

Monthly water situation report: Solent and South Downs Area

Summary - May 2023

Solent and South Downs SSD had below average rainfall in May, receiving 72% (40mm) of the Long Time Average (LTA) rainfall (56 mm). Monthly mean river flows across SSD ranged from **normal** to **exceptionally high**. Groundwater levels ranged from **above normal** to **exceptionally high**. Soils across Solent and South Downs ended the month drier than the average for May. End of month reservoir stocks at Ardingly Reservoir (Ouse) and at Arlington Reservoir (Cuckmere) were both above average.

1.1 Rainfall

SSD had below average rainfall in May, receiving 72% (40mm) of the LTA rainfall (56 mm). The rainfall pattern across SSD for May shows the largest totals in the west of the area, which were close to average, while the eastern side received about half of the LTA. The Test Chalk areal unit in the west of SSD received the most rainfall with 95% (56mm) of LTA (59mm), while the Pevensey Levels areal unit, at the most eastern end, had the least rainfall with 43% (20mm) of LTA (47mm).

May rainfall across SSD was below average but most areal units were within the top ten highest for the total rain in the last 3 months, March to May. In particular the East Hampshire Chalk had the 2nd highest March to May total on its record and the Test Chalk the 3rd highest on its record. The East Hampshire Chalk also recorded its 8th highest rainfall for the six month period of December to May.

The highest daily total of 43mm was recorded on 9th May at the Harestock rain gauge (East Hampshire Chalk), which represents 97% of May's rainfall in one day. For most of the SSD raingauges over 75% of the month's total rain fell within just one week, between 5th and 11th of May. The remainder of the month, since the 13th, has been dry.

1.2 Soil moisture deficit and recharge

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

1.3 River flows

Monthly mean river flows across SSD ranged from **normal** to **exceptionally high**. Flows in the River Wallington at North Fareham and the River Meon at Mislingford were **exceptionally high**. The River Itchen at Allbrook & Highbridge, River Rother at Iping Mill, River Medina at Blackwater, River Test at Chilbolton and River Test at Broadlands were **notably high**. The

flows in the River Ouse at Goldbridge, River Adur at Sakeham, River Arun at Alfoldean, and the River Cuckmere at Cowbeech were **above normal**. The flows in the River Lymington at Brockenhurst were in the **normal** category.

The River Medina at Blackwater and the River Meon at Mislingford were the 3rd highest on their records for May. The River Itchen at Allbrook & Highbridge and the River Test at Chilbolton recorded their 4th highest May monthly mean flows.

1.4 Groundwater levels

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

The groundwater level at Chilgrove (West Sussex Chalk), Catherington (East Hampshire Chalk) and Harting Common Down (Western Rother Lower Greensand) were **exceptionally high**. Levels at Harting Common Down were the 2nd highest on record for May (starting 1984).

Groundwater levels at Lopcombe Corner (Test Chalk), Preston Candover (East Hampshire Chalk), West Meon (East Hampshire Chalk), Houndean Bottom (East Sussex Chalk) and Beeding Hill (West Sussex Chalk) were **notably high**. Levels at Preston Candover, West Meon and Beeding Hill were the 3rd highest on their record.

Carisbrooke Castle (Isle of Wight), Youngwoods Copse (Isle of Wight), Cornish Farm (East Sussex Chalk), Clanville Gate (Test Chalk) all had groundwater levels in the **above normal** category.

1.5 Reservoir stocks

End of month reservoir stocks were both above average at Ardingly Reservoir (Ouse) with 100% of total capacity (LTA 97%) and at Arlington Reservoir (Cuckmere) with 95% of total capacity (LTA 93%).

1.6 Environmental impact

No restrictions were in force at the start of the month. One licence restriction in the River Arun was triggered at the very end of May. There were two Flood Warnings issued during May, both for Hampshire on the River Itchen. Two Flood Alerts were issued in Hampshire on the River Itchen and one for the Eastern Yar on the Isle of Wight during May.

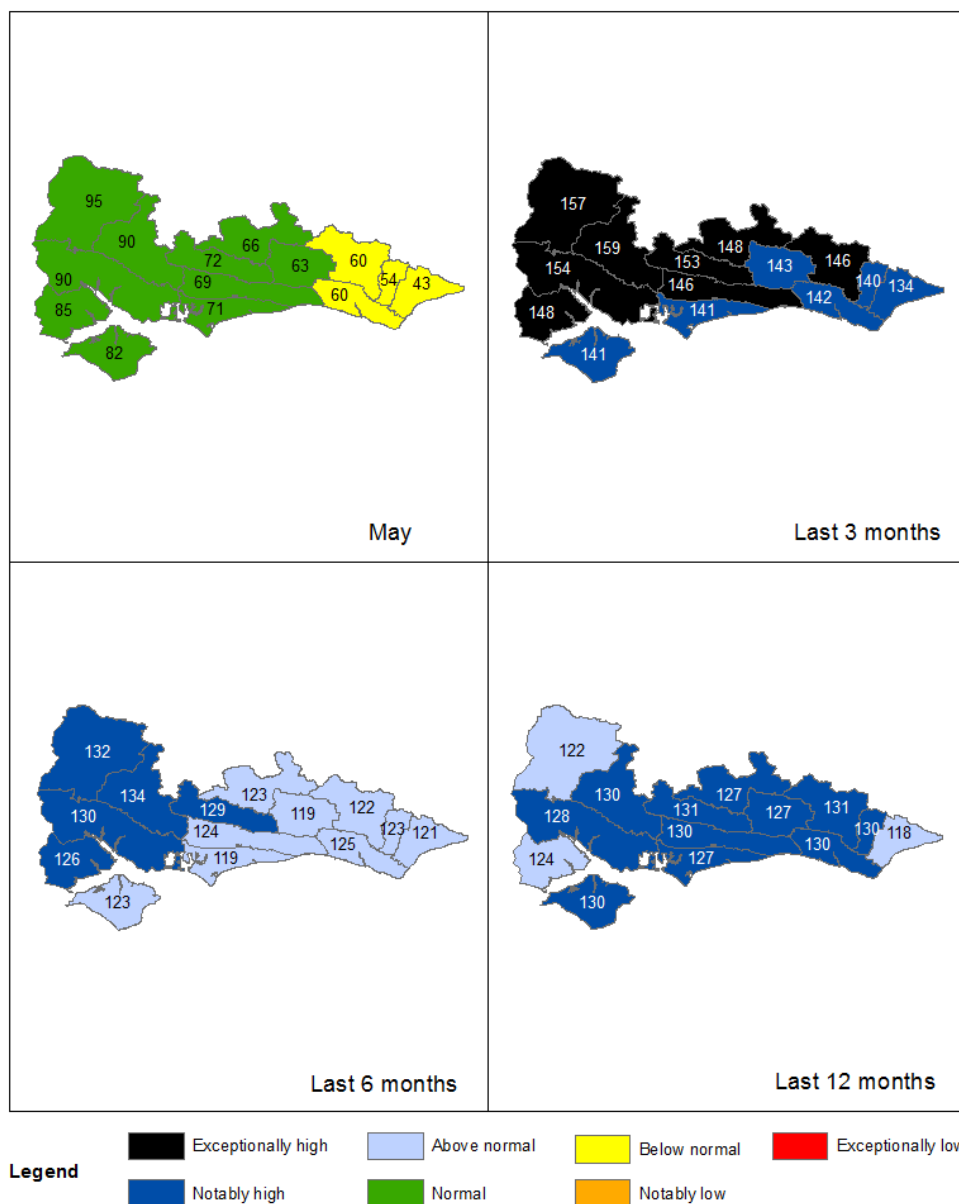
Author: HydrologySSD@environment-agency.gov.uk

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2. Rainfall

2.1 Rainfall map

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

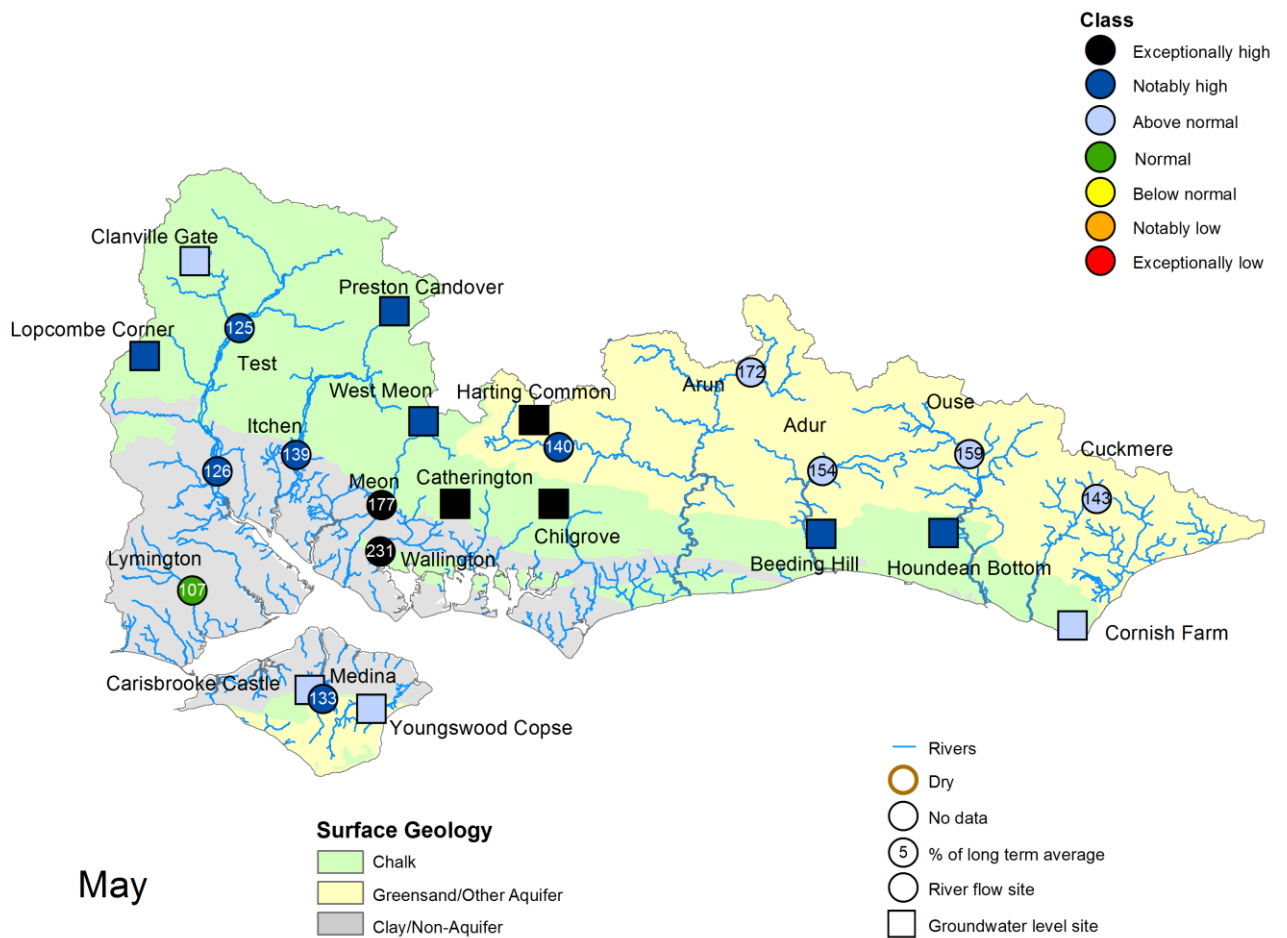


HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2023). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved. 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 May 2023, expressed as a percentage of the respective long term average and classed relative to an analysis of historic May monthly means. Table available in the appendices with detailed information.

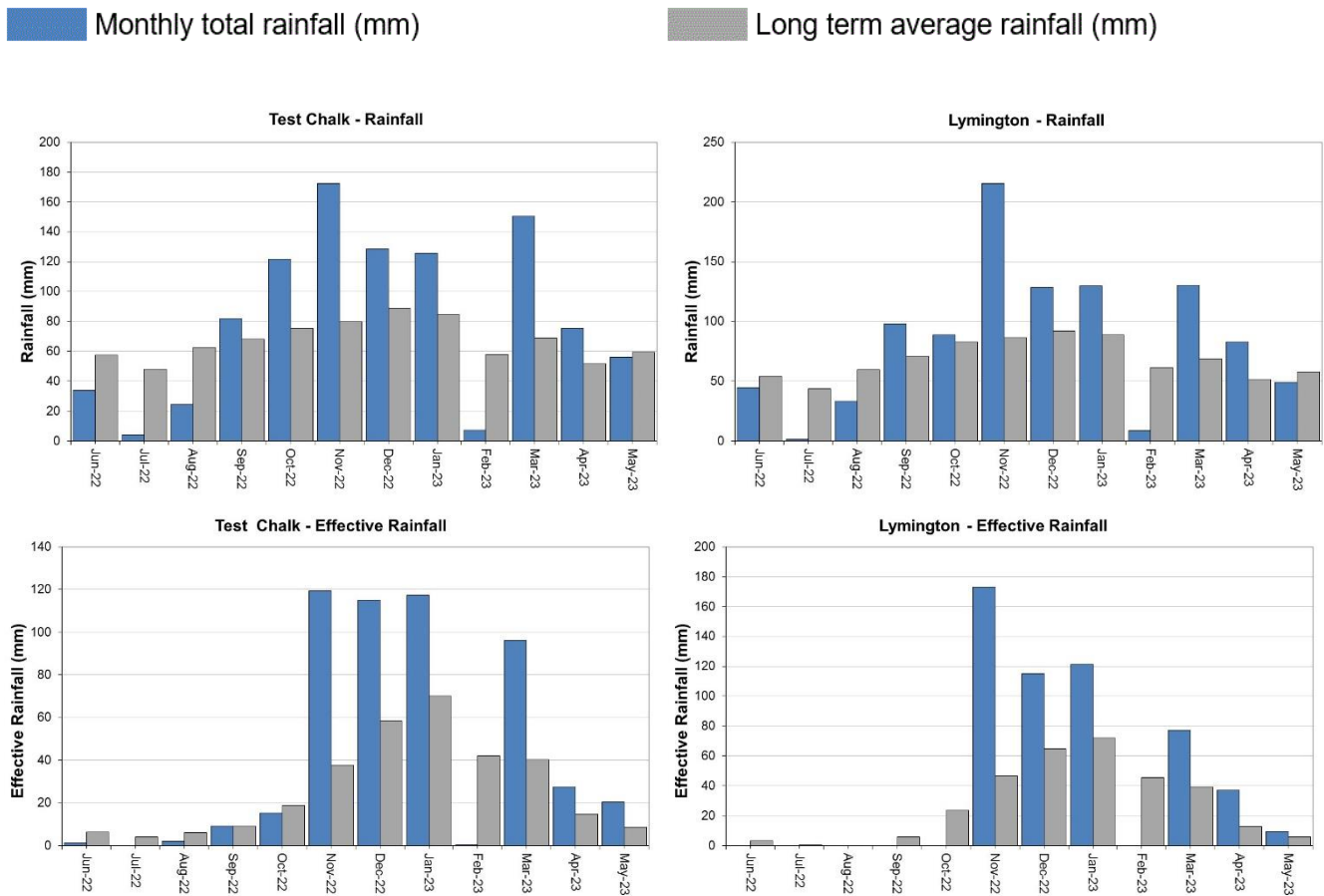


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4 West Hampshire

4.1 West Hampshire Rainfall and effective rainfall charts

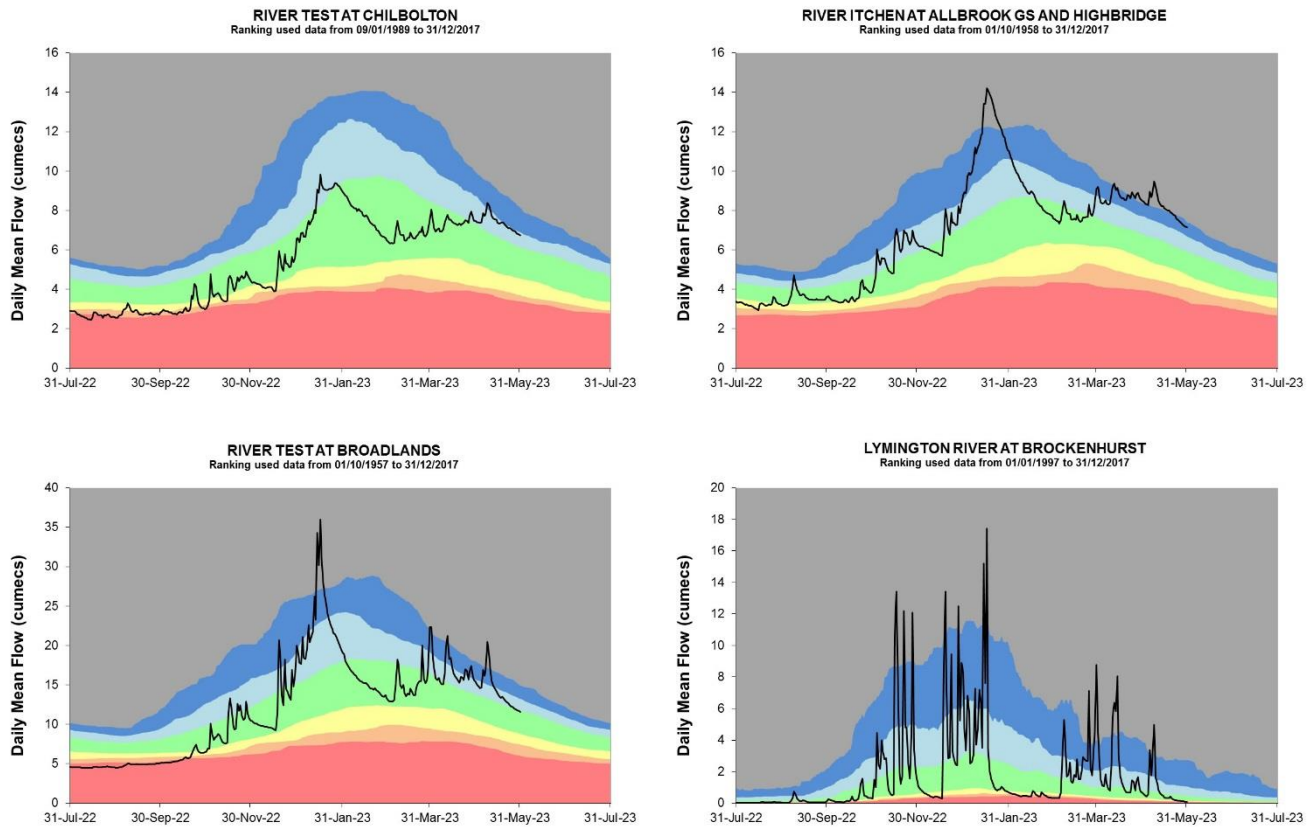
Figure 4.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

4.2 West Hampshire River flow charts

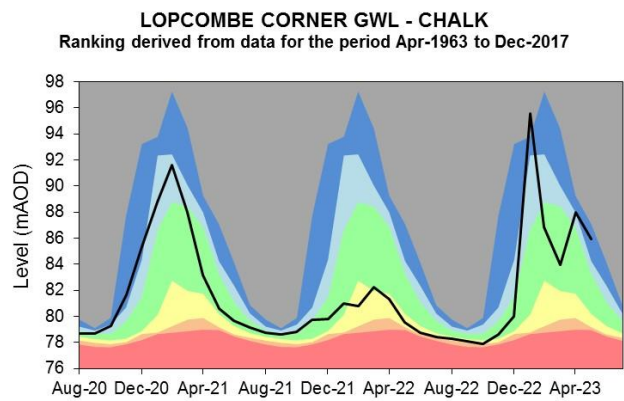
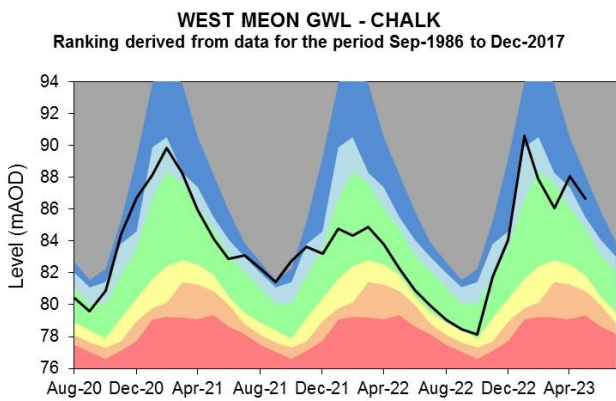
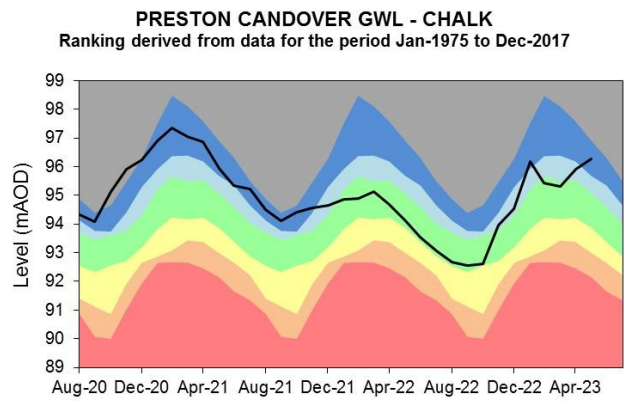
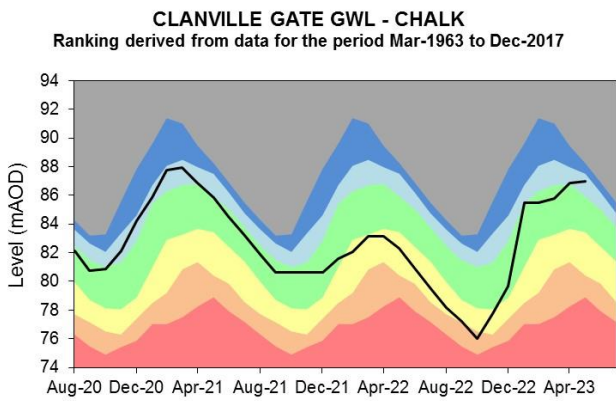
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



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.

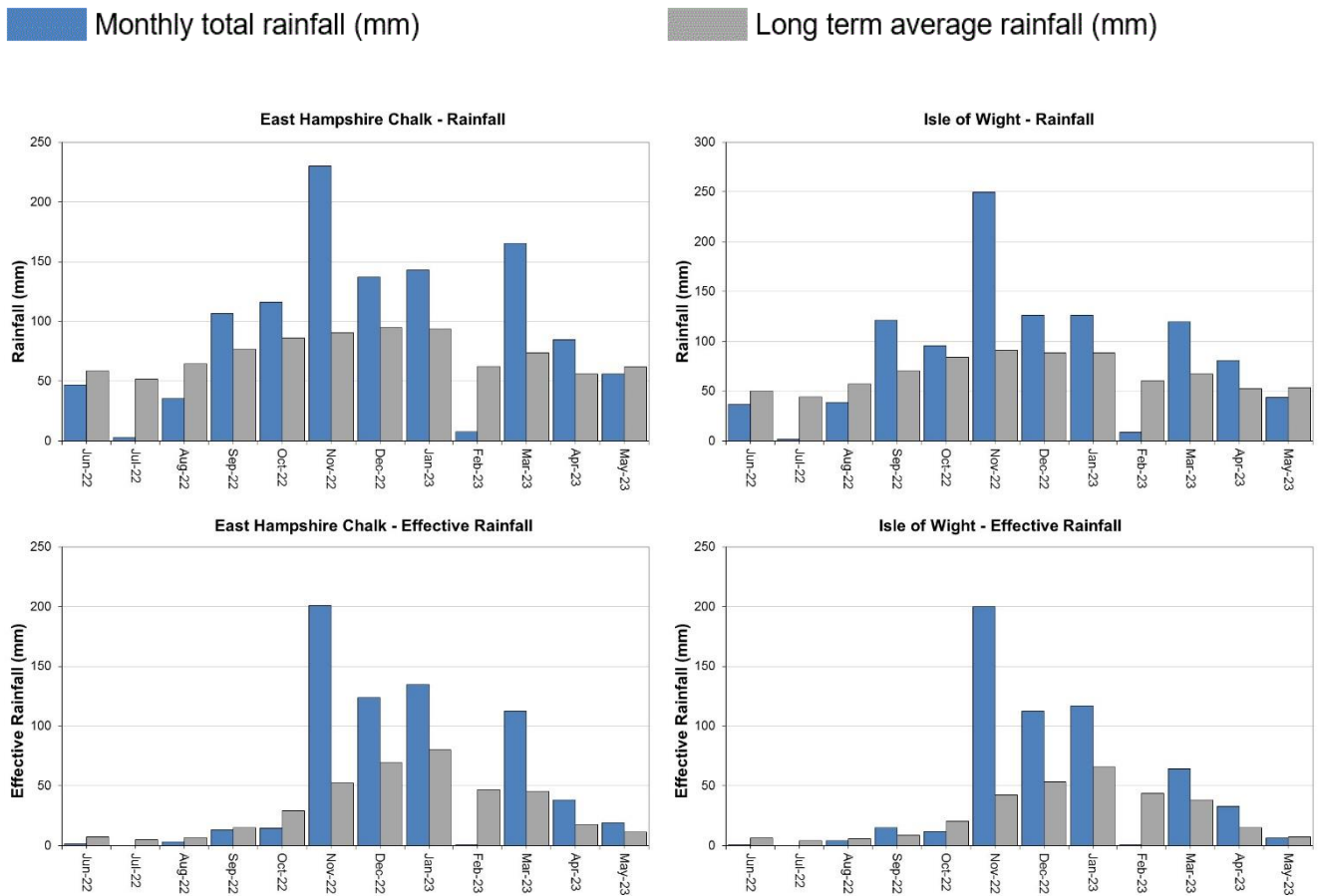


Source: Environment Agency, 2023.

5 East Hampshire and Isle of Wight

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

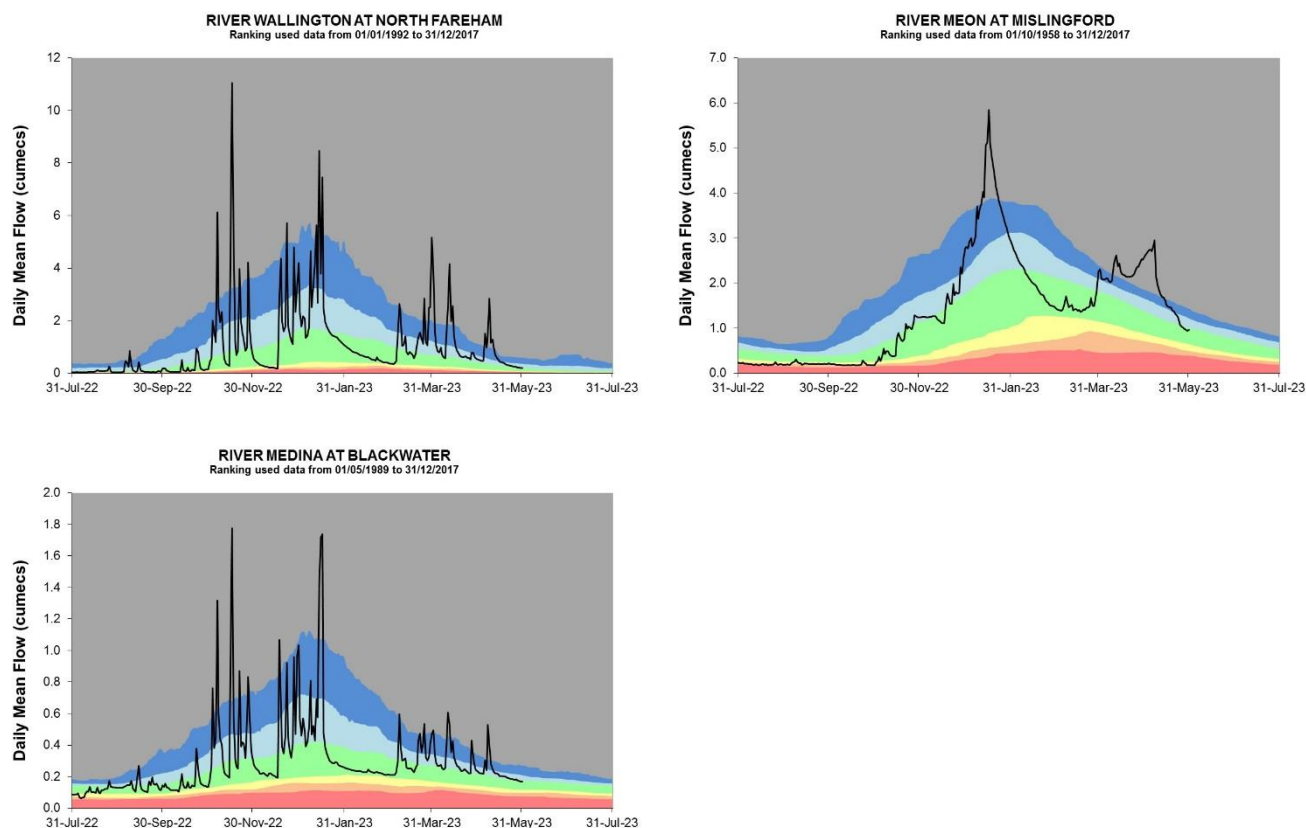
Figure 5.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

5.2 East Hampshire and Isle of Wight River flow charts

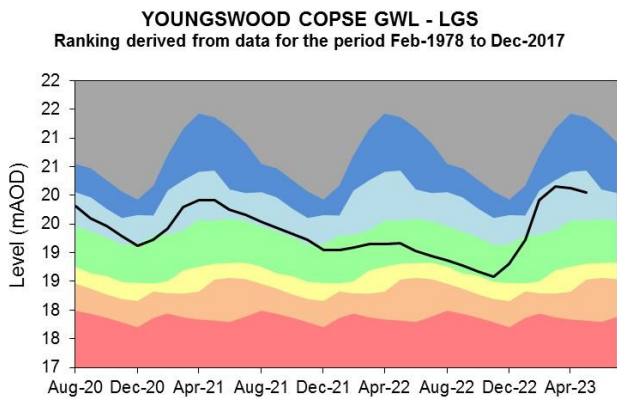
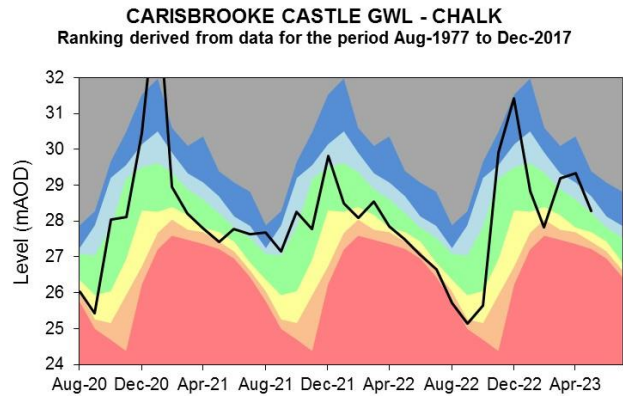
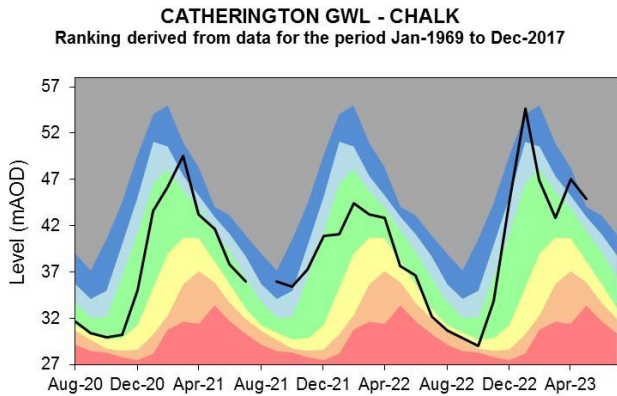
Figure 5.2 Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2023.

5.3 East Hampshire and Isle of Wight Groundwater level charts

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.

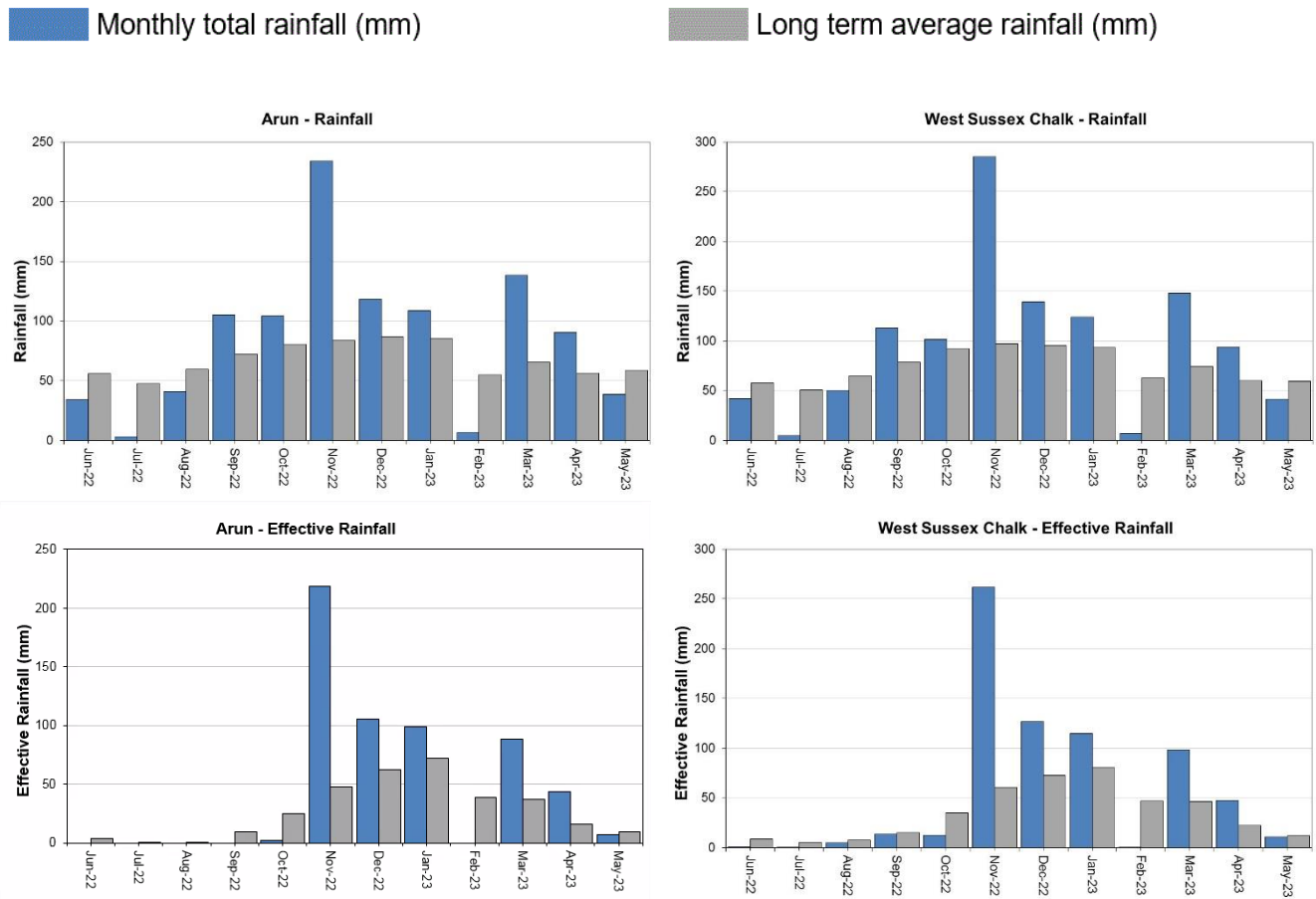


Source: Environment Agency, 2023.

6 West Sussex

6.1 West Sussex Rainfall and Effective Rainfall charts

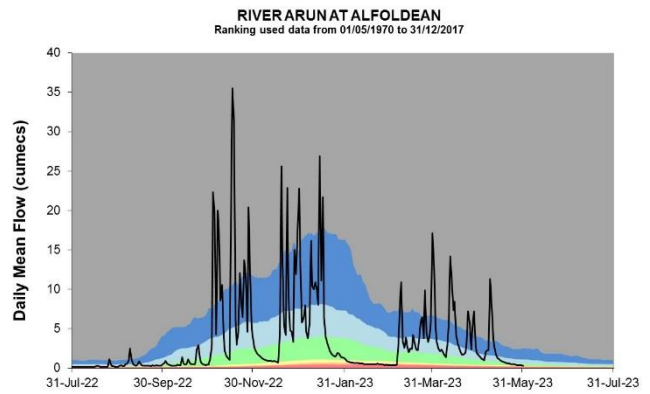
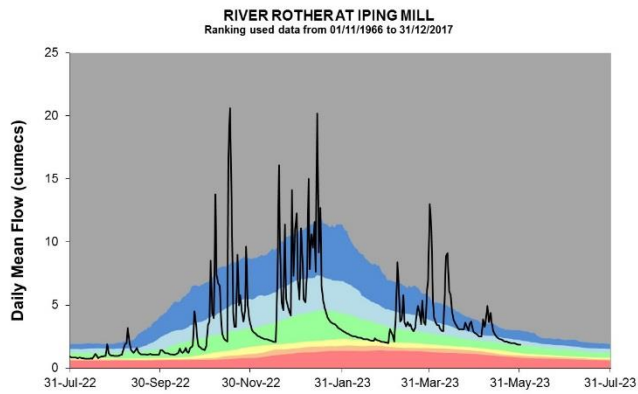
Figure 6.1: Monthly rainfall and effective rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average.



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

6.2 West Sussex River flow charts

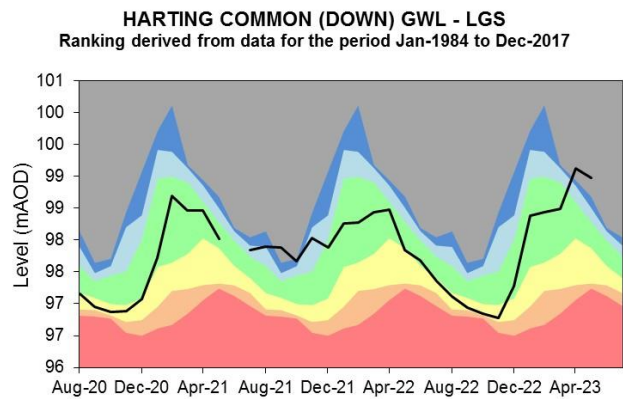
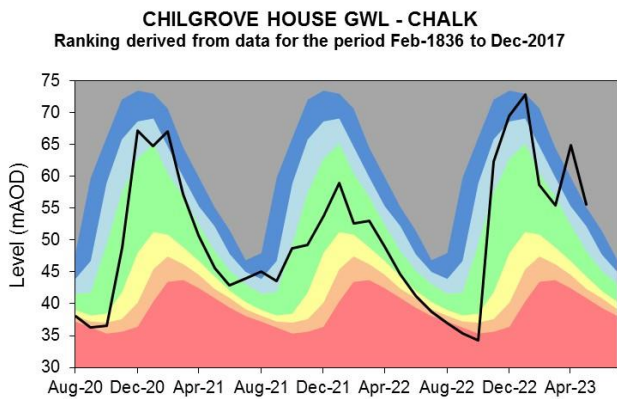
Figure 6.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2023.

6.3 West Sussex Groundwater level charts

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.

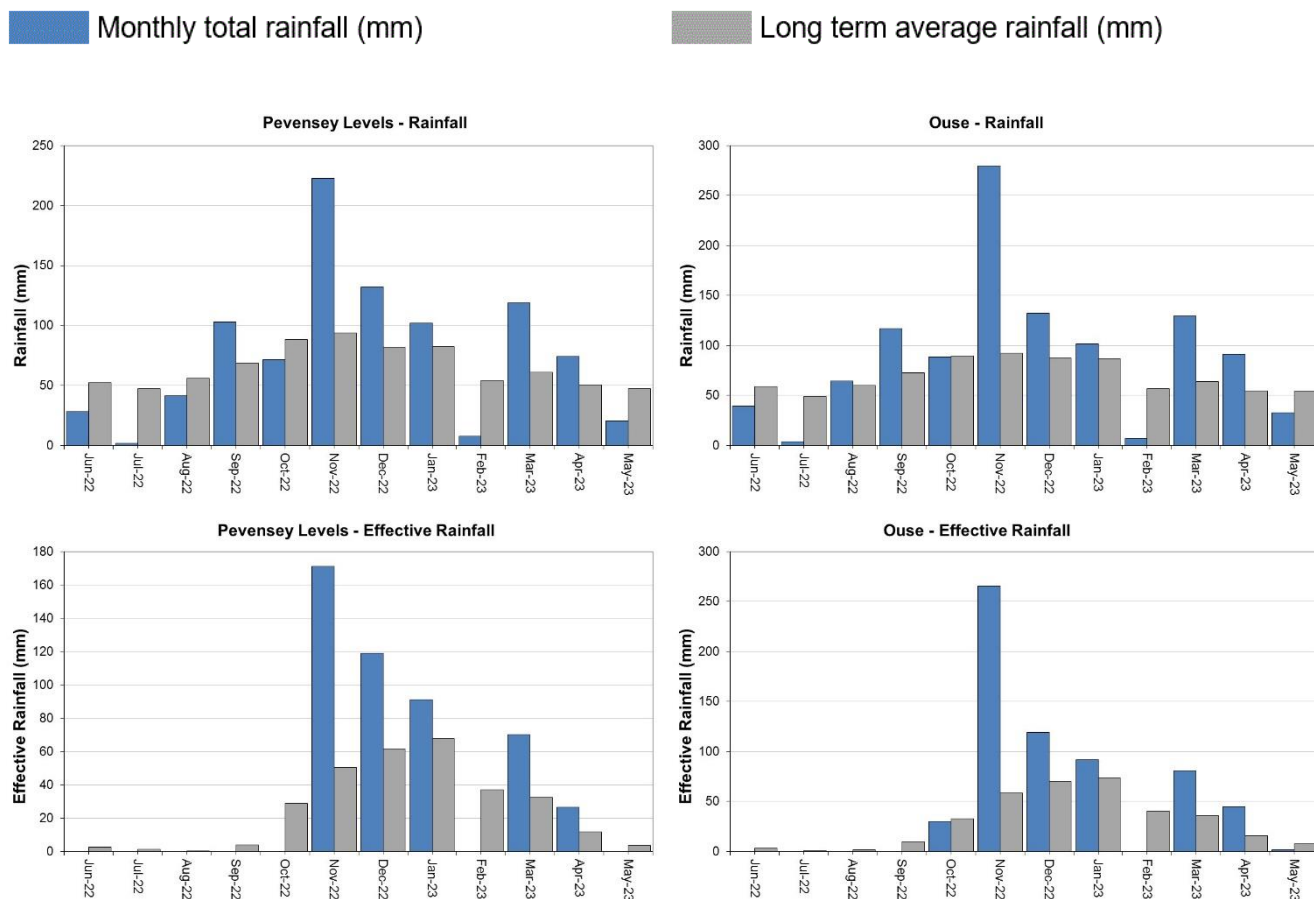


Source: Environment Agency, 2023.

7 East Sussex

7.1 East Sussex Rainfall and Effective Rainfall charts

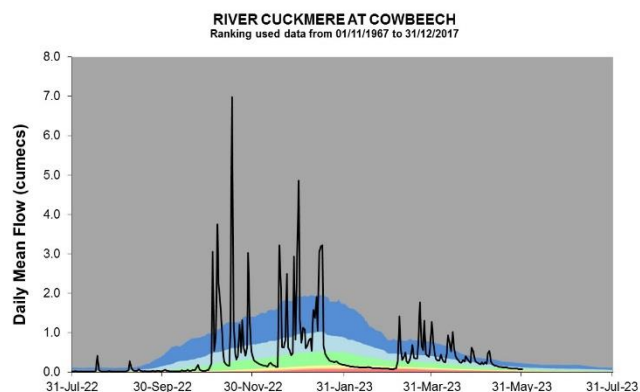
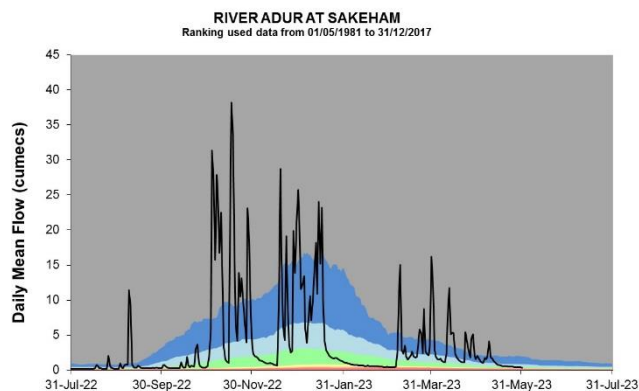
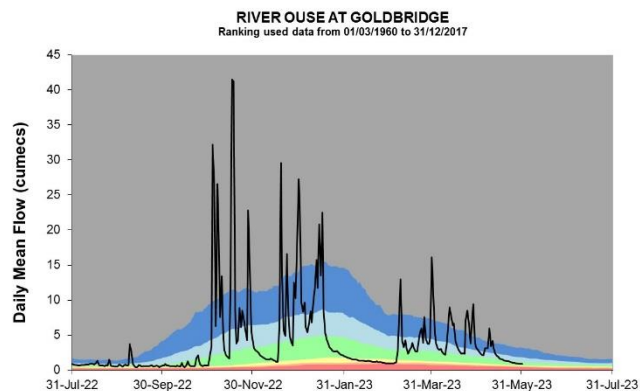
Figure 7.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

7.2 East Sussex River flow charts

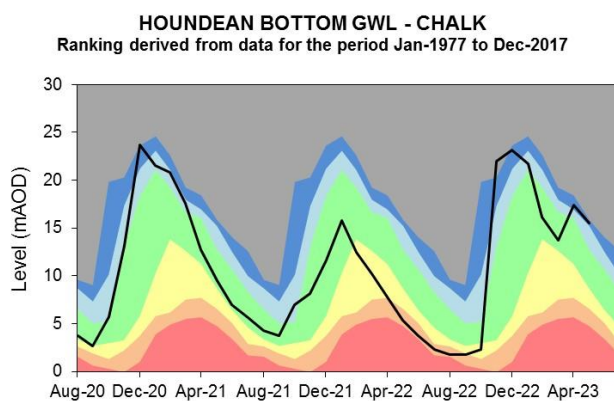
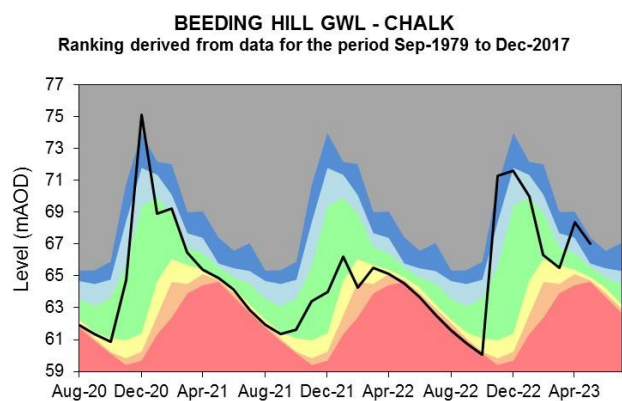
Figure 7.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2023.

7.3 East Sussex Groundwater level charts

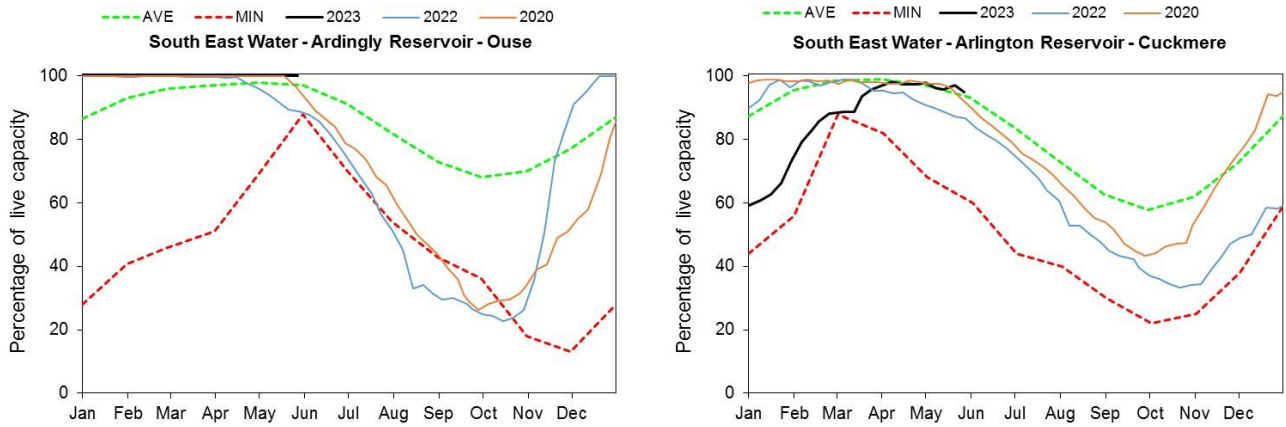
Figure 7.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



Source: Environment Agency, 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 (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, 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) 31 day Total	Rainfall MAY as %LTA	Effective Rainfall (mm) 31 day Total	Effective Rainfall MAY as %LTA	Soil Moisture Deficit (SMD) Day 31	SMD End of MAY LTA
Test Chalk	56	95%	20	234%	50	39
East Hampshire Chalk	56	90%	19	169%	51	37
West Sussex Chalk	41	69%	11	91%	51	34
East Sussex Chalk	31	60%	3	39%	54	37
Isle of Wight	43	82%	6	84%	55	42
Western Rother Greensand	46	73%	13	100%	51	35
Hampshire Tertiaries	51	89%	10	234%	51	40
Lymington	49	85%	9	164%	51	37
Sussex Coast	35	70%	2	60%	57	41
Arun	39	66%	7	72%	51	34
Adur	35	62%	4	50%	51	34
Ouse	32	60%	1	17%	49	34
Cuckmere	27	54%	0	0%	52	34
Pevensy Levels	20	43%	0	0%	63	37
Solent & South Downs Average	40	72%	8	98%	53	37

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	131	119%	44	186%
East Hampshire Chalk	140	119%	53	184%
West Sussex Chalk	135	113%	52	150%
East Sussex Chalk	115	109%	32	130%
Isle of Wight	124	118%	37	167%
Western Rother Greensand	140	113%	53	154%
Hampshire Tertiaries	132	123%	38	259%
Lymington	132	121%	43	234%
Sussex Coast	113	112%	26	168%
Arun	129	112%	43	168%
Adur	123	111%	39	155%
Ouse	124	114%	38	165%
Cuckmere	105	104%	25	135%
Pevensey Levels	94	96%	20	132%
Solent & South Downs Average	124	113%	39	168%

10.3 Rainfall banding table

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

10.4 River flows table

Site name	River	Catchment	MAY 2023 band	APRIL 2022 band
Alfoldean Gs	Arun	Arun	Above normal	Exceptionally High
Allbrook Gs+ Highbridge	Itchen (so)	Itchen	Notably high	Exceptionally High
Blackwater	Medina	Isle of Wight	Notably high	Above Normal
Broadlands	Test	Test Lower	Notably high	Above Normal
Brockenhurst GS	Lymington	New Forest	Normal	Notably high
Chilbolton GS	Test	Test Upper	Notably high	Normal
Cowbeech Gs	Cuckmere	Cuckmere	Above Normal	Notably high
Goldbridge Gs	Ouse [so]	Ouse Sussex	Above Normal	Exceptionally High
Iping Mill Gs	Rother	West Rother	Notably high	Exceptionally High
Mislingford GS	Meon	Meon	Exceptionally High	Exceptionally High
North Fareham GS	Wallington	Wallington	Exceptionally High	Exceptionally High
Sakeham GS	Adur	Adur	Above Normal	Exceptionally High

10.5 Groundwater table

Site name	Aquifer	End of MAY 2023 band	End of APR 2023 band
Houndean Bottom Gwl	Brighton Chalk Block	Notably High	Notably High
Chilgrove House Gwl	Chichester-Worthing-Portsdown Chalk	Exceptionally High	Exceptionally High
Carisbrooke Castle	Isle Of Wight Central Downs Chalk	Above Normal	Notably High
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	Notably High	Above Normal
Beeding Hill Gwl	Brighton Chalk Block	Notably High	Notably High
Catherington	River Meon Chalk	Exceptionally High	Notably High
Cornish Wigdens Gwtr	Eastbourne Chalk Block	Above Normal	Above Normal
Harting Common Down	Western Rother Lower Greensand	Exceptionally High	Normal
Preston Candover	River Itchen Chalk	Notably High	Above Normal
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 May 2023	Number of flow constraints in force between 9 to 15 May 2023	Number of flow constraints in force between 16 to 22 May 2023	Number of flow constraints in force between 23 to 30 May 2023	Number of flow constraints in force between 30 to 31 May 2023
0	0	0	0	1

10.7 SSD Areal Rainfall Units Map



10.8 SSD Areal Rainfall Units monthly LTA

Areal Rainfall Units	Jan LTA (mm)	Feb LTA (mm)	Mar LTA (mm)	Apr LTA (mm)	May LTA (mm)	Jun LTA (mm)	July LTA (mm)	Aug LTA (mm)	Sep LTA (mm)	Oct LTA (mm)	Nov LTA (mm)	Dec LTA (mm)
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	86	58	67	54	56	55	47	60	72	85	90	88