

Monthly water situation report: Solent and South Downs Area

Summary - April 2023

Solent and South Downs (SSD) had above average rainfall in April, receiving 156% (84mm) of the LTA rainfall (54mm). 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 wetter than the average for April. End of month reservoir stocks were above average at Ardingly Reservoir (Ouse) and average at Arlington Reservoir (Cuckmere).

1.1 Rainfall

SSD had above average rainfall in April, receiving 156% (84mm) of the LTA rainfall (54mm). The Test Chalk had the least rainfall with 145% (75mm) of LTA (52mm), with the Pevensy Levels close behind with 146% (74mm) of LTA (51mm). The Ouse areal unit received the most rainfall with 167% (91mm) of LTA (54mm). The April rainfall for the Ouse unit was the 10th wettest on its record (since 1961).

While April rainfall for SSD was above LTA it was not particularly notable. However, the last 6 months, November to April, was the 3rd wettest on record for SSD. For the Ouse, East Sussex Chalk and Cuckmere units it was the 2nd wettest November to April on record.

The highest daily total of 31mm was recorded on 24th April at the Testwood rain gauge (Hampshire Tertiaries). The second highest rainfall total was recorded on the 27th April at Chale and Wroxall raingauges (25mm) on the Isle of Wight. The rainfall pattern for the month was very changeable but at least a third of the months total rain fell at the end of the month between the 22nd and 27th April.

1.2 Soil moisture deficit and recharge

Soils across Solent and South Downs ended the month wetter than the average for April.

1.3 River flows

Monthly mean river flows across SSD ranged from **normal** to **exceptionally high**. Flows in the River Ouse at Goldbridge, the River Adur at Sakeham, River Arun at Alfoldean, River Rother at Iping Mill, Wallington River at North Fareham, River Meon at Misingford, and the River Itchen at Allbrook & Highbridge were **exceptionally high**. The River Cuckmere at Cowbeech and the River Lyminster at Brockenhurst had monthly flows that were **notably**

high. The flows in the River Medina at Blackwater and in the River Test at Broadlands were **above normal**. The flows in the River Test at Chilbolton were in the **normal** category.

For the River Ouse at Goldbridge, the River Adur at Sakeham, River Arun at Alfoldean, River Rother at Iping Mill the April mean flows were the highest on their records. The Wallington River at North Fareham and the River Meon at Misingford recorded their 4th highest April 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) was **exceptionally high**. Groundwater levels at Houndean Bottom (East Sussex Chalk), Beeding Hill (West Sussex Chalk), Catherington (East Hampshire Chalk), West Meon (East Hampshire Chalk) and Carisbrooke Castle (Isle of Wight) were **notably high**. Levels at Beeding Hill were the 3rd highest on record (starting 1979), while West Meon, Catherington and Houndean end of month levels were the 4th highest for April on their records. Youngwoods Copse (Isle of Wight), Cornish Farm (East Sussex Chalk), Preston Candover (East Hampshire Chalk), Lopcombe Corner and Clanville Gate (both Test Chalk) all had groundwater levels in the **above normal** category.

1.5 Reservoir stocks

End of month reservoir stocks were above average at Ardingly Reservoir (Ouse) with 100% of total capacity (LTA 98%) and average at Arlington Reservoir (Cuckmere) with 97.4% of total capacity (LTA 97.2%).

1.6 Environmental impact

One licence restriction ended at the very start of April and no new restrictions came into force throughout the month. There were three Flood Warnings issued during April, two for Sussex (Western Rother, Pevensey Levels) and 1 for Hampshire (River Itchen). Four Flood Alerts were issued in Sussex and one in Hampshire and the Isle of Wight during April.

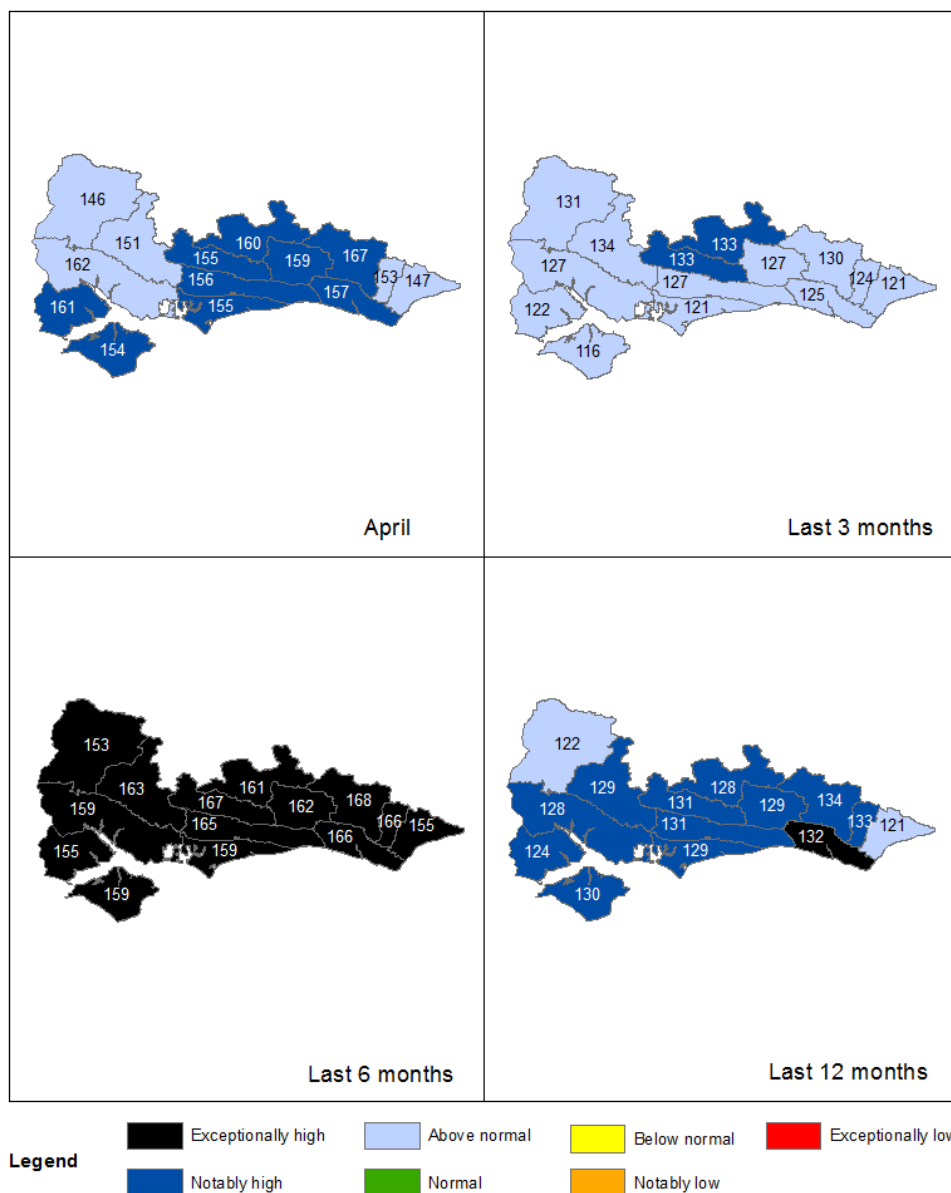
Author: HydrologySSD@environment-agency.gov.uk

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2. Rainfall

2.1 Rainfall map

Figure 2.1: Total rainfall for hydrological areas for the current month (up to 30 April 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.

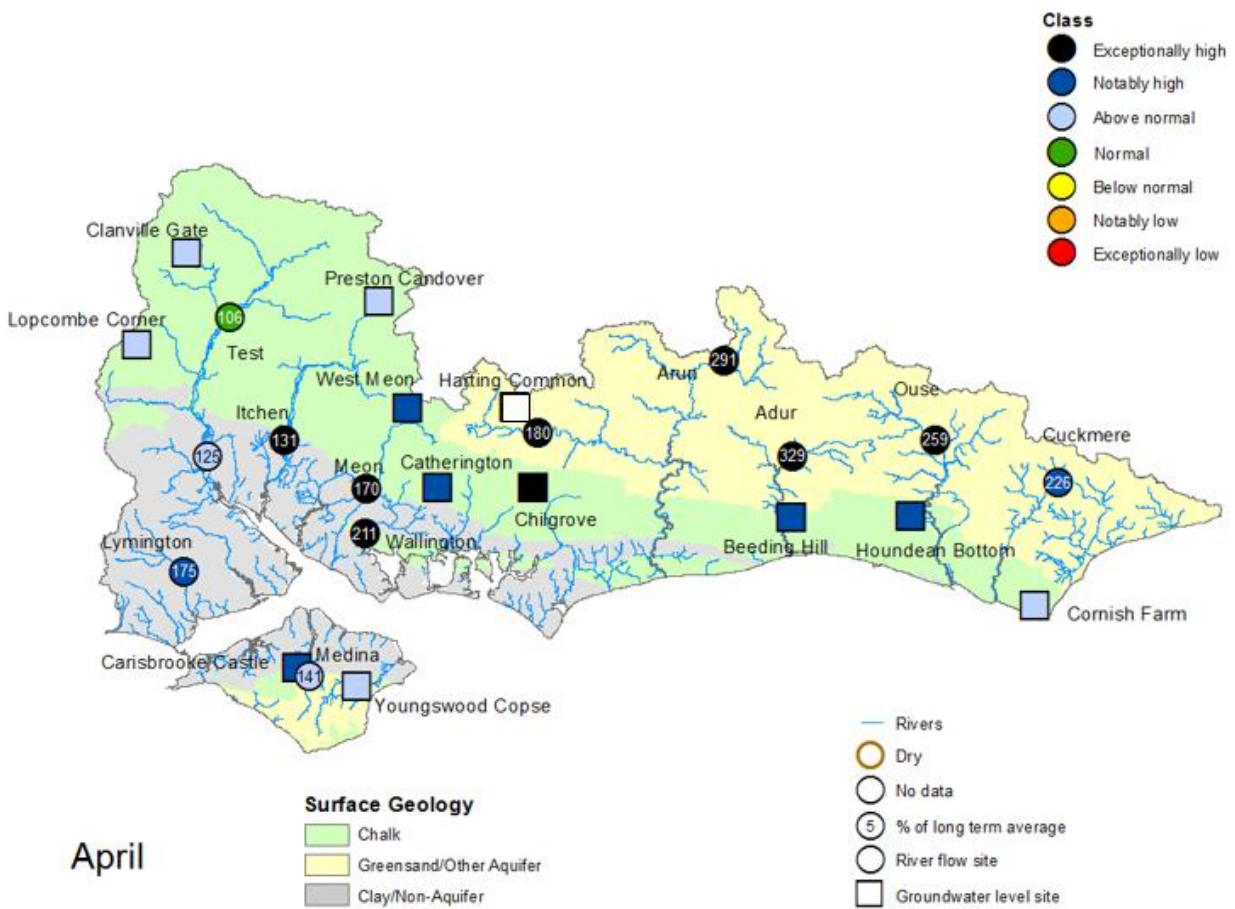


HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2023). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved.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



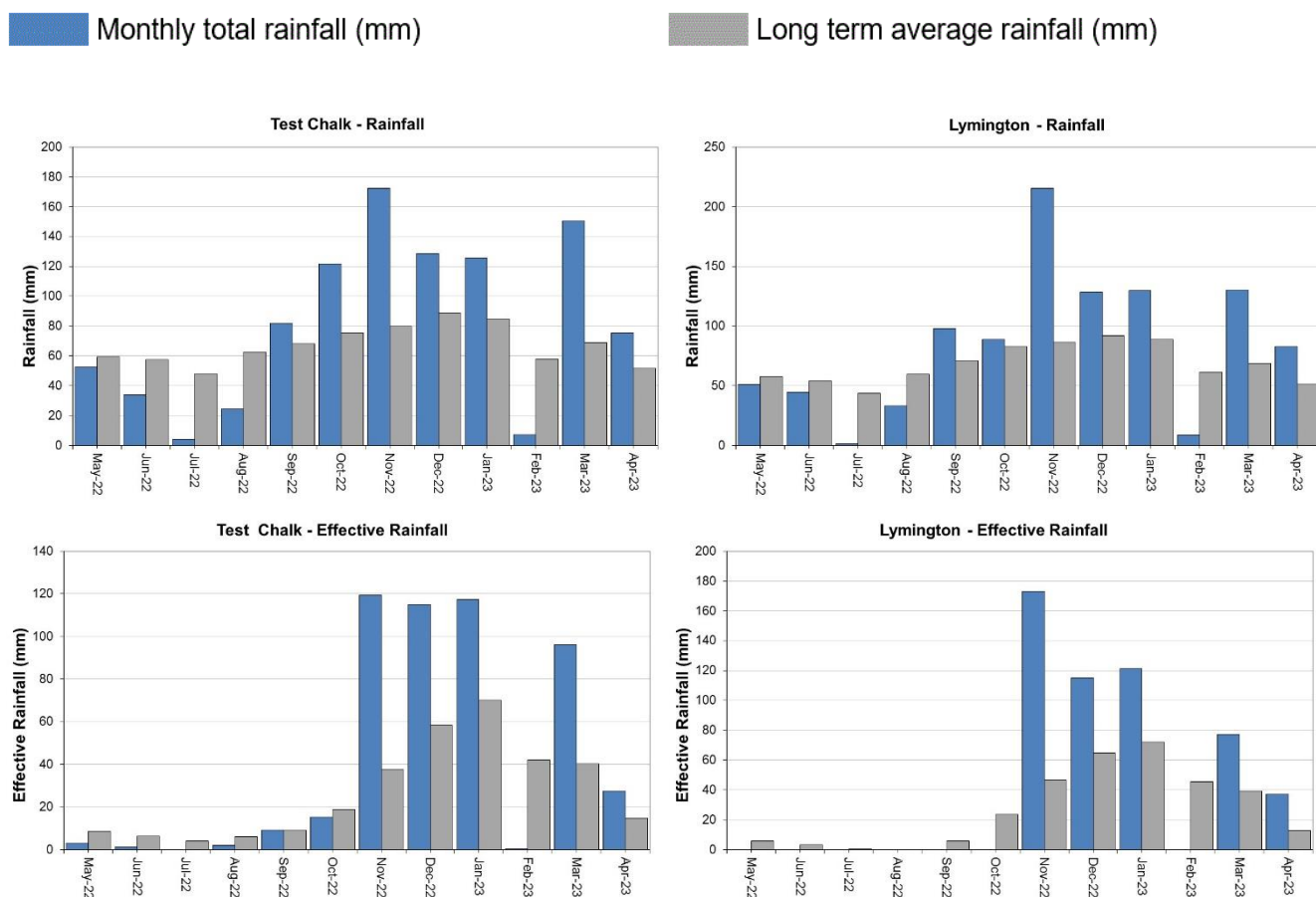
*no data available for Harting Common in April

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4 West Hampshire

4.1 West Hampshire Rainfall and effective rainfall charts

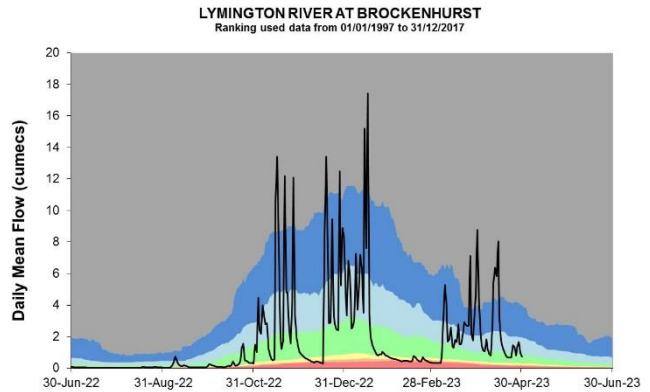
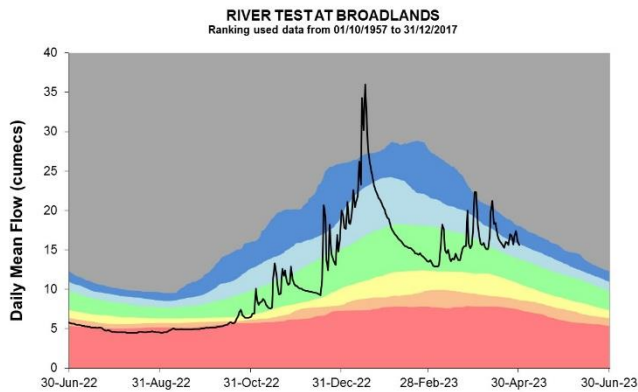
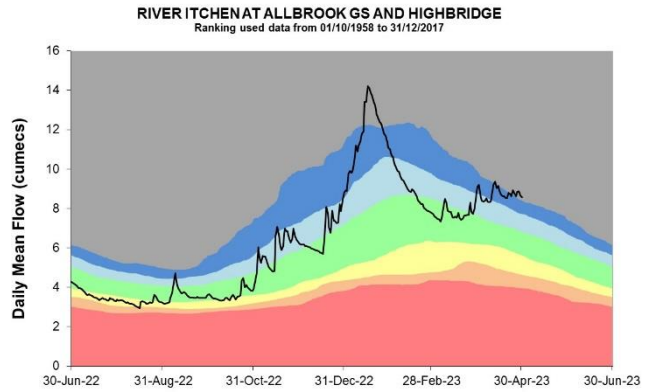
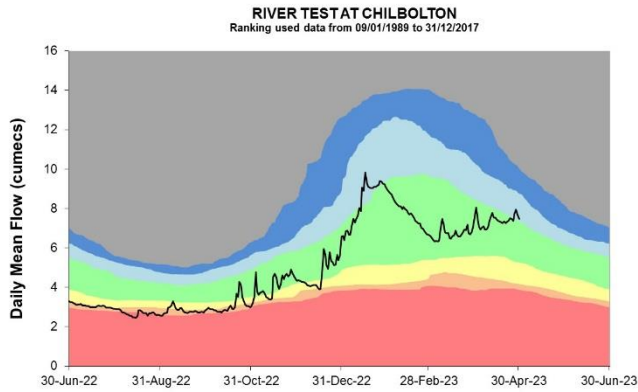
Figure 4.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

4.2 West Hampshire River flow charts

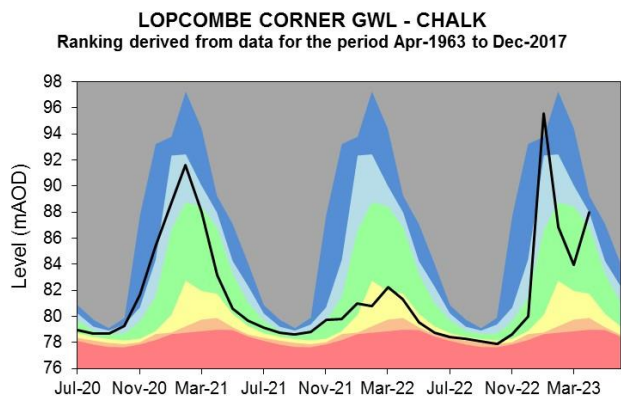
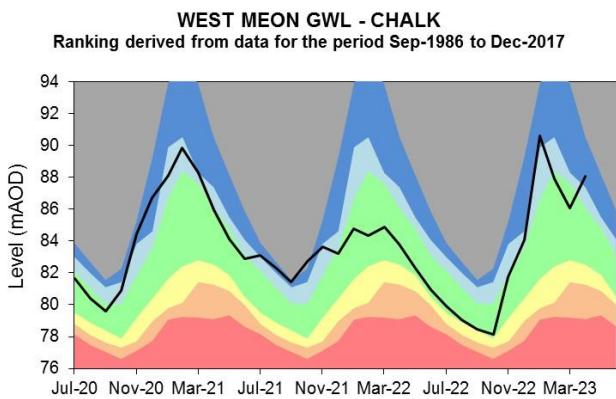
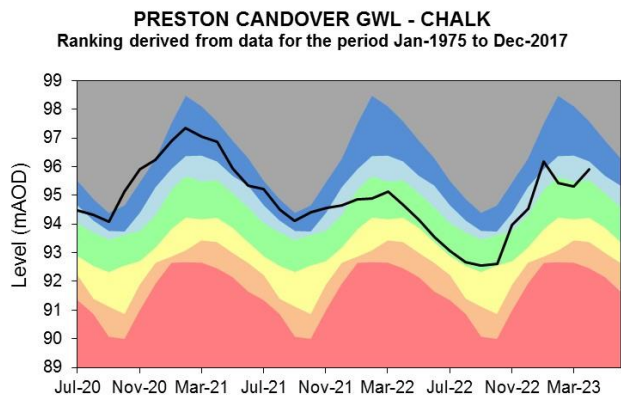
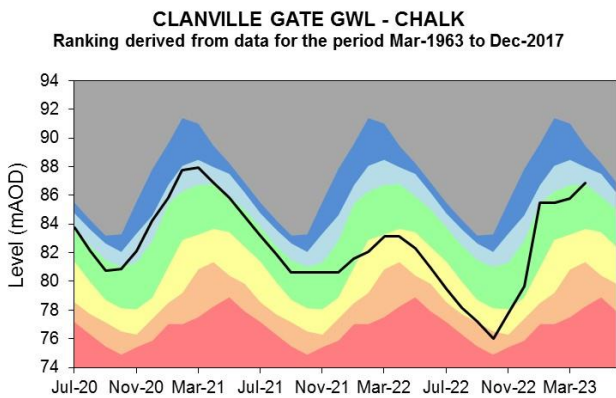
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



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.

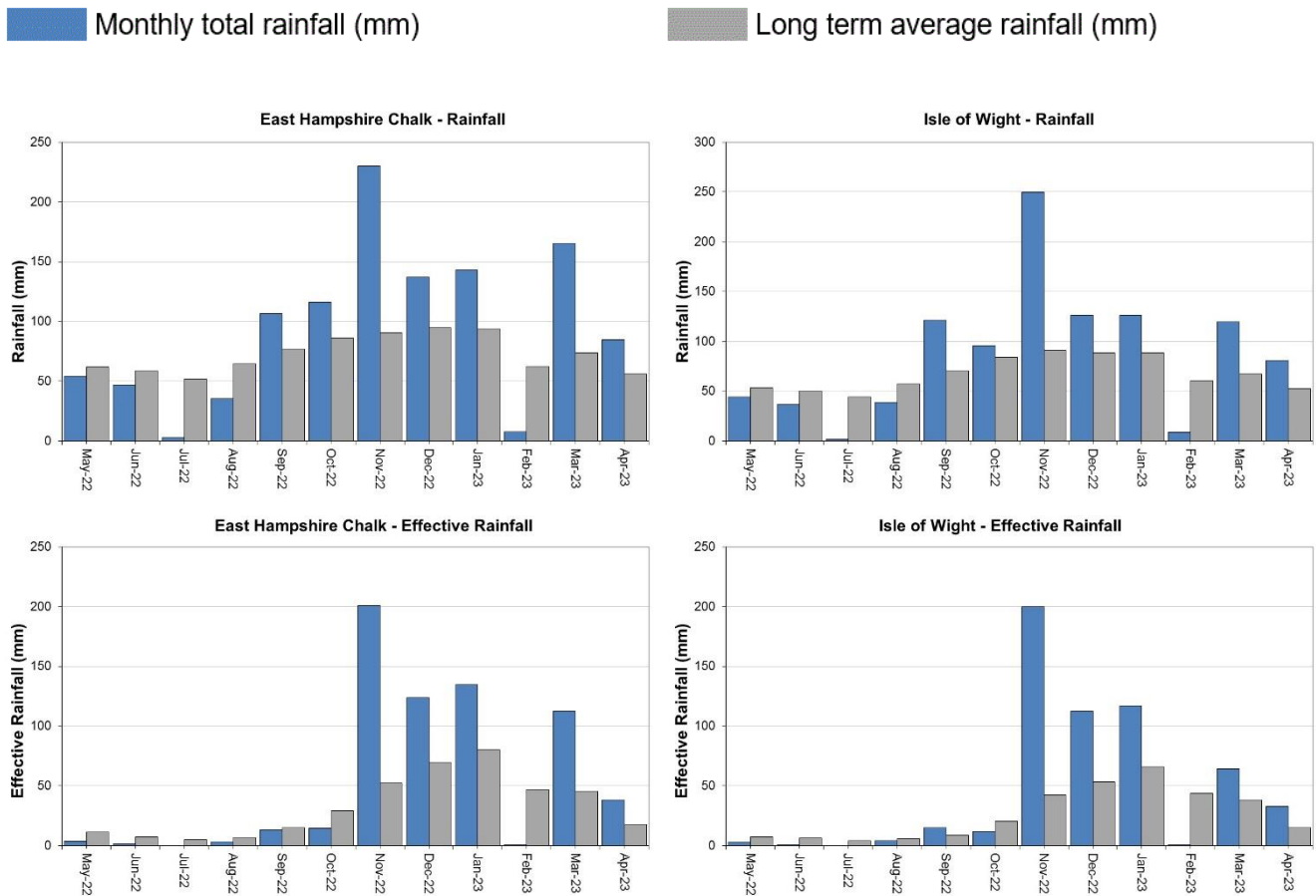


Source: Environment Agency, 2023.

5 East Hampshire and Isle of Wight

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

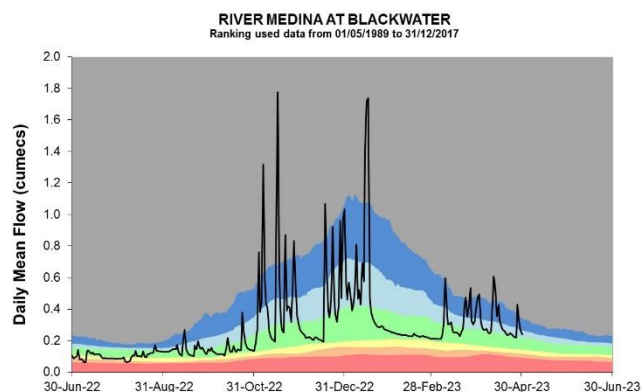
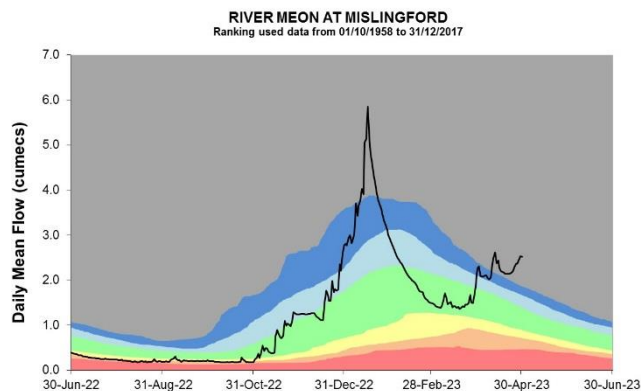
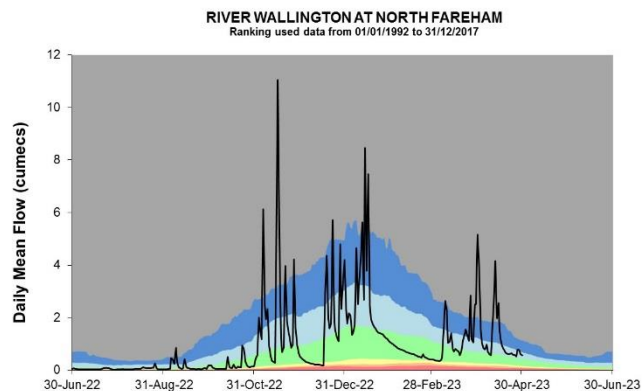
Figure 5.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

5.2 East Hampshire and Isle of Wight River flow charts

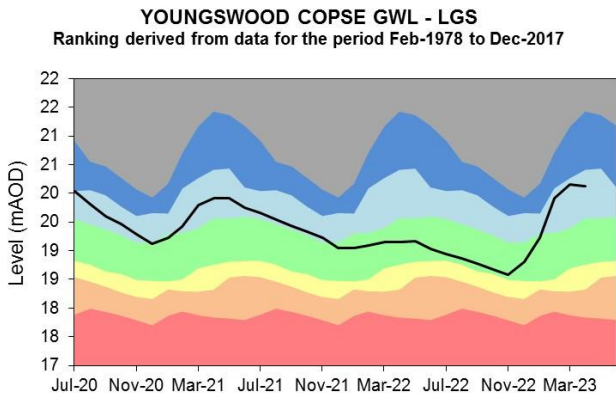
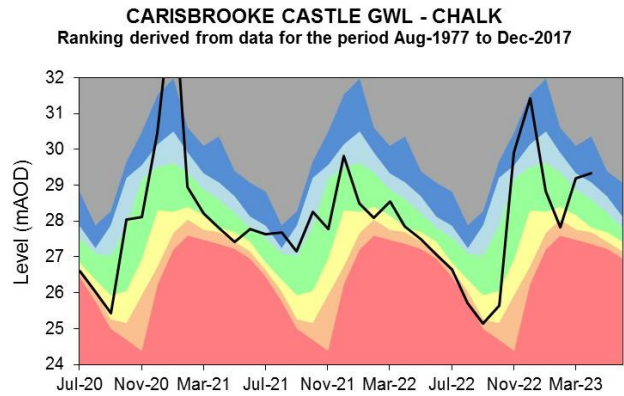
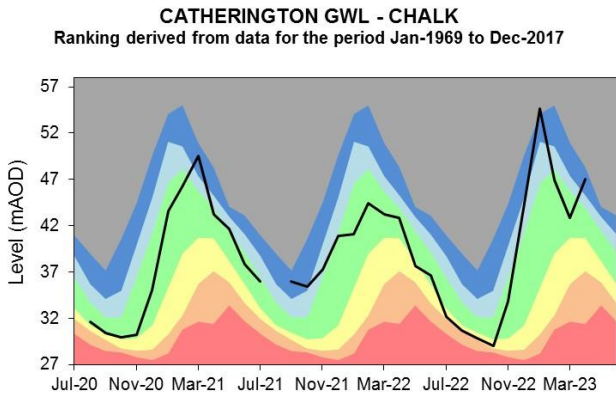
Figure 5.2 Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2023.

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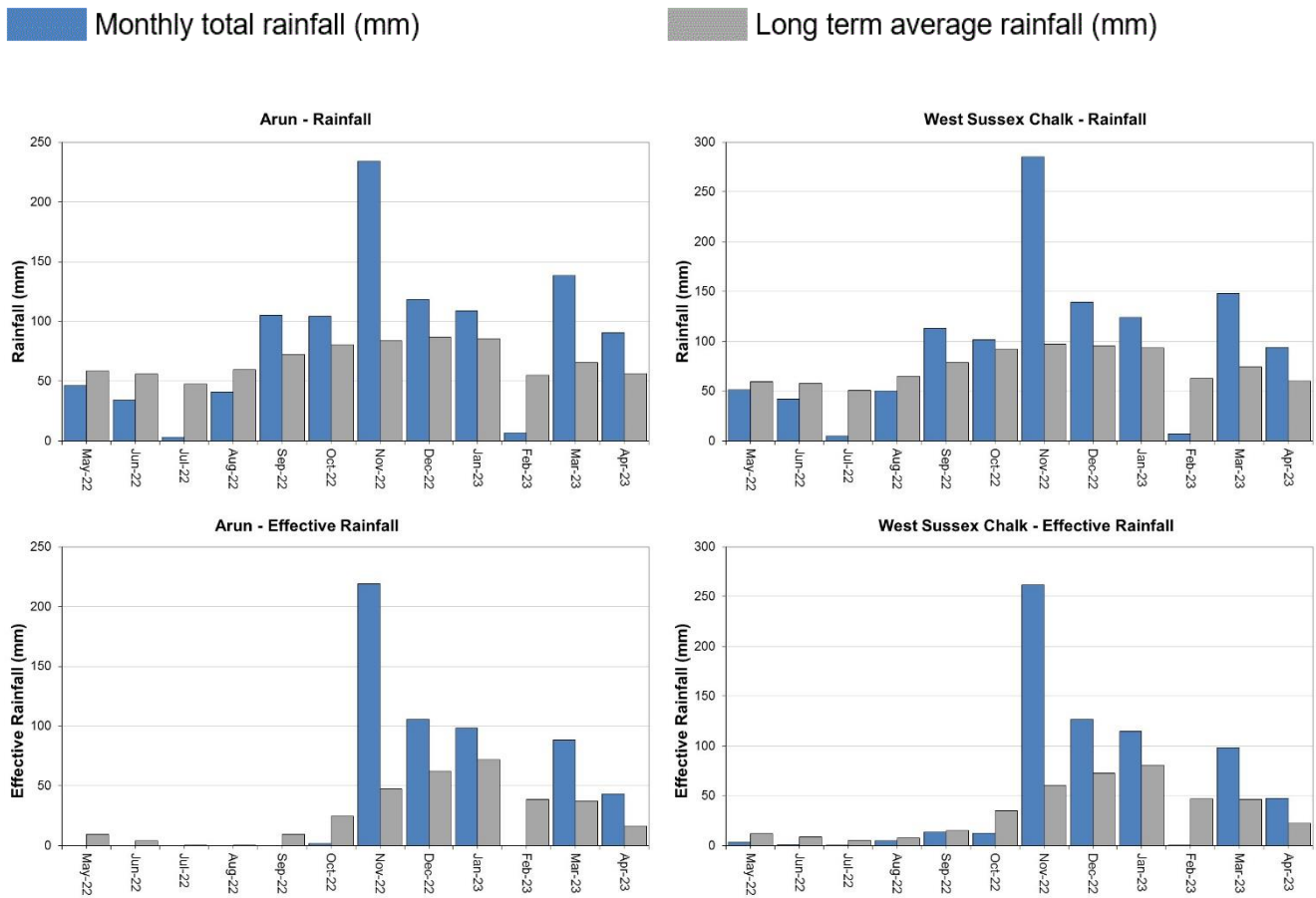


Source: Environment Agency, 2023.

6 West Sussex

6.1 West Sussex Rainfall and Effective Rainfall charts

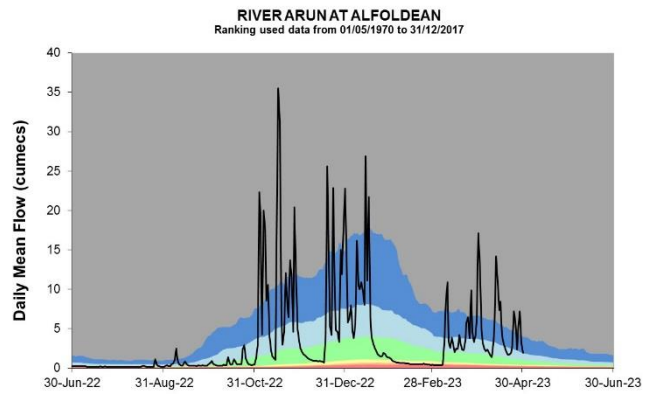
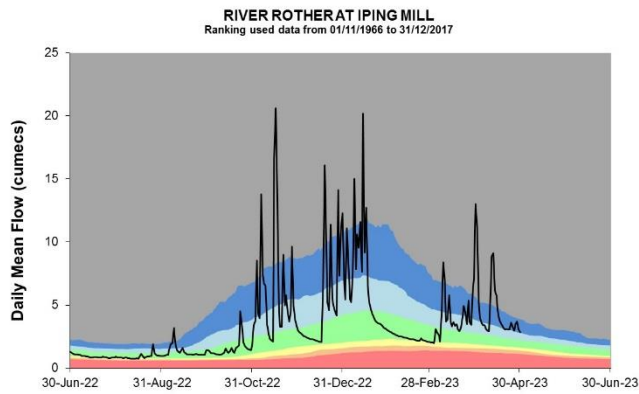
Figure 6.1: Monthly rainfall and effective rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average.



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

6.2 West Sussex River flow charts

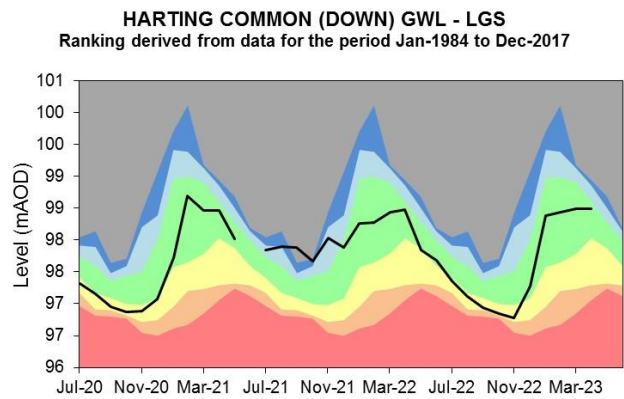
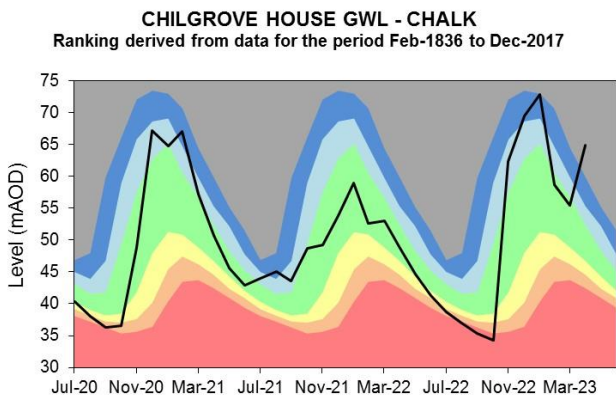
Figure 6.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2023.

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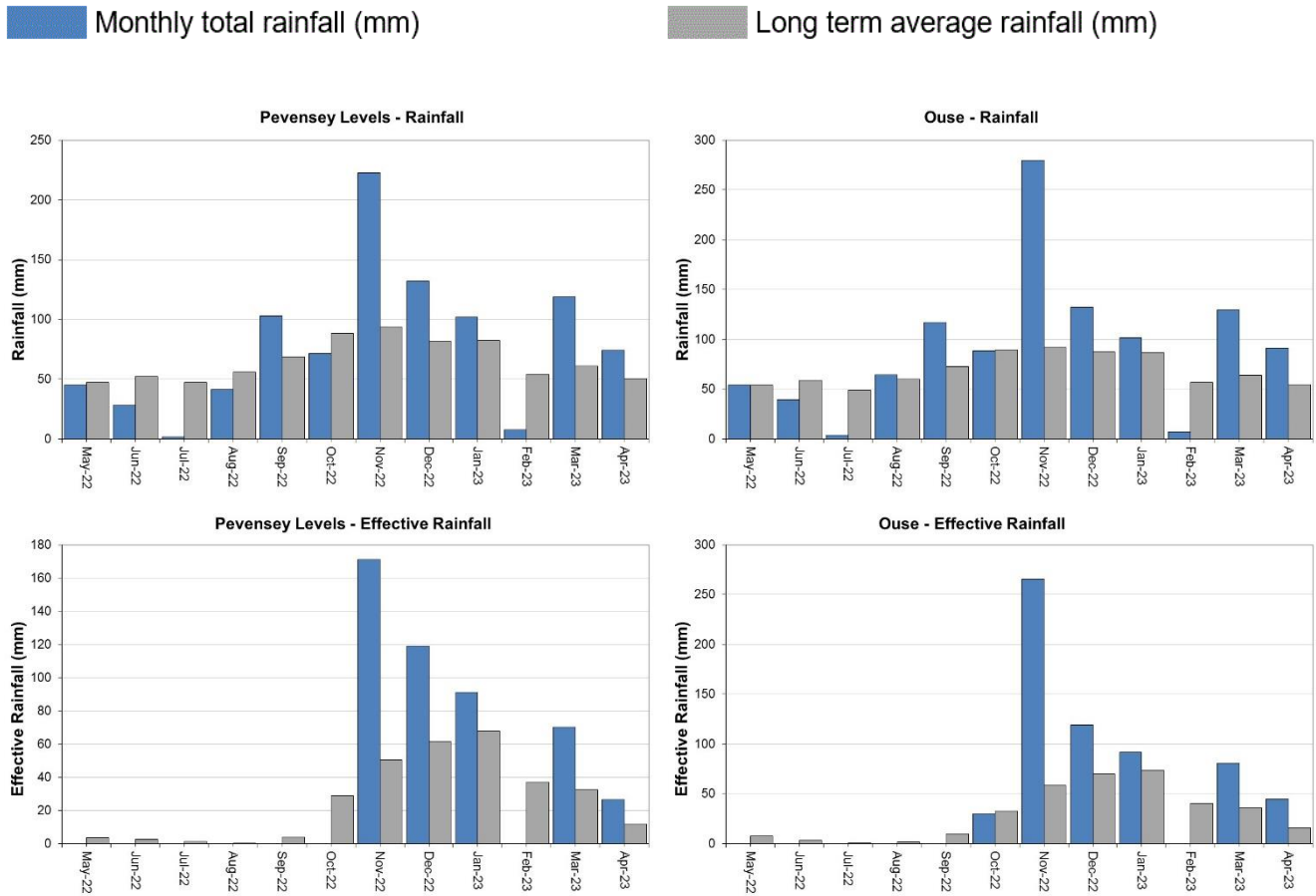


Source: Environment Agency, 2023.

7 East Sussex

7.1 East Sussex Rainfall and Effective Rainfall charts

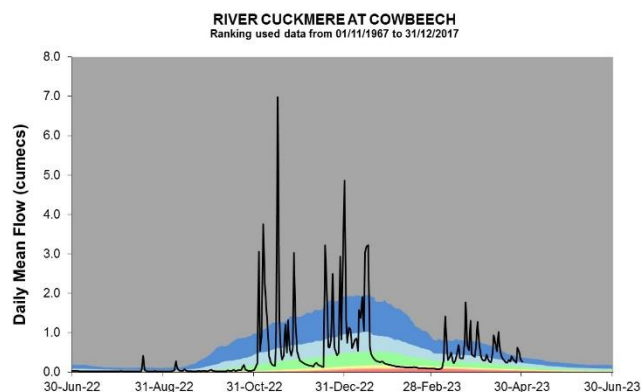
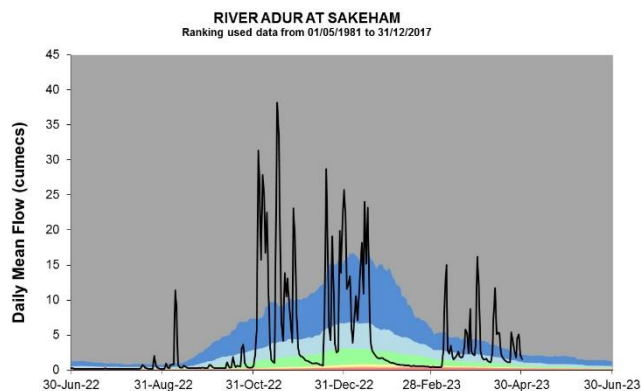
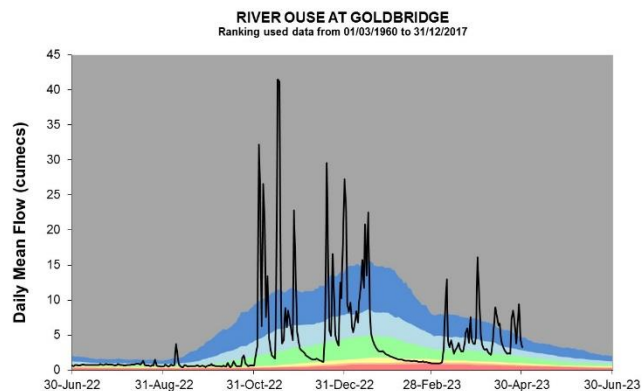
Figure 7.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

7.2 East Sussex River flow charts

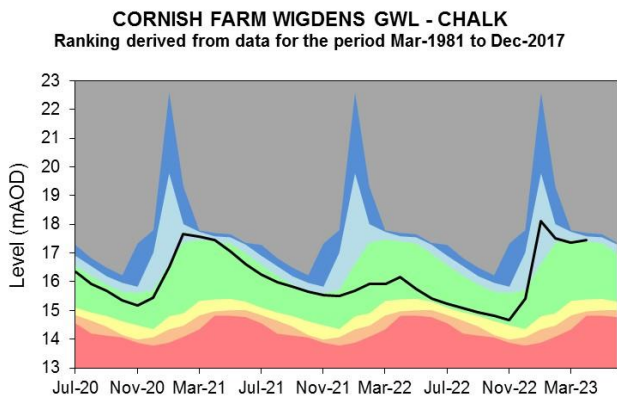
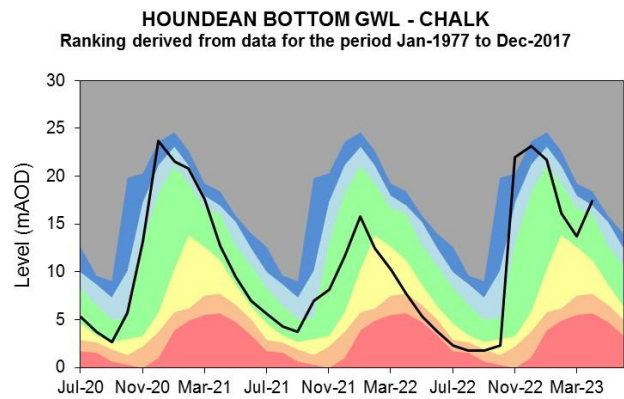
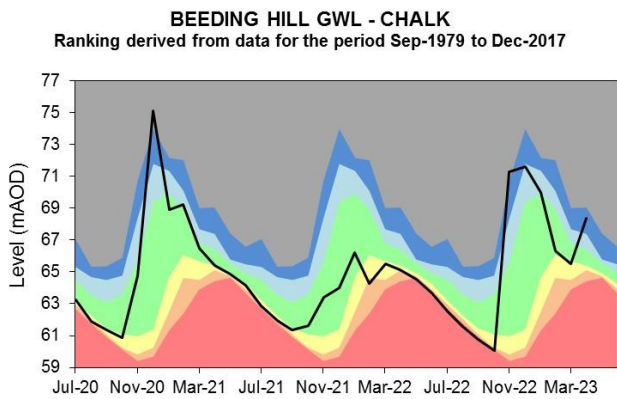
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Source: Environment Agency, 2023.

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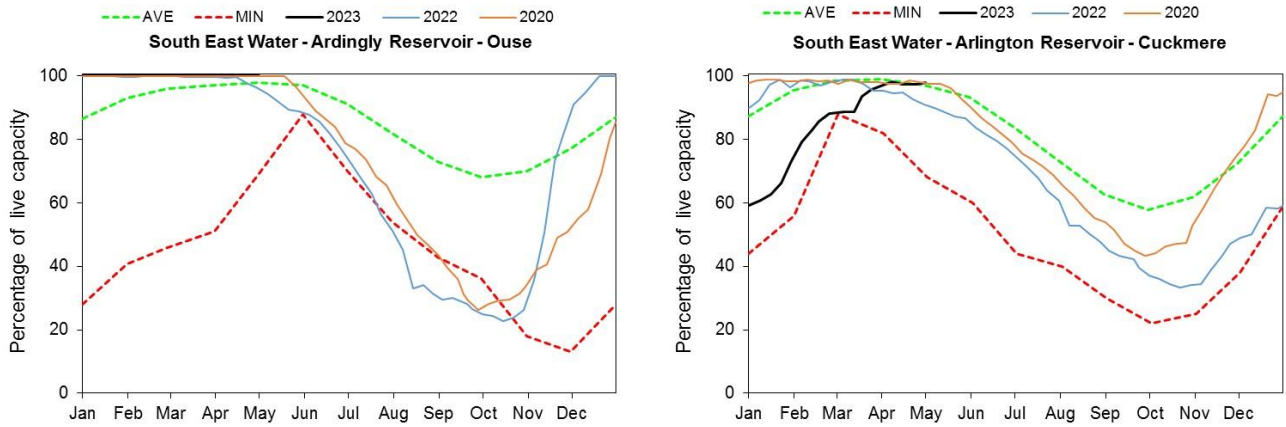
Figure 7.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



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 an estimate of 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 April as %LTA	Effective Rainfall (mm) 30 day Total	Effective Rainfall April as %LTA	Soil Moisture Deficit (SMD) Day 30 (mm)	SMD End of April LTA (mm)
Test Chalk	75	145%	28	186%	7	19
East Hampshire Chalk	85	151%	38	219%	7	18
West Sussex Chalk	94	156%	47	213%	6	16
East Sussex Chalk	84	157%	36	220%	5	17
Isle of Wight	81	154%	33	222%	9	20
Western Rother Greensand	94	155%	46	218%	6	17
Hampshire Tertiaries	81	161%	32	303%	8	20
Lymington	83	161%	37	294%	9	19
Sussex Coast	78	155%	27	228%	7	20
Arun	91	160%	43	267%	6	16
Adur	88	159%	42	255%	6	16
Ouse	91	167%	45	289%	5	16
Cuckmere	78	153%	33	252%	5	16
Pevensey Levels	74	146%	26	227%	6	17
Solent & South Downs Average	84	156%	37	239%	7	18

10.2 Seasonal summary table of rainfall and effective rainfall

Summer period: 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	75	145%	28	185%
East Hampshire Chalk	85	151%	38	219%
West Sussex Chalk	94	156%	47	213%
East Sussex Chalk	84	157%	36	220%
Isle of Wight	81	154%	33	222%
Western Rother Greensand	94	155%	47	219%
Hampshire Tertiaries	81	161%	32	303%
Lymington	83	161%	37	294%
Sussex Coast	78	155%	27	227%
Arun	91	160%	43	267%
Adur	88	159%	42	255%
Ouse	91	167%	45	288%
Cuckmere	78	153%	33	252%
Pevensey Levels	74	146%	26	226%
Solent & South Downs Average	84	156%	37	239%

10.3 Rainfall banding table

Hydrological area	Apr 2023 band	Feb 2023 to Apr 2023 cumulative band	Nov 2023 to Apr 2023 cumulative band	May 2022 to Apr 2023 cumulative band
Test Chalk	Above Normal	Above Normal	Exceptionally High	Above Normal
East Hampshire Chalk	Above Normal	Above Normal	Exceptionally High	Notably High
West Sussex Chalk	Notably High	Above Normal	Exceptionally High	Notably High
East Sussex Chalk	Notably High	Above Normal	Exceptionally High	Exceptionally High
Isle of Wight	Notably High	Above Normal	Exceptionally High	Notably High
Western Rother Greensand	Notably High	Notably High	Exceptionally High	Notably High
Hampshire Tertiaries	Above Normal	Above Normal	Exceptionally High	Notably High
Lymington	Notably High	Above Normal	Exceptionally High	Notably High
Sussex Coast	Notably High	Above Normal	Exceptionally High	Notably High

Arun	Notably High	Notably High	Exceptionally High	Notably High
Adur	Notably High	Above Normal	Exceptionally High	Notably High
Ouse	Notably High	Above Normal	Exceptionally High	Notably High
Cuckmere	Above Normal	Above Normal	Exceptionally High	Notably High
Pevensey Levels	Above Normal	Above Normal	Exceptionally High	Above Normal

10.4 River flows table

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

10.5 Groundwater table

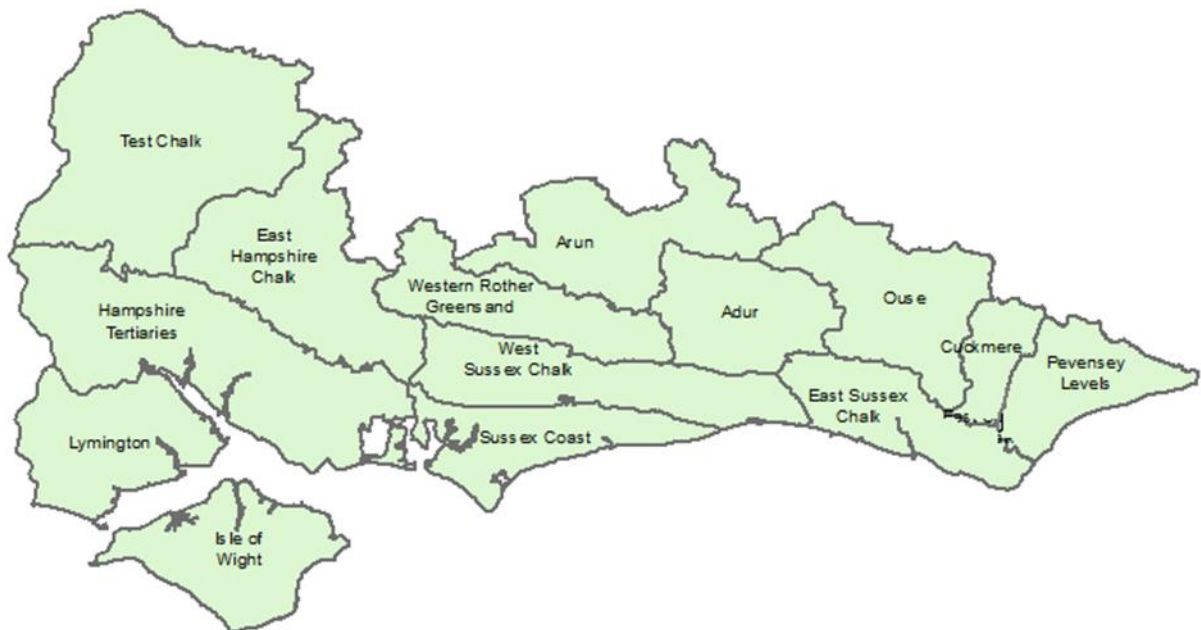
Site name	Aquifer	End of Apr 2023 band	End of Mar 2023 band
Houndean Bottom Gwl	Brighton Chalk Block	Notably High	Normal
Chilgrove House Gwl	Chichester-Worthing-Portsdown Chalk	Exceptionally High	Normal
Carisbrooke Castle	Isle Of Wight Central Downs Chalk	Notably High	Above normal
West Meon Hut Gwl	River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

Preston Candover	River Itchen Chalk	Above Normal	Normal
Youngwoods Copse	Isle of Wight Lower Greensand	Above Normal	Normal

10.6 Abstraction licence flow constraints

Number of flow constraints in force between 1 to 3 April 2023	Number of flow constraints in force between 4 to 10 April 2023	Number of flow constraints in force between 11 to 17 April 2023	Number of flow constraints in force between 18 to 24 April 2023	Number of flow constraints in force between 25 to 30 April 2023
1	0	0	0	0

10.7 SSD Areal Rainfall Units Map



10.8 SSD Areal Rainfall Units monthly LTA

Hydrological Area	April LTA Rainfall (mm)
Test Chalk	52
East Hampshire Chalk	56
West Sussex Chalk	60
East Sussex Chalk	54
Isle of Wight	52
Western Rother Greensand	61
Hampshire Tertiaries	50
Lymington	52
Sussex Coast	50
Arun	56
Adur	55

Ouse		54
Cuckmere		51
Pevensy Levels		51
Solent & South Downs Average		54