

Monthly water situation report: Solent and South Downs Area

Summary – October 2023

Solent and South Downs (SSD) had well above average rainfall in October, receiving 218% (157mm) of the long term average (LTA) rainfall (85mm). Monthly mean river flows across SSD ranged from above normal to exceptionally high. Groundwater levels ranged from normal to exceptionally high. Soils across SSD ended the month wetter than the average for October. End of month reservoir stocks at Ardingly Reservoir (Ouse) and at Arlington Reservoir (Cuckmere) were both below average.

1.1 Rainfall

SSD had well above average rainfall in October, receiving 218% (157mm) of the LTA rainfall (85mm). The first ten days of October were largely dry and then there was a significant change to the weather which resulted in a series of frontal systems, including two named storms – Babet (24 Oct) and Ciaran (31 Oct). This change brought some extremely wet conditions throughout the rest of the month. The Isle of Wight, Sussex Coast and West Sussex Chalk all recorded their wettest Octobers on record (going back to 1891). However for the whole of SSD it was only the tenth wettest October on record.

The highest daily was recorded on the 24 October at Knighton (Isle of Wight) with 91mm. This was more than the October monthly LTA of 84mm on the Isle of Wight. Other sites on the Isle of Wight also recorded very high daily totals including Ryde Vineyard (83 mm) and Calbourne (80 mm). This event caused some significant flooding across the island.

For the Isle of Wight the past 12 months (September-October) were the wettest on record while it was the second wettest for the SSD area.

1.2 Soil moisture deficit and recharge

Soils ended the month wetter than average across SSD. Soil moisture deficits for all areal units were zero which means catchments are more responsive to run off and that recharge started at the majority of our reported groundwater sites.

1.3 River flows

Monthly mean river flows across SSD ranged from above normal to exceptionally high.

Flows were exceptionally high in:

- River Lymington at Brockenhurst.

Flows were notably high in:

- River Rother at Iping Mill
- River Test at Broadlands
- River Itchen at Allbrook & Highbridge
- River Wallington at North Fareham
- River Adur at Sakeham
- River Cuckmere at Cowbeech

Flows were above normal in:

- River Test at Chilbolton
- River Ouse at Goldbridge
- River Meon at Mislingford
- River Arun at Alfoldean

The October monthly mean flow for the River Lymington at Brockenhurst was the third highest on record (since 1997) and the River Wallington at North Fareham was the fourth highest (since 1992).

Data for the River Medina at Blackwater (Isle of Wight) was incomplete due to works at the gauging station in the first part of the month.

1.4 Groundwater levels

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

Groundwater levels were exceptionally high at:

- Carisbrooke Castle (Isle of Wight)

Groundwater levels were notably high at:

- Chilgrove (West Sussex Chalk)
- Clanville Gate (Test Chalk)
- Houndean Bottom (East Sussex Chalk)
- Preston Candover (East Hampshire Chalk).

Groundwater levels were above normal at:

- Cornish Farm (East Sussex Chalk)
- Lopcombe Corner (Test Chalk)
- West Meon (East Hampshire Chalk)
- Youngwoods Copse (Isle of Wight)

Groundwater levels were normal at:

- Beeding Hill (West Sussex Chalk)
- Catherington (East Hampshire Chalk)
- Harting Common (Western Rother Greensand)

Groundwater levels for October were the highest on record at Carisbrooke Castle (starting 1977) and fourth highest on record at Clanville Gate (1963).

1.5 Reservoir stocks

End of month reservoir stocks were below average at both Ardingly Reservoir (Ouse) with 44% of total capacity (LTA 70%) and Arlington Reservoir (Cuckmere) with 37% of total capacity (LTA 61%).

1.6 Environmental impact

Two licence restrictions were in place at the start of October. Both were in the Arun and Western Streams catchment. By the end of the month all restrictions were lifted.

There were 29 Flood Warnings (9 in Hampshire and Isle of Wight and 10 in Sussex) and 34 Flood Alerts (21 in Hampshire and Isle of Wight and 13 in Sussex) issued during October.

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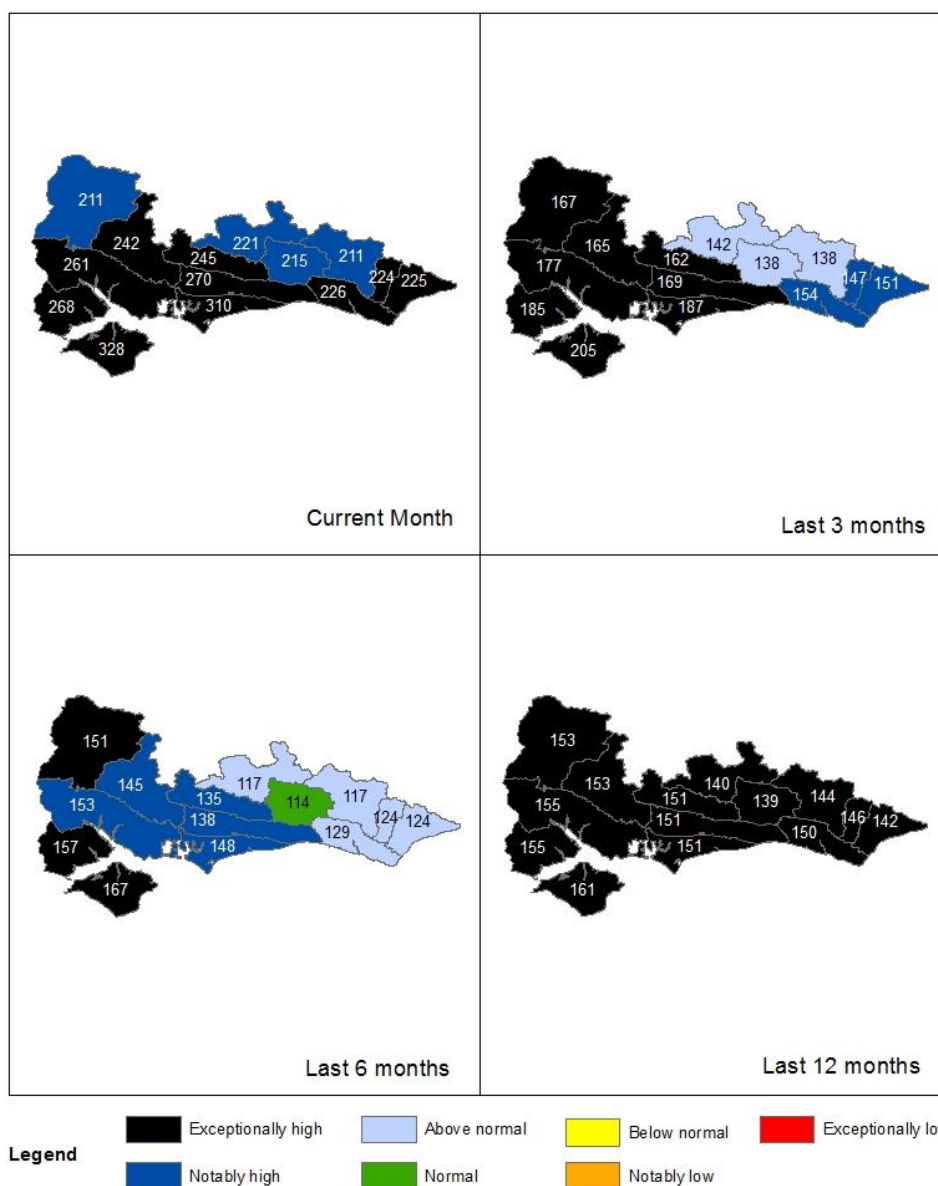
Contact Details: 03708 506 506

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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 October 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.

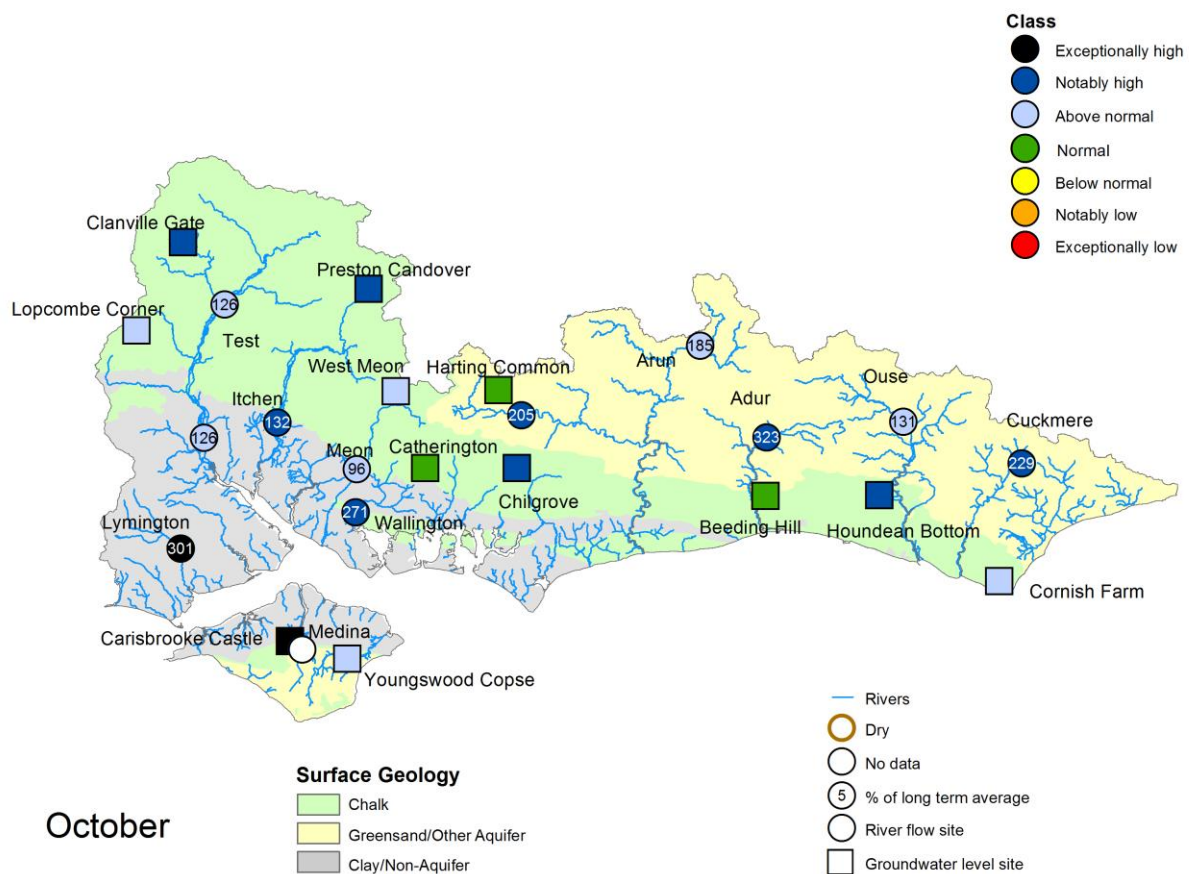


Rainfall data for 2023, extracted from Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. (Source: Environment Agency. Crown Copyright, 100024198, 2023). Rainfall data prior to 2023, extracted from Met Office HadUK 1km gridded rainfall dataset derived from registered rain gauges (Source: Met Office. Crown copyright, 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 October 2023, expressed as a percentage of the respective long term average and classed relative to an analysis of historic September monthly means. Table available in the appendices with detailed information.

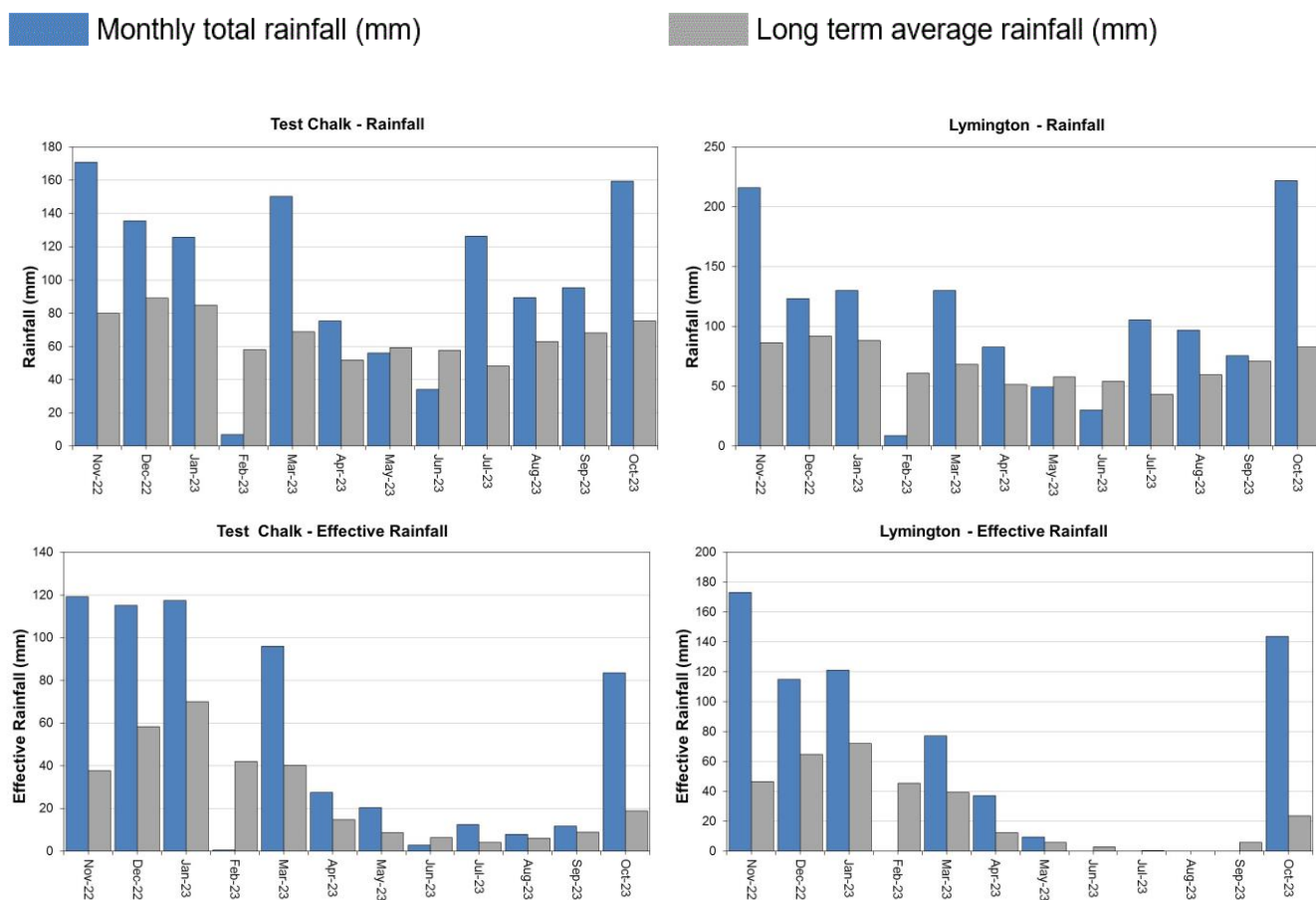


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4 West Hampshire

4.1 West Hampshire Rainfall and effective rainfall charts

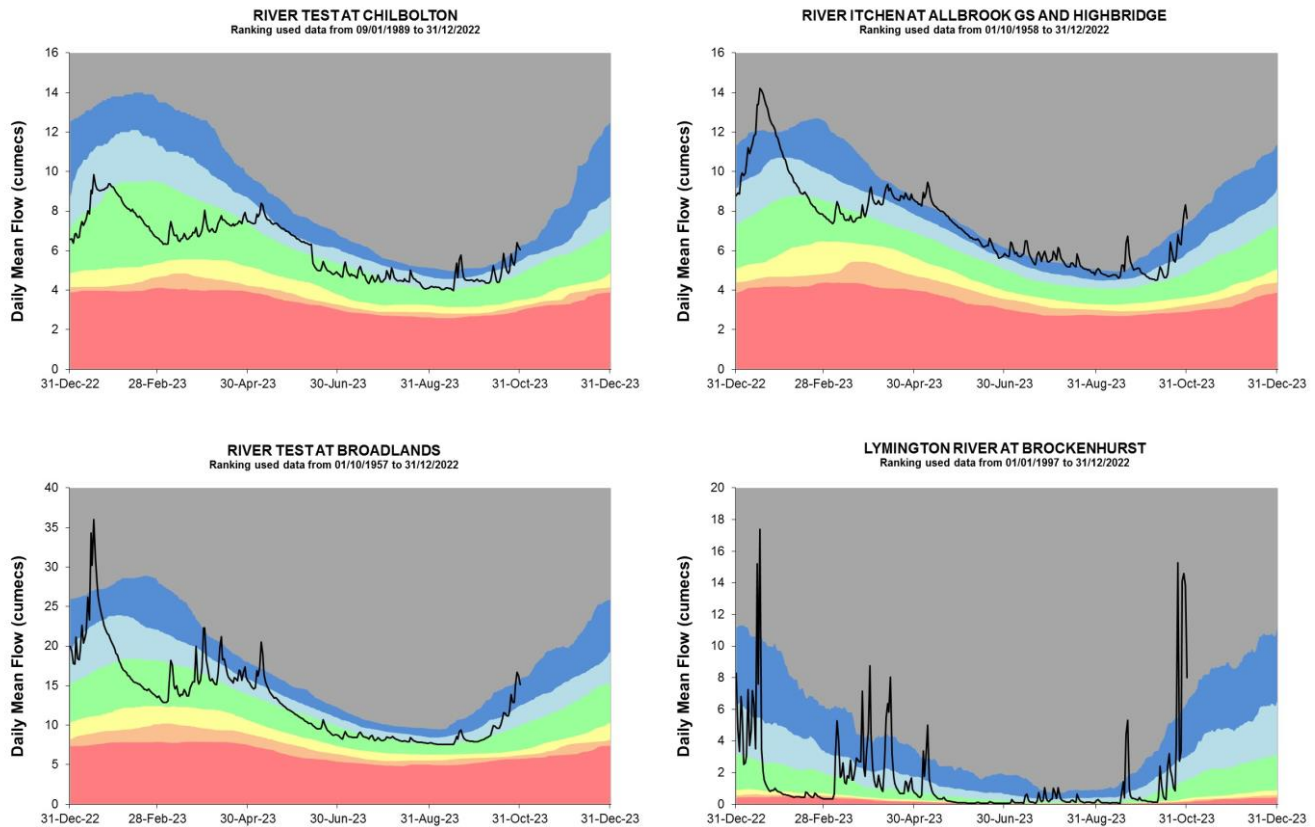
Figure 4.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

4.2 West Hampshire River flow charts

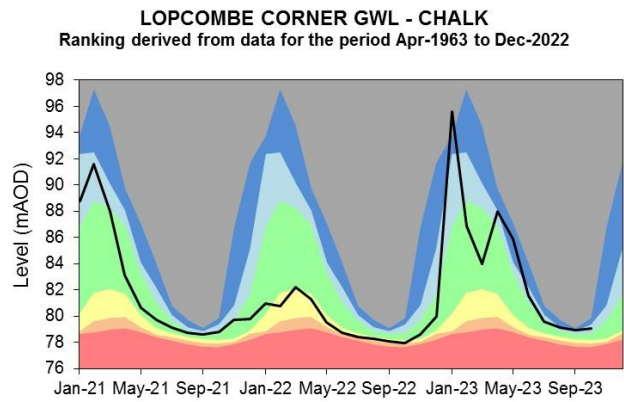
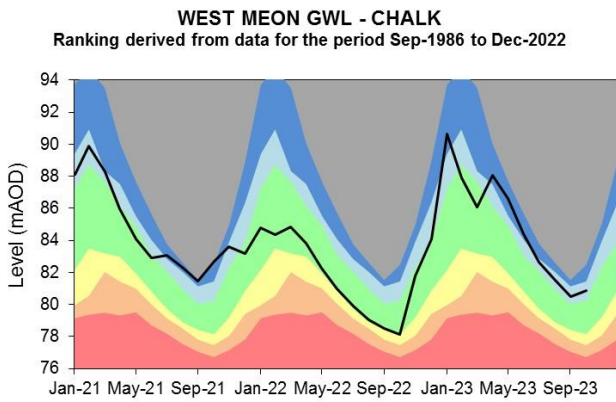
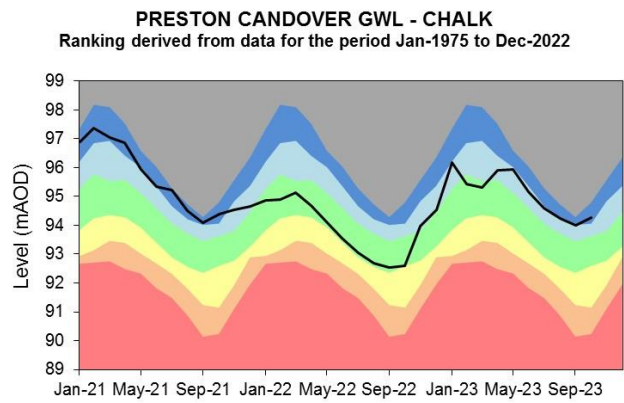
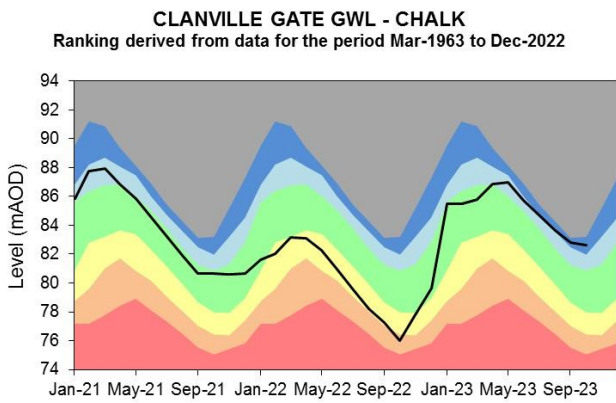
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



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.

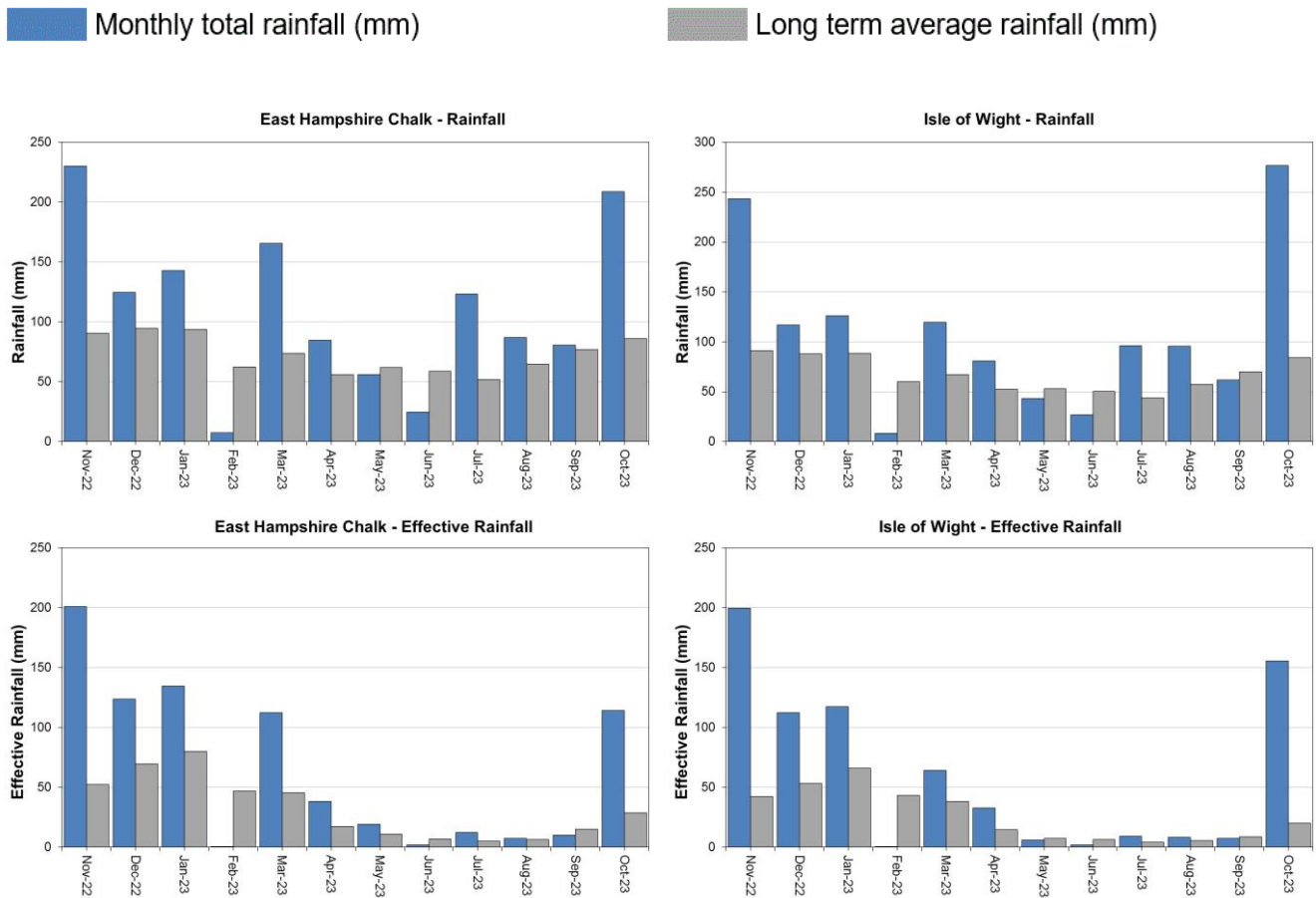


Source: Environment Agency, 2023.

5 East Hampshire and Isle of Wight

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

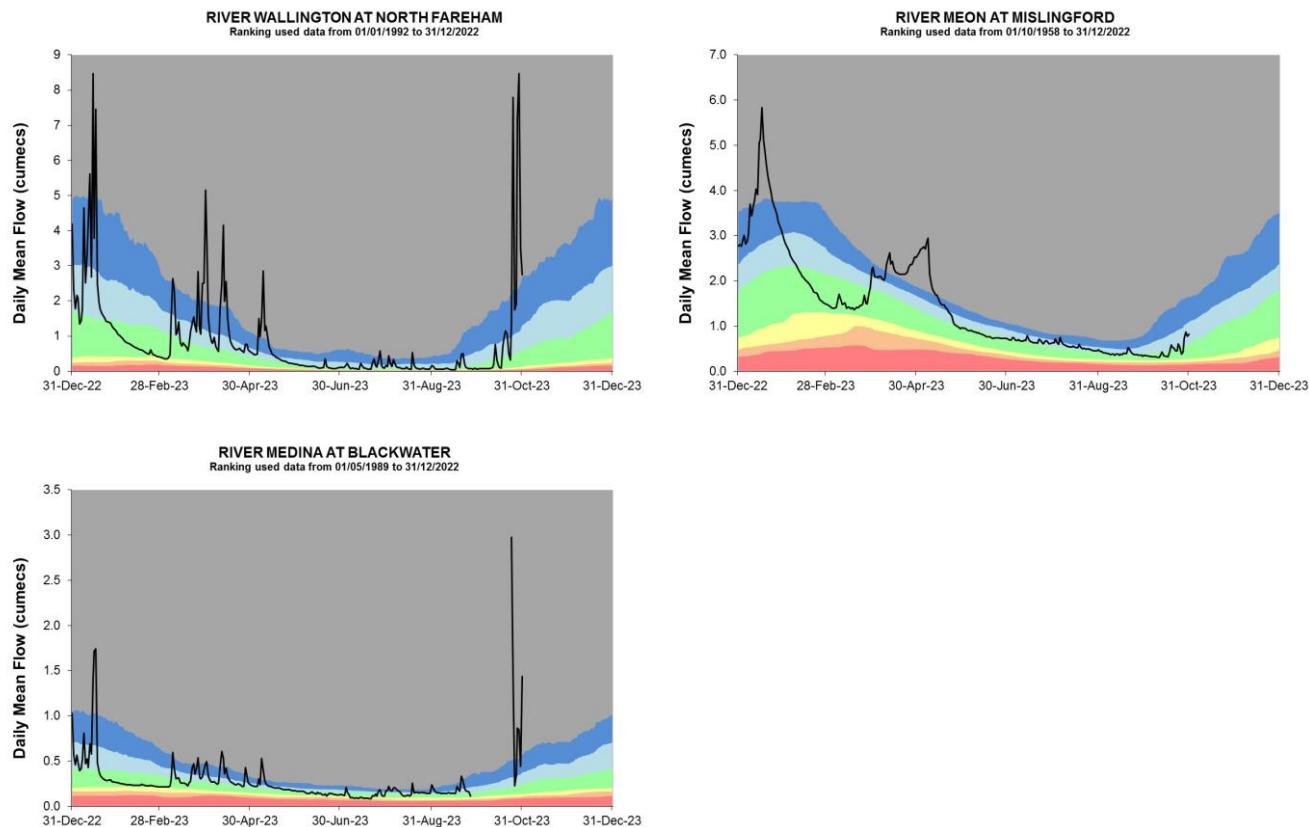
Figure 5.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

5.2 East Hampshire and Isle of Wight River flow charts

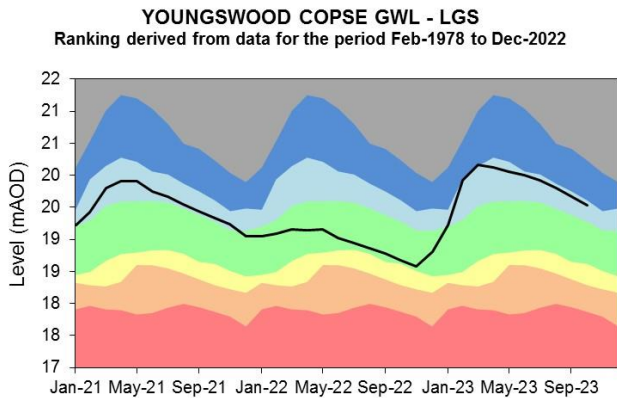
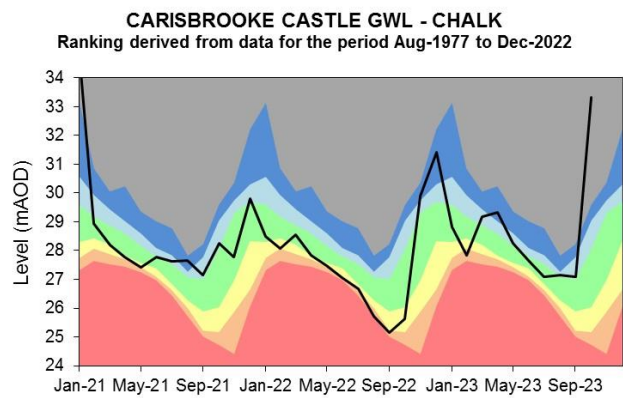
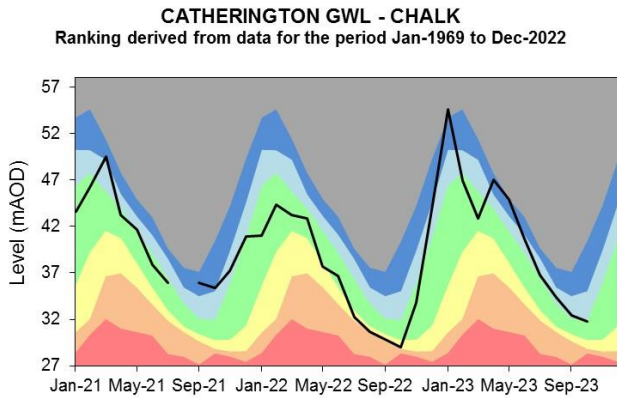
Figure 5.2 Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



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.

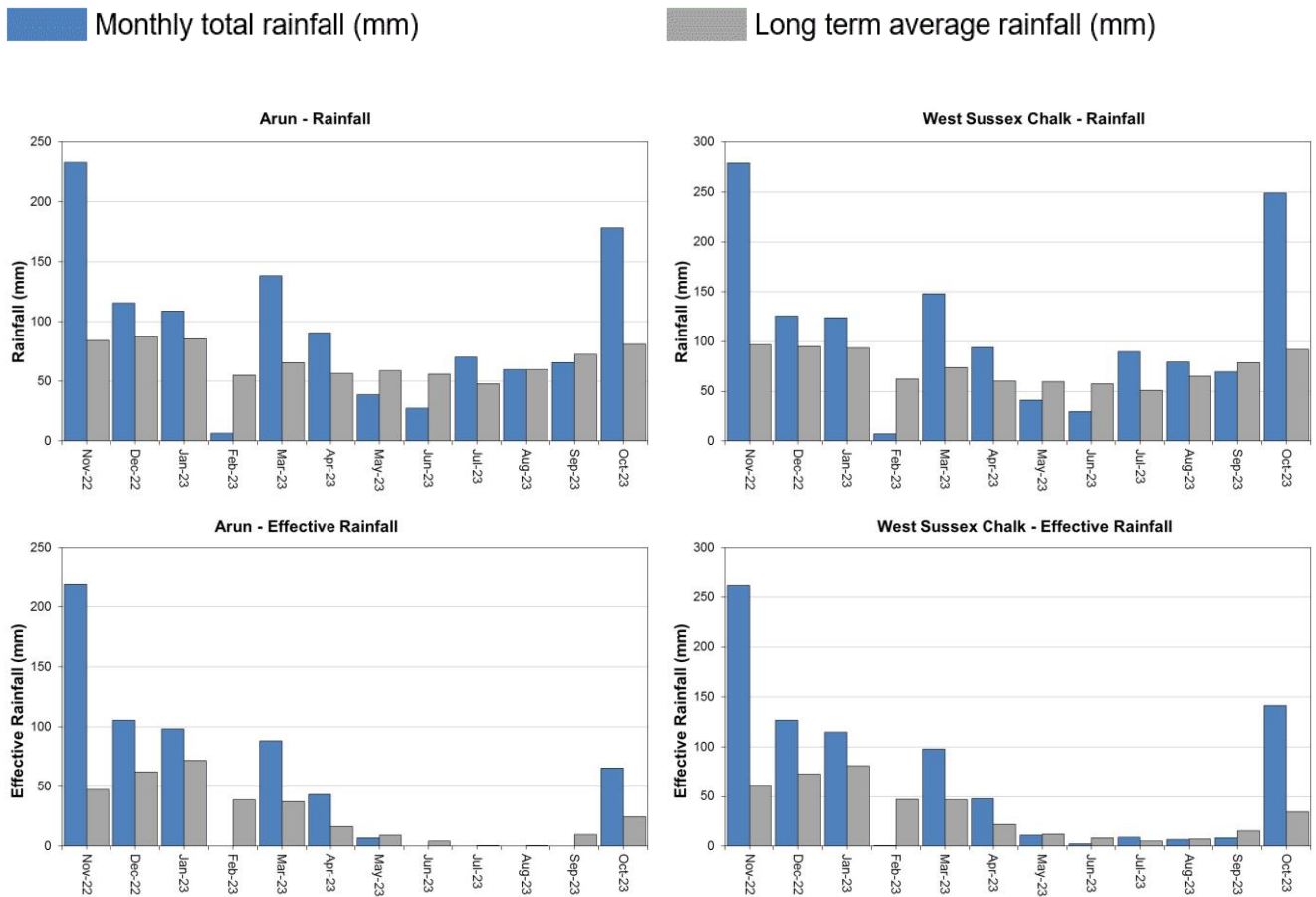


Source: Environment Agency, 2023.

6 West Sussex

6.1 West Sussex Rainfall and Effective Rainfall charts

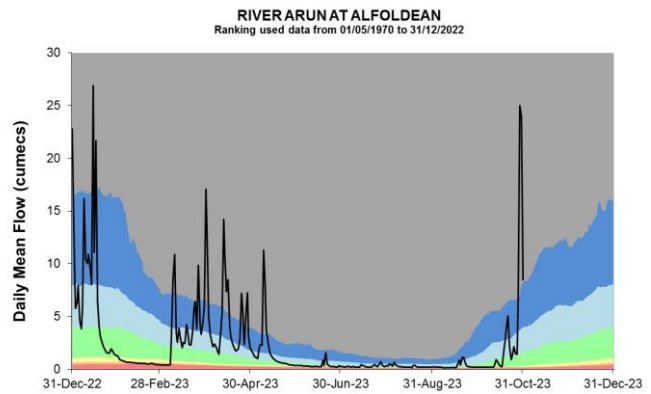
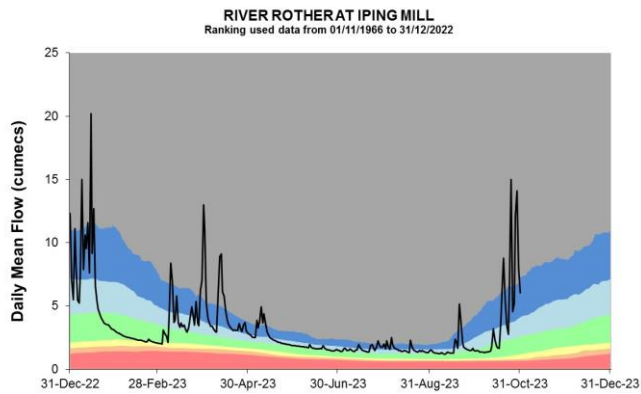
Figure 6.1: Monthly rainfall and effective rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average.



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

6.2 West Sussex River flow charts

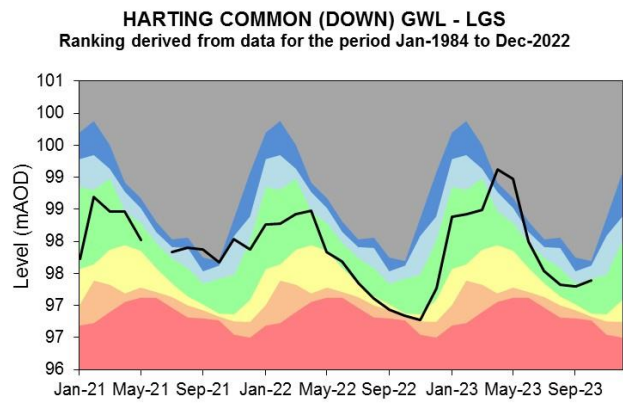
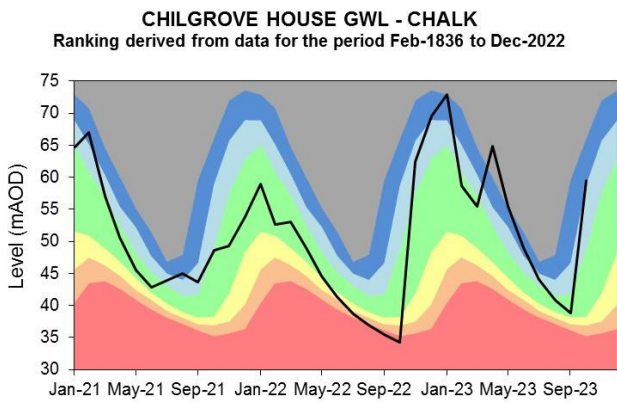
Figure 6.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



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.

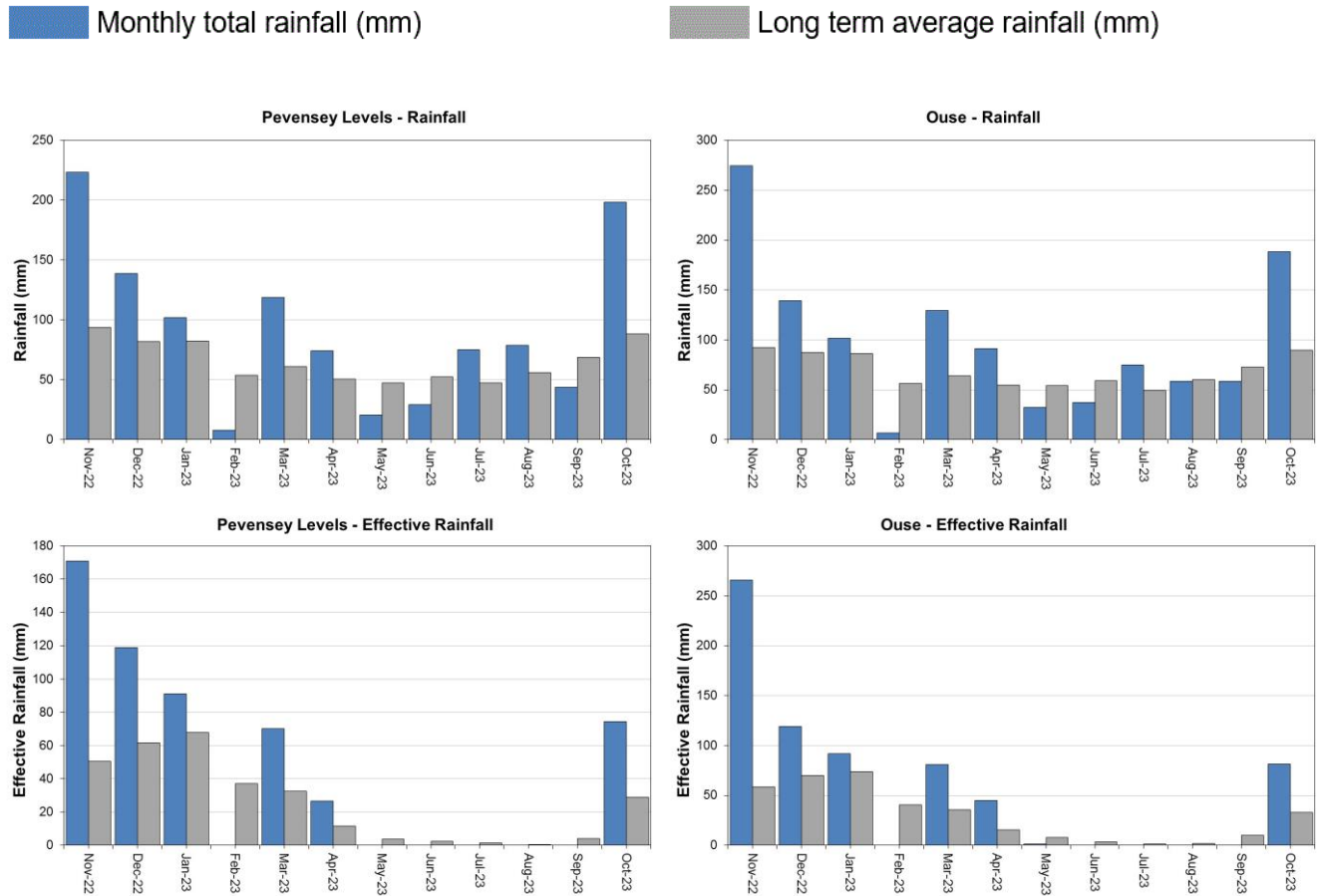


Source: Environment Agency, 2023.

7 East Sussex

7.1 East Sussex Rainfall and Effective Rainfall charts

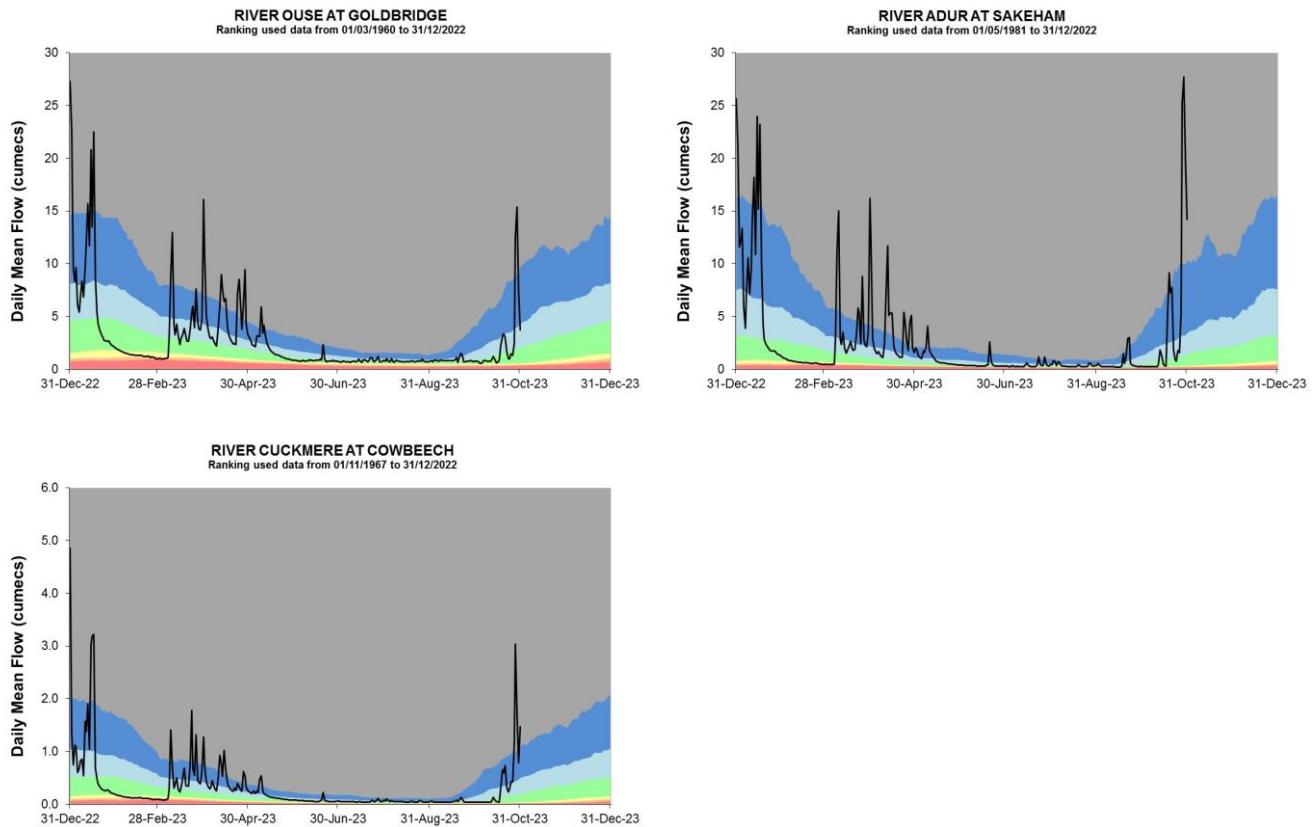
Figure 7.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

7.2 East Sussex River flow charts

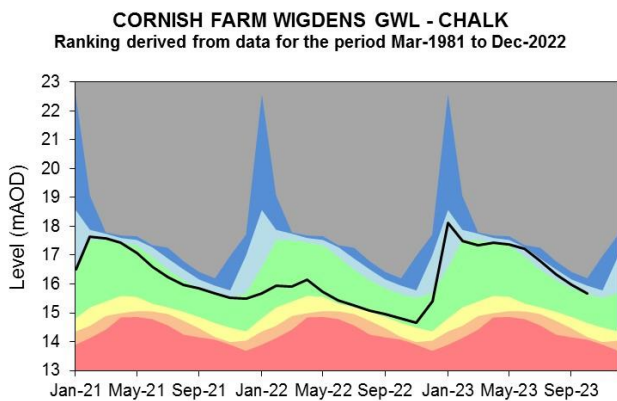
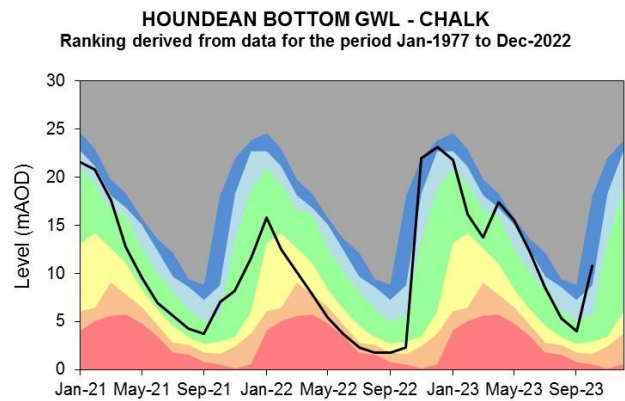
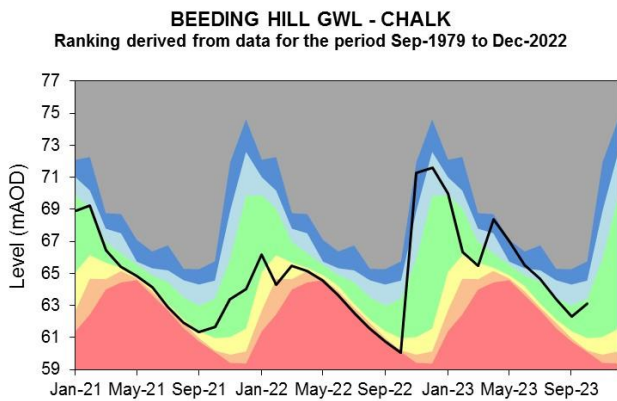
Figure 7.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2023.

7.3 East Sussex Groundwater level charts

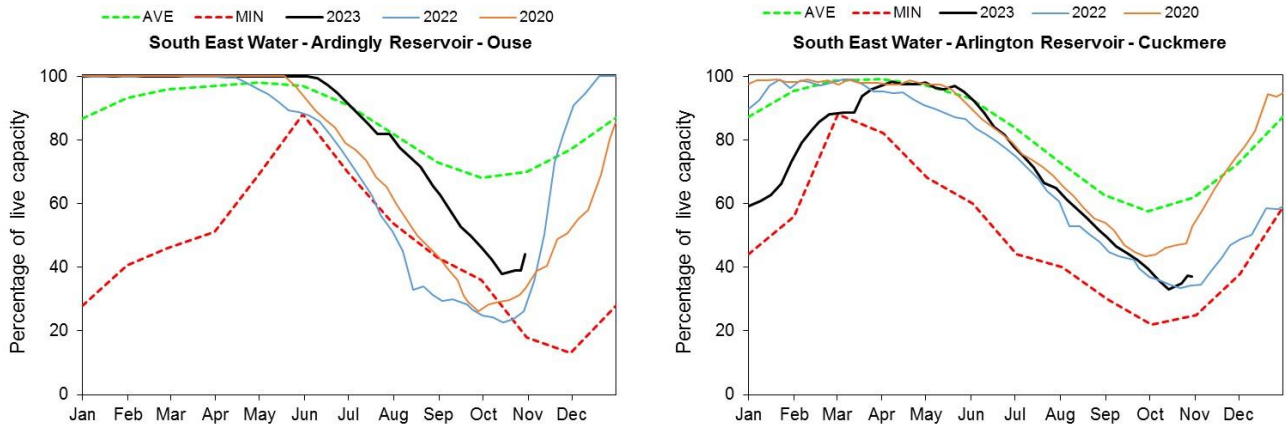
Figure 7.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



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 SSD. There may be significant variation within each area which must be considered when interpreting these data. When additional meteorological data is available estimates are revised which will affect the period totals in section 10.2

Hydrological Area	Rainfall (mm) 31 day Total	Rainfall October as %LTA	Effective Rainfall (mm) 30 day Total	Effective Rainfall October as %LTA	Soil Moisture Deficit (SMD) Day 30	SMD End of October LTA
Test Chalk	160	212%	84	443%	0	63
East Hampshire Chalk	209	242%	114	396%	0	51
West Sussex Chalk	249	270%	141	408%	0	48
East Sussex Chalk	210	226%	97	280%	0	55
Isle of Wight	277	328%	155	770%	0	70
Western Rother Greensand	222	245%	120	355%	0	49
Hampshire Tertiaries	206	261%	109	617%	0	57
Lymington	222	267%	144	609%	0	51
Sussex Coast	239	310%	108	822%	0	66
Arun	178	221%	65	267%	0	47
Adur	184	214%	67	231%	0	44
Ouse	188	211%	81	250%	0	42
Cuckmere	204	224%	99	284%	0	41
Pevensey Levels	198	225%	74	257%	0	51
SSD Average	210	246%	104	389%	0	52

10.2 Seasonal summary table of rainfall and effective rainfall

Winter season: 01/10/2023 to 31/10/2023

Hydrological Area	Seasonal Rainfall (mm)	Seasonal Rainfall as % LTA	Seasonal Effective Rainfall (mm)	Seasonal Effective Rainfall as % LTA
	Total		Total	
Test Chalk	160	212%	84	443%
East Hampshire Chalk	209	242%	114	396%
West Sussex Chalk	249	270%	141	408%
East Sussex Chalk	210	226%	97	280%
Isle of Wight	277	328%	155	770%
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Adur	184	214%	67	231%
Ouse	188	211%	81	250%
Cuckmere	204	224%	99	284%
Pevensey Levels	198	225%	74	257%
SSD Average	210	246%	104	389%

10.3 Rainfall banding table

Hydrological area	Oct 2023 band	Aug 2023 to Oct 2023 cumulative band	May 2023 to Oct 2023 cumulative band	Nov 2022 to Oct 2023 cumulative band
Test Chalk	Notably high	Exceptionally high	Exceptionally high	Exceptionally high
East Hampshire Chalk	Exceptionally high	Exceptionally high	Above normal	Exceptionally high
West Sussex Chalk	Exceptionally high	Exceptionally high	Notably high	Exceptionally high
East Sussex Chalk	Exceptionally high	Notably high	Notably high	Exceptionally high
Isle of Wight	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
Western Rother Greensand	Exceptionally high	Exceptionally high	Notably high	Exceptionally high
Hampshire Tertiaries	Exceptionally high	Exceptionally high	Notably high	Exceptionally high
Lymington	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
Sussex Coast	Exceptionally high	Exceptionally high	Notably high	Exceptionally high
Arun	Notably high	Above normal	Above normal	Exceptionally high
Adur	Notably high	Above normal	Normal	Exceptionally high
Ouse	Notably high	Above normal	Above normal	Exceptionally high
Cuckmere	Exceptionally high	Notably high	Above normal	Exceptionally high
Pevensey Levels	Exceptionally high	Notably high	Above normal	Exceptionally high

10.4 River flows table

Site name	River	Catchment	Oct 2023 band	Sep 2023 band
Alfoldean Gs	Arun	Arun	Above normal	Normal
Allbrook Gs+ Highbridge	Itchen (so)	Itchen	Notably high	Exceptionally high
Blackwater	Medina	Isle of Wight	No Data	Above normal
Broadlands	Test	Test Lower	Above normal	Above normal
Brockenhurst GS	Lymington	New Forest	Exceptionally high	Above normal
Chilbolton GS	Test	Test Upper	Above normal	Above normal
Cowbeech Gs	Cuckmere	Cuckmere	Notably high	Normal
Goldbridge Gs	Ouse [so]	Ouse Sussex	Above normal	Above normal
Iping Mill Gs	Rother	West Rother	Notably high	Above normal
Mislingford GS	Meon	Meon	Above normal	Normal
North Fareham GS	Wallington	Wallington	Notably high	Normal
Sakeham GS	Adur	Adur	Notably high	Above normal

10.5 Groundwater table

Site name	Aquifer	End of Oct 2023 band	End of Sep 2023 band
Houndean Bottom Gwl	Brighton Chalk Block	Notably high	Normal
Chilgrove House Gwl	Chichester-Worthing-Portsdown Chalk	Notably high	Normal
Carisbrooke Castle	Isle Of Wight Central Downs Chalk	Exceptionally high	Above normal
West Meon Hut Gwl	River Itchen Chalk	Above normal	Above normal
Clanville Gate Gwl	River Test Chalk	Notably high	Notably high
Lopcombe Corner Gwl	River Test Chalk	Above normal	Notably high
Beeding Hill Gwl	Brighton Chalk Block	Normal	Normal
Catherington	River Meon Chalk	Normal	Above normal
Cornish Wigdens Gwtr	Eastbourne Chalk Block	Above normal	Above normal
Harting Common Down	Western Rother Lower Greensand	Normal	Normal
Preston Candover	River Itchen Chalk	Notably high	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 10 October 2023	Number of flow constraints in force between 11 to 17 October 2023	Number of flow constraints in force between 18 to 24 October 2023	Number of flow constraints in force between 25 to 31 October 2023
2	1	1	1

10.7 Solent and South Downs Areal Rainfall Units Map



10.8 SSD Areal Rainfall Monthly Long Term Averages

Hydrological Area	Jan LTA mm	Feb LTA mm	Mar LTA mm	Apr LTA mm	May LTA mm	Jun LTA mm	Jul LTA mm	Aug LTA mm	Sep LTA mm	Oct LTA mm	Nov LTA mm	Dec LTA mm
Test Chalk	85	58	69	52	59	58	48	63	68	75	78	89
East Hampshire Chalk	94	63	74	56	62	59	52	65	77	86	90	95
West Sussex Chalk	93	63	74	60	60	58	51	65	79	92	97	95
East Sussex Chalk	87	57	65	54	52	58	49	60	73	93	98	89
Isle of Wight	88	60	67	52	53	50	44	58	70	84	91	88
Western Rother Greensand	100	65	76	61	63	57	51	66	79	91	95	100
Hampshire Tertiaries	86	59	67	50	57	53	45	59	70	79	83	87
Lymington	89	61	68	52	58	54	44	60	71	83	87	92
Sussex Coast	77	51	61	50	50	48	42	53	64	77	81	79
Arun	85	55	66	56	58	56	48	59	72	81	84	87
Adur	85	55	64	55	56	56	46	60	72	86	89	86
Ouse	87	56	64	54	54	59	49	60	73	89	93	88
Cuckmere	85	55	62	51	50	58	49	60	72	91	94	85
Pevensey Levels	82	54	61	51	47	52	47	56	69	88	94	82
SSD Average	87	58	67	54	56	55	47	60	72	85	90	89