

Monthly water situation report: Thames Area

1 Summary - September 2024

Thames area received 193mm of rainfall in September, 317% of the long term average (LTA); making it the wettest month since records began in 1871. Following the high rainfall, soil moisture deficits (SMDs) were reduced to zero and this resulted in high effective rainfall of 50mm (LTA is 5mm). Monthly mean flows increased at all our sites and 4 measured their highest ever September flows since site records began. Due to the heavy rainfall, the seasonal declining trend of groundwater levels reversed at the majority of our indicator sites in September, which is earlier than normal. 51 flood alerts and 15 flood warnings were issued on rivers during September.

1.1 Rainfall

Thames area experienced its wettest month since records began in 1871. Overall, Thames area received 193mm of rainfall during the month (317% of the LTA) and over a third of this fell on just 2 days - 22 and 23 September. The highest daily total of 93.2mm was recorded at Stokenchurch (Chilterns West) on 22 September. Over the past 12 months, Thames area recorded exceptionally high rainfall in every areal unit and during the summer period (April to September inclusive), the area received 146% of LTA rainfall.

1.2 Soil moisture deficit and recharge

High rainfall during the month cleared the above average SMDs recorded in August and resulted in SMDs of 0 or 1mm being recorded in every areal unit except for one. This was considerably below the LTA of 88mm, which means that soils were wetter than usual for the time of year. The saturated soils enabled high effective rainfall of 50mm, compared to the September LTA of 5mm.

1.3 River flows

Monthly mean river flows increased at all our indicator sites in September following the high rainfall. Exceptionally high flows were recorded at all sites except 2, both of which recorded notably high flows. Four of our sites measured their highest ever September flows since site records began: Abingdon, River Ock (since 1963); Banbury, River Cherwell (since 1967); Bourne End (Hedsor), River Wye (since 1965); and Wheatley, River Thame (since 1989).

1.4 Groundwater levels

Following the above average rainfall, groundwater levels increased at the majority of our sites, although it would be expected that most sites would continue their seasonal decline during September. Groundwater levels at sites located in the slower responding Chalk aquifers

started to show early signs of recovery towards the end of the month. Exceptionally high groundwater levels were recorded at 5 sites, with the rest recording notably high levels for the time of year due to the exceptionally high rainfall recorded over the past 12 months.

1.5 Reservoir stocks

Reservoir stocks decreased at both Farmoor and Lower Thames. At the end of September, Farmoor reservoir was 87.5% full, slightly below the LTA. The Lower Thames reservoir was 79.8% full, which was slightly above the LTA.

1.6 Environmental impact

During September, there were 51 flood alerts and 15 flood warnings issued on rivers in Thames area. At the end of the month, 0 abstraction licences were being constrained in the area to protect water resources and the environment.

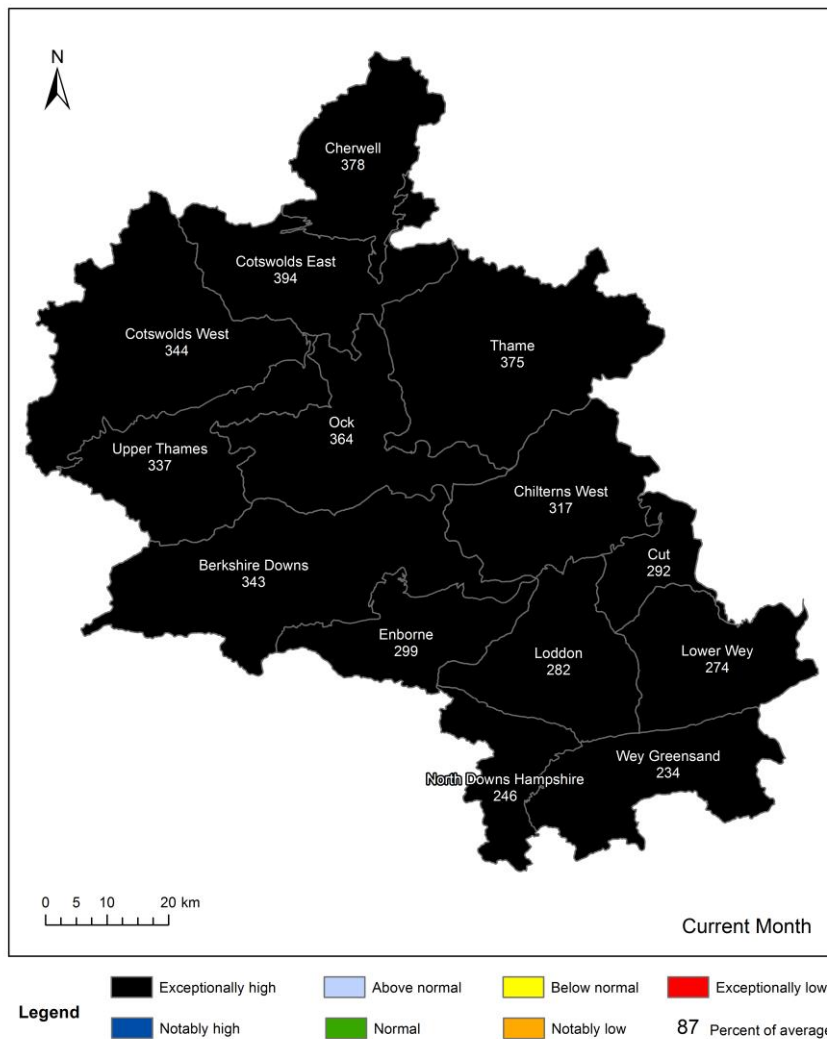
Author: Thames Area Groundwater Resources and Hydrology, enquiriesWT@environment-agency.gov.uk

Contact Details: 030708 506 506

2 Rainfall

2.1 Rainfall map

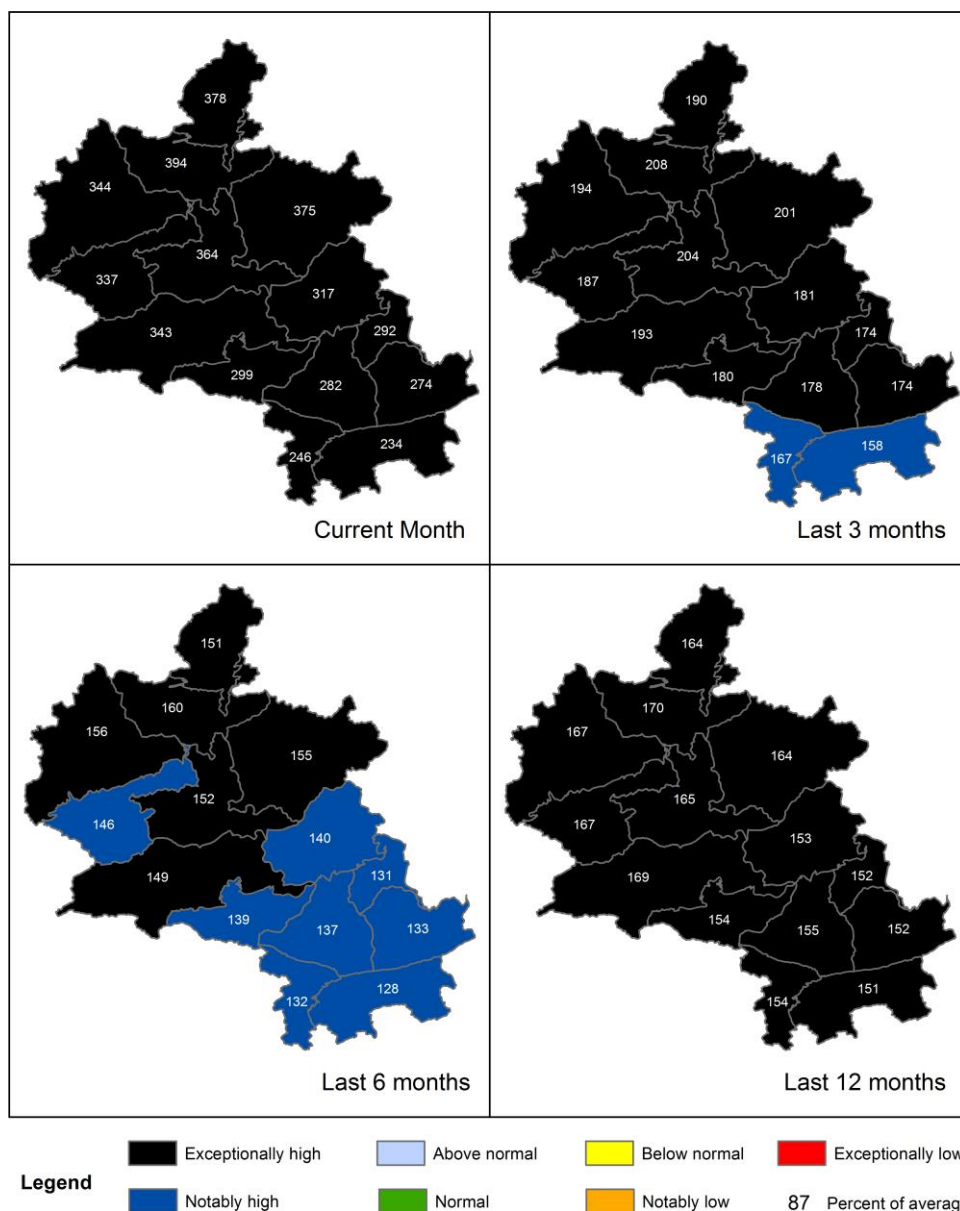
Figure 2.1: Total rainfall for hydrological areas for the current month (up to 30 September 2024), classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.



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, 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).

2.2 Rainfall map (2)

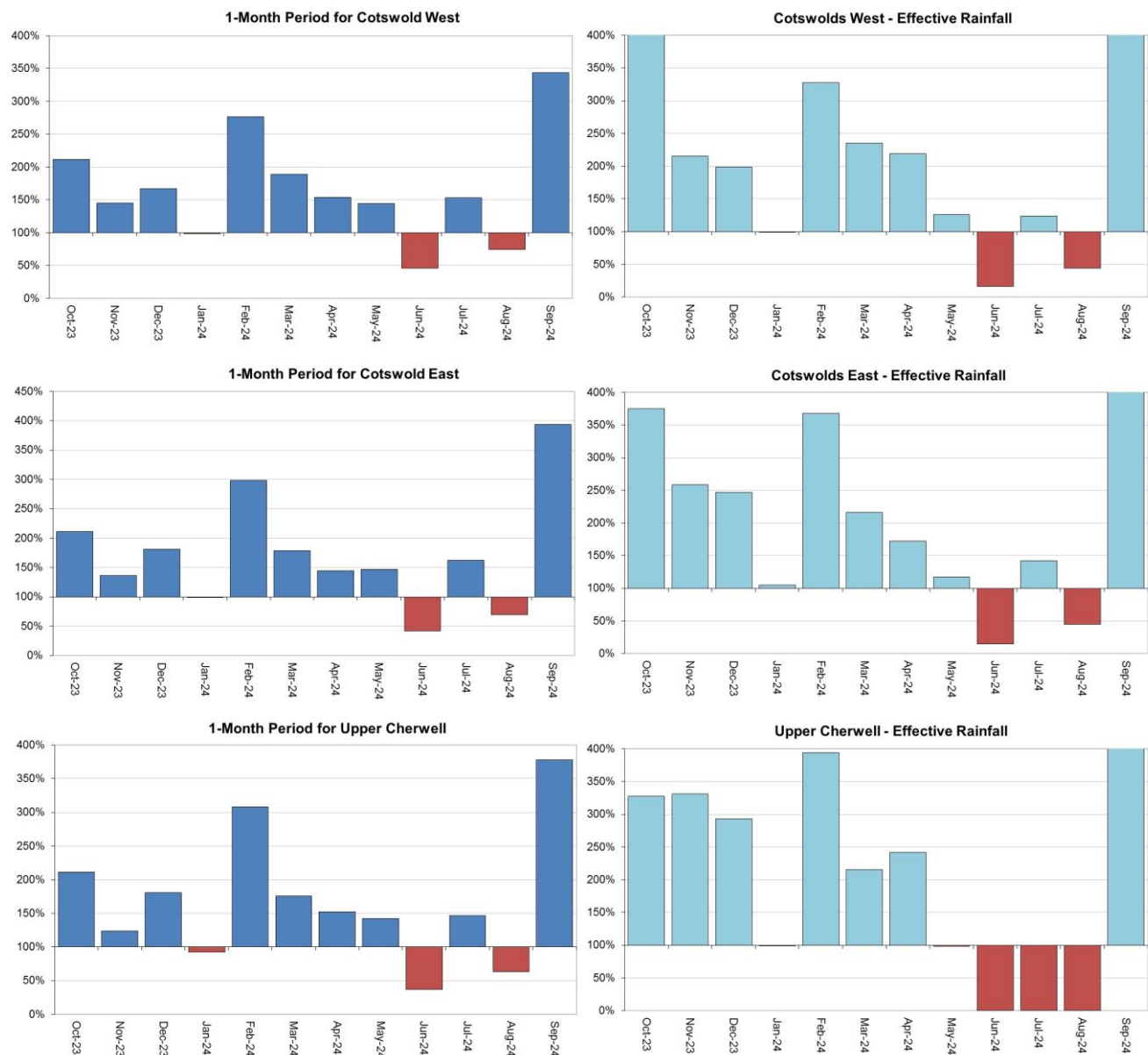
Figure 2.2: Total rainfall for hydrological areas for the current month (up to 30 September 2024), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.



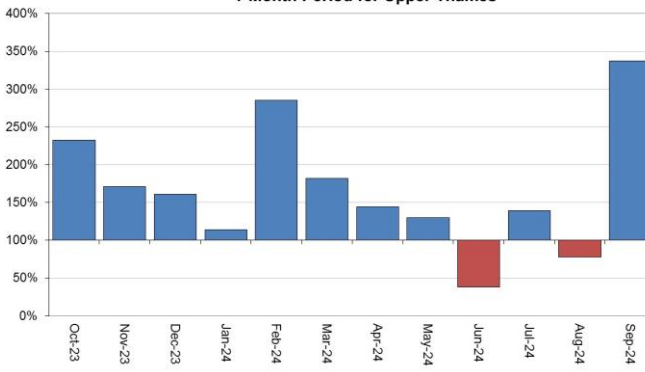
HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2024). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved. Environment Agency, 100024198, 2024.

2.3 Rainfall charts

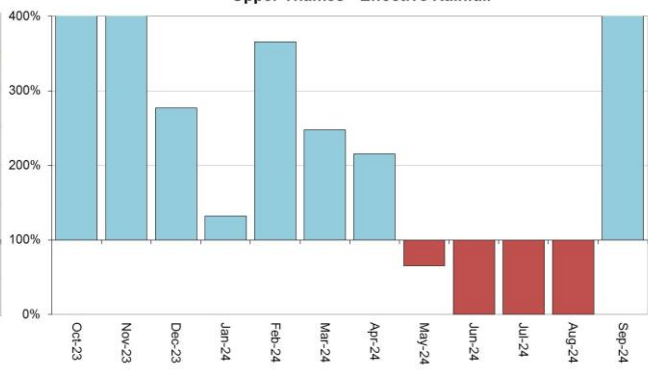
Figure 2.3: Monthly rainfall totals for the past 12 months as a percentage of the 1961 to 1990 long term average for each areal unit.



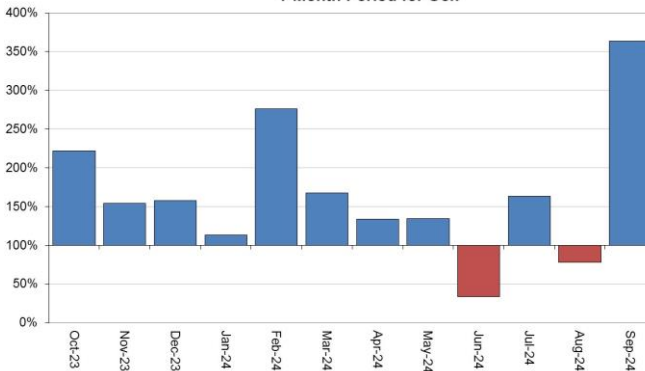
1-Month Period for Upper Thames



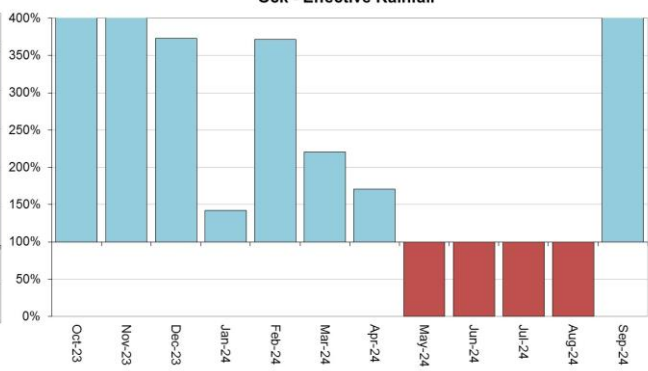
Upper Thames - Effective Rainfall



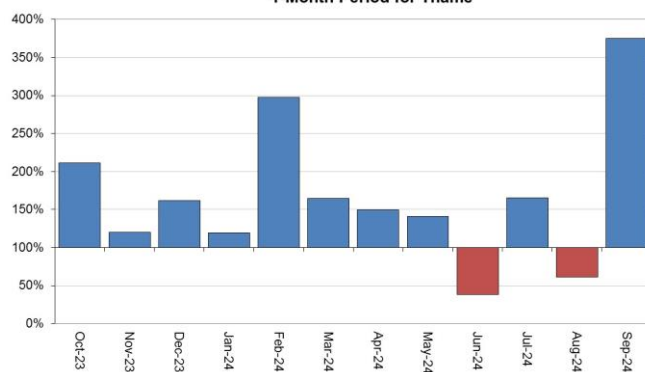
1-Month Period for Ock



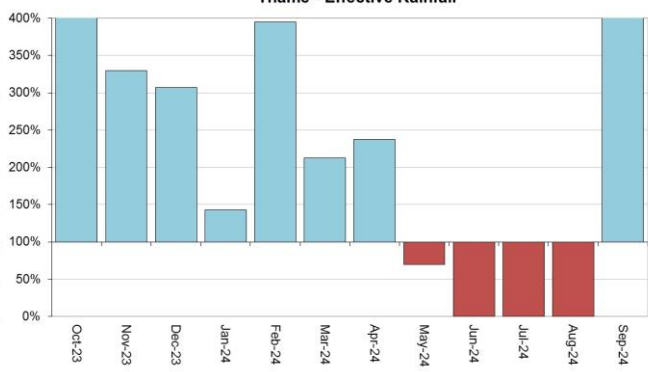
Ock - Effective Rainfall



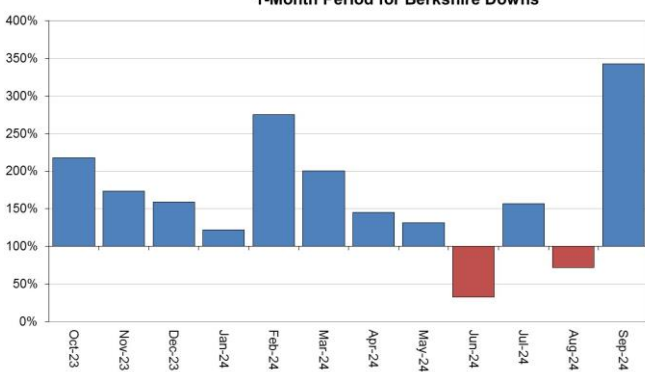
1-Month Period for Thame



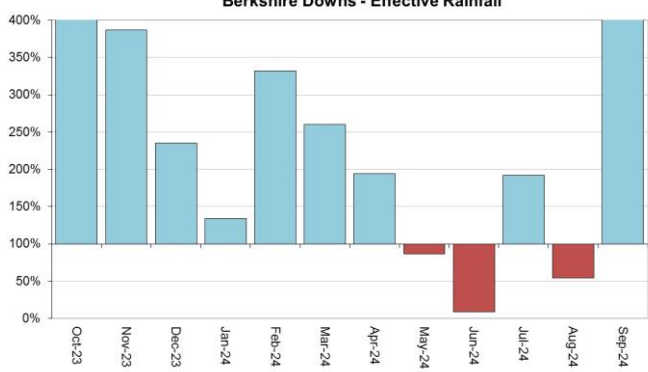
Thame - Effective Rainfall



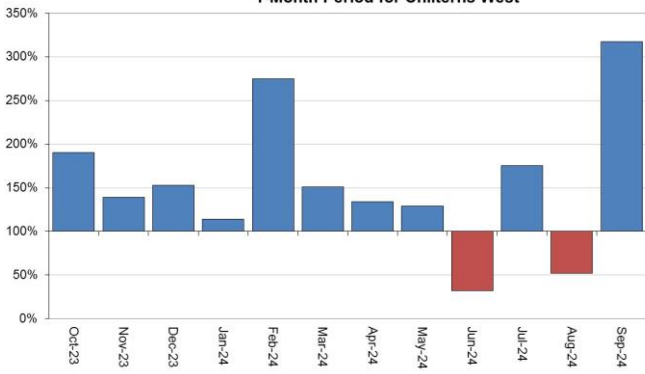
1-Month Period for Berkshire Downs



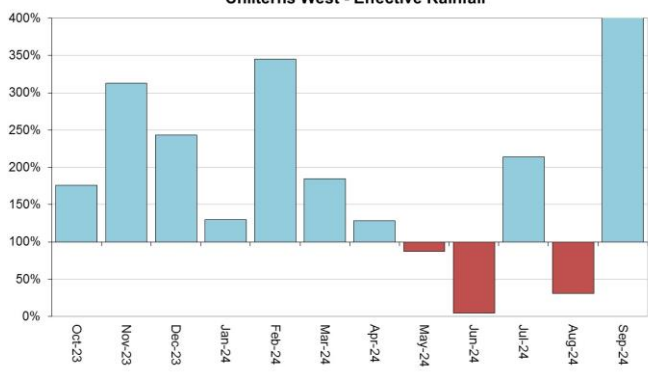
Berkshire Downs - Effective Rainfall



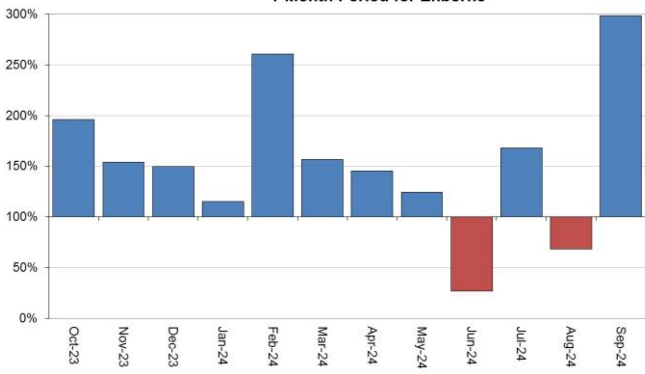
1-Month Period for Chilterns West



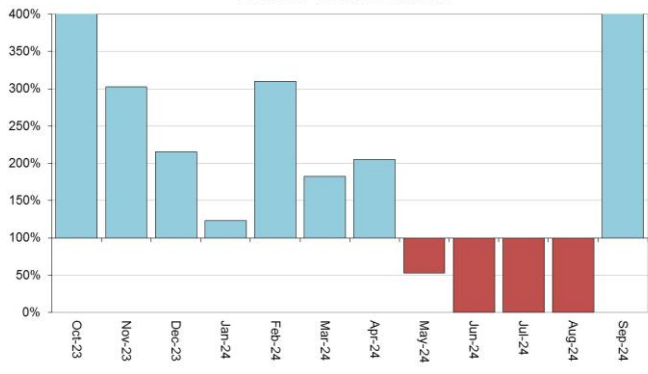
Chilterns West - Effective Rainfall



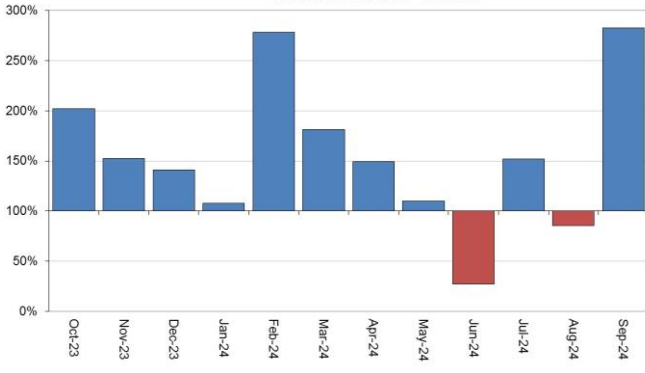
1-Month Period for Enborne



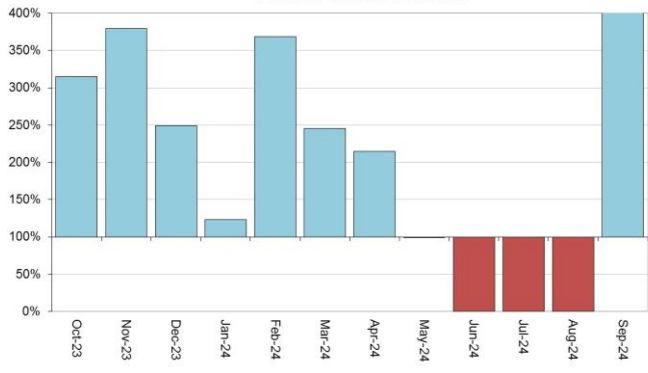
Enborne - Effective Rainfall



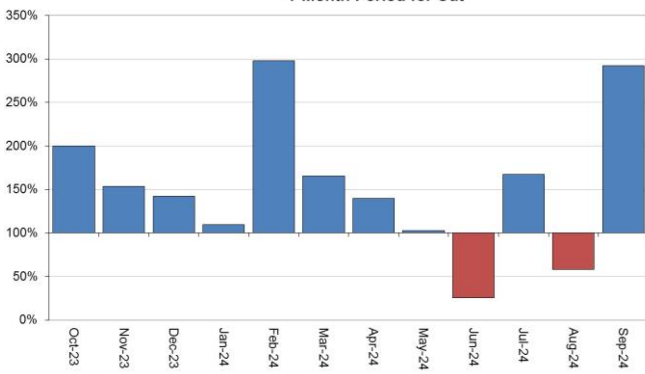
1-Month Period for Loddon



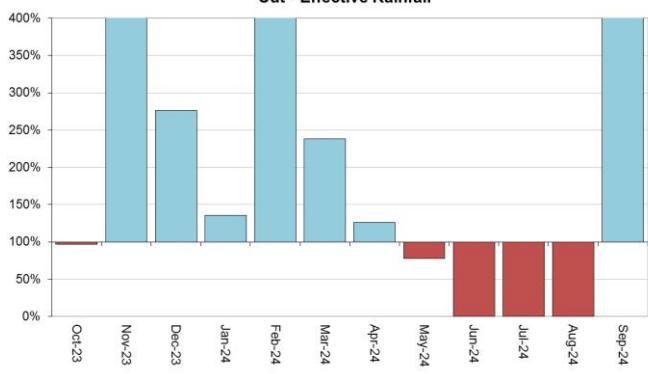
Loddon - Effective Rainfall

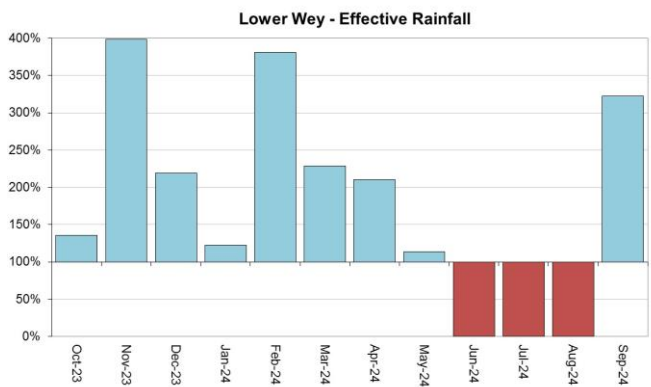
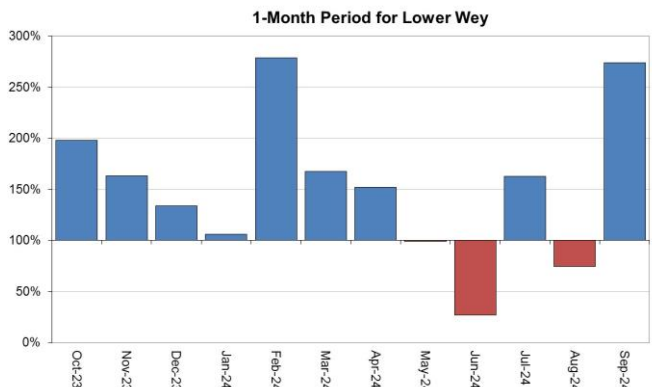
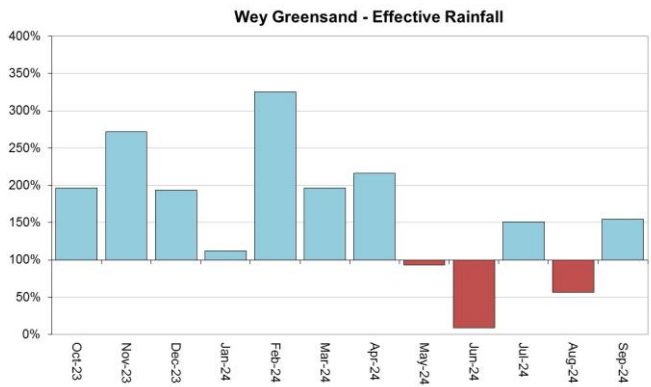
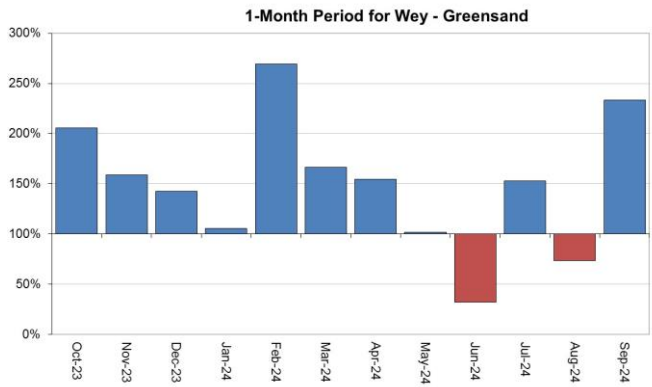
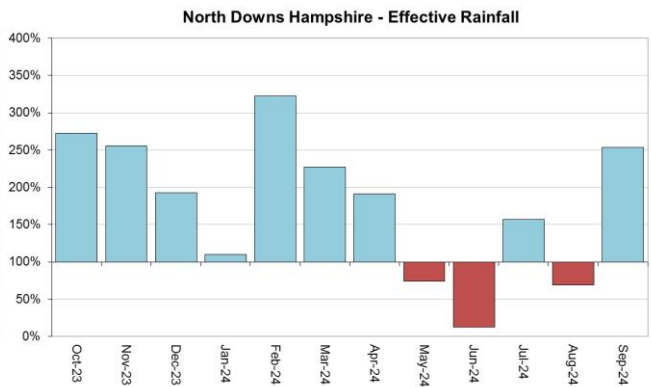
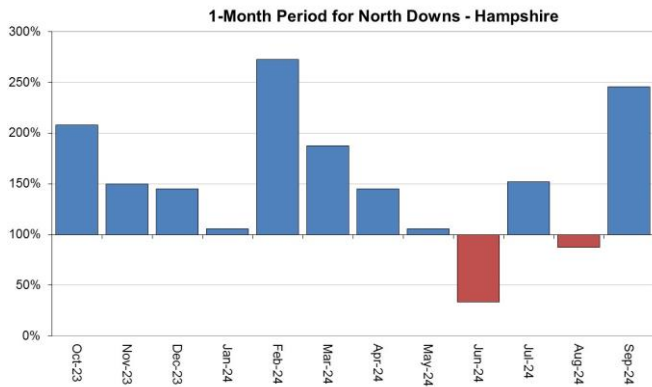


1-Month Period for Cut



Cut - Effective Rainfall





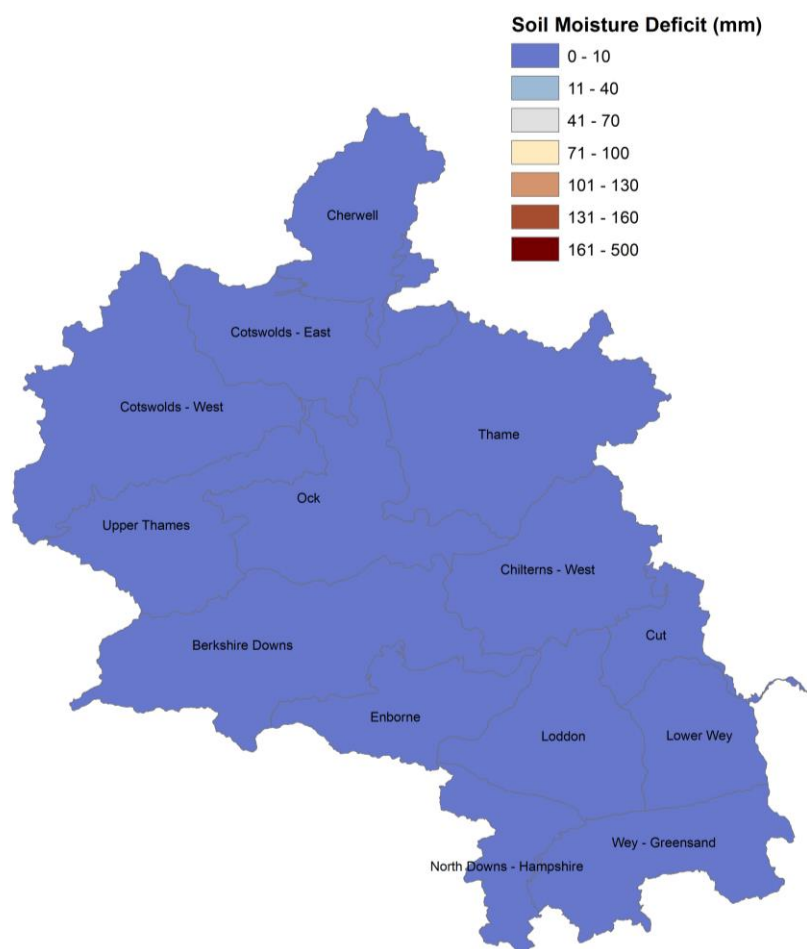
HadUK rainfall data. (Source: Met Office. Crown copyright, 2024).

EA effective rainfall data (Source: EA Soil Moisture Model)

3 Soil moisture deficit

3.1 Soil moisture deficit map

Figure 3.1: Soil moisture deficits for the week ending 30 September 2024. Shows the areal SMD estimate in millimetres.

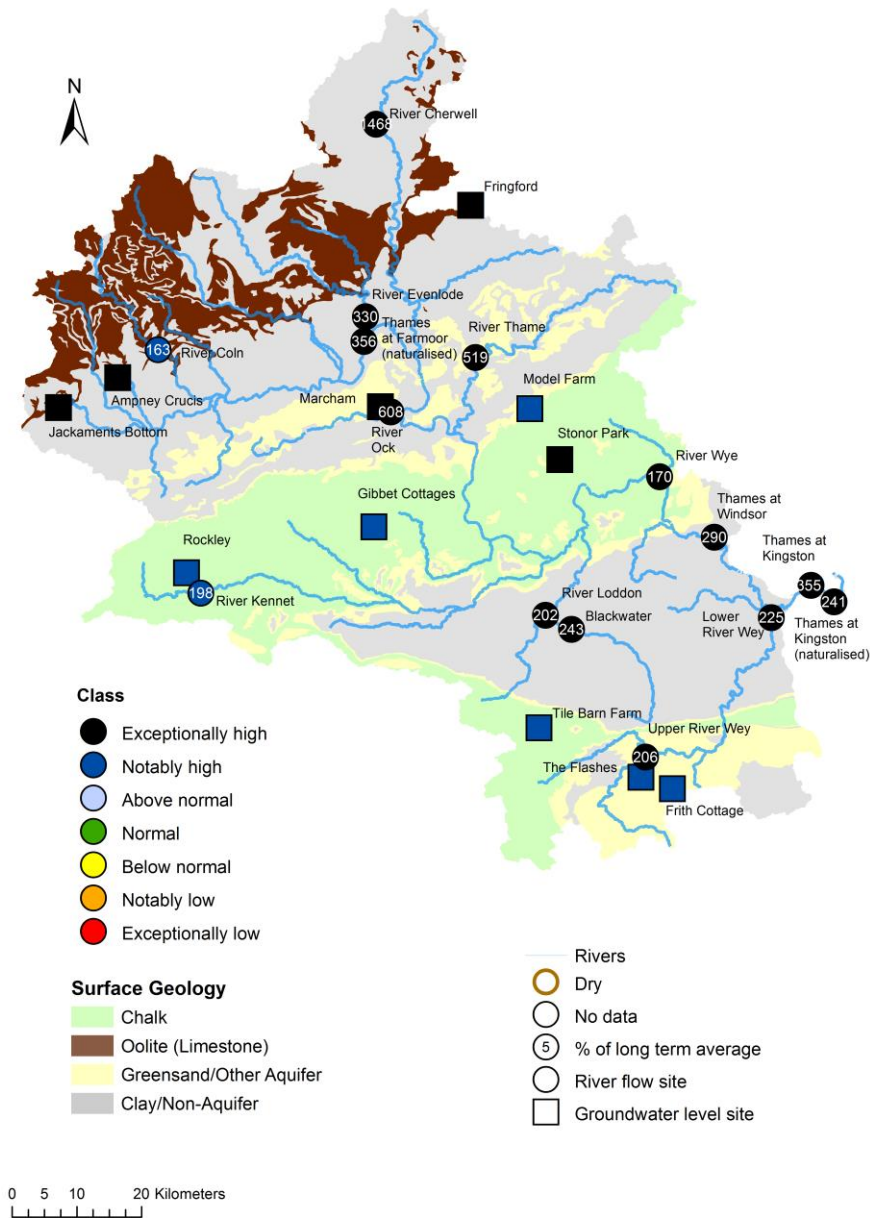


(Source: Met Office. Crown copyright, 2024). All rights reserved. Environment Agency, 100024198, 2024.

4 River Flow and Groundwater Status

4.1 River flow and groundwater level map

Figure 4.1: Monthly mean river flow for indicator sites and end of month groundwater levels for indicator sites for September 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic September means.

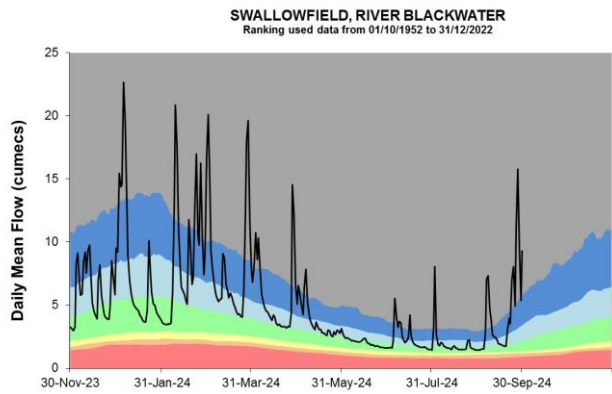
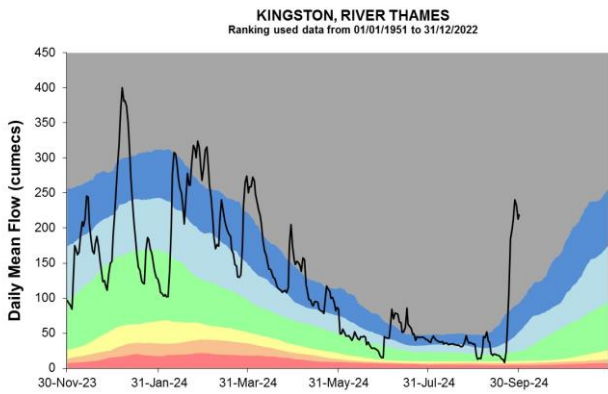
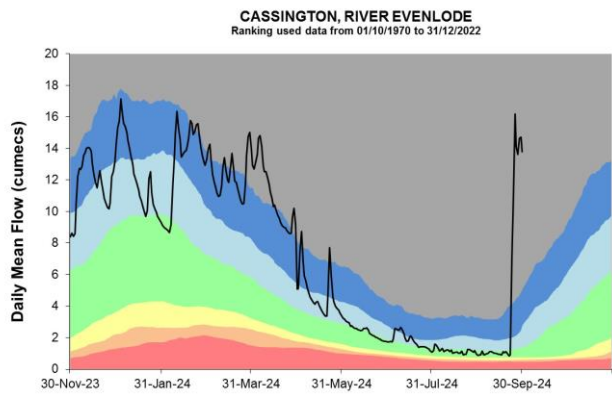
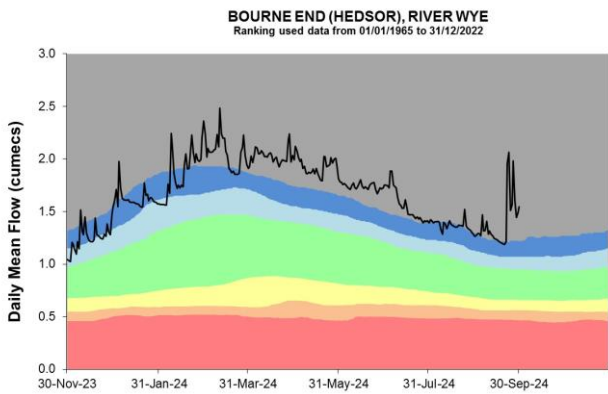
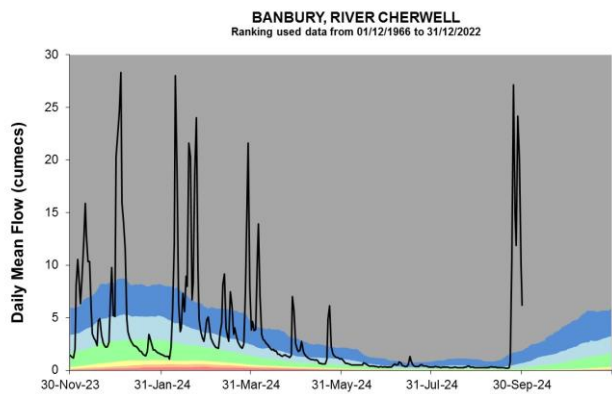
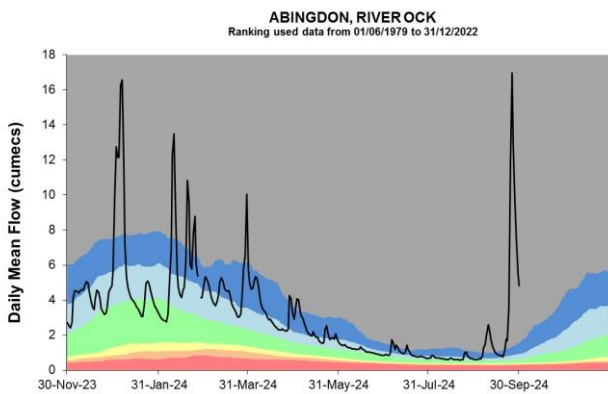
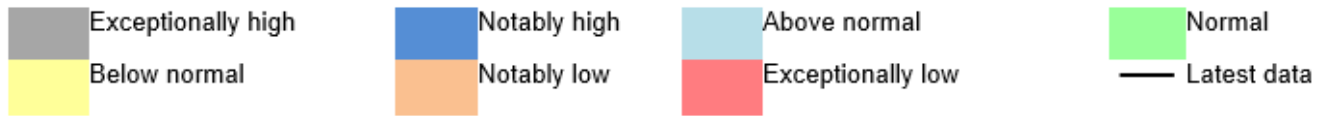


(Source: Environment Agency). Crown copyright. All rights reserved. Environment Agency, 100024198, 2024.

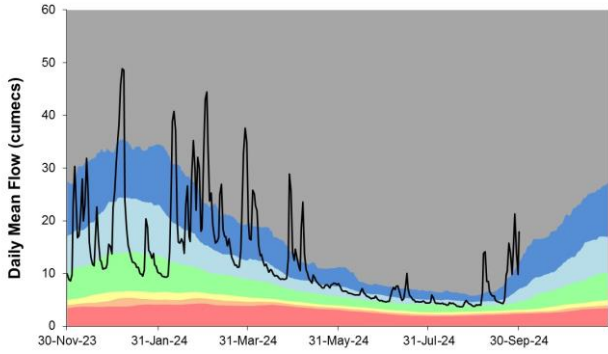
5 River flows

5.1 River flow charts

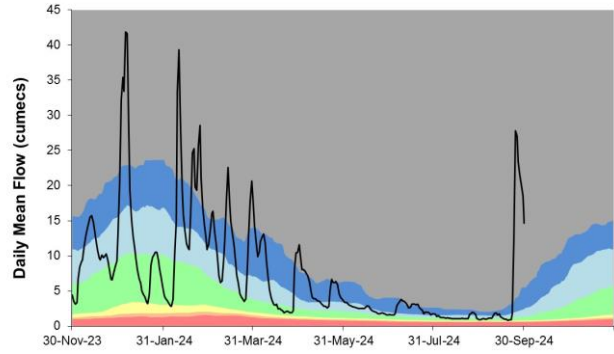
Figure 5.1: Daily mean river flows for indicator sites compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



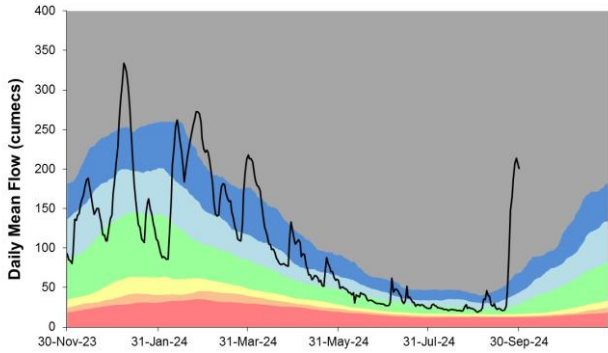
WEYBRIDGE, RIVER WEY
Ranking used data from 01/04/1979 to 31/12/2022



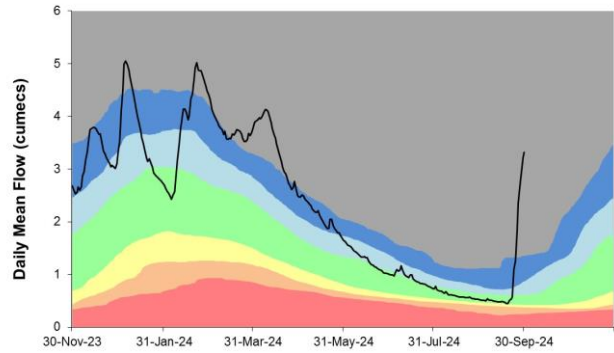
WHEATLEY, RIVER THAME
Ranking used data from 01/01/1990 to 31/12/2022



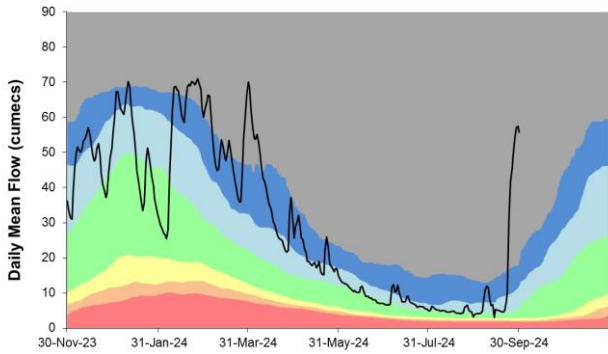
WINDSOR, RIVER THAMES
Ranking used data from 01/08/1979 to 31/12/2022



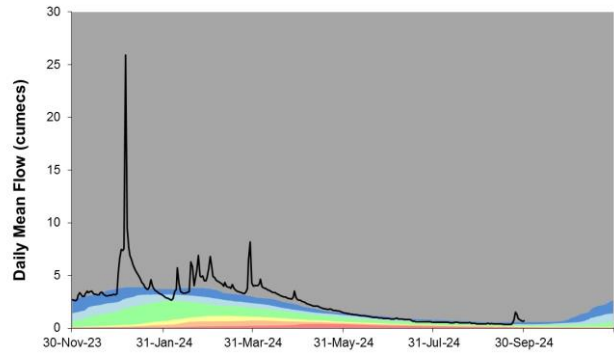
BIBURY, RIVER COLN
Ranking used data from 01/10/1963 to 31/12/2022

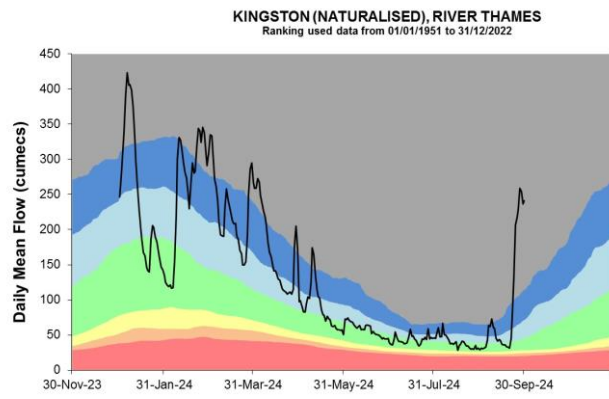
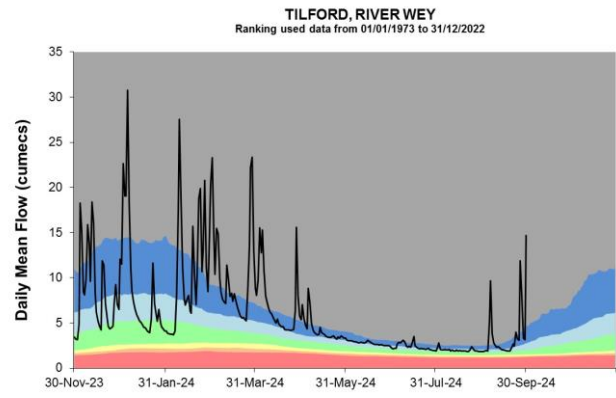
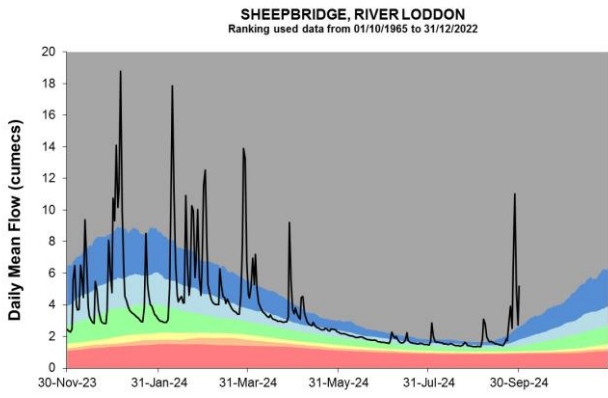


FARMOOR (NATURALISED), RIVER THAMES
Ranking used data from 01/10/1992 to 31/12/2022



MARLBOROUGH, RIVER KENNET
Ranking used data from 01/02/1972 to 31/12/2022



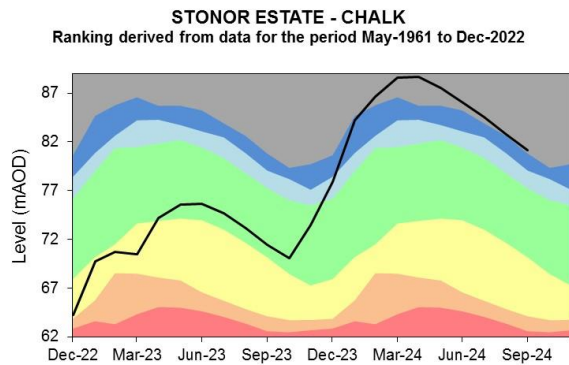
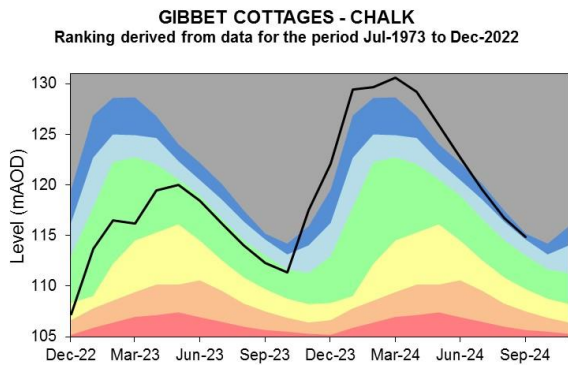
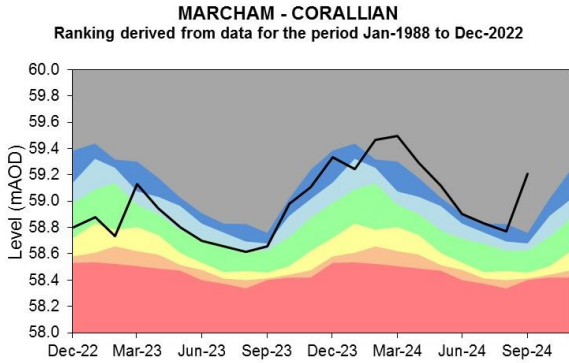
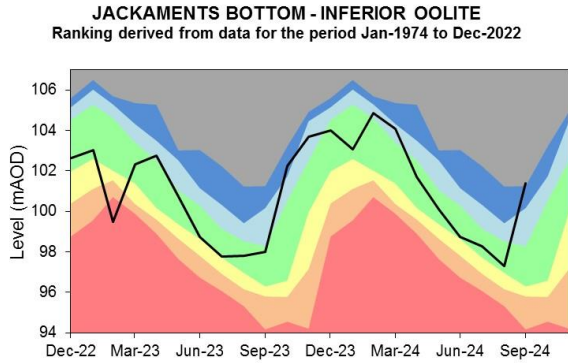
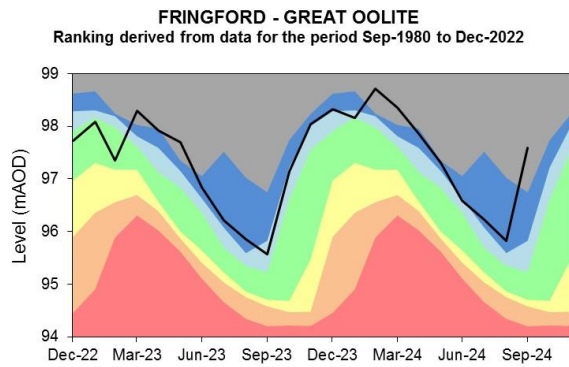
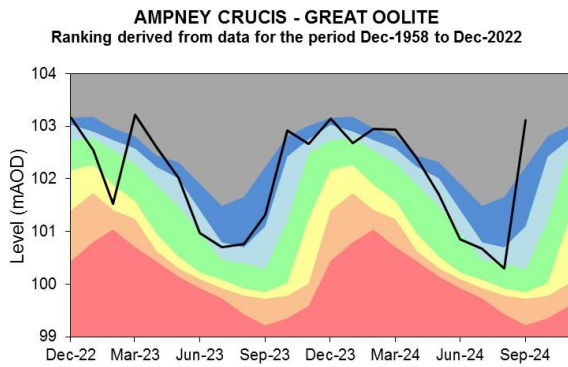
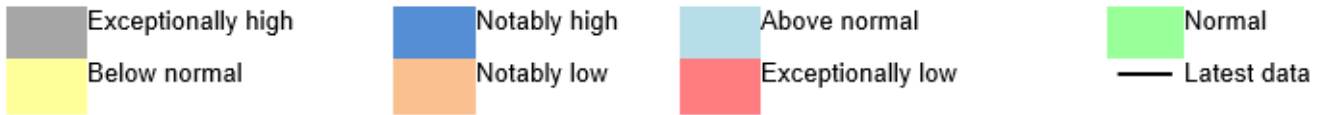


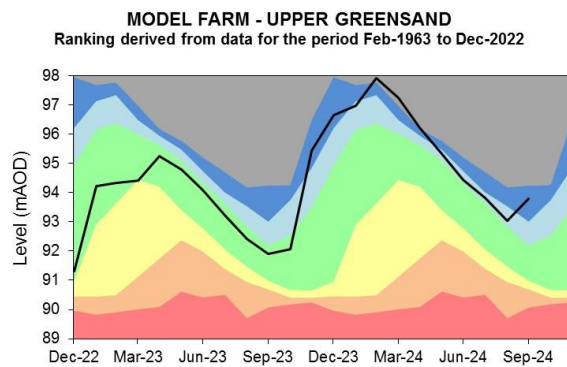
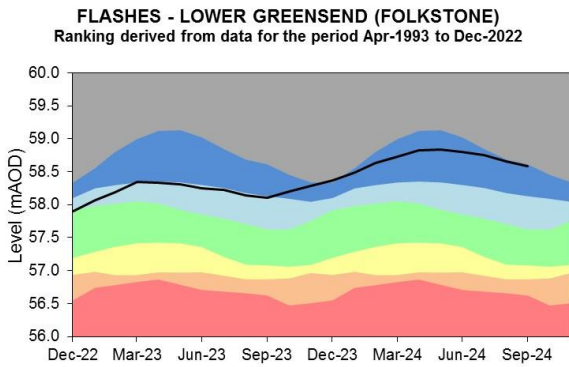
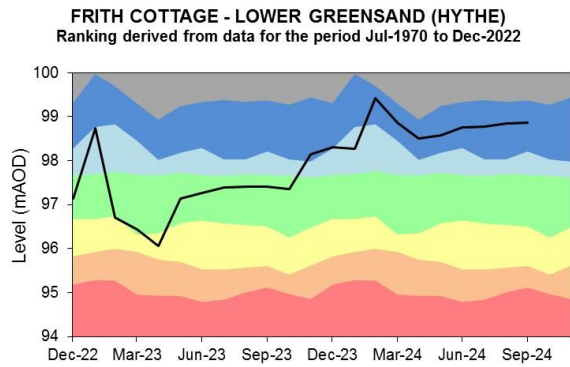
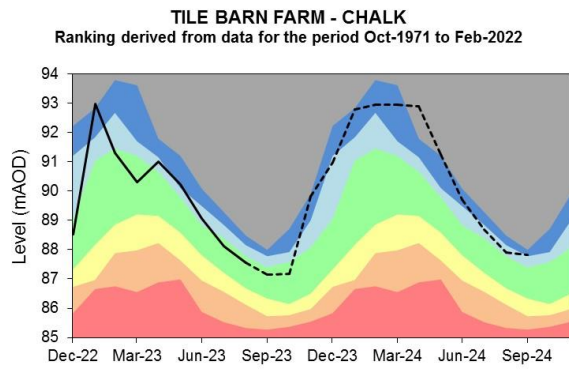
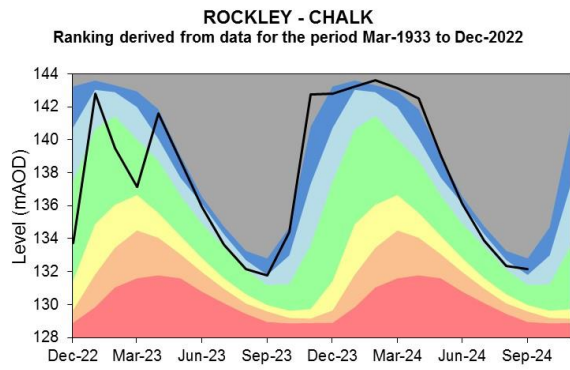
Source: Environment Agency.

6 Groundwater levels

6.1 Groundwater level charts

Figure 6.1: End of month groundwater levels for indicator sites, compared to an analysis of historic end of month levels, and long term maximum and minimum levels.



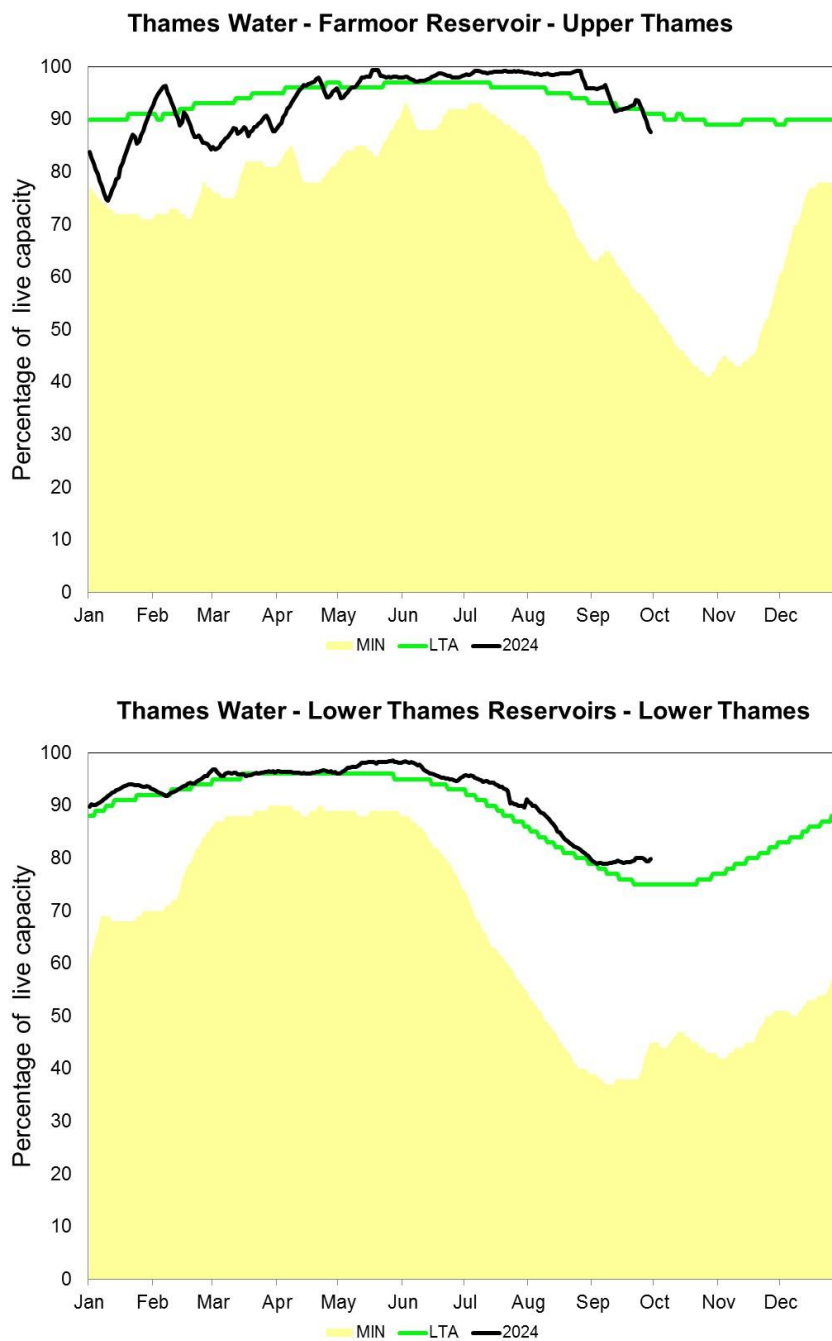


*Tile Barn Farm data has been estimated from two local sites since April 2022. A replacement is planned

Source: Environment Agency, 2024.

7 Reservoir stocks

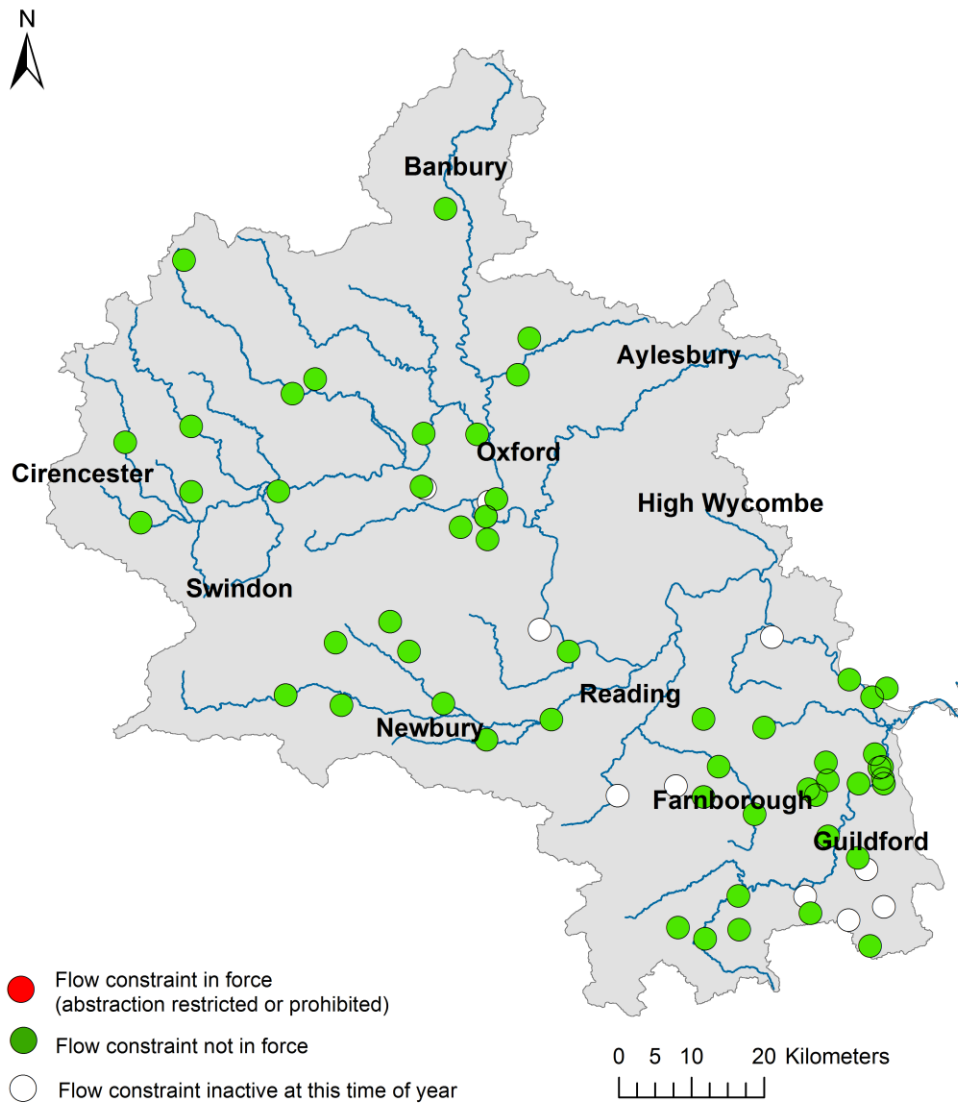
Figure 7.1: End of month regional reservoir stocks compared to minimum and average stocks.



(Source: water companies).

8 Flow Constraints

8.1 Figure 8.1: End of month flow constraints in Thames Area.



8.2 Summary of flow constraints

Week ending	01/09/24	08/09/24	15/09/24	22/09/24	29/09/24
Number of flow constraints in force	22	5	20	4	0

9 Summary of rainfall, effective rainfall and soil moisture deficit

9.1 Rainfall and effective rainfall

Area	Rainfall (mm) 30 day Total	Rainfall (mm) September LTA	Rainfall (mm) % LTA	Effective Rainfall (mm) 30 day total	Effective Rainfall (mm) September LTA	Effective Rainfall (mm) % LTA
Cotswolds - West	232	68	344	123	11	400+
Cotswolds - East	226	57	393	114	8	400+
Berkshire Downs	220	64	344	77	8	400+
Chilterns - West	196	62	318	48	8	400+
North Downs - Hampshire	179	73	246	32	13	253
Wey - Greensand	167	72	233	20	13	154
Upper Thames	194	57	338	43	1	400+
Cherwell	210	55	379	75	2	400+
Thame	207	55	376	66	2	400+
Loddon	168	59	283	14	2	400+
Lower Wey	161	59	274	8	2	322
Ock	194	53	363	44	1	400+
Enborne	184	62	296	36	2	400+
Cut	165	56	293	4	1	400+
Thames Area	193	61	317	50	5	400+

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

EA effective rainfall data (Source: EA Soil Moisture Model)

9.2 Soil moisture deficit

Area	SMD (mm) Day 30	SMD (mm) LTA
Cotswolds - West	0	55
Cotswolds - East	0	64
Berkshire Downs	1	90
Chilterns - West	0	94
North Downs - Hampshire	1	89
Wey - Greensand	4	87
Upper Thames	1	95
Cherwell	0	81
Thame	0	91
Loddon	1	97
Lower Wey	1	92
Ock	1	102
Enborne	1	88
Cut	1	102
Thames Area	1	88

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

EA effective rainfall data (Source: EA Soil Moisture Model)

9.3 Summer rainfall and effective rainfall

Summer period: 01/04/2024 to 30/09/2024						
Area	Rainfall (mm) Total	Rainfall (mm) LTA	Rainfall (mm) % LTA	Effective Rainfall (mm) Total	Effective Rainfall (mm) LTA	Effective Rainfall (mm) % LTA
Cotswolds - West	569	364	156	190	64	294
Cotswolds - East	526	329	160	159	50	318
Berkshire Downs	519	347	149	125	49	255
Chilterns - West	477	341	140	86	49	177
North Downs - Hampshire	479	361	133	86	59	146
Wey - Greensand	458	358	128	82	62	132
Upper Thames	467	320	146	61	14	438
Cherwell	498	331	150	106	21	505
Thame	491	316	156	91	17	536
Loddon	434	315	138	38	17	222
Lower Wey	416	312	133	34	20	173
Ock	457	301	152	55	12	456
Enborne	458	331	138	61	20	299
Cut	409	311	131	18	15	115
Thames Area	476	331	143	85	34	254

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

EA effective rainfall data (Source: EA Soil Moisture Model)

10 Glossary

10.1 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).

10.2 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.

11 Appendices

11.1 Rainfall table

Hydrological area	Sep 2024 rainfall % of long term average 1961 to 1990	Sep 2024 band	Jul 2024 to September cumulative band	Apr 2024 to September cumulative band	Oct 2023 to September cumulative band
Berkshire Downs	343	Exceptionally High	Exceptionally high	Exceptionally high	Exceptionally high
Chilterns West	317	Exceptionally High	Exceptionally high	Notably high	Exceptionally high
Cotswold East	394	Exceptionally High	Exceptionally high	Exceptionally high	Exceptionally high
Cotswold West	344	Exceptionally High	Exceptionally high	Exceptionally high	Exceptionally high
Cut	292	Exceptionally High	Exceptionally high	Notably high	Exceptionally high
Enborne	299	Exceptionally High	Exceptionally high	Notably high	Exceptionally high
Loddon	282	Exceptionally High	Exceptionally high	Notably high	Exceptionally high
Lower Wey	274	Exceptionally High	Exceptionally high	Notably high	Exceptionally high
North Downs - Hampshire	246	Exceptionally High	Notably high	Notably high	Exceptionally high
Ock	364	Exceptionally High	Exceptionally high	Exceptionally high	Exceptionally high

Thame	375	Exceptionally High	Exceptionally high	Exceptionally high	Exceptionally high
Upper Cherwell	378	Exceptionally High	Exceptionally high	Exceptionally high	Exceptionally high
Upper Thames	337	Exceptionally High	Exceptionally high	Notably high	Exceptionally high
Wey - Greensand	234	Exceptionally High	Notably high	Notably high	Exceptionally high

11.2 River flows table

Site name	River	Catchment	Sep 2024 band	Aug 2024 band
Abingdon	River Ock	Ock	Exceptionally high	Above normal
Banbury	River Cherwell	Cherwell Upper	Exceptionally high	Normal
Bibury	River Coln	Cotswolds West	Notably high	Normal
Bourne End (Hedsor)	River Wye	Wye Bucks	Exceptionally high	Exceptionally high
Cassington	River Evenlode	Evenlode	Exceptionally high	Normal
Farmoor (naturalised)	River Thames	Thames	Exceptionally high	Normal
Kingston	River Thames	Thames North Bank	Exceptionally high	Normal
Marlborough	River Kennet	Kennet	Notably high	Above normal
Sheepbridge	River Loddon	Loddon	Exceptionally high	Notably high
Swallowfield	River Blackwater	Loddon	Exceptionally high	Normal
Tilford	River Wey	Wey Addleston Bourne	Exceptionally high	Above normal
Weybridge	River Wey	Wey Addleston Bourne	Exceptionally high	Above normal

Wheatley	River Thame	Thame	Exceptionally high	Normal
Windsor	River Thames	Thames	Exceptionally high	Normal
Kingston (naturalised)	River Thames	Thames North Bank	Exceptionally high	Normal

11.3 Groundwater table

Site name	Aquifer	End of Sep 2024 band	End of Aug 2024 band
Ampney Crucis OBH	Burford Oolitic Limestone (great)	Exceptionally high	Normal
Frith Cottage	Godalming Lower Greensand	Notably high	Notably high
Gibbet Cottages OBH	Berkshire Downs Chalk	Notably high	Notably high
Jackaments Bottom OBH	Burford Oolitic Limestone (inferior)	Exceptionally high	Normal
Marcham OBH	Shrivenham Corallian	Exceptionally high	Notably high
Model Farm	Chiltern Upper Greensand	Notably high	Above normal
Rockley OBH	Berkshire Downs Chalk	Notably high	Above normal
Stonor Estate	South-west Chilterns Chalk	Exceptionally high	Exceptionally high
The Flashes OBH	Godalming Lower Greensand	Notably high	Notably high
Tile Barn Farm	Basingstoke Chalk	Notably high	Above normal
Fringford P.S.	Upper Bedford Ouse Oolitic Limestone (great)	Exceptionally high	Notably high