

Monthly water situation report: Solent and South Downs Area

Summary - September 2024

Solent and South Downs (SSD) had well above average rainfall in September, receiving 239% (171mm) of the long term average (LTA) rainfall (72mm). Monthly mean river flows across SSD ranged from above normal to exceptionally high. End of month groundwater levels ranged from normal to exceptionally high. Soils across SSD ended the month wetter than the average for September. 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 September, receiving 239% (171mm) of the LTA (72mm).

During September the highest rainfall totals were recorded in the Test Chalk and East Sussex Chalk areal units with 205mm. For the Test Chalk this represented 302% of the LTA) and for East Sussex Chalk 282% of the LTA. The lowest total was 129mm in Sussex Coast (203% of the LTA) areal unit. There were no completely dry days during September. There was some significant rainfall between the 5 and 8 September with 40.7mm being recorded at Overton (Test Chalk) on the 5 September. The 13 through to the 19 of the month was largely dry and then there was a very wet end to the month. The highest daily total during September was recorded at Ardingly (Ouse) on 22 September with 63.5mm. On 26 September 48.2mm was recorded at Plumpton (East Sussex Chalk).

This September was the third wettest September on record for SSD as a whole. It was the wettest on record for the East Sussex Chalk, Ouse and Test Chalk areal units. For 18months (starting April) it was the second wettest on record for SSD as a whole. It was the wettest on record for the East Hampshire Chalk, Hampshire Tertiaries, Isle of Wight, Lymington and Test Chalk areal units. For 24months (starting October) it was the wettest on record for SSD area and all areal units (with the exception of the Pevensey Levels). All these statistics are based on records going back to 1871.

1.2 Soil moisture deficit and recharge

Soils across SSD ended the month much wetter than the average for September.

1.3 River flows

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

Flows were above normal:

- River Meon at Mislingsford
- River Wallington at North Fareham

Flows were notably high:

- River Test at Chilbolton
- River Ouse at Goldbridge
- River Rother at Iping Mill

Flows were exceptionally high:

- River Arun at Alfoldean
- River Adur at Sakeham
- River Cuckmere at Cowbeech
- River Itchen at Allbrook&Highbridge
- River Lymington at Brockenhurst
- River Medina at Blackwater
- River Test at Broadlands

The monthly mean flows for September were the highest on record at Allbrook&Highbridge (Itchen), since 1959 and Sakeham (Adur) since 1967.

1.4 Groundwater levels

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

Groundwater levels were normal at:

- Beeding Hill (West Sussex Chalk)
- Chilgrove (West Sussex Chalk)

Groundwater levels were above normal at:

- Carisbrooke Castle (Isle of Wight)
- Catherington (East Hampshire Chalk)
- Harting Common (Western Rother Greensand)
- Houndean Bottom (East Sussex Chalk)

Groundwater levels were notably high at:

- Cornish Farm (East Sussex Chalk)

- Lopcombe Corner (Test Chalk)
- West Meon (East Hampshire Chalk)

Groundwater levels were exceptionally high at:

- Clanville Gate (Test Chalk)
- Preston Candover (East Hampshire Chalk)
- Youngwoods Copse (Isle of Wight)

Groundwater levels for September were the highest on record at Youngwoods Copse since 1978 and second highest at Preston Candover since 1975, respectively.

1.5 Reservoir stocks

End of month reservoir stock was below average at Ardingly Reservoir (Ouse) with 63.5% of total capacity (LTA 68%) and at Arlington Reservoir (Cuckmere) with 45.9% of total capacity (LTA 57.7%).

1.6 Environmental impact

During September there were a total of four licence restrictions in force, two cessations and two reduced abstraction rates.

There were cessations in force on the River Meon (East Hampshire) and on the Walkford Brook (New Forest).

There were reduced abstraction rate restrictions in force on Pagham Rife (Sussex Coast) and at Wallers Haven at Hazard's Green (Pevensey catchment).

During September there was one Flood Warning in Sussex on 30 September. There were also 11 Flood Alerts issued with eight in Sussex and three in Hampshire and the Isle of Wight.

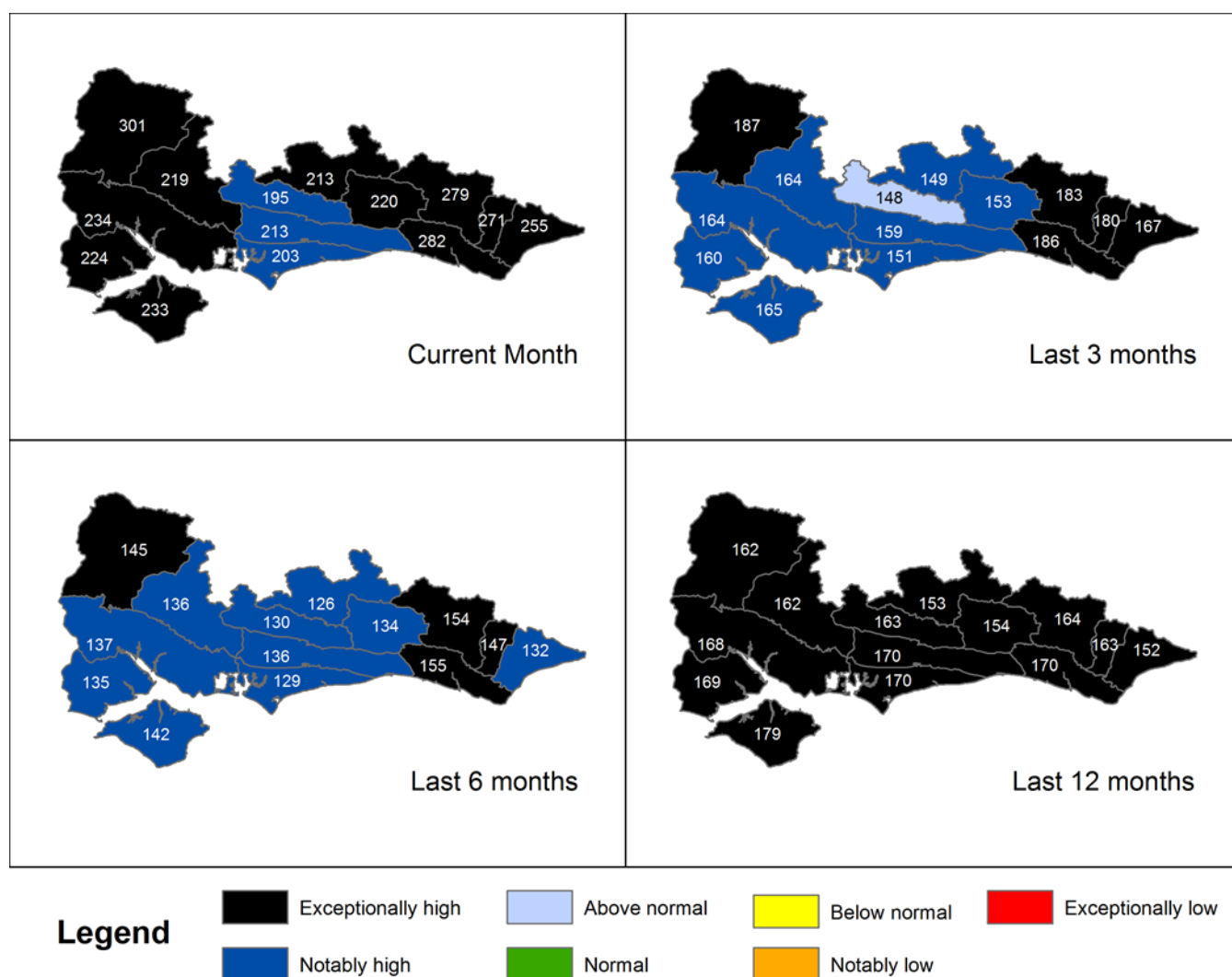
Author: HydrologySSD@environment-agency.gov.uk

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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 September 2024), 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.

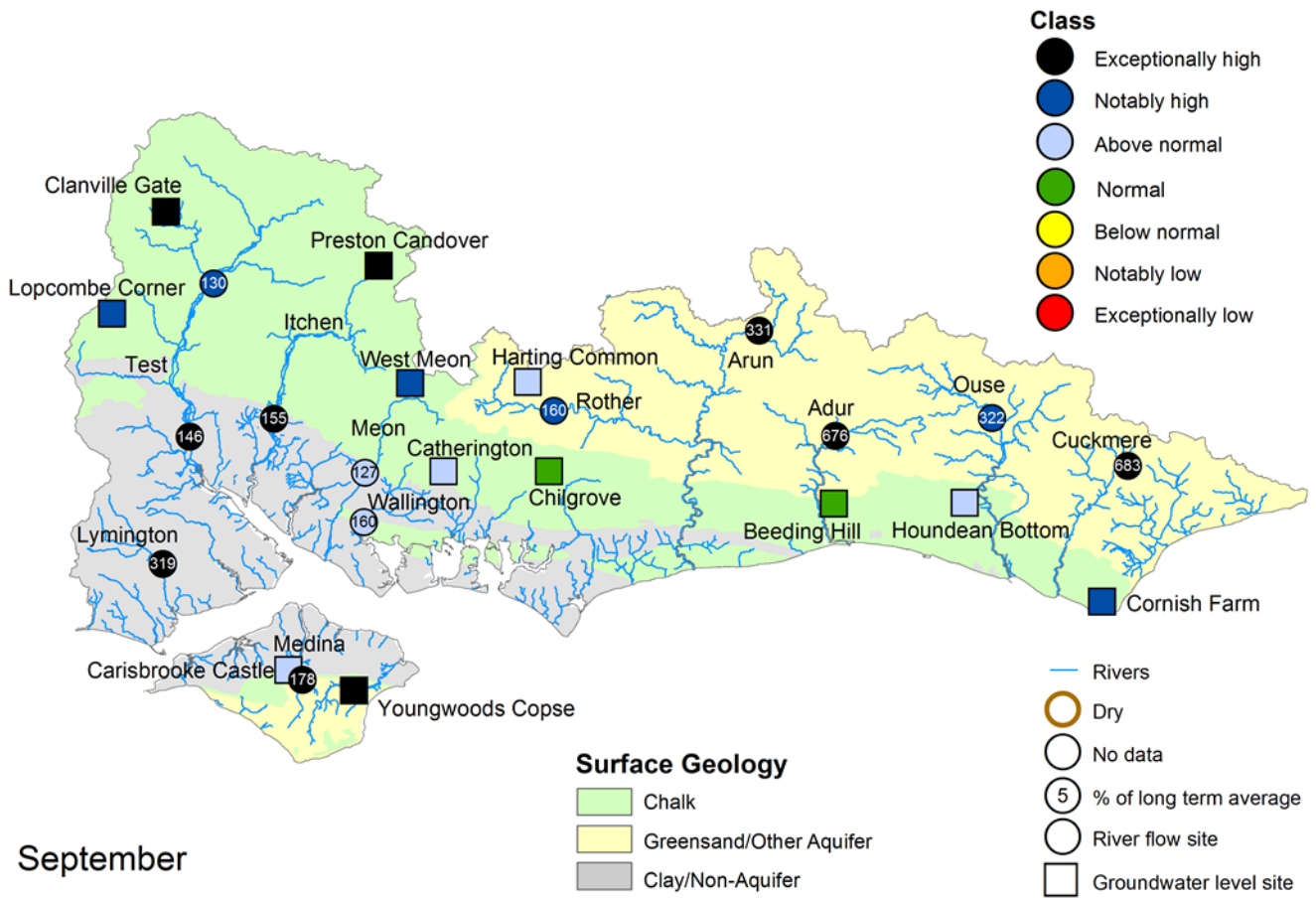


Rainfall data for 2024, extracted from Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. (Source: Environment Agency. Crown Copyright, 100024198, 2024). Rainfall data prior to 2023, extracted from Met Office HadUK 1km gridded rainfall dataset derived from registered rain gauges (Source: Met Office. Crown copyright, 2024).

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 September 2024, 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.

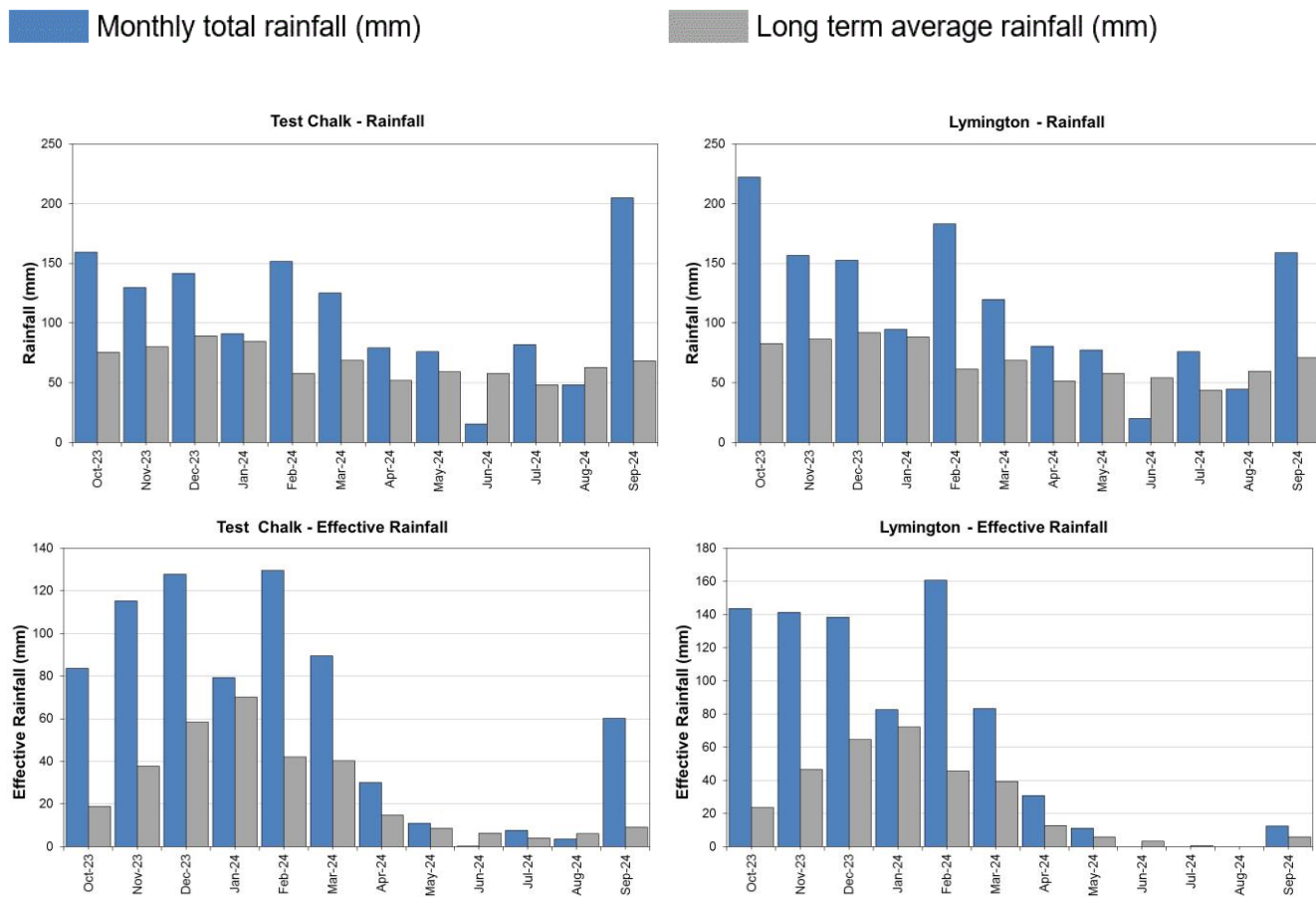


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4 West Hampshire

4.1 West Hampshire Rainfall and effective rainfall charts

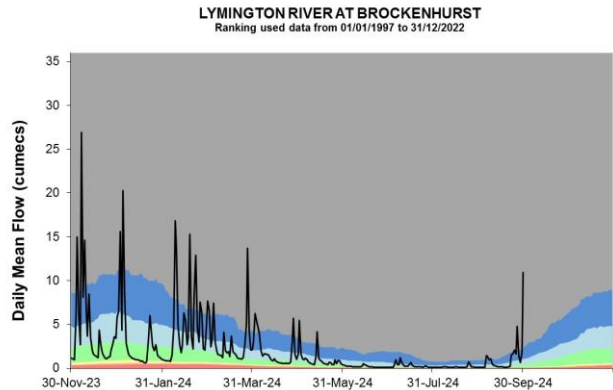
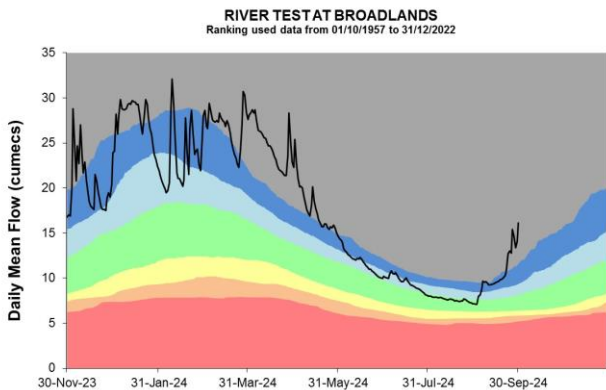
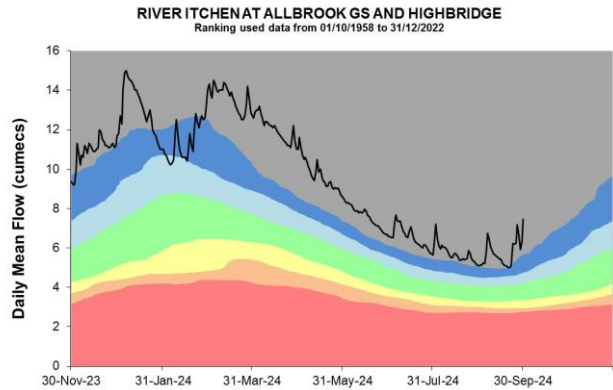
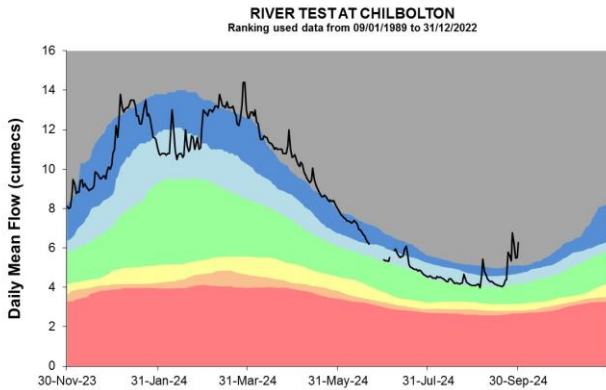
Figure 4.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



HadUK rainfall data. (Source: Met Office. Crown copyright, 2024).

4.2 West Hampshire River flow charts

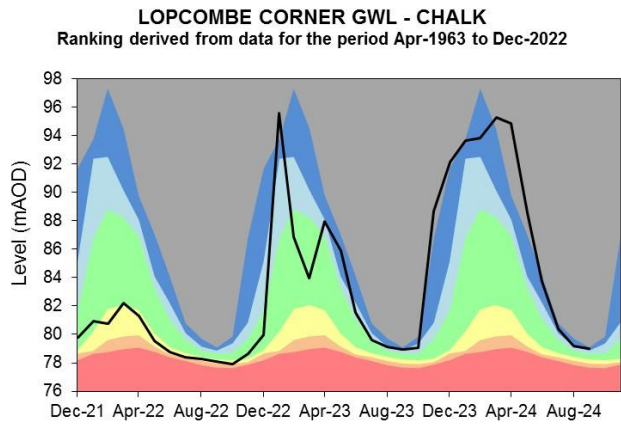
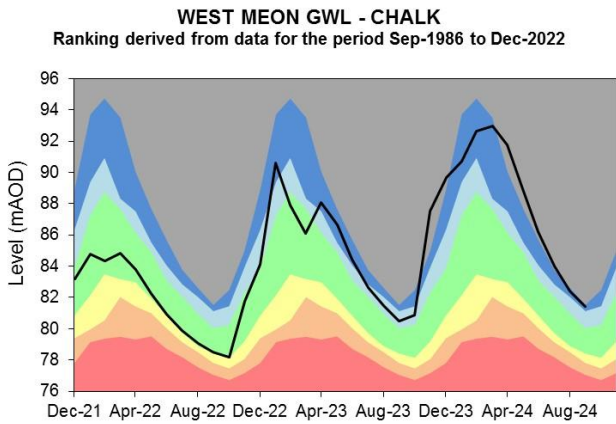
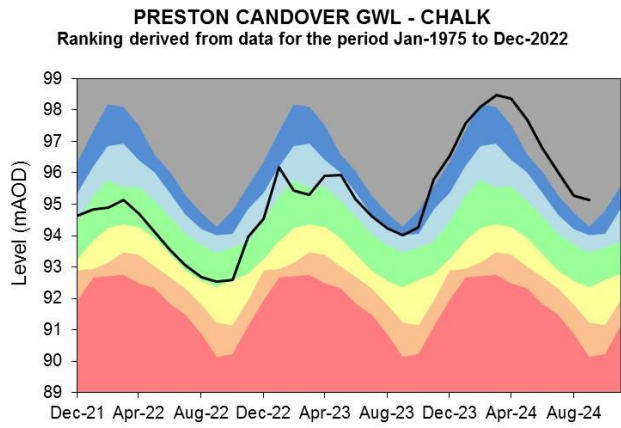
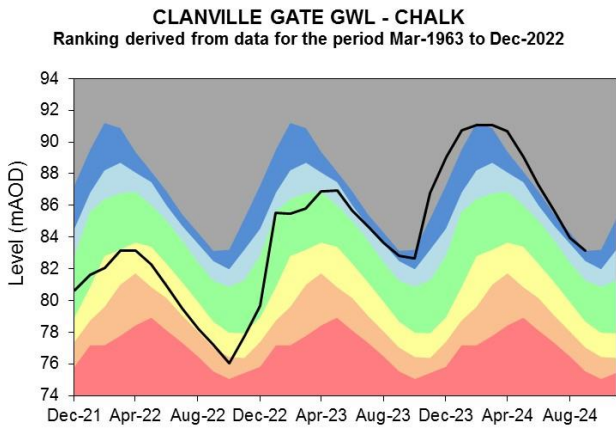
Figure 4.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2024.

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.

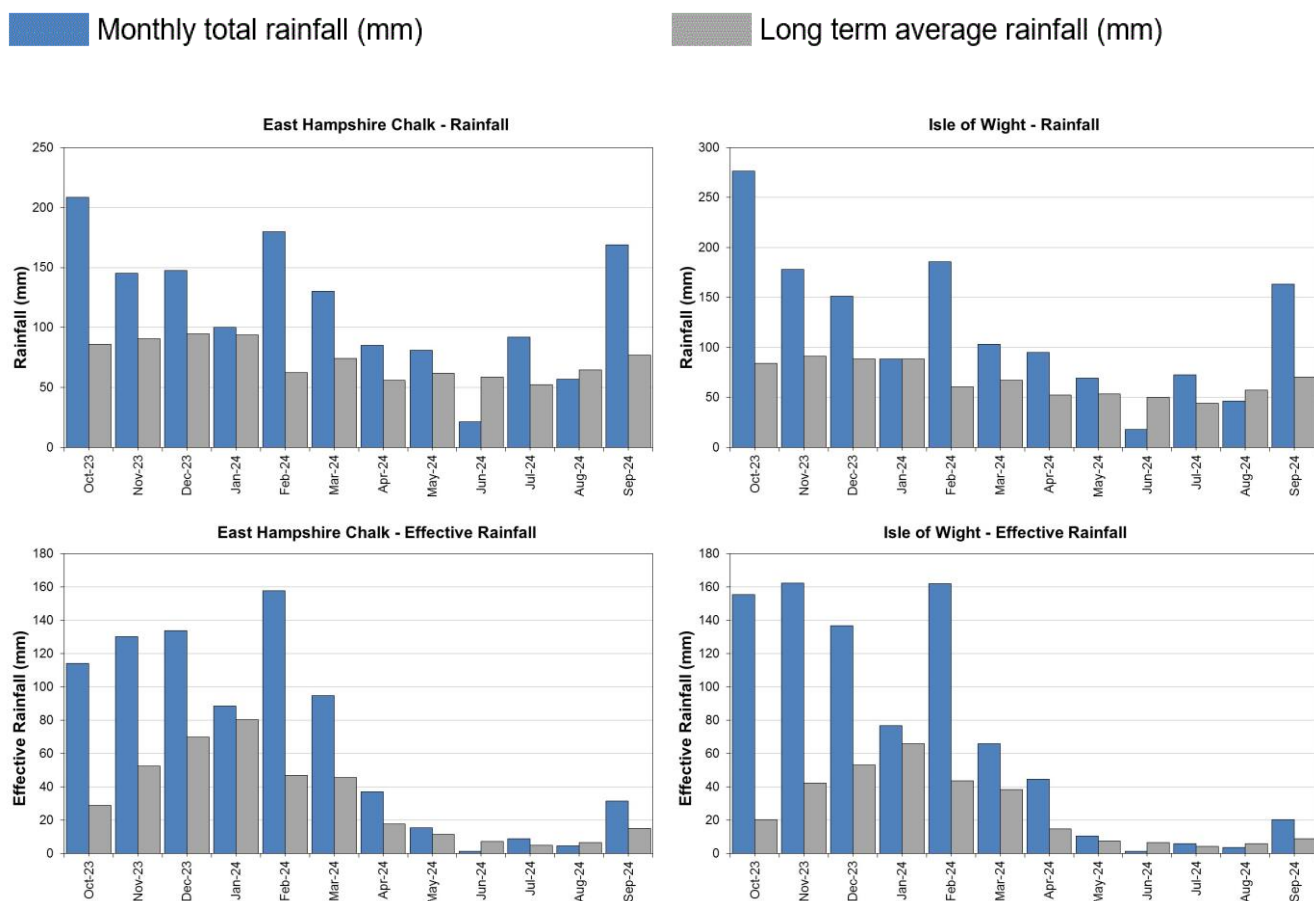


Source: Environment Agency, 2024.

5 East Hampshire and Isle of Wight

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

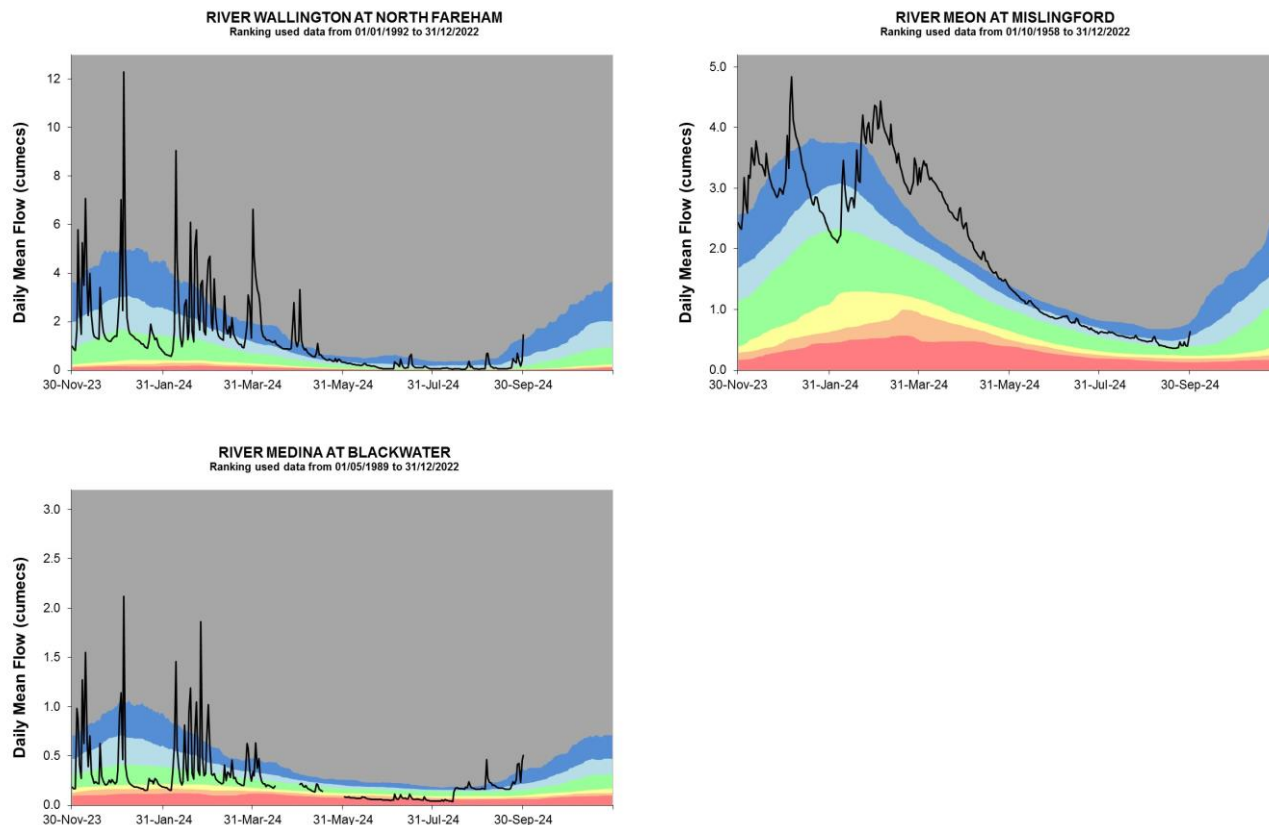
Figure 5.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



HadUK rainfall data. (Source: Met Office. Crown copyright, 2024).

5.2 East Hampshire and Isle of Wight River flow charts

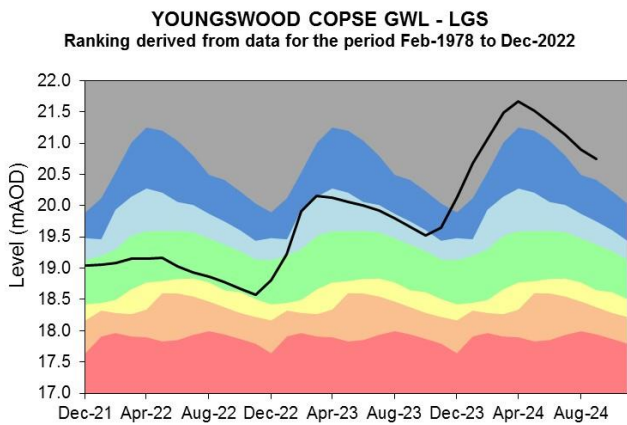
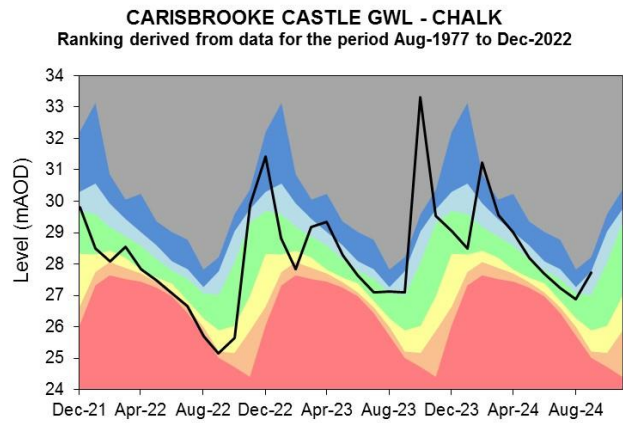
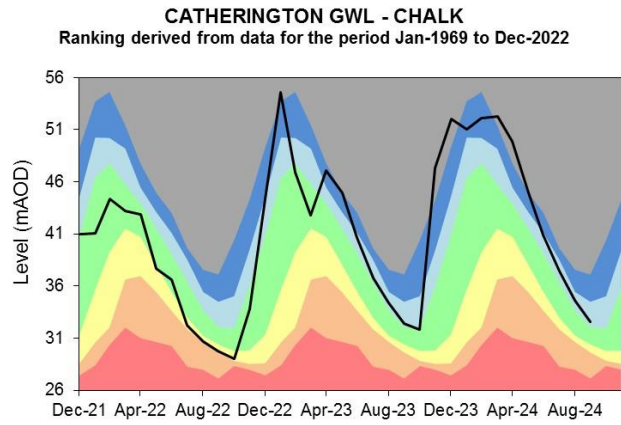
Figure 5.2 Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2024.

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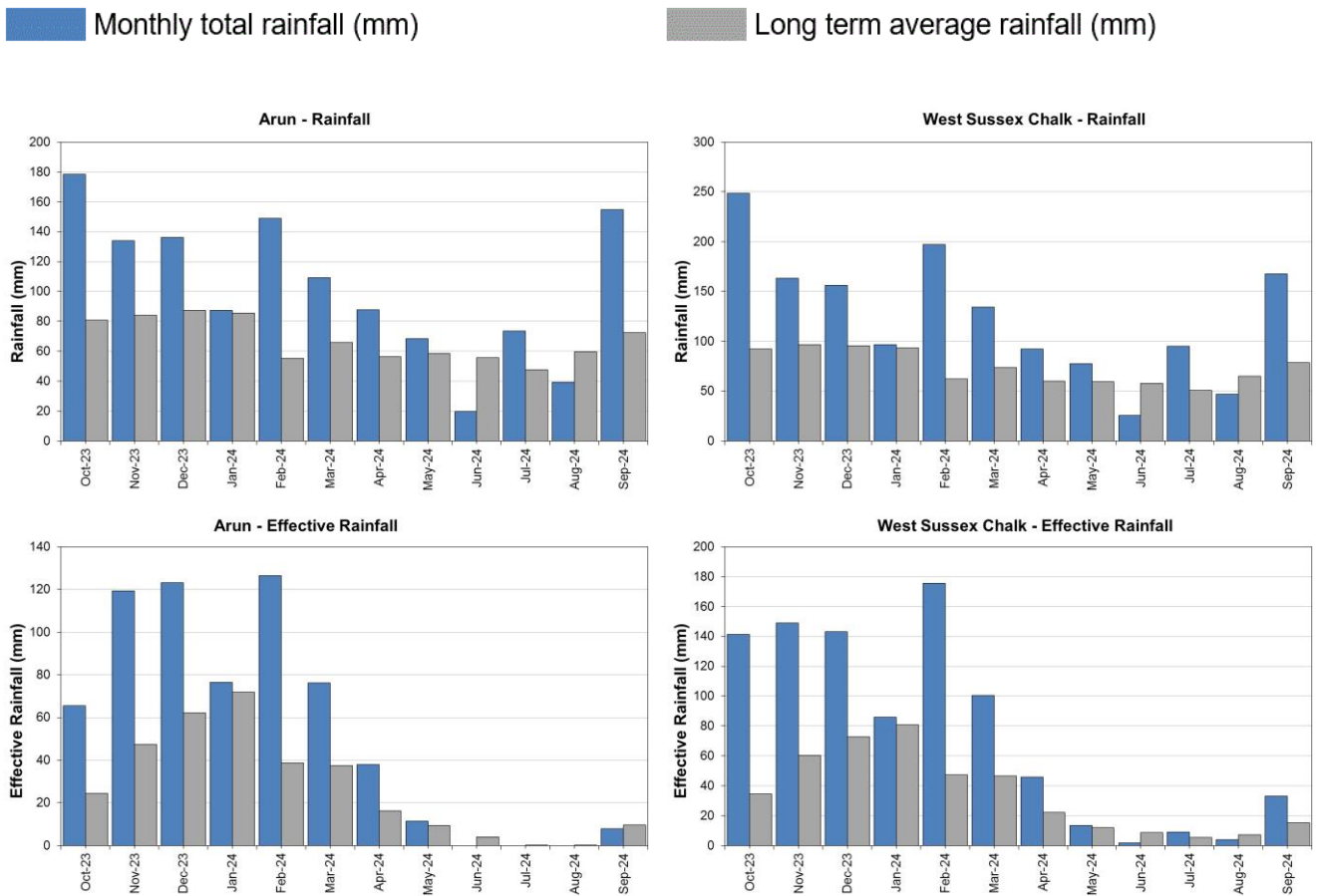


Source: Environment Agency, 2024.

6 West Sussex

6.1 West Sussex Rainfall and Effective Rainfall charts

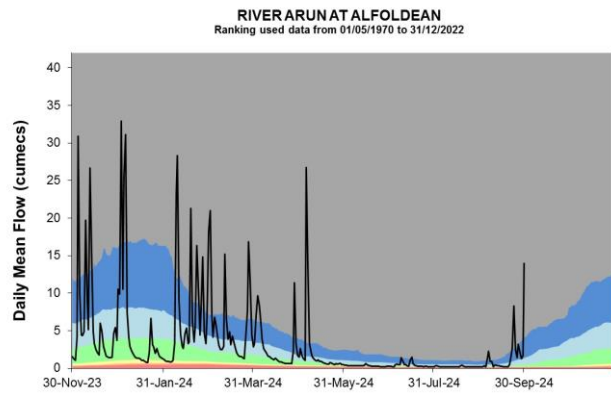
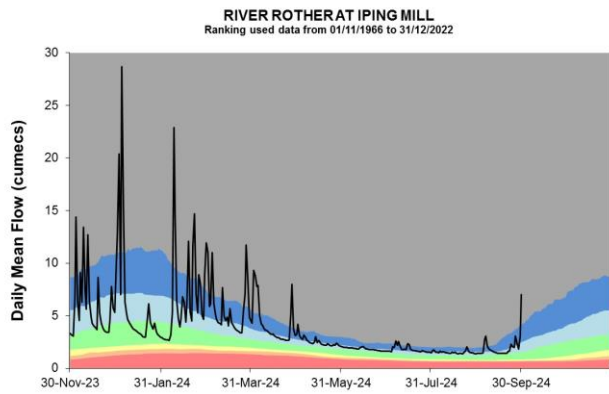
Figure 6.1: Monthly rainfall and effective rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average.



HadUK rainfall data. (Source: Met Office. Crown copyright, 2024).

6.2 West Sussex River flow charts

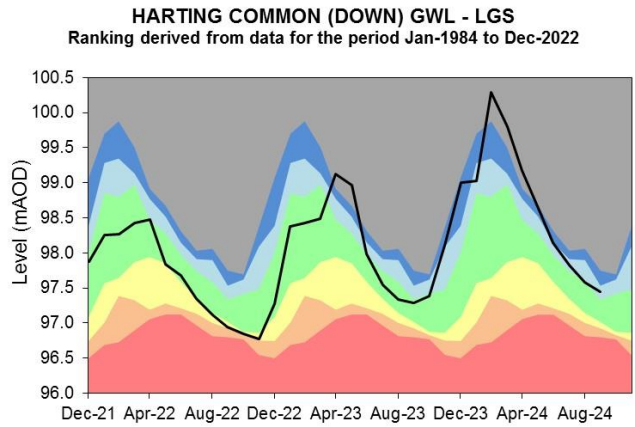
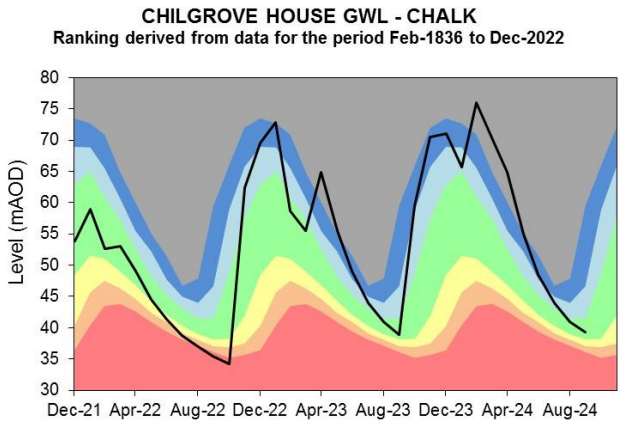
Figure 6.2: Daily mean river flow for index sites over the past year, compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



Source: Environment Agency, 2024.

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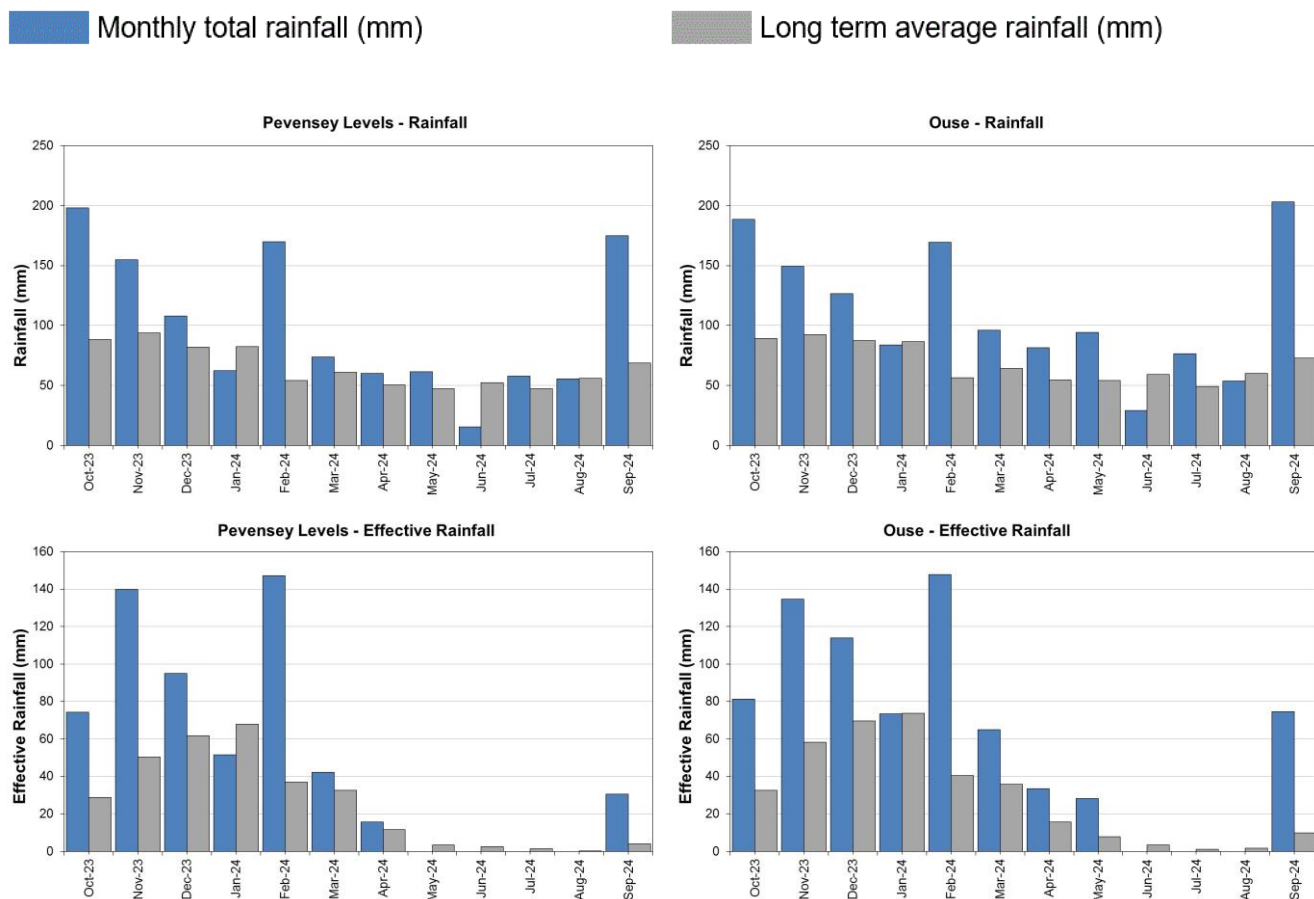


Source: Environment Agency, 2024.

7 East Sussex

7.1 East Sussex Rainfall and Effective Rainfall charts

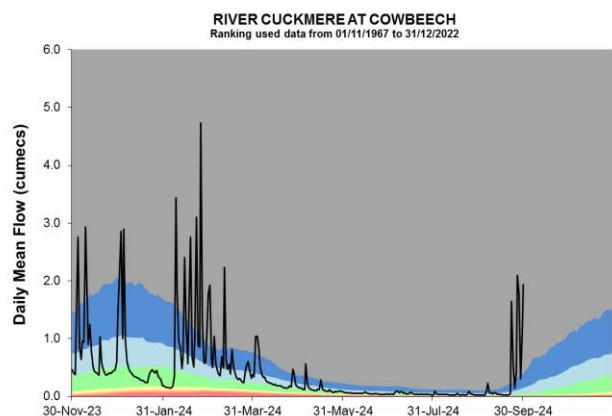
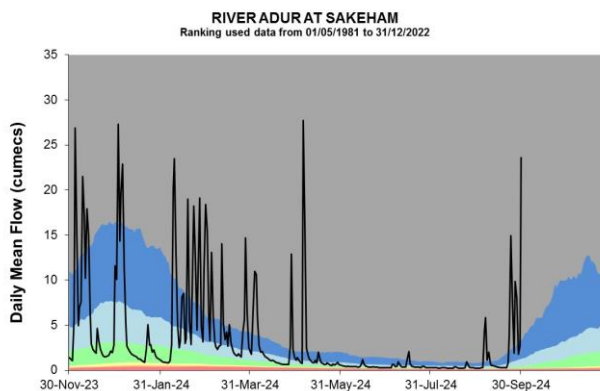
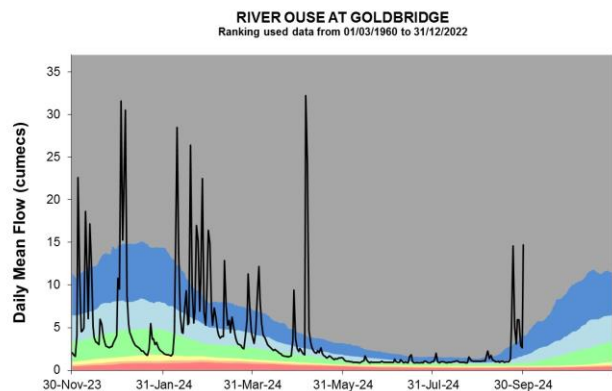
Figure 7.1: Monthly rainfall and effective rainfall totals for the past 12 months compared to the 1961 to 1990 long term average.



HadUK rainfall data. (Source: Met Office. Crown copyright, 2024).

7.2 East Sussex River flow charts

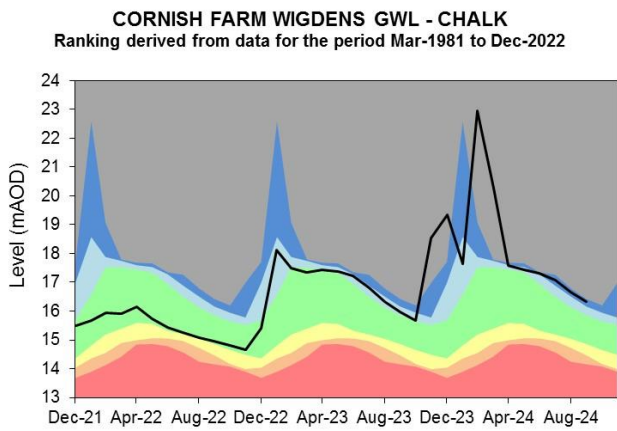
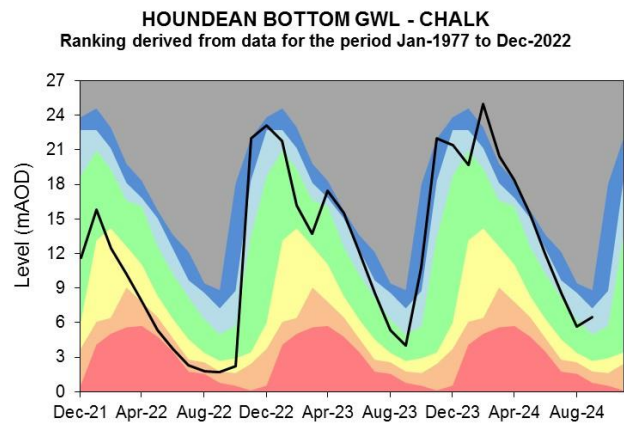
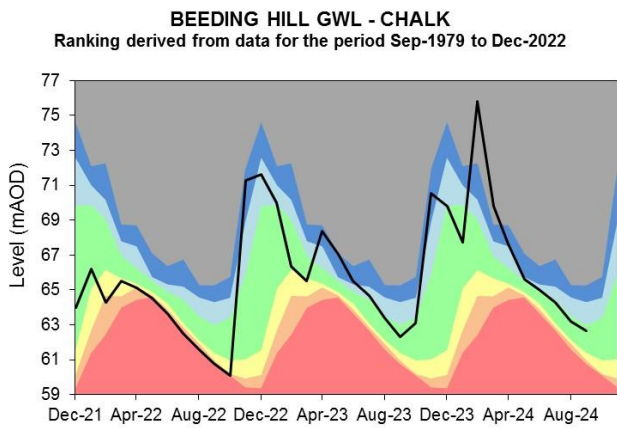
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Source: Environment Agency, 2024.

7.3 East Sussex Groundwater level charts

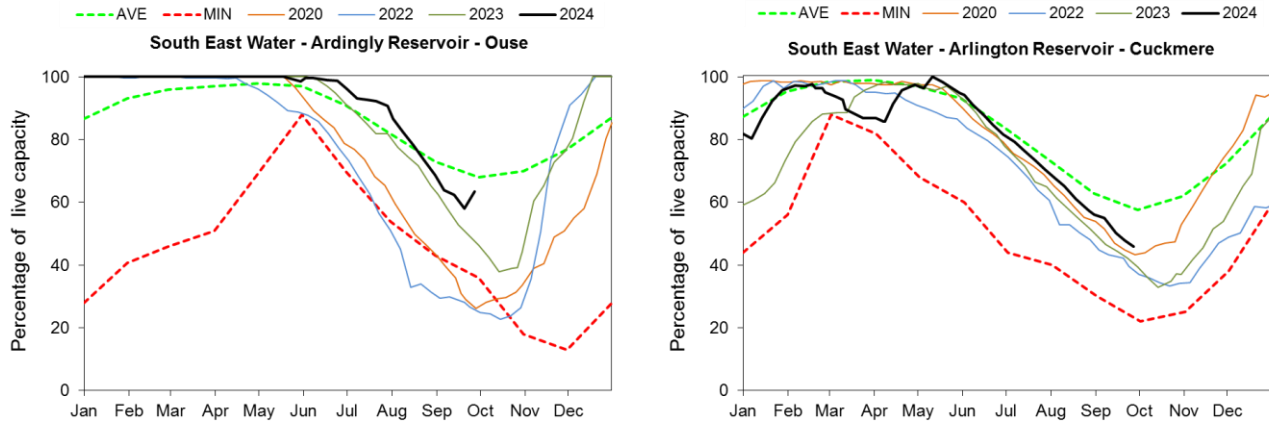
Figure 7.3: End of month groundwater levels at index groundwater level sites for major aquifers. 34 months compared to an analysis of historic end of month levels and long term maximum and minimum levels.



Source: Environment Agency, 2024.

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, 2024). All rights reserved. Environment Agency, 100024198, 2024

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 September as %LTA	Effective Rainfall (mm) 30 day Total	Effective Rainfall September as %LTA	Soil Moisture Deficit (SMD) Day 30	SMD End of September LTA
Test Chalk	205	302%	60	662%	1	91
East Hampshire Chalk	169	219%	31	209%	1	82
West Sussex Chalk	168	214%	33	217%	1	78
East Sussex Chalk	205	282%	71	615%	1	83
Isle of Wight	163	233%	20	230%	16	97
Western Rother Greensand	154	195%	18	117%	5	79
Hampshire Tertiaries	163	235%	11	248%	1	88
Lymington	158	223%	12	214%	1	81
Sussex Coast	129	203%	0	0%	30	97
Arun	155	214%	8	83%	1	77
Adur	158	221%	17	207%	1	74
Ouse	203	280%	75	757%	1	70
Cuckmere	194	272%	71	880%	1	69
Pevensey Levels	175	256%	30	756%	0	79
SSD Average	171	239%	33	363%	4	82

10.2 Seasonal summary table of rainfall and effective rainfall

Summer season: 01/04/2024 to 30/09/2024

Hydrological Area	Seasonal Rainfall (mm) Total	Seasonal Rainfall as % LTA	Seasonal Effective Rainfall (mm) Total	Seasonal Effective Rainfall as % LTA
Test Chalk	505	146%	113	229%
East Hampshire Chalk	506	137%	98	158%
West Sussex Chalk	504	136%	107	152%
East Sussex Chalk	538	156%	139	247%
Isle of Wight	464	142%	86	182%
Western Rother Greensand	490	131%	97	137%
Hampshire Tertiaries	458	138%	51	241%
Lymington	455	135%	54	196%
Sussex Coast	396	129%	31	168%
Arun	442	127%	57	145%
Adur	461	134%	74	195%
Ouse	538	154%	136	348%
Cuckmere	499	147%	101	307%
Pevensey Levels	425	132%	46	198%
SSD Average	477	139%	85	200%

10.3 Rainfall banding table

Hydrological area	Sep 2024 band	Jul 2024 to Sep 2024 cumulative band	Apr 2024 to Sep 2024 cumulative band	Oct 2023 to Sep 2024 cumulative band
Test Chalk	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
East Hampshire Chalk	Exceptionally high	Notably high	Notably high	Exceptionally high
West Sussex Chalk	Notably high	Notably high	Notably high	Exceptionally high
East Sussex Chalk	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
Isle of Wight	Exceptionally high	Exceptionally high	Above normal	Exceptionally high
Western Rother Greensand	Notably high	Above normal	Notably high	Exceptionally high
Hampshire Tertiaries	Exceptionally high	Notably high	Notably high	Exceptionally high
Lymington	Exceptionally high	Notably high	Notably high	Exceptionally high
Sussex Coast	Notably high	Notably high	Notably high	Exceptionally high
Arun	Exceptionally high	Notably high	Notably high	Exceptionally high
Adur	Exceptionally high	Notably high	Notably high	Exceptionally high
Ouse	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
Cuckmere	Exceptionally high	Exceptionally high	Exceptionally high	Exceptionally high
Pevensey Levels	Exceptionally high	Exceptionally high	Notably high	Exceptionally high

10.4 River flows table

Site name	River	Catchment	Sep 2024 band	Aug 2024 band
Alfoldean Gs	Arun	Arun	Exceptionally high	No data
Allbrook Gs+ Highbridge	Itchen (so)	Itchen	Exceptionally high	Exceptionally high
Blackwater	Medina	Isle of Wight	Exceptionally high	Normal
Broadlands	Test	Test Lower	Exceptionally high	Normal
Brockenhurst GS	Lymington	New Forest	Exceptionally high	Normal
Chilbolton GS	Test	Test Upper	Notably high	Above normal
Cowbeech Gs	Cuckmere	Cuckmere	Exceptionally high	Normal
Goldbridge Gs	Ouse [so]	Ouse Sussex	Notably high	Notably high
Iping Mill Gs	Rother	West Rother	Notably high	Above normal
Mislingford GS	Meon	Meon	Above normal	Above normal
North Fareham GS	Wallington	Wallington	Above normal	Normal
Sakeham GS	Adur	Adur	Exceptionally high	Normal

10.5 Groundwater table

Site name	Aquifer	End of Sep 2024 band	End of Aug 2024 band
Houndean Bottom Gwl	Brighton Chalk Block	Above normal	Normal
Chilgrove House Gwl	Chichester-Worthing-Portsdown Chalk	Normal	Normal
Carisbrooke Castle	Isle Of Wight Central Downs Chalk	Above normal	Normal
West Meon Hut Gwl	River Itchen Chalk	Notably high	Notably high
Clanville Gate Gwl	River Test Chalk	Exceptionally high	Notably high
Lopcombe Corner Gwl	River Test Chalk	Notably high	Notably high
Beeding Hill Gwl	Brighton Chalk Block	Normal	Normal
Catherington	River Meon Chalk	Above normal	Above normal
Cornish Wigdens Gwtr	Eastbourne Chalk Block	Notably high	Notably high
Harting Common Down	Western Rother Lower Greensand	Above normal	Normal
Preston Candover	River Itchen Chalk	Exceptionally high	Exceptionally high
Youngwoods Copse	Isle of Wight Lower Greensand	Exceptionally high	Exceptionally high

10.6 Abstraction licence flow constraints

Number of flow constraints in force between 1 to 9 September 2024	Number of flow constraints in force between 10 to 16 September 2024	Number of flow constraints in force between 17 to 23 September 2024	Number of flow constraints in force between 24 to 30 September 2024
3	2	4	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	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