

Monthly water situation report: Solent and South Downs Area

Summary - November 2023

Solent and South Downs (SSD) had above average rainfall in November, receiving 168% (151mm) of the long term average (LTA) rainfall (89.6mm). Monthly mean river flows across SSD ranged from notably high to exceptionally high. Groundwater levels ranged from above normal to exceptionally high. Soils across SSD ended the month wetter than the average for November. End of month reservoir stocks at Ardingly Reservoir (Ouse) and at Arlington Reservoir (Cuckmere) were both below average.

1.1 Rainfall

SSD had above average rainfall in November, receiving 168% (151mm) of the long term average (LTA) rainfall (89.6mm). Every rainfall unit across SSD had above average rainfall for November. The highest rainfall was received on the Isle of Wight areal rainfall unit with 195% (178mm) of the average rainfall (91.2mm). The lowest rainfall was received in the Adur areal unit where rainfall amounted to 153% (136mm) of LTA (88.8mm). In general the higher rainfall was in the western areas of SSD.

The 5 highest daily totals were all measured on the 1 November and the highest daily total of 39mm, was recorded at Broughton (Test Chalk). About 40% of the monthly total rainfall fell between the 1 and 4 November and 90% of the monthly total rainfall amounted in the first three weeks.

The period from the 20 to 30 November was much drier.

We are two months into the winter season and the area received a significant amount of rain already. The Isle of Wight and the Lymington areal units had their wettest October to November on their records and for West Sussex Chalk and Sussex Coast areal units it was the second wettest on record.

SSD as a whole was the third wettest on record for the October to November period.

1.2 Soil moisture deficit and recharge

Soils across SSD ended the month wetter than the average for November, which means catchments are more responsive to run off.

1.3 River flows

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

Flows were exceptionally high:

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

Flows notably high:

- River Meon at Misingford
- River Medina at Blackwater
- River Arun at Alfoldean
- River Ouse at Goldbridge

The River Test at Chilbolton was the second highest (since 1989), while the River Itchen at Allbrook & Highbridge, the River Rother at Iping Mill, the River Wallington at North Fareham, the River Adur at Sakeham, the River Cuckmere at Cowbeech and the Lymington at Brockenhurst were all the third highest on their records for November monthly mean flows.

1.4 Groundwater levels

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

Groundwater levels were above normal at:

- Carisbrooke Castle (Isle of Wight)

Groundwater levels were notably high at:

- Youngwood Copse (Isle of Wight)
- Harting Common (Western Rother Greensand)
- Chilgrove (West Sussex Chalk)
- Beeding Hill (West Sussex Chalk)

Groundwater levels were exceptionally high at:

- Clanville Gate (Test Chalk)
- Lopcombe Corner (Test Chalk)
- Preston Candover (East Hampshire Chalk).
- West Meon (East Hampshire Chalk)
- Catherington (East Hampshire Chalk)
- Houndean Bottom (East Sussex Chalk)
- Cornish Farm (East Sussex Chalk)

Groundwater levels for November were the second highest on record at Clanville Gate, West Meon, Catherington and Cornish Farm (starting 1966, 1986, 1969 and 1981 respectively). Also, groundwater levels were third highest on their record for Lopcombe Corner, Harting Common and Preston Candover.

1.5 Reservoir stocks

End of month reservoir stocks were below average at both Ardingly Reservoir (Ouse) with 76.1% of total capacity (LTA 77%) and Arlington Reservoir (Cuckmere) with 54% of total capacity (LTA 72.36%).

1.6 Environmental impact

No licence restrictions were in force in November.

There were 27 Flood Alerts issued in November. In Hampshire 2 groundwater and 10 fluvial, on the Isle of Wight 2 fluvial and in Sussex 13 fluvial.

There were 20 Flood Warnings issued in November. In Hampshire 7 fluvial and in Sussex 13 fluvial.

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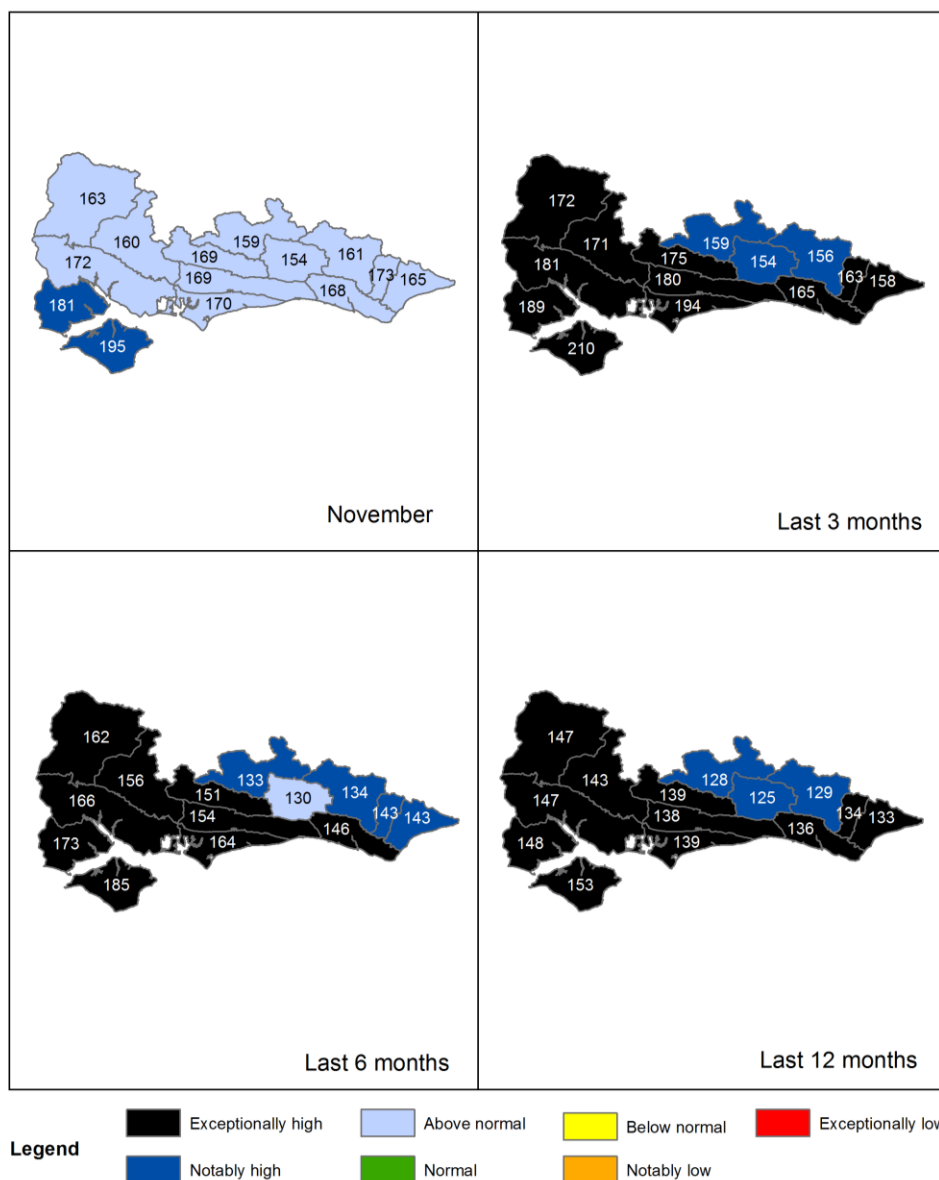
Contact Details: 03708 506 506

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2. Rainfall

2.1 Rainfall map

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

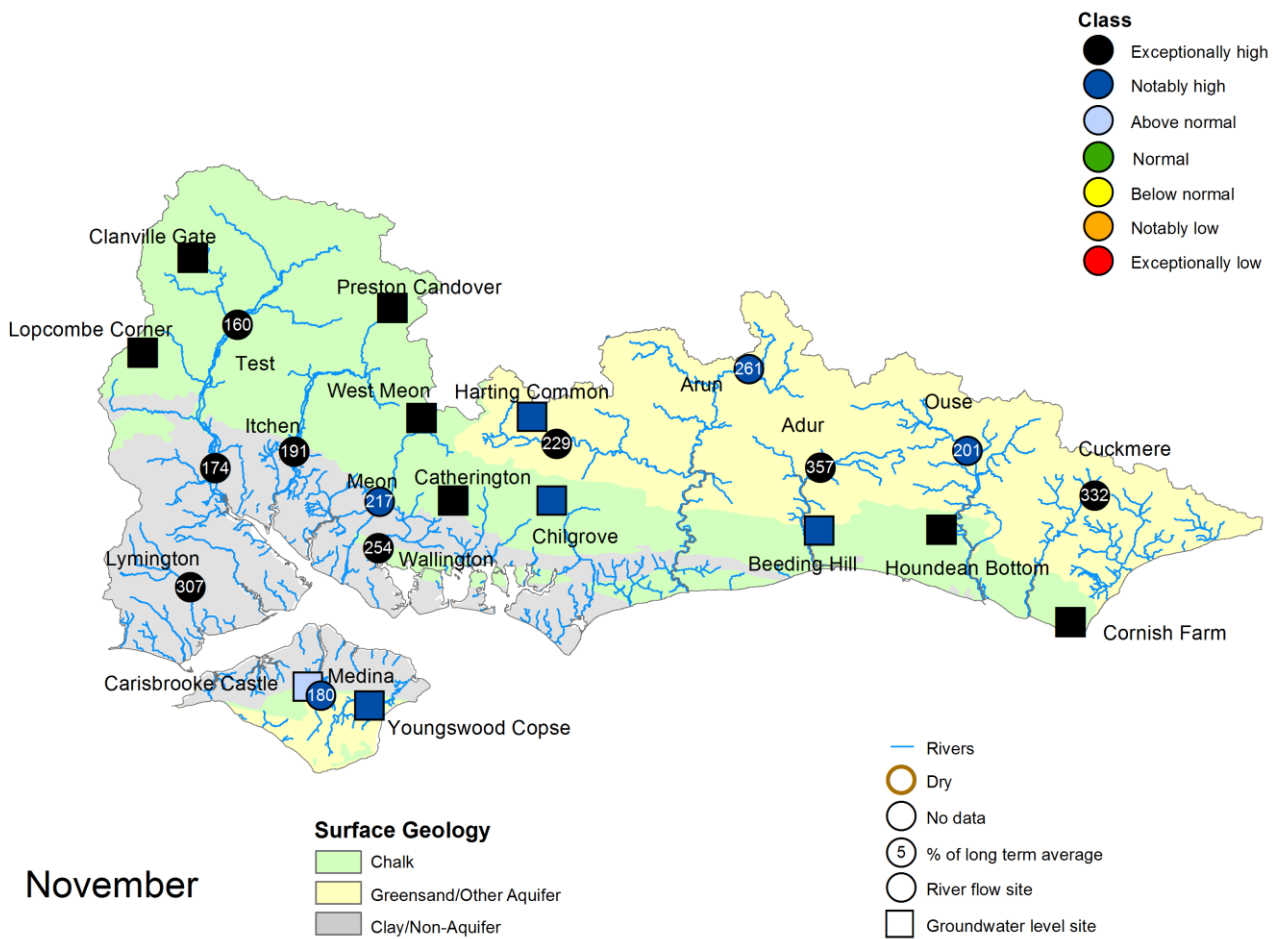


Rainfall data for 2023, extracted from Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. (Source: Environment Agency. Crown Copyright, 100024198, 2023). Rainfall data prior to 2023, extracted from Met Office HadUK 1km gridded rainfall dataset derived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

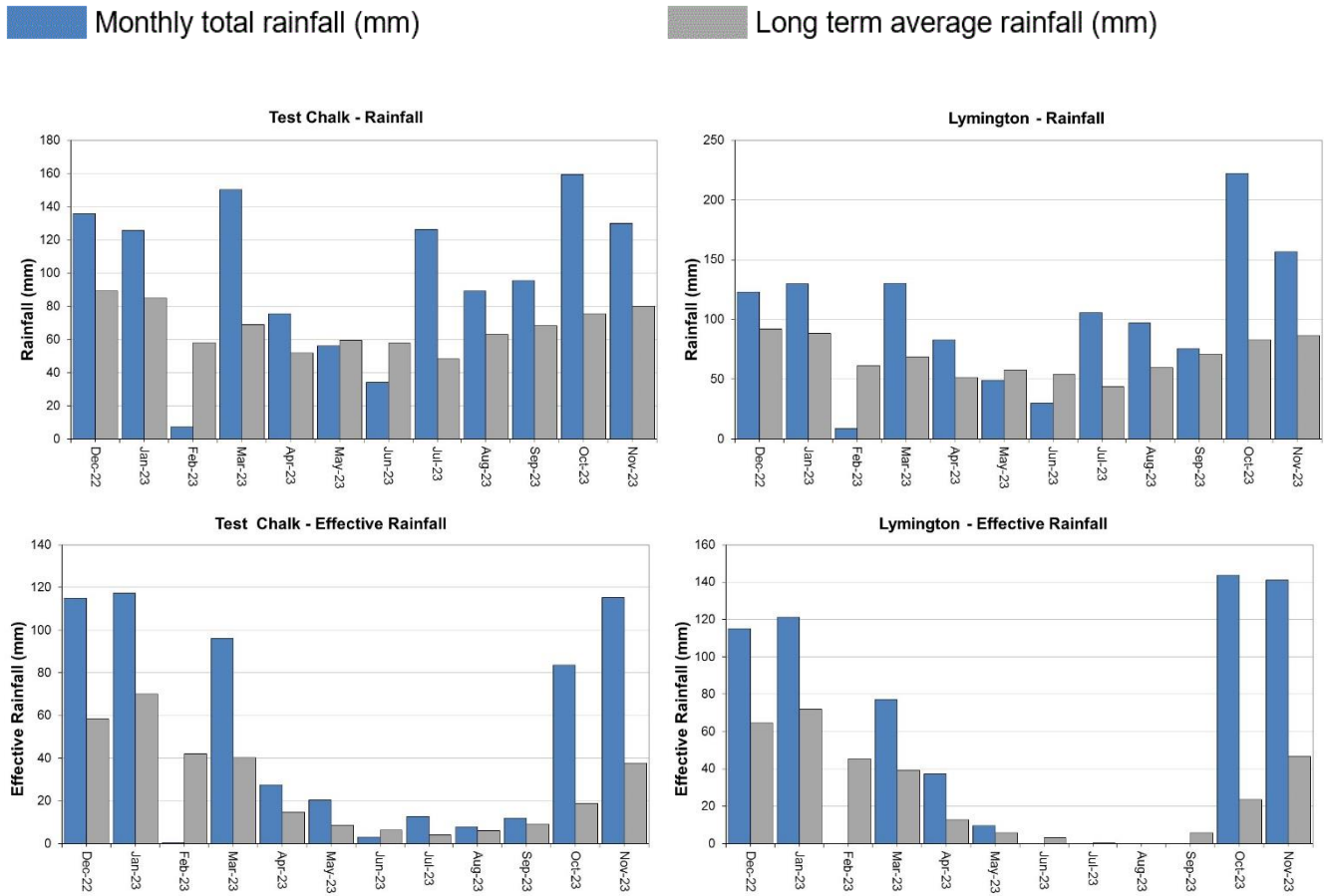


(Source: Environment Agency). Crown copyright. All rights reserved. Environment Agency, 100024198, 2023. Geological map reproduced with kind permission from UK Groundwater Forum, BGS copyright NERC. Crown copyright. All rights reserved. Environment Agency, 100024198, 2023.

4 West Hampshire

4.1 West Hampshire Rainfall and effective rainfall charts

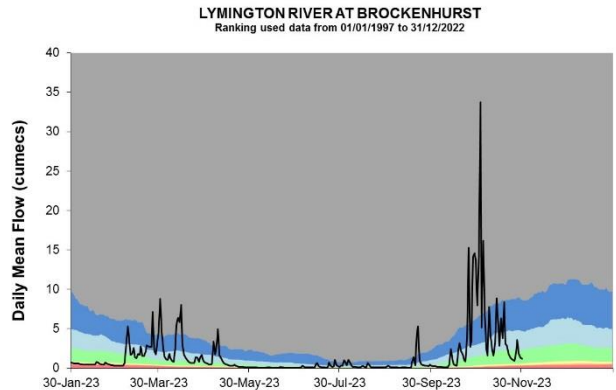
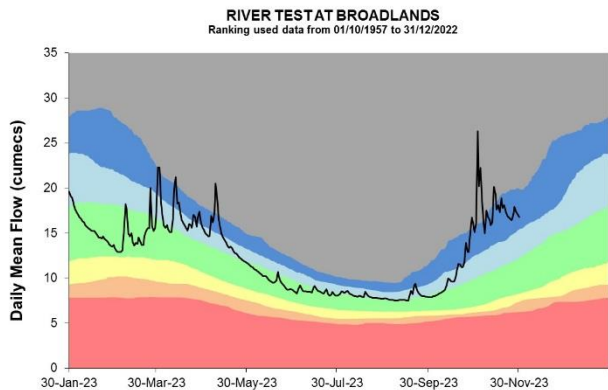
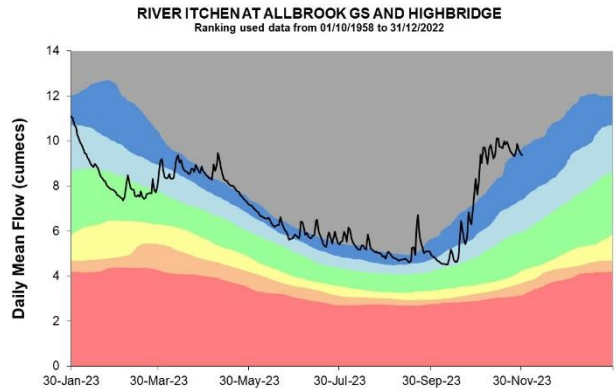
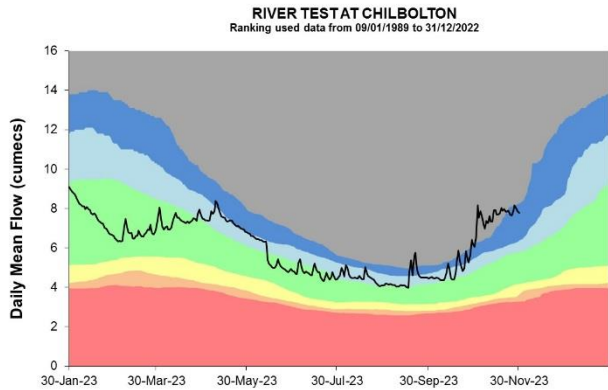
Figure 4.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

4.2 West Hampshire River flow charts

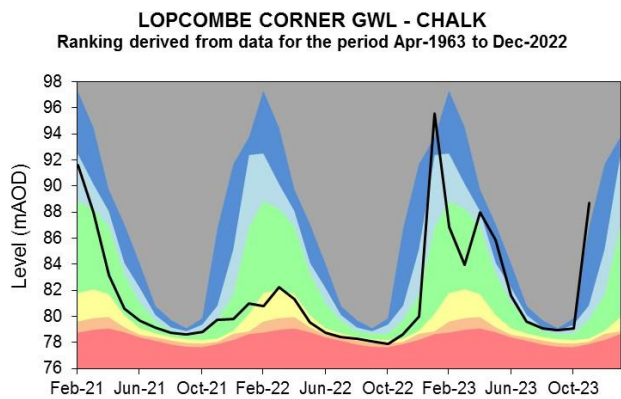
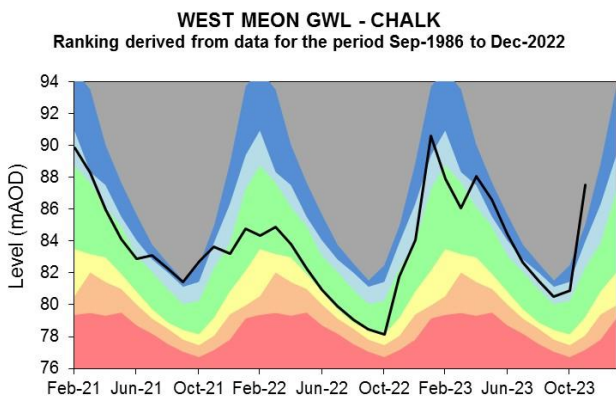
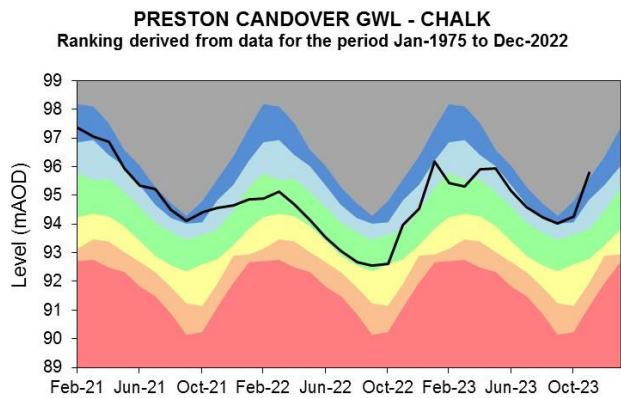
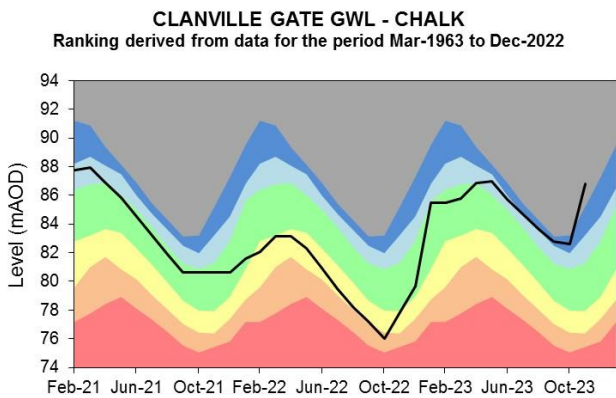
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2023.

4.3 West Hampshire Groundwater level charts

Figure 4.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.

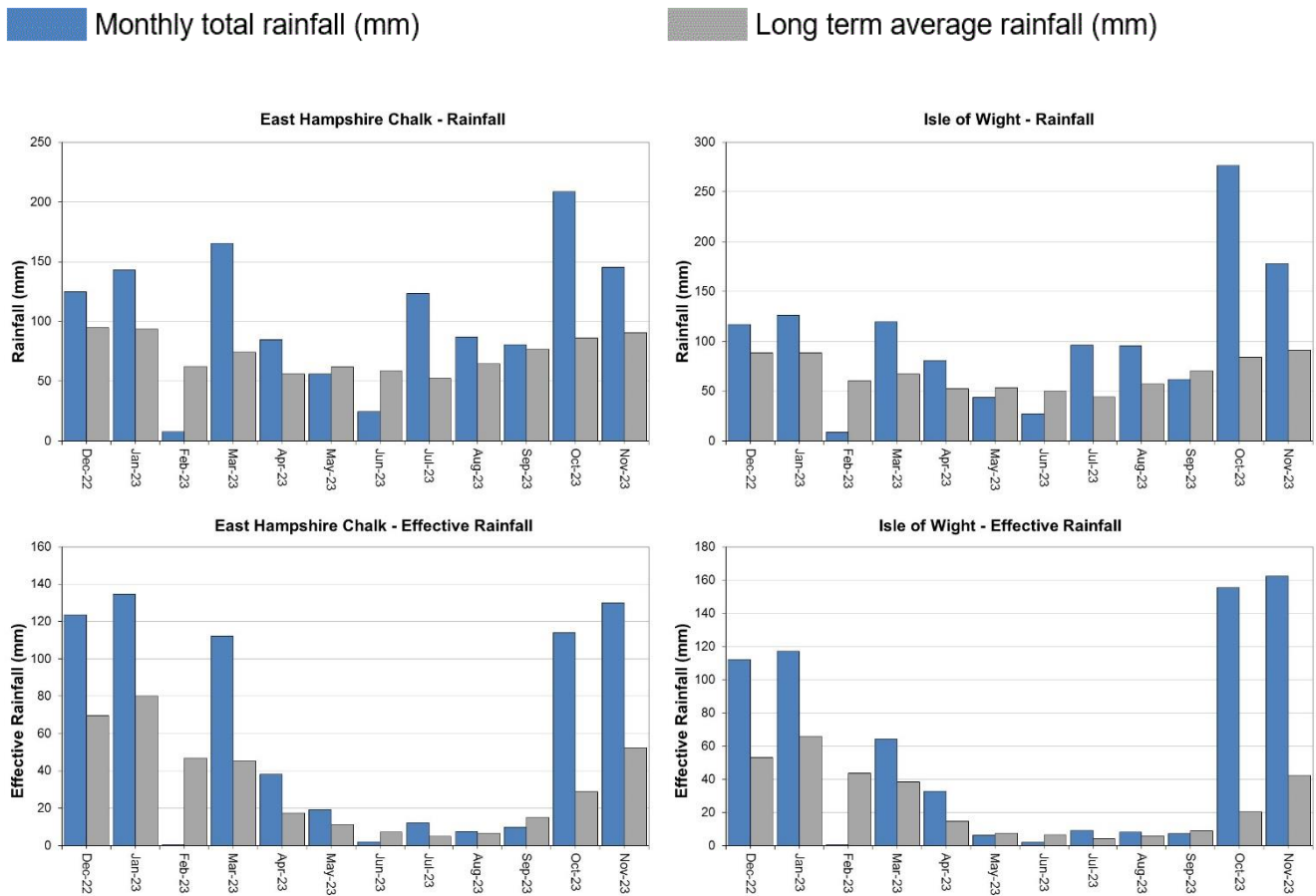


Source: Environment Agency, 2023.

5 East Hampshire and Isle of Wight

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

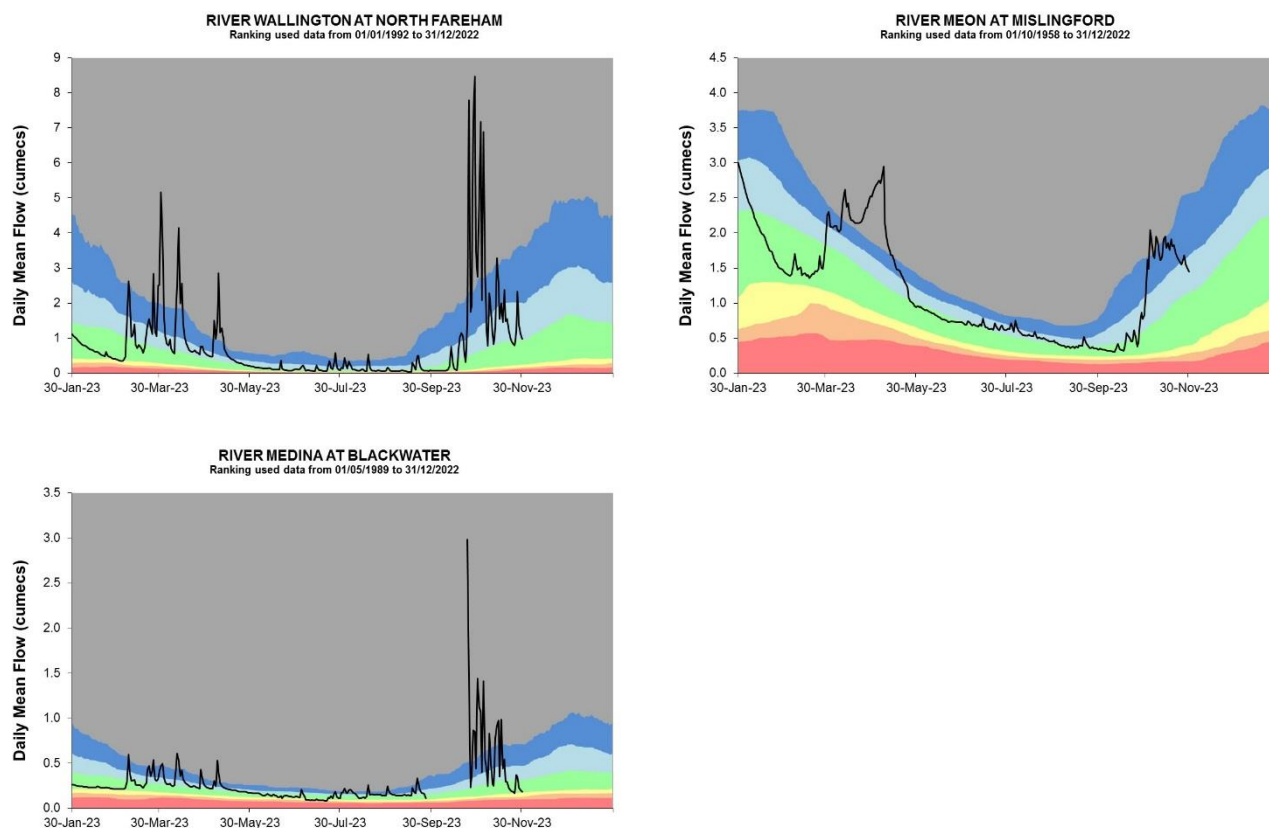
Figure 5.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

5.2 East Hampshire and Isle of Wight River flow charts

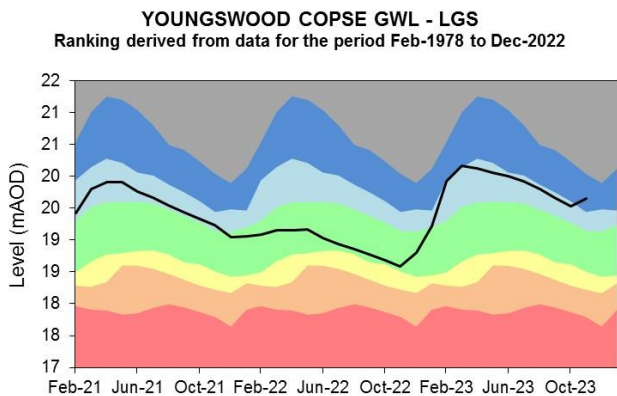
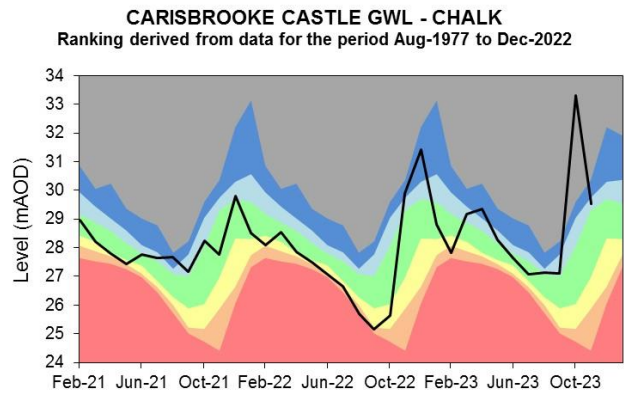
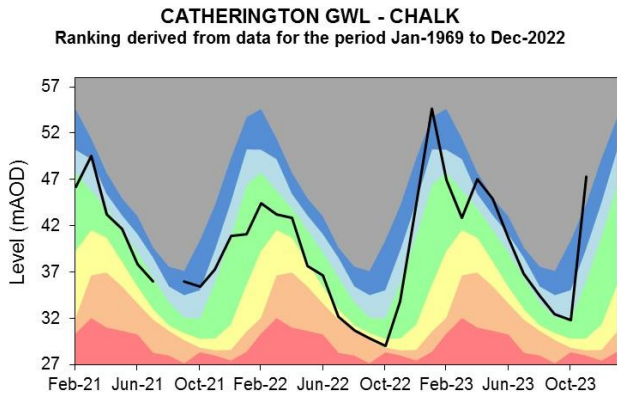
Figure 5.2 Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2023.

5.3 East Hampshire and Isle of Wight Groundwater level charts

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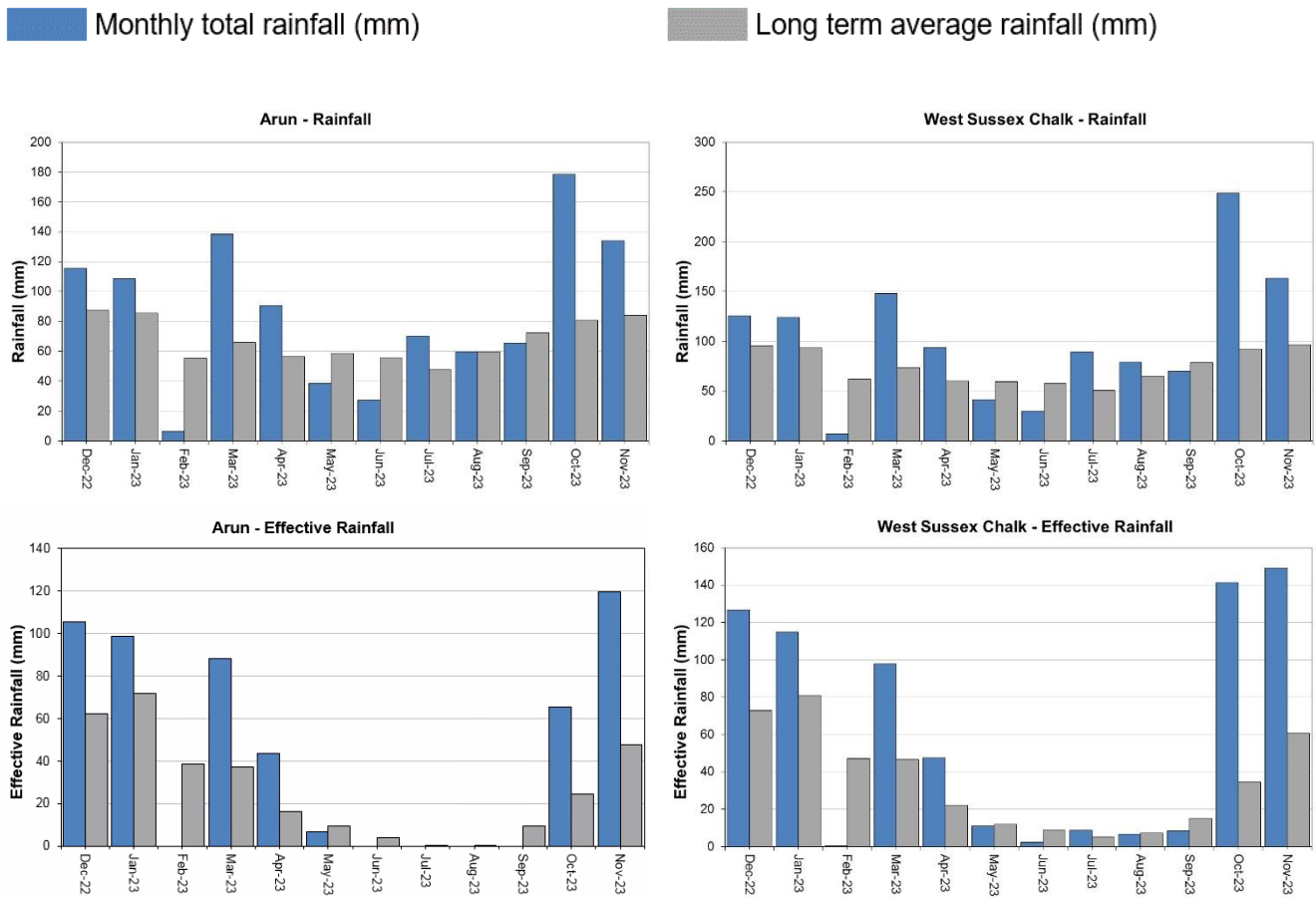


Source: Environment Agency, 2023.

6 West Sussex

6.1 West Sussex Rainfall and Effective Rainfall charts

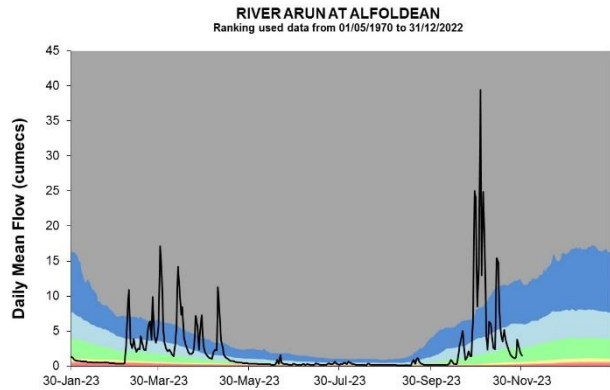
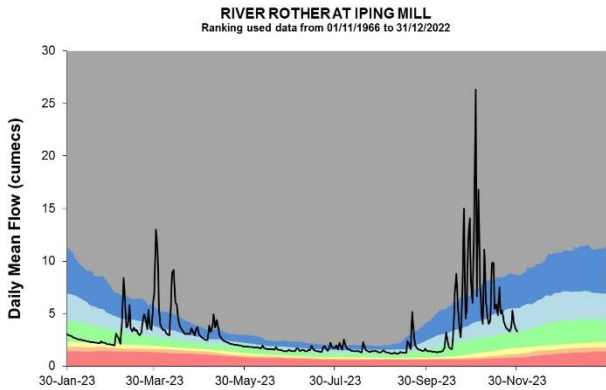
Figure 6.1: Monthly rainfall and effective rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average.



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

6.2 West Sussex River flow charts

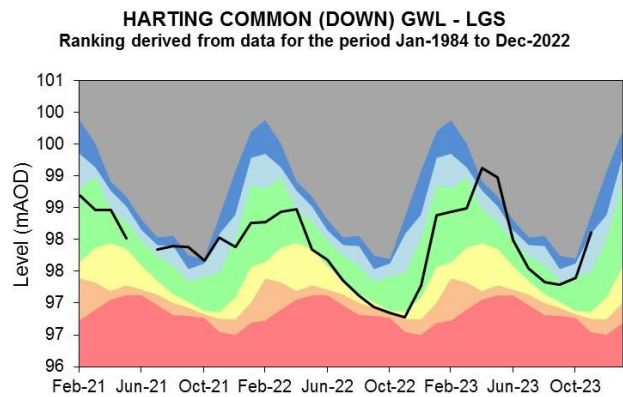
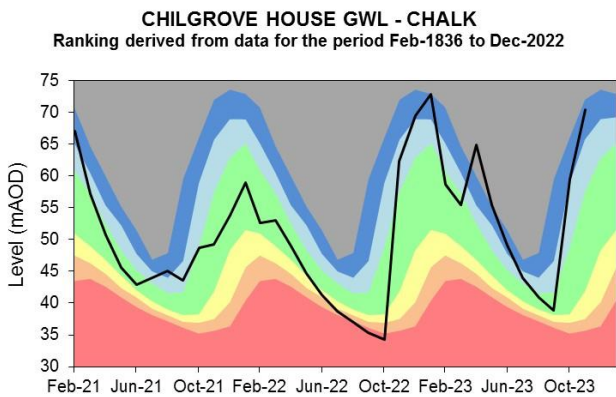
Figure 6.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2023.

6.3 West Sussex Groundwater level charts

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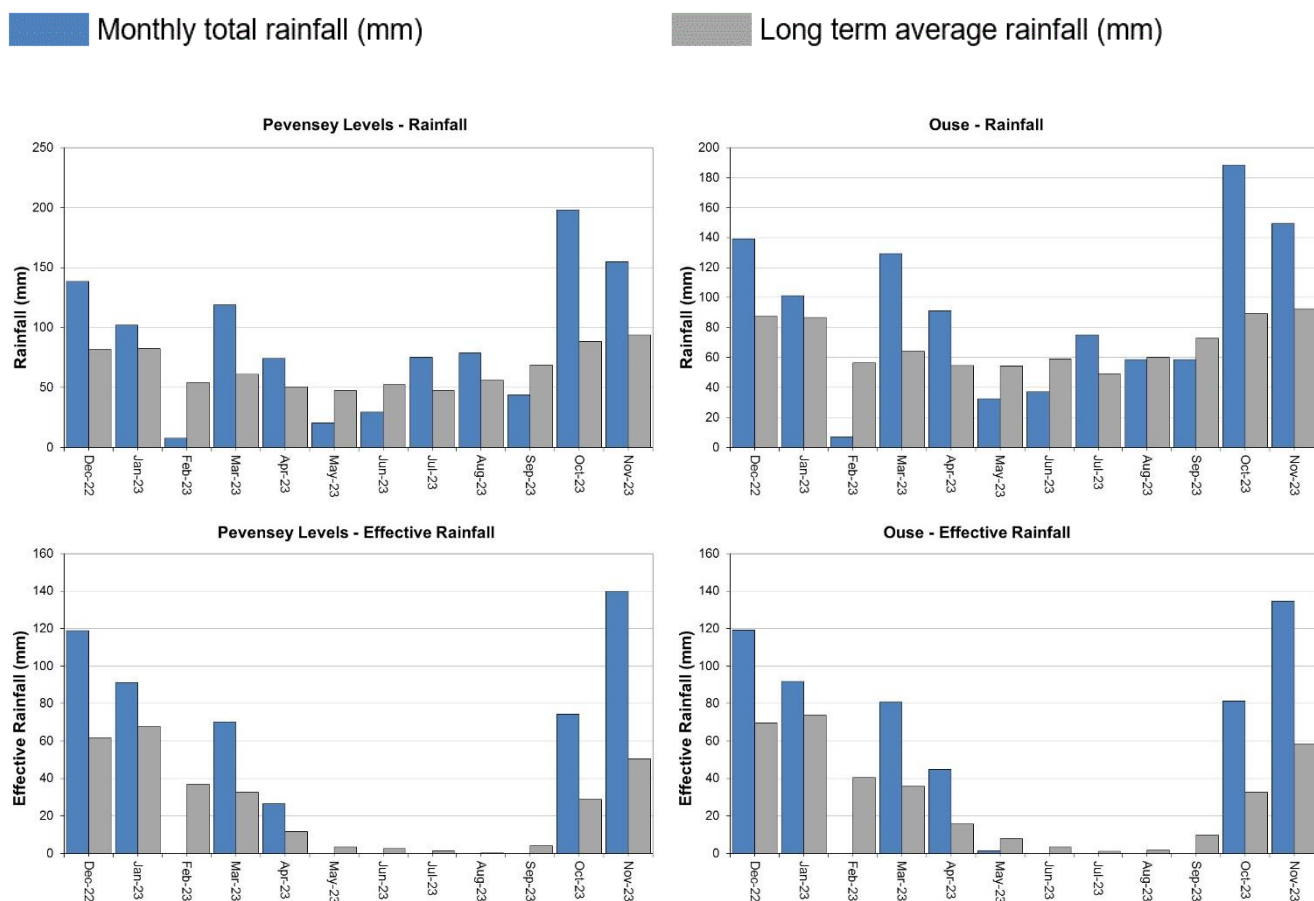


Source: Environment Agency, 2023.

7 East Sussex

7.1 East Sussex Rainfall and Effective Rainfall charts

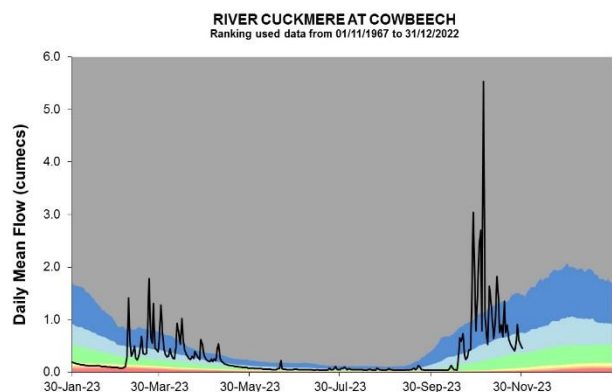
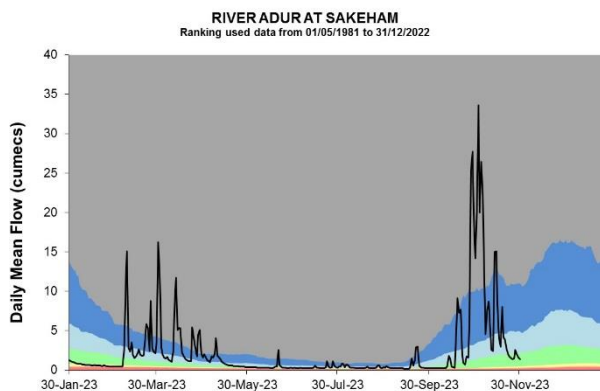
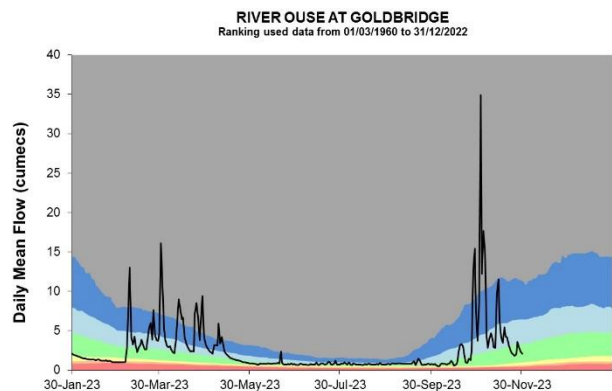
Figure 7.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



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

7.2 East Sussex River flow charts

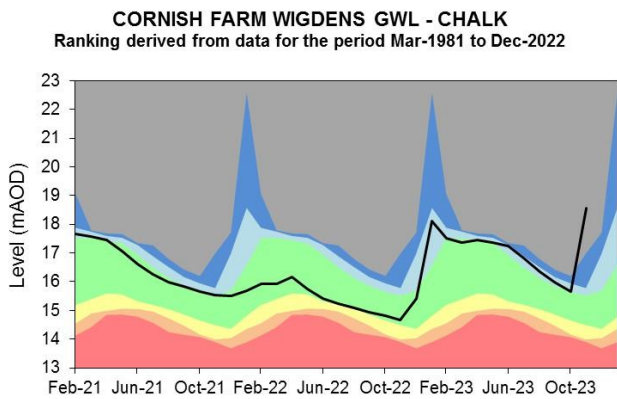
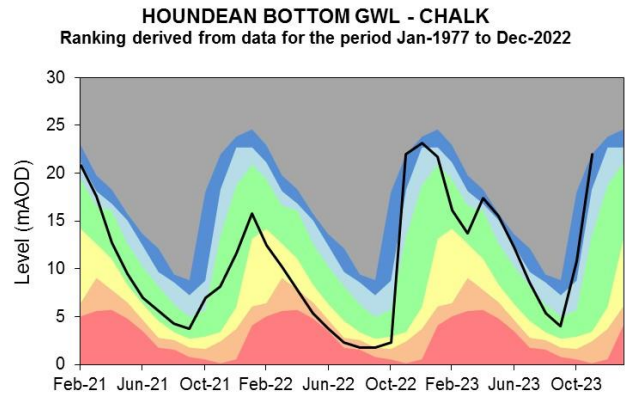
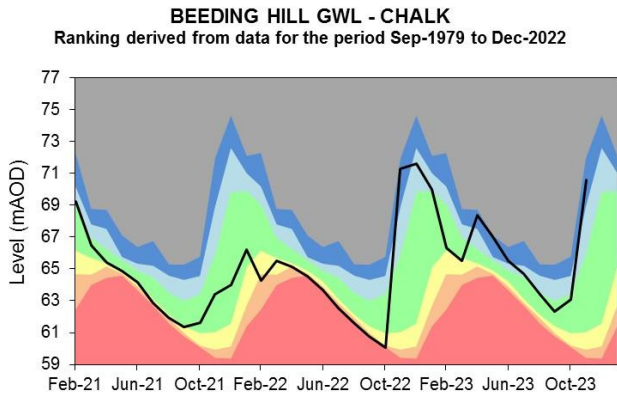
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Source: Environment Agency, 2023.

7.3 East Sussex Groundwater level charts

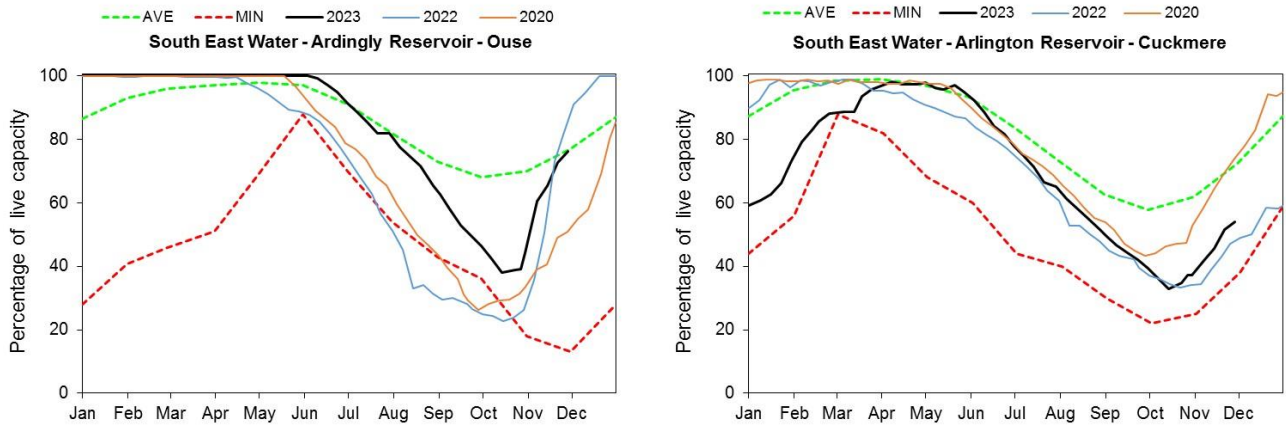
Figure 7.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



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) 30 day Total	Rainfall November as %LTA	Effective Rainfall (mm) 30 day Total	Effective Rainfall November as %LTA	Soil Moisture Deficit (SMD) Day 30	SMD End of November LTA
Test Chalk	130	163%	115	305%	1	33
East Hampshire Chalk	145	160%	130	248%	1	25
West Sussex Chalk	163	168%	149	247%	1	22
East Sussex Chalk	165	168%	150	276%	1	25
Isle of Wight	178	195%	162	384%	1	40
Western Rother Greensand	160	169%	146	252%	1	23
Hampshire Tertiaries	143	171%	127	313%	1	28
Lymington	157	180%	141	304%	1	25
Sussex Coast	137	169%	121	353%	1	34
Arun	134	160%	119	252%	1	23
Adur	136	153%	122	227%	1	19
Ouse	149	160%	135	231%	1	15
Cuckmere	163	173%	148	247%	1	13
Pevensy Levels	155	165%	140	277%	1	19
SSD Average	151	168%	136	274%	1	25

10.2 Seasonal summary table of rainfall and effective rainfall

Winter season: 01/10/2023 to 31/03/2024

Hydrological Area	Seasonal Rainfall (mm)	Seasonal Rainfall as % LTA	Seasonal Effective Rainfall (mm)	Seasonal Effective Rainfall as % LTA
	Total		Total	
Test Chalk	290	186%	199	351%
East Hampshire Chalk	353	200%	244	300%
West Sussex Chalk	412	218%	291	305%
East Sussex Chalk	375	196%	247	277%
Isle of Wight	454	259%	318	509%
Western Rother Greensand	382	206%	266	290%
Hampshire Tertiaries	349	215%	236	405%
Lymington	379	223%	285	407%
Sussex Coast	376	238%	229	483%
Arun	313	190%	185	257%
Adur	320	183%	189	229%
Ouse	337	185%	216	238%
Cuckmere	366	199%	248	261%
Pevensy Levels	353	194%	214	270%
SSD Average	361	206%	240	314%

10.3 Rainfall banding table

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

10.4 River flows table

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

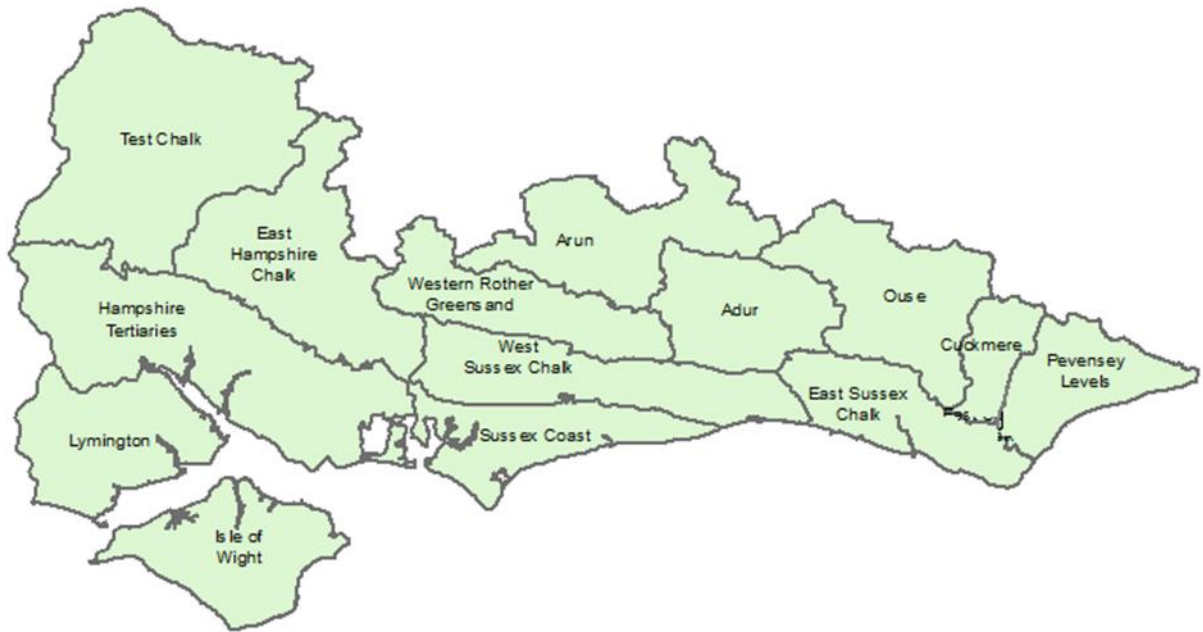
10.5 Groundwater table

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

10.6 Abstraction licence flow constraints

Number of flow constraints in force between 1 to 6 November 2023	Number of flow constraints in force between 7 to 13 November 2023	Number of flow constraints in force between 14 to 20 November 2023	Number of flow constraints in force between 21 to 27 November 2023	Number of flow constraints in force between 28 to 30 November 2023
0	0	0	0	0

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	84.8	57.9	68.7	51.7	59.0	57.3	47.9	62.5	67.9	75.4	79.9	89.1
East Hampshire Chalk	93.8	62.5	73.9	56.2	61.9	58.7	51.7	64.6	77.0	86.2	90.5	94.8
West Sussex Chalk	93.5	62.5	73.9	60.2	59.5	57.6	50.7	64.8	78.5	92.0	97.0	95.5
East Sussex Chalk	87.1	56.9	65.1	53.5	51.5	57.4	48.9	60.3	72.7	92.9	97.9	88.7
Isle of Wight	88.2	60.4	67.0	52.3	53.2	50.2	44.1	57.4	70.2	84.3	91.2	88.1
Western Rother Greensand	99.5	64.5	75.5	60.6	62.6	57.3	50.4	65.6	78.8	90.8	94.7	99.7
Hampshire Tertiaries	86.1	59.2	67.0	50.4	56.8	52.8	44.5	58.7	69.6	78.8	83.4	88.7
Lymington	88.5	61.2	68.5	51.5	57.9	54.3	43.4	59.3	71.0	83.0	86.8	91.8
Sussex Coast	76.6	51.3	60.7	50.2	50.2	47.7	41.9	53.0	63.7	77.2	80.8	78.9
Arun	85.5	55.1	65.5	56.5	58.5	55.6	47.2	59.4	72.4	80.5	83.9	86.9
Adur	84.8	55.1	63.8	55.3	56.2	55.6	46.0	59.6	71.5	85.7	88.8	86.0
Ouse	86.6	56.4	64.0	54.4	54.0	58.6	48.7	60.0	72.5	89.1	92.9	87.6
Cuckmere	84.8	55.2	61.8	51.2	50.1	57.5	48.5	59.8	71.5	90.8	93.7	85.0
Pevensey Levels	82.2	54.0	60.9	50.6	47.5	52.2	47.3	55.6	68.5	88.1	93.6	82.0
SSD Average	87.3	58.0	66.9	53.9	55.6	55.2	47.2	60.0	71.8	85.3	89.6	88.8