Monthly water situation report: Thames Area

1 Summary - July 2024

Thames area received 77mm of rainfall in July, 158% of the long term average (LTA). Most areal units in the east received above normal rainfall and those in the west received normal rainfall. Soil moisture deficits (SMD) increased from last month to 82mm across the area, and ended the month close to the LTA (81mm). Monthly mean river flows at all our indicator sites were notably high or above normal, except the River Wye at Bourne End (exceptionally high), and the River Coln at Bibury (normal). At the end of the month, most of our groundwater sites' levels continued their expected seasonal decline. The groundwater levels at all our sites were normal or above for the time of year.

1.1 Rainfall

July was wetter than typical, with Thames area receiving 77mm of rainfall during the month, 158% of the LTA. Most of the rain fell in the first week of the month with 5 July receiving 26mm. There was a largely east-west distribution to the rainfall across the area, with mainly above normal rainfall in the east and normal rainfall in the west. Rainfall for the last 3 months was normal, however due to the wet winter, rainfall continued to be exceptionally high for the last 6 and 12 months.

1.2 Soil moisture deficit and recharge

Drier than normal soils in June were wetted by July's rainfall and the SMD ended the month at 82mm, close to the LTA (81mm). SMDs were similar throughout the area, however the Cotswolds – East and Cotswold – West units in the northwest of the area were slightly lower. Increased seasonal evaporation, and the presence of the SMD, meant that effective rainfall for the month was low (3mm).

1.3 River flows

With July's higher than average rainfall, and despite June's lower than average rainfall, monthly mean flows at most of our indicator sites were notably high or above normal, though nearly all sites continued their usual seasonal decrease. Many of the groundwater fed rivers (i.e. River Blackwater, River Wey, River Wye) were still supported by the continued contribution of groundwater baseflow resulting from the exceptionally wet winter. Sites on less permeable clay geologies (i.e. River Cherwell, River Ock) reacted quickly to the high rainfall in early July due to high run off rates.

1.4 Groundwater levels

Almost all the groundwater sites continued their expected seasonal declines, though the levels remained normal or above for the time of year following the exceptionally wet winter. The Chalk aquifer at Stonor Estate and the Corallian at Marcham were both exceptionally high for July. The Inferior Oolite aquifer at Jackaments Bottom was the only site that was at a normal level. Groundwater levels of the Lower Greensand (both Folkestone and Hythe) remained notably high for the sixth month in a row.

1.5 Reservoir stocks

Reservoir capacity at Farmoor was steady, starting the month at 98% and ending the month at 99%; above the LTA. Capacity at the Lower Thames reservoirs decreased from 95% in June to 90% at the end of July but remained above the LTA for the time of year.

1.6 Environmental impact

There were 3 flood alerts issued across Thames area during July. At the end of July, 19 abstraction licences were being constrained in Thames area to protect water resources and the environment.

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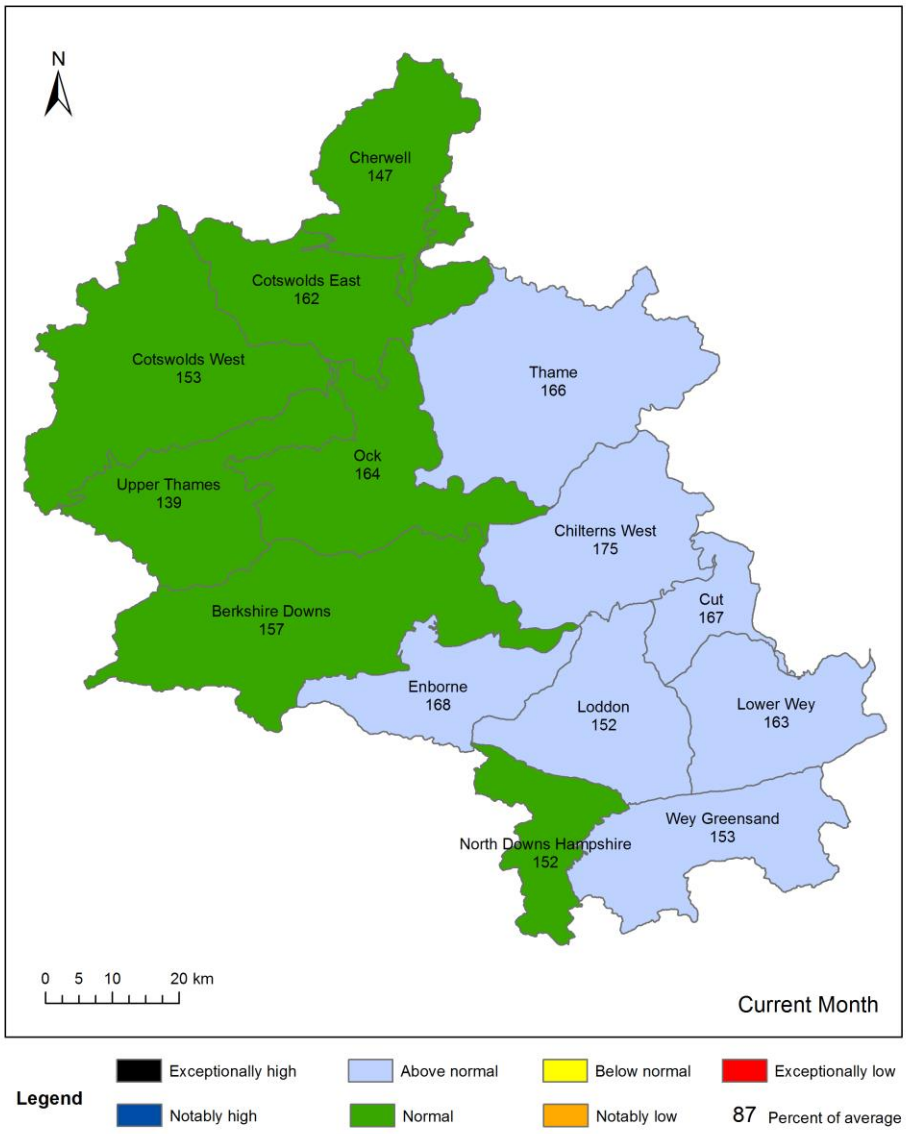
2 Rainfall

2.1 Rainfall map

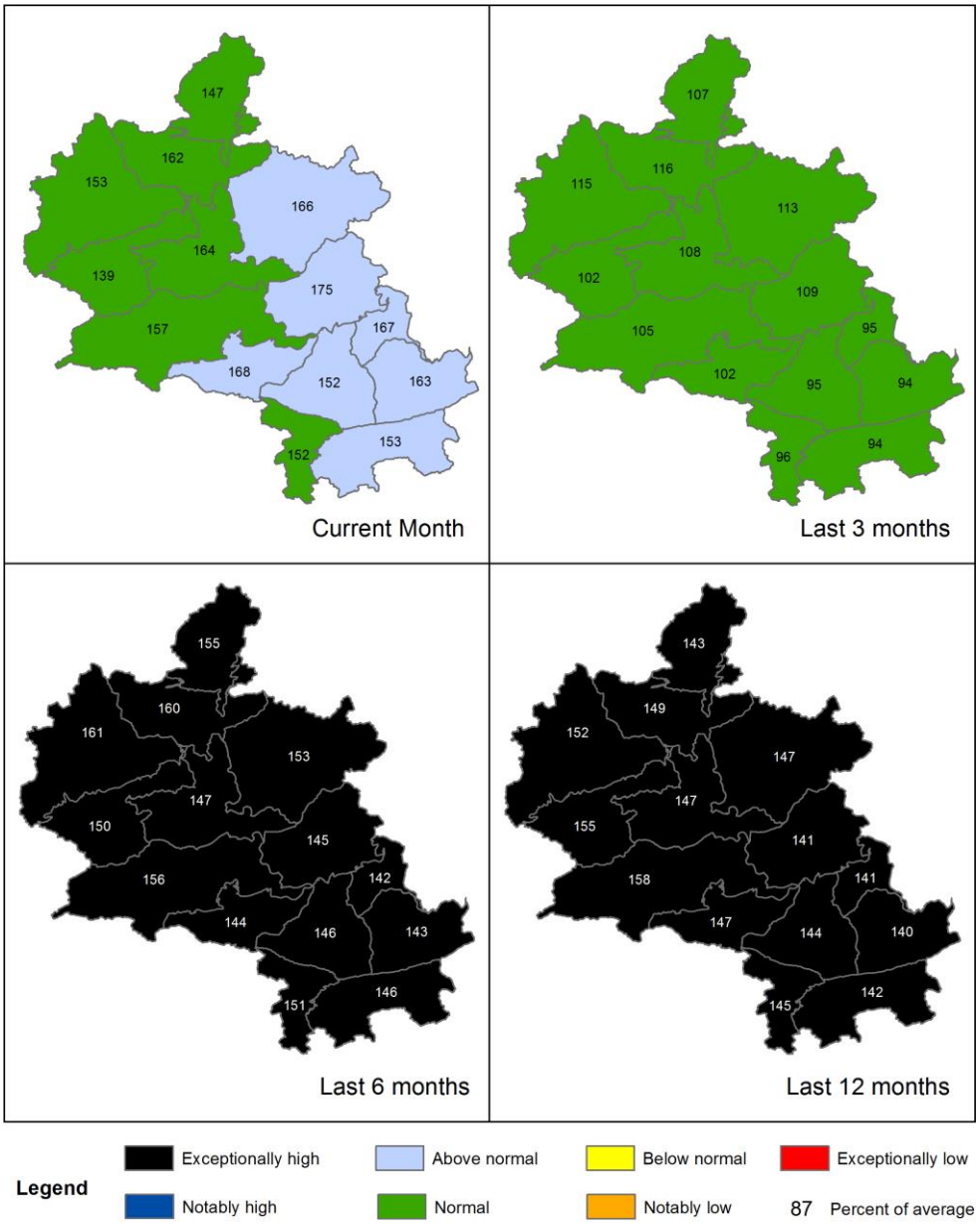
Figure 2.1: Total rainfall for hydrological areas for the current month (up to 31 July 2024), classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.



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)

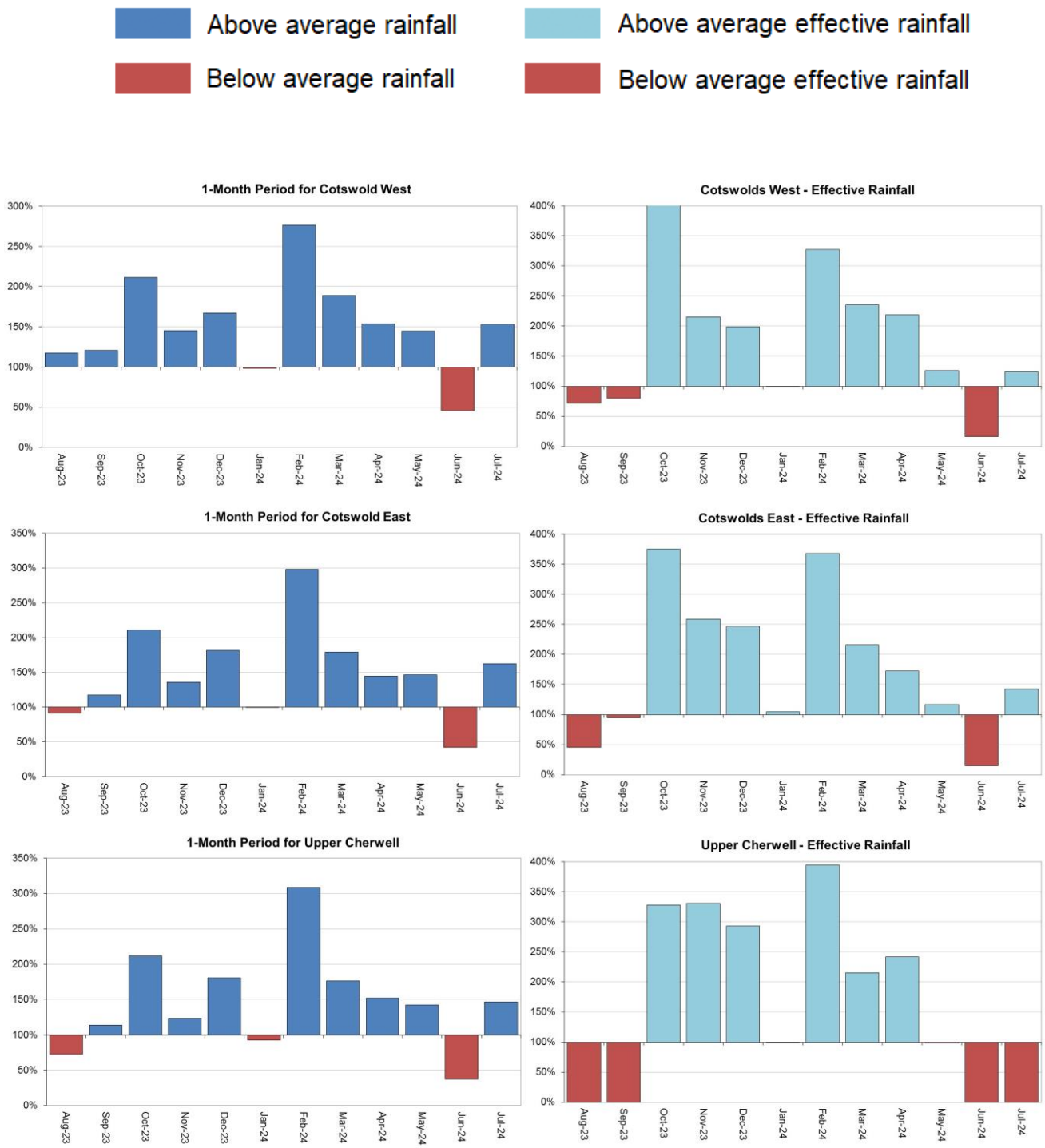
Figure 2.2: Total rainfall for hydrological areas for the current month (up to 31 July 2024), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.

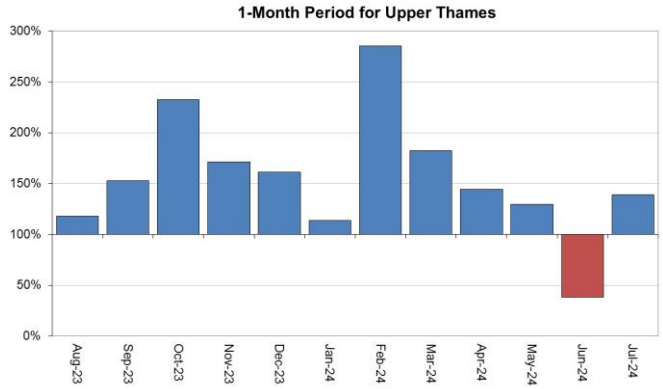


HadUK data based on the Met Office 1km gridded rainfall dataset derived from rain gauges (Source: Met Office. Crown copyright, 2024). Provisional data based on Environment Agency 1km gridded rainfall dataset derived from Environment Agency intensity rain gauges. Crown copyright. All rights reserved. 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
300%
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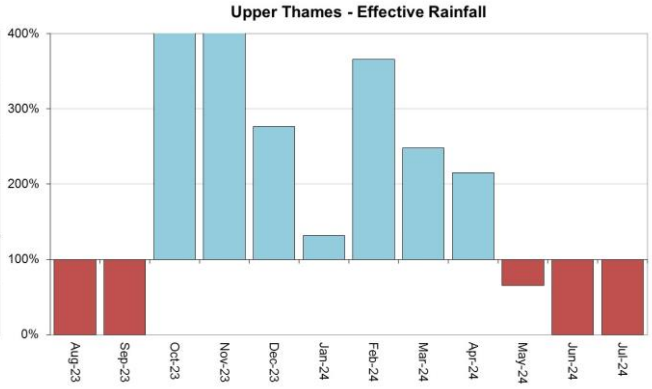
Upper Thames - Effective Rainfall
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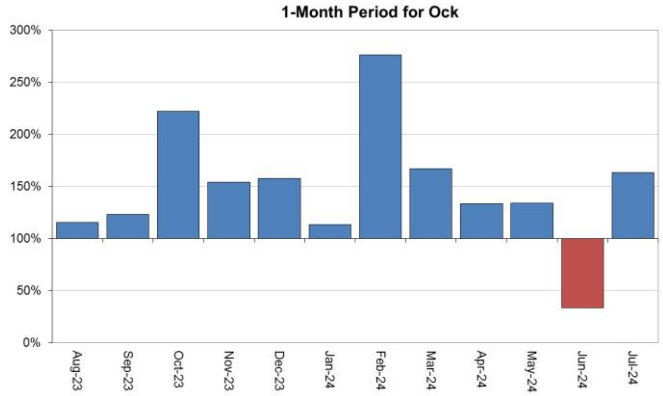
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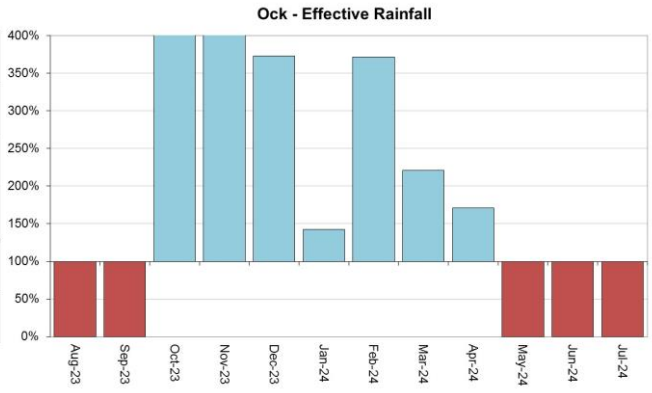
Ock - Effective Rainfall
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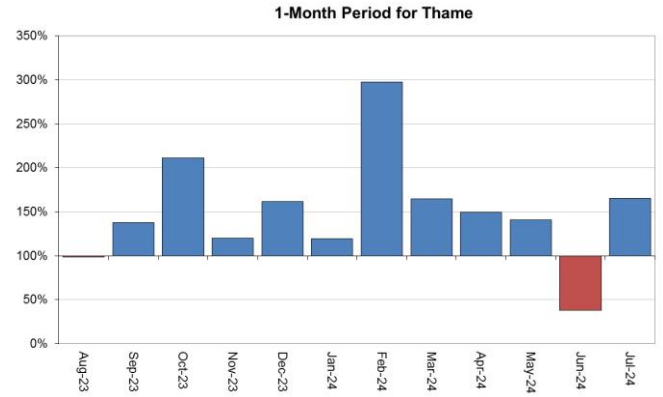
1-Month Period for Thame
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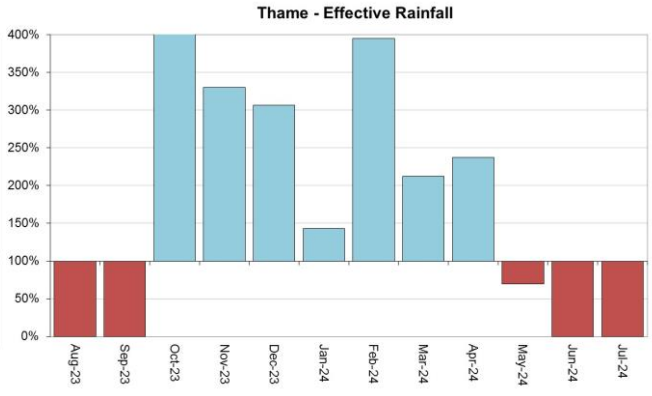
Thame - Effective Rainfall
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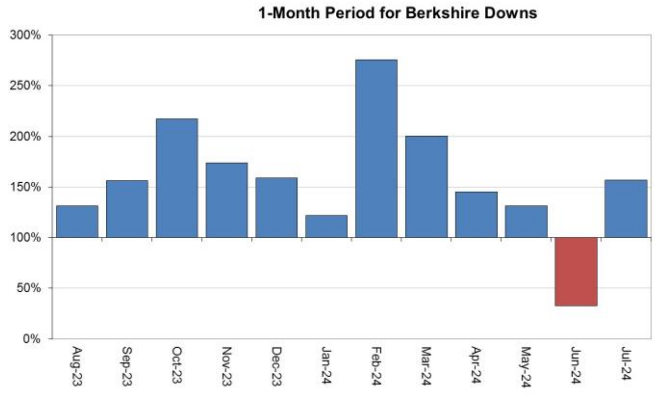
1-Month Period for Berkshire Downs
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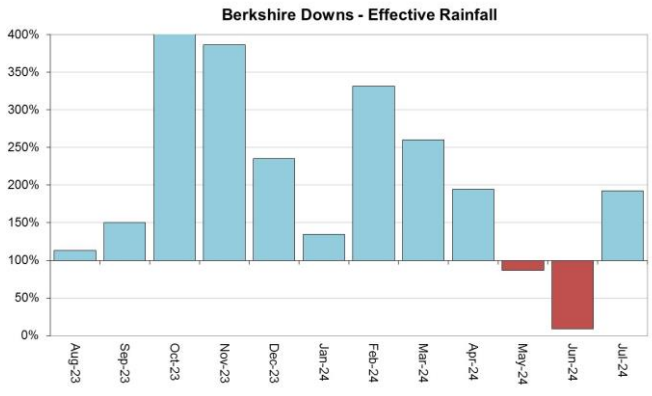
Berkshire Downs - Effective Rainfall
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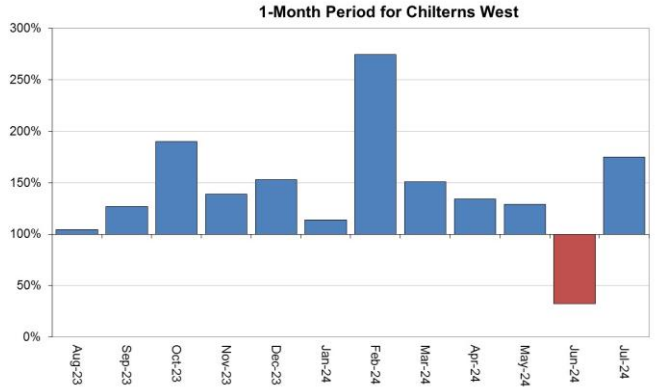
1-Month Period for Chilterns West
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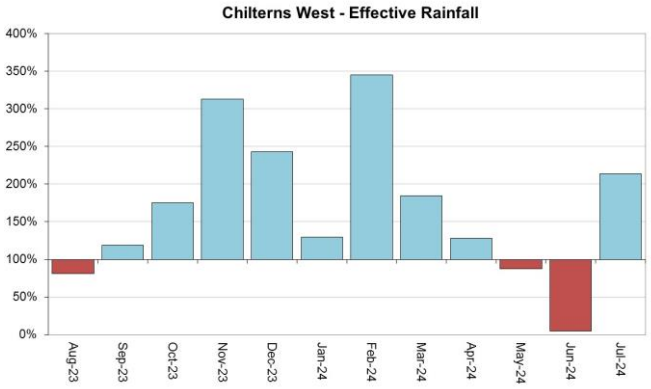
Chilterns West - Effective Rainfall
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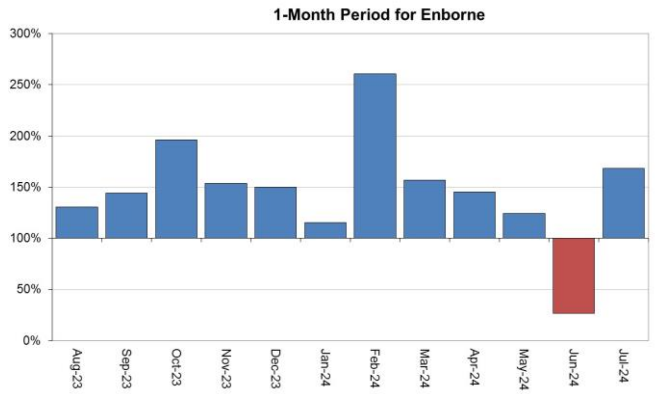
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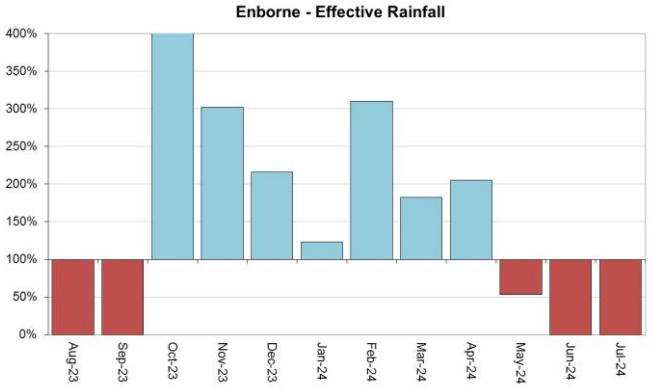
Enborne - Effective Rainfall
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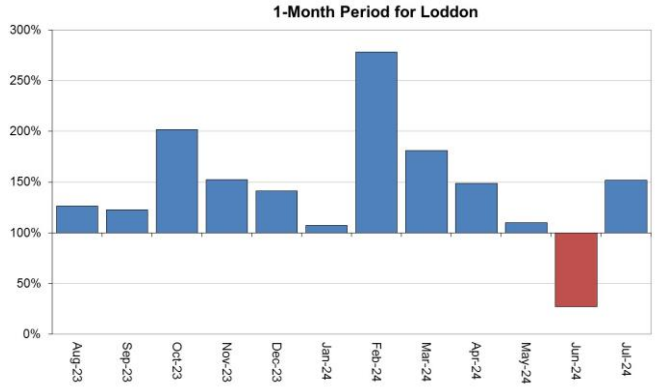
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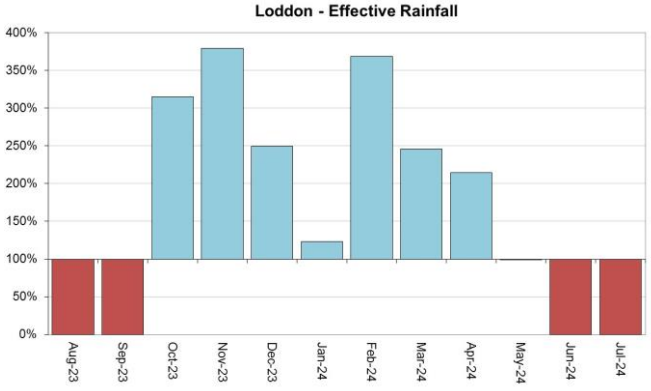
Loddon - Effective Rainfall
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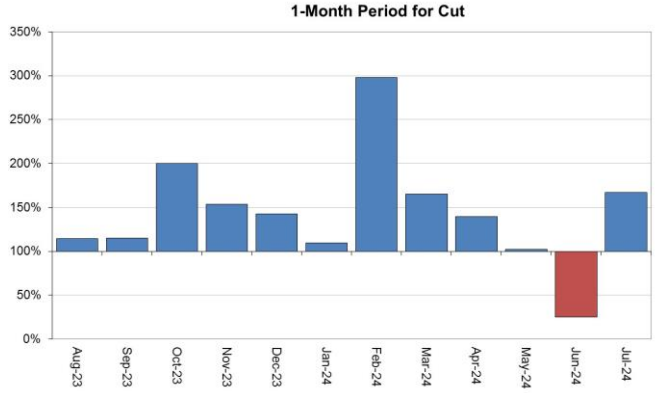
1-Month Period for Cut
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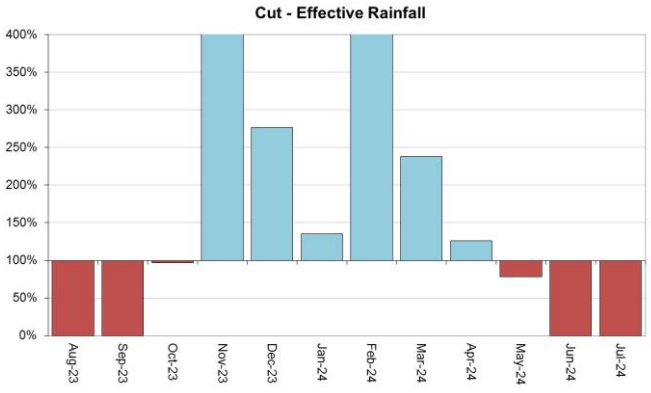
Cut - Effective Rainfall
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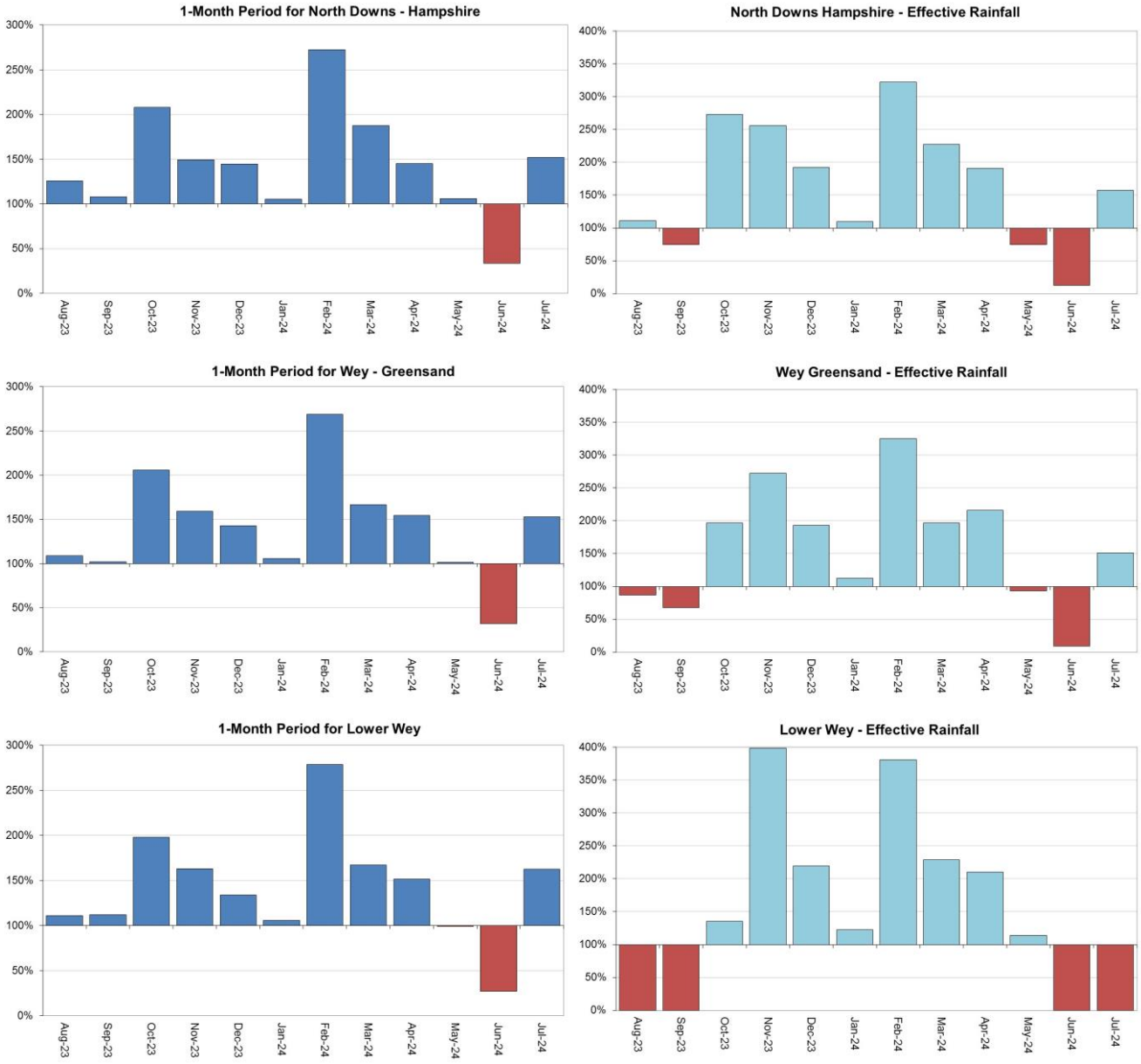


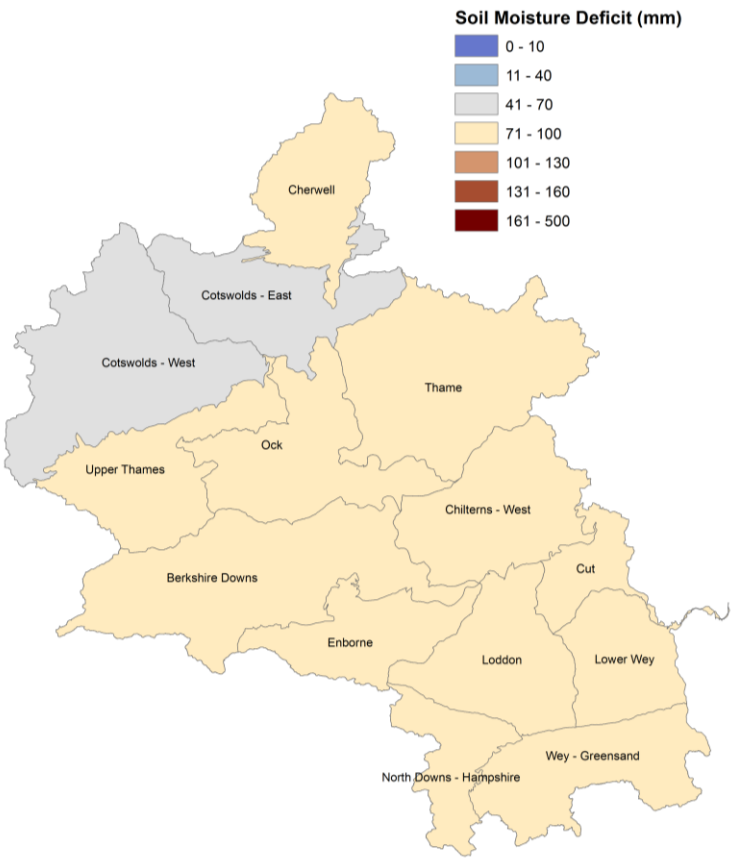
HadUK rainfall data. (Source: Met Office. Crown copyright, 2024).

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

3 Soil moisture deficit

3.1 Soil moisture deficit map

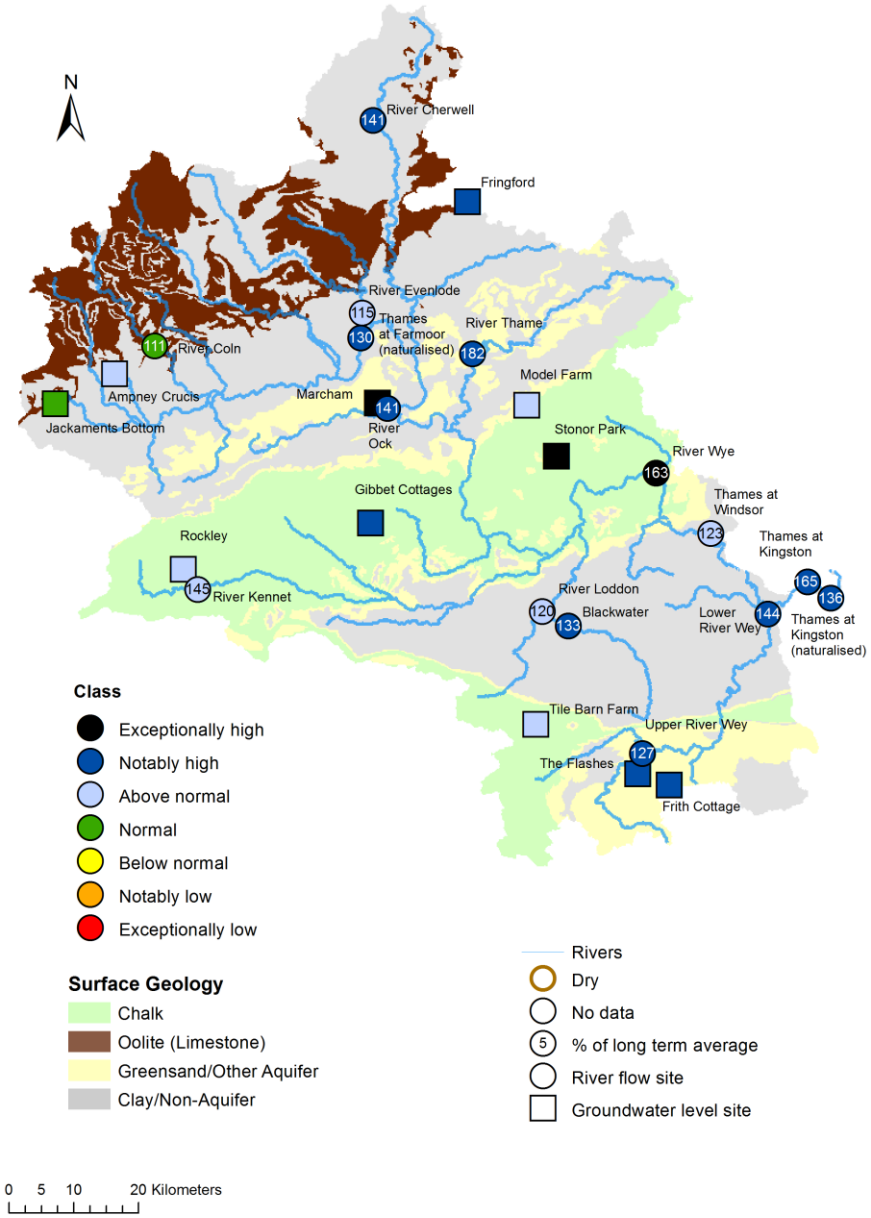
Figure 3.1: Soil moisture deficits for the week ending 31 July 2024. Shows the areal SMD estimate in millimetres.



4 River Flow and Groundwater Status

4.1 River flow and groundwater level map

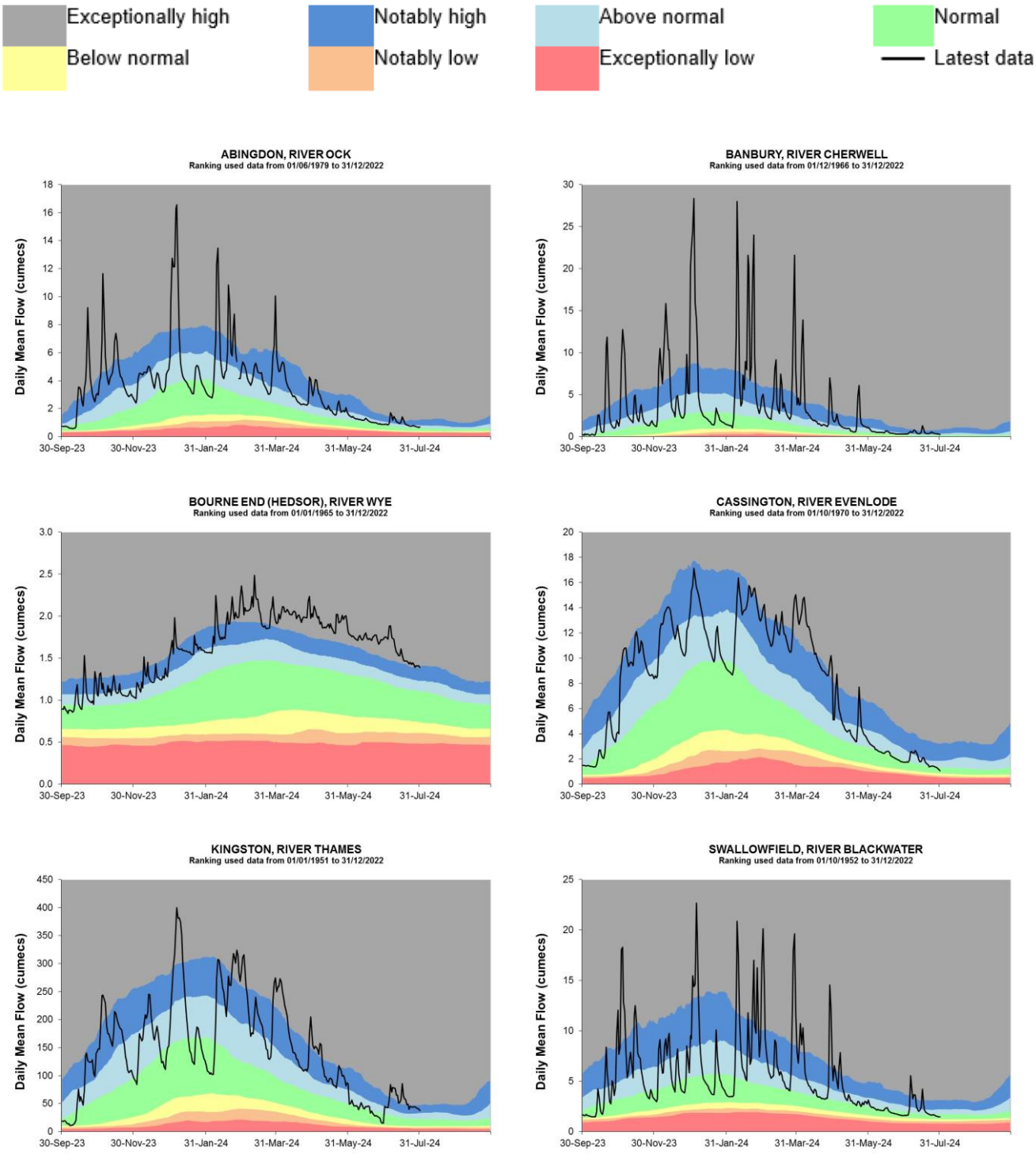
Figure 4.1: Monthly mean river flow for indicator sites and end of month groundwater levels for indicator sites for July 2024, expressed as a percentage of the respective long term average and classed relative to an analysis of historic July means.



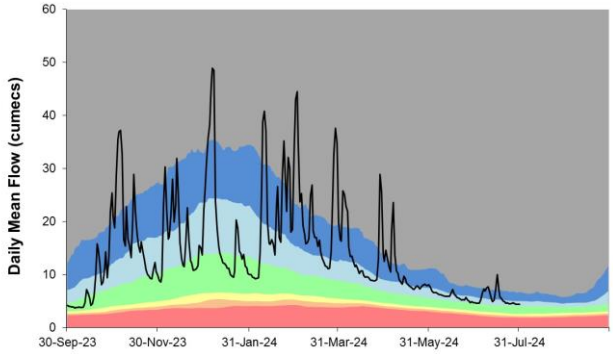
5 River flows

5.1 River flow charts

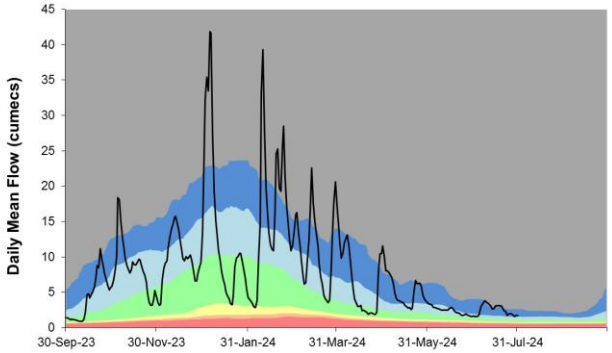
Figure 5.1: Daily mean river flows for indicator sites compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



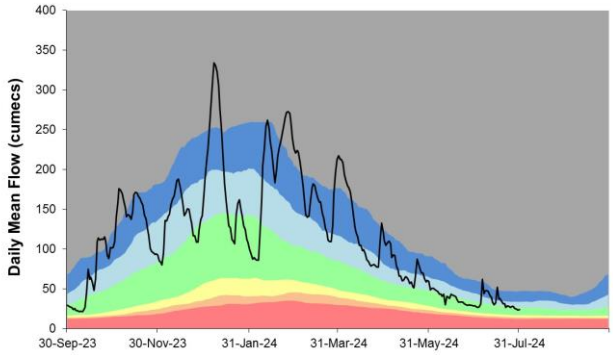
WEYBRIDGE, RIVER WEY
Ranking used data from 01/04/1979 to 31/12/2022



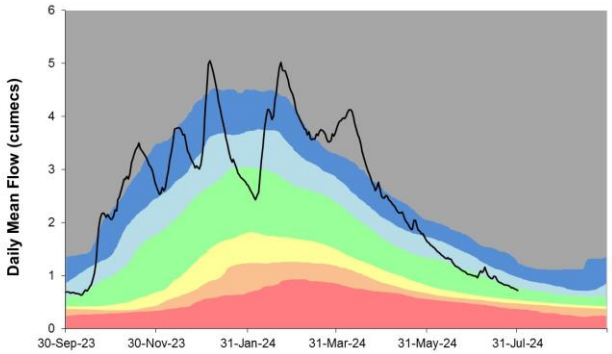
WHEATLEY, RIVER THAME
Ranking used data from 01/01/1990 to 31/12/2022



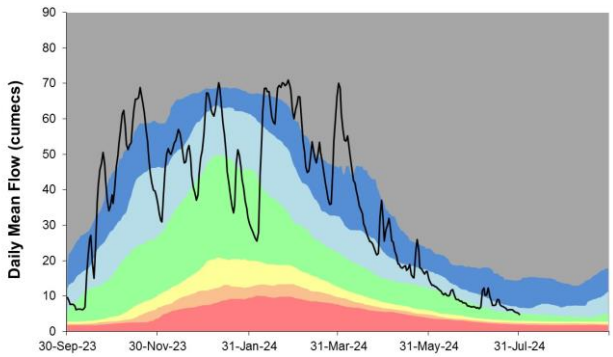
WINDSOR, RIVER THAMES
Ranking used data from 01/08/1979 to 31/12/2022



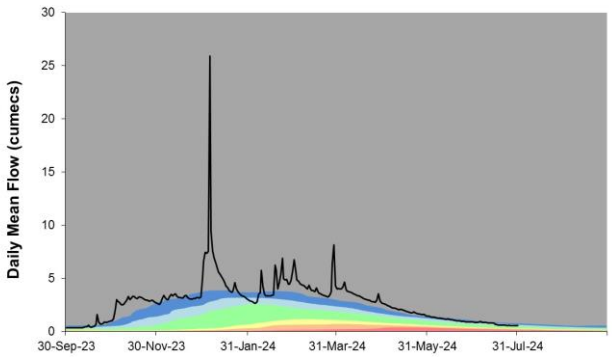
BIBURY, RIVER COLN
Ranking used data from 01/10/1963 to 31/12/2022

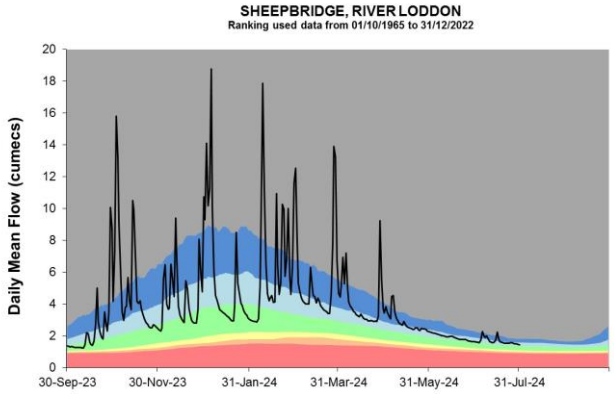


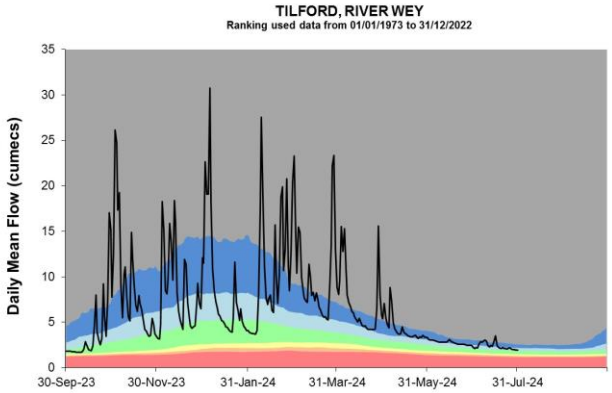
FARMOOR (NATURALISED), RIVER THAMES
Ranking used data from 01/10/1992 to 31/12/2022

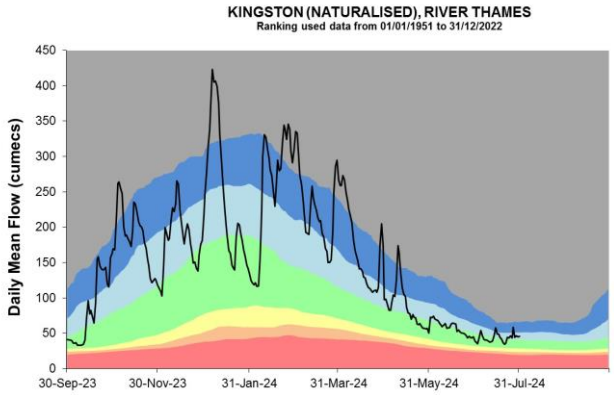


MARLBOROUGH, RIVER KENNET
Ranking used data from 01/02/1972 to 31/12/2022







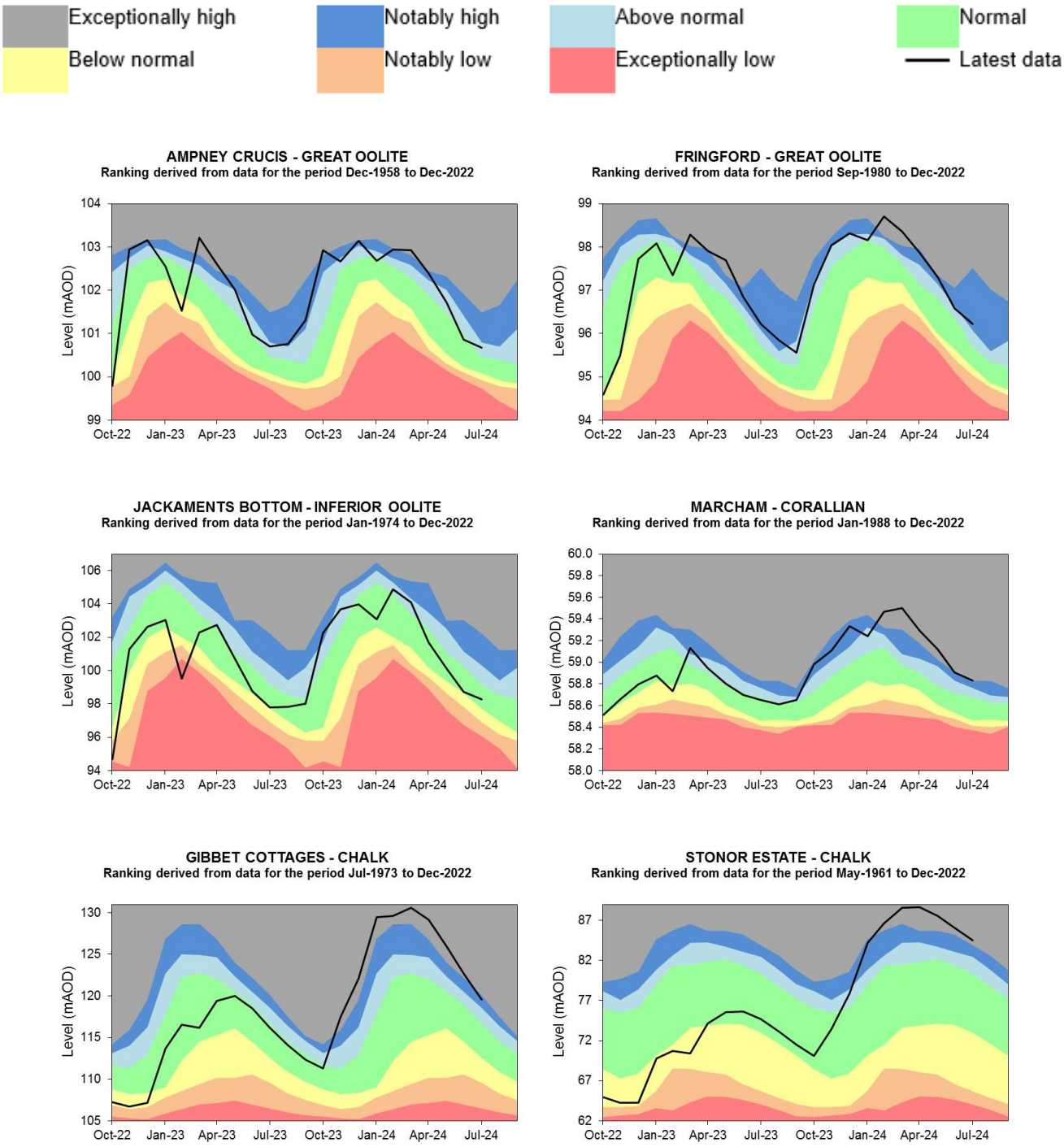


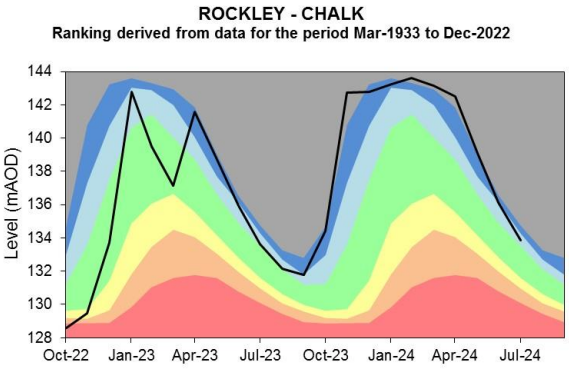
Source: Environment Agency.

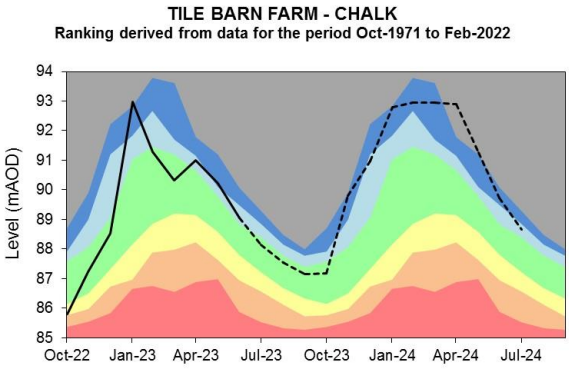
6 Groundwater levels

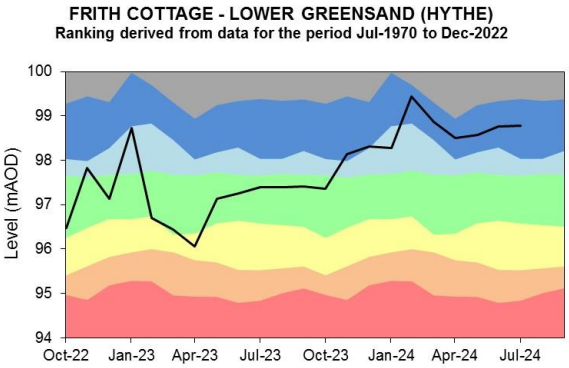
6.1 Groundwater level charts

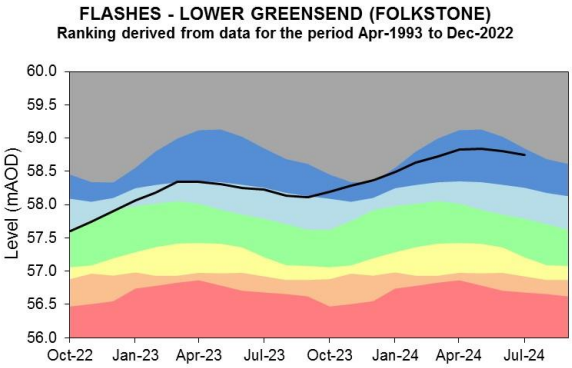
Figure 6.1: End of month groundwater levels for indicator sites, compared to an analysis of historic end of month levels, and long term maximum and minimum levels.

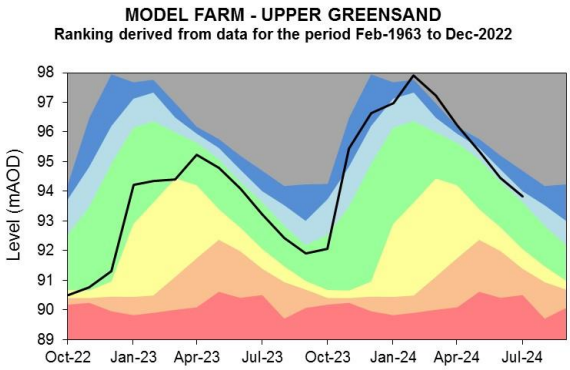










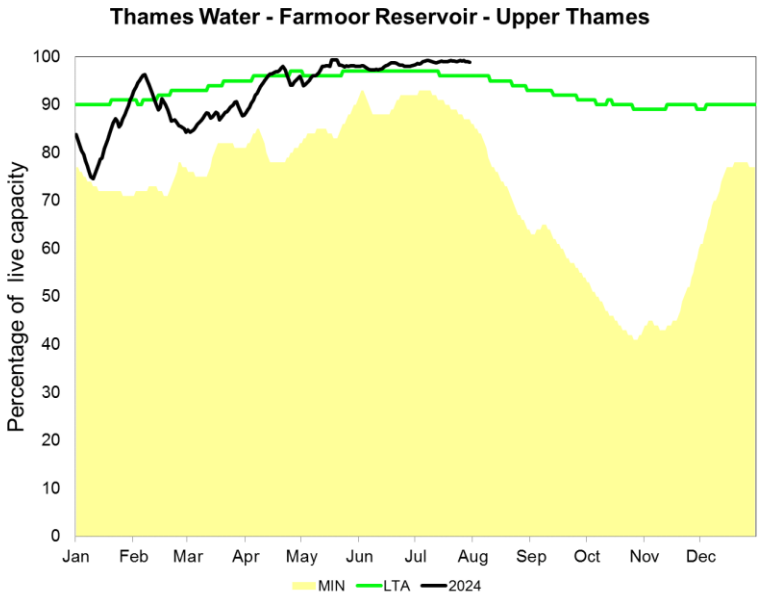


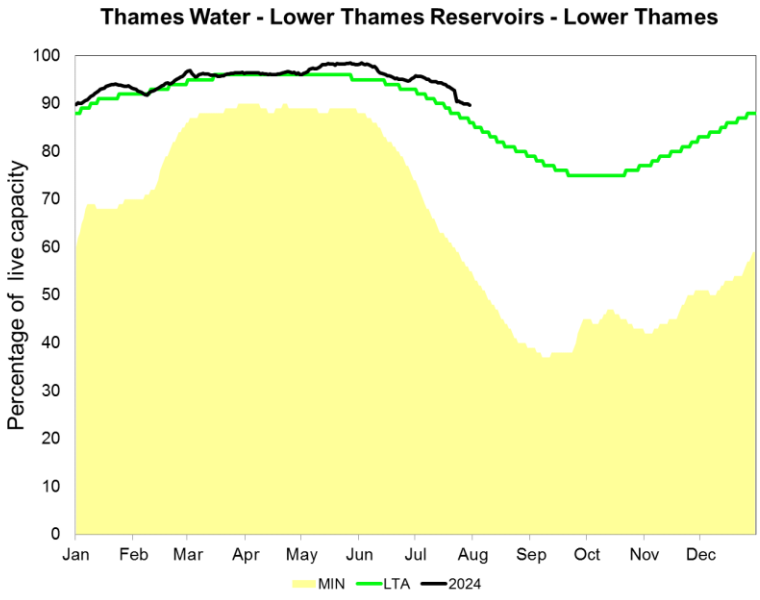
*Tile Barn Farm data has been estimated from two local sites since April 2022. A replacement is planned

Source: Environment Agency, 2024.

7 Reservoir stocks

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

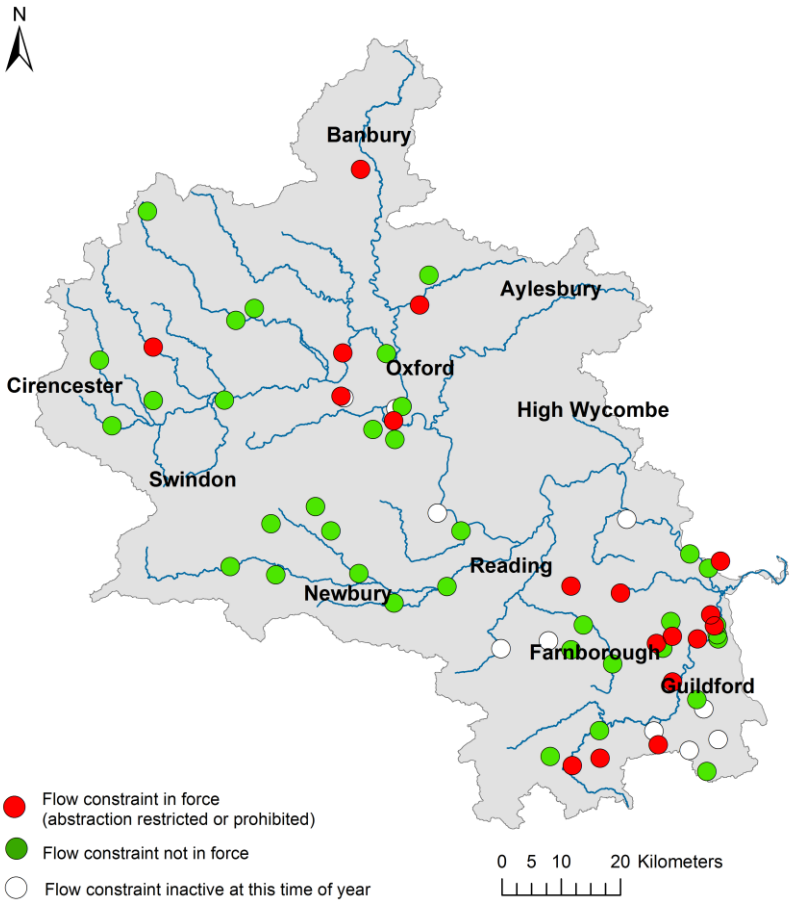




(Source: water companies).

8 Flow Constraints

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



8.2 Summary of flow constraints

Week ending	07/07/23	14/07/23	21/07/23	28/07/23
Number of flow constraints in force	19	19	19	19

9 Summary of rainfall, effective rainfall and soil moisture deficit

9.1 Rainfall and effective rainfall

Area	Rainfall (mm) 31 day Total	Rainfall (mm) July LTA	Rainfall (mm) % LTA	Effective Rainfall (mm) 31 day total	Effective Rainfall (mm) July LTA	Effective Rainfall (mm) % LTA
Cotswolds - West	81	53	153	8	6	124
Cotswolds - East	78	48	162	7	5	142
Berkshire Downs	77	49	158	8	4	192
Chilterns - West	87	49	175	9	4	214
North Downs - Hampshire	80	52	153	8	5	157
Wey - Greensand	77	50	154	7	4	151
Upper Thames	66	47	140	0	1	0
Cherwell	74	51	146	0	1	0
Thame	80	48	166	0	0	-
Loddon	71	47	153	0	0	-
Lower Wey	74	46	163	0	0	-
Ock	72	44	163	0	0	-
Enborne	75	45	167	0	0	-
Cut	78	46	167	0	0	-
Thames Area	**77**	**48**	**158**	**3**	**2**	**151**

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 31	SMD (mm) LTA
Cotswolds - West	47	54
Cotswolds - East	50	57
Berkshire Downs	85	85
Chilterns - West	84	86
North Downs - Hampshire	88	83
Wey - Greensand	90	83
Upper Thames	89	88
Cherwell	81	80
Thame	80	84
Loddon	93	88
Lower Wey	92	86
Ock	88	92
Enborne	87	83
Cut	94	91
Thames Area	**82**	**81**

HadUK rainfall data (Source: Met Office Crown copyright 2023)
EA effective rainfall data (Source: EA Soil Moisture Model)

9.3 Winter rainfall and effective rainfall

Summer period: 01/04/2024 to 31/07/2024						
Area	Rainfall (mm) Total	Rainfall (mm) LTA	Rainfall (mm) % LTA	Effective Rainfall (mm) Total	Effective Rainfall (mm) LTA	Effective Rainfall (mm) % LTA
Cotswolds - West	287	230	124	64	46	139
Cotswolds - East	257	211	122	43	36	120
Berkshire Downs	252	218	115	44	34	130
Chilterns - West	249	217	115	36	34	104
North Downs - Hampshire	246	227	108	49	40	124
Wey - Greensand	246	225	109	58	43	136
Upper Thames	229	205	112	18	13	135
Cherwell	247	211	117	31	19	166
Thame	249	204	122	25	15	163
Loddon	219	202	108	24	15	157
Lower Wey	215	199	108	26	17	152
Ock	222	194	114	11	11	97
Enborne	233	208	112	25	18	138
Cut	213	201	106	14	15	96
Thames Area	**240**	**211**	**114**	**33**	**25**	**131**

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	Jul 2024 rainfall % of long term average 1961 to 1990	Jul 2024 band	May 2024 to July cumulative band	Feb 2024 to July cumulative band	Aug 2023 to July cumulative band
Berkshire Downs	157	Normal	Normal	Exceptionally high	Exceptionally high
Chilterns West	175	Above Normal	Normal	Exceptionally high	Exceptionally high
Cotswold East	162	Normal	Normal	Exceptionally high	Exceptionally high
Cotswold West	153	Normal	Normal	Exceptionally high	Exceptionally high
Cut	167	Above Normal	Normal	Exceptionally high	Exceptionally high
Enborne	168	Above Normal	Normal	Exceptionally high	Exceptionally high
Loddon	152	Above Normal	Normal	Exceptionally high	Exceptionally high
Lower Wey	163	Above Normal	Normal	Exceptionally high	Exceptionally high
North Downs - Hampshire	152	Normal	Normal	Exceptionally high	Exceptionally high
Ock	164	Normal	Normal	Exceptionally high	Exceptionally high
Thame	166	Above Normal	Normal	Exceptionally high	Exceptionally high

Upper Cherwell	147	Normal	Normal	Exceptionally high	Exceptionally high
Upper Thames	139	Normal	Normal	Exceptionally high	Exceptionally high
Wey - Greensand	153	Above Normal	Normal	Exceptionally high	Exceptionally high

11.2 River flows table

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

11.3 Groundwater table

Site name	Aquifer	End of Jul 2024 band	End of Jun 2024 band
Ampney Crucis Obh	Burford Oolitic Limestone (great)	Above normal	Normal
Frith Cottage	Godalming Lower Greensand	Notably high	Notably high
Gibbet Cottages Obh	Berkshire Downs Chalk	Notably high	Exceptionally high
Jackaments Bottom Obh	Burford Oolitic Limestone (inferior)	Normal	Normal
Marcham Obh	Shrivenham Corallian	Exceptionally high	Notably high
Model Farm	Chiltern Upper Greensand	Above normal	Above normal
Rockley Obh	Berkshire Downs Chalk	Above normal	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	Above normal	Notably high
Fringford P.s.	Upper Bedford Ouse Oolitic Limestone (great)	Notably high	Above normal