Monthly water situation report: Thames Area

1 Summary - March 2024

March was another wet month with 174% of the monthly long term average (LTA) rainfall being recorded across Thames area. The winter period, comprising the last 6 months, had exceptionally high rainfall and was the second wettest winter since records began in 1871. The soil moisture deficit (SMD) in Thames area was 1mm at the end of the month, allowing high levels of effective rainfall to occur (222% LTA). After several months of significantly high rainfall, exceptionally high river flows were recorded at all our indicator sites in March. Groundwater levels remained high across Thames Area and were exceptionally high at the majority of our indicator sites for the time of the year.

1.1 Rainfall

March was another wet month in Thames Area, with a total of 102mm of rain, 174% of the LTA. 44% of the month's rain fell in the last week of March, with the highest daily rainfall total (26mm) recorded on the 28th at Shalbourne in the Berkshire Downs. Notably high and exceptionally high rainfall was recorded right across Thames Area, with higher rainfall totals typically falling on the westernmost areal units. March marked the end of the hydrological winter, which started in October 2023. During the winter period, rainfall was exceptionally high throughout all of Thames Area, ranging from 165% (Enborne and Chilterns-West) to 186% (Berkshire Downs and Upper Thames) of the LTA. It was the second wettest winter since records began in 1871.

1.2 Soil moisture deficit and recharge

As a result of rainfall in March, soils remained saturated and wetter than expected for the time of the year. The SMD in Thames area was 1mm at the end of the month and this allowed a high amount of effective rainfall to occur in March (222% LTA). Effective rainfall for the previous 6 month winter period was 243% of the LTA.

1.3 River flows

Exceptionally high monthly mean river flows were recorded at all our indicator sites in March, as significant rainfall and high groundwater levels combined in many catchments. The Rivers Evenlode at Cassington, Thames at Windsor, Kennet at Marlborough and Wey at Tilford recorded their highest monthly mean flow for March since records began at those sites. Despite the high river flows, 11 out of 15 indicator sites had lower monthly mean flows in March compared to February.

1.4 Groundwater levels

Following a wet winter, groundwater levels at all sites reported notably high or higher levels, with the only exception being Jackaments Bottom in the Inferior Oolites which was above normal for the time of year. By the end of the month, groundwater levels of the Chalk were exceptionally high at the Berkshire Downs and South-west Chilterns; and notably high at the North Downs. Lower Greensand sites have remained notably high for the second month in a row.

1.5 Reservoir stocks

Reservoir stocks in Farmoor reservoir were 89% at the end of March, an increase from 85% at the end of February. Stocks at the Lower Thames reservoir has also increased to 96.4% at the end of this month from 96% at the end of February. Reservoir levels remain below the LTA at Farmoor while levels at Lower Thames remain just above the LTA for the time of year.

1.6 Environmental impact

During March, there were 74 flood alerts and 3 flood warnings issued on rivers in Thames area. At the end of the month, 1abstraction licences was being constrained in the area to protect water resources and the environment.

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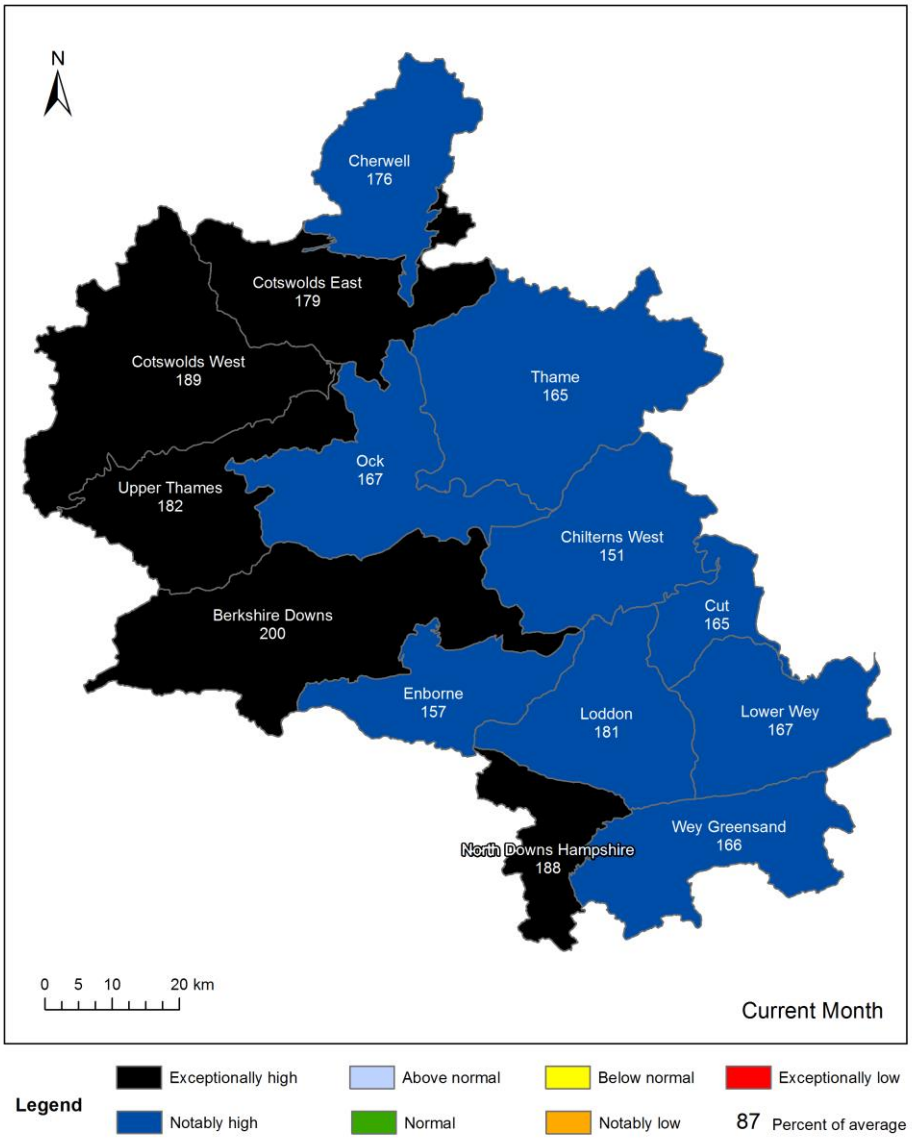
Contact Details: 020302559659

2 Rainfall

2.1 Rainfall map

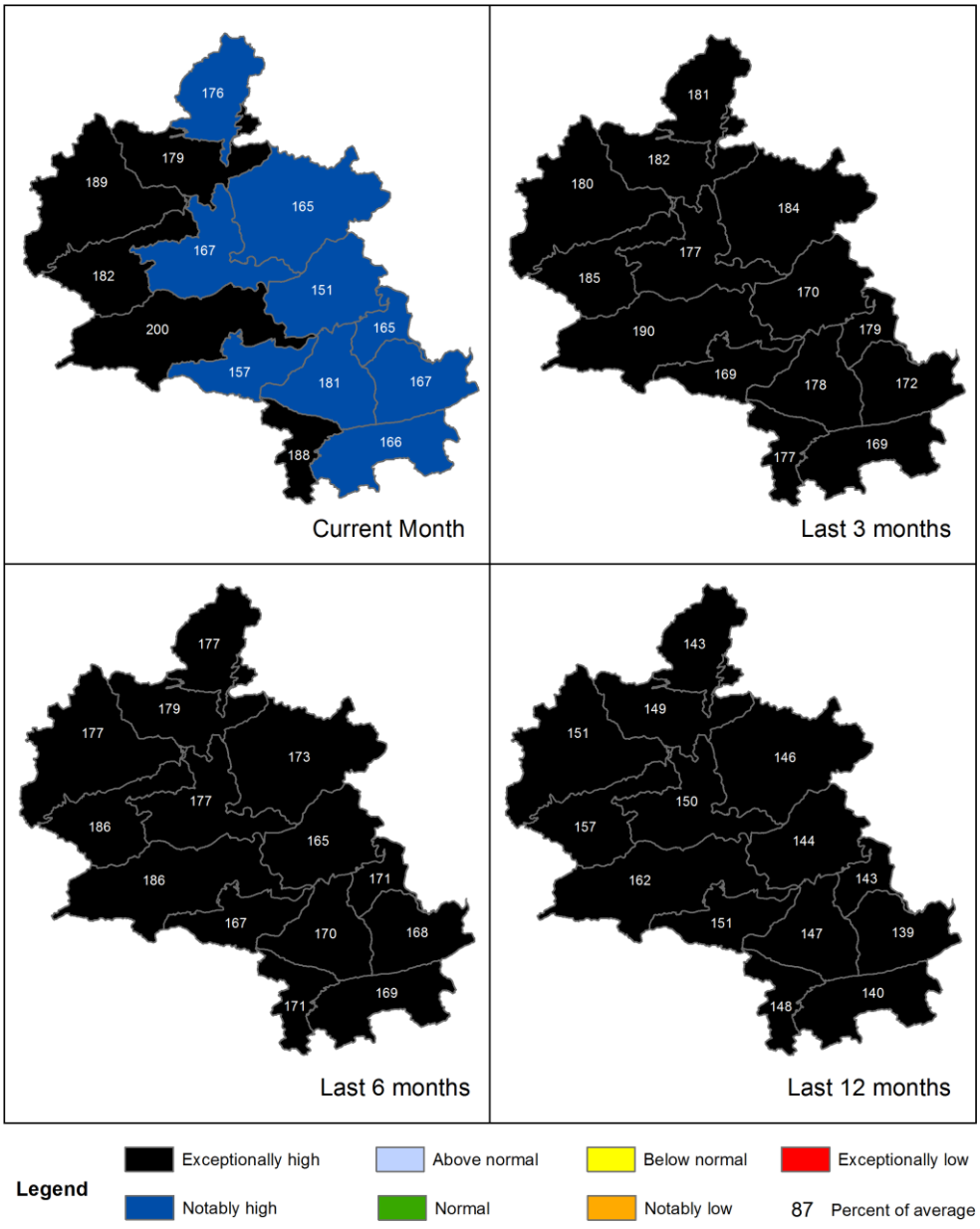
Figure 2.1: Total rainfall for hydrological areas for the current month (up to 31 March 2024), classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.



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).

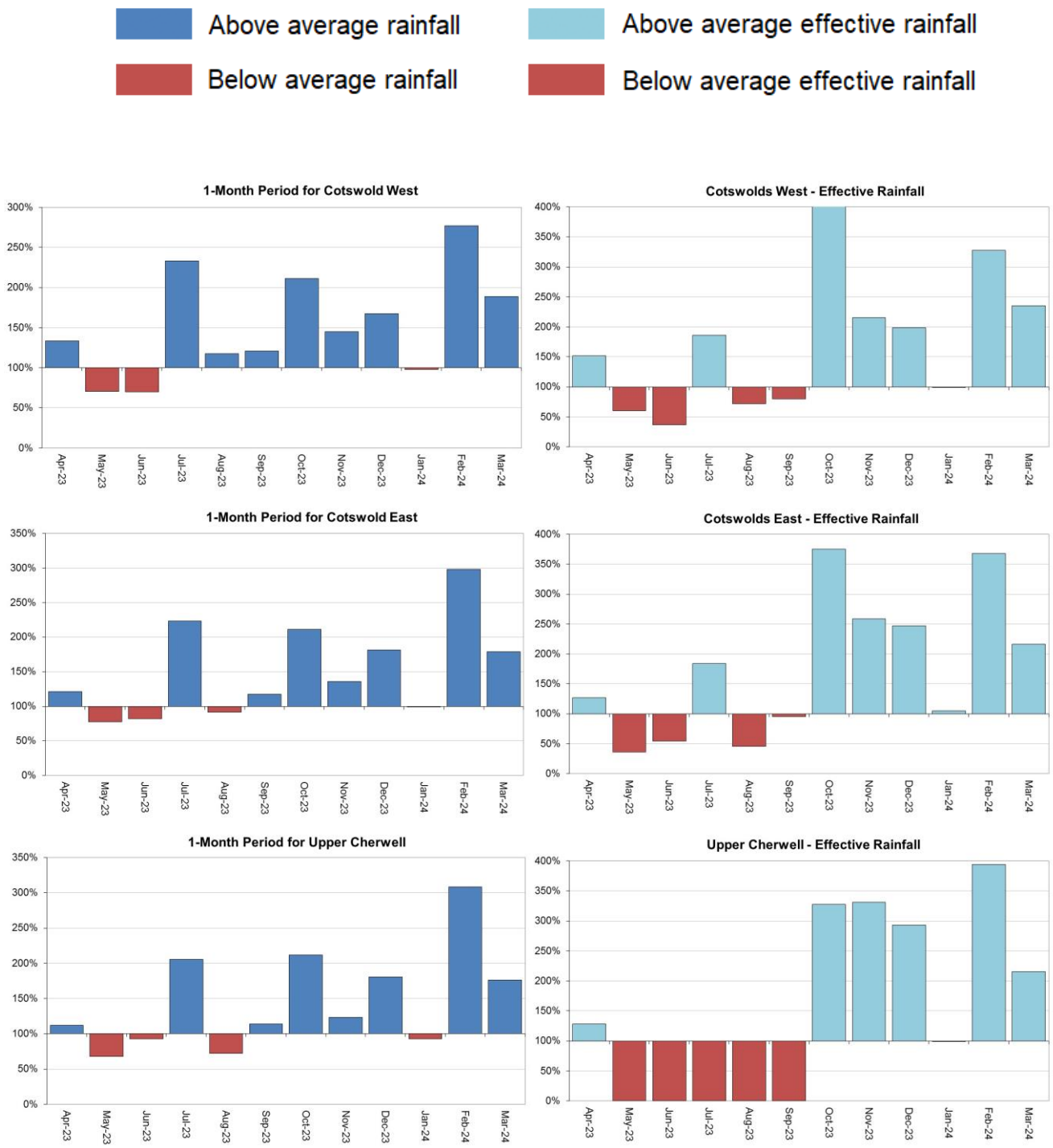
2.2 Rainfall map (2)

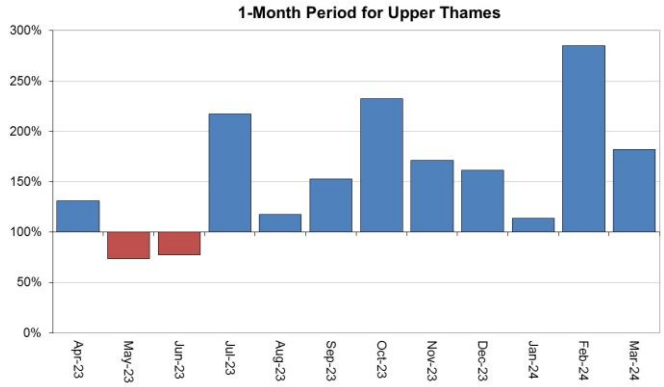
Figure 2.2: Total rainfall for hydrological areas for the current month (up to 31 March 2024), the last 3 months, the last 6 months, and the last 12 months, classed relative to an analysis of respective historic totals. Table available in the appendices with detailed information.



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
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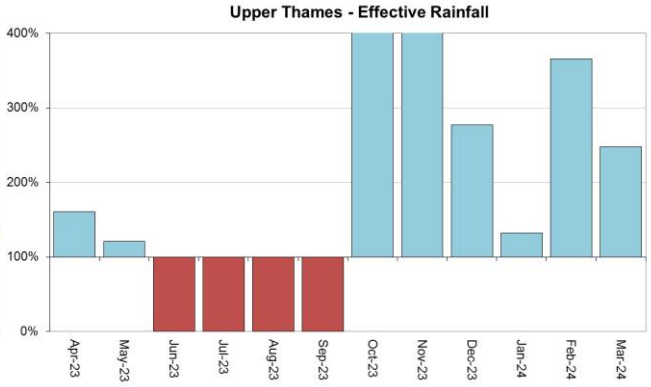
Upper Thames - Effective Rainfall
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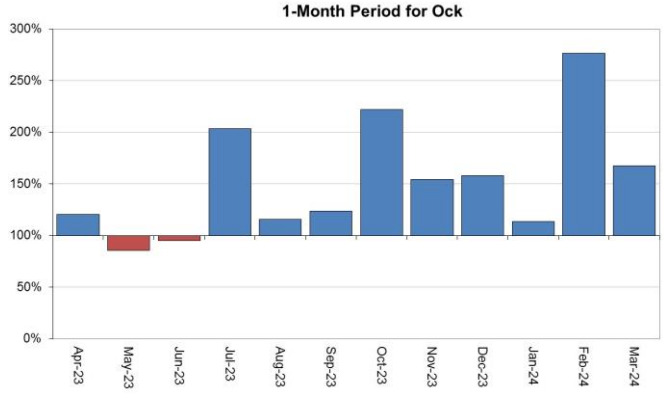
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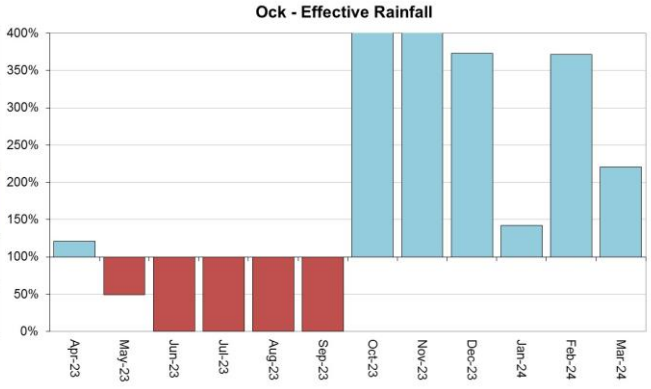
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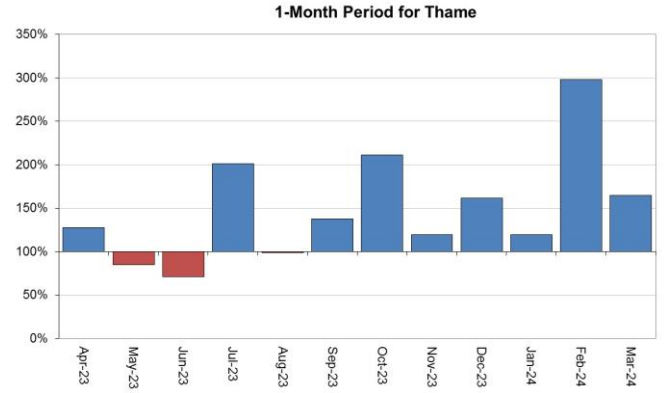
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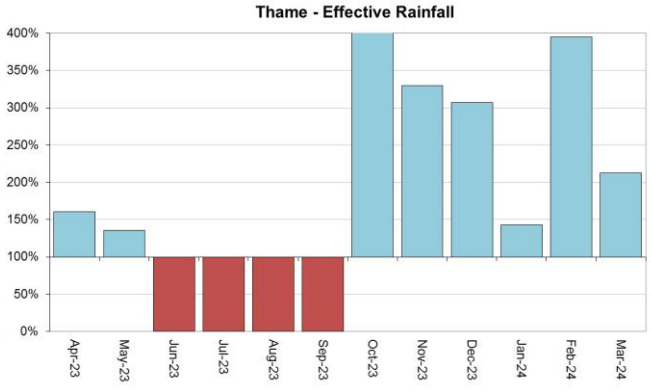
Thame - Effective Rainfall
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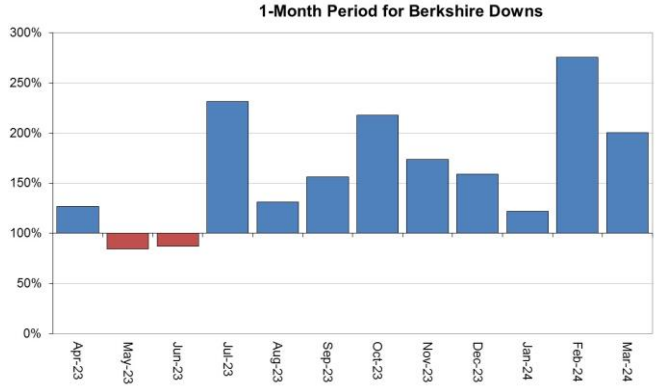
1-Month Period for Berkshire Downs
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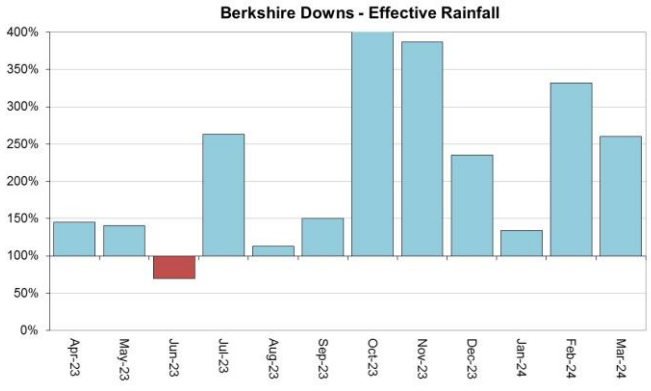
Berkshire Downs - Effective Rainfall
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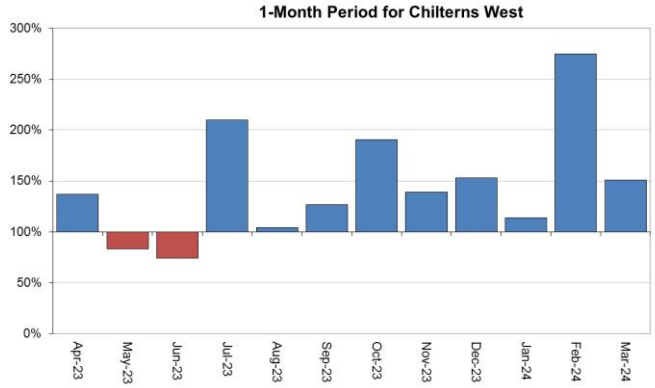
1-Month Period for Chilterns West
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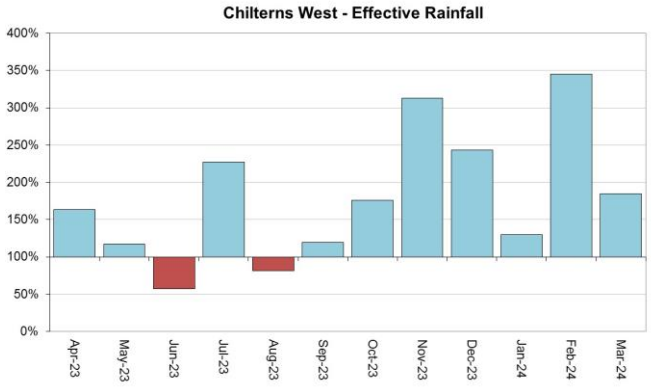
Chilterns West - Effective Rainfall
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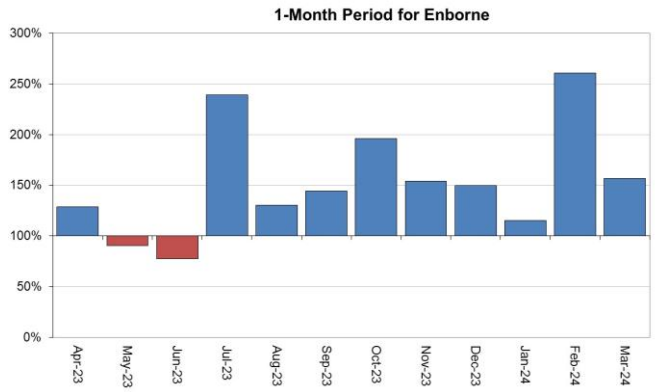
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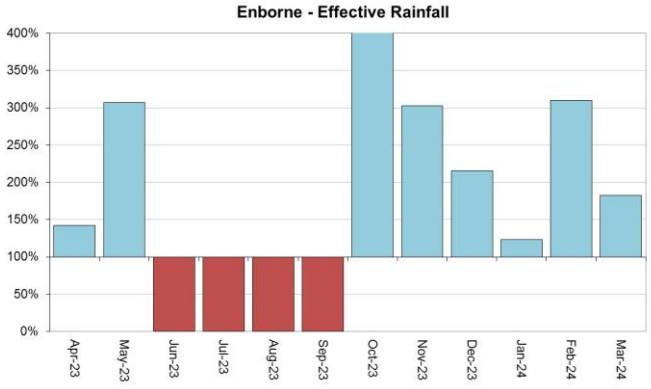
Enborne - Effective Rainfall
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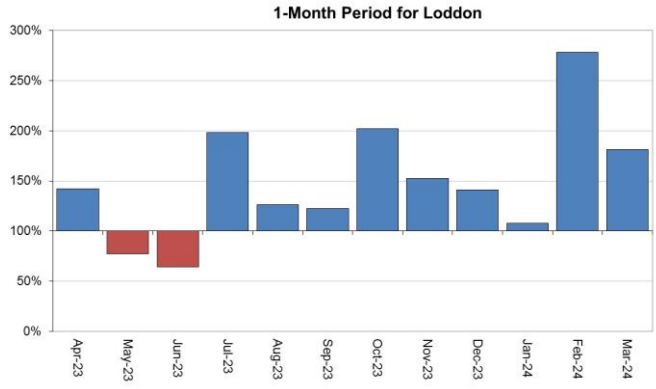
1-Month Period for Loddon
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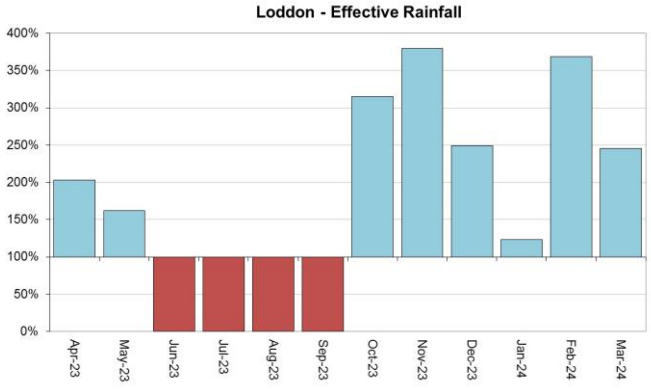
Loddon - Effective Rainfall
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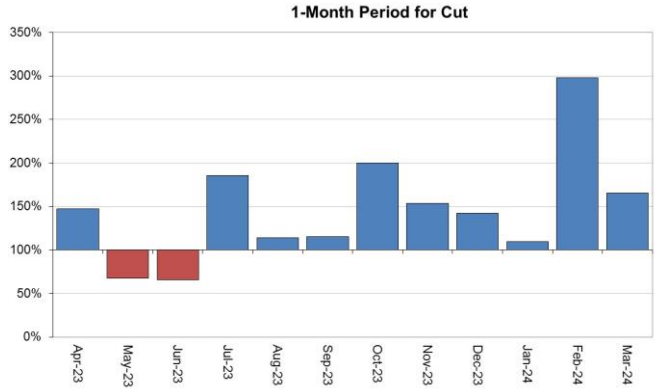
1-Month Period for Cut
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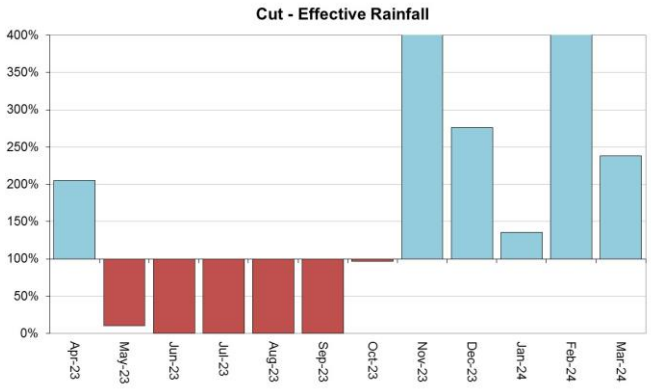
Cut - Effective Rainfall
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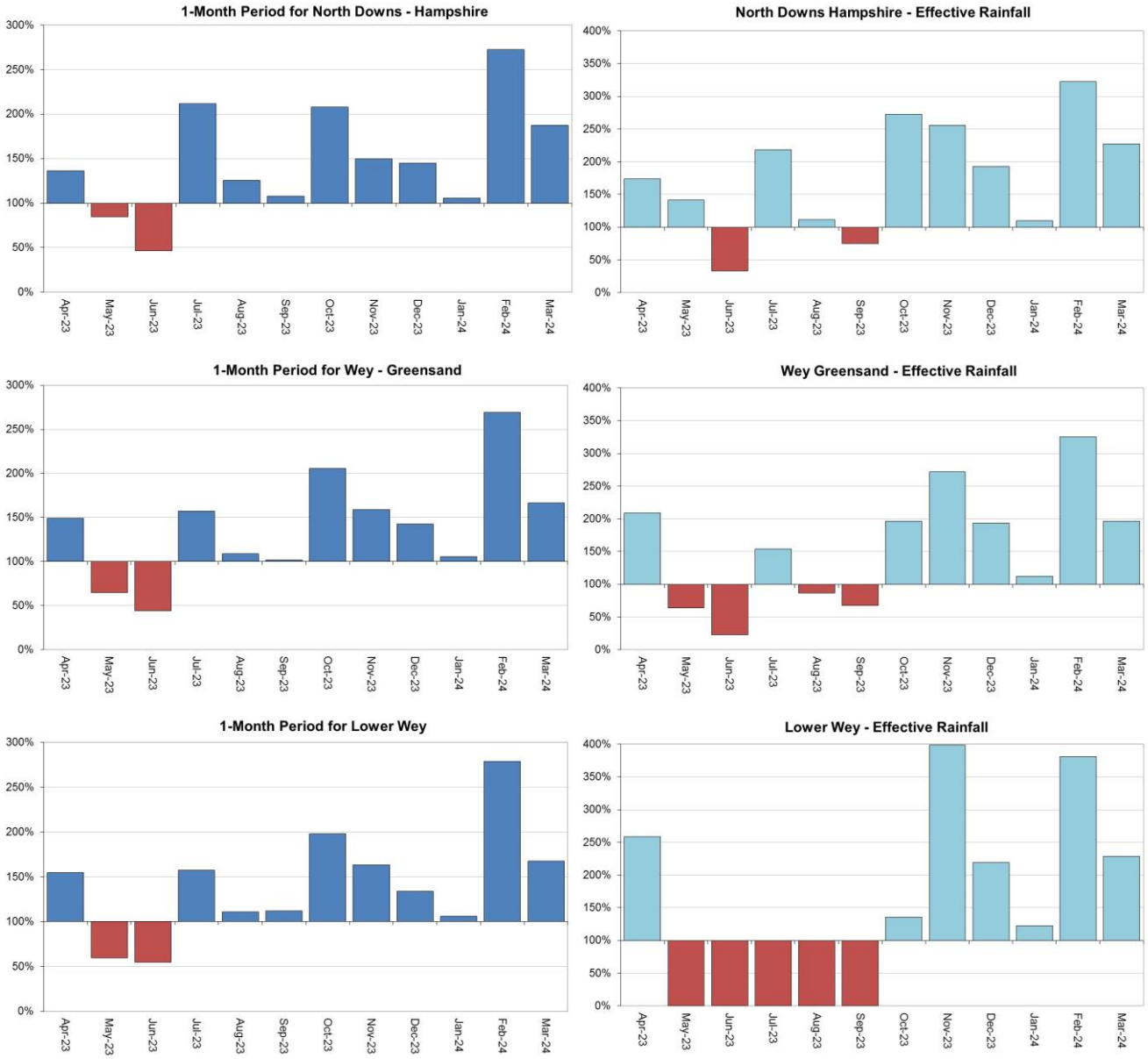


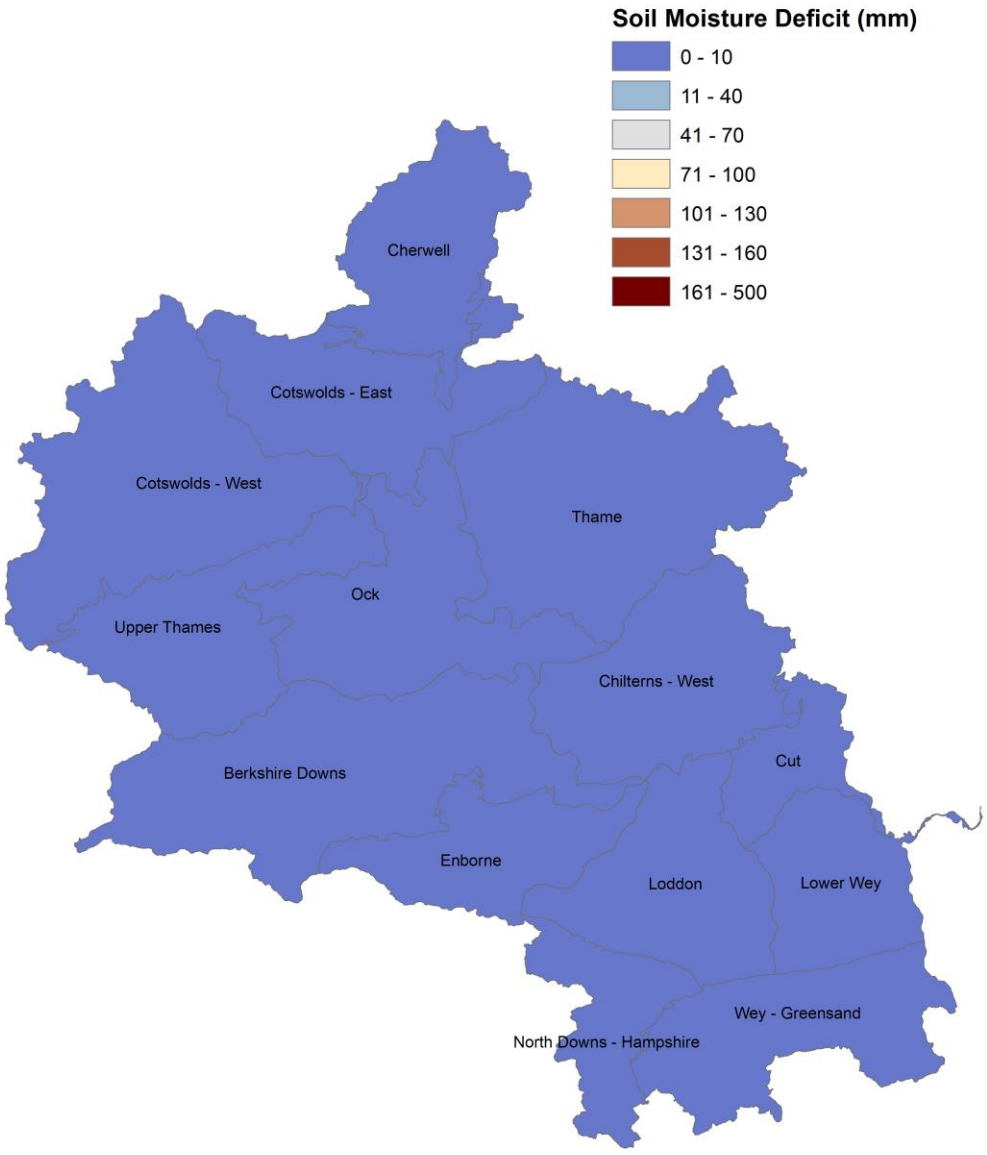
HadUK rainfall data. (Source: Met Office. Crown copyright, 2024).

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

3 Soil moisture deficit

3.1 Soil moisture deficit map

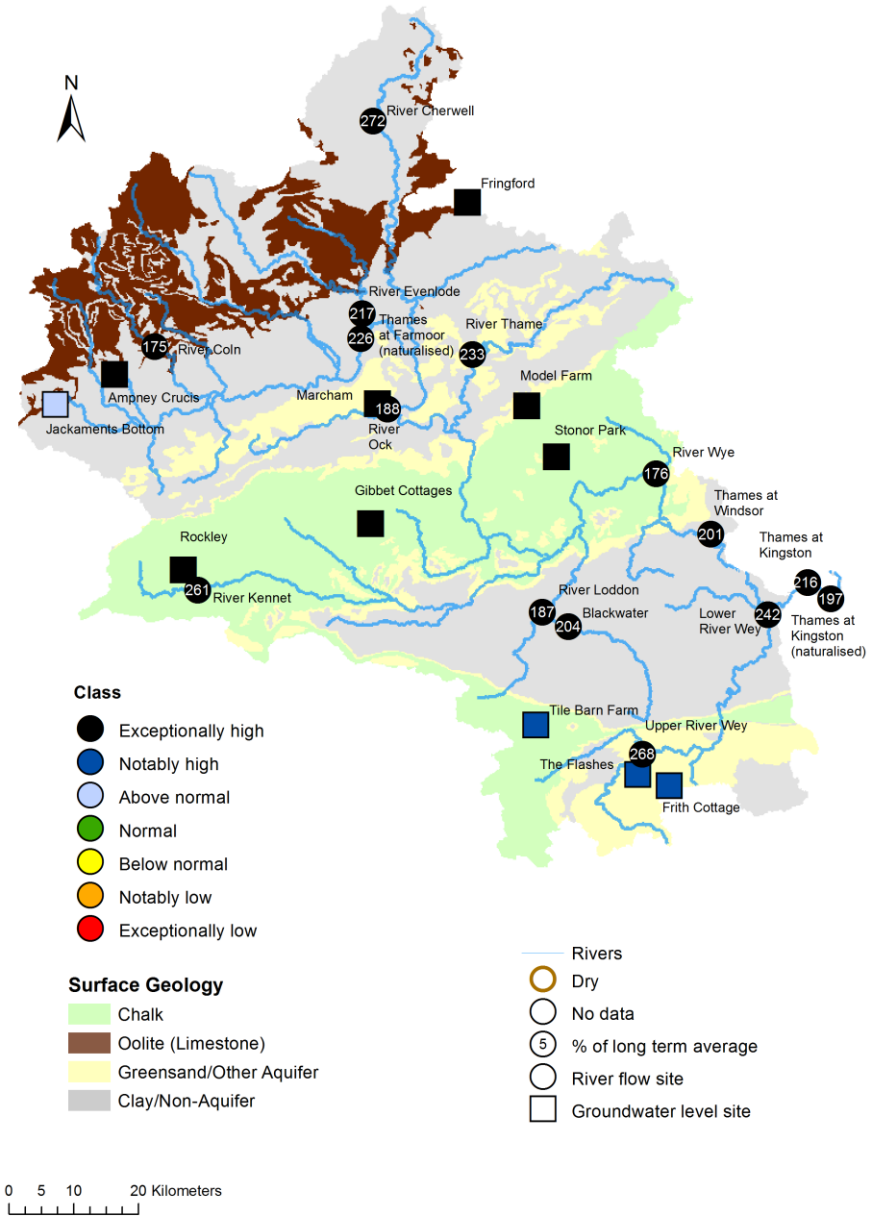
Figure 3.1: Soil moisture deficits for the week ending 31 March 2024. Shows the areal SMD estimate in millimetres.



4 River Flow and Groundwater Status

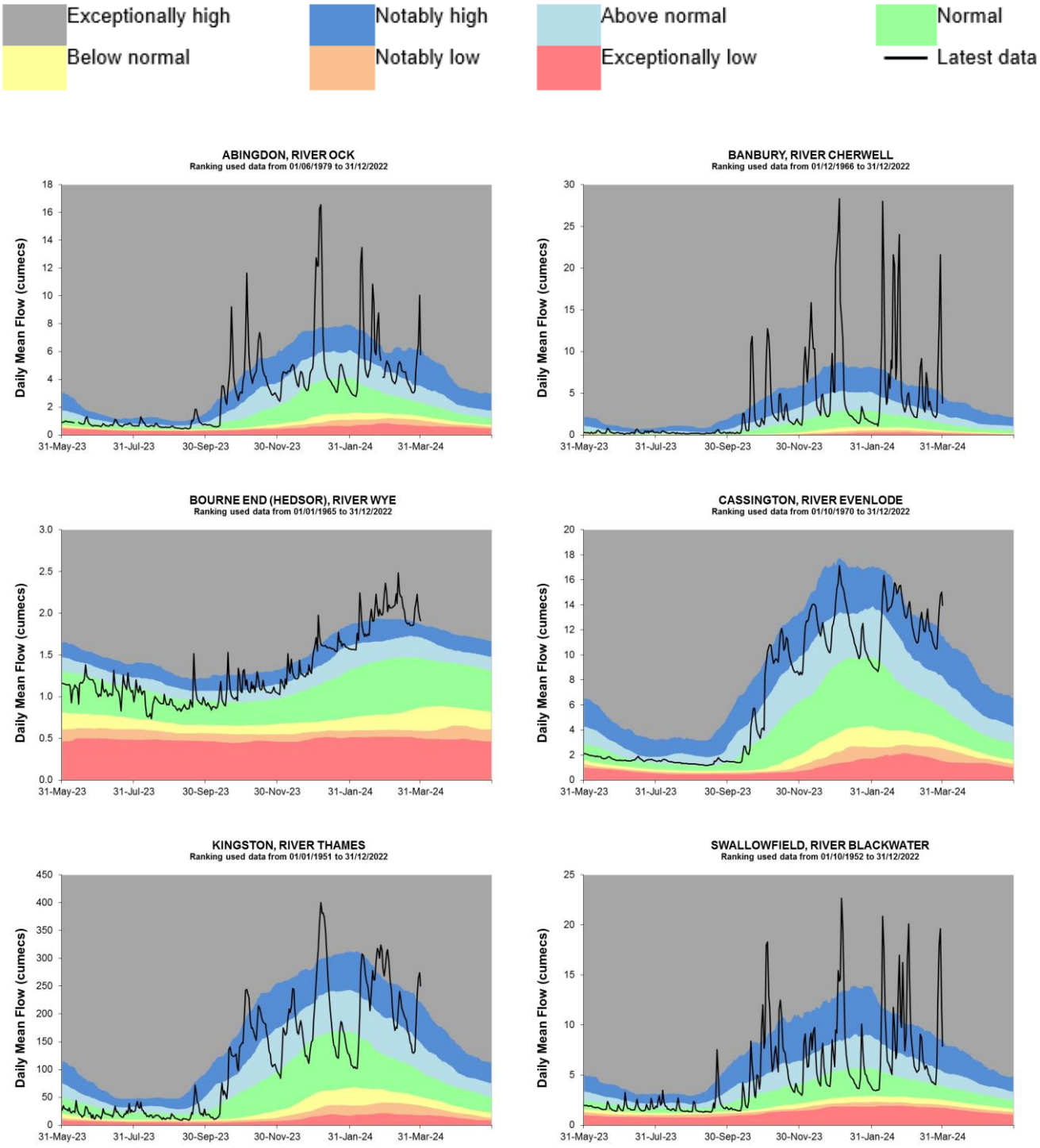
4.1 River flow and groundwater level map

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

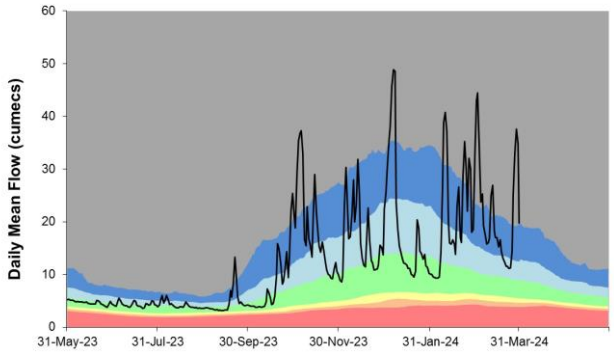


4.2 River flow charts

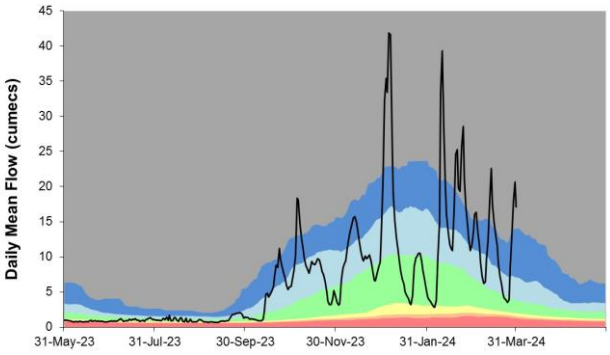
Figure 4.2: Daily mean river flows for indicator sites compared to an analysis of historic daily mean flows, and long term maximum and minimum flows.



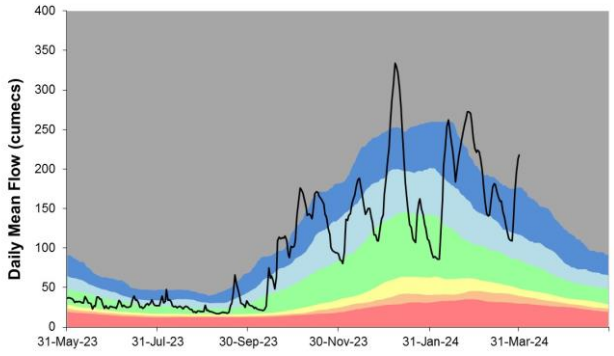
WEYBRIDGE, RIVER WEY
Ranking used data from 01/04/1979 to 31/12/2022



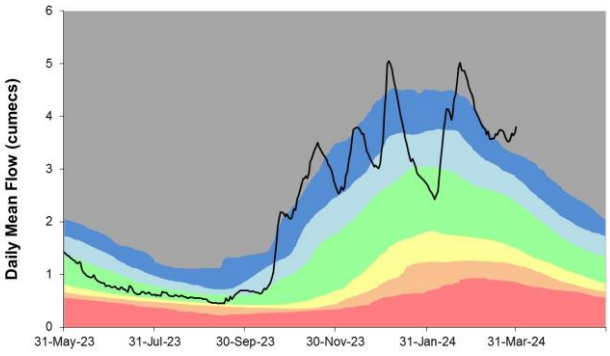
WHEATLEY, RIVER THAME
Ranking used data from 01/01/1990 to 31/12/2022



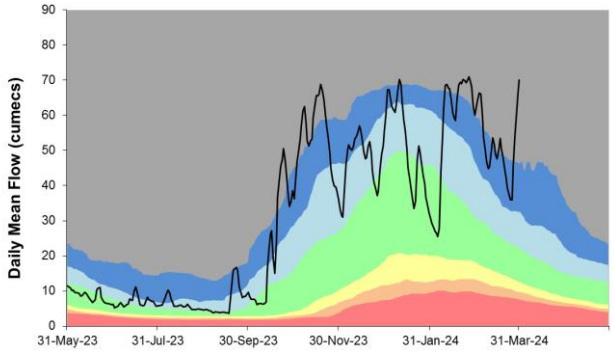
WINDSOR, RIVER THAMES
Ranking used data from 01/08/1979 to 31/12/2022



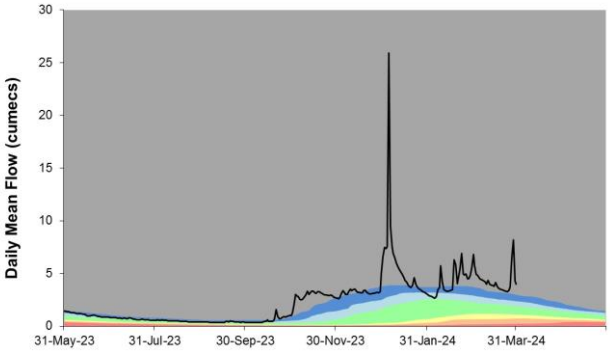
BIBURY, RIVER COLN
Ranking used data from 01/10/1963 to 31/12/2022

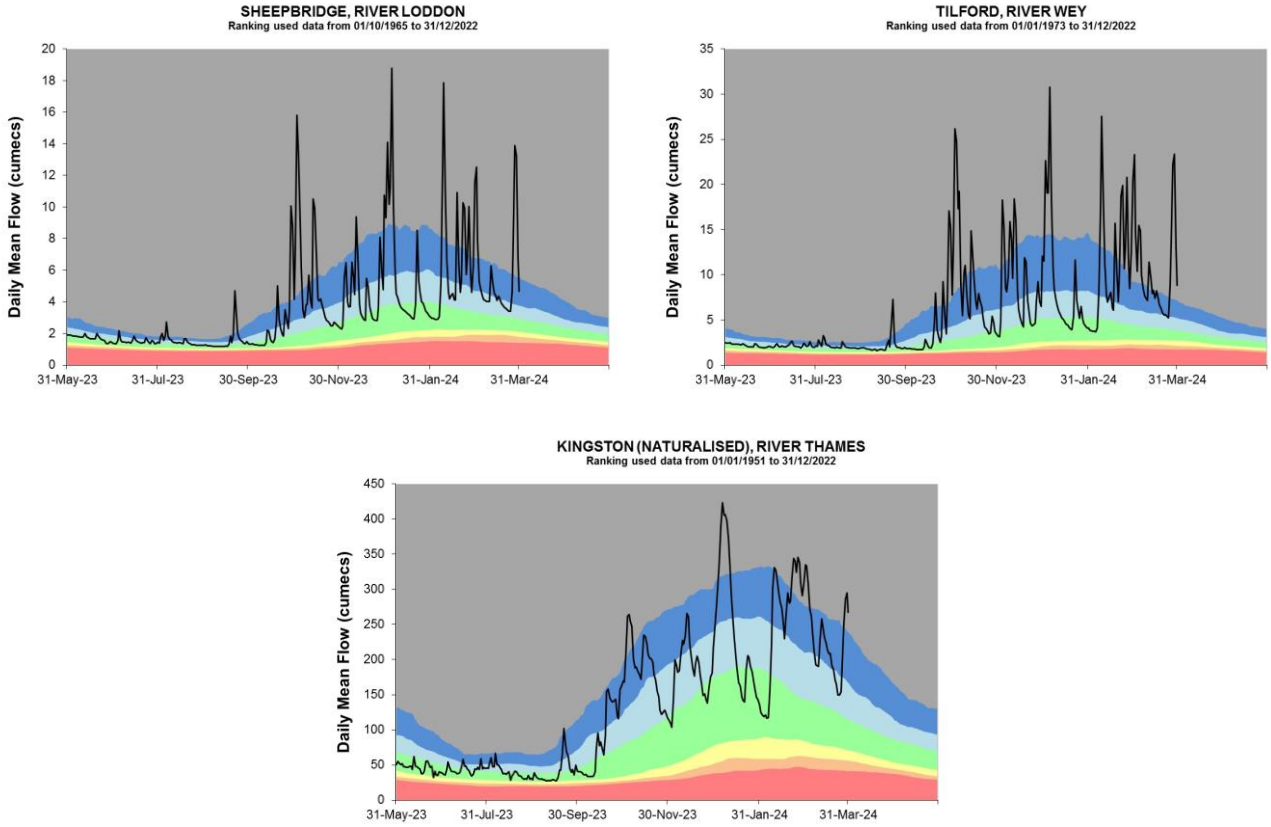


FARMOOR (NATURALISED), RIVER THAMES
Ranking used data from 01/10/1992 to 31/12/2022



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

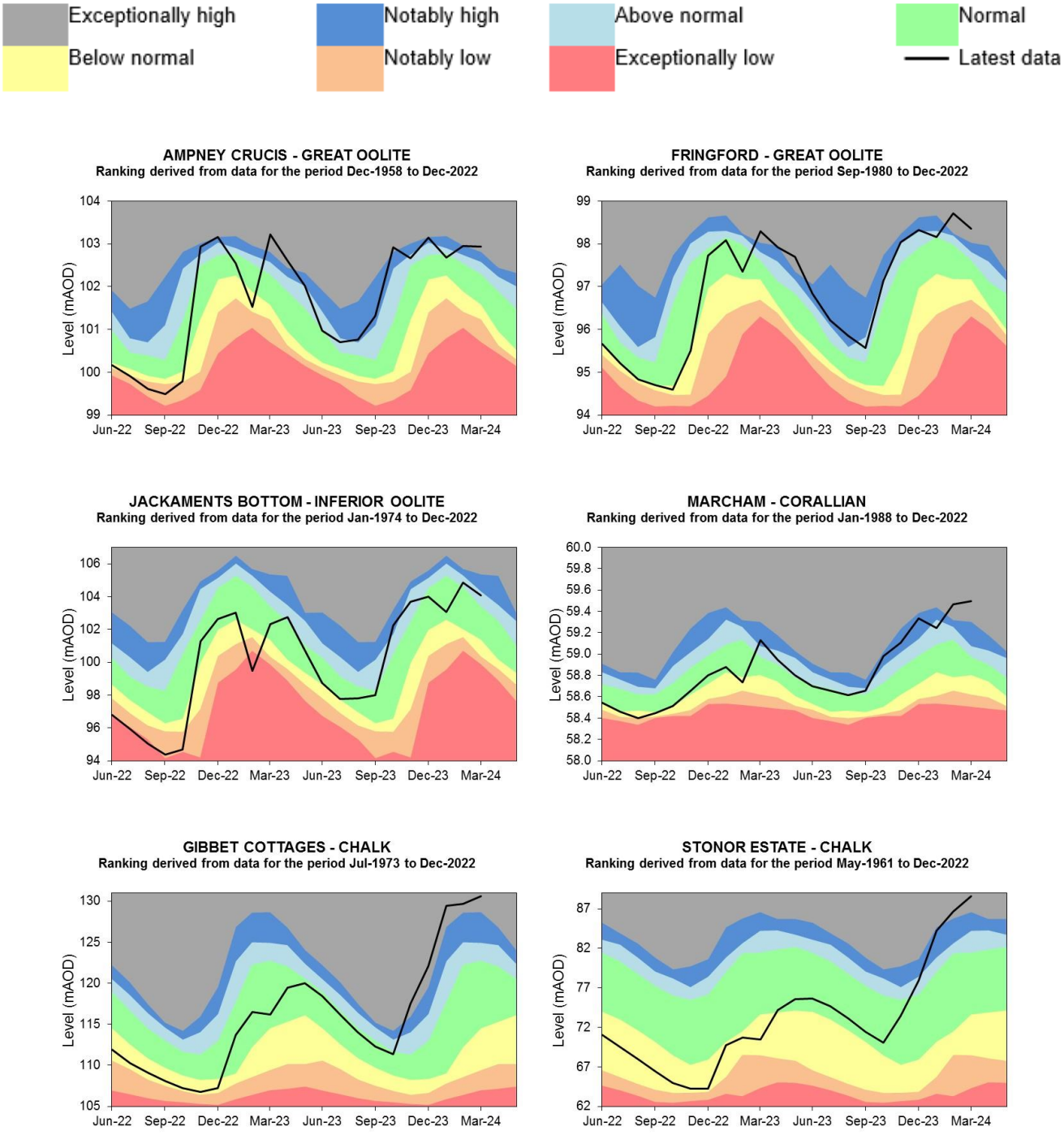


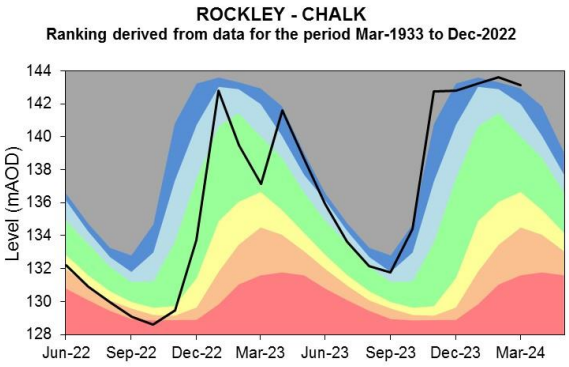


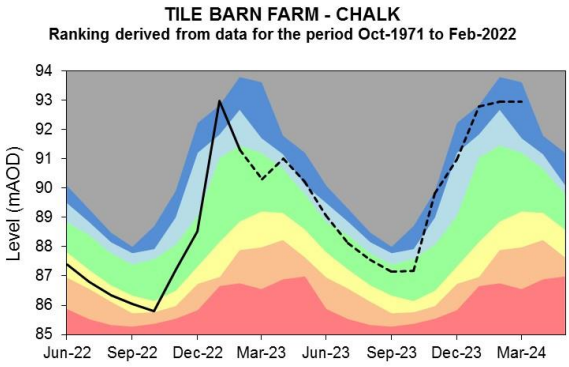
Source: Environment Agency.

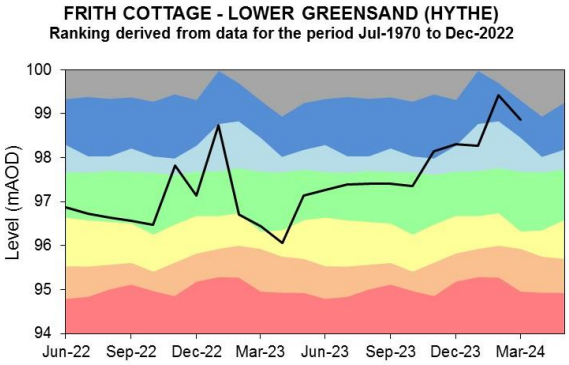
4.3 Groundwater level charts

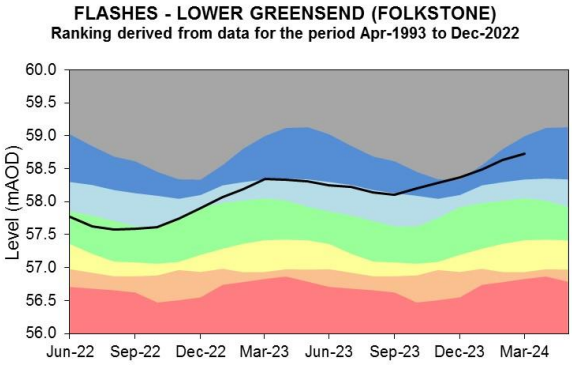
Figure 4.3: End of month groundwater levels for indicator sites, compared to an analysis of historic end of month levels, and long term maximum and minimum levels.

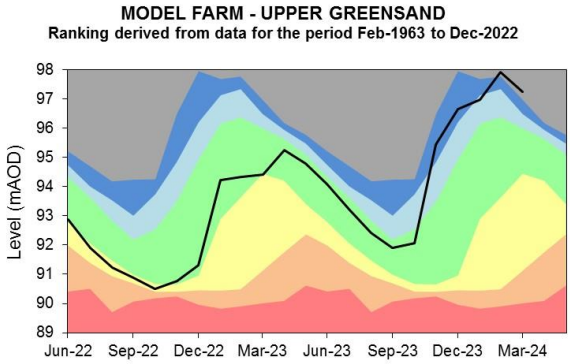










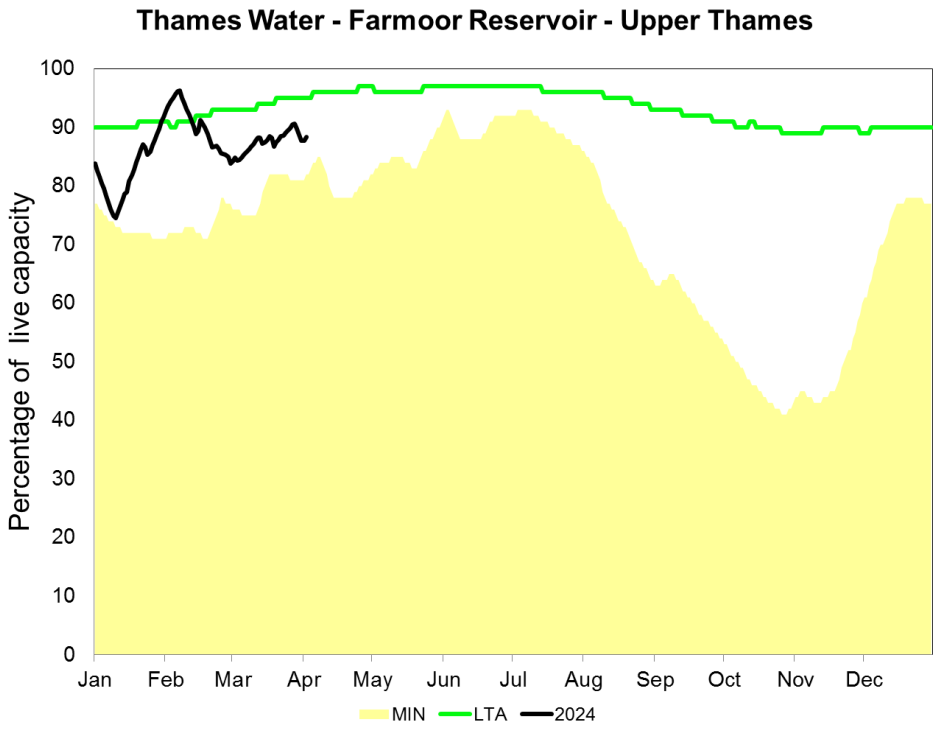


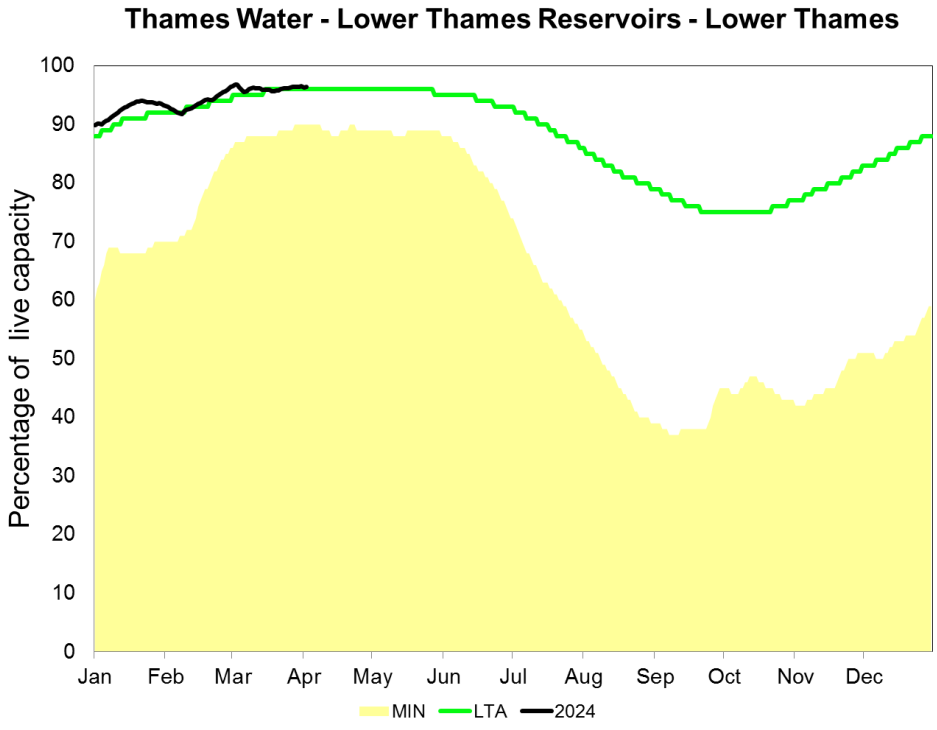
*Tile Barn Farm data has been estimated from two local sites since April 2022. A replacement is planned

Source: Environment Agency, 2024.

5 Reservoir stocks

Figure 5.1: End of month regional reservoir stocks compared to minimum and average stocks.

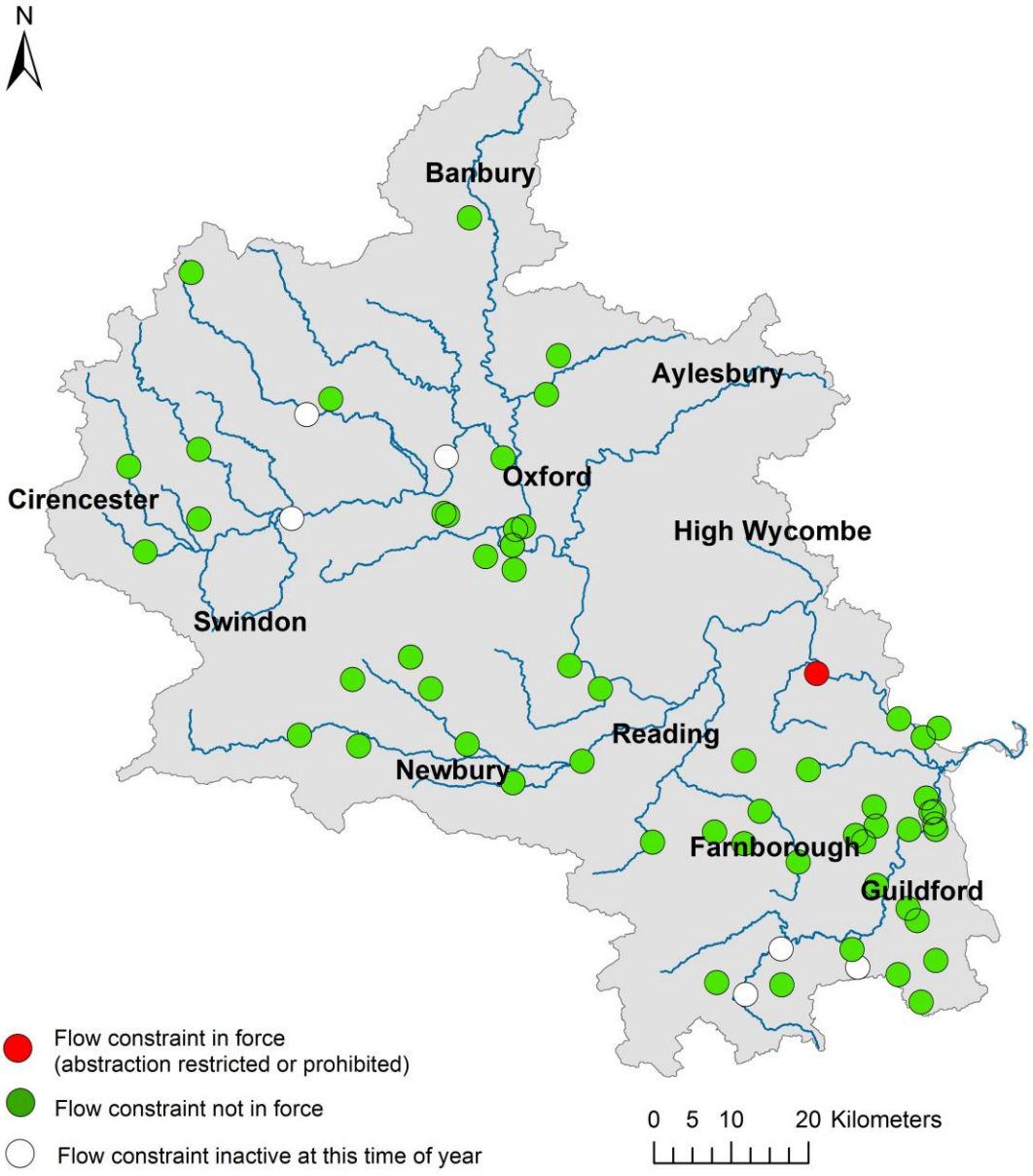




(Source: water companies).

6 Flow Constraints

6.1 Figure 6.1: End of month flow constraints in Thames Area.



6.2 Summary of flow constraints

Week ending	03/03/2024	10/03/2024	17/03/2024	24/03/2024	31/04/2024
	0	1	1	1	1

7 Summary of rainfall, effective rainfall and soil moisture deficit

7.1 Rainfall and effective rainfall

HadUK rainfall data (Source: Met Office Crown copyright 2024)
EA effective rainfall data (Source: EA Soil Moisture Model)

Area	Rainfall (mm) 31 day Total	Rainfall (mm) March LTA	Rainfall (mm) % LTA	Effective Rainfall (mm) 31 day total	Effective Rainfall (mm) March LTA	Effective Rainfall (mm) % LTA
Cotswolds - West	125	66	189	89	38	235
Cotswolds - East	103	58	179	68	31	216
Berkshire Downs	129	64	201	94	36	260
Chilterns - West	89	59	151	56	30	185
North Downs - Hampshire	133	71	188	97	43	227
Wey - Greensand	113	68	166	80	41	196
Upper Thames	101	55	183	63	26	248
Cherwell	98	56	176	63	29	215
Thame	83	51	165	48	23	213
Loddon	102	56	181	66	27	246
Lower Wey	90	54	167	57	25	229
Ock	84	50	168	47	21	221
Enborne	95	61	154	58	32	183
Cut	87	53	165	52	22	238
Thames Area	**102**	**59**	**174**	**67**	**30**	**222**

7.2 Soil moisture deficit

HadUK rainfall data (Source: Met Office Crown copyright 2024)
EA effective rainfall data (Source: EA Soil Moisture Model)

Area	SMD (mm) Day 31	SMD (mm) LTA
Cotswolds - West	0	7
Cotswolds - East	0	9
Berkshire Downs	0	8
Chilterns - West	2	8
North Downs - Hampshire	0	7
Wey - Greensand	1	7
Upper Thames	0	10
Cherwell	0	8
Thame	0	10
Loddon	2	8
Lower Wey	3	8
Ock	0	12
Enborne	0	7
Cut	3	11
Thames Area	**1**	**8**

7.3 Winter rainfall and effective rainfall

HadUK rainfall data (Source: Met Office Crown copyright 2024)
EA effective rainfall data (Source: EA Soil Moisture Model)

Winter period: 01/10/2023 to 31/03/2024						
Area	Rainfall (mm) Total	Rainfall (mm) LTA	Rainfall (mm) % LTA	Effective Rainfall (mm) Total	Effective Rainfall (mm) LTA	Effective Rainfall (mm) % LTA
Cotswolds - West	750	425	176	607	268	226
Cotswolds - East	654	366	179	481	204	237
Berkshire Downs	768	412	186	598	225	266
Chilterns - West	626	380	165	429	191	225
North Downs - Hampshire	815	476	171	614	290	212
Wey - Greensand	772	459	168	561	275	204
Upper Thames	661	355	186	479	156	306
Cherwell	607	344	177	410	164	251
Thame	562	325	173	371	138	269
Loddon	621	365	170	418	166	252
Lower Wey	589	350	168	381	160	238
Ock	567	320	177	363	118	307
Enborne	665	404	165	491	214	229
Cut	573	335	171	356	131	272
Thames Area	**659**	**380**	**174**	**468**	**193**	**243**

8 Glossary

8.1 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).

8.2 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.

9 Appendices

9.1 Rainfall table

Hydrological area	Mar 2024 rainfall % of long term average 1961 to 1990	Mar 2024 band	Jan 2024 to March cumulative band	Oct 2023 to March cumulative band	Apr 2023 to March cumulative band
Berkshire Downs	201	Exceptionally High	Exceptionally high	Exceptionally high	Exceptionally high
Chilterns West	151	Notably High	Exceptionally high	Exceptionally high	Exceptionally high
Cotswold East	179	Exceptionally High	Exceptionally high	Exceptionally high	Exceptionally high
Cotswold West	189	Exceptionally High	Exceptionally high	Exceptionally high	Exceptionally high
Cut	165	Notably High	Exceptionally high	Exceptionally high	Exceptionally high
Enborne	157	Notably High	Exceptionally high	Exceptionally high	Exceptionally high
Loddon	181	Notably High	Exceptionally high	Exceptionally high	Exceptionally high
Lower Wey	167	Notably High	Exceptionally high	Exceptionally high	Exceptionally high
North Downs - Hampshire	188	Exceptionally High	Exceptionally high	Exceptionally high	Exceptionally high

Ock	167	Notably High	Exceptionally high	Exceptionally high	Exceptionally high
Thame	165	Notably High	Exceptionally high	Exceptionally high	Exceptionally high
Upper Cherwell	176	Notably High	Exceptionally high	Exceptionally high	Exceptionally high
Upper Thames	182	Exceptionally High	Exceptionally high	Exceptionally high	Exceptionally high
Wey - Greensand	167	Notably High	Exceptionally high	Exceptionally high	Exceptionally high

9.2 River flows table

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

Weybridge	River Wey	Wey Addleston Bourne	Exceptionally high	Notably high
Wheatley	River Thame	Thame	Exceptionally high	Notably high
Windsor	River Thames	Thames	Exceptionally high	Notably high
Kingston (naturalised)	River Thames	Thames North Bank	Exceptionally high	Notably high

9.3 Groundwater table

Site name	Aquifer	End of Mar 2024 band	End of Feb 2024 band
Ampney Crucis Obh	Burford Oolitic Limestone (great)	Exceptionally high	Notably high
Frith Cottage	Godalming Lower Greensand	Notably high	Notably high
Gibbet Cottages Obh	Berkshire Downs Chalk	Exceptionally high	Exceptionally high
Jackaments Bottom Obh	Burford Oolitic Limestone (inferior)	Above normal	Above normal
Marcham Obh	Shrivenham Corallian	Exceptionally high	Exceptionally high
Model Farm	Chiltern Upper Greensand	Exceptionally high	Exceptionally high
Rockley Obh	Berkshire Downs Chalk	Exceptionally high	Exceptionally high
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	Notably high

Fringford P.s.	Upper Bedford Ouse Oolitic Limestone (great)	Exceptionally high	Exceptionally high