

Monthly water situation report: Solent and South Downs Area

Summary - March 2023

Solent and South Downs (SSD) had above average rainfall in March, receiving 202% (135mm) of the long-term average (LTA) rainfall (83mm). Monthly mean river flows across SSD ranged from **normal** to **exceptionally high**. Groundwater levels ranged from **below normal** to **above normal**. Soil moisture deficits ended the month at zero which means soils were wetter than average for the time of year. End of month reservoir stocks were above average at Ardingly Reservoir (Ouse) and slightly below average at Arlington Reservoir (Cuckmere).

1.1 Rainfall

SSD had above average rainfall in March, receiving 202% (135mm) of the LTA rainfall (83mm). The East Hampshire Chalk areal unit received the most rainfall with 223% (165mm) of LTA (74mm). The Sussex Coast had the least rainfall with 187% (114mm) of LTA (61mm). For SSD as a whole March 2023 was the 4th wettest March on record. For the Arun, East Sussex Chalk, Test Chalk and Western Rother Greensand areal unit it was the 3rd wettest on record. The September-March seven month rainfall total was 7th wettest on record for SSD and 2nd wettest on record for the East Sussex Chalk areal unit.

The first few days of March were a continuation of the dry conditions experienced during February. However early on in the month the weather changed to much wetter conditions and there were several days (8th, 9th, 23rd, 30th and 31st March) where highest daily rainfall totals exceeded 20mm. The highest daily total of 26.2mm was recorded on 9th March at the Plumpton rain gauge (East Sussex Chalk).

1.2 Soil moisture deficit and recharge

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

1.3 River flows

Monthly mean river flows across SSD ranged from **normal** to **exceptionally high**. Flows in the River Adur at Sakeham and River Cuckmere at Cowbeech River were **exceptionally high**. The flows in the River Arun at Alfoldean, the River Lymington at Brockenhurst, the River Ouse at Goldbridge, the River Rother at Iping Mill and the Wallington River at North Fareham were **notably high**. The flows in the River Medina at Blackwater were **above normal**. All remaining sites were in the **normal** category. For the River Adur at Sakeham and the River Rother at Iping Mill the March mean flows were the 3rd highest on record.

1.4 Groundwater levels

End of month groundwater levels ranged from **below normal** to **above normal**. The groundwater level at Beeding Hill was **below normal**. Carisbrooke Castle and Youngwoods Copse on the Isle of Wight both had groundwater levels in the **above normal** category. Groundwater levels at all remaining reporting sites were in the **normal** category. The response to the wet conditions during March has resulted in groundwater levels beginning to rise again after receding during the dry February.

1.5 Reservoir stocks

End of month reservoir stocks were above average at Ardingly Reservoir (Ouse) with 100% of total capacity (LTA 97%) and slightly below average at Arlington Reservoir (Cuckmere) with 95.8% of total capacity (LTA 99%).

1.6 Environmental impact

In total there were 5 licence restrictions (in the New Forest, Meon, Ouse and Rother catchments) during March. There was one Flood Warning issued during March for the Beaulieu River in Hampshire. Eight Flood Alerts were issued in Sussex and four in Hampshire and the Isle of Wight during March.

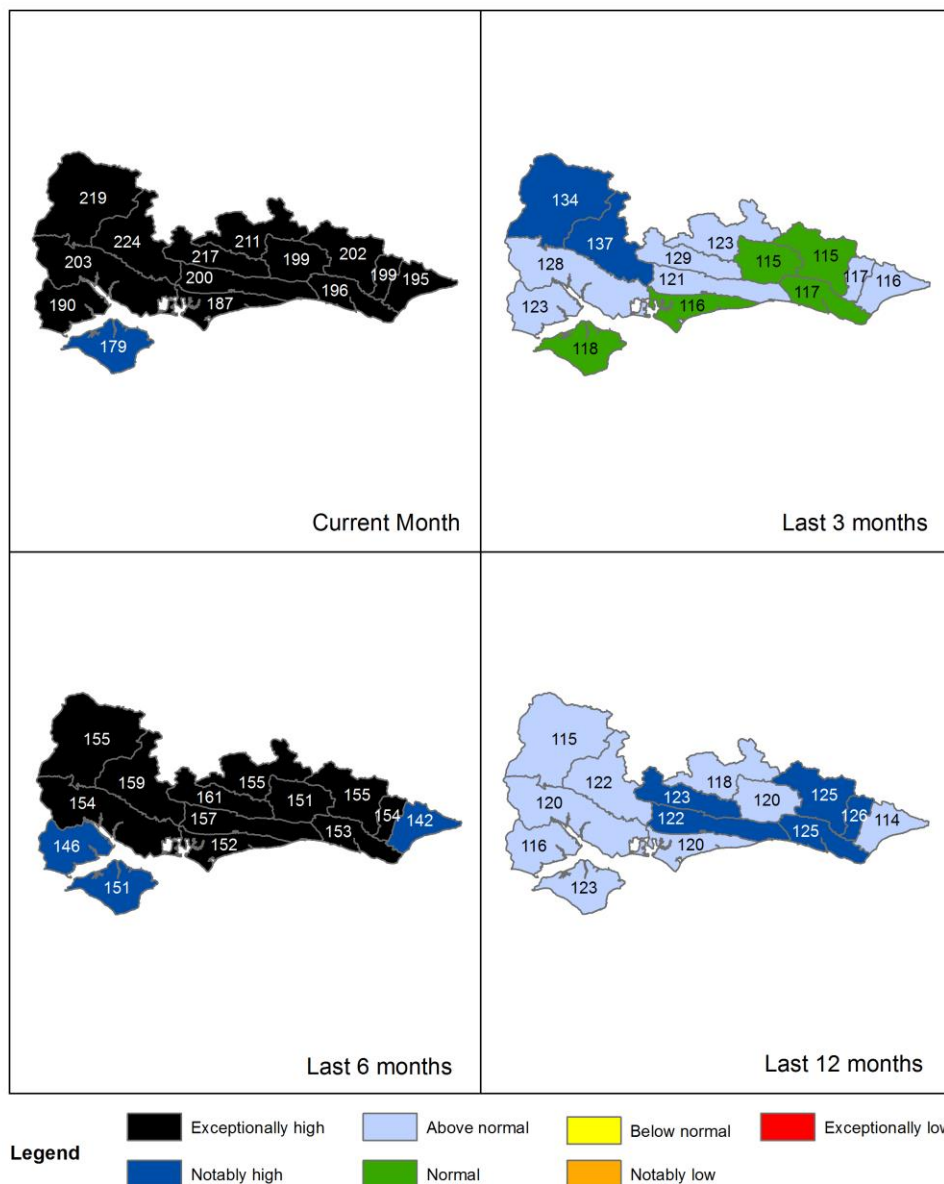
Author: HydrologySSD@environment-agency.gov.uk

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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 March 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.

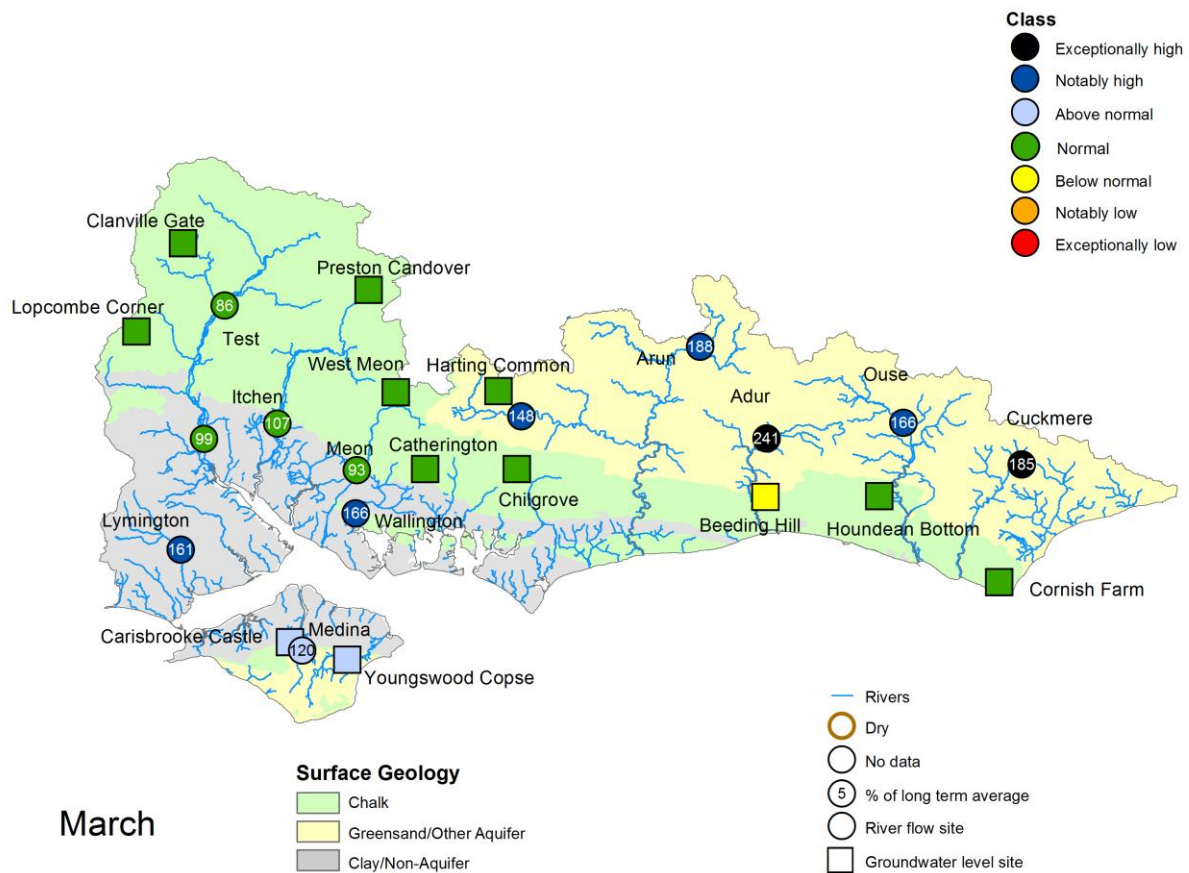


HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2023). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved.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

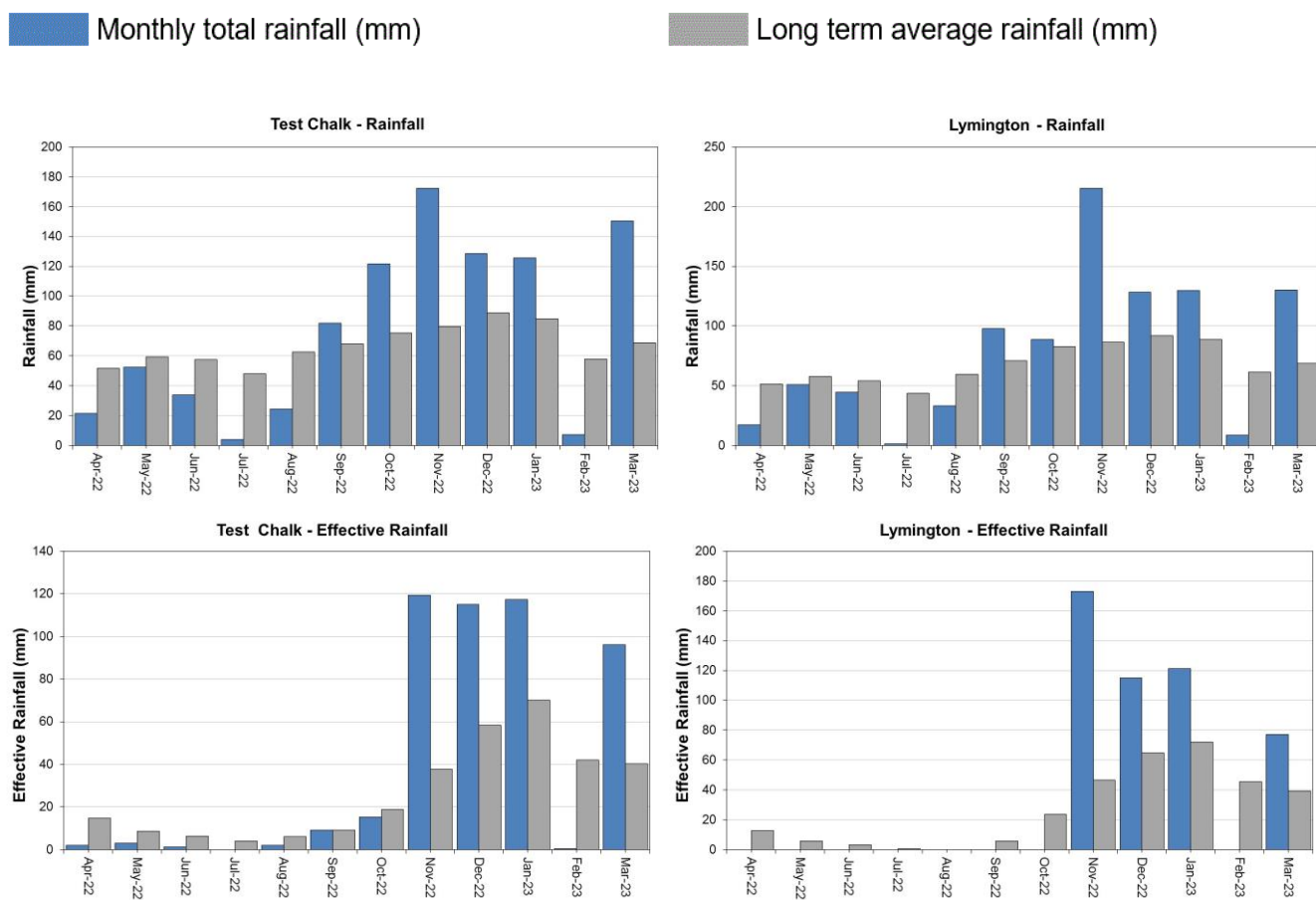


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4 West Hampshire

4.1 West Hampshire Rainfall and effective rainfall charts

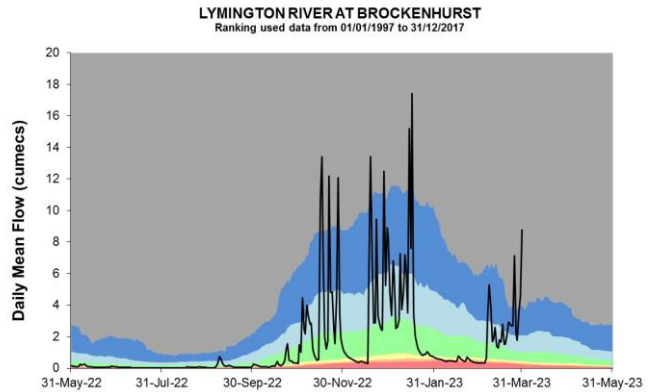
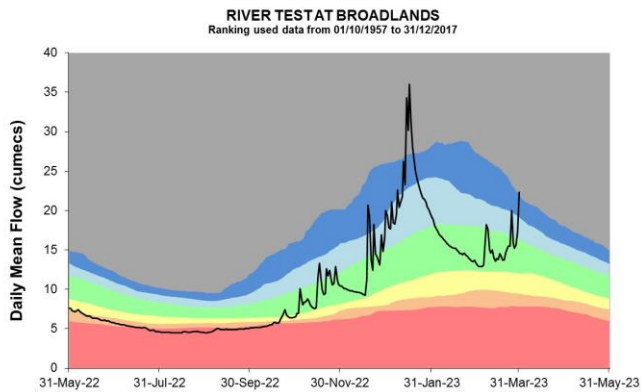
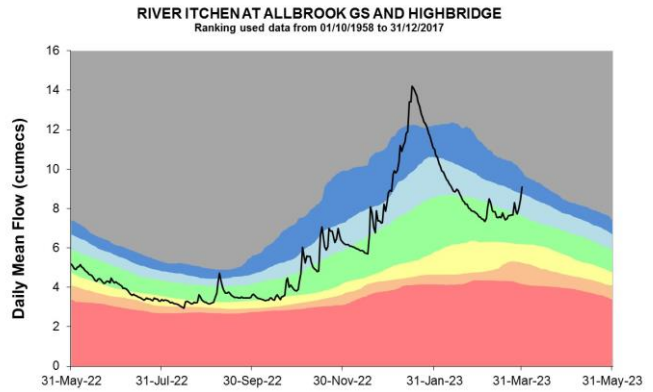
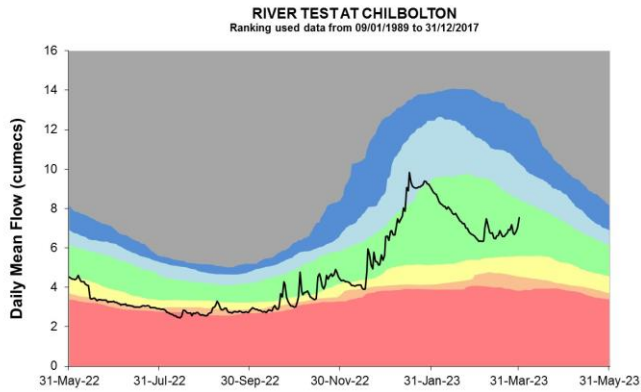
Figure 4.1: Monthly rainfall and effective rainfall totals for the past 24 months compared to the 1961 to 1990 long term average.



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

4.2 West Hampshire River flow charts

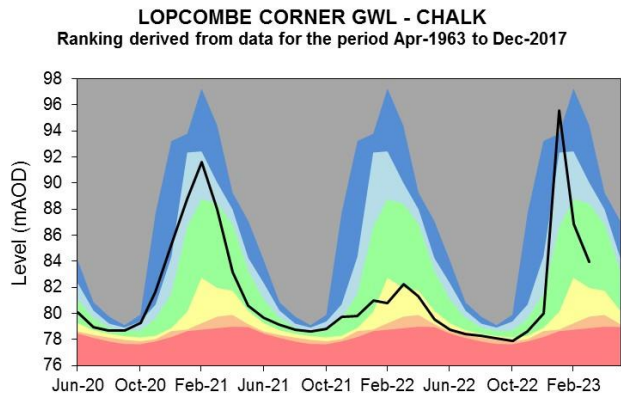
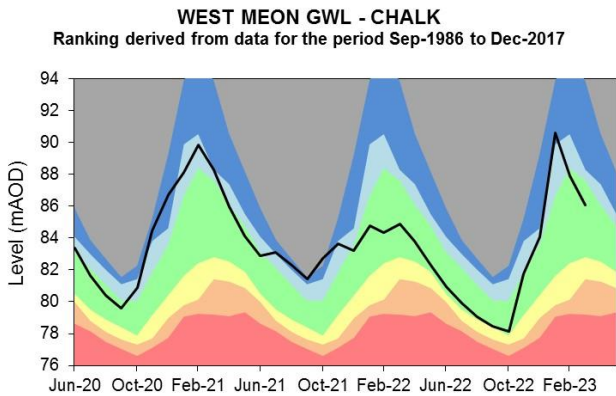
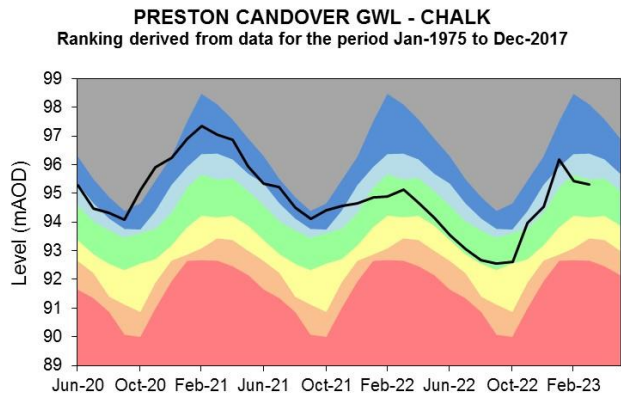
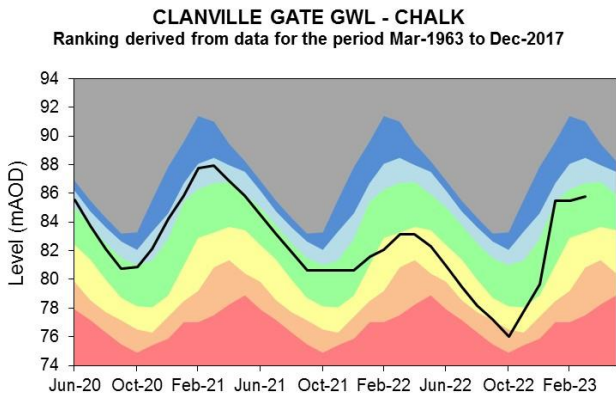
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



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.

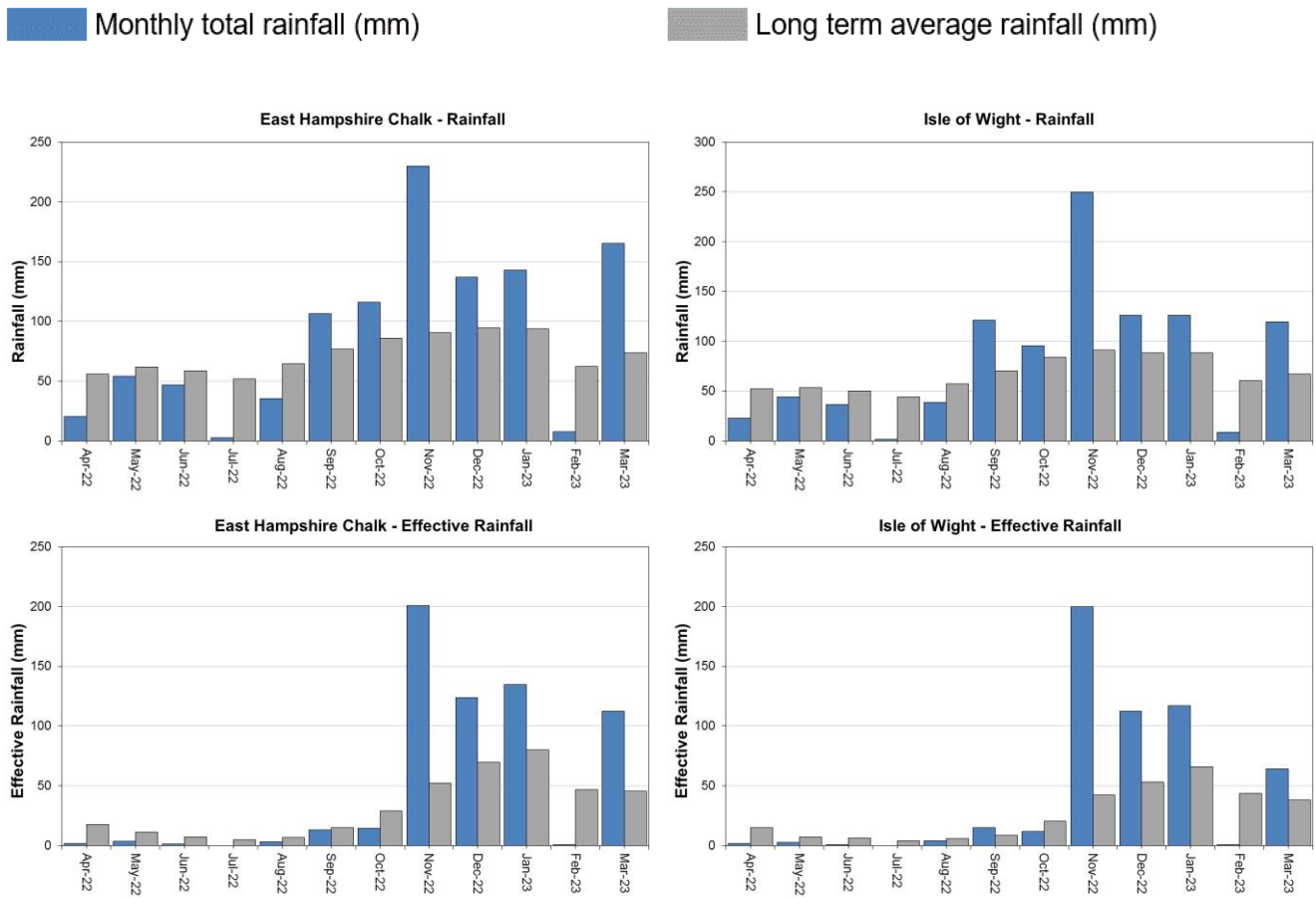


Source: Environment Agency, 2023.

5 East Hampshire and Isle of Wight

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

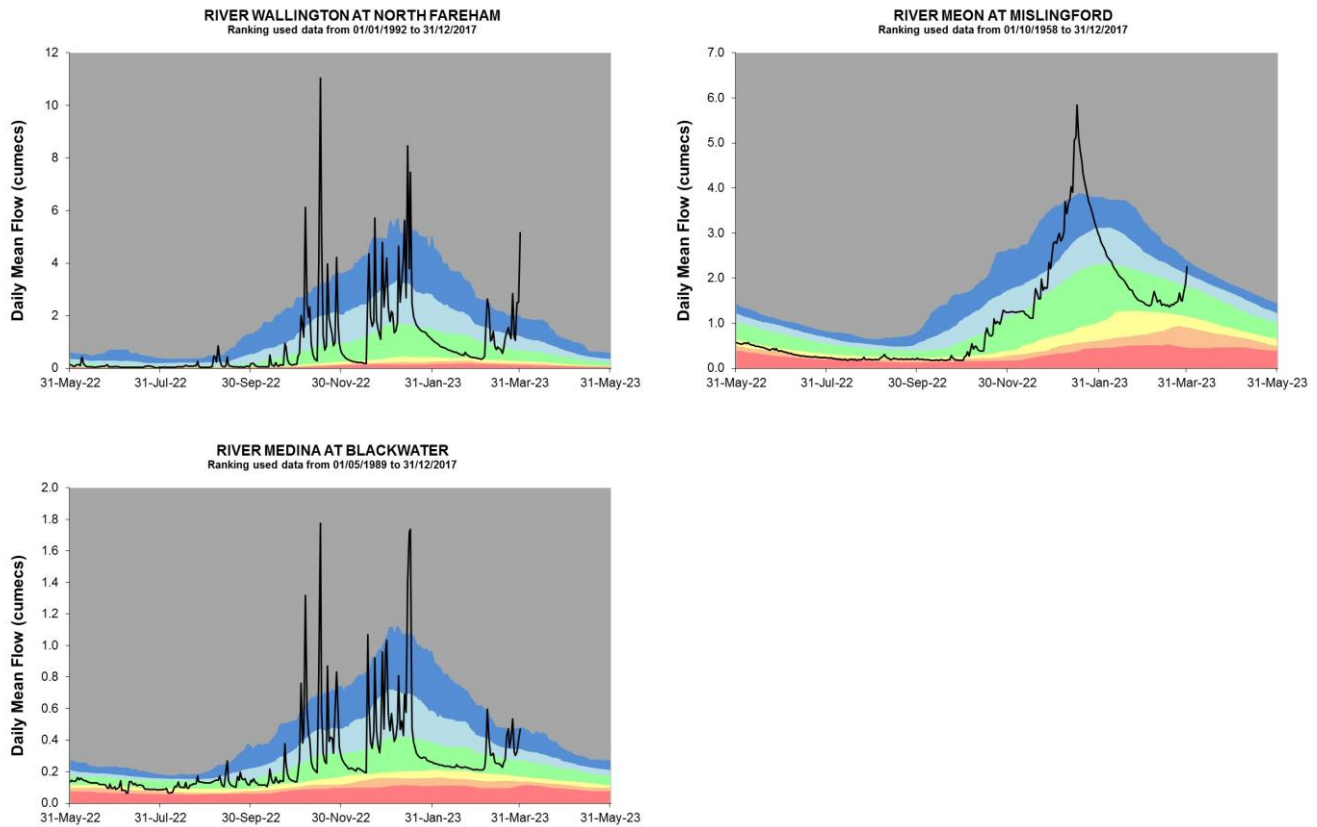
Figure 5.1: Monthly rainfall and effective rainfall totals for the past 24 months compared to the 1961 to 1990 long term average.



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

5.2 East Hampshire and Isle of Wight River flow charts

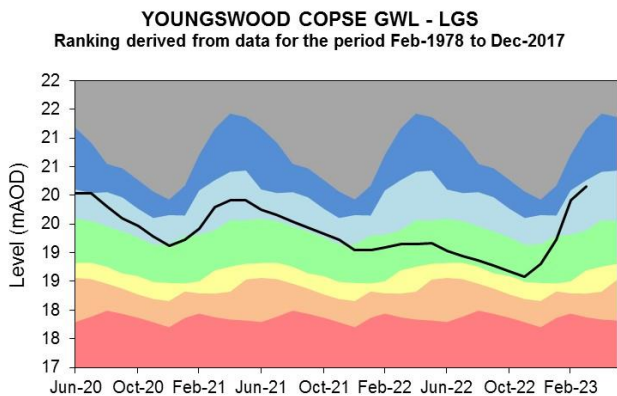
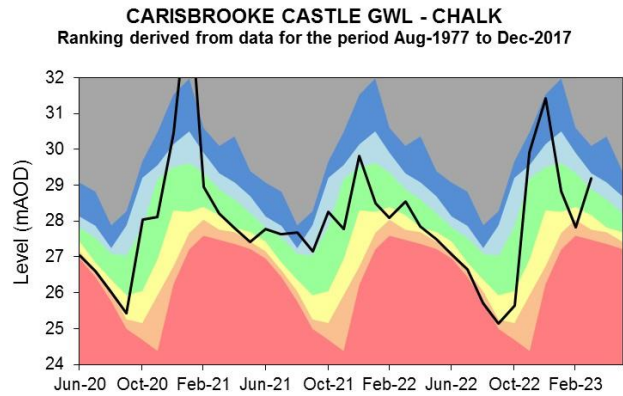
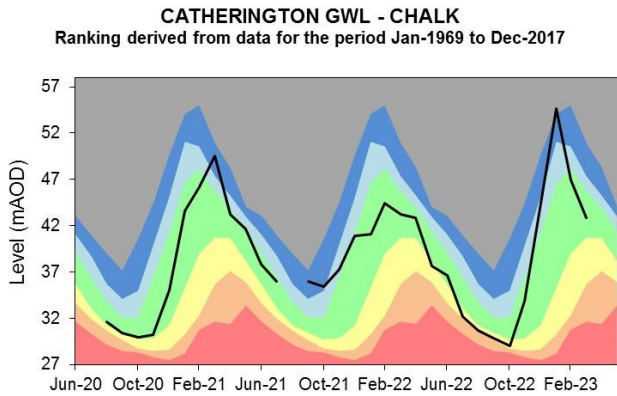
Figure 5.2 Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2023.

5.3 East Hampshire and Isle of Wight Groundwater level charts

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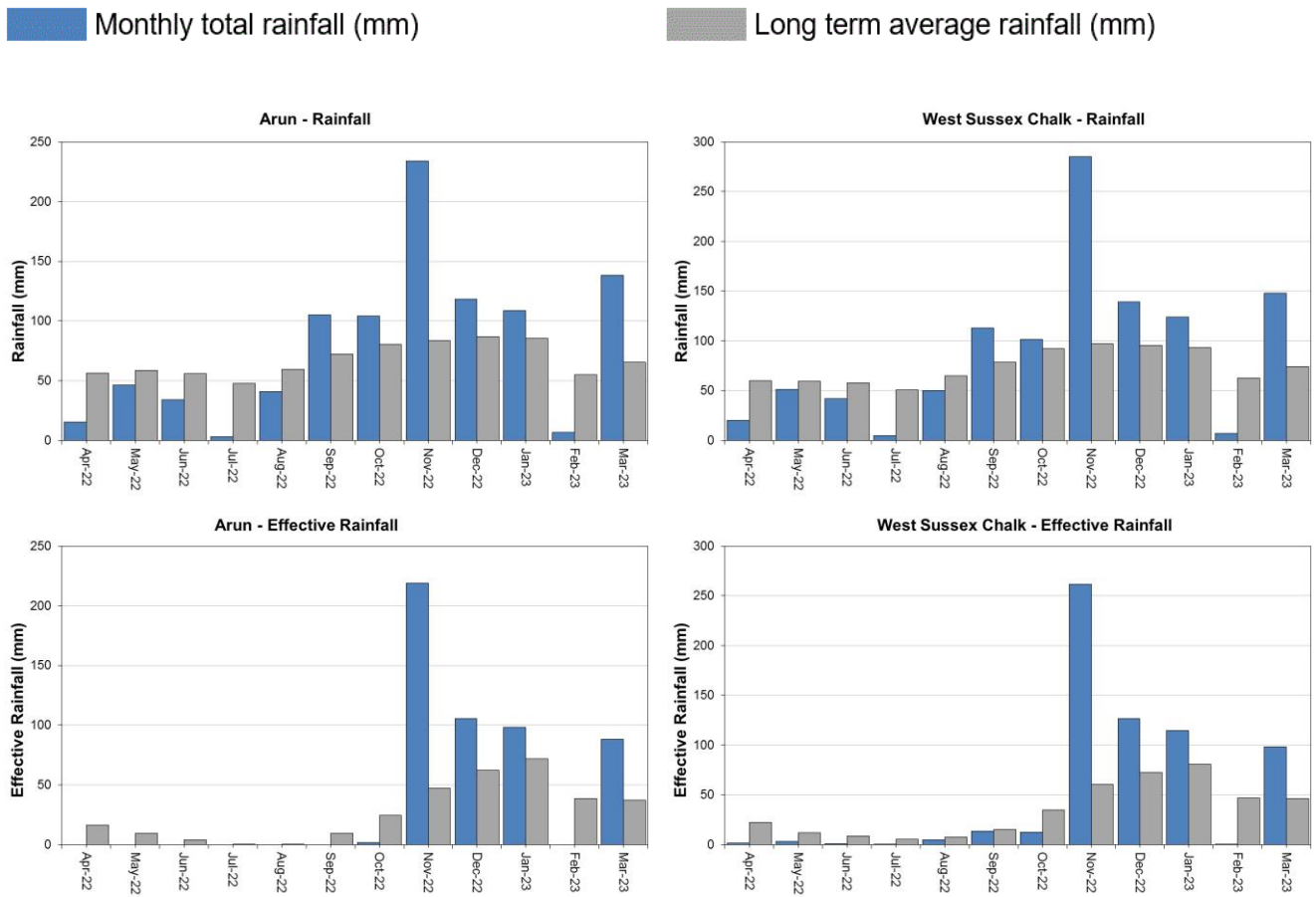


Source: Environment Agency, 2023.

6 West Sussex

6.1 West Sussex Rainfall and Effective Rainfall charts

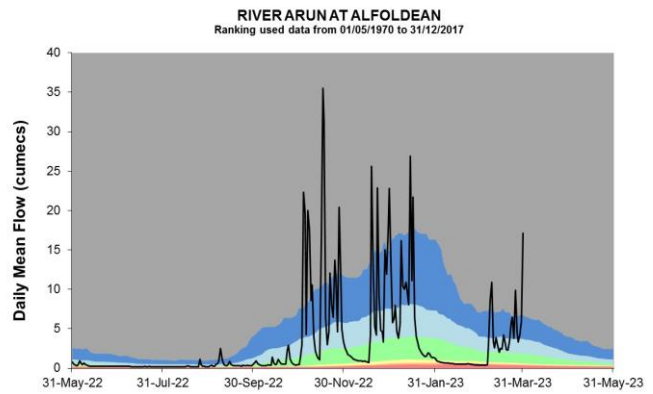
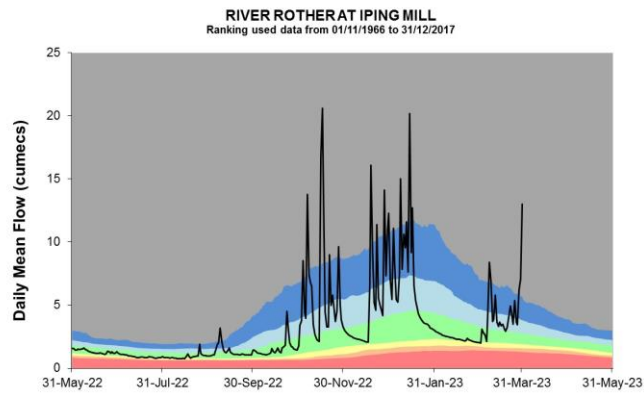
Figure 6.1: Monthly rainfall and effective rainfall totals for the past 24 months as a percentage of the 1961 to 1990 long term average.



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

6.2 West Sussex River flow charts

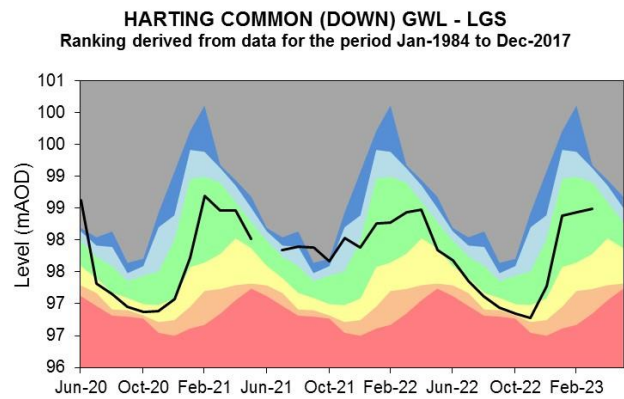
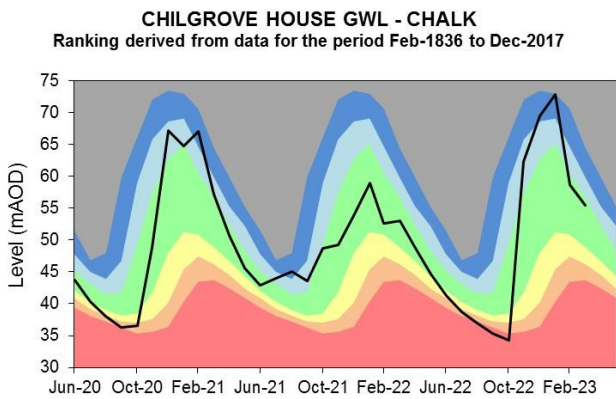
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Source: Environment Agency, 2023.

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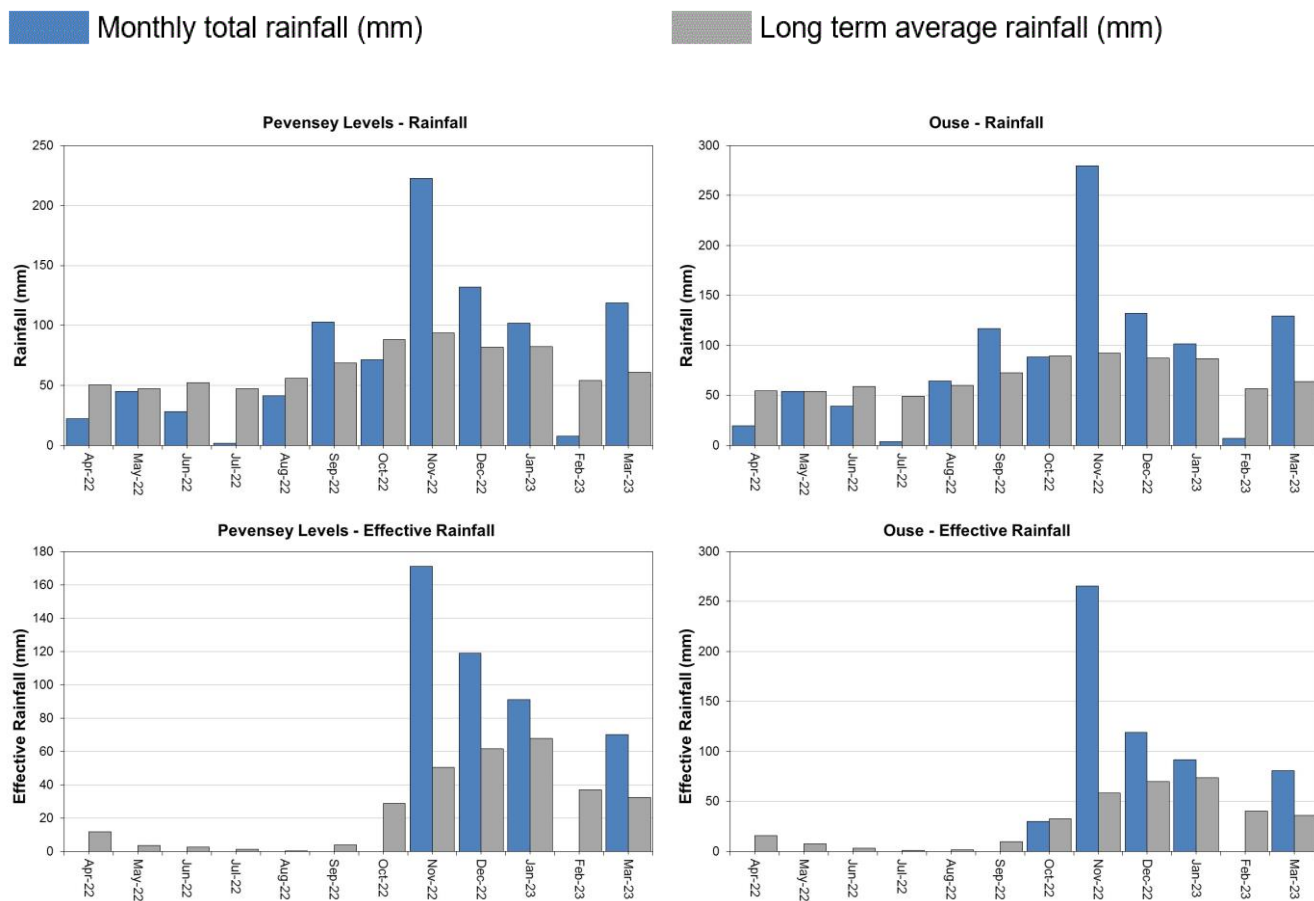


Source: Environment Agency, 2023.

7 East Sussex

7.1 East Sussex Rainfall and Effective Rainfall charts

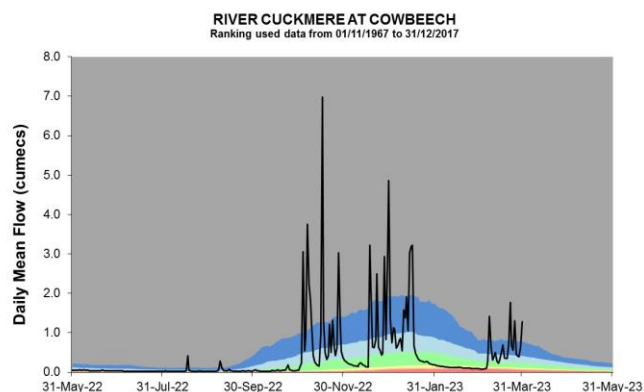
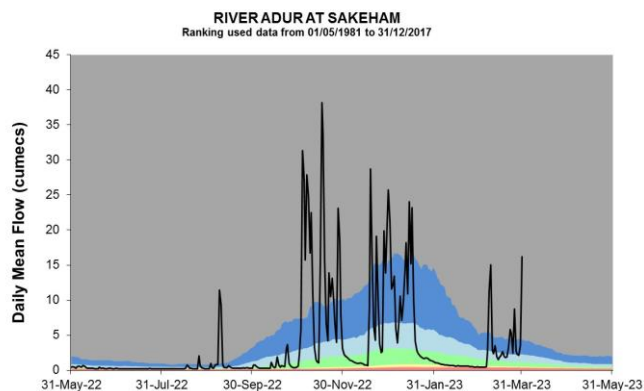
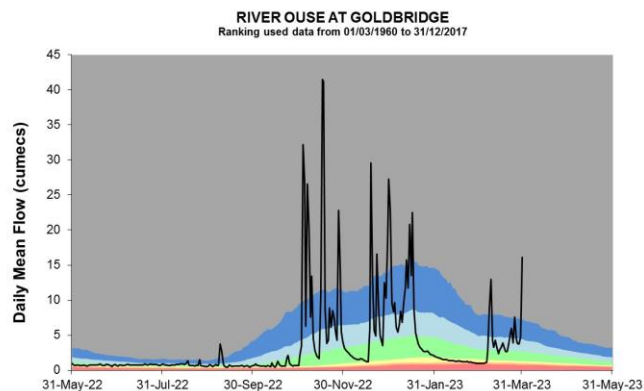
Figure 7.1: Monthly rainfall and effective rainfall totals for the past 24 months compared to the 1961 to 1990 long term average.



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

7.2 East Sussex River flow charts

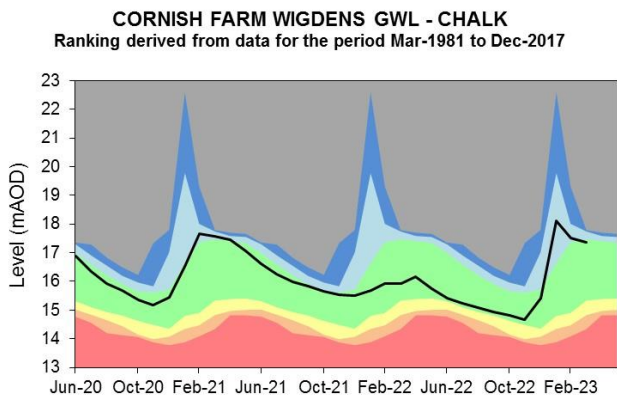
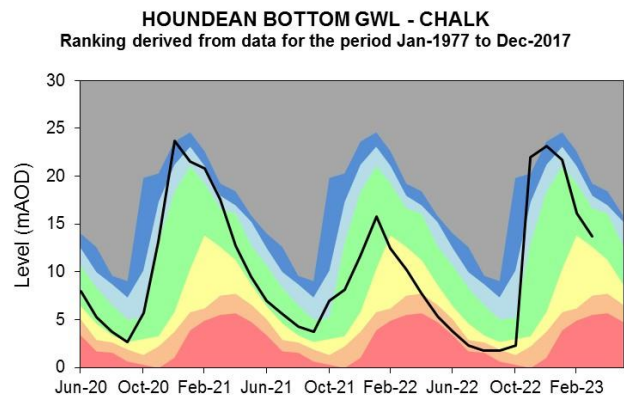
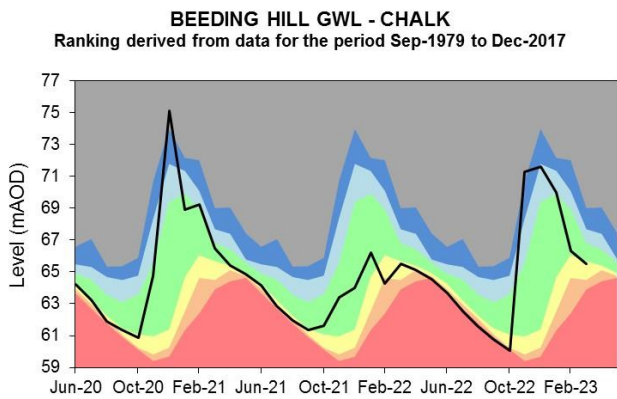
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Source: Environment Agency, 2023.

7.3 East Sussex Groundwater level charts

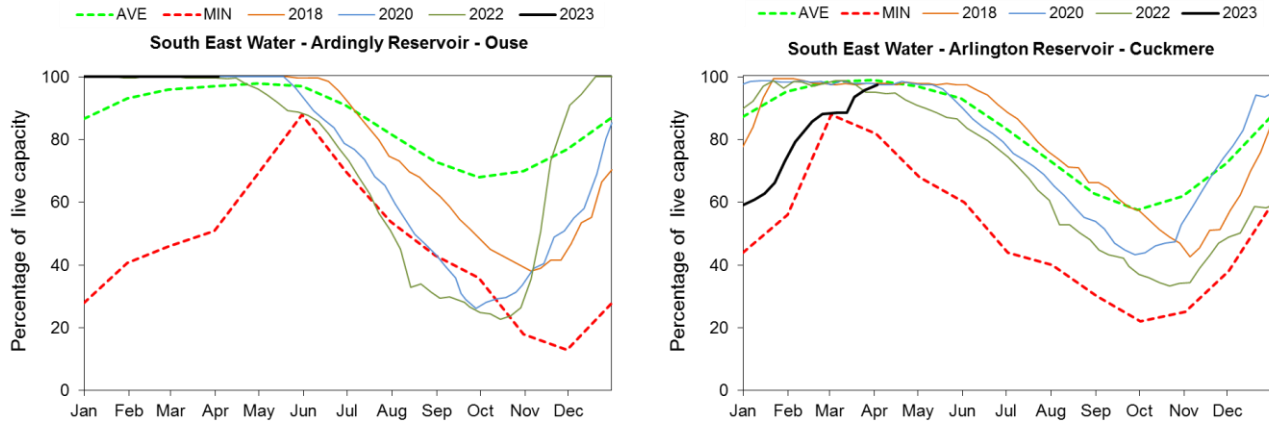
Figure 7.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



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 a second 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) 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	150	219%	96	238%	0	7
East Hampshire Chalk	165	223%	112	247%	0	6
West Sussex Chalk	149	201%	98	211%	0	6
East Sussex Chalk	128	196%	77	209%	0	7
Isle of Wight	120	178%	64	168%	0	8
Western Rother Greensand	164	217%	113	239%	0	6
Hampshire Tertiaries	136	203%	80	219%	0	7
Lymington	130	190%	77	196%	0	7
Sussex Coast	114	187%	56	175%	0	8
Arun	138	211%	88	236%	0	6
Adur	127	199%	76	213%	0	6
Ouse	129	202%	81	226%	0	6
Cuckmere	123	198%	76	221%	0	6
Pevensey Levels	119	195%	70	216%	0	7
Solent & South Downs Average	135	202%	83	217%	0	7

10.2 Seasonal summary table of rainfall and effective rainfall

Hydrological Area	Seasonal Rainfall (mm) Total	Seasonal Rainfall as % LTA	Seasonal Effective Rainfall (mm) Total	Seasonal Effective Rainfall as % LTA
Test Chalk	705	155%	463	173%
East Hampshire Chalk	798	159%	587	181%
West Sussex Chalk	806	157%	614	179%
East Sussex Chalk	747	153%	560	186%
Isle of Wight	725	151%	506	192%
Western Rother Greensand	843	161%	637	183%
Hampshire Tertiaries	713	154%	484	182%
Lymington	700	146%	487	167%
Sussex Coast	645	152%	417	190%
Arun	710	155%	513	182%
Adur	701	151%	523	178%
Ouse	738	155%	588	189%
Cuckmere	724	154%	578	187%
Pevensey Levels	654	142%	451	162%
Solent & South Downs Average	729	153%	529	181%

10.3 Rainfall banding table

Hydrological area	Mar 2023 band	Jan 2023 to Mar 2023 cumulative band	Oct 2022 to Mar 2023 cumulative band	Apr 2022 to Mar 2023 cumulative band
Test Chalk	Exceptionally high	Notably high	Notably high	Above Normal
East Hampshire Chalk	Exceptionally high	Exceptionally high	Notably high	Above Normal
West Sussex Chalk	Exceptionally high	Exceptionally high	Above Normal	Notably high
East Sussex Chalk	Exceptionally high	Exceptionally high	Normal	Notably high
Isle of Wight	Notably high	Exceptionally high	Normal	Above Normal
Western Rother Greensand	Exceptionally high	Exceptionally high	Above Normal	Notably high
Hampshire Tertiaries	Exceptionally high	Exceptionally high	Above Normal	Above Normal
Lymington	Exceptionally high	Exceptionally high	Above Normal	Above Normal
Sussex Coast	Exceptionally high	Exceptionally high	Normal	Above Normal

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

10.4 River flows table

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

10.5 Groundwater table

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

Youngwoods Cope	Isle of Wight Lower Greensand	Above normal	Normal
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10.6 Abstraction licence flow constraints

Number of flow constraints in force between 1 to 7 March 2023	Number of flow constraints in force between 8 to 14 March 2023	Number of flow constraints in force between 15 to 21 March 2023	Number of flow constraints in force between 22 to 31 March 2023
5	5	1	1

10.7 SSD Areal Rainfall Units Map

