Teme Abstraction Licensing Strategy

A strategy to manage water resources sustainably

March 2023

We are the Environment Agency. We protect and improve the environment.

We help people and wildlife adapt to climate change and reduce its impacts, including flooding, drought, sea level rise and coastal erosion.

We improve the quality of our water, land and air by tackling pollution. We work with businesses to help them comply with environmental regulations. A healthy and diverse environment enhances people's lives and contributes to economic growth.

We can't do this alone. We work as part of the Defra group (Department for Environment, Food & Rural Affairs), with the rest of government, local councils, businesses, civil society groups and local communities to create a better place for people and wildlife.

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Contents

1. About the licensing strategy

1.1. Overview

This strategy sets out how we manage new and existing abstractions and impoundments within the Teme Catchment.

It ensures that we:

- meet river basin management plan (RBMP) objectives for water resources activities
- avoid deterioration within this catchment

We apply this approach to the water body in which the abstraction is located.

It also applies to:

- all downstream surface water bodies that may be affected by any reduction in abstraction related flow
- adjacent groundwater bodies affected by any reduction in groundwater level

The strategy also sets out local approaches to the sustainable management of water resources in collaboration with partners.

Managing water abstraction describes the technical explanation, legal and policy requirements behind the abstraction licensing strategies (ALS).

The abstraction pages advise on:

- who needs an abstraction or impoundment licence
- how to apply for a licence

The Teme catchment is in the Severn river basin district but is a cross border catchment spanning both England and Wales. A small portion of the upper catchment falls within Wales but most of the catchment falls within England.

For abstraction or impounding that falls within Wales further information regarding the application process is available from the Natural Resources Wales website.

1.2. How is the licensing strategy set out?

This ALS provides an overview of how water is sustainably managed in the Teme catchment to:

- provide water for abstraction
- protect the environment

The following is a summary of what each section covers:

- Catchment background - sets out additional information about the catchment and the influences and pressures on water availability
- Water resource availability - explains how much water is available for abstraction in the catchment
- How we manage water resource availability - explains the local licensing approach for the catchment which is summarised in Table 3. This includes the potential water available for licensing and the restrictions that would be required
- Managing the catchment together - details the actions we are taking where abstraction is currently unsustainable in the catchment. Approaches to ensure

sustainable water management in the future are outlined, including information on licence trading

- Related links - are listed for further information on water resource management
- Abbreviations – lists the full text of abbreviations used in this document
- Glossary – explains technical terms included throughout this document
- Contact details – on how to get in touch

Note: whilst our assessment tools are continuously updated, we aim to update this document on a 3-year basis. Therefore, some details within this document, for example hands off flow (HoF) values may be outdated. Use this document as a guide to water availability, but for the most up to date information please contact us.

1.3. Collaborative and sustainable water management

Our long-term goal is to develop a stronger catchment focus for water resources. We are working with abstractors and catchment groups to:

- develop local solutions to existing pressures
- prepare for the future

Catchment groups may include a variety of different partnership groups such as:

- abstractor groups
- local catchment partnerships
- priority catchment groups
- environmental groups

Since the autumn of 2018, we have been collaborating with local partners. In several priority catchments across England we have explored:

- modern and innovative ways of improving access to water
- alternative ways to achieving sustainable abstraction

This strategy is a tool to make informed decisions on the choices abstractors make about their use of water. We want this strategy to help abstractors plan their water use and become more resilient in the face of climate change.

2. Catchment overview

The Teme Abstraction Licensing Strategy area covers the whole of the River Teme catchment situated within the counties of:

- Shropshire
- Herefordshire
- Worcestershire
- Powys

At 130 kilometres long, the River Teme is the second largest tributary of the River Severn. It rises in the Kerry Hills in Mid-Wales from a small spring in Bryn Coch quarry on Cilfaesty Hill at 460 metres above sea level. For most of its course it is a rural river, passing through only 3 market towns before joining the River Severn to the south of Worcester.

2.1. Landscape and land use

The Teme catchment area is predominantly rural, making agriculture the main land use. Urban development within the area is characterised mainly by market towns and local administrative centres, many with business parks and small industrial estates. The population density is low.

The north of the catchment is bordered by the:

- Stiperstones
- Long Mynd
- Wenlock Edge

The southeast of the catchment is bordered by the:

- Suckley Hills
- Malvern Hills

2.2. Water Resources

The catchment covers an area of 1,650 square kilometres. It includes the major tributaries of the rivers:

- Clun
- Onny
- Corve
- Rea
- Redlake

It also includes some larger brooks such as the:

- Kyre Brook
- Ledwyche Brook
- Leigh Brook
- Laughern Brook
- Sapey Brook

The rural nature of the area is reflected by the biologically rich rivers. They support high class fisheries and provide a variety of habitats for a wide range of flora and fauna. The whole of the River Teme itself (including the bottom section of the River Clun) is designated as a Site of Special Scientific Interest (SSSI). The River Clun just upstream of its confluence with the River Teme is designated as a Special Area of Conservation (SAC) noted for its freshwater pearl mussels.

The River Teme often experiences low flows during the summer months. In the upper reaches of the catchment there are thick deposits of gravels formed in the river valleys. There can be significant water movement between the river channel and these underlying gravel deposits. During very low flows this process leads to some sections of the river channel running dry, as the water goes subterranean into the underlying gravels. Examples of this phenomenon have been recorded upstream of Leintwardine towards Knighton.

Other tributaries within the catchment, such as the Rivers Redlake, Clun and Onny also commonly experience low flows during dry weather periods.

The geology underlying the River Teme catchment area is varied due to the large range of different rock types present. These include:

- limestones
- sandstones
- mudstones
- shales

There are no principal aquifers within the catchment. Instead, the rocks are all secondary aquifers and so groundwater resources within the catchment are relatively limited.

The main demand for water within the Teme catchment comes from public water supply and agriculture. There are also some spring water bottling operations but there is very little industrial use. The River Teme has become an important source of water for irrigation and more recently as a source of water for Hydroelectric Power Schemes. Hydroelectric Power Schemes are classed as a non-consumptive use of water as all the abstracted water is returned to the watercourse.

Table 1: proportion of different sectors' abstraction based on licensed consumptive abstraction quantity

Abstraction licence sector	**Proportion of total licensed quantity (%)**
Public water supply and other potable uses	62%
Agriculture	24%
Industry	8%
Amenity/environmental	6%

The Catchment Data Explorer and Defra's Magic Map can help you explore and download information about the catchment and water environment.

2.3. Climate change

Climate change will likely impact on the quantity and seasonal availability of water resources within the catchment.

The projected climate change impacts on rainfall and river flow for the Midlands Region by the 2050s are for:

- rainfall to decrease by 34% in the summer but increase by 29% in the winter
- low flows to be 65% lower but peak river flows to be 30% higher

Climate change projections are estimated using data from UKCP09, consistent with a 4^{o}C rise by 2100. Further details on the assumptions used can be found in the Environment Agency Climate impacts tool.

2.4. Environment and sustainability

Our licensing approach ensures that we avoid deterioration within this catchment in line with the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (WFD). The WFD Regulations (2017) seek environmental objectives to protect and enhance the water environment. It ensures the sustainable use of water resources for economic and social development.

We assess the impacts of new water abstraction applications to make sure that they comply with the WFD Regulations (2017). This includes ensuring water bodies will maintain a healthy ecology. If the ecology is not good, we ensure abstraction will not deteriorate the ecology further. WFD status is assessed at a water body scale. Water body WFD Regulations (2017) status can be:

- bad
- poor
- moderate
- good
- high

Groundwater body status is assessed with a separate set of tests, with the status reported as either good or poor.

3. Water resource availability in the Teme catchment

3.1. Surface water availability

The method for calculating the water resource availability is explained in Managing water abstraction. Water availability is calculated at selected assessment points (APs). The maps show the water availability calculated at the AP; local water availability may differ.-

There are 15 APs in the Teme ALS:

AP1

This covers the upper reaches of the River Teme from its source down to Knighton. The AP is situated in Wales, but the catchment upstream of the AP includes several small tributaries within both England and Wales. The catchment is underlain by secondary aquifers comprising mainly mudstones, limestones and sandstones up into the uplands.

AP2

This covers the River Teme from Knighton to upstream of the confluence with the River Onny at Bromfield. It includes the tributaries of:

- Pont-faen Brook (situated in Wales)
- Allcocks Brook
- Stone Brook

The catchment is underlain by secondary aquifers comprising mainly mudstones, limestones, siltstones and sandstones. The higher hills are the Silurian rocks consisting of siltstones and limestones. In the river valleys thick deposits of gravels can be found, particularly along the main River Teme corridor.

AP3

This covers the River Teme from Bromfield to Tenbury Wells. It includes the tributaries of:

- Upton Brook
- West Brook
- Cadmore Brook

The catchment is underlain by secondary aquifers comprising mainly mudstones with some siltstone and sandstones. At the top of the catchment near to Ludlow, the hills forming higher ground are Silurian siltstones, limestones and shales.

AP4

This covers the River Teme from Tenbury to Knightwick. It includes the tributaries of:

- Corn Brook
- Stony Brook
- Dumbleton Brook

The catchment is underlain by secondary aquifers comprising mainly mudstones with some siltstone and sandstones. At the top of the catchment near to Titterstone Clee Hill are microgabbro igneous rocks.

AP5

This covers the lower reaches of the River Teme from Knightwick to its confluence with the River Severn downstream of Worcester. The majority of this catchment is underlain by secondary aquifer comprising mainly Triassic mudstones. The higher ground to the west near Knightwick is the Silurian Hills of siltstones, limestones and sandstones.

AP6

This covers the whole of the River Redlake catchment from its source to its confluence with the River Clun near Leintwardine. The majority of this catchment is underlain by secondary aquifer comprising mainly mudstones, limestones, siltstones and sandstones. The higher hills are the Silurian rocks consisting of siltstones and limestones. In the river valleys thick deposits of gravels can be found, particularly along the River Redlake corridor.

AP7

This covers the whole of the River Clun catchment from its source to its confluence with the River Teme at Leintwardine. It includes the tributaries of the:

- Folly Brook
- River Unk
- River Kemp

The catchment is underlain by secondary aquifers comprising mainly mudstones with some siltstone, sandstones and limestones. The higher hills are the Silurian rocks consisting of siltstones and limestones.

AP8

This covers the upper reaches of the River Onny. This is from its source near to the Stiperstones to just upstream of where it is joined by the Quinny Brook. It includes the tributaries of:

- Darnford Brook
- Black Brook
- Criftin Brook

The catchment is underlain by secondary aquifers comprising many varied interbedded rock types including mudstones, siltstones, shales, sandstones and limestones much affected by earth movements. The Stiperstones ridge is formed of hard quartzite.

AP9

This covers the lower reaches of the River Onny from AP8 to Onibury. It includes the Quinny Brook tributary. The catchment is underlain by secondary aquifers comprising mainly Silurian rocks of mudstones with siltstones, shales, sandstones and limestones.

AP10

This covers the whole of the River Corve catchment from its source to the south-west of Much Wenlock, to just upstream of its confluence with the River Teme at Ludlow. It includes the tributaries:

- Trow Brook
- Kidnall Gutter
- Pye Brook
- Seifton Brook

The catchment is underlain by secondary aquifers comprising mainly Silurian rocks of mudstones, siltstones, shales, sandstones and limestones. The higher ground towards the Clee Hills are Devonian sandstones with microgabbro bosses on the peaks. Corve Dale valley (siltstones and shales) is formed within the dip-slope in-between the limestone ridge escarpments and the Clee Hills.

AP11

This covers the whole of the Ledwyche Brook catchment from its source to its confluence with the River Teme upstream of Tenbury Wells. It includes the tributaries:

- Brockleton Brook
- Batch Gutter
- Hopton Brook
- Dogditch Brook
- Cay Brook
- Stoke Brook
- Greet Brook

The catchment is underlain by secondary aquifers comprising mainly mudstones and sandstones.

AP12

This covers the whole of the River Rea catchment from its source to its confluence with the River Teme downstream of Tenbury Wells. It includes the tributaries:

- Winterburn Brook
- Clee Brook
- Moor Brook
- Farlow Brook
- Mill Brook
- Trapnell Brook
- Marl Brook

The catchment is underlain by secondary aquifers comprising interbedded rocks of mainly mudstones and sandstones.

AP13

This covers the whole of the Sapey Brook catchment from its source to its confluence with the River Teme upstream of AP4. It includes the tributaries:

- Linceter Brook
- Paradise Brook

The catchment is underlain by secondary aquifers comprising interbedded rocks of mainly mudstones and sandstones.

AP14

This covers the whole of the Leigh Brook catchment (also called the Cradley Brook in its upper reaches). This is from its source to its confluence with the River Teme near Bransford. The catchment is underlain by secondary aquifers comprising mainly mudstones, siltstones, sandstones and limestones. The Leigh Brook cuts a small gorge through the Silurian Hills composed of limestone ridges and siltstones within shale valleys.

AP15

This covers the whole of the Laughern Brook catchment from its source to its confluence with the River Teme in its lower reaches; just upstream of where it joins the Severn. It also includes the Fitcher Brook tributary. The catchment is entirely underlain by secondary Triassic mudstone aquifer with some siltstone intermixed strata.

3.1.1 Water resource availability colours and implications for licensing

We use colours to represent different surface water availability at a range of flows:

Water available for licensing

Green 

There is more water than required to meet the needs of the environment. New licences can be considered depending on local and downstream impacts. Licences will be issued with a hands off flow (HoF) restriction to protect environmental requirements at lower flows.

Restricted water available for licensing

Yellow 

Full Licensed flows fall below the Environmental Flow Indicators (EFI).

If all licensed water is abstracted there will not be enough water left for the needs of the environment. No new consumptive licences would be granted. It is likely we'll be taking action to reduce full licensed risks. Water may be available if you can ‘buy’ (known as licence trading) the entitlement to abstract water from an existing licence holder.

Water not available for licensing

Red 

Recent actual flows are below the EFI.

This scenario highlights water bodies where flows are below the indicative flow requirement to help support a healthy ecology in our rivers. We call this 'Good Ecological Status' (GES) or 'Good Ecological Potential' (GEP) where a water body is heavily modified for reasons other than water resources.

We are currently taking action in water bodies that are not supporting GES or GEP. We will not grant further licences. Water may be available if you can buy (known as licence trading) the amount equivalent to recently abstracted from an existing licence holder.

Heavily Modified Water Bodies (HMWBs) (and/or discharge rich water bodies)

Grey 

These water bodies have a modified flow that is influenced by reservoir compensation releases or they have flows that are augmented. These are often known as ‘regulated rivers’. They may be managed through an operating agreement, often held by a water company. The availability of water is dependent on these operating agreements.

There may be water available for abstraction in discharge rich catchments, you need to contact us to find out more.

The water resource availability is calculated and the colour assigned at 4 different flows:

- Q30 – the flow of a river which is exceeded on average for 30% of the time, therefore you would expect the river flow to be lower than Q30 on 256 days in an average year - Q30 is a high flow
- Q50 – the flow of a river which is exceeded on average 50% of the time, therefore you would expect the river flow to be lower than Q50 on 183 days in an average year
- Q70 – the flow of a river which is exceeded on average for 70% of the time, therefore you would expect the river flow to be lower than Q70 on 110 days in an average year
- Q95 – the flow of a river which is exceeded on average for 95% of the time, therefore you would expect the river flow to be lower than Q95 on 18 days in an average year - Q95 is a low flow

3.1.2 Water availability maps

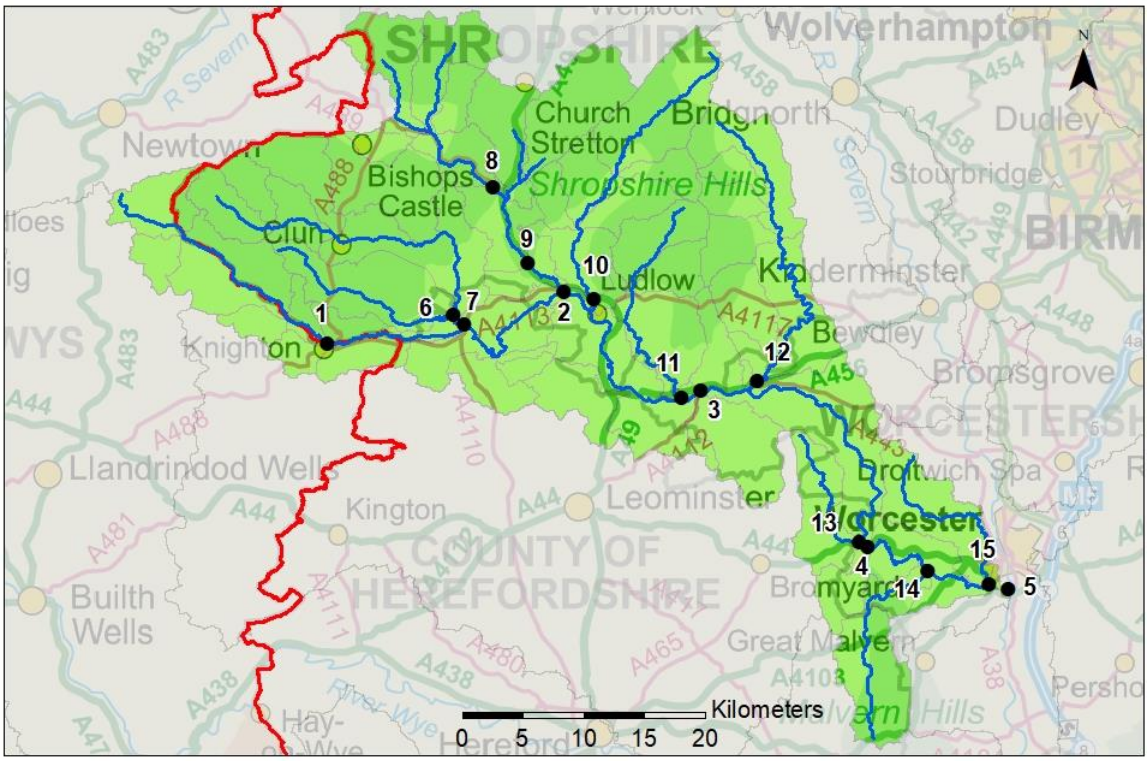
The water availability colours for the Teme catchment are presented in maps 1 to 4.

Whilst Table 2 shows water availability at each assessment point, the maps provide the water availability for individual waterbodies. An individual waterbody may have an unfavourable local water resource balance and therefore show a lower water availability than the rest of the AP catchment. This may mean that it needs to be assessed on a case-by-case basis and may be subject to different restrictions.

Table 2: summary of maps 1 to 4 showing the water availability at each assessment point by flow category

Assessment Point	Name	Q30	Q50	Q70	Q95
1 (Situated in Wales)	River Teme at Knighton	Available	Available	Available	Restricted
2	River Teme at Bromfield	Available	Available	Available	Restricted
3	River Teme at Tenbury	Available	Available	Available	Restricted
4	River Teme at Knightsford	Available	Available	Available	Restricted
5	River Teme at Worcester	Available	Available	Available	Restricted
6	River Redlake	Available	Available	Available	Restricted
7	River Clun	Available	Available	Available	Restricted
8	River Onny upstream of Quinney Brook	Available	Available	Available	Restricted
9	River Onny at Onibury	Available	Available	Available	Restricted
10	River Corve at Ludlow	Available	Available	Available	Restricted
11	Ledwyche Brook	Available	Available	Available	Restricted
12	River Rea	Available	Available	Available	Restricted
13	Sapey Brook	Available	Available	Available	Restricted
14	Leigh Brook	Available	Available	Available	Restricted
15	Laughern Brook	Available	Available	Available	Restricted

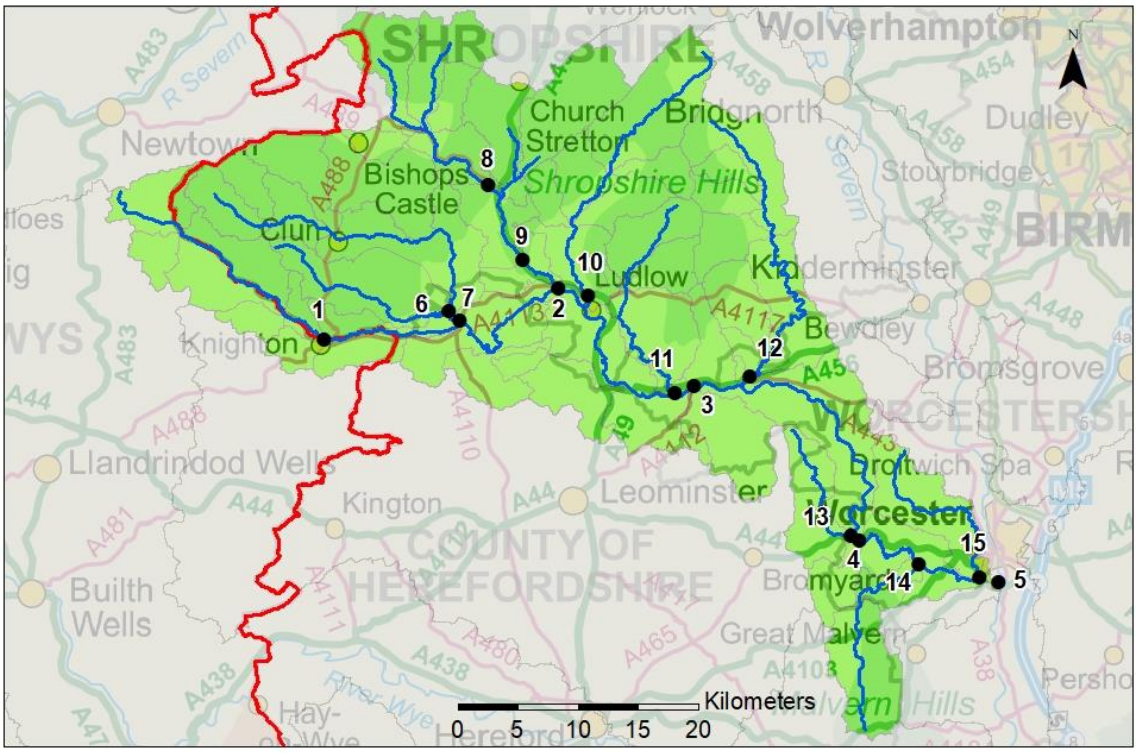
Map 1: water resource availability colours at Q30 for Teme ALS



Legend

- Assessment Points (APs)
- Rivers
- England - Wales border
- Water available
- Restricted water available
- Water not available

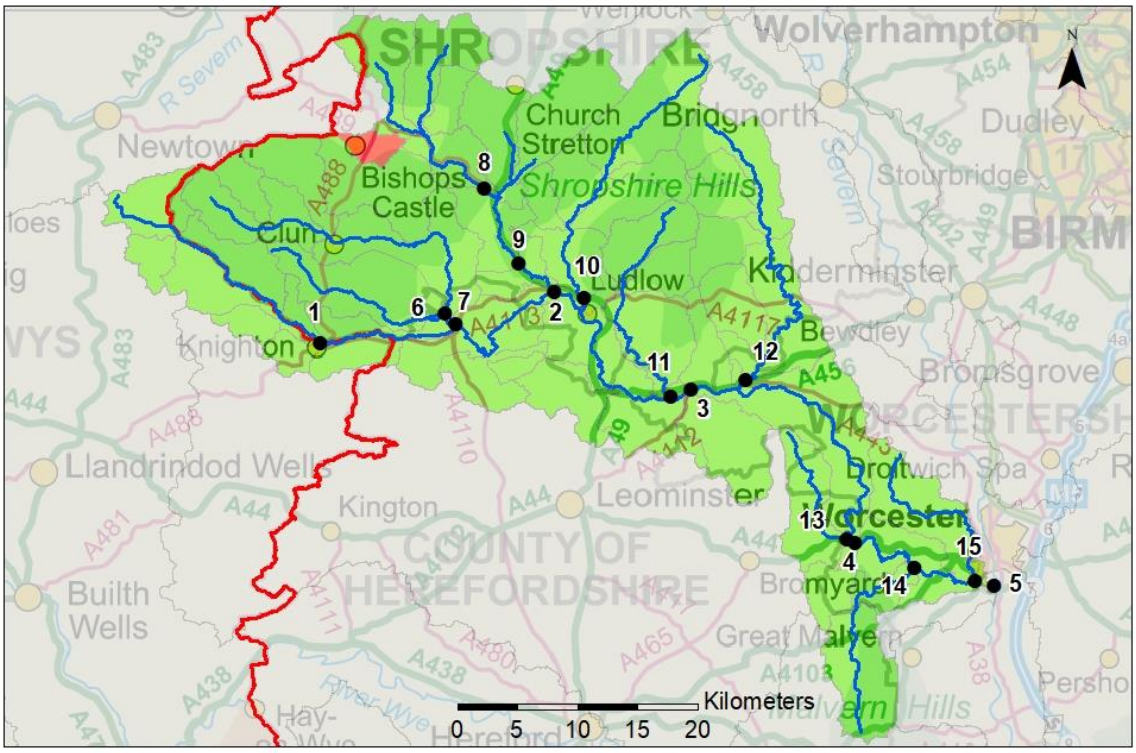
Map 2: water resource availability colours at Q50 for Teme ALS



Legend

- Assessment Points (APs)
- Rivers
- England - Wales border
- Water available
- Restricted water available
- Water not available

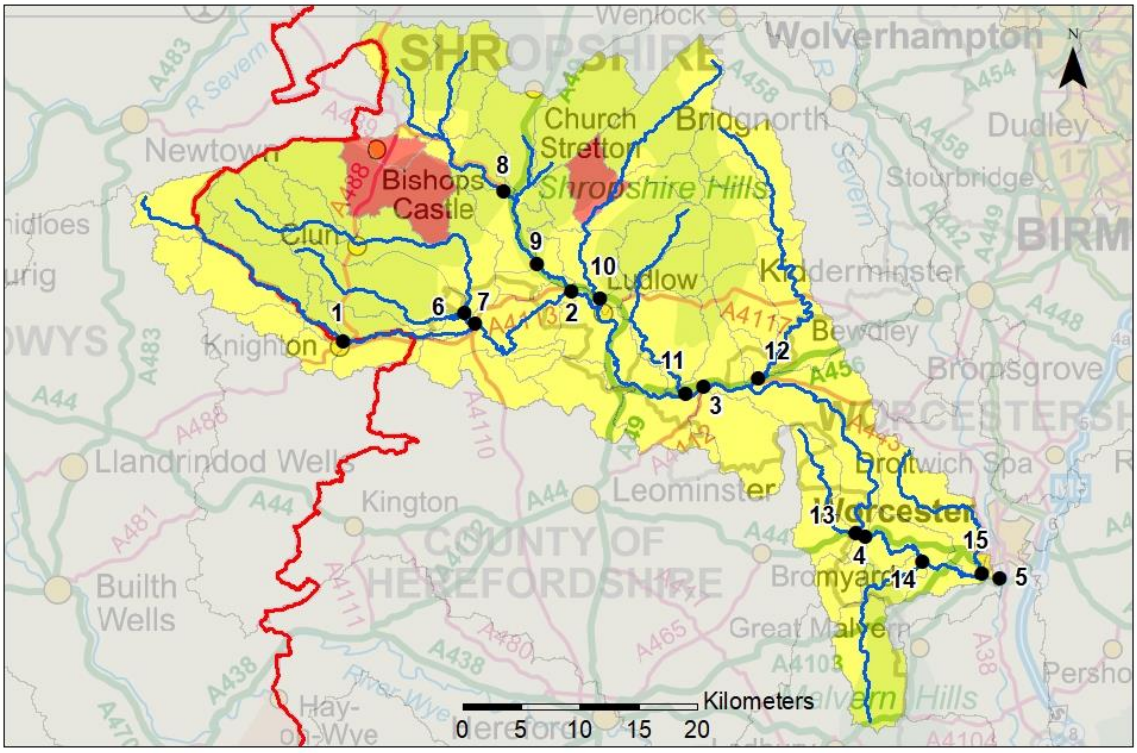
Map 3: water resource availability colours at Q70 for Teme ALS



Legend

- Assessment Points (APs)
- Rivers
- England - Wales border
- Water available
- Restricted water available
- Water not available

Map 4: water resource availability colours at Q95 for Teme ALS



Legend

- Assessment Points (APs)
- Rivers
- England - Wales border
- Water available
- Restricted water available
- Water not available

3.2. Groundwater resource availability

Groundwater availability is guided by the surface water resource availability unless we:

- are aware of local issues we need to protect
- need to protect groundwater dependent features including designated conservation sites
- have local groundwater level monitoring data we need to consider especially in close proximity to rivers where there may be connectivity

There are no principal aquifers within the Teme catchment with the entire catchment underlain by secondary aquifers. For secondary aquifers, where we typically have less information, groundwater availability is guided by the surface water availability.

In certain areas, resource concerns over groundwater mean that the standard water resource availability colours have been overridden.

Under the WFD Regulations (2017), aquifers are designated as named groundwater bodies (GWBs). We may divide GWBs into groundwater management units (GWMUs). However, in the case of the Teme catchment there are no GWMUs. Within the Teme catchment, groundwater has been assessed using GWBs only to represent the water resource status for groundwater.

The following secondary aquifer groundwater body outcrops within the Teme ALS area:

- Teme - Secondary Combined (GB40902G991000)

3.3. Resource reliability

If you want to apply for a licence, it's worth considering the reliability of your abstraction.

By assessing the quantity of water available at different flows it's possible to see:

- when there is a surplus or deficit of water
- the associated reliability of an abstraction

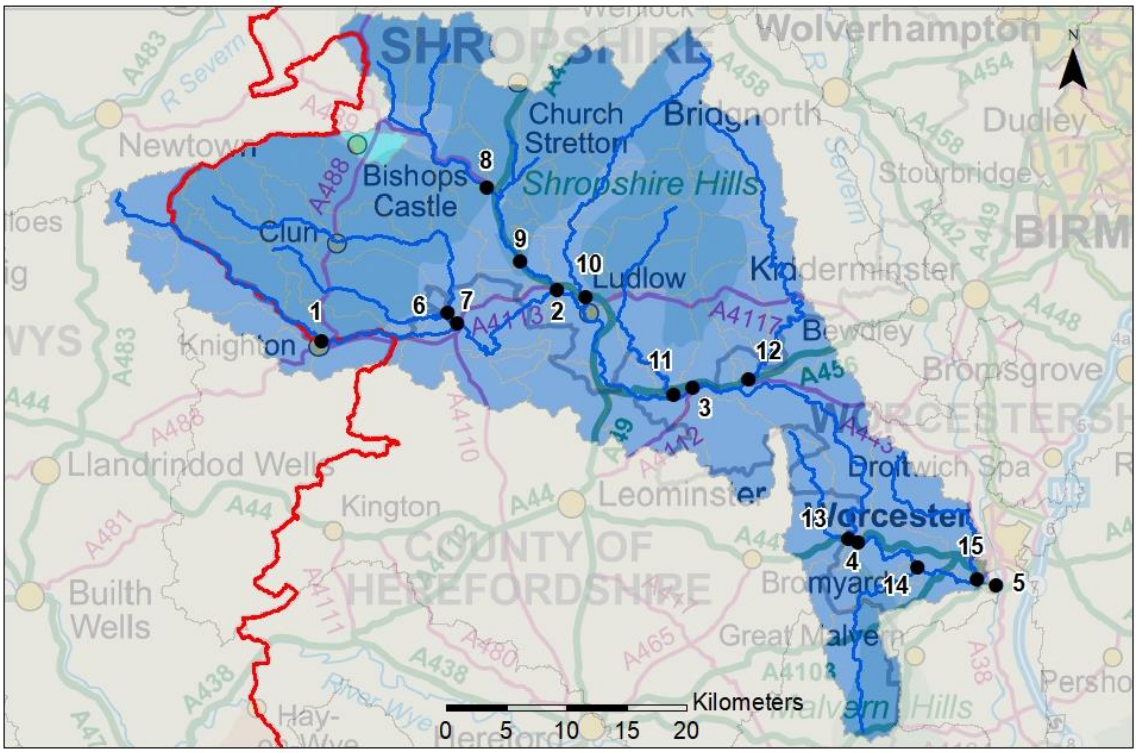
This is an indication only. Actual reliability of a licence will be discussed when you apply.

Map 5 gives an indication of the resource availability for consumptive abstraction in the Teme area expressed as a percentage of time.

In this catchment, consumptive abstraction is available:

- at least 70% of the time at all APs (except for the Snakescroft Brook catchment where abstraction is available at least 50% of the time)

Map 5: water resource reliability of the Teme ALS expressed as percentage of time available



Legend

- Assessment Points (APs)
- Rivers
- England - Wales border
- Resource reliability - at least 50% of the time
- Resource reliability - at least 70% of the time

3.4. Other considerations for resource availability and reliability

We will add constraints to licences such as hands off flow (HoF) or hands off level (HoL) conditions to protect:

- the environment
- the rights of other abstractors

As a result, when we grant a licence, it does not mean that we guarantee a supply of water. These conditions specify that if the flow in the river drops below what is needed to protect the environment, abstraction must reduce or stop. In dry years, restrictions are likely to apply more often. This will affect the reliability of supply.

There is no guarantee that we will grant licences even where water is available for abstraction. This is because we determine each application on its own merits. Local factors may mean we are either unable to grant a licence as applied for, or even at all.

New licences within a catchment are usually given a Common End Date (CED), which allows them to be reviewed at the same time. The next CED for this ALS is 31 March 2037 and the subsequent one is 31 March 2049.

3.5. Impoundments

Applications for impoundments will be dealt with on a case-by-case basis. More information may be found on our water management web pages.

4. How we manage water availability in the Teme ALS

4.1. Surface water

We assess surface water flows at assessment points (APs). These are significant points on a river, often where 2 major rivers join or at a gauging station. APs cover multiple surface water bodies.

To protect the environment we will issue licences with a condition referred to as a hands off flow (HoF). It means that if flow in the river drops below that which is required to protect the environment, abstraction must stop, hence 'hands off flow'.

Each HoF is linked to an AP and is dependent on the assessment of the river at that AP and downstream. This determines the water resource availability at that AP. In some cases additional restrictions may apply to licences where there is a more critical resource availability downstream. This is to protect the ecological requirements of the river.

All abstraction licence applications are subject to an assessment to take account of any local and downstream issues.

Where groundwater abstractions directly impact on surface water flows, the impact is measured at the surface water AP. Surface waters are supported by groundwater where they interact with aquifers:

- springs feed headwaters or contribute further downstream
- baseflow supports flow through riverbeds along the watercourse route

Groundwater abstractions can lower the water table. This could reduce groundwater inputs via springs and baseflow so reducing surface water flows and impacting ecology. The potential for groundwater abstraction to affect groundwater and surface water connectivity is included in the assessment of any groundwater resource status and risk.

Table 3 gives an indication of:

- how much water is available for further abstraction from surface water
- the associated restrictions we may have to apply to new and varied abstraction licences from the main river

Depending on the nature of the catchment, tributaries to the main river may be subject to different restrictions and quantities. This may be assessed locally on a case-by-case basis.

Reading from top to bottom in Table 3 are the APs in the Teme ALS area. Reading across the columns you can see:

- the potential HoF that may be applied to a licence
- the number of days water may be available under this restriction
- the approximate volume of water in Ml/d that may be available

Across the Teme area, the HoF restrictions are driven by the need to protect flows going into the River Severn. Flows of 2,271 Ml/d are needed in the River Severn at Bewdley. Flows of 2,568 Ml/d are needed in the River Severn at Deerhurst. These are required to protect resources for existing abstractors and the river ecology. All HoFs in the catchment have therefore been set at flows which are equivalent to, or higher than these. Where

watercourses need further protection of flows due to unfavourable local water resource situations, then the HoFs are set at a suitable higher flow.

The conditions in Table 3 apply to new or varied consumptive abstractions. They may not apply if the abstraction is non-consumptive or if the licence results in an overall environmental benefit. Increase in volume applications on existing licences will be subject to the same conditions as new licences on the increased part of the licence only.

To protect fish and eels we may also require a correctly sized intake screen and/or a fish or eel pass. These will mitigate delays or barriers to the movement of fish and eels.

The strategy outlined in Table 3 depends on the resource situation remaining as it is currently. Any changes to major abstractions from or discharges to the catchment may change this licensing strategy or the volumes of water available.

The volumes stated are the maximum acceptable volume at that point; less water will be available upstream and from tributaries due to reduced flows. All volumes applied for will be assessed individually to ensure the impacts are sustainable both locally and further downstream.

AP	Name	AP National Grid Reference	Water Resource Availability	HoF Restriction (Ml/d)	Number of days per annum abstraction may be available	Approximate volume available at restriction (Ml/d)	Is there a gauging station at this AP?	Additional restrictions
1	River Teme at Knighton (situated in Wales)	SO 28988 72372	Restricted water available for licensing	284 Ml/d at Tenbury gauging station	285	See AP3	Yes	See AP3
2	River Teme at Bromfield	SO 48473 76630	Restricted water available for licensing	284 Ml/d at Tenbury gauging station	285	See AP3	No	See AP3
3	River Teme at Tenbury	SO 59772 68529	Restricted water available for licensing	284 Ml/d	285	9 Ml/d is available upstream of Tenbury, and 13 Ml/d is available downstream of Tenbury	Yes	A lower restriction of 256 Ml/d will apply when water company abstractions are reduced.
4	River Teme at Knightsford	SO 73484 55705	Restricted water available for licensing	284 Ml/d at Tenbury gauging station	285	See AP3	Yes	See AP3
5	River Teme at Worcester	SO 85000 52176	Restricted water available for licensing	284 Ml/d at Tenbury gauging station	285	See AP3	No	See AP3
6	River Redlake	SO 39399 74763	Restricted water available for licensing	284 Ml/d at Tenbury	285	See AP3	No	See AP3

AP	Name	AP National Grid Reference	Water Resource Availability	HoF Restriction (Ml/d)	Number of days per annum abstraction may be available	Approximate volume available at restriction (Ml/d)	Is there a gauging station at this AP?	Additional restrictions
				gauging station				
7	River Clun	SO 40260 73908	Restricted water available for licensing	284 Ml/d at Tenbury gauging station	285	See AP3	No	Any new abstraction from the Snakescroft Brook catchment will be assessed on a case-by-case basis due to concerns over sustainability.
8	River Onny upstream of Quinney Brook	SO 42658 85186	Restricted water available for licensing	284 Ml/d at Tenbury gauging station	285	See AP3	No	See AP3
9	River Onny at Onibury	SO 45494 78971	Restricted water available for licensing	284 Ml/d at Tenbury gauging station	285	See AP3	Yes	See AP3
10	River Corve at Ludlow	SO 50923 76063	Restricted water available for licensing	284 Ml/d at Tenbury gauging station	285	See AP3	Yes	See AP3
11	Ledwyche Brook	SO 58170 67935	Restricted water available for licensing	284 Ml/d at Tenbury gauging station	285	See AP3	No	See AP3

AP	Name	AP National Grid Reference	Water Resource Availability	HoF Restriction (Ml/d)	Number of days per annum abstraction may be available	Approximate volume available at restriction (Ml/d)	Is there a gauging station at this AP?	Additional restrictions
12	River Rea	SO 64394 69277	Restricted water available for licensing	284 Ml/d at Tenbury gauging station	285	See AP3	Yes	See AP3
13	Sapey Brook	SO 72723 56050	Restricted water available for licensing	284 Ml/d at Tenbury gauging station	285	See AP3	No	See AP3
14	Leigh Brook	SO 78390 53666	Restricted water available for licensing	284 Ml/d at Tenbury gauging station	285	See AP3	No	See AP3
15	Laughern Brook	SO 83388 52604	Restricted water available for licensing	284 Ml/d at Tenbury gauging station	285	See AP3	No	See AP3

Table 3: summary of licensing approach for the assessment points of the Teme ALS

4.2. Groundwater

Groundwater availability is guided by surface water resource availability unless we have better information or are aware of local issues we need to protect.

The majority of the bedrock strata present are classed as secondary aquifers. The main aquifers being the:

- Devonian Raglan Mudstone
- St Maughan's Formation
- Silurian siltstones
- Wenlock/ Aymestry limestones

The other significant secondary aquifers comprise the drift gravel deposits located along the valley corridor floors. These strata can contain permeable layers that are generally capable of supporting water supplies at a local rather than strategic scale. They can also form an important source of baseflow to rivers. In some areas these strata are able to support commercial water bottling and public water supply abstraction.

The degree of connection between the watercourses in the ALS area and the regional groundwater needs to be assessed on a case-by-case basis. Groundwater within the drift deposits is assumed to be connected to watercourses where it is discharging into the streams and rivers as baseflows. However, the nature of the aquifers present across the area differs from fractured limestones to mudstones, to drift deposits. This means that the volume of water that can actually/physically be abstracted from the strata will be naturally highly variable.

Abstraction from groundwater such as the river gravel deposits would likely have a direct impact on surface water. It would therefore be subject to the same licensing controls as surface water where hydraulically connected. In this case, groundwater availability would be represented by the surface water resource availability colours (maps 1 to 4). On a local scale the groundwater and surface water interactions are likely to be complex and dependent upon:

- the groundwater level and river stage
- permeability of the river sediment beds
- the aquifer properties

Given the presence of drift deposits along the main river corridors, the surface water may be perched above (and therefore disconnected from) the regional groundwater.

Where groundwater abstractions directly impact on surface water flows the impact is measured at the surface water AP. This includes where the impact reduces baseflow. In these cases, restrictions may be applied to licences, such as hands off level (HoL) or hands off flow (HoF) conditions. The HoL is a groundwater level below which an abstractor is required to reduce or stop abstraction. The HoF is applied when flows fall below a certain rate in a connected watercourse.

Other restrictions may apply where availability is limited or to protect the environment, for example to prevent saline intrusion.

The groundwater licence exempt area that previously covered a large proportion of the Teme catchment has now been removed by the Water Act 2003. This means that only water abstractions of 20 cubic metres or less per day are now exempt

from licensing unless a different exemption applies. A full list of the existing licensing exemptions is available from the abstraction pages.

Secondary aquifers

New groundwater licence applications for abstraction will continue to be assessed on a case-by-case basis. Consideration will include potential impacts on:

- existing water users
- groundwater dependent terrestrial ecosystems
- groundwater resources including groundwater levels and groundwater quantity availability
- surface water level and flow

We must ensure that no deterioration of the water environment is allowed to occur.

4.3. Coasts and estuaries

The Severn Estuary supports a wide array of habitats and species and is designated as a:

- Site of Special Scientific Interest (SSSI)
- Habitats Directive Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- wetland of international importance under the Ramsar Convention (Ramsar Site)

The intertidal mudflats, sand banks, rocky platforms and salt marsh are among the largest and most important in Britain. They support internationally important populations of:

- waterfowl
- invertebrate populations of considerable interest
- large populations of migratory fish including atlantic salmon, sea trout, allis and twaite shad, sea and river lamprey and european eels

The estuary receives a significant proportion of its flow from the River Severn catchment. We have an obligation to protect all Habitats Directive sites. The River Severn and its tributaries must be managed using appropriate flow restrictions to protect the environmental needs of the estuary. HoFs applied to new licences within the River Severn catchment must be equal to or more restrictive than the flow required by the estuarine ecology.

4.4. Protected sites

The Conservation of Habitats and Species Regulations 2017 (Habitats Regulations) provides a very high level of protection to:

• Special Areas of Conservation (SAC), which contribute to biodiversity by maintaining and restoring habitats and species

• Special Protection Area (SPA), which provides protection to birds and their nests, eggs and habitats

Government policy treats Ramsar sites (internationally important wetland sites) in the same way as SACs and SPAs. Ramsars, SACs and SPAs are referred to

collectively as European sites. Sites of Special Scientific Interest (SSSI) also carry a high level of environmental importance.

Conservation objectives are the main objectives for European and SSSI protected sites to maintain at, or to reach, favourable condition. These are set by Natural England. The process for setting targets is described through the Joint nature conservation committee approved 'Common Standards Monitoring Guidance' (CSMG). Natural England use these targets to assess the condition of European and SSSI protected sites. These quantitative targets are considered by Natural England as a pre-requisite for achieving the conservation objectives for European or SSSI designated sites. We have a duty to have regard to Natural England's advice when determining licence applications that may impact on a designated site.

We may need more detailed supporting information when a licence application could impact on a designated conservation site. This will allow us to complete the required statutory assessment.

Table 4: important local designated features that may affect water availability

Designation	Site name
Special Area of Conservation	The Stiperstones and The Hollies Bottom section of River Clun Downton Gorge
Site of Special Scientific Interest	River Teme (including bottom section of the Clun) Gwernaffel Dingle (situated in Wales) Rhos Fiddle Catherton Common Cuckoopen Coppice Downton Gorge Dumbleton Dingle Hanley Dingle Hill House & Crumpsbrook Meadows Leigh Brook Valley Lord's Wood Meadow Nine Holes Meadows Osebury Rock Shelve Pool Titterstone Clee The Long Mynd

5. Managing the catchment together

5.1. Action on unsustainable abstraction

Managing water abstraction gives details on:

- what an unsustainable abstraction is
- the measures available to resolve environmental issues caused by abstraction

There are a series of actions that we are taking to address unsustainable abstraction. These are listed here and are followed by work that is being done in individual catchments.

Revocation for non-use / reduction of under used licences

The Environment Agency has an unused licences programme. It is addressing the large volume of water licensed within abstraction licences that has not been abstracted for a number of years. This limits water availability for those that need it. In some cases it presents a significant environmental risk if abstraction were to be restarted. The majority of changes to licensed quantities are made voluntarily. However, where there is risk of environmental damage, the Environment Agency can propose the revocation of unused licences. This is done using legal powers under section 52 of the Water Resources Act 1991.

During the 3 phases of this programme so far, we have contacted 45 abstractors in the Teme area. The sum of water reduced or revoked so far within this catchment is 595,517 cubic metres per year.

We will continue to target unused and underused licences in the catchment with the aim of reducing licensed abstraction which is not being used. This helps to reduce the risk of future deterioration and may release unused water for future licensing.

Water Industry National Environment Programme (WINEP) and Asset Management Plans (AMP)

Through these programmes we work with Water Companies to investigate and deliver environmental improvements. These are needed to meet Water Framework Directive and national targets. Water companies carry out investigations to understand the environmental impact of their licences. If the investigations show a risk of deterioration due to planned sustained increases in abstraction they need to carry out an Options Appraisal. This is to identify measures to mitigate the risks and prevent deterioration of WFD status. Mitigation or changes to abstraction to prevent deterioration need to be implemented before deterioration is predicted to occur.

Restoring Sustainable Abstraction (RSA)

This is the Environment Agency's programme of work to review unsustainable abstraction. We have been changing or revoking existing abstraction licences in order to achieve a sustainable abstraction regime. We have done this for water abstractions that cause or potentially cause actual flows to fall short of the EFIs and result in environmental damage.

Changing Licences to Prevent Deterioration

The Environment Agency must take action to prevent water bodies from deteriorating in status. This is in accordance with its duties under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. The Environment Agency's principal intervention to prevent deterioration is to reduce licensed quantities. The scale of any reduction is dependent on the deterioration risk and how current levels of abstraction impact the environment. Licence changes to prevent deterioration will need to commence as part of the renewal of time limited abstraction licences. Changes to licences held by statutory water undertakers to prevent deterioration will normally be progressed through the Water Industry National Environment Programme. Changes to permanent licences not held by statutory water undertakers will be progressed as and when circumstances allow. Further changes may be required to licences to meet other environmental obligations in addition to preventing deterioration.

Serious Damage

In order to be classified as being at Serious Damage a surface water body must meet the following 3 criteria:

- be identified as being Band 3 non-compliant for flow - this means that they are experiencing severe levels of abstraction pressure causing recent actual flows to fall into deficit against the EFI
- have an overall WFD Regulations (2017) status of less than 'Good'
- have the abstraction of water and subsequent low flows confirmed as the reason, or contributing to the reason, for not achieving 'Good' WFD Regulations (2017) status

New applications for abstraction from water bodies that are classified as being at, or at risk of, Serious Damage will be assessed on a case-by-case basis. This is to ensure that no deterioration of the water environment is allowed to occur.

In the Teme catchment there are no surface water bodies confirmed as being at actual Serious Damage. There is one surface water body which is at risk of Serious Damage. This is the:

- Snakescroft Brook (GB109054044061)

For a groundwater body, Serious Damage occurs when:

- there is a deterioration in combined overall WFD Regulations (2017) groundwater body status from good to poor
- there is a deterioration in combined overall WFD Regulations (2017) groundwater status from poor (low confidence) to Poor (high confidence)
- the WFD Regulations (2017) Groundwater Dependent Terrestrial Ecosystem (wetlands) test is assessed as poor

A groundwater body is at risk of Serious Damage where the full licence conditions could result in:

- the deterioration in combined overall WFD Regulations (2017) groundwater body status from good to poor
- the deterioration in combined overall WFD Regulations (2017) groundwater status from poor (low confidence) to Poor (high confidence)

In the Teme catchment there are no groundwater bodies either at Serious Damage or at risk of Serious Damage.

The Teme secondary combined GWB (GB40902G991000) has an overall quantitative status of good (high confidence) under recent actual abstraction. The GWB is not deemed to be at risk of deterioration. More information on these programmes is available in our abstraction plan.

Changes to time limited licences

Where environmental sustainability is not in question renewal of time limited licences will be considered subject to local considerations and the following criteria:

- there is a continued justification of need for the water
- the water is used efficiently

Where these 2 criteria are met but the abstraction of water is unsustainable we will require licence changes to reflect historic usage. To manage the risk of future deterioration to the groundwater or surface water body we would not wish to see growth into licensed headroom. This would result in a sustained increase in abstraction and damage to the environment. We may also issue renewed licences with a short time-limit.

The renewal criteria also apply to renewals of licences for formerly exempt purposes which were brought into the licensing regime under New Authorisations transitional regulations. The HoFs applied to these licences under the transitional regulations were not always required to address sustainability issues, therefore the abstractions may still be unsustainable. We will require further evidence on the abstraction and its impacts on the environment at renewal to assess environmental sustainability. There is no guarantee that we will renew licences or renew them on the same terms.

Water availability colours for surface water at Q30, Q50, Q70 and Q95 can be found on maps 1 to 4.

Surface water abstraction licences

Surface water licences will be renewed on the following broad principles around environmental sustainability:

Water available for licensing

Green 

We will consider renewing the licence at the same quantities, subject to the renewal criteria. The water body, and downstream water bodies, need to have environmentally sustainable rates of water abstraction - both now and at times when abstractors take their full licensed quantities of water.

Restricted water available for licensing

Yellow 

On renewal of abstractions in water bodies where full licensed flows have fallen below the EFI, we may seek to reduce unused portions of licensed quantities. This is to reduce the risk of surface water bodies becoming unsustainable at fully licensed rates of abstraction. It will also help to prevent the ecology deteriorating compared to the River Basin Management Plan (RBMP) 2015 baseline.

Water not available for licensing

Red 

These surface water bodies are already subject to unsustainable rates of abstraction. We will need to renew the licences with measures to help restore that water body to a sustainable level of abstraction.

On renewal, time limited licences may be capped at historic maximum abstraction. This will reduce the risk of abstraction from surface water bodies becoming increasingly unsustainable at fully licensed rates of abstraction. It will also help to prevent the ecology deteriorating compared to the River Basin Management Plan (RBMP) 2015 baseline. We will also consider more restrictive terms and conditions such as hands off flow/level conditions.

Where measures are still under investigation, licences would be renewed with a cap at historic maximum uptake and may be time-limited to an earlier date.

Groundwater abstraction licences

Individual groundwater availability is summarised in Section 4.2.

Groundwater licences will be renewed on the following broad principles around environmental sustainability:

Water available for licensing

Green 

We will consider renewing the licence at the same quantities. The groundwater body, overlying rivers and associated wetland habitats need to have environmentally sustainable rates of water abstraction - both now, and at times when abstractors take their full licensed quantities of water.

Restricted water available for licensing

Yellow 

Groundwater/surface water bodies in which the groundwater abstraction sits are at risk of deterioration. Time limited renewals will require licence changes to reflect historic usage and reduce the fully licensed risk in order to manage the risk of deterioration.

Water not available for licensing

Red 

Groundwater/surface water bodies in which the groundwater abstraction sits are already subject to unsustainable rates of abstraction. We will renew the licence with measures to help restore a more sustainable level of abstraction. These measures could be licence quantity reductions or hands off flow/level conditions. Where 'water body' scale measures are still under investigation, then licence changes to reflect historic usage and a short time-limit will be applied. Requirements for any further licence changes (reductions, HoFs etc.) can then be assessed on the subsequent renewal.

5.2. Action that has been taken on unsustainable abstraction in this catchment

Five Regional Groups have been created to develop long-term water resources plans up to 2050 and beyond. The Teme area falls in the Water Resources West group. The area covered by this group includes the North-West, the Midlands and cross-border catchments between Wales and England. It is a multi-sector group that includes representatives from the:

- Water companies
- National Farmers Union
- Canal and River Trust
- Energy UK

The Regional Groups have been tasked with considering the challenges and producing multi-sector regional plans. These will set out how water supply and demand will be managed over the long-term for people, businesses and agriculture, whilst protecting the environment. They will need to understand environmental needs and develop the long-term environmental destination for water resources ensuring:

- no deterioration
- addressing unsustainable abstraction
- improving environmental resilience in the face of climate change

The regional plans will set out the actions that water companies and other abstractors will need to take to reach the long-term environmental destination.

We have provided information to this group to help them identify catchments with existing or potential problems.

This catchment also lies within water company supply zones which have been classified by DEFRA as being under serious water stress. This is where the current or future demand for water is a high proportion of the rainfall available to meet that demand. The classification informs:

- water companies on whether to consider metering
- local authorities on whether to request more stringent consumption standards in new developments

Further detail is available in our Water Stressed Areas – 2021 classification.

The following actions are being undertaken in the catchment:

River Teme at Leintwardine

A water company investigation looking at groundwater abstraction and flows in the River Teme SSSI has been undertaken during a previous AMP cycle. Future investigations for the River Teme catchment are being developed as part of the Water Industry National Environment Program (WINEP). These plans are yet to be finalised and therefore not confirmed at the time of publishing.

5.3. Water rights trading

A water rights trade is where a person sells all or part of their water right, as defined by their abstraction licence(s), to another person. This could be on a permanent or temporary basis. In the majority of cases a trade will involve a change in abstraction location and/or use. We will need to approve through the issue or variation of abstraction licences.

In licensing trades, as with new abstraction licences, we need to ensure that:

- the trade does not result in deterioration of the status on any surface or ground water body
- the trade should be compatible with the ambition to maintain good or the pathway to achieving good status - the ambition should be realistic and cost beneficial
- the trade must not cause any environmental damage
- the trade must not derogate any Protected Right and must have due regard to lawful users
- there is a presumption against trading to a non-compliant surface water body
- the receiving trade abstraction point(s) must consider the distributed impact across surface water bodies - there is a presumption against trading where the distributed impact results in depleting flows within a non-compliant surface water body

This is both:

- within the water body / bodies where the trade will take place
- to downstream water bodies

This section provides a guide to the potential for trading in water bodies of a particular ALS water resource availability colour. Water availability colours are shown in maps 1 to 4.

As New Authorisations licences have not been granted with HoFs which address sustainability, trading of these will be limited. Only beneficial (which result in a positive move towards achieving sustainability) and temporary changes will be permitted. All traded water will be returned to the New Authorisations licence at the CED (or sooner) so that sustainability can be addressed at that point.

Guide to potential trading based on water resource availability

Water available for licensing

Green 

There may be opportunities to allow trades of recent actual abstraction and licensed abstraction. But little demand for trading expected within this water body as water is available for new abstractions.

Restricted water available for licensing

Yellow 

There may be opportunities for licence holders to trade up to their full licensed quantities. But the quantities of water available to trade may be restricted once levels of actual abstraction reach sustainable limits. We will not permit licence trades in water bodies or groundwater management units where we are taking action to prevent deterioration. The exception to this is if the trade is consistent with achieving water body objectives.

Water not available for licensing

Red 

We will only trade up to recent actual abstraction but no increase in recent actual abstraction is permitted in these water bodies/groundwater management units. Licensed abstraction will be recovered for the environment.

HMWBs

Grey 

Opportunities for trading will depend on local operating agreements and local management.

To find out more about licence trading please go to our water management web pages.

Help for trading water rights map: this may help abstractors to identify potential trades - it provides information on nearby licences and an indication of the potential for a trade.

6. Related links

Agriculture and Horticulture Development Board (AHDB) website - provides information on effective use of water on livestock farms

Catchment Based Approach community website - provides further information on the catchment based approach

UK Centre for Ecology and Hydrology Drought Portal - is an interactive portal presenting information on the latest hydrological situation across the UK

Environment Agency, how to apply for a water abstraction or impoundment licence web pages - provide all the information needed to go through the application process to get a licence

Environment Agency manage your water abstraction or impoundment licence online web service - allows abstractors to view and share licence information and submit abstraction returns

Environment Agency priority catchments website - provides further information about the priority catchment work

Environment Agency National Framework for Water Resources - explores England's long-term water needs and the importance of planning at the regional scale and link to the catchment scale

Linking Environment and Farming (LEAF) Simply Sustainable Water guide – explains 6 simple steps for managing water quality and industrial use

National Farmer's Union web pages on Irrigation and water resources – provide useful information

Natural England's website provides further information on protected sites and species

The UK Irrigation Association and Cranfield University - provide a range of irrigation booklets that tackle key issues

Waste and Resources Action Programme website has guidance on water efficiency in the food and drink industry

Waste and Resources Action Programme website has a roadmap towards water security for food and drink supply

7. List of abbreviations

ALS
Abstraction Licensing Strategy.

AMP
Asset Management Plan

AP
Assessment Point.

CaBA
Catchment Based Approach.

CED
Common End Date.

Defra
Department of Environment Food and Rural Affairs.

EFI
Environmental Flow Indicator.

GEP
Good Ecological Potential.

GES
Good Ecological Status.

GW
Groundwater.

GWB
Groundwater body.

GWMU
Groundwater management unit

HMWB
Heavily Modified Water Body.

HoF
Hands off flow.

HoL
Hands off level.

Ml/d
Megalitres per day.

RBMP
River basin management plan

SAC
Special Areas of Conservation.

SPA
Special Protection Areas.

SSSI
Sites of Special Scientific Interest.

UKTAG
United Kingdom's Technical Advisory Group.

WB
Water body.

WINEP
Water Industry National Environment Programme

8. Glossary

Abstraction

Removal of water from a source of supply (surface or groundwater).

Abstraction licence

The authorisation granted by the Environment Agency to allow the removal of water.

Assessment point

A significant point on a river, often where 2 major rivers join or at a gauging station.

Asset Management Plan

Every 5 years Ofwat assesses water company business plans, including spending and investment. The Water Industry National Environment Programme (WINEP) is included in the business plans and is considered by Ofwat in the determination of water company prices. The WINEP consists of investigations, monitoring, options appraisals and schemes to improve, prevent deterioration and protect the water environment. These form part of a water company's Asset Management Plan (AMP). We are currently in AMP7 with measures being delivered between 2020 and 2025.

Catchment

The area from which precipitation and groundwater will collect and contribute to the flow of a specific river.

Catchment based approach

Partnership working at the river catchment scale to deliver a range of environmental, social and economic benefits while protecting our precious water environments for the benefit of all.

Consumptive abstraction

Abstraction where a significant proportion of the water is not returned either directly or indirectly to the source of supply after use. For example for the use of spray irrigation.

Deterioration

Deterioration is a change in the class of any one of the quality elements used to determine the WFD regulations (2017) status in a water body from the 2015 baseline classification to the class below, or any deterioration within the lowest class. It is not change within a class unless already in the lowest class.

Discharge

The release of substances (for example, water, treated sewage effluent) into surface waters.

Environmental flow indicator

Flow indicator to prevent environmental deterioration of rivers, set in line with new UK standards set by UKTAG.

Groundwater

Water that is contained in underground rocks or soil.

Hands off flow

A condition attached to an abstraction licence which states that if flow (in the river) falls below the level specified on the licence, the abstractor will be required to reduce or stop the abstraction.

Hands off level

A condition attached to an abstraction licence which states that if a groundwater level falls below the level specified on the licence, the abstractor will be required to reduce or stop the abstraction.

Headroom

Water that is licensed but not being used.

Impoundment

A structure that obstructs or impedes the flow of inland water, such as a dam, weir or other constructed works.

Maximum peak abstraction

The maximum volume of water abstracted in any one year during the representative abstraction period.

New Authorisations

The Water Act 2003 brought all significant water abstraction under licensing control. This resulted in the following activities being brought into the licensing regime:

- trickle irrigation
- dewatering of mines
- quarries
- engineering works and construction sites
- abstractions related to Internal Drainage Districts
- navigation abstraction
- abstraction for ports and harbour authorities
- all other local exemptions

Non-consumptive abstraction

Abstraction that does not result in a loss of water to any part of the catchment.

Pathway to good measures

Actions that are taken to move a water body at a 'less than good' status towards ‘good status'.

Protected Right

A protected right is simply a right to abstract. The Environment Agency has a statutory duty to not take away from, or weaken a protected right, by granting another licence.

Recent actual average abstraction

The total volume of water abstracted during the representative recent actual period divided by the number of years in that period.

Surface water

This is a general term used to describe all water features such as rivers, streams, springs, ponds and lakes.

Transitional arrangements

The process by which previously exempt abstractions (new authorisations) were brought into the licensing regime between 2018 and 2023. The Water Abstraction (Transitional Provisions) Regulations 2017 and The Water Abstraction (Transitional Provisions) (Amendment) (England) Regulations 2022.

Water body

Units of either surface water or groundwater which we use to assess water availability.

Water Industry National Environment Programme

A schedule of environmental enhancement obligations for water companies to deliver. The programme is drawn up by the Environment Agency and Natural England and signed off by the Secretary of State at Defra.

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