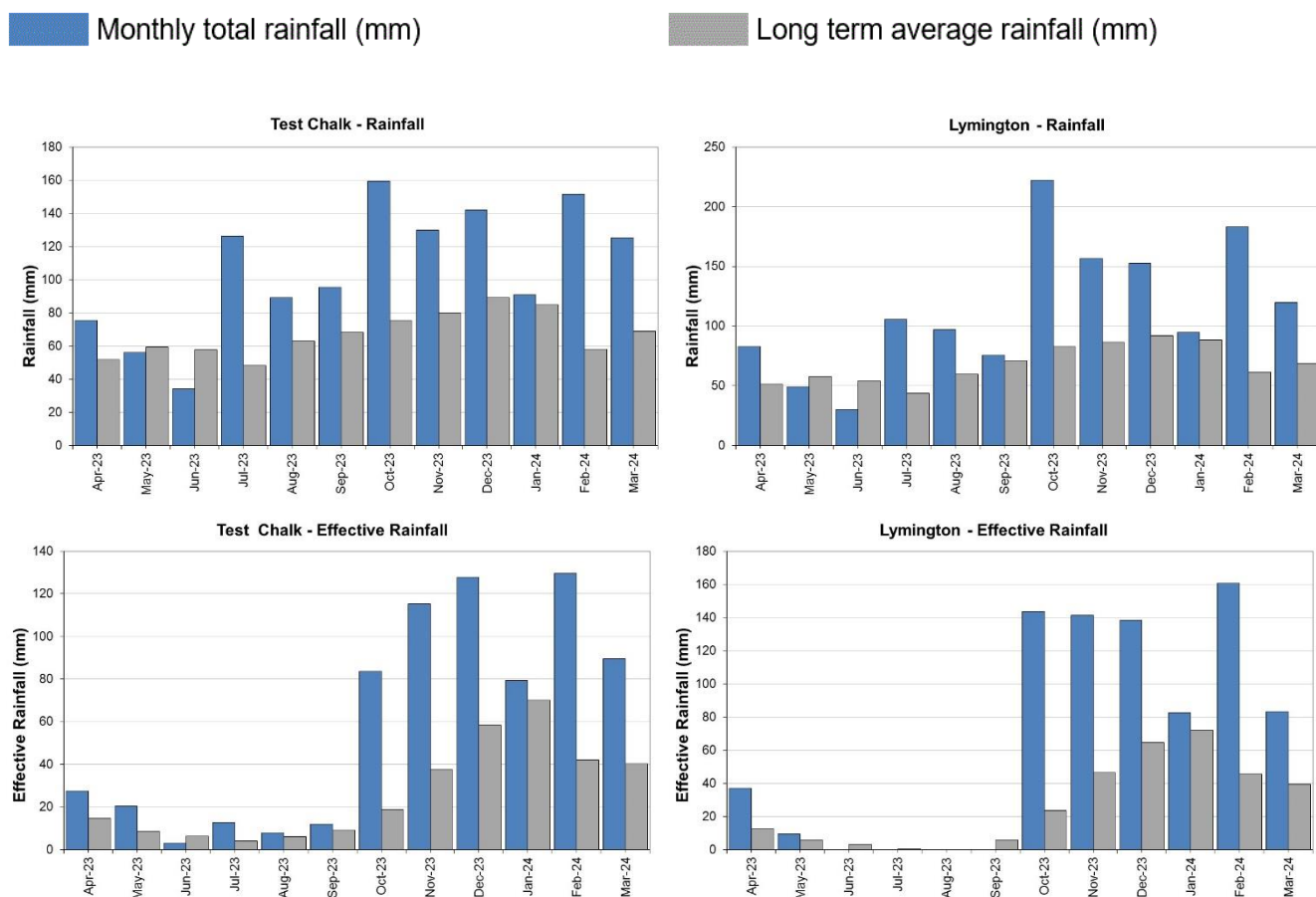


(Source: Environment Agency). Crown copyright. All rights reserved. Environment Agency, 100024198, 2024. Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2024.

# 4 West Hampshire

## 4.1 West Hampshire Rainfall and effective rainfall charts

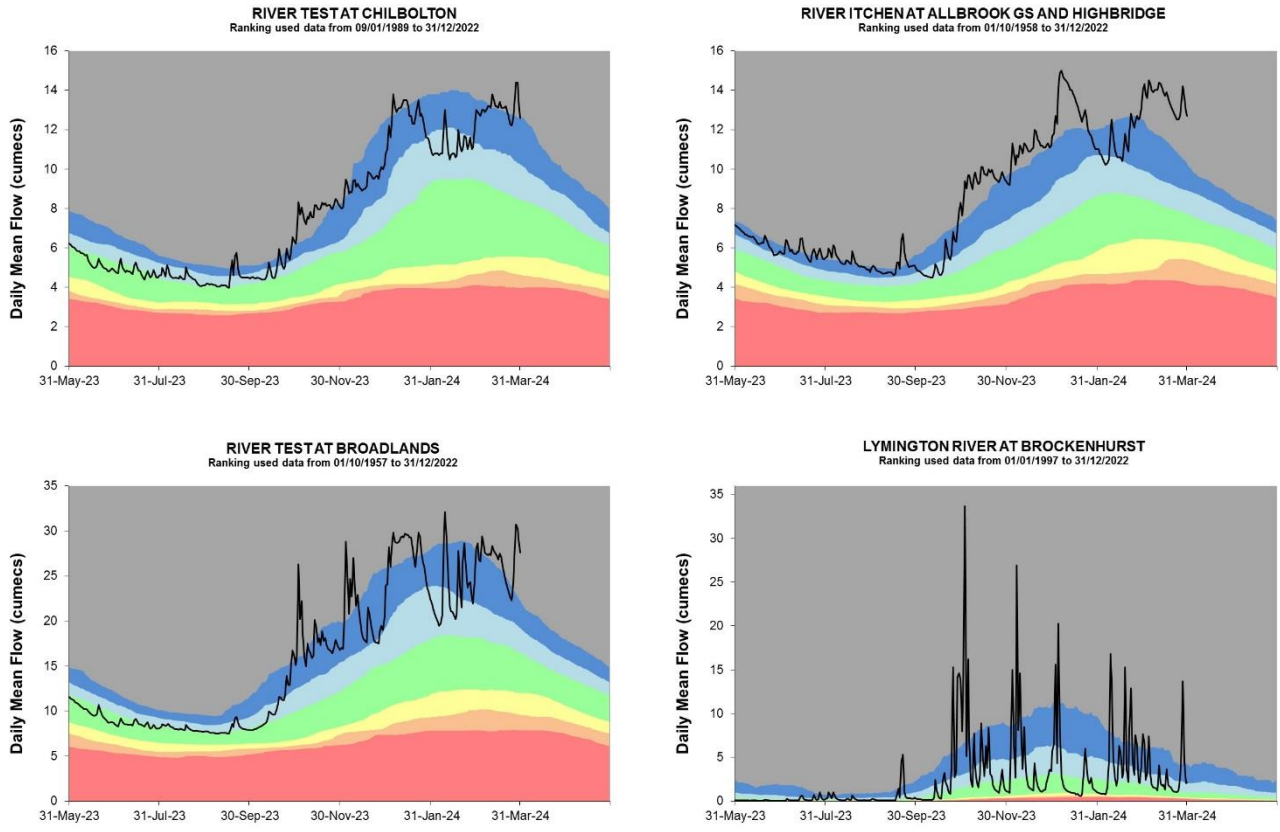
Figure 4.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

## 4.2 West Hampshire River flow charts

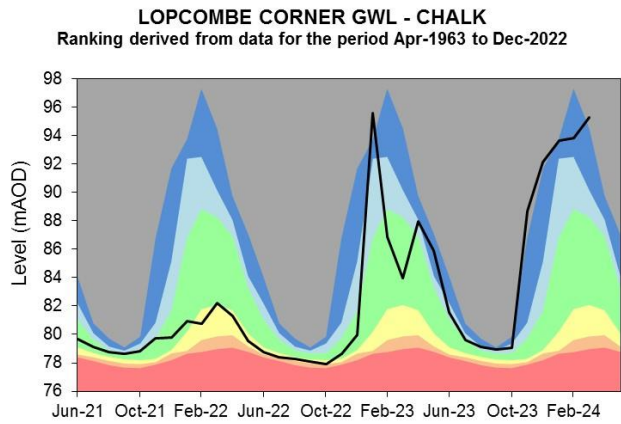
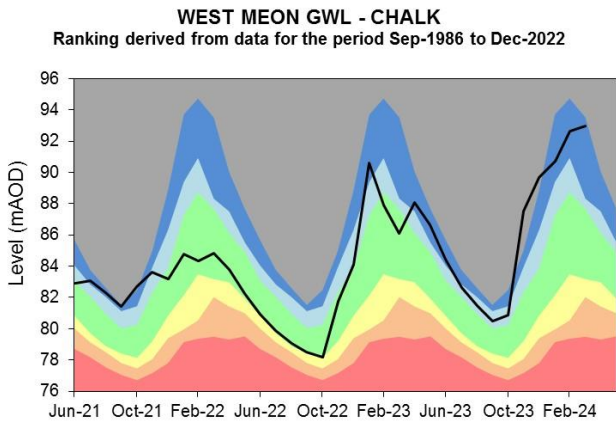
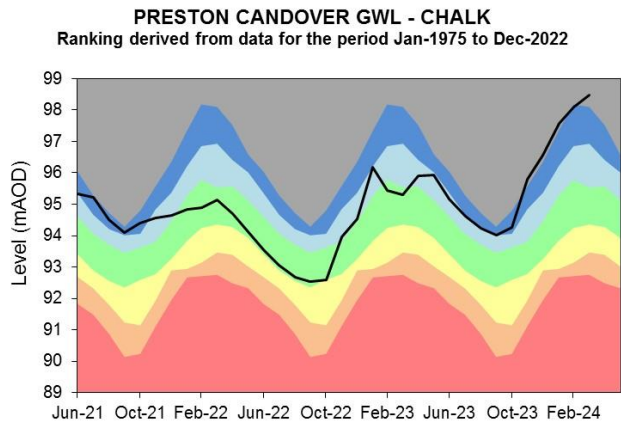
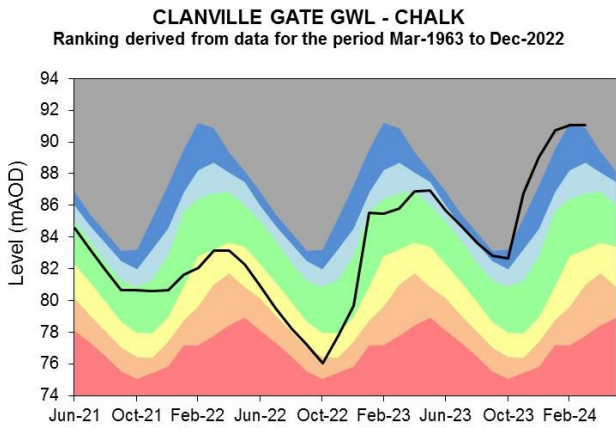
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



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.



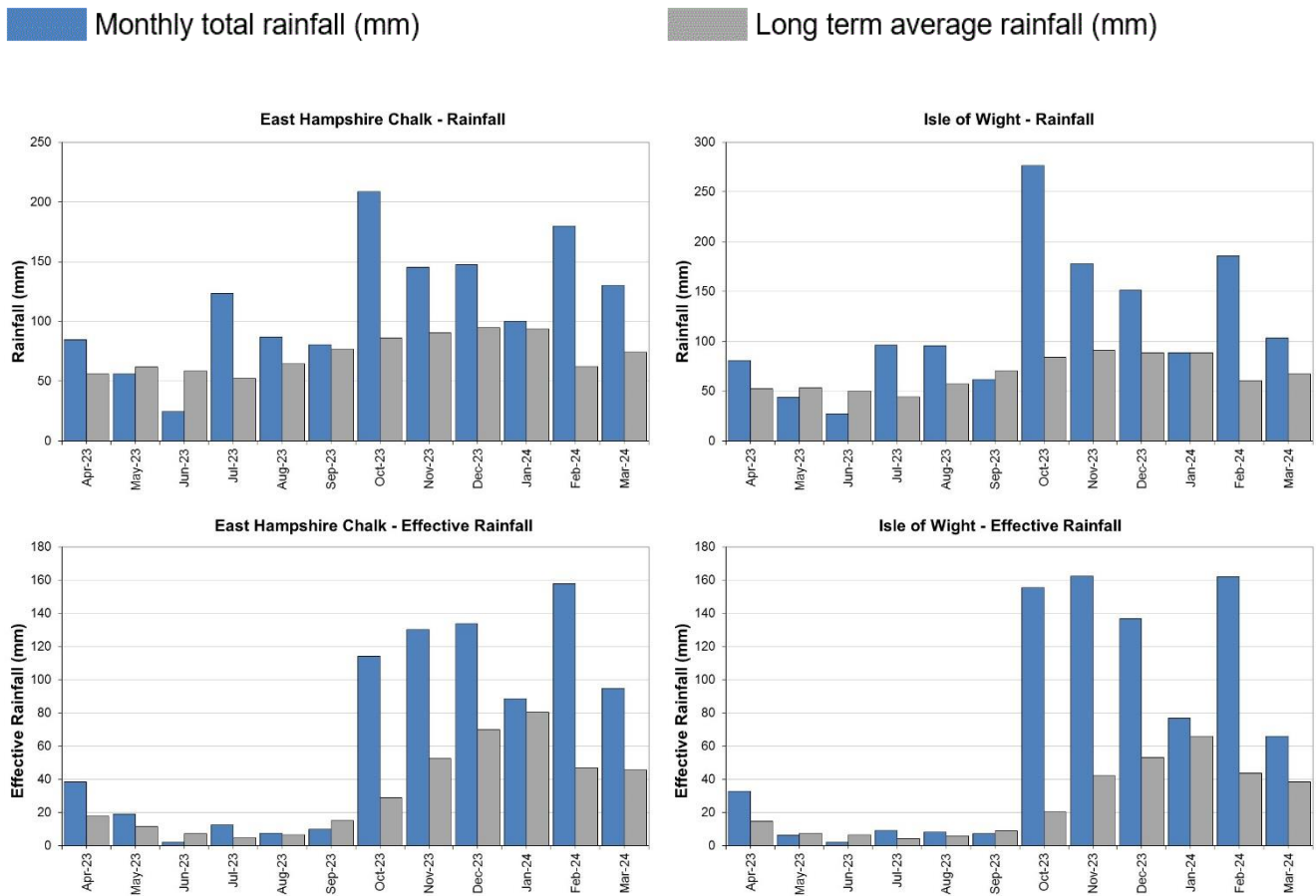
Source: Environment Agency, 2024.



# 5 East Hampshire and Isle of Wight

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

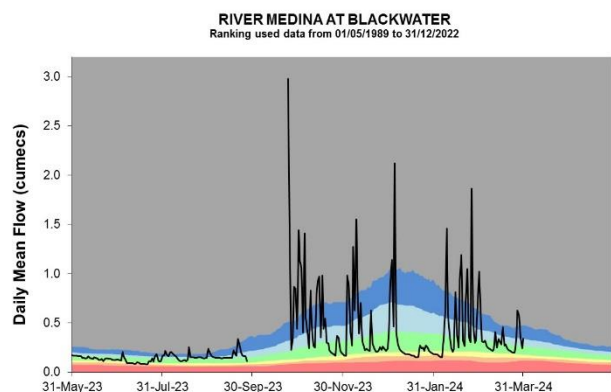
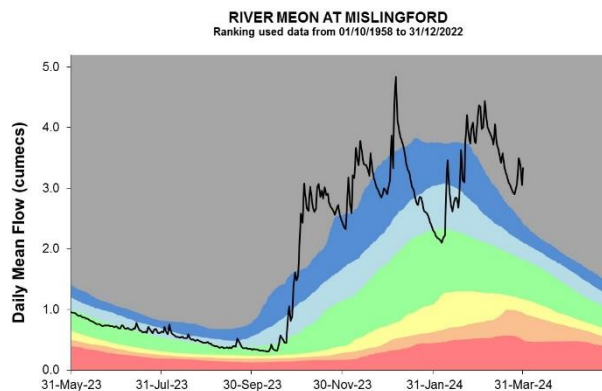
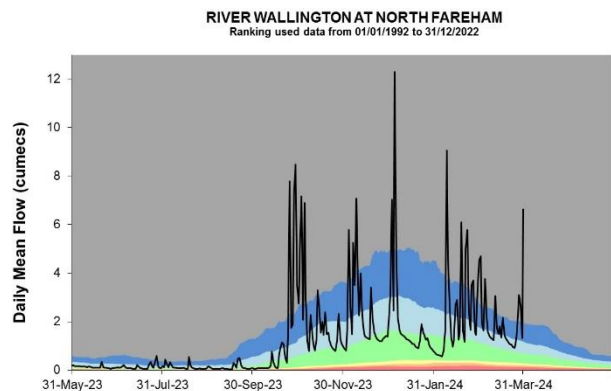
Figure 5.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

## 5.2 East Hampshire and Isle of Wight River flow charts

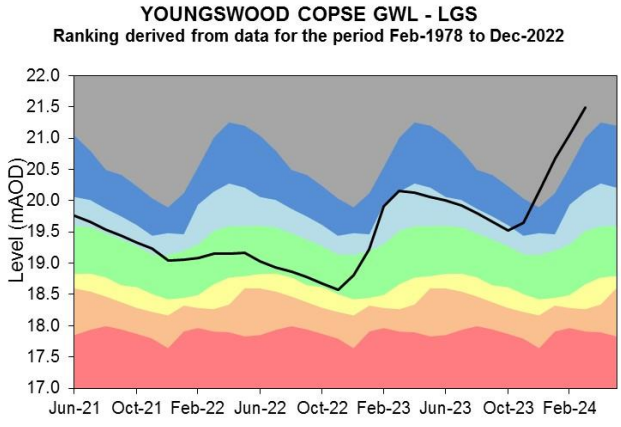
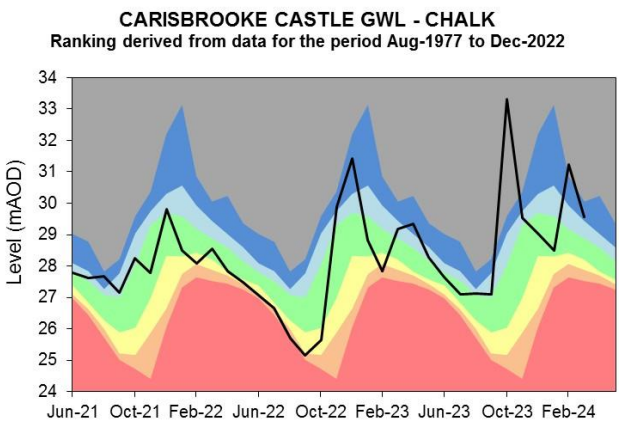
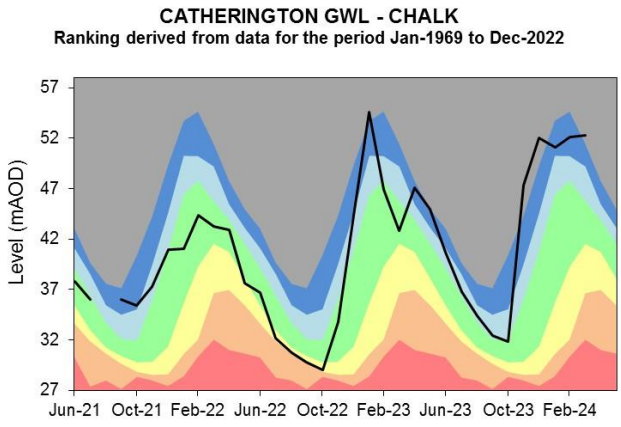
Figure 5.2 Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



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.

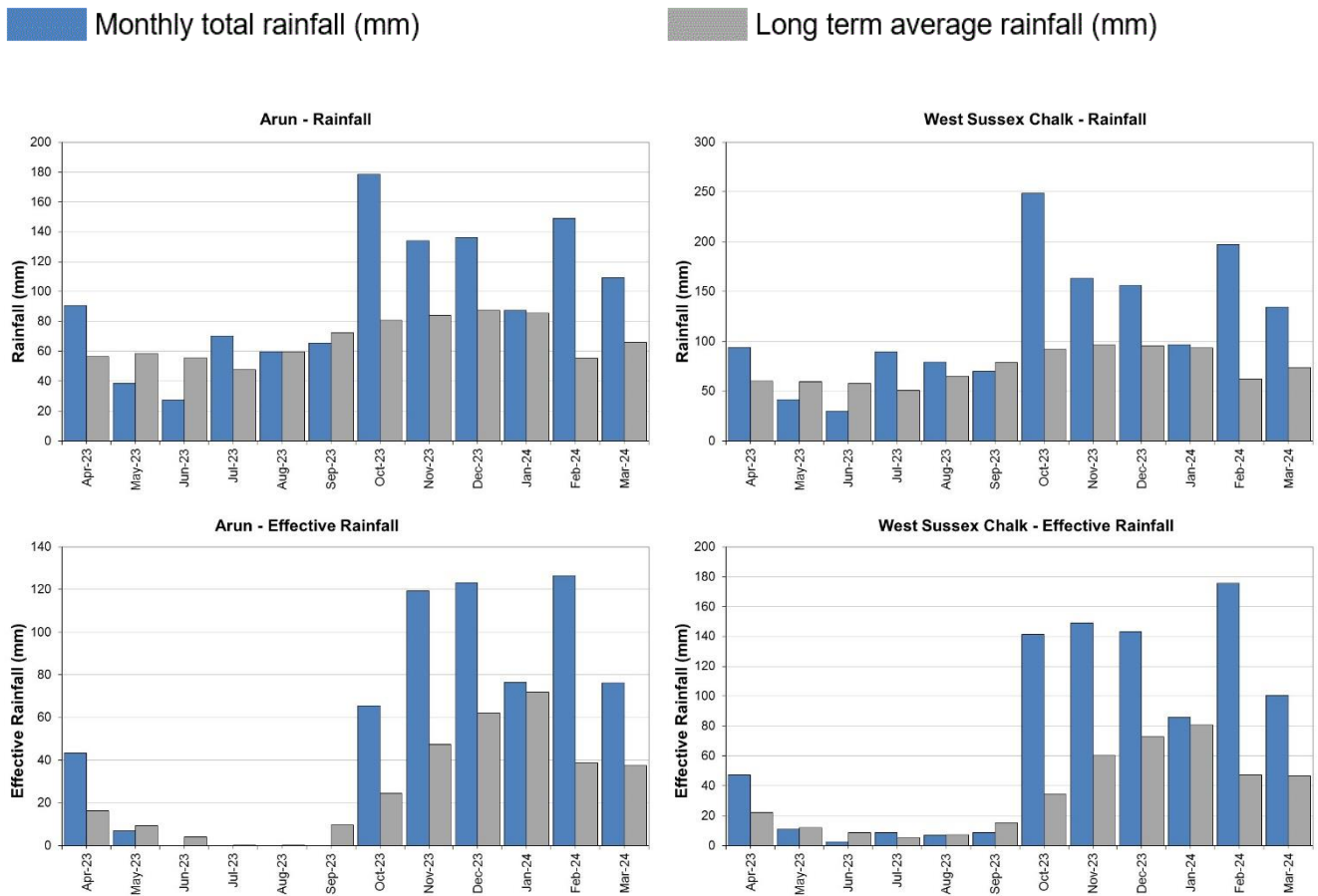


Source: Environment Agency, 2024.

# 6 West Sussex

## 6.1 West Sussex Rainfall and Effective Rainfall charts

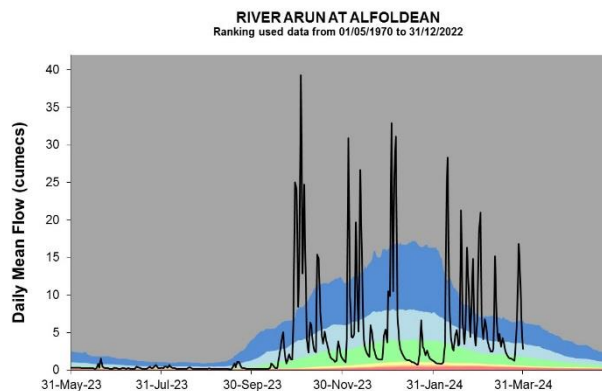
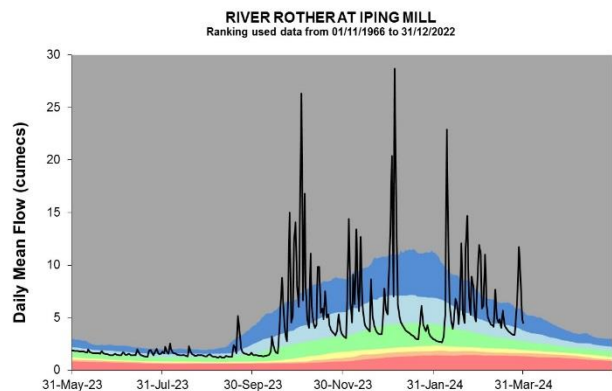
Figure 6.1: Monthly rainfall and effective rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average.



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

## 6.2 West Sussex River flow charts

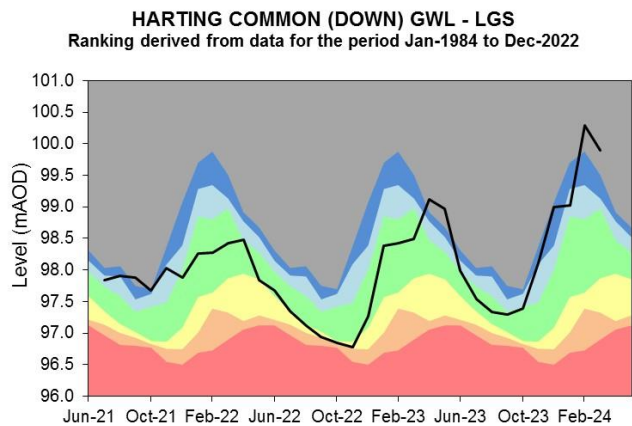
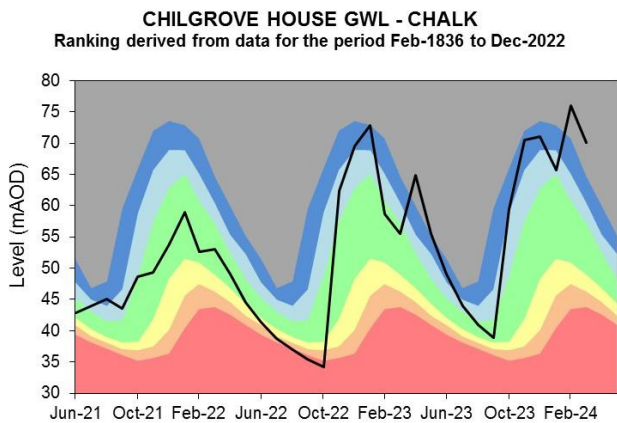
Figure 6.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



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.

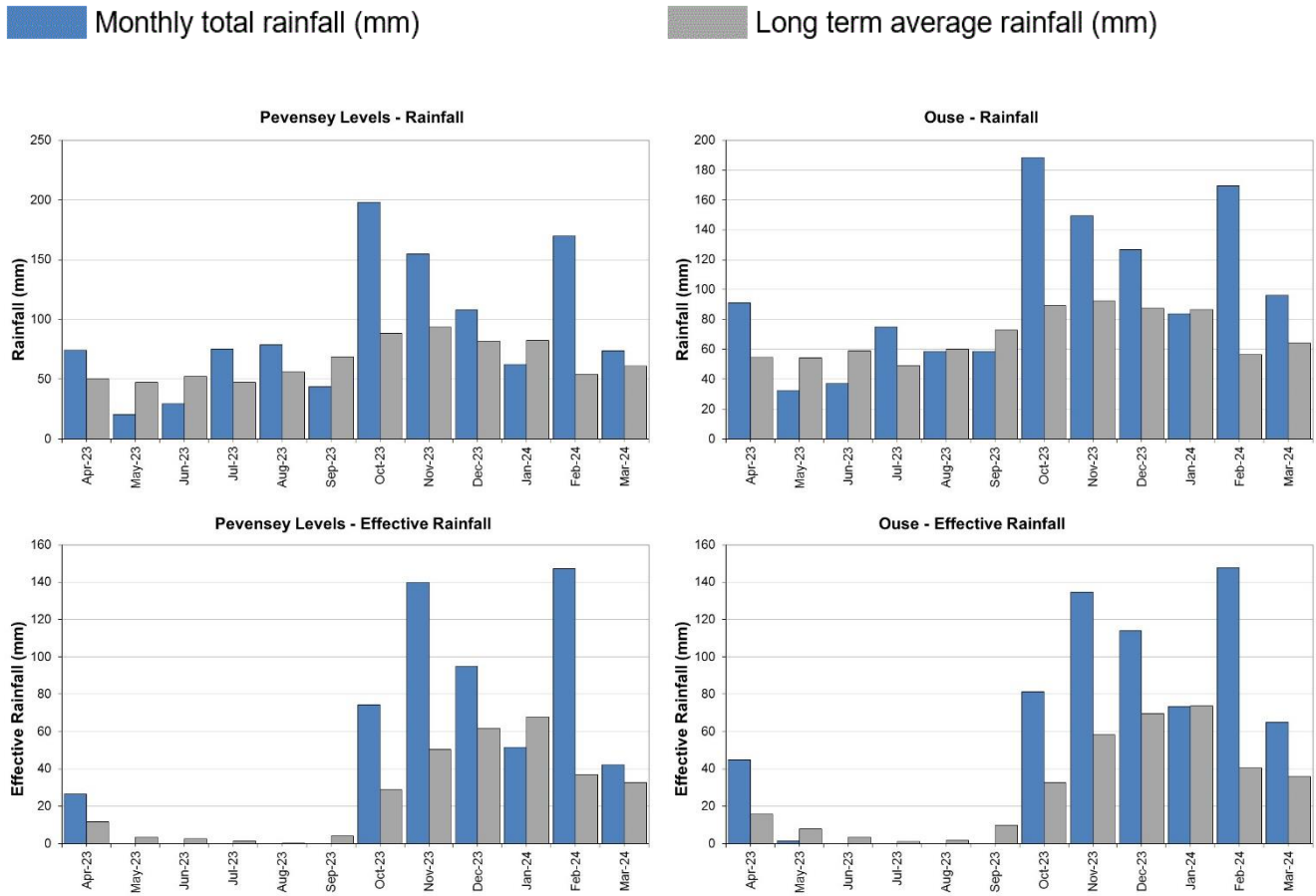


Source: Environment Agency, 2024.

# 7 East Sussex

## 7.1 East Sussex Rainfall and Effective Rainfall charts

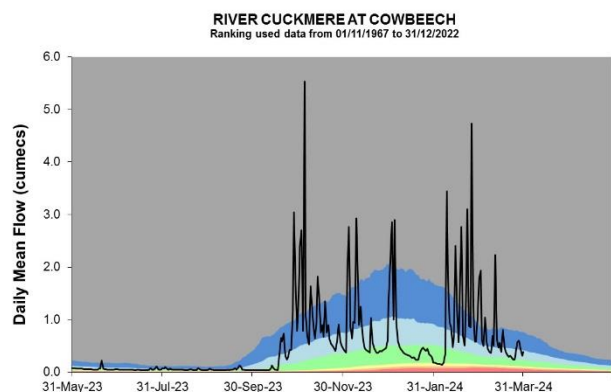
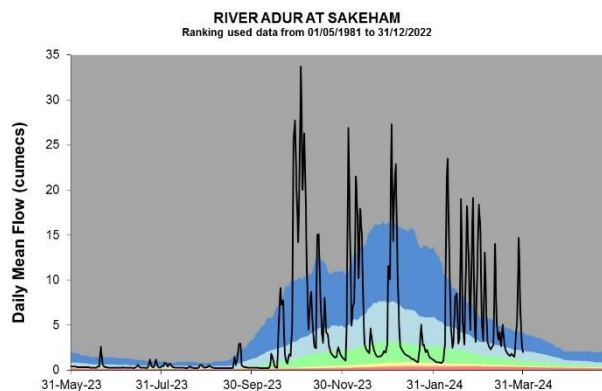
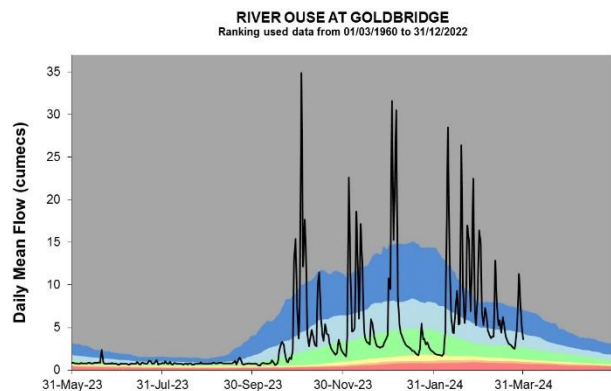
Figure 7.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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.

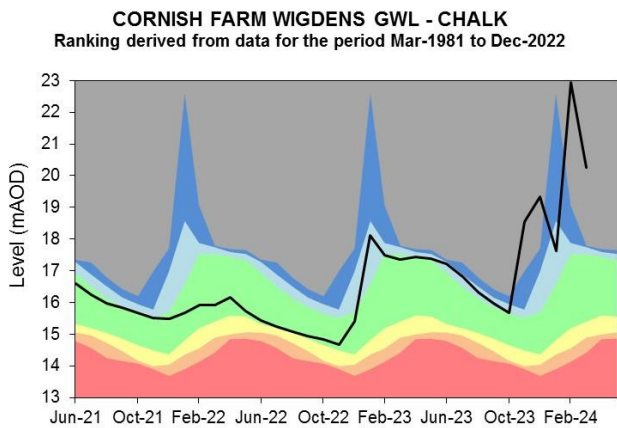
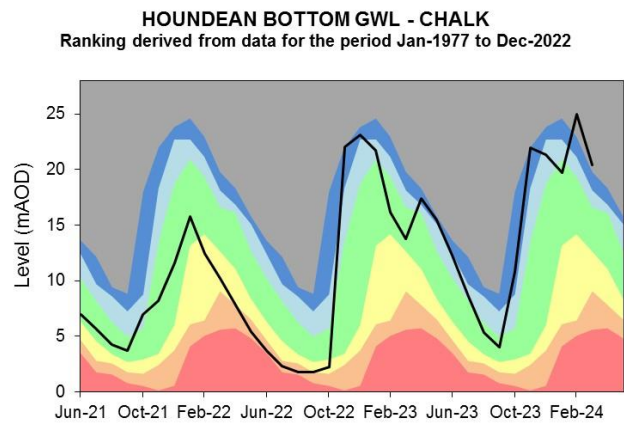
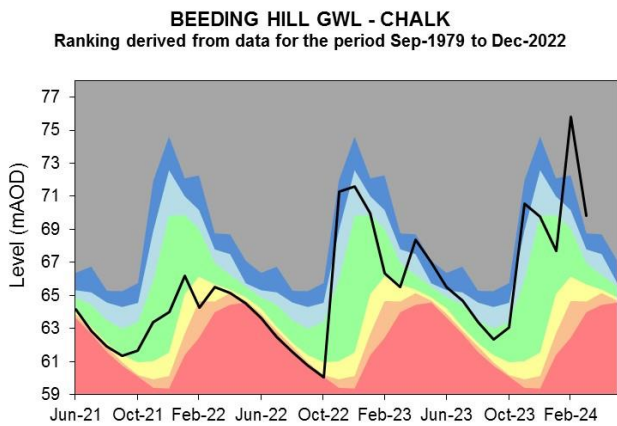


Source: Environment Agency, 2024.



### 7.3 East Sussex Groundwater level charts

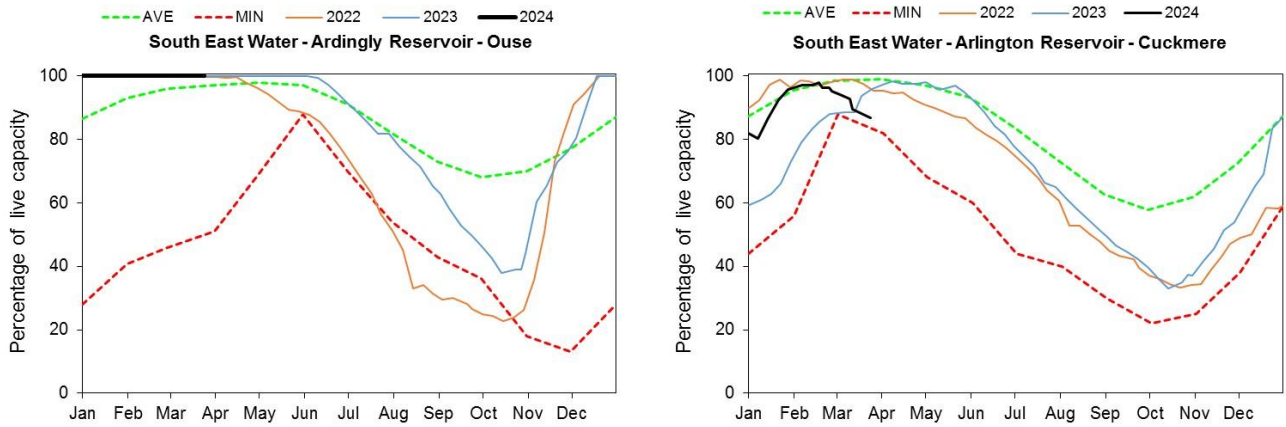
Figure 7.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



Source: Environment Agency, 2024.

## 8 Reservoir stocks

Figure 8.2: 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 ( $\text{m}^3\text{s}^{-1}$ ).

### **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) 31 day Total	Rainfall March as %LTA	Effective Rainfall (mm) 31 day Total	Effective Rainfall March as %LTA	Soil Moisture Deficit (SMD) Day 31	SMD End of March LTA
Test Chalk	125	182%	90	222%	0	7
East Hampshire Chalk	130	176%	95	209%	0	6
West Sussex Chalk	135	182%	101	216%	0	6
East Sussex Chalk	96	148%	64	174%	2	7
Isle of Wight	103	154%	66	172%	0	8
Western Rother Greensand	133	177%	99	209%	0	6
Hampshire Tertiaries	126	188%	88	243%	0	7
Lymington	119	174%	83	211%	0	7
Sussex Coast	109	179%	71	223%	0	8
Arun	109	166%	76	204%	2	6
Adur	100	157%	68	190%	2	6
Ouse	96	150%	65	182%	3	6
Cuckmere	86	139%	56	163%	3	6
Pevensey Levels	73	121%	42	130%	4	7
<b>SSD Average</b>	<b>110</b>	<b>165%</b>	<b>76</b>	<b>198%</b>	<b>1</b>	<b>7</b>

## 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	799	175%	625	234%
East Hampshire Chalk	910	181%	719	222%
West Sussex Chalk	997	194%	796	232%
East Sussex Chalk	881	180%	675	224%
Isle of Wight	983	205%	759	288%
Western Rother Greensand	977	186%	779	223%
Hampshire Tertiaries	882	190%	682	256%
Lymington	928	193%	750	257%
Sussex Coast	846	199%	612	279%
Arun	794	174%	587	208%
Adur	785	169%	577	196%
Ouse	813	171%	616	198%
Cuckmere	828	176%	635	205%
Pevensey Levels	766	166%	550	198%
<b>SSD Average</b>	<b>870</b>	<b>183%</b>	<b>669</b>	<b>228%</b>

### 10.3 Rainfall banding table

Hydrological area	March 2024 band	Jan 2024 to Mar 2024 cumulative band	Oct 2023 to Mar 2024 cumulative band	Apr 2023 to Mar 2024 cumulative band
Test Chalk	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
East Hampshire Chalk	Notably high	Exceptionally high	Exceptionally high	Exceptionally high
West Sussex Chalk	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
East Sussex Chalk	Notably high	Exceptionally high	Exceptionally high	Exceptionally high
Isle of Wight	Notably 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	Notably high	Exceptionally high	Exceptionally high	Exceptionally high
Sussex Coast	Notably high	Exceptionally high	Exceptionally high	Exceptionally high
Arun	Notably high	Exceptionally high	Exceptionally high	Exceptionally high
Adur	Notably high	Exceptionally high	Exceptionally high	Exceptionally high
Ouse	Notably high	Exceptionally high	Exceptionally high	Exceptionally high
Cuckmere	Above normal	Exceptionally high	Exceptionally high	Exceptionally high
Pevensey Levels	Above normal	Exceptionally high	Exceptionally high	Exceptionally high



## 10.4 River flows table

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

## 10.5 Groundwater table

Site name	Aquifer	End of Mar 2024 band	End of Feb 2024 band
Houndean Bottom Gwl	Brighton Chalk Block	Exceptionally high	Exceptionally high
Chilgrove House Gwl	Chichester-Worthing-Portsdown Chalk	Exceptionally high	Exceptionally high
Carisbrooke Castle	Isle Of Wight Central Downs Chalk	Notably high	Exceptionally high
West Meon Hut Gwl	River Itchen Chalk	Notably high	Notably high
Clanville Gate Gwl	River Test Chalk	Exceptionally high	Notably high
Lopcombe Corner Gwl	River Test Chalk	Exceptionally high	Notably high
Beeding Hill Gwl	Brighton Chalk Block	Exceptionally high	Exceptionally high
Catherington	River Meon Chalk	Exceptionally high	Notably high
Cornish Wigdens Gwtr	Eastbourne Chalk Block	Exceptionally high	Above normal
Harting Common Down	Western Rother Lower Greensand	Exceptionally high	Exceptionally high
Preston Candover	River Itchen Chalk	Exceptionally high	Notably 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 March 2024	Number of flow constraints in force between 9 to 15 March 2024	Number of flow constraints in force between 16 to 22 March 2024	Number of flow constraints in force between 23 to 31 March 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
<b>SSD Average</b>	<b>87.3</b>	<b>58.0</b>	<b>66.9</b>	<b>53.9</b>	<b>55.6</b>	<b>55.2</b>	<b>47.2</b>	<b>60.0</b>	<b>71.8</b>	<b>85.3</b>	<b>89.6</b>	<b>88.8</b>