

# Monthly water situation report: Solent and South Downs Area

## Summary - June 2023

Solent and South Downs SSD had below average rainfall in June, receiving 54% (30mm) of the Long Time Average (LTA) rainfall (55 mm). Monthly mean river flows across SSD ranged from **exceptionally low** to **notably high**. Groundwater levels ranged from **normal** to **notably high**. Soils across Solent and South Downs ended the month drier than the average for June. End of month reservoir stocks were average at Ardingly Reservoir (Ouse) and below average at Arlington Reservoir (Cuckmere).

### 1.1 Rainfall

SSD had below average rainfall in June, receiving 54% (30mm) of the LTA rainfall (55 mm). The Ouse areal unit received the most rainfall with 63% (37mm) of LTA (59mm), while the Sussex Coast had the least rainfall with 50% (24mm) of LTA (48mm).

For most of June it was dry and hot as high pressure dominated the weather. Most of the June rainfall was recorded over a three day period from 17th to 19th of the month. The highest daily total of 29mm was recorded at the Ardingly rain gauge (Ouse) on the 19th June. The only additional significant rainfall was recorded on the 11th and 28th June but this had little impact overall.

### 1.2 Soil moisture deficit and recharge

Soils across Solent and South Downs ended the month drier than the average for June.

### 1.3 River flows

Monthly mean river flows across SSD ranged from exceptionally low to notably high. Flows in the River Itchen at Allbrook & Highbridge were notably high. The flows in the River Rother at Iping Mill were above normal. The flows in the River Lymington at Brockenhurst were in the exceptionally low category reflecting the response to the lack of rainfall and the fact that last month flows at this site were already declining faster than at the other reporting sites. The remaining reported sites were all in the normal category.

The highest daily mean flows during June were recorded in the more responsive Sussex rivers on the 20th of the month, in response to the wettest period of the month from 17th to 19th of June. Most notable was the daily mean flow of 2.595 m<sup>3</sup>/s in the River Adur at Sakeham which was in the exceptionally high range.

## 1.4 Groundwater levels

End of month groundwater levels ranged from **normal** to **notably high**. The groundwater levels at Beeding Hill (West Sussex Chalk), Chilgrove (West Sussex Chalk) and West Meon (East Hampshire Chalk) Rother Lower Greensand) were **notably high**. Levels at Beeding Hill (starting 1979) and West Meon (starting 1986) ranked as 4<sup>th</sup> highest on their June records. Carisbrooke Castle (Isle of Wight) and Harting Common Down (Western Rother Greensand) ended the month in the **normal** range. All remaining reporting sites had groundwater levels in the **above normal** category.

## 1.5 Reservoir stocks

End of month reservoir stocks were average at Ardingly Reservoir (Ouse) with 91% of total capacity (LTA 91%) and below average at Arlington Reservoir (Cuckmere) with 78% of total capacity (LTA 84%).

## 1.6 Environmental impact

Two licence restrictions were in place in the River Arun catchment during June. Towards the end of the month a licence restriction came into force on the River Lymington (New Forest). The only Flood Alert was issued on the 20th June for a tributary of the River Ouse.

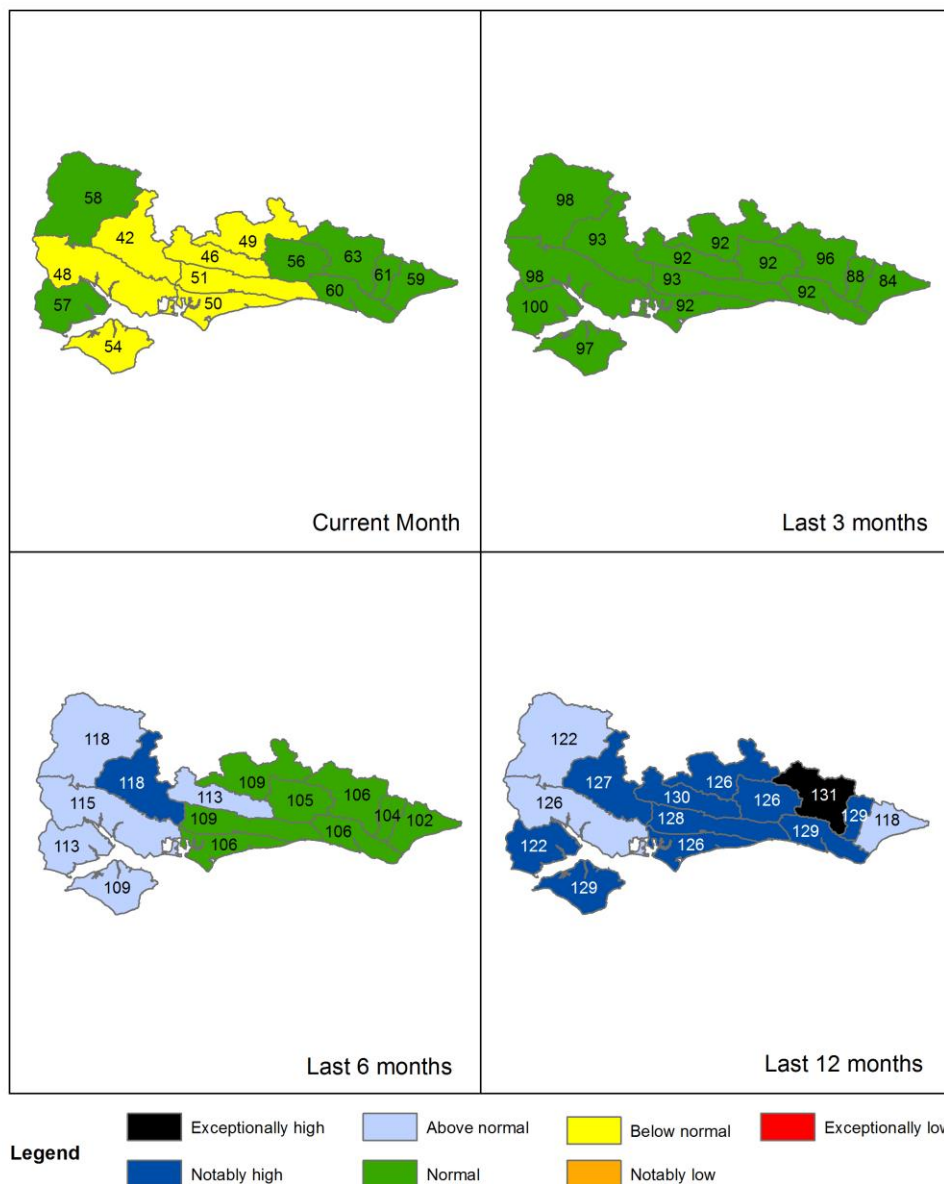
Author: [HydrologySSD@environment-agency.gov.uk](mailto:HydrologySSD@environment-agency.gov.uk)

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## 2. Rainfall

### 2.1 Rainfall map

Figure 2.1: Total rainfall for hydrological areas for the current month (up to 30 June 2023), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.

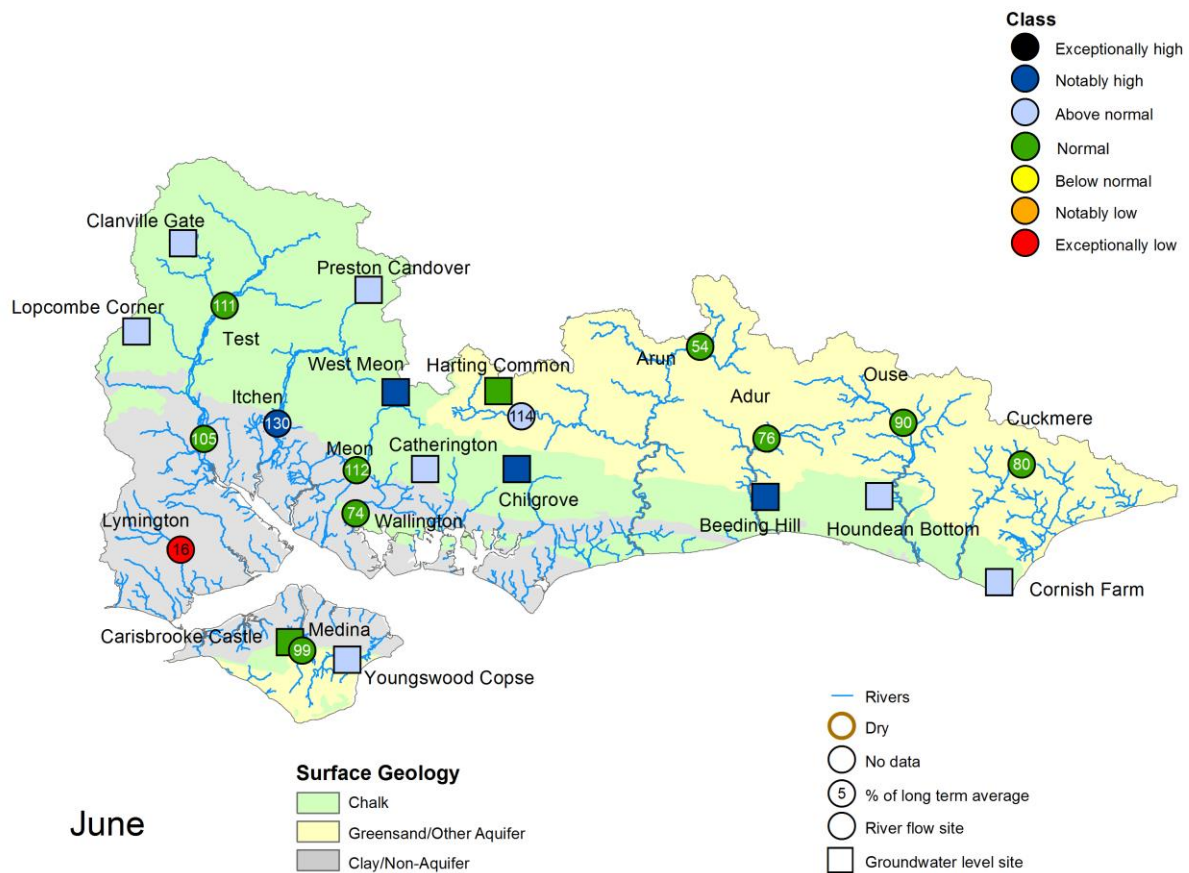


HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2023). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved. Environment Agency, 100024198, 2023.

# 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 June 2023, expressed as a percentage of the respective long term average and classed relative to an analysis of historic June monthly means. Table available in the appendices with detailed information.

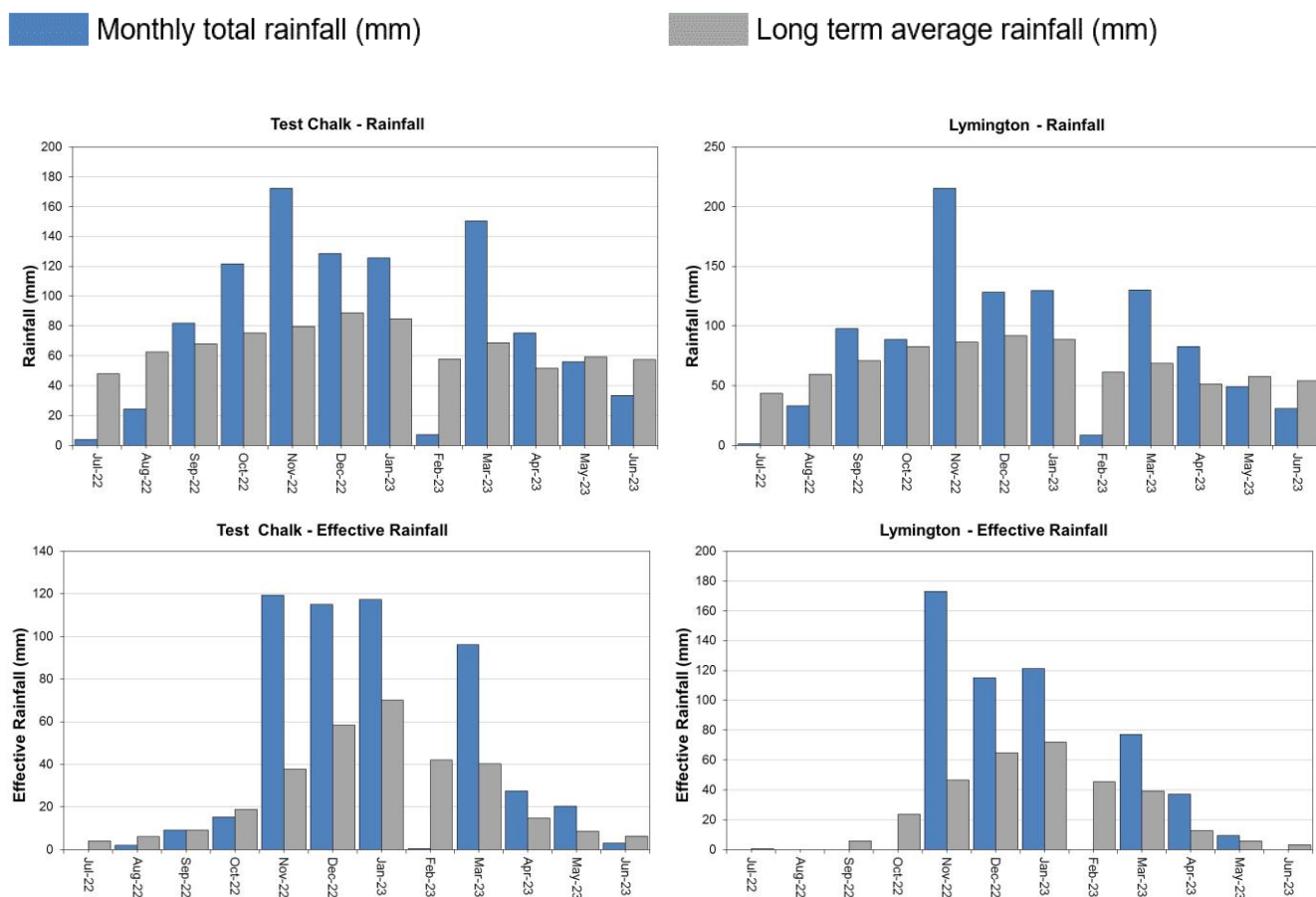


(Source: Environment Agency). Crown copyright. All rights reserved. Environment Agency, 100024198, 2023. Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2023.

# 4 West Hampshire

## 4.1 West Hampshire Rainfall and effective rainfall charts

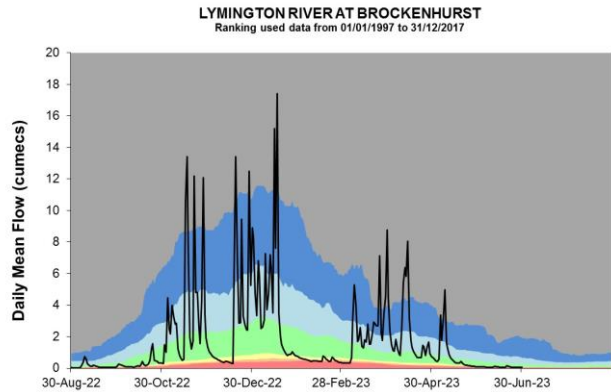
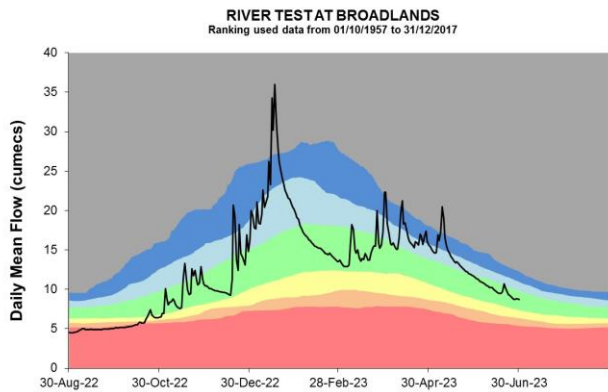
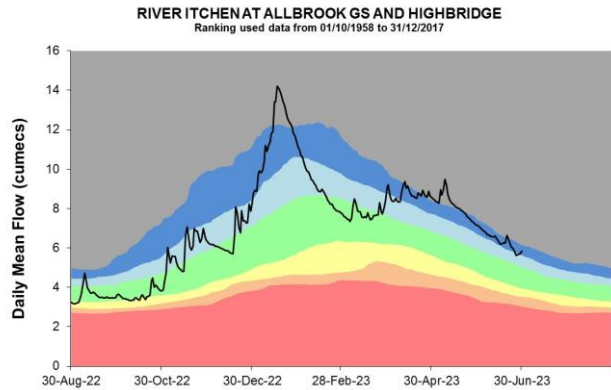
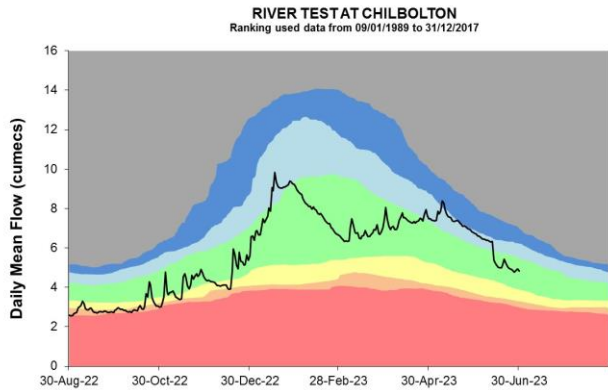
Figure 4.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



HadUK rainfall data. (Source: Met Office. Crown copyright, 2023).

## 4.2 West Hampshire River flow charts

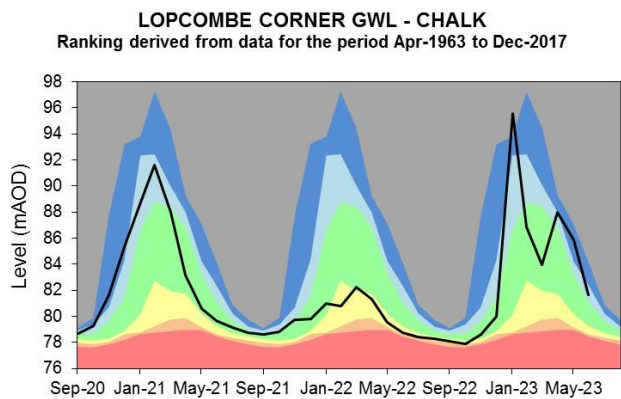
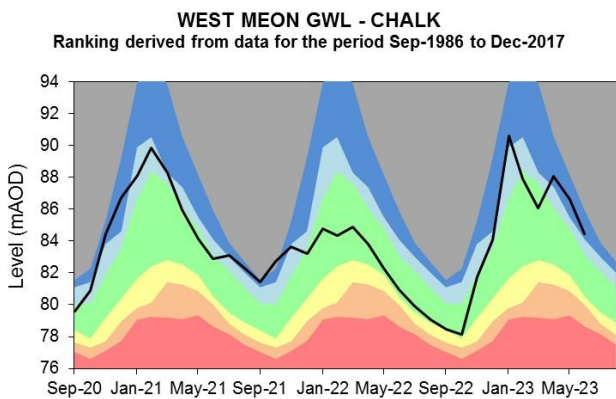
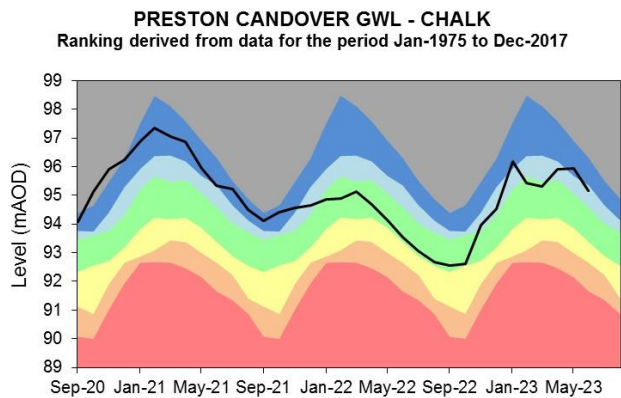
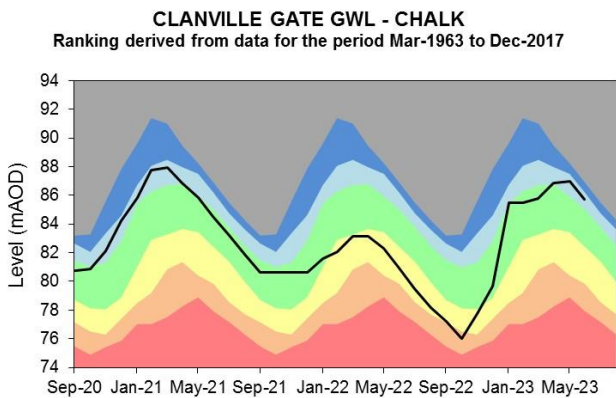
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2023.

### 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.

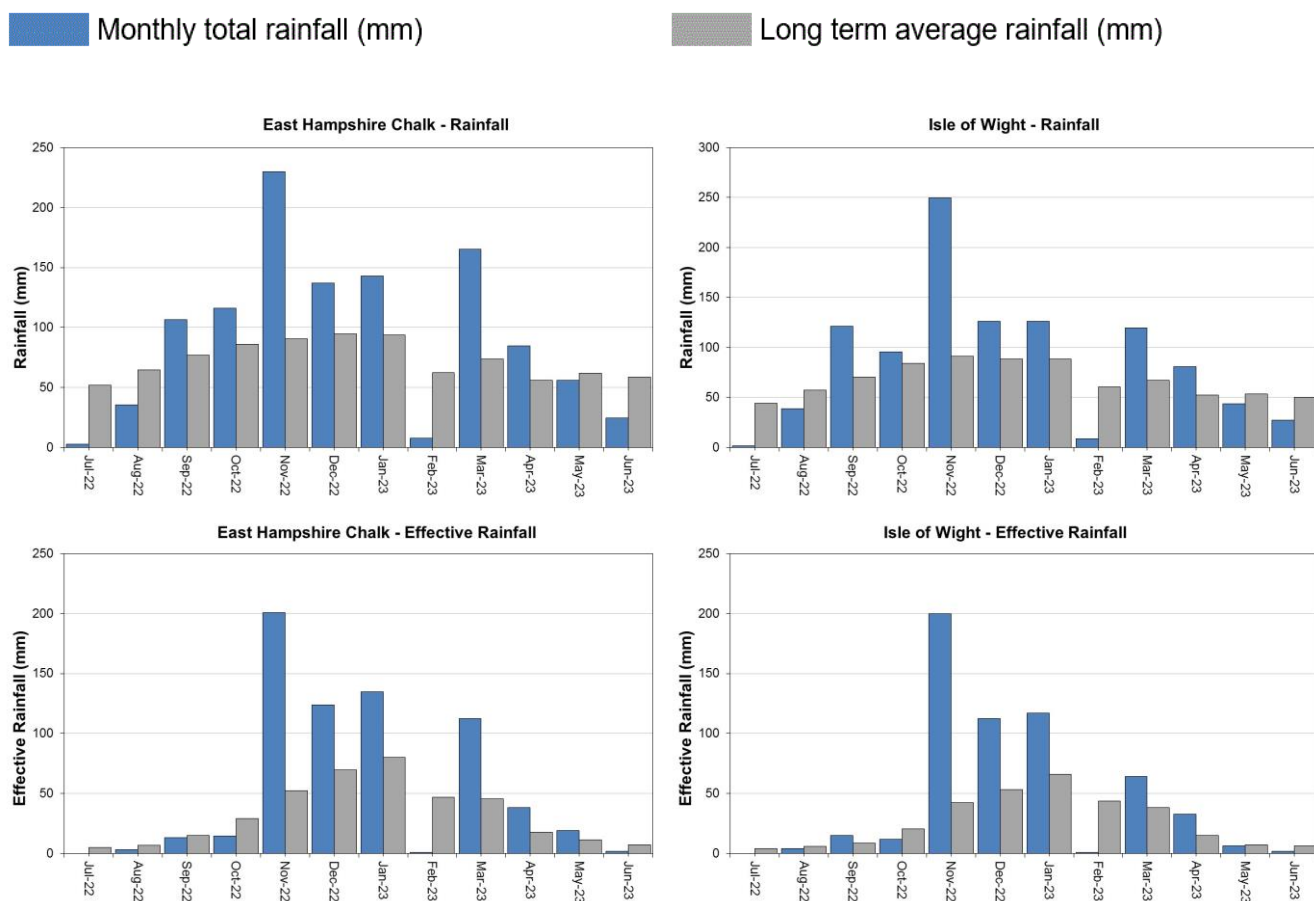


Source: Environment Agency, 2023.

# 5 East Hampshire and Isle of Wight

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

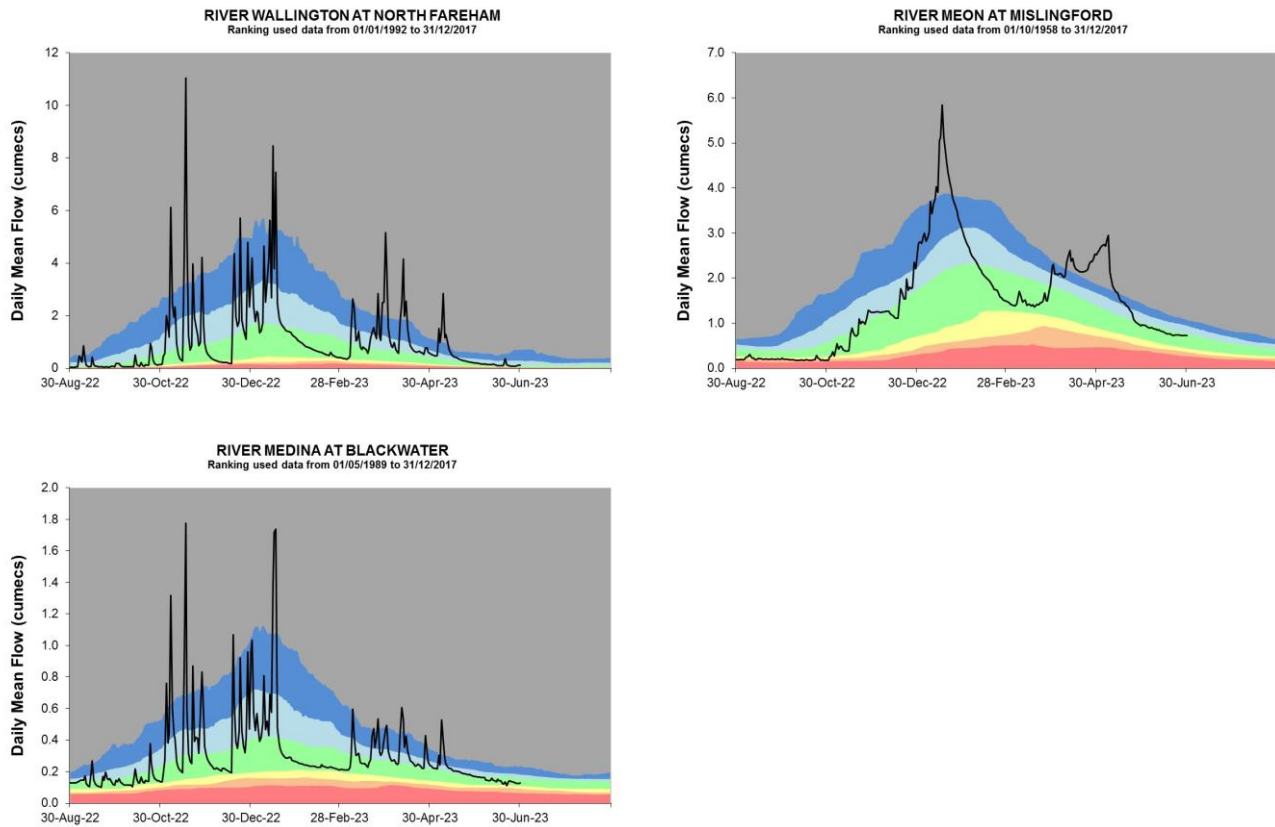
Figure 5.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



HadUK rainfall data. (Source: Met Office. Crown copyright, 2023).

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

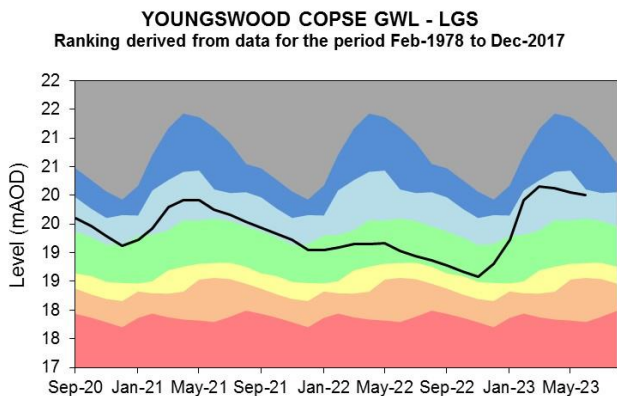
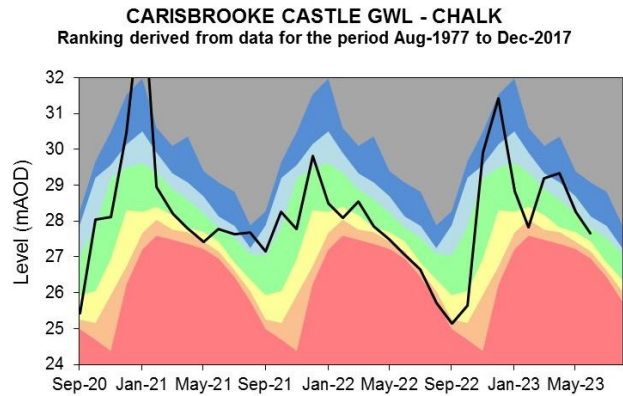
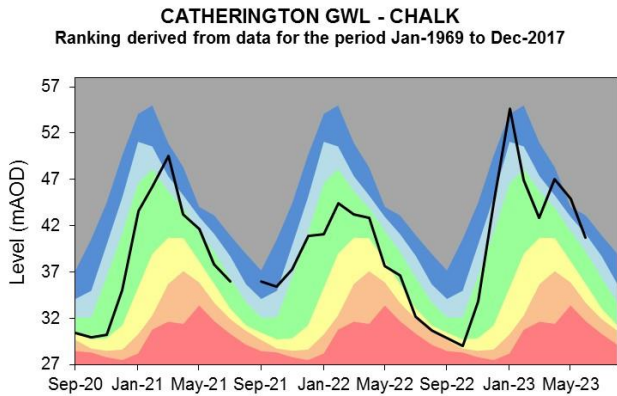
Figure 5.2 Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2023.

### 5.3 East Hampshire and Isle of Wight Groundwater level charts

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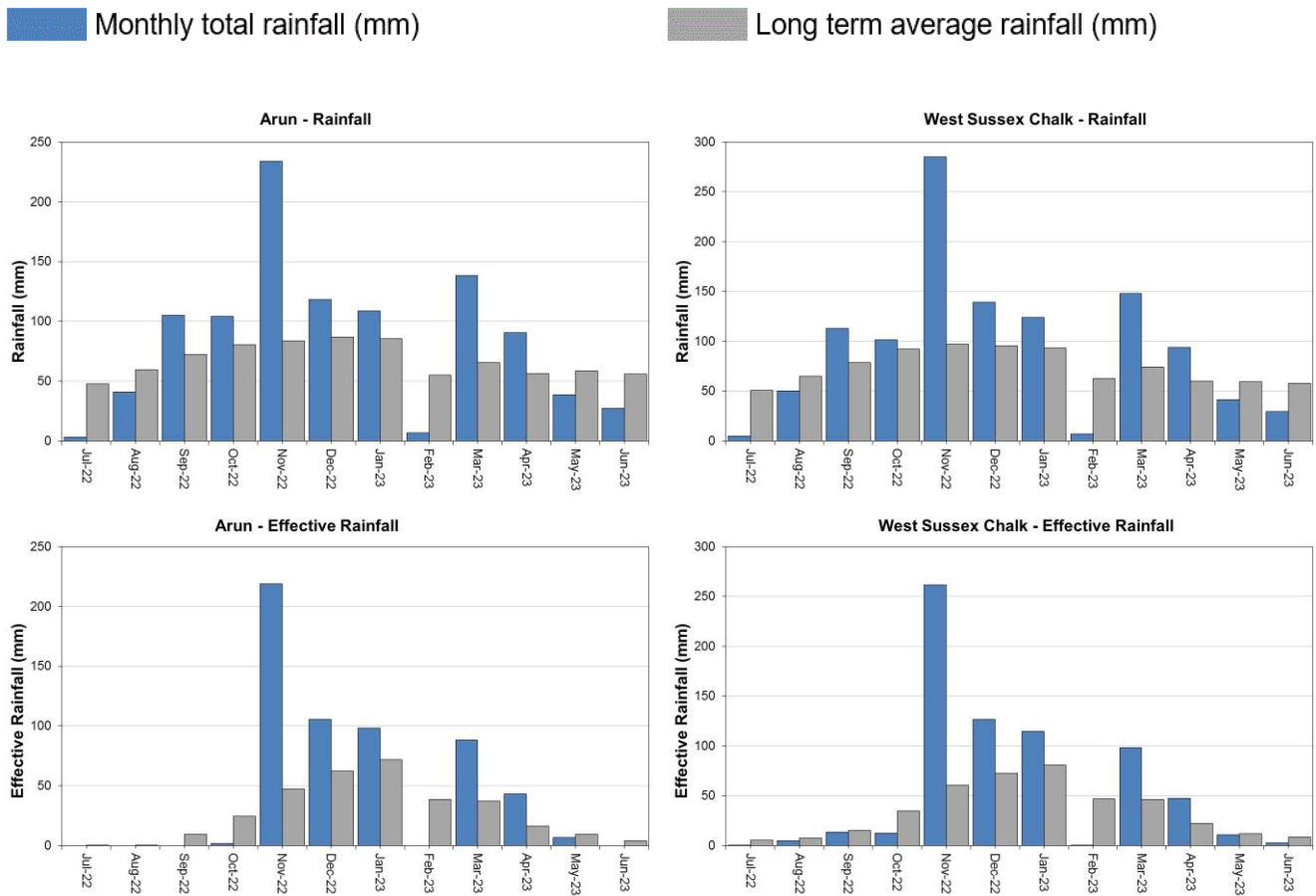


Source: Environment Agency, 2023.

# 6 West Sussex

## 6.1 West Sussex Rainfall and Effective Rainfall charts

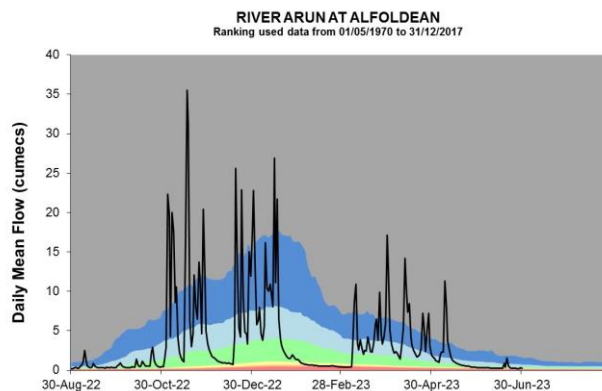
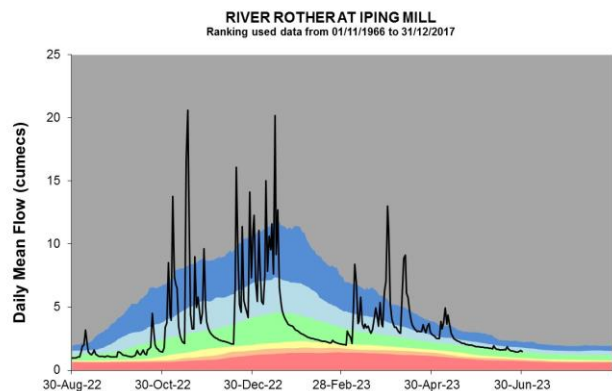
Figure 6.1: Monthly rainfall and effective rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average.



HadUK rainfall data. (Source: Met Office. Crown copyright, 2023).

## 6.2 West Sussex River flow charts

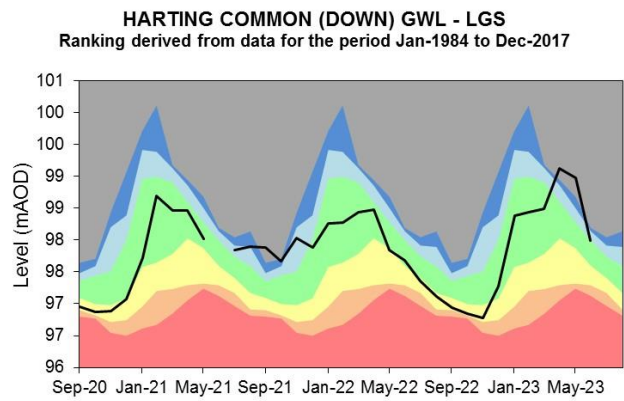
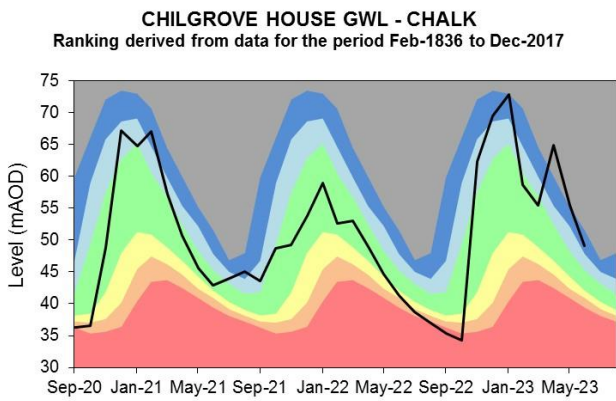
Figure 6.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2023.

### 6.3 West Sussex Groundwater level charts

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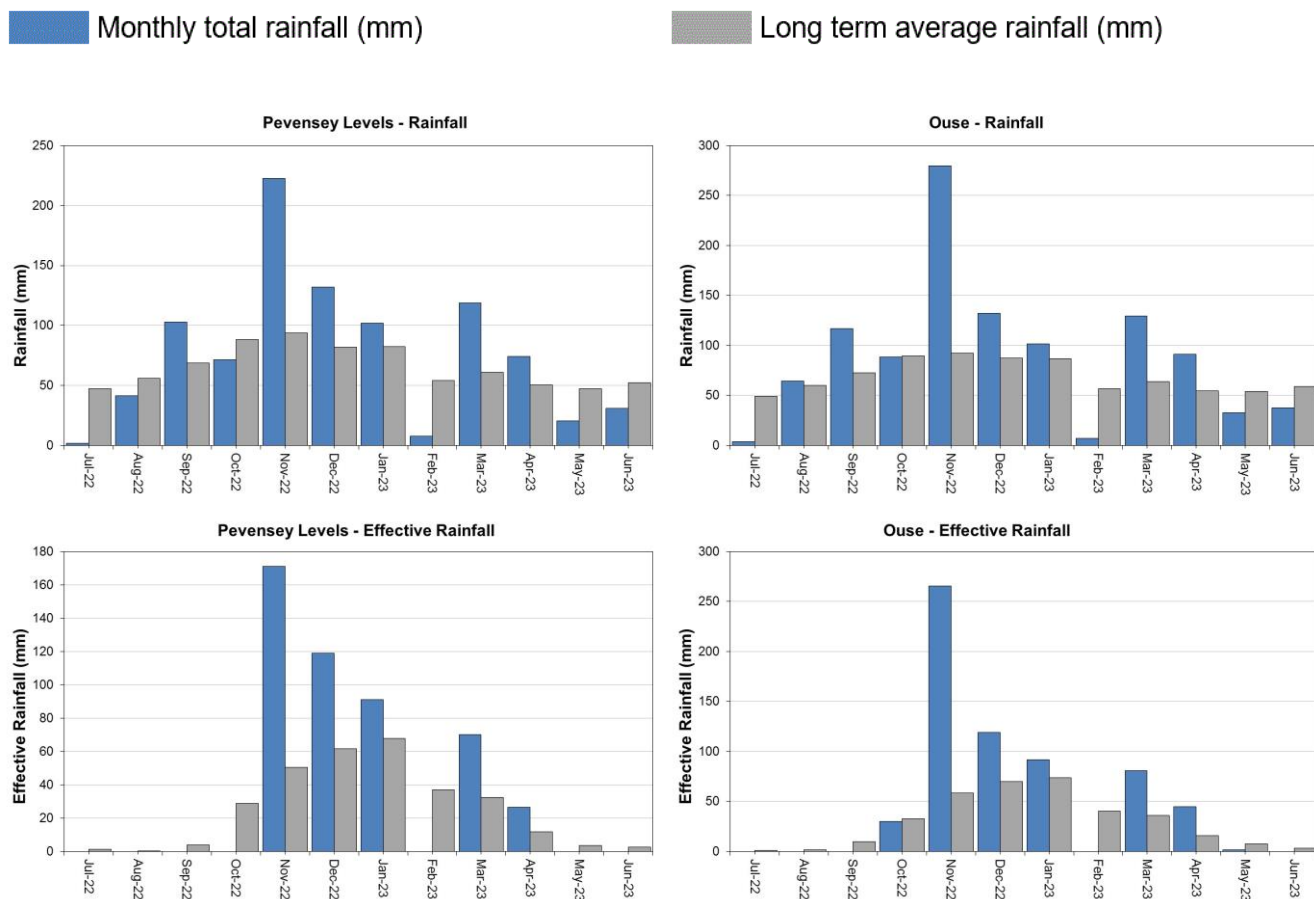


Source: Environment Agency, 2023.

# 7 East Sussex

## 7.1 East Sussex Rainfall and Effective Rainfall charts

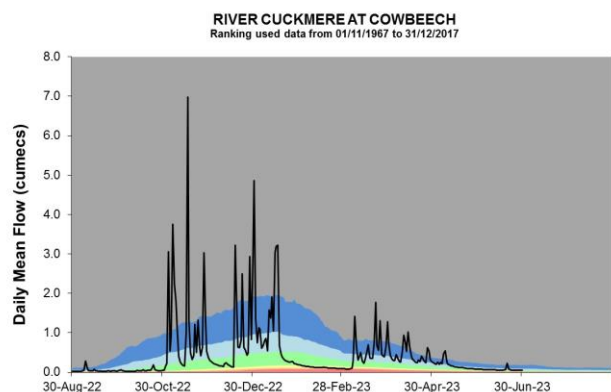
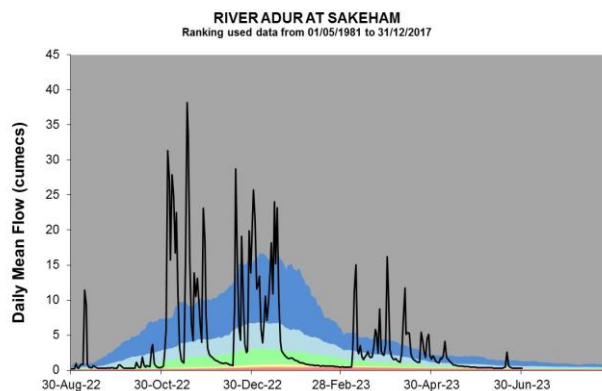
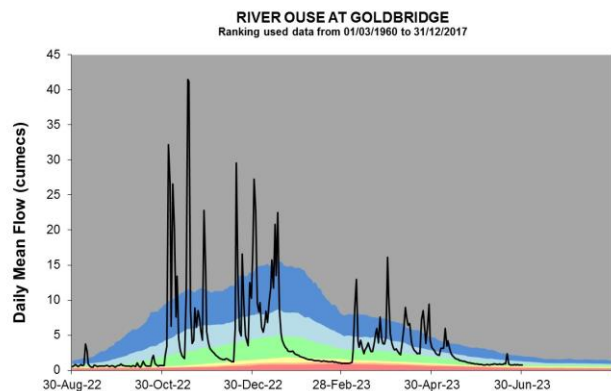
Figure 7.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



HadUK rainfall data. (Source: Met Office. Crown copyright, 2023).

## 7.2 East Sussex River flow charts

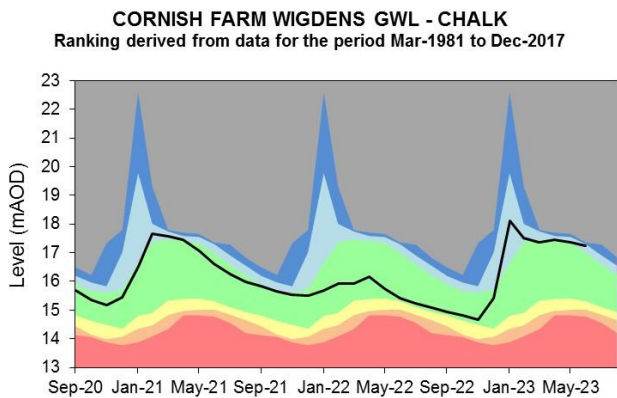
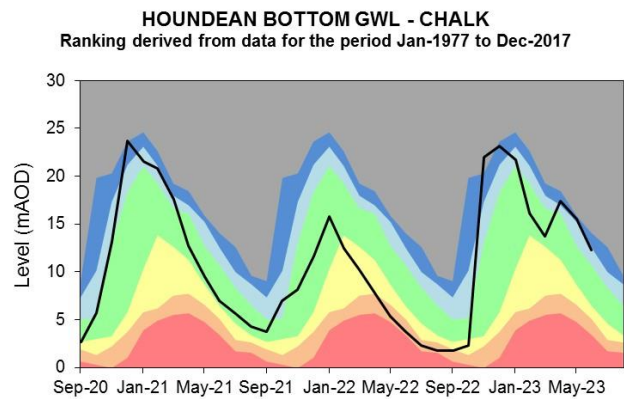
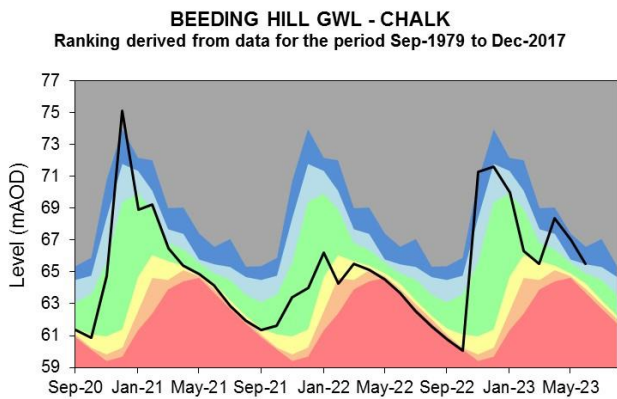
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Source: Environment Agency, 2023.

### 7.3 East Sussex Groundwater level charts

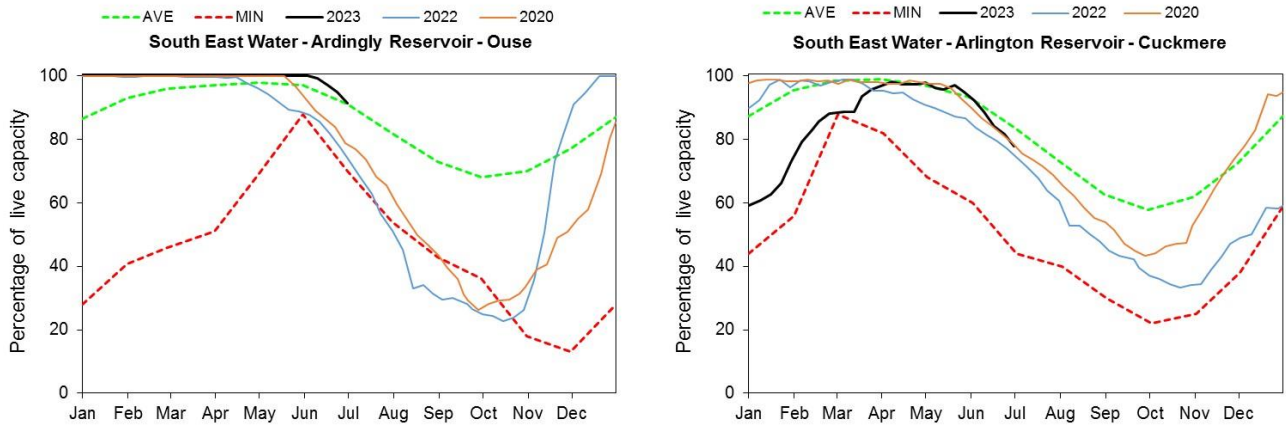
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Source: Environment Agency, 2023.

## 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 ( $\text{m}^3\text{s}^{-1}$ ).

### **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, 2023). All rights reserved. Environment Agency, 100024198, 2023

Figure 10.1: This is areal rainfall, effective rainfall (percolation or runoff) and soil moisture deficit for the hydrological areas across the Solent and South Downs. 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 June as %LTA	Effective Rainfall (mm) 30 day Total	Effective Rainfall June as %LTA	Soil Moisture Deficit (SMD) Day 30	SMD End of June LTA
Test Chalk	33	58%	3	46%	92	62
East Hampshire Chalk	25	42%	2	26%	94	61
West Sussex Chalk	29	51%	2	27%	92	60
East Sussex Chalk	35	60%	3	39%	91	63
Isle of Wight	27	54%	2	27%	96	66
Western Rother Greensand	26	46%	2	21%	93	61
Hampshire Tertiaries	25	48%	0	0%	95	64
Lymington	31	57%	0	0%	93	59
Sussex Coast	24	49%	0	0%	97	68
Arun	28	49%	0	0%	92	60
Adur	32	57%	0	0%	90	59
Ouse	37	64%	0	0%	87	57
Cuckmere	36	62%	0	0%	88	58
Pevensey Levels	31	59%	0	0%	93	63
Solent & South Downs Average	30	54%	1	20%	92	61

## 10.2 Seasonal summary table of rainfall and effective rainfall

Summer season: 01/04/2023 to 30/09/2023

Hydrological Area	Seasonal Rainfall (mm) Total	Seasonal Rainfall as % LTA	Seasonal Effective Rainfall (mm) Total	Seasonal Effective Rainfall as % LTA
Test Chalk	165	98%	47	158%
East Hampshire Chalk	165	93%	54	151%
West Sussex Chalk	165	93%	54	125%
East Sussex Chalk	149	92%	35	107%
Isle of Wight	151	97%	39	135%
Western Rother Greensand	166	92%	54	127%
Hampshire Tertiaries	157	98%	39	234%
Lymington	163	100%	42	197%
Sussex Coast	137	92%	26	151%
Arun	156	92%	42	141%
Adur	155	93%	38	132%
Ouse	161	97%	38	141%
Cuckmere	141	89%	25	111%
Pevensey Levels	126	84%	20	113%
Solent & South Downs Average	154	94%	39	141%

### 10.3 Rainfall banding table

Hydrological area	Jun 2023 band	Apr 2023 to Jun 2023 cumulative band	Jan 2023 to Jun 2023 cumulative band	Jul 2022 to Jun 2022 cumulative band
Test Chalk	Normal	Normal	Above normal	Above normal
East Hampshire Chalk	Below normal	Normal	Notably high	Notably high
West Sussex Chalk	Below normal	Normal	Normal	Notably high
East Sussex Chalk	Normal	Normal	Normal	Notably high
Isle of Wight	Below normal	Normal	Above normal	Notably high
Western Rother Greensand	Below normal	Normal	Above normal	Notably high
Hampshire Tertiaries	Below normal	Normal	Above normal	Above normal
Lymington	Normal	Normal	Above normal	Notably high
Sussex Coast	Below normal	Normal	Normal	Notably high
Arun	Below normal	Normal	Normal	Notably high
Adur	Normal	Normal	Normal	Notably high
Ouse	Normal	Normal	Normal	Exceptionally high
Cuckmere	Normal	Normal	Normal	Notably high
Pevensey Levels	Normal	Normal	Normal	Above normal

## 10.4 River flows table

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

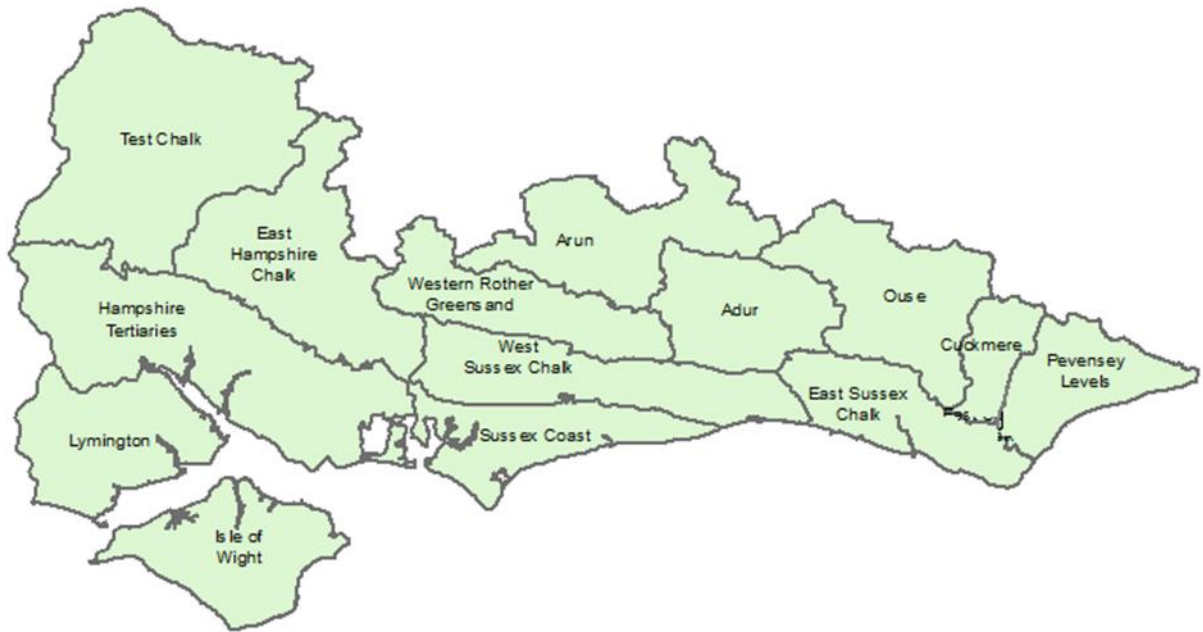
## 10.5 Groundwater table

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

## 10.6 Abstraction licence flow constraints

Number of flow constraints in force between 1 to 8 June 2023	Number of flow constraints in force between 9 to 15 June 2023	Number of flow constraints in force between 16 to 22 June 2023	Number of flow constraints in force between 23 to 30 June 2023
2	2	2	3

## 10.7 SSD Areal Rainfall Units Map



## 10.8 SSD Areal Rainfall Monthly Long Term Averages

Hydrological Area	Jan LTA mm	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Test Chalk	82	58	69	52	59	58	48	63	66	75	80	88
East Hampshire Chalk	90	62	74	56	62	59	52	65	74	86	90	93
West Sussex Chalk	92	63	74	60	60	58	51	65	78	92	98	94
East Sussex Chalk	85	57	65	54	52	58	49	60	72	93	98	88
Isle of Wight	87	60	67	52	53	50	44	58	69	84	94	87
Western Rother Greensand	98	65	76	61	63	57	51	66	79	91	96	98
Hampshire Tertiaries	85	59	67	50	57	53	45	59	68	79	85	89
Lymington	88	61	68	52	58	54	44	60	71	83	89	91
Sussex Coast	75	51	61	50	50	48	42	53	64	77	81	77
Arun	85	55	66	56	58	56	48	59	73	81	85	86
Adur	84	55	64	55	56	56	46	60	72	86	89	85
Ouse	85	56	64	54	54	59	49	60	73	89	93	86
Cuckmere	84	55	62	51	50	58	49	60	72	91	94	85
Pevensey Levels	80	54	61	51	47	52	47	56	68	88	94	81
Solent & South Downs Average	86	58	67	54	56	55	47	60	72	85	90	88