

A4.3.5 Water quality

The risks to water quality are evidenced through measured data from the one Environment Agency water quality monitoring site that is present in Reach 3 (Error! Reference source not found.): River Thames (Thames at Sutton Bridge, Culham). To further inform the baseline, continuous sampling has also been undertaken at one Thames Water monitoring site in Reach 3 (Thames at Culham).

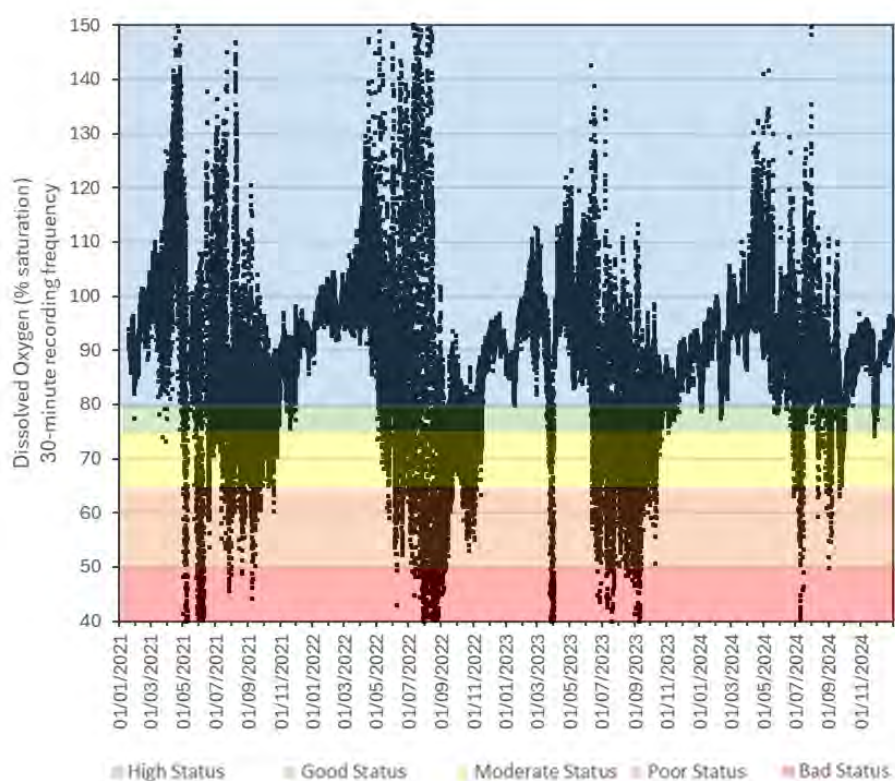
The average pH over the ten-year review period (Environment Agency data) was 8.1 and the 98th percentile water temperature from 30-minute data over a four-year review period (Thames Water data) was 22.2°C in the upper areas of Reach 3 (River Thames).

Dissolved oxygen saturation

Dissolved oxygen saturation was reviewed and Thames Water data are presented in **Figure A4-11** for upper areas of Reach 1 against the relevant WFD standards for a lowland high alkalinity river²¹.

30-minute dissolved oxygen saturation measurements at Thames at Culham were highly variable with a very strong seasonal pattern. Considerable supersaturation during spring and summer months overlaps with and is followed by considerable and usually prolonged sags from June to October. Considerable diurnal variability is also recorded, except in winter.

Figure A4-11 Dissolved Oxygen Saturation in River Thames (Thames at Culham), Incorporating Appropriate WFD Status Bands for spot sampling data



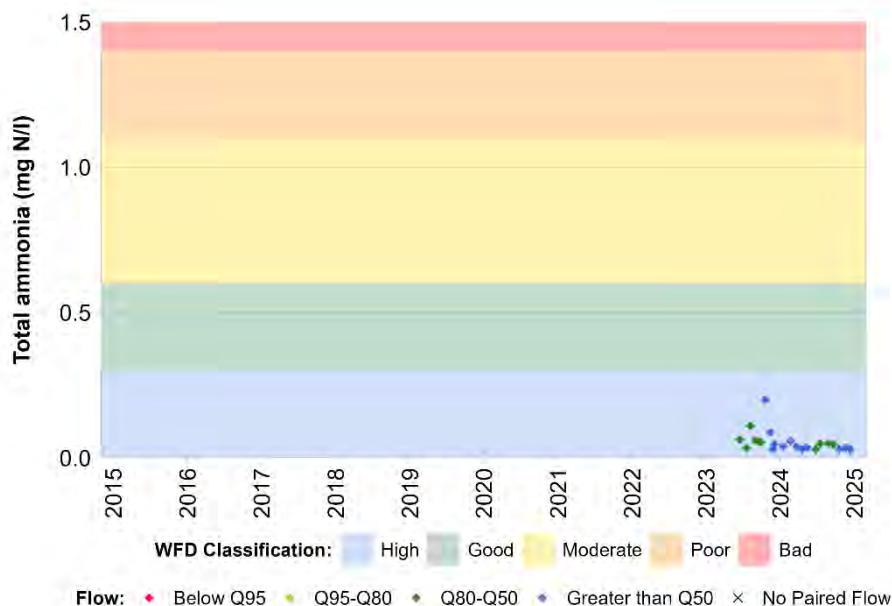
Total ammonia concentration

Total ammonia concentration was reviewed and Environment Agency data are presented in **Figure A4-12** for upper Reach 3 against the relevant WFD standards for a lowland high alkalinity river²².

²¹ The River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2015. ISBN 978-0-85521-192-9.

²² The River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2015. ISBN 978-0-85521-192-9.

Figure A4-12 Total Ammonia in River Thames (Thames at Sutton Bridge, Culham), Incorporating Appropriate WFD Status Bands

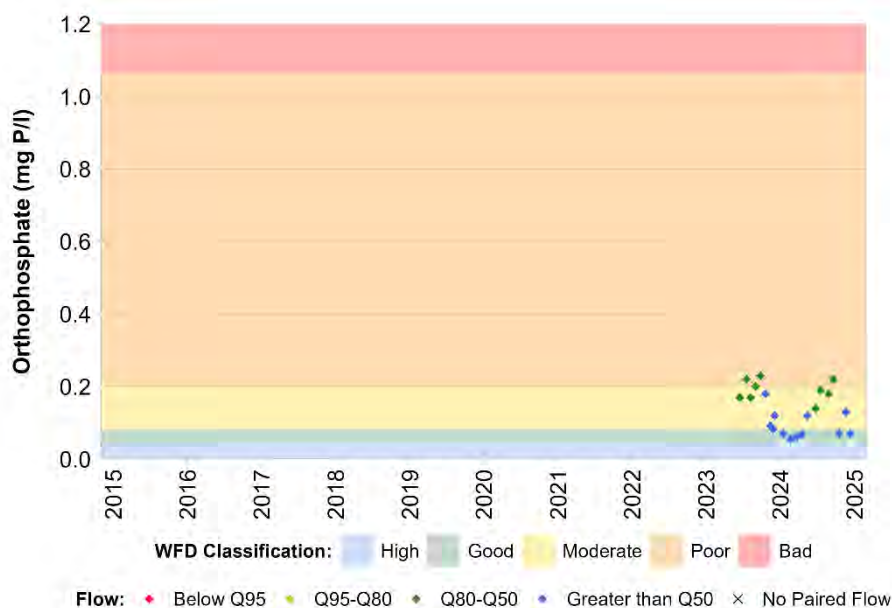


Total ammonia concentrations at Thames at Sutton Bridge, Culham were consistent with the WFD standard to support High status for fish and invertebrates (0.3 mg/l). No association between total ammonia concentration and river flows are apparent at the nearby Sutton Courtenay gauging station.

SRP Concentration

SRP concentration was reviewed and Environment Agency data are presented in **Figure A4-13** for upper Reach 3 against the site specific relevant WFD standards provided by the Environment Agency for a lowland high alkalinity river²³.

Figure A4-13 SRP concentration in River Thames (Thames at Sutton Bridge, Culham), Incorporating Appropriate WFD Status Bands



²³ The River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2015. ISBN 978-0-85521-192-9.

SRP concentrations at Thames at Sutton Bridge, Culham were variable and typically within the WFD standards to support Moderate-Good status for diatoms and macrophytes (0.214-0.086 mgP/l). Seasonality and low flow association was noted with higher concentrations in summer/autumn and lower concentration in winter/spring.

A summary description of the potential risks to water quality in Reach 3 as a result of drought options is presented in **Table A4-19**.

Table A4-19 Potential risks to water quality in Reach 3 as a result of Farmoor drought permit

	Dissolved Oxygen	Total ammonia	SRP
General quality	30-minute dissolved oxygen saturation values were highly variable High-Bad, dependent on season. Strong seasonality apparent with supersaturation and considerable diurnal variability.	Ammonia concentrations were consistent with High WFD status (0.3 mg/l) throughout the monitoring period. No seasonality or association with differing flows is apparent.	SRP concentrations were variable and not consistent with Good WFD status (0.08 mgP/l). Strong seasonality and flow association is apparent.
Summary	No general risk.	No general risk.	High risk associated with reduced flushing rates

Bathing water quality

There are two designated bathing water sites in Reach 3 (**Figure A4-8**): Wallingford Beach and Pangbourne Meadow. For 2026 Wallingford Beach is classified as Sufficient bathing water quality²⁴, while Pangbourne Meadow is not classified as the site was designated in 2026, therefore will be classified after the 2026 bathing season has ended²⁵.

Potential impacts of drought permit implementation on this receptor will be considered in **Appendix B**, and any monitoring and mitigation outlined in **Appendix C**.

A4.3.6 Environmental pressures to flow and water quality

Flow pressures (other abstractions)

It was agreed during the consultation process in preparing the EARs that for DP completion, licensed abstractions less than 0.5 MI/d only need to be identified within the reports and do not require assessment (see 'the Methodology').

Table A4-20 Ground and Surface water abstractions, Reach 3

Name	Licence Number	Abstraction source (GW only)	Holder	Use	Peak daily abstraction limit and licence conditions
Groundwater abstractions (between the River Thame and River Pangbourne confluences in Reach 3)					
H R Wallingford Borehole (GW1)	TH/039/0018/001/R01	Upper Greensands	Hr Wallingford Ltd	Non-Evaporative Cooling	1.07 MI/d
Gatehampton Pumping Station (GW2)	28/39/23/0173	White Chalk Subgroup	Thames Water	Potable Water Supply - Direct	105 MI/d constrained to 101.5 MI/d when flows below 400 MI/d in the River Thames at Reading gauging station
Cleeve Pumping Station (GW3)	28/39/23/0009	White Chalk Subgroup	Thames Water	Potable Water Supply - Direct	16.4 MI/d
Woods Farm Pumping Station (GW4)	28/39/20/0011	White Chalk Subgroup	Thames Water	Potable Water Supply - Direct	3.41 MI/d

²⁴ Environment Agency. 2026 Bathing Water Profile for Wallingford Beach, River Thames. Available at: <https://environment.data.gov.uk/bwq/profiles/profile.html?site=ukj1403-11947> (Accessed: 25 August 2026).

²⁵ Environment Agency. 2026 Bathing Water Profile for Pangbourne Meadow, River Thames. Available at: <https://environment.data.gov.uk/bwq/profiles/profile.html?site=ukj1102-11941> (Accessed: 25 August 2026).

Name	Licence Number	Abstraction source (GW only)	Holder	Use	Peak daily abstraction limit and licence conditions
Pangbourne Pumping Station (GW5)	28/39/21/0007	White Chalk Subgroup	Thames Water	Potable Water Supply - Direct	38.6 MI/d
Ashridge Wood Groundwater Scheme BH	28/39/21/0067	Chalk	Environment Agency	Environmental – Transfer Scheme	38.5 MI/d
Compton, Newbury	28/39/21/0041	Chalk	Institute for Animal Health	Industrial, Commercial And Public Services	0.7 MI/d
Icknield Way, Ewelme	28/39/18/0013	Lower Greensand	S Grundon (Ewelme) Ltd	Industrial, Commercial And Public Services	0.5 MI/d
Howberry Park, Wallingford, - Well 'C'	28/39/18/0079	Upper Greensand and Gravels	Hr Wallingford Ltd	General Use Relating To Secondary Category (Low Loss)	0.49 MI/d
Greenlands Farm, Moulsoford	28/39/20/0053	Chalk	Beacroft (Farms) Ltd	General Farming & Domestic	0.25 MI/d
Didcot, Oxfordshire	TH/039/0020/004	Chalk	Mr C T Allen, Mr A R Allen, Mr G W Allen	Agriculture	0.2 MI/d
St Peters Farm, North Moreton	28/39/20/0052	Upper Greensand	Slade	Agriculture	0.2 MI/d
Greenlands Farm, Moulsoford	28/39/20/0053	Chalk	Beacroft Farms Ltd	Agriculture	0.2 MI/d
Goring & Streatley Golf Club, Streatley (Borehole)	28/39/20/0070/R01	Chalk	Goring & Streatley Golf Club	Spray Irrigation - Direct	0.14 MI/d
Turners Court, Benson	28/39/23/0082	Chalk	Passmore Brothers	Agriculture	0.09 MI/d
Child-Beale Wildlife Trust, Lower Basildon	28/39/20/0063	Chalk	Trustees Child Beale Trust	General Farming & Domestic	0.068 MI/d
Starveall Farm, Moulsoford	28/39/20/0046	Chalk	Osmond	Agriculture	0.06 MI/d
Cadleys Farm, South Stoke, Goring, Oxon	28/39/23/0122	Chalk	Mr M Bullock	General Farming & Domestic	0.045 MI/d
Pangbourne, Berkshire	28/39/21/0077	Chalk	Agriculture	0.04 MI/d	Pangbourne, Berkshire
Bower Farm, Aldworth	28/39/20/0064	Chalk	Walters	Agriculture	0.04 MI/d
Black Barn Borehole/Sheep cote Borehole	TH/039/0023/005	Chalk	Mr C T Allen	Animal Watering & General Use In Non Farming Situations	0.035 MI/d
Manor Farm, West Hagbourne	28/39/20/0043	Chalk	Hagbourne Farm Partners	Agriculture	0.033 MI/d
New Buildings, Blewbury	28/39/20/0050	Chalk	Beeswax Farming	Agriculture	0.03 MI/d

Name	Licence Number	Abstraction source (GW only)	Holder	Use	Peak daily abstraction limit and licence conditions
			(Rainbow) Limited		
Haddon and Fulscot Farms, Didcot	28/39/20/0029	Upper Greensand	A G Hedges Farms Ltd	Agriculture	0.028 MI/d

Surface water abstractions

Culham Weir	TH/039/0015/003	n/a	Trustees of Mrs P V E Morrell's Marriage Settlement	Production of Energy	2300 MI/d
Culham Weir	TH/039/0015/006	n/a	Trustees of Mrs P V E Morrell's Marriage Settlement	Environmental Transfer between Sources (Fish passage)	Culham Weir
Abingdon Weir	TH/039/0016/021	n/a	Abingdon Hydro Ltd	Production of Energy	921 MI/d
Abingdon Weir	TH/039/0016/022	n/a	Abingdon Hydro Ltd	Environmental Transfer between Sources (Fish passage)	
River Thames - Mill Race, Mapledurham Mill (SW11)	28/39/23/0200	n/a	The Mapledurham 1997 Trust	Transfer Between Sources (Post Water Act 2003)	691.2 MI/d. Constrained when flows in the River Thames at Reading gauging station are below 457.9 MI/d
Didcot Power Station Intake - River Thames (SW6)	28/39/18/0059	n/a	RWE Npower Plc	Evaporative Cooling	204.6 MI/d
Culham Waterworks - River Thames (SW4)	28/39/15/0006	n/a	Thames Water	Potable Water Supply - Direct	4.55 MI/d. Constrained when naturalised flows are below 182 MI/d in the River Thames at Days Weir gauging station
Culham Waterworks	28/39/15/006	n/a	Thames Water	Potable Water Supply - Direct	4.5 MI/d
River Thames - Christchurch Meadows (SW12)	28/39/23/0199/TR	n/a	Reading Borough Council	Transfer Between Sources (Post Water Act 2003)	4.8 MI/d
Severalls Farm, Shillingford, - River Thames (SW7)	28/39/18/0082	n/a	W C Emmett & Sons Ltd	Spray Irrigation - Direct	2.73 MI/d
Blackalls Farm, Cholsey, - River Thames (SW8)	28/39/20/0059	n/a	Hall Farm South Moreton Ltd	Spray Irrigation - Direct	0.73 MI/d
Water Course At Manor Farm, South Stoke, Berkshire (SW9)	28/39/23/0089	n/a	Mr M Bullock	Spray Irrigation - Direct	0.60 MI/d
Streatley Farm, Streatley, - River Thames (SW10)	28/39/20/0012	n/a	R Bishop & Partners	Spray Irrigation - Direct	0.60 MI/d

Name	Licence Number	Abstraction source (GW only)	Holder	Use	Peak daily abstraction limit and licence conditions
Oday Hill, Drayton	28/39/18/0074	n/a	Spray Irrigation - Storage	0.7 MI/d	Oday Hill, Drayton
Warren Farm, Culham	28/39/15/0030	n/a	Cauldwell and Sons Ltd	Agriculture	0.55 MI/d
River Thames At Park Farm, Mapledurham	28/39/23/0100	n/a	The Mapledurham 1997 Trust	Spray Irrigation - Direct	0.46 MI/d
Uptown Farm, Sutton Courtenay, - River Thames	28/39/18/0019	n/a	C E Allen & Son	Spray Irrigation - Direct	0.27 MI/d

Water Quality Pressures

Discharges put pressure on water quality during a drought as lower than normal river flows mean that there is less water available to dilute discharges such as final effluent from STWs. Discharges that impact the oxygen balance, ammonia and SRP concentration in the river reaches have been reviewed. Any local discharges may be considered as beneficial as they contribute more flow to rivers however they may also pose risks to water quality (noting that only abstractions are considered as flow pressures in the section above). A summary of water quality pressures from discharges is provided in **Table A4-21** below. The Farmoor drought permit is predicted to decrease river flow by 30 MI/d. A reduction in river flow will lead to a reduction in STW effluent dilution and subsequent changes in the concentrations of selected variables (e.g. BOD, SRP, etc.).

Table A4-21 Summary of Significant Water Quality Pressures in Impacted River Reaches of the Farmoor Drought Permit (Reach 3)

Consent number, holder, use	Consent conditions*	Risk to water quality
CTCR.0709, Oxford STW, Sewage Disposal Works - Water Company	51MI/d DWF 3 mg/l Ammonia (N) 95%ile (Max Summer 14 mg/l, Max Winter 20 mg/l 95%ile) 10 mg/l BOD ATU 95%ile (Max 50 BOD ATU 95%ile)	High risk (associated with SRP and total ammonia)
CTCR.1804, Abingdon STW (to Odhay Hill Ditch), Sewage Disposal Works - Water Company	8.3 MI/d DWF 5 mg/l Ammonia (N) 95%ile (Summer Max 14 mg/l and Winter Max 20 mg/l Ammonia (N) 95%ile) 10 mg/l BOD ATU 95%ile (Max 44 BOD ATU 95%ile) 2 mg/l Total Phosphorous (annual average)	Medium risk
CNTM.0413 Abingdon STW (outfall to River Thames), Sewage Disposal Works - Water Company	4.5 MI/d DWF 15 mg/l Ammonia (N) 95%ile (Max 44 mg/l Ammonia (N) 95%ile) 20 mg/l BOD ATU 95%ile (Max 50 BOD ATU 95%ile)	Medium risk
CATM.3524, Benson STW, Sewage Disposal Works - Water Company	2.5 MI/d DWF 3 mg/l Ammonia (N) 95%ile (Summer Max 14 mg/l and Winter Max 20 mg/l Ammonia (N) 95%ile) 10 mg/l BOD ATU 95%ile (Max 50 BOD ATU 95%ile)	Low risk
CNTW.0872, Culham Laboratory, Culham – Trade Discharge	1.0 MI/d DWF	

* Note that not all STWs have water quality consents relating to ammonia or total phosphorous (depends on size and location of STW). Consents are set with respect to total phosphorous rather than SRP.

Under dry weather flow conditions and consented limits, Oxford STW increases River Thames BOD concentrations by approximately 7.3 mg/l (not accounting for baseline BOD concentrations in the river). The WFD standard for high status for BOD in the River Thames is 4 mg/l. Reducing the dilution of STW effluent would increase the influence that BOD load in the STW effluent would have on load in the river. Not accounting for baseline BOD concentrations in the river, the BOD concentration in the river due to Oxford STW would increase by 44% (to 13.1 mg/l) as a result of the drought permit. The discharge additions from this STW therefore present a high risk to the in-river oxygen balance in Reach 3.

Under dry weather flow conditions and consented limits, Oxford STW increases River Thames total ammonia concentrations by approximately 2.2 mg/l (not accounting for baseline total ammonia concentrations in the river). The WFD standard for high status for total ammonia in the River Thames is 0.3 mg/l. Reducing the dilution of STW effluent would increase the influence that total ammonia load in the STW effluent would have on load in the river. Not accounting for baseline total ammonia concentrations in the river, the total ammonia concentration in the river due to Oxford STW would increase by 44% (to 3.9 mg/l) as a result of the drought permit. The additions from this STW therefore present a high risk to the in-river total ammonia balance in Reach 3.

Under dry weather flow conditions and consented limits, Oxford STW increases River Thames SRP concentrations by approximately 0.73 mg/l (not accounting for baseline SRP concentrations in the river). The WFD standard for high status for SRP in the River Thames is 0.05 mg/l. Reducing the dilution of STW effluent would increase the influence that SRP load in the STW effluent would have on load in the river. Not accounting for baseline SRP concentrations in the river, the SRP concentration in the river due to Oxford STW would increase by 44% (to 1.3 mg/l) as a result of the drought permit. The additions from this STW therefore present a high risk to the in-river SRP balance in Reach 3.

Oxford STW is therefore assessed as presenting a high risk to water quality in Reach 3 during implementation of the Farmoor drought permit, associated with dissolved oxygen, total ammonia and SRP.

Under dry weather flow conditions and consented limits, Abingdon STW increases River Thames BOD concentrations by approximately 0.72 mg/l (via Odhay Hill Ditch) and 0.52 mg/l (via River Thames outfall) (not accounting for baseline BOD concentrations in the river). The WFD standard for high status for BOD in the River Thames is 4 mg/l. Reducing the dilution of STW effluent would increase the influence that BOD load in the STW effluent would have on load in the river. Not accounting for baseline BOD concentrations in the river, the BOD concentration in the river due to Abingdon STW would increase by 18% (to 0.87 mg/l and 0.29 mg/l for the two outfalls respectively²⁶) as a result of the drought permit. The additions from this STW therefore present a low risk to the in-river oxygen balance.

Under dry weather flow conditions and consented limits, Abingdon STW increases River Thames total ammonia concentrations by approximately 0.24 mg/l (via Odhay Hill Ditch) and 0.39 mg/l (via River Thames outfall) (not accounting for baseline total ammonia concentrations in the river). The WFD standard for high status for total ammonia in the River Thames is 0.3 mg/l. Reducing the dilution of STW effluent would increase the influence that total ammonia load in the STW effluent would have on load in the river. Not accounting for baseline total ammonia concentrations in the river, the total ammonia concentration in the river due to Abingdon STW would increase by 18% (to 0.29 mg/l and 0.47 mg/l for the two outfalls respectively²⁷) as a result of the drought permit. The discharge additions from this STW therefore present a medium risk to the in-river total ammonia balance.

Under dry weather flow conditions and consented limits, Abingdon STW increases River Thames SRP concentrations by approximately 0.10 mg/l (via Odhay Hill Ditch) and 0.05 mg/l (via River Thames outfall) (not accounting for baseline SRP concentrations in the river). The WFD standard for high status for SRP in the River Thames is 0.05 mg/l. Reducing the dilution of STW effluent would increase the influence that SRP load in the STW effluent would have on load in the river. Not accounting for baseline SRP concentrations in the river, the SRP concentration in the river due to Abingdon STW would increase by 18% (to 0.12 mg/l and

²⁶ Based on consent conditions and low flow statistics (Q95) with and without the drought permit in place

²⁷ Based on consent conditions and low flow statistics (Q95) with and without the drought permit in place

0.06 mg/l for the two outfalls respectively²⁸) as a result of the drought permit. The discharge additions from this STW therefore present a medium risk to the in-river SRP balance.

Abingdon STW is therefore assessed as presenting a medium risk to water quality in Reach 3 during implementation of the Farmoor drought permit, associated with total ammonia and SRP.

Under dry weather flow conditions and consented limits, Benson STW increases River Thames BOD concentrations by approximately 0.17 mg/l (not accounting for baseline BOD concentrations in the river). The WFD standard for high status for BOD in the River Thames is 4 mg/l. Reducing the dilution of STW effluent would increase the influence that BOD load in the STW effluent would have on load in the river. Not accounting for baseline BOD concentrations in the river, the BOD concentration in the river due to Benson STW would increase by 18% (to 0.21 mg/l²⁹) as a result of the drought permit. The additions from this STW therefore present a low risk to the in-river oxygen balance.

Under dry weather flow conditions and consented limits Benson STW increases River Thames total ammonia concentrations by approximately 0.06 mg/l (not accounting for baseline total ammonia concentrations in the river). The WFD standard for high status for total ammonia in the River Thames is 0.3 mg/l. Reducing the dilution of STW effluent would increase the influence that total ammonia load in the STW effluent would have on load in the river. Not accounting for baseline total ammonia concentrations in the river, the total ammonia concentration in the river due to Benson STW would increase by 18% (to 0.07 mg/l³⁰) as a result of the drought permit. The discharge additions from this STW therefore present a low risk to the in-river total ammonia balance.

Benson STW does not have a total phosphorous consent and it is assumed that it would present an equivalent risk to the in-river SRP balance as it does for the in-river total ammonia and dissolved oxygen balances (i.e. it would present a low risk).

Benson STW is therefore assessed as presenting a low risk to water quality in Reach 3 during implementation of the Farmoor drought permit.

Other potential water quality pressures

In this section, the influence of discharges that are released into watercourses just upstream of where they flow into the impacted reaches.

81 non-STW discharge permits were identified for discharges into tributaries which flow into Reach 3 of the Farmoor drought permit, mostly associated with trade effluent, pumping stations and domestic septic tanks, see **Table A4-22**. All these permits had no consented limits regarding DWF, and all are considered negligible relative to low flows in this reach of the River Thames.

Table A4-22 Summary of Significant Water Quality Pressures in Tributaries of the River Thames

Consent number, holder, use	Consent conditions*	Risk to water quality
CTCR.0709, Oxford STW, Sewage Disposal Works - Water Company	51 MI/d DWF 150 MI/d Daily Total 3 mg/l Ammonia (N) 95%ile (Max Summer 14 mg/l, Max Winter 20 mg/l 95%ile) 10 BOD ATU 95%ile (Max 50 BOD ATU 95%ile)	Medium risk† (associated with SRP and total ammonia)
CNTD.0030, Drayton STW, Sewage Disposal Works - Water Company	1.67 MI/d DWF 12 mg/l Ammonia (N) 95%ile (Max 41 mg/l Ammonia (N) 95%ile) 20 BOD ATU 95%ile (Max 56 BOD ATU 95%ile)	Low risk

²⁸ Based on consent conditions and low flow statistics (Q95) with and without the drought permit in place

²⁹ Based on consent conditions and low flow statistics (Q95) with and without the drought permit in place

³⁰ Based on consent conditions and low flow statistics (Q95) with and without the drought permit in place

Consent number, holder, use	Consent conditions*	Risk to water quality
CATM.3651, Didcot STW, Sewage Disposal Works - Water Company	11.48 MI/d DWF 9 mg/l Ammonia (N) 95%ile (Max 33 mg/l Ammonia (N) 95%ile) 10 BOD ATU 95%ile (Max 50 BOD ATU 95%ile)	Medium risk (associated with SRP and total ammonia)
CSSC.2363, Long Wittenham STW, Sewage Disposal Works - Water Company	0.27 MI/d DWF 30 BOD ATU 95%ile	Low risk
CNTD.0070, Nuneham Courtenay STW, Sewage Disposal Works - Water Company	<0.05 MI/d DWF 30 BOD ATU 95%ile	Low risk
CSSC.2372, Dorchester STW, Sewage Disposal Works - Water Company	0.61 MI/d DWF 30 BOD ATU 95%ile	Low risk
CSSC.2367, South Moreton STW, Sewage Disposal Works - Water Company	0.86/d DWF	Low risk
CNTW.0360, Cholsey STW, Sewage Disposal Works - Water Company	3.2 MI/d DWF 10 mg/l Ammonia (N) 95%ile (Max 37 mg/l Ammonia (N) 95%ile) 15 BOD ATU 95%ile (Max 50 BOD ATU 95%ile)	Low risk
CTCR.1846, Goring STW, Sewage Disposal Works - Water Company	1.29 MI/d DWF 8 mg/l Ammonia (N) 95%ile (30 mg/l Ammonia (N)) 20 BOD ATU 95%ile (Max 56 BOD ATU 95%ile)	Low risk
CSSC.1442, Streatley STW, Sewage Disposal Works - Water Company	0.19/d DWF 30 BOD ATU 95%ile	Low risk
CTCA. 2077, Pangbourne STW, Sewage Disposal Works - Water Company	2.33/d DWF 20 mg/l Ammonia (N) 95%ile 30 BOD ATU 95%ile	Low risk

* Note that not all STWs have water quality consents relating to ammonia or total phosphorous (depends on size and location of STW). Consents are set with respect to total phosphorous rather than SRP.

† Risk from Oxford STW assessed separately for Reach 1 and Reach 3 (see text below).

Oxford STW discharges into the Pottery Stream, which then flows into Littlemore Brook, a small tributary which joins the River Thames at the downstream end of Reach 1, just upstream of Sandford Lock. The potential water quality risks from Oxford STW extend downstream of the confluence with Littlemore Brook into Reach 3. The risk to water quality in Reach 3 from Oxford STW is based on flows in Reach 3 downstream of the confluence with Littlemore Brook. Under dry weather flow conditions and consented limits, Oxford STW increases River Thames BOD concentrations by approximately 2.96 mg/l (not accounting for baseline BOD concentrations in the river). The WFD standard for high status for BOD in the River Thames is 4 mg/l. Reducing the dilution of STW effluent would increase the influence that BOD load in the STW effluent would have on load in the river. Not accounting for baseline BOD concentrations in the river, the BOD concentration in the river due to Oxford STW would increase by 18% (to 3.61 mg/l) as a result of the drought permit. The discharge additions from this STW therefore present a low risk to the in-river oxygen balance in Reach 3.

Under dry weather flow conditions and consented limits Oxford STW increases River Thames total ammonia concentrations by approximately 0.89 mg/l (not accounting for baseline total ammonia concentrations in the river). The WFD standard for high status for total ammonia in the River Thames is 0.3 mg/l. Reducing the dilution of STW effluent would increase the influence that total ammonia load in the STW effluent would have on load in the river. Not accounting for baseline total ammonia concentrations in the river, the total ammonia concentration in the river due to Oxford STW would increase by 18% (to 1.08 mg/l) as a result of the drought permit. The additions from this STW therefore present a medium risk to the in-river total ammonia balance in Reach 3.

Under dry weather flow conditions and consented limits Oxford STW increases River Thames SRP concentrations by approximately 0.30 mg/l (not accounting for baseline SRP concentrations in the river). The WFD standard for high status for SRP in the River Thames is 0.05 mg/l. Reducing the dilution of STW effluent would increase the influence that SRP load in the STW effluent would have on load in the river. Not accounting for baseline SRP concentrations in the river, the SRP concentration in the river due to Oxford STW would increase by 18% (to 0.36 mg/l) as a result of the drought permit. The additions from this STW therefore present a medium risk to the in-river SRP balance in Reach 3. Oxford STW is therefore assessed as presenting a medium risk to water quality in Reach 3 during implementation of the Farmoor drought permit, associated with SRP.

Oxford STW is therefore assessed as presenting a medium risk to water quality in Reach 3 during implementation of the Farmoor drought permit, associated with total ammonia and SRP.

Didcot STW discharges into Moor Ditch, a small tributary which joins the River Thames in the upstream half of Reach 3. Under dry weather flow conditions and consented limits, Didcot STW increases River Thames BOD concentrations by approximately 0.58 mg/l (not accounting for baseline BOD concentrations in the river). The WFD standard for high status for BOD in the River Thames is 4 mg/l. Reducing the dilution of STW effluent would increase the influence that BOD load in the STW effluent would have on load in the river. Not accounting for baseline BOD concentrations in the river, the BOD concentration due to Didcot STW in the river would increase by 16% (to 0.69 mg/l) as a result of the drought permit. The additions from this STW therefore present a low risk to the in-river oxygen balance.

Under dry weather flow conditions and consented limits Didcot STW increases River Thames total ammonia concentrations by approximately 0.52 mg/l (not accounting for baseline total ammonia concentrations in the river). The WFD standard for high status for total ammonia in the River Thames is 0.3 mg/l. Reducing the dilution of STW effluent would increase the influence that total ammonia load in the STW effluent would have on load in the river. Not accounting for baseline total ammonia concentrations in the river, the total ammonia concentration in the river due to Didcot STW would increase by 16% (to 0.62 mg/l) as a result of the drought permit. The additions from this STW therefore present a medium risk to the in-river total ammonia balance.

Under dry weather flow conditions and consented limits Didcot STW increases River Thames SRP concentrations by approximately 0.12 mg/l (not accounting for baseline SRP concentrations in the river). The WFD standard for high status for SRP in the River Thames is 0.05 mg/l. Reducing the dilution of STW effluent would increase the influence that SRP load in the STW effluent would have on load in the river. Not accounting for baseline SRP concentrations in the river, the SRP concentration in the river due to Didcot STW would increase by 16% (to 0.14 mg/l) as a result of the drought permit. The additions from this STW therefore present a medium risk to the in-river total SRP balance.

Didcot STW is therefore assessed as presenting a medium risk to water quality in Reach 3 during implementation of the Farmoor drought permit, associated with total ammonia and SRP.

The overall risk from water quality pressures in the area of influence of the Farmoor drought permit is assessed as medium in Reach 3 (associated with risk to total ammonia and SRP from Abingdon STW, Didcot STW and Oxford STW) with the drought permit in place.

Intermittent discharges

Intermittent discharges from combined sewer overflows (CSOs) may also contribute to a reduction in water quality during an environmental drought. CSOs relieve strain on the sewers during storm events by temporarily diverting water into nearby watercourses to prevent sewer flooding. As there is usually a time lag between discharges from CSOs and rises in river levels during a storm event, the potential exacerbation of low flows by the drought permit may decrease the amount of water immediately available to dilute CSO discharges, leading to a temporary reduction in river water quality if a storm event occurs during implementation of the drought permit.

APPENDIX B – RECEPTOR ASSESSMENT

B1 INTRODUCTION

B1.1 PURPOSE

This appendix assesses the potential impacts on the environmental receptors of relevant river reaches during the period of implementation of the Farmoor drought permit.

Details regarding the approaches/methodologies used for assessing susceptibility and sensitivity to drought management actions and the assessment of potential impacts that may result from these actions are presented in Sections 3.5 and 3.6 of Thames Water's Drought Plan 2027 Environmental Assessment Methodology¹ ('the Methodology').

There is a limited understanding of physiological and behavioural factors that determine the tolerance of aquatic organisms to drought conditions. Response will in part be determined by the length, frequency and severity of the drought conditions as well as the biotic assemblage and abiotic factors that precede and prevail at the time.

The prediction of impacts of hydrological and water quality changes on aquatic ecology therefore remains subject to uncertainty and this may be exacerbated where data are limited. This assessment has adopted a precautionary approach, with potential impacts highlighted where doubt exists.

This assessment of environmental receptors has been informed by the Physical Environment of the Farmoor drought permit EAR presented in **Appendix A**.

Environmental assessment is neither required nor included for receptors where screening has identified a minor (undesigned) or negligible impact.

The geographic extent of the assessment and points of interest referred to throughout the text are indicated in **Figure B1-1**.

This appendix is set out in the following sections:

Section B2 Baseline and sensitivity

- Statutory designated sites
- Non-statutory designated sites and NERC Habitats
- NERC and other protected species
- WFD receptors
- Invasive non-native species (INNS)
- Landscape, navigation, recreation and heritage

Section B3 Environmental receptors screening summary

Section B4 Receptors assessment, monitoring and mitigation

- Receptors assessment
- Summary of impacts

Section B5 Cumulative impacts receptors assessment

Section B6 Monitoring and mitigation

B1.2 DROUGHT OPTION OVERVIEW

Licence details and proposed drought permit details are provided in **Table B1-1** below. The location of the abstraction is indicated in **main EAR Figure 4-1**. The drought permit option includes a revised abstraction rate to Farmoor Reservoir when naturalised flows in the River Thames derived for the Farmoor gauging station are below 377.3 Ml/d. This includes a greater range of river flows at which 300 Ml/d would be abstracted and a higher rate of reduced abstraction - in all cases with a minimum flow downstream of Farmoor flow gauging

¹ Thames Water Utilities Ltd (2026) Thames Water Drought Plan 2027: Environmental Assessment Methodology Report – Prepared by Ricardo (V6 March 2026).

station of 46.38 MI/d, which is lower than that licensed. Where river flows downstream of Farmoor flow gauging station are less than 46.38 MI/d this would not be a change to licence conditions.

Table B1-1 Farmoor existing and proposed drought permit abstraction

Abstraction Water Source	NGR	Normal Abstraction	Proposed Drought Permit Abstraction	Benefit MI/d
River Thames	SP 439 064	Thames Water are licensed to abstract 55,312 MI/year at an abstraction rate not exceeding 300 MI/d or 12.502 MI/hour. The following conditions also apply: At any time when naturalised flow at Farmoor flow gauging station, downstream of the abstraction, is greater than 377.3 MI/d, abstraction shall not exceed 300 MI/d or 12.502 MI/hour. Under these circumstances, there would be a residual flow of at least 77.3 MI/d downstream of the abstraction. At any time when naturalised flow at Farmoor flow gauging station, downstream of the abstraction, is between 136.4 MI/d and 377.3 MI/d, abstraction shall not result in the residual flow being reduced below 77.3 MI/d. Abstractions of at least 59.1 MI/d would be possible. At any time when naturalised flow at Farmoor flow gauging station, downstream of the abstraction, is less than 136.4 MI/d, abstraction shall not exceed 59,100 cubic meters per day (59.1 MI/d) with a maximum hourly abstraction rate of 2,546 cubic meters per hour (2.55 MI/hour).	Normal conditions apply other than: At any time when naturalised flow at Farmoor flow gauging station, downstream of the abstraction, is greater than 346.38 MI/d, abstraction shall not exceed 300 MI/d or 12.502 MI/hour. Under these circumstances, there would be a residual flow of at least 46.38 MI/d downstream of the abstraction. At any time when naturalised flow at Farmoor flow gauging station, downstream of the abstraction, is between 136.384 MI/d and 346.38 MI/d, abstraction shall not result in the residual flow being reduced below 46.38 MI/d. Abstraction shall not exceed 90,000 cubic meters per day (90 MI/d) with a maximum hourly abstraction rate of 3,750 cubic meters per hour (3.75 MI/hour). At any time when naturalised flow at Farmoor flow gauging station, downstream of the abstraction is between 105.48 MI/d and 346.38 MI/d abstraction shall not allow flow at the gauging station to reduce below 46.38 MI/d. Abstraction shall not exceed 59,100 cubic meters per day (59.1 MI/d) with a maximum hourly abstraction rate of 2,546 cubic meters per hour (2.55 MI/hour). At any time when naturalised flow at Farmoor flow gauging station, downstream of the abstraction, is less than 105.48 MI/d, abstraction shall not exceed 59.1 MI/d with a maximum hourly abstraction rate of 2.55 MI/hour.	Up to 30

Surface water is abstracted from the River Thames and transferred to the pumped storage Farmoor Reservoir. Stored water is treated at Farmoor water treatment works (WTW) or Swinford WTW for treatment and public water supply to the SWOX WRZ.

It should be noted that licence flow conditions are based on the naturalised flow. Naturalised flows in this context are adjusted flow records that approximate the flows that would occur in the absence of river regulation and abstraction. The naturalised flow at Farmoor referred to in the abstraction licence is effectively a partially naturalised flow that only takes account of the Thames Water abstraction immediately upstream of the Farmoor gauging station. The naturalised flow for the Farmoor licence is calculated as the measured flow at the gauging station plus the abstraction at the Thames Water Farmoor intake.

As part of the Farmoor drought permit implementation, over-pumping of water from the River Thames into selected distributaries is proposed to help maintain a minimum flow (or level) in the sensitive distributaries.

The principle of the proposed over-pumping operation is as follows: as the River Thames downstream of the upper two licensed Farmoor abstraction intakes is effectively made up of a series of ponds (or pounds) when the locks and weirs along the river are closed off leaving a small volume of residual flow in the river. Over-pumping would allow advantage to be taken of the residual flow left below the Farmoor and Swinford intakes, to pump some of this residual flow into the distributaries to maintain a minimum flow or level. The proposed operation at the entry to each distributary would involve over-pumping from the River Thames into the distributary or ensuring flow was maintained into the distributary through the existing weir structure. The pumped water, would simply be pumped into the top of the distributary in each case or allowed to flow into the distributary by controlling the sluice or weir setting to ensure the minimum required flow entered the distributary. In this way, the over-pumped water is available to help maintain a minimum flow along the sensitive distributaries from the River Thames.

The main aims of the over-pumping as part of the Farmoor drought permit would be as follows:

- 1) To provide sufficient water into the Seacourt Stream to maintain a minimum ecological flow to maintain the ecology. For the Seacourt Stream the required minimum flow into the stream would be 120 l/sec. This flow could be provided by setting the weir controlling flow into the Seacourt Stream to the appropriate level to ensure this flow into the stream, with a pumping solution also installed, in case it is needed, to ensure this volume of water could be pumped into the Seacourt Stream if levels fall too low to guarantee flow over the weir.
- 2) To provide sufficient water into the Wolvercote Stream to maintain a minimum ecological flow to maintain the ecology. For the Wolvercote Stream the required minimum flow into the stream would be 25-50 l/sec. Flow into the Wolvercote Stream would be maintained by the setting of Kings Weir to ensure levels are maintained in the main River Thames to ensure the required minimum flow down the Wolvercote Stream.
- 3) To provide sufficient water into the Osney Stream to maintain a minimum ecological flow to maintain the ecology. For the Osney Stream the required minimum flow into the stream would be 25-50 l/sec. This flow could be maintained by retaining the settings of the undershot sluice and if levels are maintained in the River Thames by the existing weir settings at the next downstream weir there will always be enough water to ensure flow through the undershot sluice.
- 4) To provide sufficient water into the Castle Mill Stream to maintain a minimum ecological flow to maintain the ecology. For the Castle Mill Stream the required minimum flow into the stream would be 25-50 l/sec. This flow could be maintained by retaining the settings of the Castle Mill existing structures which ensure that there is flow into the Wareham Stream from the Castle Mill Stream and this flow then returns to the Castle Mill Stream further downstream. If levels are maintained in the Castle Mill Stream by the existing weir settings at the next downstream weir there will always be enough water at the offtake from the Castle Mill Stream to ensure flow into the Wareham Stream. A pumping solution could be prepared if needed.
- 5) To provide sufficient water into the Bulstake Stream to maintain a minimum ecological flow to maintain the ecology. For the Bulstake Stream the required minimum flow into the stream would be 25-50 l/sec. This flow would be provided by a pumping solution installed to ensure this volume of water could be pumped into the Bulstake Stream and is likely to be needed for the duration of the period that the Drought Permit is in use.

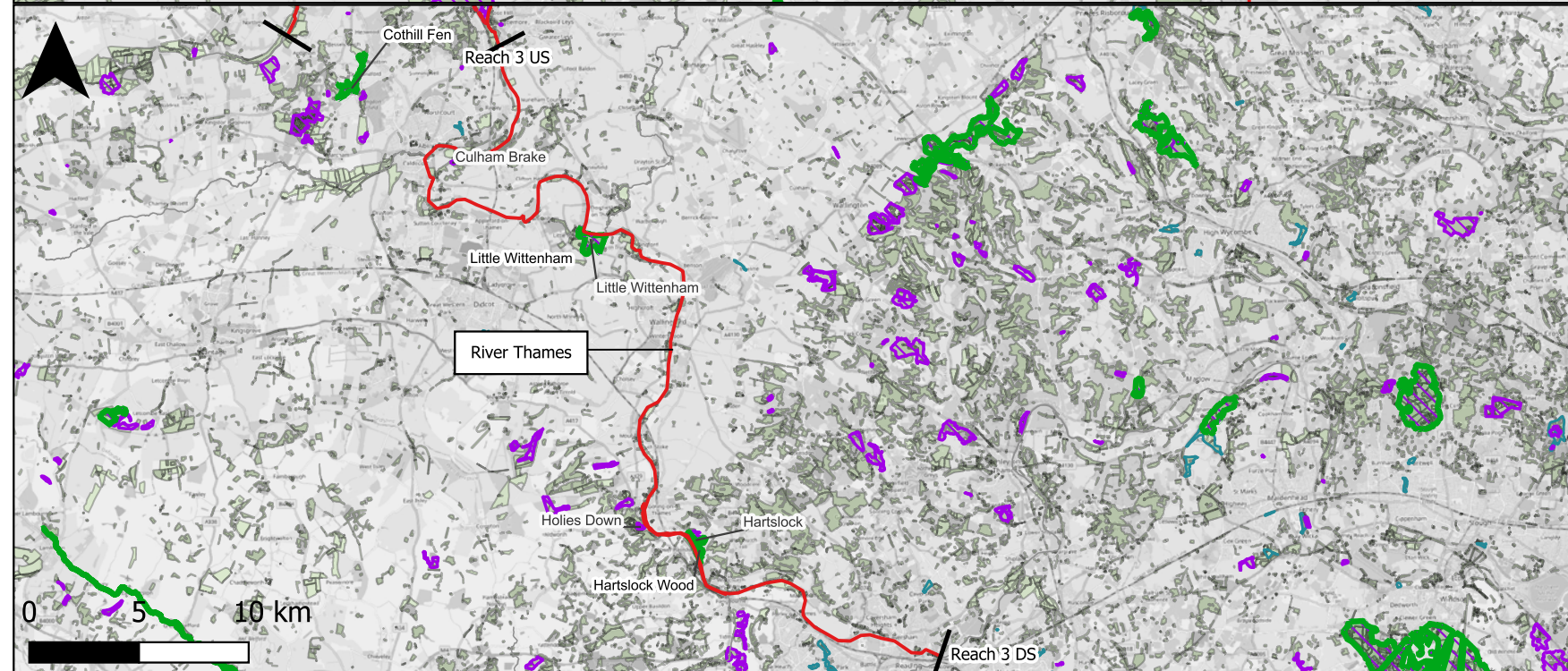
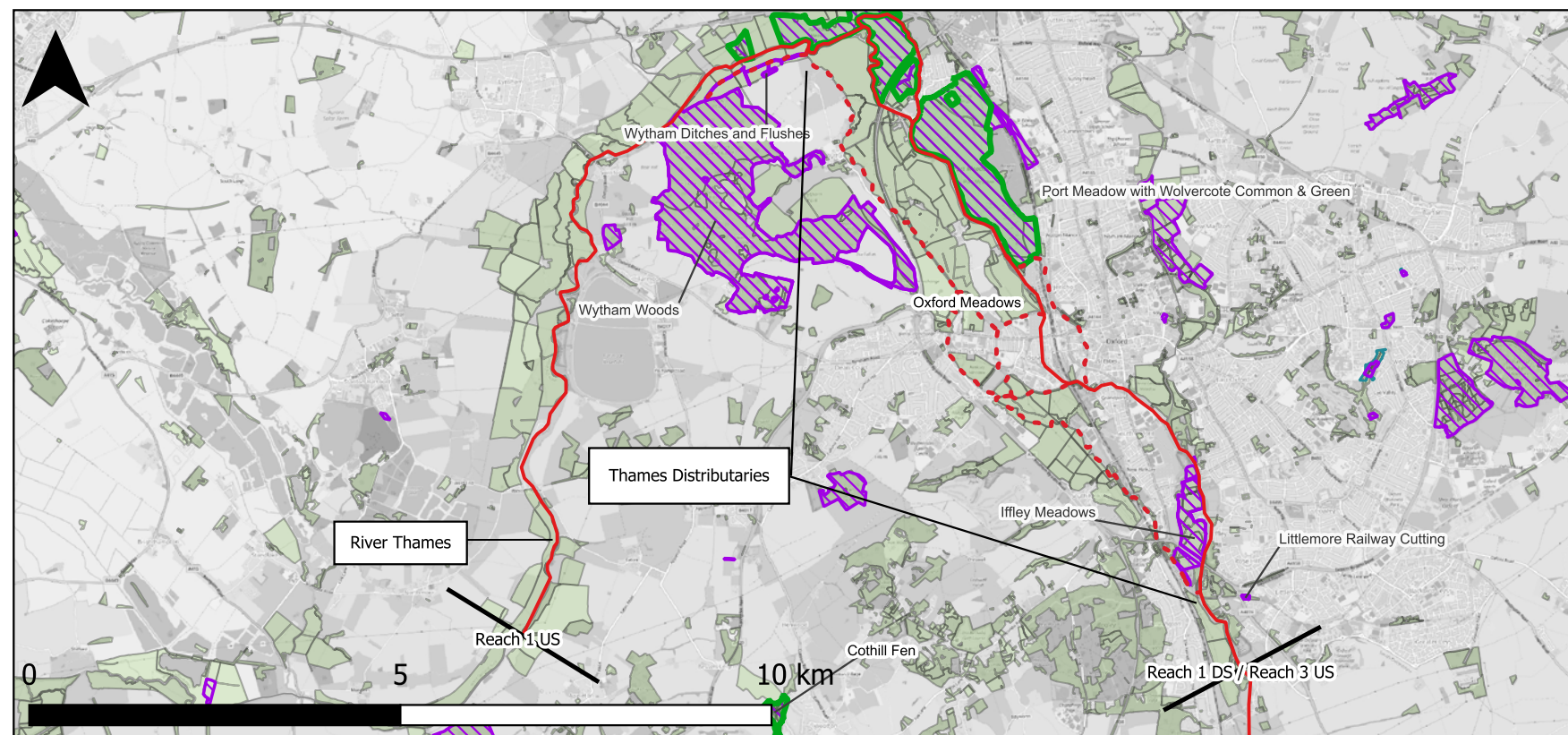
These Watercourses and their associated ecology are dependent on receiving flow from the Thames.

Over-pumping, where required, would be initiated by different triggers for each distributary, as agreed with the Environment Agency.

These measures are included as conditions on the drought permit and the assessment made is of these measures in place.

Legend

- Watercourses
- Thames Distributaries
- Reach Divides
- Local Nature Reserves
- Special Areas of Conservation
- SSSI
- Priority Habitats Inventory



Project Title
Thames Water Drought Plan

Figure Title
Ecological Receptors, Farmoor

Data: OS Open Rivers
Published by: Ordnance Survey
Source: <https://osdatahub.os.uk/downloads/open>
Attribution statement: Contains OS data © Crown copyright and database right [2024].
© UKCEH. Data from the UK National River Flow Archive
Contains public sector information licensed under the Open Government Licence v3.0
© OpenStreetMap contributors OpenStreetMap® is open data, licensed under the Open Data Commons Open Database License (ODbL) by the OpenStreetMap Foundation (OSMF).

B2 BASELINE AND SENSITIVITY

Details regarding the approaches/methodologies used for assessing susceptibility and sensitivity to drought option implementation are presented in Section 3.6 of 'the Methodology'.

Potential receptors have been identified on a reach-by-reach basis. Following the approach set out in **the Methodology**, three potential impacted river reaches have been identified (see **Figure B1-1**).

- Reach 1 covers the River Thames, from Northmoor Lock until Sandford Lock along with the river-left distributaries including Wolvercote Mill Stream which feeds off from the River Thames at Oxey Meads, flanks Pixey Mead and Wolvercote Meadows before reconnecting with the River Thames at Godstow.
- Reach 2 covers the distributaries of the River Thames in Oxford with connectivity to the Seacourt Stream including the Seacourt Stream, Botley Stream, Bulstake Stream and Hinksey Stream.
- Reach 3 covers the River Thames, from Sandford Lock until Caversham Lock.

B2.1 STATUTORY AND NON – STATUTORY DESIGNATED SITES

B2.1.1 Statutory designated sites

The statutory designated sites (Local Nature Reserves 'LNR', National Nature Reserves 'NNR', Sites of Special Scientific Interest 'SSSI', Special Areas of Conservation 'SAC' and Special Protection Areas 'SPA') which are located on or within 500m of the assessed reaches are detailed below.

Oxford Meadows SAC

Oxford Meadows SAC comprises a series of lowland hay meadows, which are an Annex I habitat comprising unique vegetation communities that reflect the influence of long-term grazing and hay-cutting. The site is comprised of a number of component SSSI sites, which include Cassington SSSI, Pixey and Yarnton SSSI, Wolvercote Meadow SSSI and Port Meadow with Wolvercote Common and Green SSSI.

The Oxford Meadows SAC is also designated for the presence of the Annex II species creeping marshwort (*Apium repens*), with Port Meadow the larger of only two known sites for this species in the UK.

Cassington Meadows SSSI

Cassington Meadows comprises of a cluster of neutral hay meadows and fen, which are surviving remnants of semi-natural vegetation in an area now characterised by intensive arable farming and gravel extraction. The site is situated adjacent to the River Thames on seasonally flooded alluvial soils over-lying gravel. The type of meadow grassland present was once widespread in the Thames valley and other parts of lowland Britain but is now a nationally threatened habitat. The fen is a type quite widespread in Oxfordshire, but largely restricted to small, scattered patches.

The site is a component part of the Oxford Meadows SAC, with habitats consistent with those identified above. In addition to the habitats covered by the SAC designation, the SSSI citation includes the presence of the National Vegetation Classification (NVC) community S5 great manna grass (*Glyceria maxima*) swamp.

The current status of the site is favourable.

Pixey and Yarnton Meads SSSI

The site comprises unimproved floodplain meadows on alluvium over calcareous gravel on the first terrace bordering the River Thames. The site is internationally renowned and represents some of the best remaining examples of neutral grassland in lowland England.

Past management of the site has been good, with the meadows cut annually for hay and the aftermath grazed for well over a thousand years. The outcome of this is a botanically rich grassland with a significant diversity of species and the presence of a number of notable plants. The site was last assessed in 2010 and concluded that the whole site was of favourable condition.

Wolvercote Meadows SSSI

Wolvercote Meadows SSSI borders the River Thames and consists of unimproved and semi-improved grassland which has been traditionally managed for hay and pasture to support a rich flora. The site is situated on alluvium overlying calcareous gravels and shares many characteristics with Pixey Mead, which borders the site to the west.

Despite localised poaching by horses, the site has a rich floral diversity with an abundance of herb species. The three meadows present are separated by willow-lined ditches and are normally managed for hay with subsequent autumn grazing, which produces a wealth of wildflowers in unimproved pastures during early summer. The flora is one of damp, somewhat calcareous soils with a diverse list of meadow grasses and herbs including at least eight species indicative of ancient grassland. The watercourses surrounding the meadows have tall emergent vegetation frequented by dragonflies, the most conspicuous of which is the banded demoiselle (*Calopteryx splendens*). The current status of the site is favourable.

Port Meadow with Wolvercote Common and Green SSSI

The designated site consists of a series of neutral grasslands situated in the Thames floodplain. The site is believed to have been grazed almost continuously for over a millennium, with the characteristic associations of plants present considered to reflect the influence of grazing on the balance of species better than any grassland in Britain.

Port Meadow occupies the majority of the SSSI and is intercommunally grazed with the adjoining Wolvercote Common, from which it is separated by a ditch which carried a stream during Saxon times. Wolvercote Green is a small area of common land, now cut for hay, which became separated from the main site following the construction of the Oxford canal in the 18th Century.

The site is a component of the Oxford Meadows SAC, with habitats consistent with those identified above. In addition to the habitats covered by the SAC designation, the SSSI citation includes the presence of the NVC communities MG6 rye grass (*Lolium perenne*) – crested dog's tail (*Cynosurus cristatus*) grassland, MG11 red fescue (*Festuca rubra*) – creeping bent-grass (*Agrostis stolonifera*) -silverweed (*Potentilla anserina*) grassland and MG13 *Agrostis stolonifera* - water foxtail (*Alopecurus geniculatus*) grassland.

A study of the vegetation in the late 1980s revealed seven main plant groups on the common pasture, with the distribution pattern of these related to the differences in inundation by floodwater, past influence in the control of river levels and grazing densities. Although the site generally has a low species-diversity in comparison to those adjoining the site, a total of 178 flowering plants have been recorded including the Red Data Book species creeping marshwort (*Apium repens*) for which the site is one of the only localities for this species. The current status of the site is in 100% favourable condition.

Iffley Meadows SSSI

Iffley Meadows SSSI is situated between two arms of the River Thames and comprises a series of alluvial flood meadows, with NVC communities MG4 *Alopecurus pratensis*-*Sanguisorba officinalis* grassland, MG9 Yorkshire fog (*Holcus lanatus*) - tufted hair grass (*Deschampsia cespitosa*) grassland and MG10 *Holcus lanatus*- soft rush (*Juncus effusus*) rush pasture present. These are traditionally managed as hay meadow and permanent pasture.

The outstanding feature of a rich grassland flora, undamaged by farming improvements, is the largest remaining population of snakehead fritillaries (*Fritillaria meleagris*) in the middle Thames area.

The flora of the site varies in composition as a result of the different management regimes and surface deposits. Much of the site lies on clay soils, enriched annually by floodwater silt and crossed by old river channels, willow-lined ditches and overgrown hedges. The vegetation is a notably species-rich and undamaged example of damp grassland. The field south of the southern by-pass is wet permanent pasture and grazing marsh. Extensive examples of unimproved marshland on rich soils are now rare in the lowland agricultural landscape and rarer still in urban areas. The current status of the site is mixed, with 54% of the site in favourable condition and 46% unfavourable recovering.

Wytham Ditches and Flushes SSSI

Wytham Ditches and Flushes SSSI are a series of ditches which are connected and drain into Seacourt Stream, which forms part of the Thames distributaries. They support a species-rich eutrophic aquatic and fen

flora, examples of which are rare in the county following widespread drainage, pollution and fertiliser enrichment. They contain flowering plants which are now uncommon in central southern England, with at least one species which has its sole Oxfordshire locality on the site.

The flat riverside land at the north end of the site has calcareous soils of the Thames Association, underlain by alluvium. The higher sloping land to the south has fine loamy soils of the Badsey 1 Association over river terrace gravels. The water table is permanently high and there is a seepage line along the lower slopes at the junction of the two soils, which helps maintain the ditches and keeps the small meadow present partly waterlogged.

The main ditch on the site is up to one metre deep and up to six metres wide near the eastern end. The banks are dominated by dense stands of emergent vegetation and herbs, with the only sizeable populations of greater water-parsnip (*Sium latifolium*) and greater spearwort (*Ranunculus lingua*) in the county. The open water retains a diverse flora. The current status of the site is unfavourable recovering.

Macrophyte surveys in the Wytham Ditches and Flushes SSSI

A total of 39 aquatic macrophyte species were found during the surveys. The river macrophyte community reflects a species-rich, naturally eutrophic aquatic flora affected by drainage, pollution, and fertiliser enrichment. Channel macrophyte coverage ranged between 40 and 85 total percent cover and <1 to 50% individual species cover.

Wytham Ditch Site 1 had a higher proportion of whorled water-milfoil (*Myriophyllum verticillatum*), yellow water-lily (*Nuphar lutea*) and common reed (*Phragmites australis*) than the other ditches, all of which individually have higher tolerance for eutrophic conditions. While two of these species are desirable open water flora, monocultures of *Phragmites australis* have been noted as one of the primary reasons the ditches failed to meet favourable conditions because they preclude early successional stage habitat for the key species, great water-parsnip (*Sium latifolium*).

Wytham Ditch Site 2 is dominated by common water-starwort (*Callitriche stagnalis*) and simplestem bur-reed (*Sparganium erectum*), while Wytham Ditch Site 3 is dominated by *Cladophora* spp. with common water-plantain (*Alisma plantago-aquatica*) the second most abundant species. Notable species in the SSSI Citation also inventoried during this survey include *Sium latifolium* (the only sizeable population in the county), and diverse open water flora such as *Nuphar lutea*, *Myriophyllum verticillatum*, which is considered a rare native species², and thread-leaved water crowfoot (*Ranunculus trichophyllus*).

The RMNI in the Wytham Ditches indicates moderately eutrophic conditions (7.3-8.0), with the highest RMNI found in Wytham Ditch 1. Higher *Cladophora* sp. cover and a higher ALG score was also found in Wytham Ditch 1, indicating enriched conditions compared to the other two sites. NTAXA (6-7) and NFMG (5-6) scores were relatively consistent between the three sampling sites.

Hartslock Wood SAC

Hartslock Wood SAC comprises the Annex I habitats semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) and English yew (*Taxus baccata*) woods of the British Isles. Both habitats are considered to be of good conservation status with the semi-natural dry grassland habitat is considered to support an excellent global assessment with the *Taxus baccata* woods supporting a good global assessment.

Hartslock SSSI

Hartslock SSSI comprises a mixture of semi-natural habitats which includes species-rich chalk downland, one of the few examples of ancient yew wood in the Chilterns, semi-natural broadleaved woodland, chalk scrub and riverine fen.

The majority of the site is considered to be in favourable condition, with only 12% of the site considered to be in an unfavourable but recovering condition.

Table B2-1 summaries the proposed sensitivity of the designated sites to physical environment impacts on a reach-by-reach basis.

² Holmes, N. (2009) River macrophyte field guide. Environment Agency Environmental Monitoring Service.

Table B2-1 Sensitivity of the statutory designated sites within the Farmoor Drought Permit Zone of Influence

Site/Receptor and designation	Associated reach	River Habitat Impact at Location (Major, Moderate, Minor, Negligible)	Susceptibility to flow and level impacts	Sensitivity (Low, Medium, High, Not Sensitive, Uncertain)	Further Consideration Required (Yes/No)
Oxford Meadows SAC	Reach 1, Reach 2	Moderate (Reach 1), Uncertain (Reach 2)	The lowland hay meadow habitat and creeping marshwort (<i>Apium repens</i>) qualifying features are both dependent on seasonal flooding from the Thames but are not dependent on the Thames distributaries. The site is also supported hydrologically by groundwater within the superficial sand and gravel deposits of the Thames floodplain.	Uncertain (Reach 1), Not sensitive (Reach 2)	Yes (Reach 1), No (Reach 2)
Wytham Ditches and Flushes SSSI	Reach 1, Reach 2	Moderate (Reach 1), Uncertain (Reach 2)	The series of ditches drain into Seacourt Stream. A reduction in water level in the Seacourt Stream may have knock-on impacts on the level within the ditch network.	Low (Reach 1 & 2)	Yes (Reach 1 & 2)
Cassington Meadows SSSI	Reach 1	Moderate	The lowland meadow and fen habitats are dependent on seasonal inundation.	Medium	Yes
Pixey and Yarnton Meads SSSI	Reach 1, Reach 2	Moderate (Reach 1), Uncertain (Reach 2)	The unimproved floodplain meadow and fen habitats are dependent on seasonal inundation from the Thames but are not connected to the distributary channels.	Medium (Reach 1), Not sensitive (Reach 2)	Yes (Reach 1), No (Reach 2)
Wolvercote Meadows SSSI	Reach 1, Reach 2	Moderate (Reach 1), Uncertain (Reach 2)	The floodplain meadow habitats are dependent on seasonal inundation from the Thames, but are not connected to the distributary channels.	Medium (Reach 1), Not sensitive (Reach 2)	Yes (Reach 1), No (Reach 2)
Port Meadow with Wolvercote Common and Green SSSI	Reach 1, Reach 2	Moderate (Reach 1), Uncertain (Reach 2)	The floodplain meadow habitats are dependent on seasonal inundation by the River Thames. However, this habitat is not connected to the distributaries assessed as Reach 2.	Medium (Reach 1), Not Sensitive (Reach 2)	Yes (Reach 1), No (Reach 2)
Iffey Meadows SSSI	Reach 1, Reach 2	Moderate (Reach 1), Uncertain (Reach 2)	The floodplain meadow habitats are dependent on seasonal inundation the Thames, but are not connected to the distributary channels.	Medium (Reach 1), Not sensitive (Reach 2)	Yes (Reach 1), No (Reach 2)
Wytham Woods SSSI	Reach 1, Reach 2	Moderate (Reach 1), Uncertain (Reach 2)	The site is not likely to be fed by the River Thames or the Thames distributaries, with springs and other surface sources almost certainly feeding into the site, thus a drought permit is not considered likely to impact on the site.	Not sensitive (Reach 1 & 2)	No (Reach 1 & 2)

Site/Receptor and designation	Associated reach	River Habitat Impact at Location (Major, Moderate, Minor, Negligible)	Susceptibility to flow and level impacts	Sensitivity (Low, Medium, High, Not Sensitive, Uncertain)	Further Consideration Required (Yes/No)
Littlemore Railway Cutting SSSI	Reach 1	Moderate	This geological SSSI features are not directly impacted by the River Thames and the drought permit is therefore not considered likely to impact the site.	Not sensitive	No
Hartslock Wood SAC	Reach 3	Minor	The site supports semi-natural dry grasslands and English yew woods, none of which are water dependent features and therefore will not be impacted upon by the drought permit.	Not sensitive	No
Hartslock SSSI	Reach 3	Minor	A mixture of semi-natural habitats which are characteristic of the Chiltern scarp. It includes an area of species-rich chalk downland and one of the few examples of ancient yew wood in the Chilterns, as well as semi-natural broadleaved woodland, chalk scrub and riverine fen.	Not sensitive	No
Culham Break SSSI	Reach 3	Minor	This small area of willow carr by the Thames contains one of the largest British populations of the summer snowflake (<i>Leucojum aestivum</i>). This site is dominated by well grown crack willow (<i>Salix fragilis</i>) growing in a seasonally flooded backwater of the Thames.	Low	Yes
Little Wittenham SSSI and SAC	Reach 3	Minor	This site supports one of the largest known breeding populations of great crested newt (<i>Triturus cristatus</i>) in the UK. The site also supports an outstanding breeding assemblage of amphibians, which include smooth newt, common frogs and common toads. The woodland includes a number of ponds, streams, flushes and damp hollows fed by springs. The site is not fed by the River Thames, with springs and other surface sources feeding the site. Thus the Farmoor drought permit will not impact the site.	Not sensitive	No
Holies Down SSSI	Reach 3	Minor	The site comprises an area of unimproved chalk grassland, which is grazed and supports a large number of flowering plant species in close association.	Not sensitive	No

B2.1.2 Non-statutory designated sites and NERC habitat

The non-statutory designated sites (Local Wildlife Sites 'LWS', Key Wildlife Sites 'KWS') which are located on or within 500m of the assessed reaches are detailed below.

Thames Island (Skinner's Weir Island) SNCI

Thames Island SNCI supports a range of wetland habitats, including swamp, reedbed and wet woodland, all of which are identified as UK NERC priority habitats. These habitats support a diverse range of fauna species, including a range of bird species and notable invertebrates.

Swinford Toll Brook Meadow SNCI

Swinford Toll Brook Meadow SNCI comprises a traditionally managed hay meadow, resembling other floodplain grasslands in the Oxford area, although drier. The site also includes a stream channel, which supports a diverse range of flora including relatively uncommon wetland and marginal plant species.

Pasture by A34 Thames Bridge SNCI

The SNCI supports floodplain grassland habitat.

Binsey Green SNCI

Binsey Green SNCI comprises of a botanically rich floodplain grassland site associated with the River Thames and the Oxford floodplain. The site contributes to the ecological network surrounding Port Meadow and Oxford Meadows SAC.

Kennington Pool SNCI

Kennington Pool SNCI supports two UK NERC priority habitats in mesotrophic pools and wet woodland, the latter of which supports a diverse range of red data book fauna and notable bird species.

Bypass Swamp SNCI

Bypass Swamp SNCI supports two distinct wetland habitats including swamp, which is valuable for a number of bird species, and rare regularly flooded habitat.

Fiddler's Elbow Marsh SNCI

Fiddler's Elbow Marsh SNCI comprises reedbed habitat which supports a number of notable bird species.

Thames Cut SNCI

Thames Cut SNCI is an old, disconnected channel of the River Thames which supports some notable nesting bird species.

Heyford Hill Lane Pasture SNCI

Heyford Hill Lane Pasture SNCI comprises floodplain grassland which supports a diverse range of species including nationally scarce flora.

Thames Island near Streatley SNCI

Analysis of aerial photography suggests that the Thames Island near Streatley SNCI comprises wetland habitat.

South Stoke Marsh (south) SNCI and South Stoke Marsh (north) SNCI

South Stoke Marsh (south) SNCI and South Stoke Marsh (north) SNCI comprise riverside marshland with swamp vegetation, dominated by reed sweet-grass (*Glyceria maxima*), and pasture with marshy grassland.

Monastic Fish Ponds, South Stoke SNCI

Monastic Fish Ponds, South Stoke SNCI comprises rare wetland habitat in the form of ditches and channels dominated by greater pond sedge (*Carex riparia*) and reed sweet-grass.

Whitchurch on Thames Wet Meadow SNCI

Whitchurch on Thames Wet Meadow SNCI comprises unimproved neutral grassland, however given its location in the floodplain of the River Thames it is assumed that the site is dependent on winter flooding.

Table B2-2 summaries the proposed sensitivity of the NERC Act Section 41 or other notable and/or protected habitats to physical environment impacts on a reach-by-reach basis.

Table B2-2 Non-statutory designated sites, NERC Act Section 41 or other notable and/or protected habitats within the Farmoor Drought Permit zone of influence

Site/Receptor and designation	Associated reach	River Habitat Impact at Location (Major, Moderate, Minor, Negligible)	Susceptibility to flow and level impacts	Sensitivity (Low, Medium, High, Not Sensitive, Uncertain)	Further Consideration Required (Yes/No)
Thames Island (Skinner's Weir Island) SNCI	Reach 1, Reach 3	Moderate (Reach 1), Minor (Reach 3)	The wet woodland, swamp and reedbed habitats present are likely to be dependent on the river level in the River Thames. Unimproved neutral grassland that is dependent on winter flooding	Uncertain (Reach 1), Low (Reach 3)	Yes (Reach 1 & 2)
Swinford Toll Brook Meadow SNCI	Reach 1	Moderate	The floodplain meadow habitats are dependent on seasonal inundation.	Medium	Yes
Pasture by A34 Thames Bridge SNCI	Reach 1	Moderate	The floodplain meadow habitats are dependent on seasonal inundation.	Medium	Yes
Bisney Green SNCI	Reach 1	Moderate	The floodplain meadow habitats are dependent on seasonal inundation.	Medium	Yes
Kennington Pool SNCI	Reach 1, Reach 2	Moderate (Reach 1), Uncertain (Reach 2)	The wet woodland habitat present is likely to be hydrologically dependent on the River Thames and it's tributaries.	Uncertain (Reach 1 & 2)	Yes (Reach 1 & 2)
Bypass Swamp SNCI	Reach 1	Moderate	The swamp habitat is dependent on seasonal inundation.	Medium	Yes
Fiddler's Elbow Marsh SNCI	Reach 1	Moderate	The reedbed habitats are hydrologically linked to the River Thames.	Medium	Yes
Thames Cut SNCI	Reach 1	Moderate	The habitat is a former channel of the River Thames, with wooded banks, and is thus considered likely to be hydrologically linked to the River Thames still.	Uncertain	Yes
Hayford Hill Lane Pasture SNCI	Reach 1	Moderate	The floodplain meadow habitats are dependent on seasonal inundation.	Medium	Yes
South Stoke Marsh (south) SNCI	Reach 3	Minor	Comprises of riverside marshland with swamp vegetation, dominated by reed sweet-grass (<i>Glyceria maxima</i>), and pasture with marshy grassland.	Low	Yes
South Stoke Marsh (north) SNCI		Minor		Low	Yes
Monastic Fish Ponds, South Stoke SNCI	Reach 3	Minor	Rare wetland habitat in the form of ditches and channels dominated by greater pond sedge (<i>Carex riparia</i>) and reed sweet-grass.	Low	Yes

Site/Receptor and designation		Associated reach	River Habitat Impact at Location (Major, Moderate, Minor, Negligible)	Susceptibility to flow and level impacts	Sensitivity (Low, Medium, High, Not Sensitive, Uncertain)	Further Consideration Required (Yes/No)
Whitchurch on Thames Wet Meadow SNCI		Reach 3	Minor	The site is unimproved neutral grassland, however given its location in the floodplain of the River Thames it is assumed that the site is dependent on winter flooding.	Low	Yes
McIlroy Park LNR		Reach 3	Minor	A natural park comprising mostly grassland with heather and broom. There is semi-ancient woodland, mostly around the edges of the site and old chalk pits in the west woodland area from the old clay extraction industry.	Not sensitive	No
NERC Priority Habitats	Coastal and floodplain grazing marshes	Reach 1, Reach 3	Moderate (Reach 1), Minor (Reach 3)	NERC priority habitats are of principal importance for the conservation of biodiversity in England. Fifty-six habitats are included on the S41 list. They include terrestrial habitats such as upland hay meadows to lowland mixed deciduous woodland, and freshwater and marine habitats such as ponds and subtidal sands and gravels. Reduction in flow and water level could therefore impact on macroinvertebrates, macrophytes and fish communities associated with these habitats.	Medium (Reach 1 & 3)	Yes (Reach 1 & 3)
	Lowland fens	Reach 1, Reach 3				
	Reedbeds	Reach 3				

B2.1.3 NERC and other protected species

Table B2-3 summarises the sensitivities of the NERC Act Section 41 and other protected species which are located on or within 500m of the assessed reaches, and the sensitivity of the species to the identified physical environment impacts.

Susceptibility to the flow/level impacts resulting from the drought permit is identified according to whether interest features of the site or the species are water dependent. Sensitivity was then determined according to professional judgment based on susceptibility and the level of physical environment impact at the location.

Mammals

Otter

Data obtained from NBN gateway³ was used to inform the assessment of *Lutra lutra* (otter) within the impacted reaches. The review of NBN records indicates the presence of otter within all reaches assessed in this report. Whilst the survey information that supported these records was not freely available, the home ranges of otter can extend over tens of kilometres and it is considered appropriate, following the precautionary principle, to consider otter likely to be present in all reaches at the time of the implementation of a drought option.

Water Vole

Data obtained from NBN gateway was used to inform the assessment of *Arvicola amphibius* (water vole) in the impacted reaches. Review of NBN records indicates the presence of water vole within all reaches assessed in this report. However, the distribution of information and survey data for the species was considered to be limited. Therefore, absence cannot be confirmed. It was considered appropriate, following the precautionary principle, to consider water vole likely to be present in all reaches at the time of the implementation of a drought option.

Crustacea

Austropotamobius pallipes (white-clawed crayfish) are a NERC Act Section 41 species and are sensitive to habitat modification from the management of water bodies. Data obtained from NBN gateway was used to inform the assessment of the receptor in the impacted reaches. No white-clawed crayfish have been recorded within any of the impacted reaches. Data obtained from NBN gateway reported that signal crayfish were recorded extensively within the Reach 1 and 3 since 2010. Given the dense populations of signal crayfish it is considered unlikely that white-clawed crayfish are present.

Invertebrate species

Data obtained from the EA Fish and Ecology Data Explorer between 2013-2024 has identified several NERC Act Section 41 aquatic macroinvertebrate species within the impacted reaches, along with a number of other nationally notable macroinvertebrate species which live in niche habitats and exhibit a susceptibility to impacts relating to reduced levels.

Macrophyte species

Data obtained from the EA Fish and Ecology Data Explorer between 2013-2024 has identified one NERC macrophyte species, Flowering rush (*Butomus umbellatus*), as present within all the impacted reaches along with one nationally notable species water-crowfoot (*Batrachian Ranunculus* sp) which was identified as present in reaches 1 to 3.

Fish species

Data obtained from the EA Fish and Ecology Data Explorer between 2013-2024 has identified five NERC Act Section 41 and notable fish species in all the impacted reaches assessed in this report, including two NERC Act Section 41 fish species; *Salmo trutta* (brown trout) and *Anguilla anguilla* (European eel), and three notable fish species; bullhead (*Cottus gobio*), brook lamprey (*Lampetra planeri*) and barbel (*Barbus barbus*)⁴.

³ NBN Trust (2025). The National Biodiversity Network (NBN) Atlas. <https://ror.org/00mcxye41>

⁴ Barbel is listed in Annex V of the Habitats Directive as a species of Community interest whose taking in the wild and exploitation may be the subject of management measures.

Bird species

Several NERC Act Section 41 and notable bird and bat species have been identified as present in water dependent habitats which rely on the impacted reaches assessed in this report. Based on the available information these species are considered not to be susceptible to impacts resulting from implementation of the Farmoor drought permit and **not sensitive** to the physical environment impacts identified in **Appendix A**. See **Table B2-3** below for details on these species.

Table B2-3 NERC Act Section 41 and other protected and notable species within the Farmoor Drought Permit zone of influence

Site / Receptor & designation	Associated reach	River Habitat Impact at Location (Major, Moderate, Minor, Negligible)	Susceptibility to flow & level impacts	Sensitivity (Low, Medium, High, Not Sensitive, Uncertain)	Further Consideration Required (Yes/No)
NERC Species – mammals - Otter <i>Lutra lutra</i> - Water vole <i>Arvicola amphibious</i>	Reach 1 Reach 2 Reach 3	Moderate (Reach 1) Uncertain (Reach 2) Minor (Reach 3)	The species are not expected to be significantly impacted by the implementation of the drought permit against a baseline of reduced flows characteristic of a drought. Physical attributes of waterways will only affect otter where they have an impact on food availability or significant obstructions that inhibit movement through the catchment. The reduction in flows will potentially have a beneficial effect through increased food availability. Changes in water level are the most important factor influencing water vole populations rather than changes to flow, with species readily inhabiting areas of slow flowing and standing water. In principle, changes in levels could expose water vole burrows and reduce escape potential from predators on distributaries; however, compared to background drought impacts this is likely to be an insignificant impact. In addition, water vole activity outside of the burrow throughout winter is significantly reduced which will limit any additional impact the scheme may have had through reduction in levels and exposure to predators.	Low (all reaches)	No (all reaches)
NERC Species – mammals - Bat species	Reach 1 Reach 2	Moderate (Reach 1) Uncertain (Reach 2) Minor (Reach 3)	The species are not expected to be impacted on by the implementation of the drought permit against a baseline of reduced flows characteristic of a drought, particularly as water levels will remain constant.	Not sensitive (all reaches)	No (all reaches)
NERC Species - Macroinvertebrates	Reach 1 Reach 2	Moderate (Reach 1) Uncertain (Reach 2)	These species are likely to be susceptible to flow and level impacts as they inhabit specialised niche habitat	Low (Reach 1 & 2)	Yes (all reaches)

Site / Receptor & designation	Associated reach	River Habitat Impact at Location (Major, Moderate, Minor, Negligible)	Susceptibility to flow & level impacts	Sensitivity (Low, Medium, High, Not Sensitive, Uncertain)	Further Consideration Required (Yes/No)
-Depressed river mussel <i>Pseudanodonta complanata</i> -Fine-lined pea mussel <i>Pisidium tenuilineatum</i> -Thames Ram's Horn Snail <i>Gyraulus acronicus</i> -Club-tailed dragonfly <i>Gomphus vulgatissimus</i> -	Reach 3	Minor (Reach 3)	which are likely to be altered as a result of the drought permit. These alterations could occur through siltation or decline in dissolved oxygen, for example.	Medium / High (Reach 3)	
NERC species – Crustacea - White-clawed crayfish <i>Austropotamobius pallipes</i>	Reach 1 Reach 2 Reach 3	Moderate (Reach 1) Uncertain (Reach 2) Minor (Reach 3)	Given the presence of signal crayfish in Reaches 1 & 3 it is considered unlikely that white-clawed crayfish are present and therefore they have not been considered further.	Not Sensitive (Reaches 1 & 2) Uncertain (Reach 3)	No (all reaches)
NERC Species - Fish - Brown trout <i>Salmo trutta</i> - European eel <i>Anguilla anguilla</i>	Reach 1 Reach 2 Reach 3	Moderate (Reach 1) Uncertain (Reach 2) Minor (Reach 3)	For this specific application, the aim is to implement the scheme from autumn and winter of 2026 through to spring 2027. Therefore, this receptor is susceptible as the duration of impact could impact spawning, migration, provision of cover etc. Eels are less sensitive to changes in flows, velocities and levels, however may be sensitive to reduced flows specifically during the downstream migratory period.	Medium/High (all reaches)	Yes (all reaches)

Site / Receptor & designation	Associated reach	River Habitat Impact at Location (Major, Moderate, Minor, Negligible)	Susceptibility to flow & level impacts	Sensitivity (Low, Medium, High, Not Sensitive, Uncertain)	Further Consideration Required (Yes/No)
NERC Species – Macrophytes - Flowering rush <i>Butomus umbellatus</i>	Reach 1 Reach 2 Reach 3	Moderate (Reach 1) Uncertain (Reach 2) Minor (Reach 3)	The species is likely to be susceptible to flow and level impacts as it has a relatively high nutrient and hydraulic index requirement that will change under drought permit conditions, although the level of impact beyond that of natural drought is uncertain.	Uncertain (all reaches)	Yes (all reaches)
NERC Species – Birds	Reach 1 Reach 2 Reach 3	Moderate (Reach 1) Uncertain (Reach 2) Minor (Reach 3)	Although some NERC bird species are reliant on water dependent habitats, they are not expected to be significantly impacted on by the implementation of the drought permit against a baseline of reduced flows characteristic of a drought	Low (all reaches)	No (all reaches)
Notable Species – Fish - Barbel <i>Barbus barbus</i> - Lamprey sp. <i>Petromyzontidae</i> - Bullhead <i>Cottus gobio</i>	Reach 1 Reach 2 Reach 3	Moderate (Reach 1) Uncertain (Reach 2) Minor (Reach 3)	Barbel are typically a fast-flowing water species that requires clean uncompacted gravels for spawning. All three of these species are potentially susceptible as implementation of this scheme is planned for autumn and winter of 2026 through to spring 2027, and thus could impact spawning, migration, provision of cover etc.	Medium/High (all reaches)	Yes (all reaches)
Notable Habitat - Macrophytes - Water crowfoot <i>Batrachian Ranunculus</i> sp.	Reach 1 Reach 2 Reach 3	Moderate (Reach 1) Uncertain (Reach 2) Minor (Reach 3)	<i>Batrachian Ranunculus</i> sp. often develop within specific hydraulic and nutrient conditions and thus alteration as a result of a drought permit would impact on the species, although the level of impact beyond that of a natural drought is uncertain.	Uncertain (all reaches)	Yes (all reaches)
Notable species – Macroinvertebrates	Reach 1 Reach 2	Moderate (Reach 1) Uncertain (Reach 2)	All of these species live in niche habitats and their susceptibility to impacts are likely to increase if water	Uncertain (all reaches)	Yes (all reaches)

Site / Receptor & designation	Associated reach	River Habitat Impact at Location (Major, Moderate, Minor, Negligible)	Susceptibility to flow & level impacts	Sensitivity (Low, Medium, High, Not Sensitive, Uncertain)	Further Consideration Required (Yes/No)
Mayflies - <i>Ephemera lineata</i> - <i>Potamanthus luteus</i> Caddisflies - <i>Leptocerus lusitanicus</i> - <i>Kageronia fuscogrisea</i> - <i>Metatype fragilis</i> - <i>Ylodes conspersus</i> Water beetle - <i>Stenelmis canaliculate</i> - <i>Nebrioporus depressus</i> - <i>Rhantus</i> sp Mussel - <i>Unio tumidus</i>	Reach 3	Minor (Reach 3)	levels fall, although the level of impact of this beyond that of a natural drought is uncertain.		

B2.2 INVASIVE AND NON-NATIVE SPECIES

Table B2-4 summarises the invasive and non-native (INNS) receptors identified within reaches 1-3 which should be taken into account in determining the potential impacts of Farmoor drought permit implementation.

Invertebrates

One INNS receptor, Asian clam (*Corbicula fluminea*), that is sensitive or susceptible to drought permit impacts has been identified, as per the UKTAG INNS Alarm List^{Error! Bookmark not defined.}. *Dikerogammarus haemobaphes* is not on the UKTAG INNS Alarm List, though the Environment Agency have produced a rapid risk assessment, which concludes that the potential ecological risk from the species is high (with high confidence), similar to that of *D. villosus*, and could result in marked ecological change, leading to decreased diversity in the invaded range by competing with or preying upon a broad range of invertebrates. Therefore, *D. haemobaphes* has been included for further assessment based on a precautionary approach. A further 11 invertebrate INNS have also been identified and included for further assessment.

Flora

Japanese knotweed (*Fallopia japonica*), Giant hogweed (*Heracleum mantegazzianum*), Himalayan balsam (*Impatiens glandulifera*) and Nuttall's pondweed (*Elodea nuttallii*) were identified in the assessment reaches. The assessment has ruled out the potential for increased spread of these species as a result of the drought permit implementation based on the fact that they use the flow of the watercourse for their dispersal, and the proposals will do nothing to increase this dispersal.

Table B2-4 INNS recorded within the Farmoor Drought Permit zone of influence

Site/receptors and designation	Associated reach	River Habitat Impact at Location (Major, Moderate, Minor, Negligible)	Susceptibility to flow and level impacts	Sensitivity (Low, Medium, High, Not Sensitive, Uncertain)	Further Consideration Required (Yes/No)
Invasive Species - Invertebrates - Florida crangonyx <i>Crangonyx pseudogracilis/floridanus</i> - New Zealand Mudsnail <i>Potamopyrgus antipodarum</i> - Caspian Mud Shrimp <i>Chelicorophium curvispinum</i> - Demon Shrimp <i>Dikerogammarus haemobaphes</i> - Tubificid Worm <i>Branchiura sowerbyi</i> - Wautier's Limpet <i>Ferrissia californica</i> - Asian clam <i>Corbicula fluminea</i> - Long Fingernailclam <i>Musculium transversum</i> - Ponto-Caspian Polychaete Worm <i>Hypania invalida</i> - Trumpet Ramshorn <i>Menetus dilatatus</i> - bloody-red mysid	Reach 1 Reach 2 Reach 3	Moderate (Reach 1) Uncertain (Reach 2) Minor (Reach 3)	There is uncertainty surrounding the likely effect of flow and level impacts on invasive species ability to distribute further within the watercourse.	Uncertain (Reach 1 & 2) Low (Reach 3)	Yes (all reaches)

Site/receptors and designation	Associated reach	River Habitat Impact at Location (Major, Moderate, Minor, Negligible)	Susceptibility to flow and level impacts	Sensitivity (Low, Medium, High, Not Sensitive, Uncertain)	Further Consideration Required (Yes/No)
<i>Hemimysis anomala</i> - Signal Crayfish <i>Pacifastacus leniusculus</i> - Zebra Mussel <i>Dreissena polymorpha</i> - Quagga Mussel <i>Dreissena bugensis</i>					
Invasive Species – Flora - Japanese knotweed <i>Fallopia japonica</i> - Giant hogweed <i>Heracleum mantegazzianum</i> - Himalayan balsam <i>Impatiens glandulifera</i> - Nuttall's Waterweed <i>Elodea nuttallii</i>	Reach 1 Reach 2 Reach 3	Moderate (Reach 1) Uncertain (Reach 2) Minor (Reach 3)	These invasive plant species can use the flow of the watercourse for dispersal but are not reliant on it. Implementation of the drought permit will do nothing to increase their dispersal.	Negligible (all reaches)	No (all reaches)

B2.3 LANDSCAPE, NAVIGATION, RECREATION AND HERITAGE

Table B2-5 summarises the landscape, navigation, recreation and heritage receptors identified within reaches 1-3 which should be taken into account in determining the potential impacts of Farmoor Drought Permit implementation.

Table B2-5 Landscape, navigation, recreation and heritage receptors within proximity to reaches 1 - 3

Site/Receptor and designation	Associated reach	River Habitat Impact at Location (Major, Moderate, Minor, Negligible)	Susceptibility to flow and level impacts	Sensitivity (Low, Medium, High, Not Sensitive, Uncertain)	Further Consideration Required (Yes/No)
North Wessex Downs National Landscape	All reaches	Moderate (Reach 1) Uncertain (Reach 2) Minor (Reach 3)	The National Landscape comprises certain water dependent habitats which, depending on their location, will have been taken into account through consideration of designated sites and NERC species.	Not Sensitive (all reaches)	No (all reaches)
Chilterns National Landscape	All reaches	Moderate (Reach 1) Uncertain (Reach 2) Minor (Reach 3)	The National Landscape comprises certain water dependent habitats which, depending on their location, will have been taken into account through consideration of designated sites and NERC species.	Not Sensitive (all reaches)	No (all reaches)

Site/Receptor and designation	Associated reach	River Habitat Impact at Location (Major, Moderate, Minor, Negligible)	Susceptibility to flow and level impacts	Sensitivity (Low, Medium, High, Not Sensitive, Uncertain)	Further Consideration Required (Yes/No)
Archaeology and Cultural Heritage	All reaches	Moderate (Reach 1) Uncertain (Reach 2) Minor (Reach 3)	The length of the impacted reach of the River Thames and its location presents a wealth of assets with respect to archaeology and cultural heritage. Assuming water levels are maintained, the potential impact of this drought permit on the setting of the heritage assets associated with the Thames, including sub-surface water dependent heritage assets, is considered negligible.	Not sensitive (all reaches)	No (all reaches)
Navigation (Rowing/Boating)	Reach 1 Reach 3	Moderate (Reach 1) Minor (Reach 3)	There are a number of marinas located along the impacted stretch of the River Thames. Navigation on the river is important for recreation and tourism. If water levels and/or flows in the Thames were reduced this would result in restrictions to navigation (lock operation) and possible grounding of house boats.	Moderate (all reaches)	Yes
Angling	All reaches	Moderate (Reach 1) Uncertain (Reach 2) Minor (Reach 3)	Changing distributions and numbers of fish species may impact anglers who use the river.	Moderate/High	Yes (all reaches)
The Thames Path National Trail	Reach 1 Reach 3	Moderate (Reach 1) Minor (Reach 3)	The stretch of river potentially affected by the drought permit is not likely to reduce the amenity of the River Thames for walkers.	Not sensitive (all reaches)	No (all reaches)
Oatlands Road Recreation Ground	Reach 1	Moderate	Unlikely to be impacted over the duration of the drought permit implementation	Not sensitive	No
Queen's College Recreation Ground	Reach 1	Moderate	Unlikely to be impacted over the duration of the drought permit implementation	Not sensitive	No
University Sports Ground	Reach 1	Moderate	Unlikely to be impacted over the duration of the drought permit implementation.	Not sensitive	No
Abingdon Vale Cricket and Football Club	Reach 1	Moderate	Unlikely to be impacted over the duration of the drought permit implementation.	Not sensitive	No
The Springs Golf Club	Reach 1	Moderate	Unlikely to be impacted over the duration of the drought permit implementation.	Not sensitive	No
Designated bathing water sites	Reach 2 Reach 3	Uncertain (Reach 2) Minor (Reach 3)	The potential impact of the drought permit on river flows resulting in reduced dilution and flushing rates may affect bathing water quality.	Moderate	Yes

B2.4 WFD RECEPTORS – REACH BY REACH ASSESSMENT

B2.4.1 Reach 1

B2.4.1.1 Macroinvertebrates

Assessment of the sensitivity of the macroinvertebrate community was undertaken by analysis of recorded Lotic-invertebrate Index for Flow Evaluation (LIFE) scores. LIFE Ecological Quality Ratios (EQRs) for the sites are utilised to ascertain the sensitivity of the macroinvertebrate community to low flows. LIFE_{FAMILY} EQRs are not used to determine WFD classification but provides an indication of the flow preferences of the macroinvertebrate communities at the sites. See Error! Reference source not found. for guidance in interpreting raw LIFE scores.

Walley Hawkes Paisley Trigg (WHPT) Average Score Per Taxon (ASPT), WHPT Number of Taxa (_{NTAXA}) scores are also available for the Environment Agency monitoring sites which are used for WFD assessment purposes. The indicative WFD classification for these sites is based on the worst classification between WHPT_{ASPT} and WHPT_{NTAXA}. WHPT EQR scores are calculated based on available environmental parameters provided by the Environment Agency's online Ecology & Fish Data Explorer.

PSI_{FAMILY} scores are also made available for the Environment Agency monitoring sites. PSI EQRs are not used to determine WFD classification but provides an indication of the level of sedimentation at the sites.

See **Table B2-6** and **Table B2-7** for guidance in interpreting EQR scores.

Table B2-6 LIFE score sensitivities

LIFE score	Invertebrate community flow sensitivity
7.26 and above	High sensitivity to reduced flows
6.51 – 7.25	Medium sensitivity to reduced flows
6.5 and below	Low sensitivity to reduce flows

Table B2-7 Macroinvertebrate EQR classification boundaries

WHPT Classification	WHPT _{ASPT} EQR	WHPT _{NTAXA} EQR	LIFE EQR (Non-WFD)	PSI EQR (Non-WFD)
High	>0.97	>0.8	0.94	0.7
Good	0.86 - 0.97	0.68 - 0.8		
Moderate	0.72 - 0.86	0.56 - 0.68		
Poor	0.59 - 0.72	0.47 - 0.56		
Bad	<0.59	<0.47		

Reach 1 includes two WFD water bodies in the River Thames: Thames (Leach to Evenlode) (GB106039030333) and Thames (Evenlode to Thame) (GB106039030334). The WFD classifications of biological quality in RBMP3 (2022) for this river reach was **Poor**, based on fish stocks. The macroinvertebrate communities in both water bodies were classified as **High** ecological status.

The WFD status of the macroinvertebrate community in the impacted reach may be impacted by the implementation of this drought option. However, impacts of drought permit implementation would occur against a baseline of low flows, and therefore impacts of the drought permit must be considered in the context of environmental drought.

Macroinvertebrates monitoring was completed at five sites between 2013 and 2022. These sites and the survey instances have been detailed in **Table B2-8**. The indicative WFD classification for these sites are based

on the worst classification between WHPT_{ASPT} and NTAXA, these ranged between 'Bad' on 5 occurrences to 'High' on 3 occurrences.

WHPT_{ASPT} scores ranged between 3.7 - 5.53 (av. 4.89) with the lowest WHPT_{ASPT} score of 3.7 at Site 35847 in Autumn 2013, and the highest score of 5.53 at Site 184225 in Spring 2022. The WHPT_{ASPT} expected scores for ranged between 4.4 to 4.69 across the sites, with 1 of the 13 samples below the 'Good/Moderate boundary'. WHPT_{ASPT} EQR scores ranged between 0.84 - 1.21 (av. 1.07) with the lowest WHPT_{ASPT} EQR of 0.84 at Site 35847 in Autumn 2013, and the highest EQR of 1.21 at Site 184146 in Autumn 2016.

WHPT_{NTAXA} scores ranged between 8 - 27 (av. 16.15) with the lowest WHPT_{NTAXA} score of 8 at Site 35864 in Autumn 2013, and the highest score of 27 at Site 184225 in Spring 2019. The WHPT_{NTAXA} expected scores ranged between 27.75 to 28.99 across the sites, with 9 of the 13 samples below the 'Good/Moderate boundary'. WHPT_{NTAXA} EQR scores ranged between 0.29 - 0.93 (av. 0.57) with the lowest WHPT_{NTAXA} EQR of 0.29 at Site 35864 in Autumn 2013, and the highest EQR of 0.93 at Site 184225 in Spring 2019.

LIFE_{FAMILY} EQRs are not used to determine WFD classification but provides an indication of the flow preferences of the macroinvertebrate communities at the sites. LIFE_{FAMILY} scores ranged between 5.78 - 7.2 (av. 6.5) with the lowest LIFE_{FAMILY} score of 5.78 at Site 184227 in Spring 2016, and the highest score of 7.2 at Site 184146 in Spring 2016. The LIFE_{FAMILY} expected scores ranged between 6.01 to 6.21 across the sites, with 1 of the 13 samples below the 'Good/Moderate' boundary. LIFE_{FAMILY} EQR scores ranged between 0.93 - 1.19 (av. 1.06) with the lowest LIFE_{FAMILY} EQR of 0.93 at Site 184227 in Spring 2016, and the highest EQR of 1.19 at Site 184146 in Autumn 2016.

Similarly, PSI EQRs are not used to determine WFD classification but provides an indication of the level of sedimentation and eutrophication at the sites. PSI_{FAMILY} scores ranged between 13.64 - 47.06 (av. 28.3) with the lowest PSI (family) score of 13.64 at Site 35847 in Autumn 2013, and the highest score of 47.06 at Site 35864 in Spring 2013. The PSI_{FAMILY} expected scores ranged between 13.86 to 19.46 across the sites, with 1 of the 13 above the expected PSI_{FAMILY} score for their respective season. PSI_{FAMILY} EQR scores ranged between 0.95 - 2.45 (av. 1.66) with the lowest PSI (family) EQR of 0.95 at Site 35847 in Autumn 2013, and the highest EQR of 2.45 at Site 35864 in Spring 2013.

CCI EQRs are not used to determine WFD classification but provides an indication of the community richness as well as the relative rarity of species. CCI scores ranged between 1 - 29.17 (av. 16.25) with the lowest CCI score of 1 at Site 184146 in Autumn 2016, and the highest score of 29.17 at Site 184225 in Autumn 2022. The CCI expected scores ranged between 15.56 to 18.29 across the sites, with 1 of the 13 above the expected CCI score for their respective season. CCI EQR scores ranged between 0.06 - 1.71 (av. 0.99) with the lowest CCI EQR of 0.06 at Site 184146 in Autumn 2016, and the highest CCI EQR of 1.71 at Site 184225 in Spring 2019.

A total of 6 designated species, including *Kageronia fuscogrisea*, *Riolus subviolaceus*, *Sphaerium rivicola*, *Unio tumidus*, *Ephemera lineata* and *Gomphus vulgatissimus* were recorded as present at 2 sites between 2013 to 2024.

Baseline data indicates that under present conditions, the macroinvertebrate community in the impacted reach has a **low to medium** sensitivity to reduced flows (with average LIFE scores of 6.5).

Based on the available information and adopting a precautionary approach, the macroinvertebrate community in Reach 1 is considered to be susceptible to drought permit impacts and have a **medium** sensitivity to the physical environment impacts identified in **Appendix A**.

Table B2-8 Macroinvertebrate Observed and Expected Indices Summary for Reach 1

Site ID	Site NGR	Survey count	Survey Range	LIFE EQR Score Min - Max (AVG.)	LIFE (Family) Score Min - Max (AVG.)	PSI (Family) EQR Score Min - Max (AVG.)	PSI (Family) Score Min - Max (AVG.)	CCI EQR Score Min - Max (AVG.)	CCI Score Min - Max (AVG.)	WHPT _{ASPT} EQR Score Min - Max (AVG.)	WHPT _{ASPT} EQR Class Min - Max (AVG.) B/P/M/G/H	WHPT _{ASPT} Score Min - Max (AVG.)	WHPT _{NTAXA} EQR Score Min - Max (AVG.)	WHPT _{NTAXA} EQR Class Min - Max (AVG.) B/P/M/G/H	WHPT _{NTAXA} Score Min - Max (AVG.)
35847	SP4454008704	2	2013	1.03 - 1.05 (1.04)	6.33 - 6.38 (6.36)	0.95 - 1.36 (1.15)	13.64 - 26.09 (19.87)	1.22	19	0.84 - 1.02 (0.93)	M - H (G)	3.7 - 4.78 (4.24)	0.4 - 0.56 (0.48)	B - P (P)	11 - 16 (14)
35864	SP4834909276	2	2013	1.1 - 1.11 (1.11)	6.63 - 6.91 (6.77)	1.22 - 2.45 (1.84)	17.65 - 47.06 (32.36)	0.39	6	0.95 - 1.06 (1.01)	G - H (H)	4.43 - 4.69 (4.56)	0.29 - 0.49 (0.39)	B - P (B)	8 - 14 (11)
184146	SP5285601785	2	2016	1.16 - 1.19 (1.17)	7.13 - 7.2 (7.17)	1.87 - 2.21 (2.04)	26.67 - 42.11 (34.39)	0.06 - 0.7 (0.38)	1 - 11 (6)	1.06 - 1.21 (1.13)	H - H (H)	4.94 - 5.34 (5.14)	0.36 - 0.42 (0.39)	B - B (B)	10 - 12 (11)
184225	SP4479108759	5	2016 to 2022	1.02 - 1.07 (1.05)	6.35 - 6.47 (6.41)	1.37 - 1.91 (1.64)	23.81 - 37.21 (28.62)	0.69 - 1.71 (1.4)	10.75 - 29.17 (23.44)	1.04 - 1.18 (1.13)	H - H (H)	4.89 - 5.53 (5.15)	0.5 - 0.93 (0.77)	P - H (G)	14 - 27 (22)
184227	SP5234704570	2	2016	0.93 - 1.02 (0.98)	5.78 - 6.13 (5.96)	1.68	23.33	0.62 - 0.84 (0.73)	11.43 - 13.13 (12.28)	0.99 - 1.21 (1.1)	H - H (H)	4.65 - 5.32 (4.99)	0.41 - 0.61 (0.51)	B - M (P)	12 - 17 (15)

Figure B2-1 Scores and EQR values for LIFE, WHPT_{NTAXA}, WHPT_{ASPT} and PSI for Reach 1 – River Thames



B2.4.1.2 Fish

Assessment of the sensitivity of the fish community was undertaken by analysis of recorded species present within the affected reaches. Information was not currently available to provide a quantitative assessment utilising the Fisheries Classification System (FCS2) to an equivalent WFD status. Therefore, assessment has been undertaken by professional judgement using baseline information provided by the Environment Agency.

Reach 1 includes two WFD water bodies: Thames (Leach to Evenlode) (GB106039030333) and Thames (Evenlode to Thame) (GB106039030334). For the fish element, both water bodies were classified as '**Poor**' ecological status under the RBMP (2022).

The WFD status of the fish community in the impacted reach may be impacted by the implementation of this drought permit. However, impacts of drought permit implementation would occur against a baseline of low flows, and therefore impacts of the drought permit must be considered in the context of environmental drought.

Baseline fisheries data within the impacted reach is informed by seven Environment Agency monitoring sites identified in **Table B2-9**. Monitoring data has been made available from 2013-2024.

The tolerance to flow pressures (ranging from low to high) for species of fish present within the impacted reaches of the River Thames are presented in **Table B2-10**. The most abundant fish species caught throughout 2013 - 2024 was roach, with a high tolerance to flow pressures followed by bleak and dace, both considered to have a moderate tolerance to flow pressures. Only one species considered to have a low tolerance to flow pressures was caught, bullhead, in 2014 at site ID 8820.

The scoping report⁵ identified the requirement to consider the presence of barbel within the impacted reach, as the species is listed in Annex V of the Habitats Directive as a species of Community Interest. Fisheries survey information indicates that the watercourse is likely to support low populations of barbel, with 16 individuals recorded across all sites.

Based on the available information the fish community is considered to be susceptible to Farmoor drought permit impacts and have a **medium** sensitivity to the physical environment impacts identified in **Appendix A**.

Table B2-9 Reach 1 fish survey site information

Site ID	Site Name	Survey NGR	Survey Method	Survey Count	Min Survey Year	Max Survey Year
8220	Iffley - Sandford (Margin)	SP5263002444	Electric Fishing (PDC)	10	2013	2024
10627	Northmoor- Pinkhill	SP4403706997	Electric Fishing (PDC)	7	2013	2017
10648	Eynsham- kings	SP4456808704	Electric Fishing (PDC)	7	2013	2017
11119	Godstow to Osney	SP4853709063	Electric Fishing (PDC)	7	2013	2023
40587	Godstow Weirpool	SP4852509057	Electric Fishing (PDC)	7	2013	2023
71243	Port Meadow (Day/Night)	SP4854409065	Electric Fishing (PDC)	2	2018	2019
71283	Canal confluence to Marina	SP4998907079	Electric Fishing (PDC)	2	2018	2019

Table B2-10 Fish species recorded at Thames (Leach to Evenlode) (GB106039030333) and Thames (Evenlode to Thame) (GB106039030334)

Tolerance Category	Species Name	2013	2014	2015	2016	2017	2018	2019	2022	2023	2024
Low Tolerance	Bullhead		X								
Medium tolerance	Gudgeon	X	X	X	X	X	X	X	X	X	
Medium tolerance	Pike	X	X	X	X	X	X	X	X	X	X
Medium tolerance	Ruffe	X	X	X	X			X		X	
Medium tolerance	Chub	X	X	X	X	X	X	X	X	X	X
Medium tolerance	Dace	X	X	X	X	X	X	X	X	X	X

⁵ Scott Wilson (2006) Farmoor Drought Permit - Environmental Report

Medium tolerance	Minnow		X									
Medium tolerance	Bleak	X	X	X	X	X	X	X	X	X	X	X
Medium tolerance	Common bream	X	X	X	X	X	X	X	X	X	X	X
Medium tolerance	Tench		X		X	X	X		X	X	X	
Medium tolerance	Silver bream	X	X	X	X		X	X		X	X	
High tolerance	Mirror carp							X				
High tolerance	Common [wild] carp							X				
High tolerance	Barbel				X		X	X	X	X	X	X
High tolerance	Roach	X	X	X	X	X	X	X	X	X	X	X
High tolerance	Perch	X	X	X	X	X	X	X	X	X	X	X
High tolerance	European eels > elvers				X					X		
High tolerance	Rudd									X	X	
High tolerance	Zander		X								X	

B2.4.1.3 Macrophytes

Macrophyte survey results were provided using the standard LEAFACS2 methodology⁶ in accordance with the requirements of the Water Framework Directive (WFD). This methodology is based on the principle that different combinations, quantities, and numbers of macrophytes are associated with different flow conditions and nutrient availability in a river. The LEAFACS2 method assesses the condition of river macrophyte communities using data on the presence and abundance of species and groups of species recorded during a standard survey comprising a 100m river section. The parameters used in data interpretation are listed below.

- River Macrophyte Nutrient Index (RMNI): an index of eutrophication (high scores indicate enriched conditions);
- Number of macrophyte taxa which are truly aquatic, i.e. hydrophytes (N_{TAXA});
- Number of functional groups of macrophyte taxa which are hydrophytes (NFG): an assessment of the structural diversity of the plant community; and
- Percentage cover of all green filamentous algal taxa over the whole of the surveyed river sections (ALG).
- The results for each metric are then used in conjunction with site-specific environmental variables to produce an Ecological Quality Ratio (EQR) for the combined metrics. The EQR informs the WFD classification of the macrophyte site. As environmental variables were not available for this assessment, EQRs could not be generated, instead interpretation of the un-combined metric scores were used to inform this assessment.

RMNI can be used to assess the impacts of eutrophication on macrophyte communities. Individual macrophyte taxa are scored according to nutrient preference (0, low - 10, high). Higher RMNI indices indicate communities with a preference for higher nutrient levels. A high RMNI index does not automatically indicate eutrophication, instead it must be interpreted in context by comparing it with the expected RMNI score for the site based on reference conditions.

RMHI (River Macrophyte Hydraulic Index) is a historic index that is no longer maintained within our database in terms of taxonomy or taxon values. It is displayed for information and was used for assessing the impacts of flow on macrophyte communities in the first version of the LEAFACS tool (for Cycle 1 of the WFD). Higher scores indicate macrophyte communities associated with lower flow conditions.

Baseline Data

Reach 1 includes two WFD water bodies along the River Thames: Thames (Leach to Evenlode) (GB106039030333) and Thames (Evenlode to Thame) (GB106039030334). For the macrophyte sub-element, Thames (Leach to Evenlode) is classified as Good ecological status under the RBMP (2022) whilst Thames (Evenlode to Thame) is not classified.

⁶ UKTAG (2014) UKTAG River Assessment Method. Macrophytes and Phytobenthos; Macrophytes (River LEAFACS2). July 2014

Macrophyte surveys were completed in 2019 at Site ID 184225 (see **Table B2-11** for details). The indicative WFD classification is based on the worst classification between RMNI and NTAXA, with the samples classifying as '**Good**'.

The most abundant species identified at the site were *Phragmites australis* (common reed) followed by *Myriophyllum spicatum* (spiked water-milfoil), *Nuphar lutea* (yellow water-lilly), *Phalaris arundinacea* (reed canary grass) *Sparganium erectum* (branched bur reed) and *Schoenoplectus lacustris* (common club-rush).

The RMNI score at the site was 7.93. The RMNI expected score for this site is 7.13. The RMNI EQR score was 0.63. This RMNI score is indicative of plant communities associated with higher nutrient levels that may be associated with eutrophication, which is to be expected for the Thames.

The NTAXA score was 10 for this site. The NTAXA expected score for this site is 9.089, and the NTAXA EQR score was 1.1. This is indicative of a site with a higher species richness than expected for a river with these environmental conditions.

The RMHI score was 8.05. This score is indicative of plant communities that are associated with moderate to low flow velocities.

The ALG (% cover) score was 0.1. The ALG (% cover) expected score for this site is 0.05. ALG (% cover) EQR score was 1.

The NFG score was 8. The NFG expected score for this site is 5.779. The NFG EQR score was 1.12. This again suggests a greater diversity of macrophyte groups present than what was expected for a site with these environmental conditions.

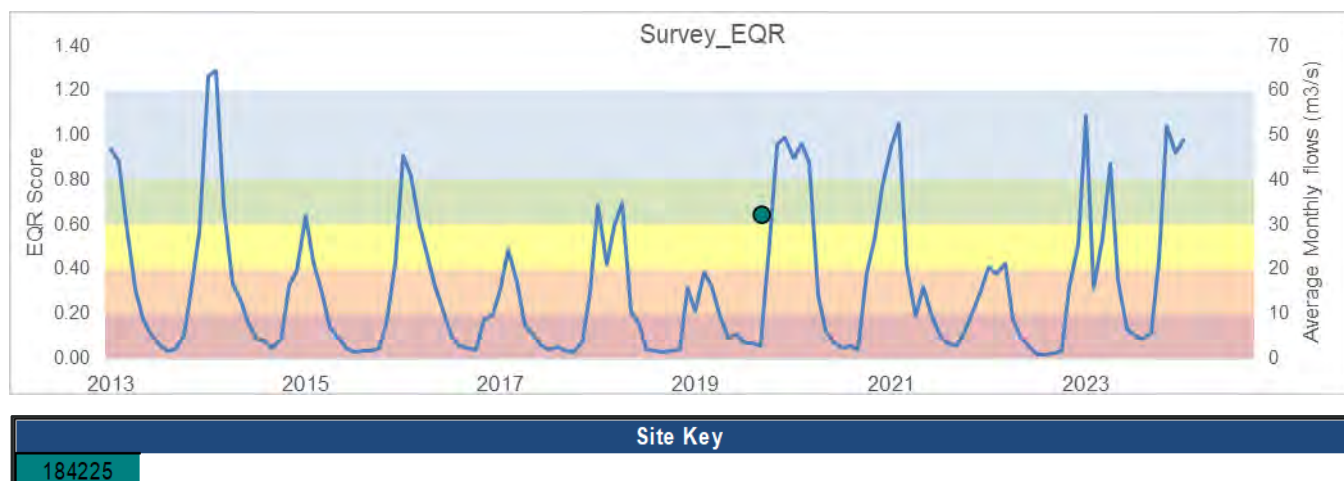
Summary

Based on the limited available data, the Macrophyte community is considered to be susceptible to the Farmoor drought permit impacts and assessed under the precautionary principle have a **medium** sensitivity to the physical environment impacts identified in **Appendix A**.

Table B2-11 Macrophytes Observed and Expected Indices Summary for Reach 1

Site ID	Site NGR	Survey count	Survey Range	RMHI score Min - Max (AVG.)	RMNI score Min - Max (AVG.)	RMNI EQR Min - Max (AVG.)	NTAXA Min - Max (AVG.)	NTAXA EQR Min - Max (AVG.)	NFG score Min - Max (AVG.)	NFG EQR Min - Max (AVG.)
184225	SP4479108759	1	2019	8.05	7.93	0.65	10	1.1	8	1.12

Figure B2-2 Macrophyte Survey EQR for Reach 1



B2.4.1.4 Diatoms

For the phytobenthos (diatom) sub-element, Thames (Leach to Evenlode) and Thames (Evenlode to Thame) is not classified under the RBMP (2022). No baseline monitoring has been undertaken within Reach 1. Although there is no baseline data available, potential impacts on diatoms will still be considered in this assessment.

B2.4.1.5 WFD waterbody status

Table B2-12 identifies the WFD status of the WFD water bodies which contain the impacted reaches. **Table B2-13** summarises the WFD status of the WFD groundwater bodies associated with the impacted reach.

Table B2-12 WFD classifications: Surface water

Waterbody ID & Name		GB106039030333 Thames (Leach to Evenlode)
Physical Environment Impact at Location (Major, Moderate, Minor, Negligible)		Moderate
RBMP Cycle 3 (2022) Status/ Potential	Overall	Poor
	Fish	Poor
	Macroinvertebrates	High
	Macrophytes and Phytobenthos	Good
Hydro-morph designation		HMWB
RBMP Cycle 3 (2027) Waterbody Objective	Overall	Moderate
	Fish	Good
	Macroinvertebrates	Good

Waterbody ID & Name					GB106039030333 Thames (Leach to Evenlode)
Macrophytes and Phytobenthos					Not Provided
Waterbody Measures					None
Waterbody ID & Name					GB106039030334 Thames (Evenlode to Thame)
Physical Environment (Major, Moderate, Minor, Negligible)	Impact at Location	Moderate			
RBMP Cycle 3 (2021) Status/ Potential	Overall	Poor			
	Fish	Poor			
	Macroinvertebrates	High			
	Macrophytes and Phytobenthos	None			
Hydro-morph designation					Not a HMWB
RBMP Cycle 3 (2027) Waterbody Objective	Overall	Moderate			
	Fish	Good			
	Macroinvertebrates	Good			
	Macrophytes and Phytobenthos	Not Stated			
Waterbody Measures					None

Table B2-13 WFD classifications: Groundwater

Waterbody ID & Name	Shrivenham Corallian Water Body
Surface Area (km ²)	197.641
Overall Water Body Classification	Good
Quantitative Dependent Surface Water Body Status	Good
Quantitative GWDTEs test	Good
Quantitative Saline Intrusion	Good
Quantitative Water Balance	Good

B2.4.2 Reach 2

B2.4.2.1 Macroinvertebrates

Reach 2 includes several smaller distributary channels, with 10 sites present that were surveyed for fish between 2013 and 2024.

Macroinvertebrates were completed at 10 sites classified as Thames distributaries between 2013 and 2024 (see **Table B2-14** below). The indicative WFD classification for these sites are based on the worst classification between WHPT_{ASPT} and NTAXA, these ranged between 'Bad' on 10 occurrences to 'High' on eight occurrences.

WHPT_{ASPT} scores ranged between 3.2 - 6.33 (av. 5.05) with the lowest WHPT_{ASPT} score of 3.2 at Site 184151 in Autumn 2016, and the highest score of 6.33 at Site 34459 in Spring 2013. The WHPT_{ASPT} expected scores for ranged between 5.2 to 5.31 across the sites, with eight of the 37 samples below the 'Good/Moderate boundary'. WHPT_{ASPT} EQR scores ranged between 0.61 - 1.19 (av. 0.96) with the lowest WHPT_{ASPT} EQR of 0.61 at Site 184151 in Autumn 2016, and the highest EQR of 1.19 at Site 34459 in Spring 2013.

WHPT_{NTAXA} scores ranged between 8 - 27 (av. 17.95) with the lowest WHPT_{NTAXA} score of eight at Site 184151 in Autumn 2016, and the highest score of 27 at Site 34459 in Spring 2019. The WHPT_{NTAXA} expected scores ranged between 26.98 to 28.97 across the sites, with 20 of the 37 samples below the 'Good/Moderate boundary'. WHPT_{NTAXA} EQR scores ranged between 0.28 - 1 (av. 0.64) with the lowest WHPT_{NTAXA} EQR of 0.28 at Site 184151 in Autumn 2016, and the highest EQR of one at Site 34459 in Spring 2019.

LIFE_{FAMILY} scores ranged between 5.25 - 7.7 (av. 6.64) with the lowest LIFE_{FAMILY} score of 5.25 at Site 184154 in Autumn 2016, and the highest score of 7.7 at Site 34459 in Autumn 2013. The LIFE_{FAMILY} expected scores ranged between 6.83 to 6.92 across the sites, with 14 of the 37 samples below the 'Good/Moderate' boundary. LIFE_{FAMILY} EQR scores ranged between 0.76 - 1.13 (av. 0.97) with the lowest LIFE_{FAMILY} EQR of 0.76 at Site 184154 in Autumn 2016, and the highest EQR of 1.13 at Site 34459 in Autumn 2013.

PSI_{FAMILY} scores ranged between 4 - 63.64 (av. 32.06) with the lowest PSI_{FAMILY} score of 4 at Site 184152 in Autumn 2016, and the highest score of 63.64 at Site 34459 in Spring 2013. The PSI_{FAMILY} expected scores ranged between 43.2 to 45.72 across the sites, with 26 of the 37 above the expected PSI_{FAMILY} score for their respective season. PSI_{FAMILY} EQR scores ranged between 0.09 - 1.39 (av. 0.72) with the lowest PSI_{FAMILY} EQR of 0.09 at Site 184152 in Autumn 2016, and the highest EQR of 1.39 at Site 34459 in Spring 2013.

CCI EQRs are not used to determine WFD classification but provides an indication of the community richness as well as the relative rarity of species. CCI scores ranged between 1 - 31.54 (av. 11.79) with the lowest CCI score of one at Site 184151 in Spring 2016, and the highest score of 31.54 at Site 184149 in Spring 2021. The CCI expected scores ranged between 11.28 to 44.32 across the sites, with 26 of the 37 above the expected CCI score for their respective season. CCI EQR scores ranged between 0.02 - 2.49 (av. 0.68) with the lowest PSI_{FAMILY} EQR of 0.02 at Site 184151 in Spring 2016, and the highest EQR of 2.49 at Site 34459 in Spring 2015.

A total of seven designated species, including *Riolus subviolaceus*, *Ephemera lineata*, *Sphaerium rivicola*, *Unio tumidus*, *Limnephilus politus*, *Viviparus contectus* and *Oxycera pygmaea* were recorded as present at six sites between 2013 to 2021.

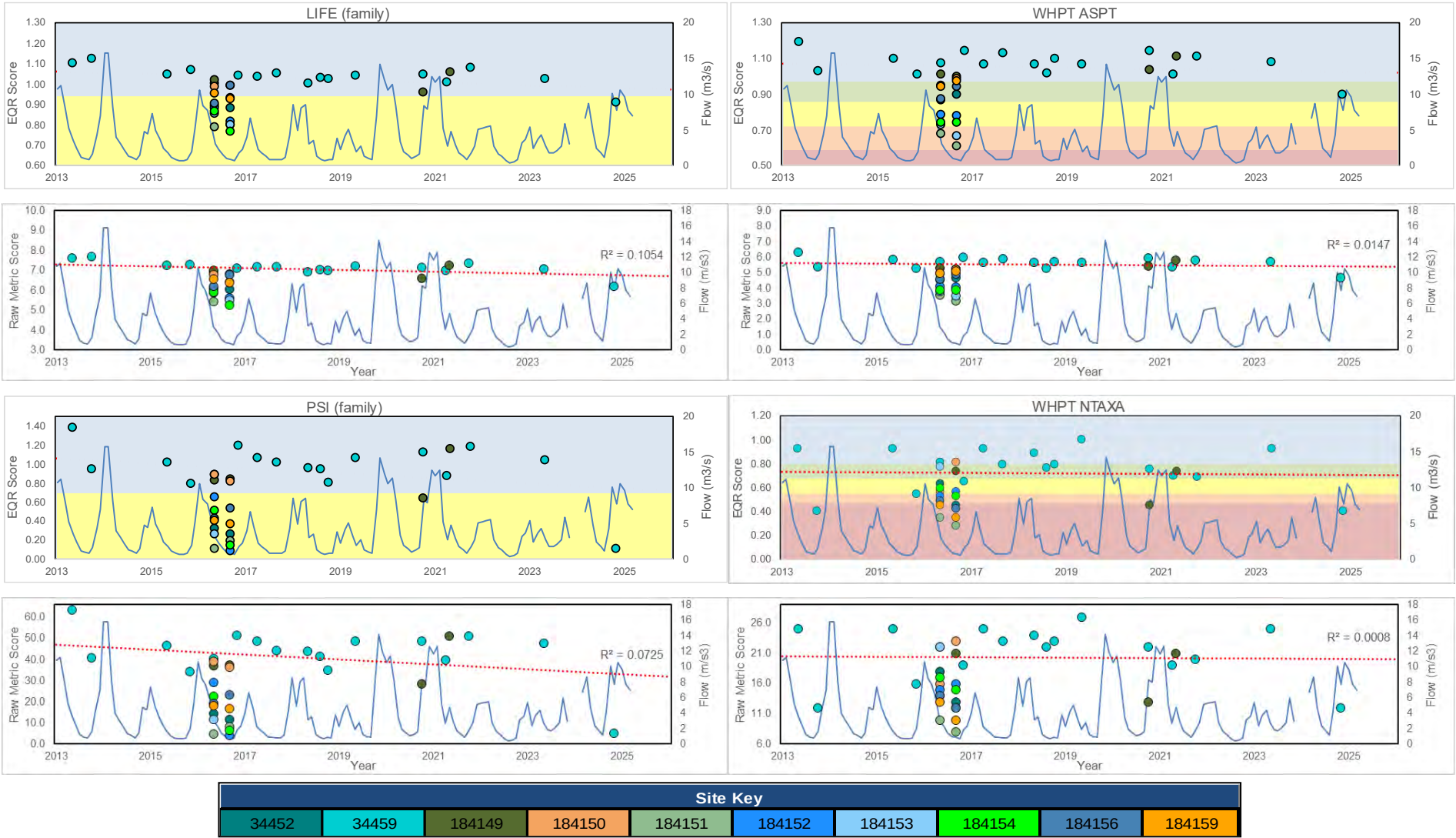
Assessment of the sensitivity of the macroinvertebrate community was undertaken by analysis of recorded LIFE scores (for further details see **Table B2-14** - LIFE score sensitivities). The average LIFE score across the sites is 6.64. This indicates that the macroinvertebrate may have a medium sensitivity to the effects of the drought permit.

Based on the available information, the macroinvertebrate community in Reach 2 is considered to be susceptible to drought permit impacts and have a **medium** sensitivity to the physical environment impacts identified in **Appendix A**.

Table B2-14 Macroinvertebrate Observed and Expected Indices Summary for Reach 2 (Thames distributaries)

Site ID	Site NGR	Survey count	Survey Range	LIFE EQR Score Min - Max (AVG.)	LIFE (Family) Score Min - Max (AVG.)	PSI (Family) EQR Score Min - Max (AVG.)	PSI (Family) Score Min - Max (AVG.)	CCI EQR Score Min - Max (AVG.)	CCI Score Min - Max (AVG.)	WHPT _{ASPT} EQR Score Min - Max (AVG.)	WHPT _{ASPT} EQR Class Min - Max (AVG.) B/P/M/G/H	WHPT _{ASPT} Score Min - Max (AVG.)	WHPT _{NTAXA} EQR Score Min - Max (AVG.)	WHPT _{NTAXA} EQR Class Min - Max (AVG.) B/P/M/G/H	WHPT _{NTAXA} Score Min - Max (AVG.)
34452	SP4946305603	2	2016	0.89 - 0.89 (0.89)	6.08 - 6.13 (6.11)	0.27 - 0.32 (0.29)	11.76 - 14.29 (13.03)	0.18 - 0.28 (0.23)	7.86 - 12.22 (10.04)	0.87 - 0.9 (0.88)	G - G (G)	4.55 - 4.7 (4.63)	0.46 - 0.64 (0.55)	B - M (P)	13 - 18 (16)
34459	SP4763808774	17	2013 to 2024	0.91 - 1.13 (1.04)	6.22 - 7.7 (7.14)	0.12 - 1.39 (0.97)	5 - 63.64 (43.13)	0.41 - 2.49 (1.22)	4.8 - 28.08 (13.94)	0.9 - 1.19 (1.08)	G - H (H)	4.7 - 6.33 (5.65)	0.41 - 1 (0.76)	B - H (G)	12 - 27 (21)
184149	SP4983805735	4	2016 to 2021	0.96 - 1.06 (1.01)	6.6 - 7.28 (6.93)	0.64 - 1.16 (0.87)	28.57 - 51.28 (38.6)	0.18 - 0.71 (0.35)	8.18 - 31.54 (15.53)	1 - 1.11 (1.04)	H - H (H)	5.23 - 5.83 (5.45)	0.46 - 0.75 (0.61)	B - G (M)	13 - 21 (17)
184150	SP5057305116	2	2016	0.94 - 0.99 (0.96)	6.42 - 6.79 (6.61)	0.82 - 0.89 (0.85)	36.36 - 39.29 (37.83)	0.15 - 0.21 (0.18)	6.43 - 9.23 (7.83)	0.95 - 0.99 (0.97)	G - H (H)	4.99 - 5.19 (5.09)	0.57 - 0.82 (0.69)	M - H (G)	16 - 23 (20)
184151	SP5038305202	2	2016	0.79 - 0.8 (0.8)	5.43 - 5.5 (5.47)	0.11 - 0.19 (0.15)	4.76 - 8.33 (6.55)	0.02 - 0.17 (0.1)	1 - 7.5 (4.25)	0.61 - 0.68 (0.65)	P - P (P)	3.2 - 3.57 (3.39)	0.28 - 0.35 (0.32)	B - B (B)	8 - 10 (9)
184152	SP5118204465	2	2016	0.82 - 0.89 (0.85)	5.62 - 6.08 (5.85)	0.09 - 0.66 (0.37)	4 - 29.17 (16.59)	0.08 - 0.23 (0.15)	3.5 - 10 (6.75)	0.78 - 0.78 (0.78)	M - M (M)	4.09 - 4.11 (4.1)	0.53 - 0.57 (0.55)	P - M (P)	15 - 16 (16)
184153	SP5147504951	2	2016	0.8 - 0.86 (0.83)	5.5 - 5.89 (5.7)	0.27	11.76	0.12 - 0.27 (0.19)	5.14 - 11.9 (8.52)	0.67 - 0.73 (0.7)	P - M (P)	3.5 - 3.81 (3.66)	0.43 - 0.78 (0.6)	B - G (M)	12 - 22 (17)
184154	SP5159403767	2	2016	0.76 - 0.86 (0.81)	5.25 - 5.93 (5.59)	0.15 - 0.51 (0.33)	6.67 - 22.58 (14.63)	0.09 - 0.44 (0.26)	4 - 19.29 (11.65)	0.74 - 0.74 (0.74)	M - M (M)	3.88 - 3.89 (3.89)	0.53 - 0.6 (0.57)	P - M (M)	15 - 17 (16)
184156	SP5173003939	2	2016	0.9 - 0.99 (0.95)	6.2 - 6.8 (6.5)	0.43 - 0.53 (0.48)	19.23 - 23.53 (21.38)	0.21 - 0.31 (0.26)	9.38 - 13.75 (11.57)	0.87 - 0.94 (0.91)	G - G (G)	4.58 - 4.93 (4.76)	0.43 - 0.5 (0.46)	B - P (B)	12 - 14 (13)
184159	SP5218703538	2	2016	0.93 - 0.96 (0.94)	6.38 - 6.56 (6.47)	0.38 - 0.41 (0.39)	16.67 - 18.18 (17.43)	0.1 - 0.25 (0.18)	4.5 - 11.25 (7.88)	0.94 - 0.98 (0.96)	G - H (G)	4.95 - 5.11 (5.03)	0.35 - 0.46 (0.41)	B - B (B)	10 - 13 (12)

Figure B2-3 Scores and EQR values for LIFE, WHPT_{NTAXA}, WHPT_{ASPT} and PSI for Reach 2 – River Thames Distributaries



B2.4.2.2 Fish

Reach 2 includes several smaller distributary channels, with nine sites present that were surveyed for fish between 2013 and 2024.

The WFD status of the fish community in the impacted reach may be impacted by the implementation of this drought option. However, impacts of drought permit implementation would occur against a baseline of low flows, and therefore impacts of the drought permit must be considered in the context of environmental drought.

Baseline Data

Baseline fisheries data within the impacted reach is informed by seven Environment Agency monitoring sites identified in **Table B2-15**. Monitoring data has been made available from 2013-2019.

Table B2-16 indicates the individual species present in the survey reach and their tolerance to flow pressures. The tolerances range from low to high with a species variation indicative of the impacted reach. The most abundant fish species caught throughout 2014 - 2019 was roach, with a high tolerance to flow pressures. This was followed by minnow and gudgeon which are also considered to have a high tolerance to flow pressures. Two species considered to have a low tolerance to flow pressures were caught, comprising of brown trout and bullhead.

The scoping report⁷ identified the requirement to consider the presence of barbel within the impacted reach, as the species is listed in Annex V of the Habitats Directive as a species of Community Interest. Fisheries survey information obtained from the Environment Agency for the River distributaries indicates that the watercourse is likely to support low populations of Barbel, with 12 individuals recorded across all sites. It must be noted that the distributaries do likely provide better habitat for barbel compared to the main Thames channel. Information from the EA in consultation responses for this EAR application indicate that Botley / Osney Stream in particular is a reliable habitat site for barbel.

Summary

Based on the available information the fish community is considered to be susceptible to Farmoor drought permit impacts and have a **medium** sensitivity to the physical environment impacts identified in **Appendix A**

Table B2-15 Reach 2 – River Thames Distributaries - Fish survey site information

Site ID	Site Name	Survey NGR	Survey Method	Survey Count	Min Survey Year	Max Survey Year
12900	Seacourt stream - Wytham Mill	SP4776709296	Electric Fishing (PDC)	1	2014	2014
13027	Bulstake Stream - Botley Park	SP5008706527	Electric Fishing (PDC)	2	2014	2019
13040	Botley Stream - Golf Range	SP4944706579	Electric Fishing (PDC)	1	2014	2014
13042	Seacourt Stream - North Hinksey	SP4944105635	Electric Fishing (PDC)	1	2014	2014
13109	Osney Stream - St Frideswides Church	SP5015106119	Electric Fishing (PDC)	1	2014	2014
13111	Castle Mill Stream - College Gardens	SP5091605973	Electric Fishing (PDC)	1	2014	2014
13112	Bulstake Stream - Fishing News Books	SP5054805550	Electric Fishing (PDC)	1	2014	2014
13115	Wolvercote Mill Stream - Wolvercote Mill East Arm	SP4870409652	Electric Fishing (PDC)	1	2014	2014
21746	Iffley Weirs Mill Stream	SP5215203772	Electric Fishing (PDC)	1	2014	2014

⁷ Scott Wilson (2006) Farmoor Drought Permit - Environmental Report

Table B2-16 Fish species recorded within Reach 2 – River Thames Tributaries

Tolerance Category	Species Name	2014	2019
Low Tolerance	Brown / sea trout	X	X
Low Tolerance	Bullhead	X	
Low Tolerance	Brook lamprey	X	
Medium tolerance	Pike	X	X
Medium tolerance	Dace	X	X
Medium tolerance	Bleak	X	X
Medium tolerance	Chub	X	X
Medium tolerance	Minnow	X	
Medium tolerance	Silver bream	X	
Medium tolerance	Common bream	X	
Medium tolerance	Ruffe	X	
Medium tolerance	Tench	X	X
Medium tolerance	Gudgeon	X	X
High tolerance	Perch	X	X
High tolerance	Barbel	X	
High tolerance	Zander	X	
High tolerance	Roach	X	X

B2.4.2.3 Macrophytes

Reach 2 includes several smaller tributary channels, with six sites present that were surveyed for macrophytes in 2022 as part of the Thames Water drought plan monitoring programme. Surveys were conducted during drought conditions.

Baseline Data

Macrophyte surveys were completed in 2022 at Site IDs Wytham Ditch Site 1, Wytham Ditch Site 3, Seacourt Stream at Fai Farm, Seacourt Stream at Wytham, Seacourt Stream u/s A34, Seacourt Stream at Golf Course (see **Table B2-17** below). The indicative WFD classification is based on the worst classification between RMNI and NTAXA, these ranged between '**Poor**' on two occurrences to '**Good**' on one occurrence.

The RMNI scores ranged between 7.76 - 8.7 (av. 8.31) with the lowest RMNI score of 7.76 at Wytham Ditch Site 1 in summer 2022, and the highest score of 8.7 at Seacourt Stream at Golf Course in summer 2022. The RMNI expected scores for ranged between 7.18 to 7.21 across the sites. RMNI EQR scores ranged between 0.33 - 0.73 (av. 0.5) with the lowest RMNI EQR of 0.33 at Seacourt Stream at Golf Course in summer 2022, and the highest EQR of 0.73 at Wytham Ditch Site 1 in summer 2022. This indicates a community that is generally tolerant to high nutrient loads. These indices results may be sign of nutrient loading or eutrophication of the watercourse.

The NTAXA scores ranged between 2 - 4 (av. 2.83) with the lowest WHPT_{NTAXA} score of 2 at Seacourt Stream at Fai Farm in summer 2022, and the highest score of 4 at Wytham Ditch Site 1 in summer 2022. The NTAXA expected scores were 9.09 across the sites. NTAXA EQR scores ranged between 0.11 - 0.66 (av. 0.37) with the lowest WHPT_{NTAXA} EQR of 0.11 at Seacourt Stream at Fai Farm in summer 2022, and the highest EQR of 0.66 at Site Seacourt Stream u/s A34 in summer 2022. This indicates that the sites are generally low in diversity and 'species poor', with the sites having less species present that what would be expected.

The highest ALG (% cover) score was 0.5 at Seacourt Stream at Wytham in summer 2022. The ALG (% cover) expected score was 0.05 across the sites. ALG (% cover) EQR scores ranged between 0.96 - 1 with the lowest NFG EQR of 0.96 at Site Seacourt Stream at Wytham in summer 2022, and the highest EQR of 1 at Site Wytham Ditch Site 1 in summer 2022.

The NFG scores ranged between 1 - 6 (av. 3) in summer 2022. The NFG expected scores ranged between 5.78 to 5.78 across the sites. NFG EQR scores ranged between 0.08 - 0.6 (av. 0.32) with the lowest NFG EQR of -0.05 at Site Seacourt Stream at Fai Farm in summer 2022, and the highest EQR of 0.6 at Site Seacourt Stream u/s A34 in summer 2022.

A single INNS species was recorded at one site (Seacourt Stream at Fai Farm) in 2022.

A single designated species, *Carux otrubae* (false fox sedge), was recorded as present at 1 site in 2022, at Wytham Ditch Site 2. The species is classified as vulnerable.

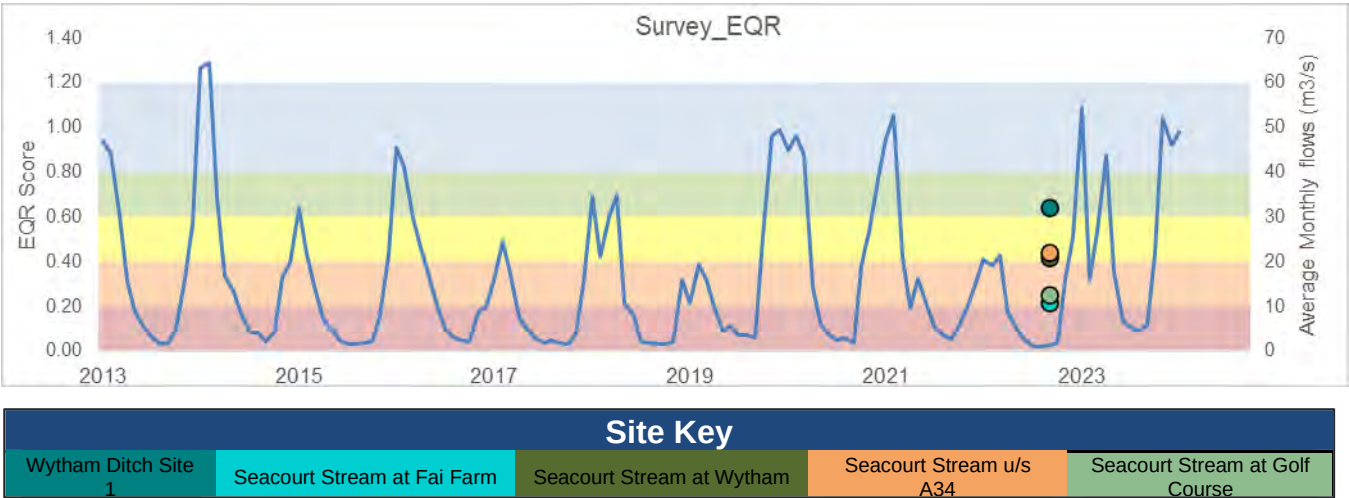
Summary

Based on the available information the macrophyte community is unlikely to be susceptible to drought permit impacts and have a **low** sensitivity to the physical environment impacts identified in **Appendix A**.

Table B2-17 Macrophyte Observed and Expected Indices Summary for Reach 2 (Thames distributaries)

Site ID	Site NGR	Survey count	Survey Range	RMNI score Min - Max (AVG.)	RMNI EQR Min - Max (AVG.)	^{NTAXA} Min - Max (AVG.)	^{NTAXA} EQR Min - Max (AVG.)	NFG score Min - Max (AVG.)	NFG EQR Min - Max (AVG.)	ALG (% cover) Min - Max (AVG.)	ALG EQR Min - Max (AVG.)	Survey EQR score Min - Max (AVG.)	Survey EQR Class Min - Max (AVG.) <i>B/P/M/G/H</i>
Wytham Ditch Site 1	SP4692710011	1	2022	7.76	0.73	5	0.55	4	0.47	0	1	0.64	G
Wytham Ditch Site 3	SP4649409884	1	2022	8.05	0.59	3	0.33	2	0.21	0	1	0.47	M
Seacourt Stream at Fai Farm	SP4773809087	1	2022	8.67	0.35	1	0.11	1	-0.05	0	1	0.22	P
Seacourt Stream at Wytham	SP4766908938	1	2022	8.24	0.52	3	0.33	3	0.21	0.5	0.96	0.42	M
Seacourt Stream u/s A34	SP4807308150	1	2022	8.44	0.44	6	0.66	6	0.6	0	1	0.44	M
Seacourt Stream at Golf Course	SP4878507396	1	2022	8.7	0.33	2	0.22	2	0.08	0	1	0.25	P

Figure B2-4 Macrophyte Survey EQR for Reach 2 – River Thames Distributaries



B2.4.2.4 Diatoms

There were no diatom surveys conducted by the EA on the Thames distributaries between 2013 and 2024. Although there is no baseline data available, potential impacts on diatoms will still be considered in this assessment.

B2.4.2.5 WFD waterbody status

The Thames distributaries do not form their own WFD water bodies, and conditions are therefore captured within **Section B2.4.1.5** for Reach 1.

B2.4.3 Reach 3

B2.4.3.1 Macroinvertebrates

Reach 3 includes two WFD water bodies: Thames (Evenlode to Thame) (GB106039030334) waterbody and the Thames (Wallingford to Caversham) (GB106039030331) waterbody. The RBMP3 (2022) WFD classification for the macroinvertebrate element was '**High**' for both water bodies.

Macroinvertebrate surveys were completed at 16 Sites between 2013 and 2024 (See below).

The indicative WFD classification for these sites are based on the worst classification between WHPT ASPT and NTAXA, these ranged between 'Bad' on nine occurrences to 'High' on three occurrences.

WHPT ASPT scores ranged between 4.03 - 6.14 (av. 5.08) with the lowest WHPT ASPT score of 4.03 at Site 35854 in Spring 2013, and the highest score of 6.14 at Site Ses_Eco_5_S2 in Autumn 2024. The WHPT ASPT expected scores for ranged between 4.4 to 6.87 across the sites, with 23 of the 49 samples below the 'Good/Moderate boundary'. WHPT ASPT EQR scores ranged between 0.71 - 1.16 (av. 0.91) with the lowest WHPT ASPT EQR of 0.71 at Site Ses_Eco_5_S3 in Autumn 2024, and the highest EQR of 1.16 at Site 184231 in Spring 2016.

WHPT NTAXA scores ranged between 1 - 26 (av. 14.39) with the lowest WHPT NTAXA score of 1 at Site Ses_Eco_5_S1 in Summer 2023, and the highest score of 26 at Site 184231 in Spring 2016. The WHPT NTAXA expected scores ranged between 15.2 to 29.02 across the sites, with 27 of the 49 samples below the 'Good/Moderate boundary'. WHPT NTAXA EQR scores ranged between 0.07 - 1.37 (av. 0.66) with the lowest WHPT NTAXA EQR of 0.07 at Site Ses_Eco_5_S1 in Summer 2023, and the highest EQR of 1.37 at Site Ses_Eco_6a_S2 in Summer 2023.

LIFE_{FAMILY} EQRs are not used to determine WFD classification but provides an indication of the flow preferences of the macroinvertebrate communities at the sites. LIFE_{FAMILY} scores ranged between 5.67 - 7.5 (av. 6.6) with the lowest LIFE(family) score of 5.67 at Site 35854 in Spring 2013, and the highest score of 7.5 at Site Ses_Eco_4_S1 in Summer 2024. The LIFE_{FAMILY} expected scores ranged between 6 to 7.5 across the sites, with 22 of the 49 samples below the 'Good/Moderate' boundary. LIFE_{FAMILY} EQR scores ranged between 0.8 - 1.12 (av. 0.96) with the lowest LIFE_{FAMILY} EQR of 0.8 at Site Ses_Eco_5_S2 in Summer 2023, and the highest EQR of 1.12 at Site 35850 in Autumn 2013.

Similarly, PSI EQRs are not used to determine WFD classification but provides an indication of the level of sedimentation and eutrophication at the sites. PSI(family) scores ranged between 5.42 - 63.64 (av. 20.85) with the lowest PSI(family) score of 5.42 at Site Ses_Eco_6a_S2 in Summer 2023, and the highest score of 63.64 at Site Ses_Eco_5_S2 in Autumn 2023. The PSI_{FAMILY} expected scores ranged between 13.8 to 69.17 across the sites, with 33 of the 49 above the expected PSI_{FAMILY} score for their respective season. PSI_{FAMILY} EQR scores ranged between 0.08 - 2.08 (av. 0.65) with the lowest PSI_{FAMILY} EQR of 0.08 at Site Ses_Eco_6a_S2 in Summer 2023, and the highest EQR of 2.08 at Site 35901 in Autumn 2013.

CCI EQRs are not used to determine WFD classification but provides an indication of the community richness as well as the relative rarity of species. CCI scores ranged between 4.2 - 34 (av. 13.87) with the lowest CCI score of 4.2 at Site Ses_Eco_5_S2 in Spring 2024, and the highest score of 34 at Site Ses_Eco_4_S1 in Spring 2024. The CCI expected scores ranged between 7.64 to 36.4 across the sites, with 33 of the 49 above the expected CCI score for their respective season. CCI EQR scores ranged between 0.14 - 4.42 (av. 1.25) with the lowest PSI(family) EQR of 0.14 at Site 184145 in Autumn 2016, and the highest EQR of 4.42 at Site Ses_Eco_4_S1 in Spring 2024.

A total of 6 designated species, including Ephemera lineata, Sphaerium rivicola, Riolus subviolaceus, Unio tumidus, Gomphus vulgatissimus and Pseudanodonta complanata were recorded as present at 11 between 2013 to 2024.

Assessment of the sensitivity of the macroinvertebrate community was undertaken by analysis of recorded LIFE scores (for further details see **Table B2-18** - LIFE score sensitivities). The average LIFE score across the sites is 6.6. This indicates that the macroinvertebrate may have a medium sensitivity to the effects of the drought permit.

Summary

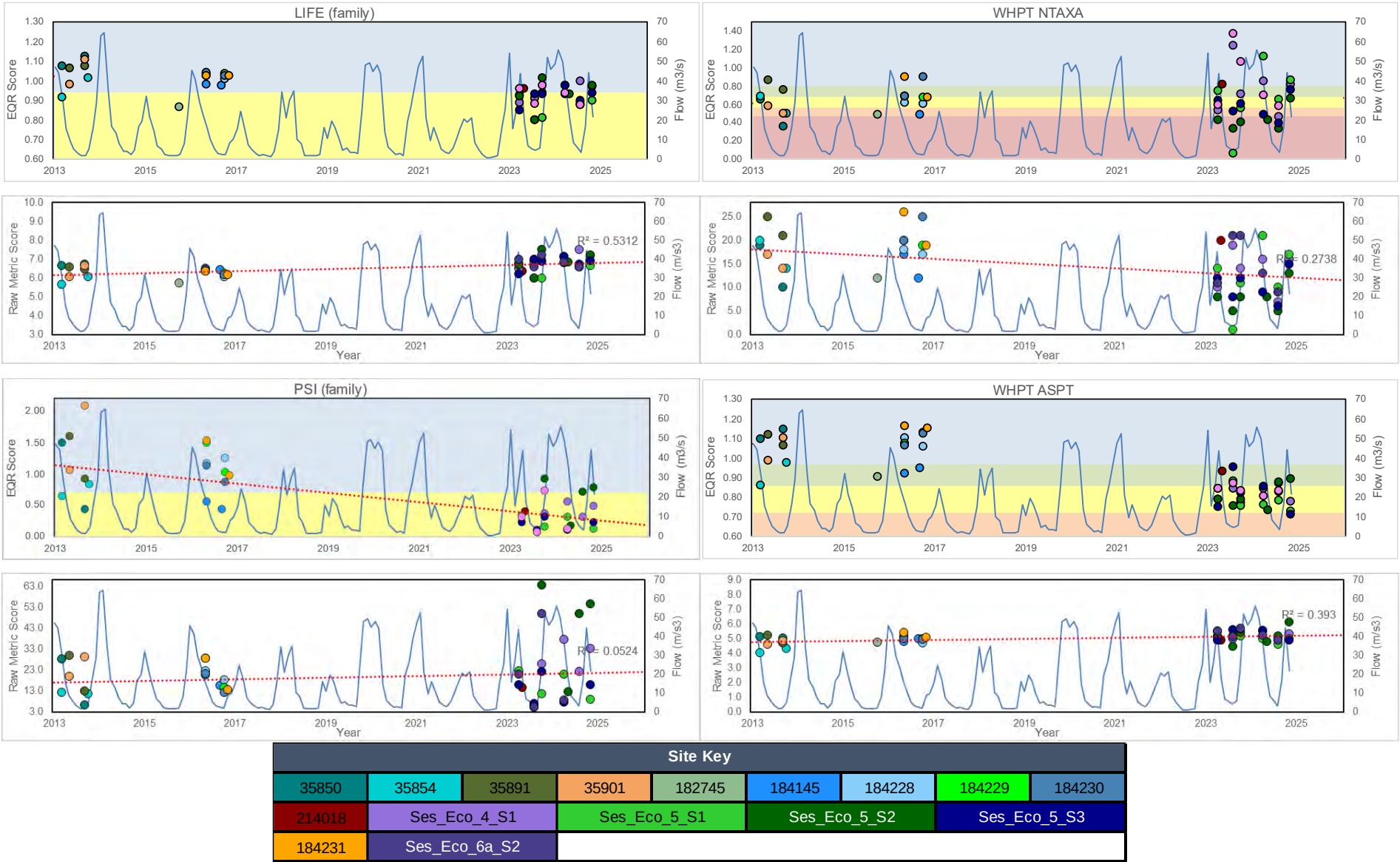
Based on the available information the macroinvertebrate community is considered to be susceptible to drought permit impacts and have a **medium** sensitivity to the physical environment impacts identified in **Appendix A**.

Table B2-18 Macroinvertebrate Observed and Expected Indices Summary for Reach 3

Site ID	Site NGR	Survey count	Survey Range	LIFE EQR Score Min - Max (AVG.)	LIFE (Family) Score Min - Max (AVG.)	PSI (Family) EQR Score Min - Max (AVG.)	PSI (Family) Score Min - Max (AVG.)	CCI EQR Score Min - Max (AVG.)	CCI Score Min - Max (AVG.)	WHPT _{ASPT} EQR Score Min - Max (AVG.)	WHPT _{ASPT} EQR Class Min - Max (AVG.) B/P/M/G/H	WHPT _{ASPT} Score Min - Max (AVG.)	WHPT _{NTAXA} EQR Score Min - Max (AVG.)	WHPT _{NTAXA} EQR Class Min - Max (AVG.) B/P/M/G/H	WHPT _{NTAXA} Score Min - Max (AVG.)
35850	SU6353876755	2	2013	1.07 - 1.12 (1.1)	6.65 - 6.75 (6.7)	0.45 - 1.49 (0.97)	6.25 - 28.13 (17.19)	0.49 - 0.74 (0.61)	7.65 - 13.5 (10.58)	1.1 - 1.15 (1.12)	H - H (H)	5.06 - 5.13 (5.1)	0.36 - 0.66 (0.51)	B - M (P)	10 - 19 (15)
35854	SU5966381001	2	2013	0.92 - 1.01 (0.96)	5.67 - 6.08 (5.88)	0.65 - 0.84 (0.75)	11.54 - 12.2 (11.87)	0	0	0.86 - 0.98 (0.92)	G - H (G)	4.03 - 4.31 (4.17)	0.5 - 0.69 (0.6)	P - G (M)	14 - 20 (17)
35891	SU5687393535	2	2013	1.06 - 1.08 (1.07)	6.47 - 6.59 (6.53)	0.92 - 1.59 (1.26)	12.9 - 30 (21.45)	1.48 - 1.54 (1.51)	23.18 - 28.18 (25.68)	1.07 - 1.12 (1.09)	H - H (H)	4.7 - 5.23 (4.97)	0.75 - 0.86 (0.81)	G - H (H)	21 - 25 (23)
35901	SU5053197181	2	2013	0.98 - 1.11 (1.05)	6.07 - 6.67 (6.37)	1.06 - 2.08 (1.57)	20 - 29.17 (24.59)	0	0	0.99 - 1.1 (1.04)	H - H (H)	4.61 - 4.86 (4.74)	0.5 - 0.59 (0.54)	P - M (P)	14 - 17 (16)
182745	SU6143590788	1	2015	0.87	5.73	0	0	0.33	12	0.91	G	4.75	0.49	P	12
184145	SP5306201197	2	2016	0.98 - 0.98 (0.98)	6.44 - 6.5 (6.47)	0.43 - 0.57 (0.5)	15.79 - 20.69 (18.24)	0.14 - 0.3 (0.22)	5.25 - 11 (8.13)	0.92 - 0.95 (0.93)	G - G (G)	4.82 - 4.97 (4.9)	0.49 - 0.69 (0.59)	P - G (M)	12 - 17 (15)
184228	SU5035797030	2	2016	1.01 - 1.04 (1.02)	6.07 - 6.43 (6.25)	1.17 - 1.25 (1.21)	18.18 - 22.58 (20.38)	0.48 - 0.73 (0.6)	7.5 - 13.21 (10.36)	1.06 - 1.1 (1.08)	H - H (H)	4.69 - 5.17 (4.93)	0.61 - 0.62 (0.62)	M - M (M)	17 - 18 (18)
184229	SU5764893171	2	2016	1.02 - 1.04 (1.03)	6.24 - 6.35 (6.3)	1.03 - 1.5 (1.26)	14.71 - 28.57 (21.64)	0.72 - 1.24 (0.98)	11.25 - 22.5 (16.88)	1.08 - 1.13 (1.1)	H - H (H)	4.99 - 5.04 (5.02)	0.68 - 0.69 (0.69)	G - G (G)	19 - 20 (20)
184230	SU5991281451	2	2016	1.03 - 1.04 (1.03)	6.17 - 6.44 (6.31)	0.88 - 1.13 (1.01)	12.2 - 21.21 (16.71)	0.74 - 1.43 (1.08)	11.56 - 26 (18.78)	1.07 - 1.12 (1.1)	H - H (H)	4.95 - 4.98 (4.97)	0.69 - 0.9 (0.8)	G - H (G)	20 - 25 (23)
184231	SU7299773943	2	2016	1.03 - 1.03 (1.03)	6.17 - 6.35 (6.26)	0.98 - 1.53 (1.26)	13.64 - 28.57 (21.11)	0.7 - 0.82 (0.76)	12.8 - 12.86 (12.83)	1.15 - 1.16 (1.16)	H - H (H)	5.07 - 5.43 (5.25)	0.68 - 0.9 (0.79)	G - H (G)	19 - 26 (23)
214018	SU5332397452	1	2023	0.96	6.35	0.4	14.71	0.71	25.83	0.93	G	4.88	0.82	H	20
Ses_Eco_4_S1	SU4970996341	6	2023 to 2024	0.89 - 1 (0.95)	6.5 - 7.5 (7.02)	0.08 - 0.56 (0.36)	5.5 - 37.5 (24.93)	0.9 - 4.42 (2.46)	9.29 - 34 (19.81)	0.78 - 0.87 (0.82)	M - G (M)	4.98 - 5.53 (5.24)	0.46 - 1.25 (0.77)	B - H (G)	7 - 19 (14)

Site ID	Site NGR	Survey count	Survey Range	LIFE EQR Score Min - Max (AVG.)	LIFE (Family) Score Min - Max (AVG.)	PSI (Family) EQR Score Min - Max (AVG.)	PSI (Family) Score Min - Max (AVG.)	CCI EQR Score Min - Max (AVG.)	CCI Score Min - Max (AVG.)	WHPT _{ASPT} EQR Score Min - Max (AVG.)	WHPT _{ASPT} EQR Class Min - Max (AVG.) B/P/M/G/H	WHPT _{ASPT} Score Min - Max (AVG.)	WHPT _{NTAXA} EQR Score Min - Max (AVG.)	WHPT _{NTAXA} EQR Class Min - Max (AVG.) B/P/M/G/H	WHPT _{NTAXA} Score Min - Max (AVG.)
Ses_Eco_5_S1	SU4973494879	6	2023 to 2024	0.8 - 0.93 (0.87)	6 - 6.81 (6.47)	0.09 - 0.34 (0.21)	6 - 22.73 (14.13)	0.46 - 1.7 (1.19)	4.8 - 13 (10.02)	0.73 - 0.88 (0.79)	M - G (M)	4.62 - 5.51 (5.08)	0.07 - 1.13 (0.67)	B - H (M)	1 - 21 (12)
Ses_Eco_5_S2	SU5028394422	6	2023 to 2024	0.8 - 1.01 (0.92)	6 - 7.5 (6.82)	0.08 - 0.92 (0.54)	5.6 - 63.64 (37.26)	0.55 - 2.18 (1.28)	4.2 - 16.67 (11.1)	0.74 - 0.89 (0.81)	M - G (M)	4.46 - 6.14 (5.19)	0.33 - 0.66 (0.43)	B - M (B)	5 - 13 (8)
Ses_Eco_5_S3	SU5478394746	6	2023 to 2024	0.85 - 0.98 (0.92)	6.2 - 7.13 (6.82)	0.1 - 0.32 (0.2)	7 - 22.22 (13.78)	1.01 - 2.27 (1.42)	10 - 17.5 (12.02)	0.71 - 0.95 (0.82)	P - G (M)	4.88 - 5.66 (5.26)	0.39 - 0.77 (0.57)	B - G (M)	6 - 15 (10)
Ses_Eco_6a_S2	SU6551677460	5	2023 to 2024	0.88 - 0.98 (0.93)	6.57 - 7.22 (6.85)	0.08 - 0.73 (0.31)	5.42 - 50 (21.24)	0.85 - 2.17 (1.38)	6.5 - 16.8 (11.48)	0.81 - 0.87 (0.84)	M - G (M)	4.9 - 5.71 (5.3)	0.59 - 1.37 (0.86)	M - H (H)	9 - 21 (15)

Figure B2-5 Scores and EQR values for LIFE, WHPTNTAXA, WHPTASPT and PSI for Reach 3



B2.4.3.2 Fish

Reach 3 includes two WFD water bodies: Thames (Evenlode to Thame) (GB106039030334) waterbody and the Thames (Wallingford to Caversham) (GB106039030331) waterbody. The RBMP3 (2022) WFD fish classification for Thames (Evenlode to Thame) was classified as '**Poor**', and Thames (Wallingford to Caversham) was not classified.

Baseline fisheries data within the impacted reach is informed by 19 Environment Agency monitoring sites across the two WFD water bodies (**Table B2-19**). There was a total of 108 surveys between 2013 and 2024 at these sites.

Table B2-20 indicates the individual species present in the survey reach and their tolerance to flow pressures. The most abundant fish species caught throughout 2013 - 2023 was roach, which comprised of over 50% of the total catch, with a high tolerance to flow pressures. This was followed by bleak and chub, both considered to have a moderate tolerance to flow pressures. Only two species considered to have a low tolerance to flow pressures was caught, comprising of brown trout and bullhead which were present in very low numbers, with only 2 and 19 individuals caught respectively. There was also low abundance of European eel, with only 15 individuals present. It must be noted that although a high number of eels were not caught at this spot, this site is known to have a high abundance of eels. Their abundance increases as you get closer to the Thames estuary.

The scoping report⁸ identified the requirement to consider the presence of barbel within the impacted reach, as the species is listed in Annex V of the Habitats Directive as a species of Community Interest. Fisheries survey information obtained from the Environment Agency for the River Thames indicates that the watercourse is supports low populations of barbel, with only 93 individuals recorded between 2013 and 2024.

Summary

Based on the available information the fish community is considered to be susceptible to Farmoor drought permit impacts and have a **medium** sensitivity to the physical environment impacts identified in **Appendix A**.

Table B2-19 Reach 3 – River Thames Tributaries - Fish survey site information

Site ID	Site Name	Survey NGR	Survey Method	Survey Count	Min Survey Year	Max Survey Year
7326	Cleeve-Goring - (Margin)	SU5970081300	Electric Fishing (PDC)	4	2013	2022
7330	Whitchurch to Mapledurham (Margin)	SU6550877460	Electric Fishing (PDC)	4	2013	2022
8113	Sandford - Abingdon - (Margin)	SP5308901278	Electric Fishing (PDC)	10	2013	2024
8227	Abingdon - Culham (Margin)	SU4967396413	Electric Fishing (PDC)	10	2013	2024
8231	Culham - Clifton Hampden (Margin)	SU5249294303	Electric Fishing (PDC)	9	2013	2024
8239	Days - Benson (Margin)	SU5937492450	Electric Fishing (PDC)	9	2013	2024
8284	Clifton Hampden - Days (Margin)	SU5580295826	Electric Fishing (PDC)	9	2013	2024
10456	Cleeve - Goring (Weirpool)	SU6003981754	Electric Fishing (PDC)	2	2019	2022
10457	Caversham (Weirpool)	SU7206474079	Electric Fishing (PDC)	4	2013	2022
10459	Whitchurch (Weirpool)	SU6337676753	Electric Fishing (PDC)	4	2013	2022
30712	Clifton Weir Stream	SU5471894681	Electric Fishing (PDC)	9	2013	2024
30713	Goring to Whitchurch (Margin)	SU5958780760	Electric Fishing (PDC)	1	2013	2013
30714	Goring weir pool	SU5958780760	Electric Fishing (PDC)	1	2013	2013
30716	Mapledurham Mill Channel	SU6694076734	Electric Fishing (PDC)	10	2014	2014
30726	Days weirpool	SU5686693627	Electric Fishing (PDC)	10	2013	2024
30727	Culham Weirpool	SU5079294877	Electric Fishing (PDC)	10	2013	2024
32811	Abingdon Weirpool	SU5057897154	Electric Fishing (PDC)	10	2013	2024
53003	Days Lock	SU5676593484	Electric Fishing (PDC)	1	2014	2014
60763	Sutton Pools	SU5044294403	Electric Fishing (PDC)	1	2014	2014

⁸ Scott Wilson (2006) Farmoor Drought Permit - Environmental Report

Table B2-20 **Reach 3 - Fish species present during surveys and their tolerance to flow pressures**

Tolerance Category	Species Name	2013	2014	2015	2016	2017	2018	2019	2022	2023	2024
Low Tolerance	Brown / sea trout		X								X
Low Tolerance	Bullhead		X								
Medium tolerance	Stone loach		X								
Medium tolerance	Pike	X	X	X	X	X	X	X	X	X	X
Medium tolerance	Dace	X	X	X	X	X	X	X	X	X	X
Medium tolerance	Bleak	X	X	X	X	X	X	X	X	X	X
Medium tolerance	Chub	X	X	X	X	X	X	X	X	X	X
Medium tolerance	Silver bream	X	X	X	X		X	X	X	X	X
Medium tolerance	Common bream	X	X	X	X	X	X	X	X	X	X
Medium tolerance	Ruffe	X	X	X	X			X			
Medium tolerance	Tench	X	X	X	X	X	X	X	X	X	X
Medium tolerance	Gudgeon	X	X	X	X	X	X	X	X	X	X
Medium tolerance	Minnow		X								
High tolerance	Rudd	X			X	X			X	X	X
High tolerance	European eel	X	X	X	X	X		X		X	
High tolerance	Roach	X	X	X	X	X	X	X	X	X	X
High tolerance	Roach x common bream hybrid	X	X				X	X			
High tolerance	Barbel	X	X	X	X	X	X		X	X	X
High tolerance	Zander		X	X	X						
High tolerance	Roach x silver bream hybrid			X							
High tolerance	Perch	X	X	X	X	X	X	X	X	X	X
High tolerance	Common Carp (Including varieties)	X	X		X	X	X		X		X

B2.4.3.3 Macrophytes

Reach 3 includes two WFD water bodies: Thames (Evenlode to Thame) (GB106039030334) waterbody and the Thames (Wallingford to Caversham) (GB106039030331) waterbody. The RBMP3 (2022) WFD classification for the macrophyte element in the Thames (Wallingford to Caversham (GB106039030331) waterbody was '**High**'. For the Thames (Evenlode to Thame) (GB106039030334) waterbody was not assessed for macrophytes.

Macrophyte surveys were completed between 2013 and 2024 at EA Site ID(s) 165823 and 214018 (see **Table B2-21** below). The indicative WFD classification is based on the worst classification between RMNI and _{NTAXA}, these ranged between '**Good**' on 2 occurrences to '**High**' on 2 occurrences.

The most abundant species identified at the site 165823 were *Sagittaria sagittifolia* (arrowhead), *Sparganium emersum* (unbranched bur-reed), with lesser quantities of the invasive *Myriophyllum spicatum* (spiked water-milfoil) and also Nuphar lutea (yellow water-lily). The most abundant species identified at the site 214018 were also spiked water-milfoil, yellow water-lily and unbranched bur-reed.

The RMNI scores ranged between 7.87 - 8.24 (av 8.02) with the lowest RMNI score of 7.87 at Site 165823 in summer 2016, and the highest score of 8.24 at Site 165823 in summer 2013. The RMNI expected scores for ranged between 7.66 to 7.74 across the sites. RMNI EQR scores ranged between 0.7 - 0.92 (av 0.81) with the lowest RMNI EQR of 0.7 at Site 165823 in summer 2013, and the highest EQR of 0.92 at Site 165823 in summer 2016. This average RMNI score indicates that the macrophyte communities are moderately tolerant to nutrient inputs.

The _{NTAXA} scores ranged between 4 - 5 (av 4.5) with the lowest WHPT _{NTAXA} score of 4 at Site 165823 in summer 2013, and the highest score of 5 at Site 165823 in summer 2016. The _{NTAXA} expected scores ranged between 9.42 to 9.55 across the sites. _{NTAXA} EQR scores ranged between 1.06 - 1.27 (av 1.19) with the lowest WHPT _{NTAXA} EQR of 1.06 at Site 214018 in summer 2024, and the highest EQR of 1.27 at Site 214018 in summer 2023.

The RMHI scores ranged between 7.91 - 8.24 (av 8.03) with the RMNI score of 7.91 at Site 214018 in summer 2023, and the highest score of 8.24 at Site 165823 in summer 2013. These scores indicate that the macrophyte communities generally prefer slow to moderate flows.

The ALG (% cover) scores ranged between 0.05 - 0.55 (0.2) with the ALG score of 0.05 at Site 214018 in summer 2024, and the highest score of 0.55 at Site 214018 in summer 2023. The ALG (% cover) expected scores ranged between 0.05 across the sites. ALG (% cover) EQR scores ranged between 0.96 - 1 (0.99) with the lowest NFG EQR of 0.96 at Site 214018 in summer 2023, and the highest EQR of 1 at Site 214018 in summer 2024.

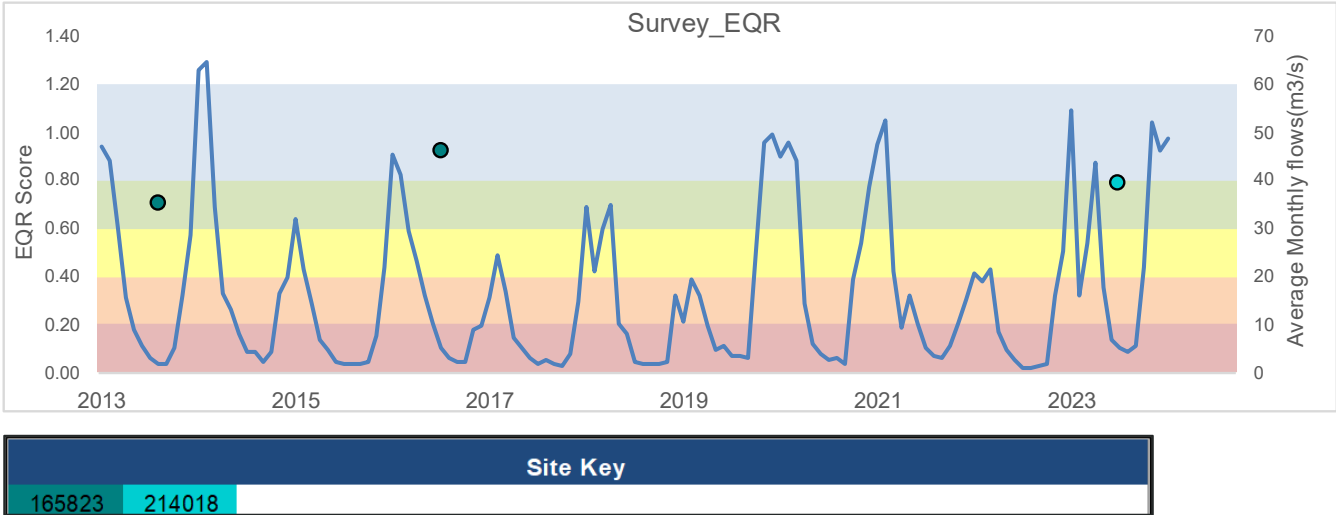
The NFG scores ranged between 7 - 8 (7.75) with the NFG score of 7.91 at Site 214018 in summer 2023, and the highest score of 8.24 at Site 165823 in summer 2013. The NFG expected scores ranged between 5.97 to 6.04 across the sites. NFG EQR scores ranged between 1.07 - 1.32 (1.22) with the lowest NFG EQR of 1.07 at Site 214018 in summer 2024, and the highest EQR of 1.32 at Site 214018 in summer 2023.

Based on the data above, the macrophyte community is generally one preferring moderate to high nutrient environments and moderate to slow flowing water bodies. Based on the available information the macrophyte community is considered to be susceptible to drought permit impacts and have a **medium** sensitivity to the physical environment impacts identified in **Appendix A**.

Table B2-21 Macrophytes Observed and Expected Indices Summary for Reach 3

Site ID	Site NGR	Survey count	Survey Range	RMHI score Min - Max (AVG.)	RMNI score Min - Max (AVG.)	RMNI EQR Min - Max (AVG.)	INTAXA Min - Max (AVG.)	NTAXA EQR Min - Max (AVG.)	NFG score Min - Max (AVG.)	NFG EQR Min - Max (AVG.)	ALG (% cover) Min - Max (AVG.)	ALG EQR Min - Max (AVG.)	Survey EQR score Min - Max (AVG.)	Survey EQR Class Min - Max (AVG.) B/P/M/G/H
165823	SU6426977059	2	2013 to 2016	7.94 - 8.24 (8.09)	7.87 - 8.24 (8.06)	0.7 - 0.92 (0.81)	11 - 12 (12)	1.15 - 1.26 (1.2)	7 - 8 (8)	1.18 - 1.3 (1.24)	0.1	1	0.7 - 0.92 (0.81)	G - H (H)
214018	SU5332397452	2	2023 to 2024	7.91 - 8.03 (7.97)	7.95 - 8.03 (7.99)	0.79 - 0.84 (0.81)	10 - 12 (11)	1.06 - 1.27 (1.17)	8	1.07 - 1.32 (1.2)	0.05 - 0.55 (0.3)	0.96 - 1 (0.98)	0.79 - 0.84 (0.81)	G - H (H)

Figure B2-6 Macrophyte metrics for Reach 3



B2.4.3.4 Diatoms

No baseline monitoring has been undertaken by the EA within Reach 3 between 2013 and 2024. The RBMP3 (2022) WFD classification for the macrophyte and phytobenthos sub-elements in the Thames (Wallingford to Caversham (GB106039030331) was **'High'**. Thames (Evenlode to Thame) (GB106039030334) was not assessed for macrophyte and phytobenthos. Although there are no baseline data available, potential impacts on diatoms will still be considered in this assessment.

B2.4.3.5 WFD waterbody status

Error! Reference source not found. identifies the WFD status of the WFD water bodies which contain the impacted reaches. Water bodies classified as overall high/good status/potential, or high/good status for fish or macroinvertebrates, are assessed as more likely to be sensitive to flow impacts (if more than minor). **Table B2-23** summarises the WFD status of the WFD groundwater bodies associated with the impacted reach.

Table B2-22 WFD classifications: Surface water

Waterbody ID & Name		GB106039030333 Thames (Wallingford to Caversham)
Physical Environment Impact at Location (Major, Moderate, Minor, Negligible)		Minor
RBMP Cycle 3 (2022*) Status/ Potential	Overall	Moderate
	Fish	None Stated
	Macroinvertebrates	High
	Macrophytes and Phytobenthos	High
Hydro-morph designation		HMWB
RBMP Cycle 3 (2027) Waterbody Objective	Overall	Moderate
	Fish	Good
	Macroinvertebrates	Good
	Macrophytes and Phytobenthos	Not Provided
Waterbody Measures		None
Waterbody ID & Name		GB106039030334 Thames (Evenlode to Thame)
Physical Environment Impact at Location (Major, Moderate, Minor, Negligible)		Minor
RBMP Cycle 3 (2022*) Status/ Potential	Overall	Poor
	Fish	Poor
	Macroinvertebrates	High
	Macrophytes and Phytobenthos	None Stated
Hydro-morph designation		Not a HMWB
RBMP Cycle 3 (2027) Waterbody Objective	Overall	Good
	Fish	Not Provided
	Macroinvertebrates	Good
	Macrophytes and Phytobenthos	Not Provided

Table B2-23 WFD classifications: Groundwater

Waterbody ID & Name	GB40601G600900 Berkshire Downs Chalk Water Body
Surface Area (km ²)	990.256
Overall Water Body Classification	Poor
Quantitative Dependent Surface Water Body Status	Poor
Quantitative GWDTEs test	Good
Quantitative Saline Intrusion	Good
Quantitative Water Balance	Good
Waterbody ID & Name	GB40601G601100 South-West Chilterns Chalk Water Body
Surface Area (km ²)	40366.559
Overall Water Body Classification	Good
Quantitative Dependent Surface Water Body Status	Good
Quantitative GWDTEs test	Good
Quantitative Saline Intrusion	Good
Quantitative Water Balance	Good
Waterbody ID & Name	GB40601G604100 Chiltern Chalk Scarp Water Body
Surface Area (km ²)	27947.554
Overall Water Body Classification	Poor
Quantitative Dependent Surface Water Body Status	Good
Quantitative GWDTEs test	Good
Quantitative Saline Intrusion	Good
Quantitative Water Balance	Good
Waterbody ID & Name	GB40601G601000 Vale of White Horse Chalk Water Body
Surface Area (km ²)	270.257
Overall Water Body Classification	Poor
Quantitative Dependent Surface Water Body Status	Good
Quantitative GWDTEs test	Good
Quantitative Saline Intrusion	Good
Quantitative Water Balance	Good

B3 ENVIRONMENTAL RECEPTORS SCREENING SUMMARY

Table B3-1 Environmental receptors screening summary

Reach	Reach 1	Reach 2	Reach 3
Risk to River Habitats Impact	Moderate	Uncertain	Minor
WFD Waterbody	GB106039030333 and GB106039030334 River Thames: Thames (Leach to Evenlode) and River Thames (Evenlode to Thame)	N/A Thames Distributaries	GB106039030334 and GB106039030331 Thames (Evenlode to Thame) and River Thames (Wallingford to Caversham)
Statutory Designated Sites			
SSSI	✓	✓	✓
SAC	✓	✓	✓
SPA	X	X	X
NERC habitat and Local Wildlife Sites			
NERC Habitat	✓	✓	✓
Local Wildlife Sites	✓	✓	✓
NERC and Other Protected/ Notable Species Receptors			
Notable Macroinvertebrates	✓	✓	✓
Notable Macrophytes	✓	✓	✓
White-clawed crayfish	X	X	X
Otter	X	X	X
Water vole	X	X	X
Barbel	✓	✓	✓
Lamprey	✓	✓	X
Brown trout	✓	✓	✓
Bullhead	✓	✓	✓
European eel	✓	✓	✓
Bats	X	X	X
Birds	X	X	X
WFD Waterbody WFD Status Receptors			
Fish	✓	✓	✓
Macroinvertebrates	✓	✓	✓
Macrophytes	✓	✓	✓
Diatoms	✓	✓	✓
Invasive non-native species (INNS)			
INNS - macroinvertebrates	✓	✓	✓
INNS - plants	✓	✓	✓
INNS- fish	X	X	X
Landscape, navigation, recreation and heritage			
Receptors	✓	✓	✓

Key	
Further assessment required = ✓	No further assessment required = x

B4 RECEPTORS ASSESSMENT, MONITORING AND MITIGATION ASSESSMENT

Details regarding the approaches/methodologies used for the assessment of the impacts associated with drought option implementation are presented in Section 3.7 of 'the Methodology'.

The assessment of environmental receptors is informed by the information provided in **Appendix A**. The 'potential risks to water quality' and 'assessment of risk to river habitats' tables, provided on a reach by reach basis in **Appendix A** provide an overview of impacts to water quality and key aspects of the river habitat including changes in flow hydraulics, sediment dynamics, connectivity, variability in usable habitat, habitat maintenance, channel morphology and bed and bank processes and should be reviewed for context alongside the receptors assessment below.

The assessment considers a drought permit implementation of September 2026 for a period of six months through autumn, winter and into early spring of 2027.

B4.1 REACH 1

The impact assessment for each of the sites is identified following guidance provided by the Chartered Institute of Ecology and Environmental Management (CIEEM)⁹, providing a significance of impact which takes into consideration the magnitude of impact alongside the value of the receptor (for the full assessment methodology, see 'the Methodology').

B4.1.1 Statutory designated sites

Sites in this section have been ordered from upstream to downstream.

B4.1.1.1 Oxford Meadows SAC

The physical environment assessment has identified that the main channel of the River Thames will be subject to moderate reductions in velocity. The risk of water quality deterioration in the impacted reach is high, associated with risk to soluble reactive phosphorus (SRP).

The Oxfordshire Biodiversity Action Plan identifies that the lowland meadows present at the site are sensitive to changes in hydrology and nutrient status, with grassland of this type identified under the National Vegetation Classification as MG4 (meadow foxtail (*Alopecurus pratensis*) and great burnet (*Sanguisorba officinalis*)) significantly reliant on winter flooding and groundwater levels in the underlying gravel.

The lowland meadows are susceptible to nutrient changes and therefore impacts associated with water quality deterioration could adversely affect the habitats on site. However, the Oxford Meadows would only be flooded with water from the Thames during a high flow scenario which will not be the conditions at the time of permit implementation. Therefore, the impacts on the designated site as a result of a reduction in velocity on the main stem of the River Thames is considered to be of Negligible magnitude. Similarly, under a baseline drought scenario, the meadows would not be receiving winter flooding from the River Thames and therefore the implementation of the permit will do nothing to reduce the volume of water entering the SAC. The Oxford Meadows SAC and constituent SSSIs are also supported hydrologically by groundwater in the superficial sand and gravel deposits of the Thames floodplain. As levels are not affected by the permit implementation, this is unlikely to impact the groundwater contribution to the habitats. Overall, the significance of impact is considered to be **Negligible**.

The overall confidence in the available data on Oxford Meadow SAC and its subsequent assessment has been classed as **medium** due to the availability of data on the species and habitat that make up the site.

A summary of the impacts is provided in **Table B4-1**.

⁹ Institute of Ecology and Environmental Management (2006) Guidelines for Ecological Impact Assessment in the United Kingdom. IEEM, Winchester.

Table B4-1 Summary of Impacts on Oxford Meadows, Reach 1

Receptor	Impact	Ecological Importance of Receptor	Impact Magnitude	Significance of Impact
Oxford Meadows SAC	Habitat degradation as a result of decreased velocities in the River Thames.	International	Negligible	Negligible

B4.1.1.2 Cassington Meadows SSSI

The NVC community S5 represents a swamp habitat of eutrophic water margins with the community occurring as a fringe to sluggish rivers and streams or on regularly inundated flood-plain washlands. The community is relatively tolerant of a range of water depths provided eutrophic conditions are maintained. Given the Oxford Meadows SAC is supported by groundwater levels in the underlying gravel, there is a likelihood that this site is similarly supported. The physical environment assessment has identified that the main channel of the River Thames will be subject to reductions in velocity. The site is situated adjacent to the River Thames on seasonally flooded alluvial soils over-lying gravel. As with Oxford Meadows, seasonal inundation will be affected by the baseline drought conditions prior to any permit implementation.

The impacts on the designated site as a whole as a result of a reduction in velocity on the main stem of the River Thames, and water quality are considered to be of negligible magnitude, temporary and reversible. Overall, the significance of impact is considered to be **Negligible**.

The overall confidence in the available data on Cassington SSSI and it's subsequent assessment has been classed as **medium** due to the availability of data on the species and habitat that make up the site.

A summary of the impacts is provided in **Table B4-2**.

Table B4-2 Summary of Impacts on Cassington Meadows SSSI, Reach 1

Receptor	Impact	Ecological Importance of Receptor	Impact Magnitude	Significance of Impact
Cassington Meadows SSSI	Habitat degradation as a result of decreased velocities in the River Thames.	National	Negligible	Negligible

B4.1.1.3 Pixey and Yarnton Meads SSSI

As the site is a component part of the Oxford Meadows SAC, impacts will be consistent with that described above. The site is situated adjacent to the River Thames and inundation is determined by both groundwater levels and seasonal inundation during winter high flows.

The impacts on the designated site as a result of a reduction in velocity on the main stem of the River Thames are considered to be of negligible magnitude, temporary and reversible. Overall, the significance of impact is considered to be **negligible**.

The overall confidence in the available data on Pixey and Yarnton Meads SSSI and it's subsequent assessment has been classed as **medium** due to the availability of data on the species and habitat that make up the site.

A summary of the impacts is provided in **Table B4-3**.

Table B4-3 Summary of Impacts on Pixey and Yarnton Meads SSSI, Reach 1

Receptor	Impact	Ecological Importance of Receptor	Impact Magnitude	Significance of Impact
Pixey and Yarnton Meads SSSI	Habitat degradation as a result of decreased velocities in the River Thames.	National	Negligible	Negligible

B4.1.1.4 Wolvercote Meadows SSSI

The SSSI comprises lowland hay meadow habitat which is reliant on annual surface flooding which is typically less than 3 days from September – November and less than 10 days in December – February. The majority of the lowland hay meadow habitat is currently in favourable condition, apart from unit 1 of the underpinning SSSI Wolvercote Meadows which is in unfavourable recovering condition due to grazing. The SSSI likely receives flows from both the River Thames and Wolvercote stream during flood conditions.

The physical environment assessment has identified that the main channel of the River Thames will be subject to temporary reductions in velocity, with Wolvercote Stream also experiencing temporary reductions in both level and velocity at its source-end as it is fed from the Thames. The degree of this reduction, however, is uncertain. With that said, this reduction should not impact the flood frequency. Any impacts associated with a lack of flooding will be realised during baseline drought conditions rather than through implementation of the drought permit, consistent with the sites described above. The impact magnitude is therefore considered to be **negligible**.

The overall confidence in the available data on Wolvercote Meadows SSSI and it's subsequent assessment has been classed as **medium** due to the availability of data on the species and habitat that make up the site.

Walkovers around Wolvercote Mill Stream have been proposed as part of the EMP in **Appendix C** in order to monitor potential impacts on the stream during implementation, and thus better understand potential impacts upon the SSSI.

A summary of the impacts is provided in **Table B4-4**.

Table B4-4 Summary of Impacts on Wolvercote Meadows SSSI, Reach 1

Receptor	Impact	Ecological Importance of Receptor	Impact Magnitude	Significance of Impact
Wolvercote Meadows SSSI	Habitat degradation as a result of decreased velocities in the River Thames and reduced velocities and levels in the Wolvercote Stream.	National	Negligible	Uncertain

B4.1.1.5 Port Meadow with Wolvercote Common and Green SSSI

The physical environment assessment has identified that the main channel of the River Thames will be subject to reductions in velocity.

The NVC community MG6 characterises a major permanent pasture type on moist but freely draining soils. Although the community will persist on heavy soils or under occasional inundation, effective drainage is essential for maintaining pastures in good condition. MG11 grassland is characteristic of a wide variety of moist but free-draining soils, in some cases frequently inundated, and MG13 grasslands occur typically on silty soils that are kept moist and sometimes waterlogged by periodic inundation¹⁰. Given the Oxford Meadows SAC is supported by groundwater levels in the underlying gravel, there is a likelihood that this site is similarly supported.

¹⁰ Rodwell, J. S. (ed) (1992) British Plant Communities, Volume 3, Grasslands and montane communities. Cambridge University Press, Cambridge

As the water level is not impacted by the drought permit, impacts on the MG6, MG11 and MG13 grassland habitats present are considered unlikely. The impacts on the designated site as a whole as a result of a reduction in velocity on the main stem of the River Thames and water quality are considered to be of negligible magnitude, temporary and reversible. Overall, the significance of impact is considered to be **negligible**.

The overall confidence in the available data on Wolvercote Meadows SSSI and it's subsequent assessment has been classed as **medium** due to the availability of data on the species and habitat that make up the site.

A summary of the impacts is provided in **Table B4-5**.

Table B4-5 Summary of Impacts on Port Meadow with Wolvercote Common and Green SSSI, Reach 1

Receptor	Impact	Ecological Importance of Receptor	Impact Magnitude	Significance of Impact
Port Meadow with Wolvercote Common and Green SSSI	Habitat degradation as a result of decreased velocity in the River Thames.	National	Negligible	Negligible

B4.1.1.6 Iffley Meadows SSSI

The physical environment assessment has identified that the main channel of the River Thames will be subject to reductions in velocity whilst the distributaries, notably Hinksey Stream for Iffley Meadows SSSI, will be subject to a reduction in level and velocity, due to lower flows from the River Thames into the distributaries.

The Oxfordshire Biodiversity Action Plan identifies that the lowland meadows are sensitive to changes in hydrology and nutrient status. MG4 grassland is characteristic of areas where traditional hay-meadow treatment has been applied to seasonally flooded land with alluvial soils, where seasonal flooding is of great importance in the maintenance of fertility through an input of salts and deposition of alluvial silt and decaying organic matter¹¹. MG9 grassland is characteristic of permanently moist, gleyed and periodically inundated soils around the upper limit of inundation and MG10 is characteristic of permanently moist sites where a high soil moisture is the most important condition for maintenance of community. Given the Oxford Meadows SAC is supported by groundwater levels in the underlying gravel, there is a likelihood that this site is similarly supported.

The physical environment assessment has identified that water levels within Hinksey Stream may be impacted which may then in theory impact the frequency of seasonal flooding. However, under a baseline drought scenario the meadows would not be receiving winter flooding from the distributaries, and therefore, the implementation of the permit will do nothing to reduce the volume reaching the meadows.

The site receives a designation for the presence of *Fritillaria meleagris*, which occurs in damp meadows, especially near rivers. Impacts upon this species are dependent upon the maintenance of suitable conditions at the habitats present. However as detailed above, these impacts will have been realised during baseline drought conditions and would only be flooded during a high flow scenario which will not be the conditions at the time of permit implementation.

The risk of water quality deterioration in the impacted reaches is high, associated with risk to SRP, and the abstraction and consented discharge pressures in Reach 1 have been identified as high risk. The lowland meadows are susceptible to nutrient changes and therefore impacts associated with water quality deterioration could adversely affect the habitats on site. As water levels within the distributaries of the River Thames will be decrease, and flooding is not expected in natural drought conditions, the pathway for water quality impacts will be removed.

The impacts on the qualifying receptors of the designated site as a result of a reduction in velocity and water quality in the main stem of the River Thames and reduction in velocity, or level and velocity, due to lower flows in the distributaries are considered to be of negligible magnitude, temporary and reversible. Overall, the significance of impact is considered to be **negligible**.

¹¹ Rodwell, J. S. (ed) (1992) British Plant Communities, Volume 3, Grasslands and montane communities. Cambridge University Press, Cambridge.

The overall confidence in the available data on Iffley Meadows SSSI and it's subsequent assessment has been classed as **medium** due to the availability of data on the species and habitat that make up the site.

A summary of the impacts is provided in **Table B4-6**.

Table B4-6 Summary of Impacts on Iffley Meadows SSSI, Reach 1

Receptor	Impact	Ecological Importance of Receptor	Impact Magnitude	Significance of Impact
Iffley Meadows SSSI	Habitat degradation as a result of decreased flows in the River Thames and distributaries.	National	Negligible	Negligible

B4.1.2 Non-Statutory designated sites and NERC habitats

B4.1.2.1 Thames Island (Skinner's Weir Island) SNCI

The physical environment assessment has identified that the main channel of the River Thames will be subject to reductions in velocity only as water levels will be maintained by lock control operations.

The wetland habitats are unlikely to be impacted by a reduction in flow velocity as they will support slow-flowing habitats. The water level is the critical factor for the site and since this is not affected by the drought permit, impacts are not anticipated.

The risk of water quality deterioration in the impacted reaches is high, associated with risk to SRP, and the abstraction and consented discharge pressures in Reach 1 have been identified as high risk. However, it is noted that the designated site is upstream of all of the identified pressures.

Overall, as water levels are not affected, the water quality impacts alone are anticipated to have a low magnitude of impact on the site. Overall, the significance of impact is considered to be **minor**.

The overall confidence in the available data on Thames Island (Skinner's Weir Island) SNCI and it's subsequent assessment has been classed as **medium** due to the availability of data on the species and habitat that make up the site.

A summary of the impacts is provided in **Table B4-7**.

Table B4-7 Summary of Impacts on Thames Island (Skinner's Weir Island) SNCI, Reach 1

Receptor	Impact	Ecological Importance of Receptor	Impact Magnitude	Significance of Impact
Thames Island (Skinner's Weir Island) SNCI	Habitat degradation as a result of decreased flow velocity in the River Thames	County	Negligible	Negligible

B4.1.2.2 Swinford Toll Brook Meadow SNCI

The Oxfordshire Biodiversity Action Plan identifies that the lowland meadows are sensitive to changes in hydrology and nutrient status, with grassland of this type significantly reliant upon winter flooding. The physical environment assessment has identified that the main channel of the River Thames in the impacted reaches will only be subject to reductions in velocity and therefore this site will not be impacted given it's location on the main stem of the River Thames.

The risk of water quality deterioration in the impacted reaches is high, associated with risk to SRP, and the abstraction and consented discharge pressures in Reach 1 have been identified as high risk. However, it is noted that the designated site is upstream of all of the identified pressures.

The impacts on the designated site as a result of a reduction in velocity on the main stem of the River Thames, and water quality impacts are considered to be of negligible magnitude. Overall, the significance of impact is considered to be **negligible**.

The overall confidence in the available data on Swinford Toll Brook Meadow SNCI and its subsequent assessment has been classed as **medium** due to the availability of data on the species and habitat that make up the site.

A summary of the impacts is provided in **Table B4-8**.

Table B4-8 Summary of Impacts on Swinford Toll Brook Meadow SNCI, Reach 1

Receptor	Impact	Ecological Importance of Receptor	Impact Magnitude	Significance of Impact
Swinford Toll Brook Meadow SNCI	Habitat degradation as a result of decreased flow velocity in the River Thames	County	Negligible	Negligible

B4.1.2.3 Pasture by A34 Thames Bridge SNCI

The Oxfordshire Biodiversity Action Plan identifies that the lowland meadows are sensitive to changes in hydrology and nutrient status, with grassland of this type significantly reliant on winter flooding. The physical environment assessment has identified that the main channel of the River Thames will be subject to reductions in velocity only. Reductions in flow will not impact the quality of the site which would be reliant on inundation which will be unaffected within the main stem of the River Thames.

The risk of water quality deterioration in the impacted reaches is high (associated with risk to SRP), and the abstraction and consented discharge pressures in Reach 1 have been identified as high risk. However, these risks are only high at times of low flow and not at times of high flows, which is when the meadows become flooded.

The impacts on the designated site as a result of a reduction in velocity and water quality on the main stem of the River Thames are considered to be of negligible magnitude, temporary and reversible. Overall, the significance of impact is considered to be **negligible**.

The overall confidence in the available data on Pasture by A34 Thames Bridge SNCI and its subsequent assessment has been classed as **medium** due to the availability of data on the species and habitat that make up the site.

A summary of the impacts is provided in **Table B4-9**.

Table B4-9 Summary of Impacts on Pasture by A34 Thames Bridge SNCI, Reach 1

Receptor	Impact	Ecological Importance of Receptor	Impact Magnitude	Significance of Impact
Pasture by A34 Thames Bridge SNCI	Habitat degradation as a result of decreased river velocity in the River Thames	County	Negligible	Negligible

B4.1.2.4 Binsey Green SNCI

The Oxfordshire Biodiversity Action Plan identifies that the lowland meadows are sensitive to changes in hydrology and nutrient status, with grassland of this type significantly reliant on winter flooding. Given the Oxford Meadows SAC is supported by groundwater levels in the underlying gravel, there is a likelihood that this site is similarly supported.

The physical environment assessment has identified that the main channel of the River Thames will be subject to reductions in velocity, and therefore winter flooding will not be impacted.

The risk of water quality deterioration in the impacted reaches is high and the abstraction and consented discharge pressures in Reach 1 have been identified as high risk. However, these risks are only high at times of low flow and not at times of the high flows on which this site is hydrologically dependent.