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Mole Abstraction licensing strategy

February 2013

A licensing strategy to manage water resources sustainably

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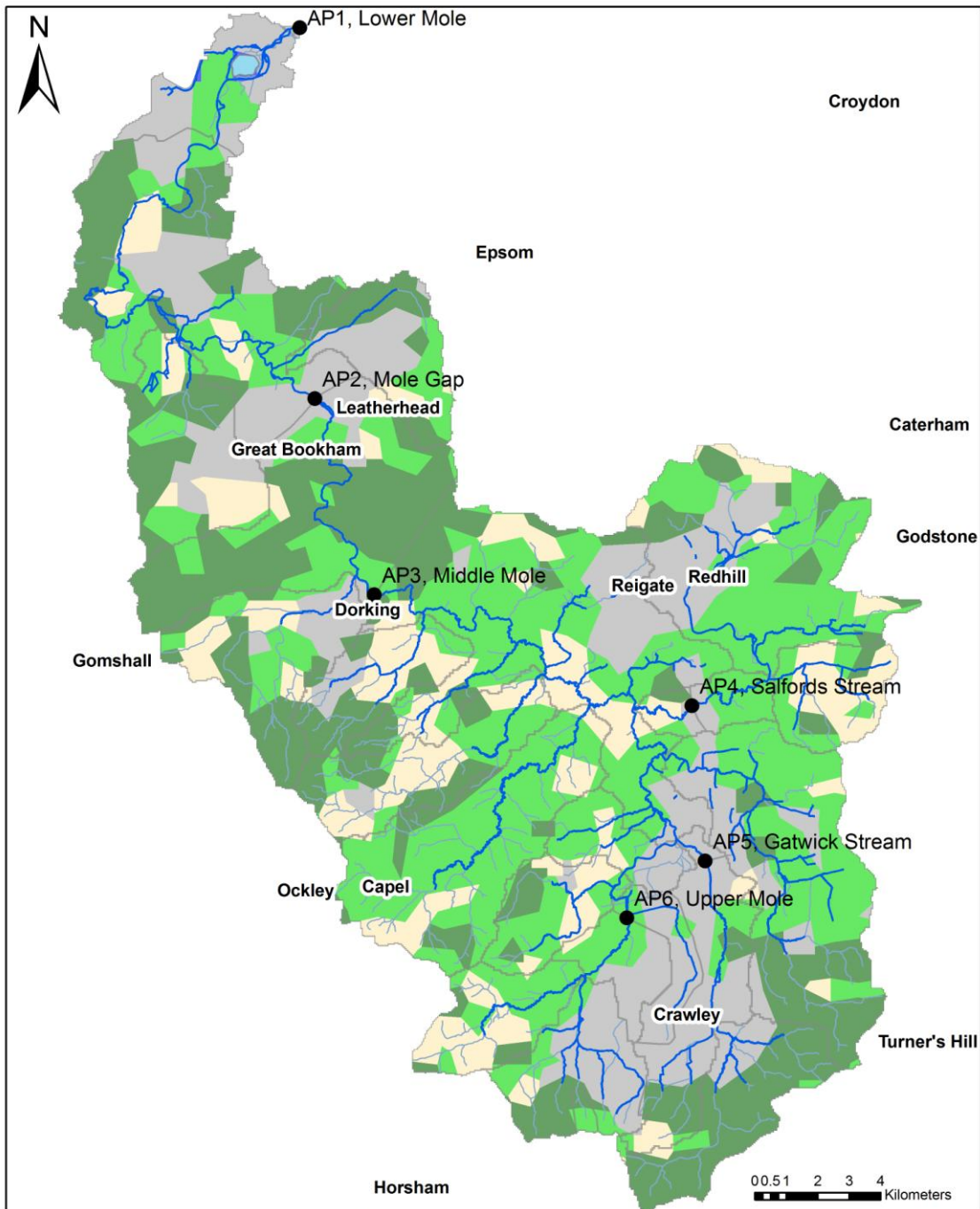
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Map 1 Mole CAMS (Catchment Abstraction Management Strategy) area

Mole CAMS



● Mole CAMS AP's	Land Use	
— Rivers	■ Semi Natural Vegetation	■ Arable
□ Mole CAMS Water Bodies	■ Managed Grassland	■ Urban
	■ Forestry / Woodland	■ Water

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Foreword

Kent and South London (KSL) is home to six million people and covers an area of 6,000km² with a diverse range of environments and related pressures. Proposed growth will continue to stretch the resources available to support this increasing population.

Water is our most essential natural resource, and it is our job to ensure that we manage and use it effectively and sustainably. KSL is one of the driest parts of England and Wales and there are many catchments where there is little or no water available for abstraction during dry periods. Demand from agriculture and industry, and above average household consumption all add to this pressure and affect both the water environment and fresh supplies.

The latest population growth and climate change predictions show that pressure on water resources will continue to increase in the future. We have to act now to make sure that we continue to maintain and improve sustainable abstraction and balance the needs of people and the environment.

This licensing strategy sets out how we will manage water resources in the catchment, existing abstraction licences and water availability for further abstraction.



Andrew Pearce

Kent & South London Area Manager

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1. About the Licensing Strategy

This **Licensing Strategy** sets out how water resources are managed in the Mole area. It provides information about where water is available for further abstraction and an indication of how reliable a new abstraction licence may be.

This strategy was produced in February 2013 and it supersedes the strategy issued in 2007.

How CAMS contributes to achieving environmental objectives under the (WFD) Water Framework Directive

The Water Framework Directive's main objectives are to protect and enhance the water environment and ensure the sustainable use of water resources for economic and social development.

Catchment Abstraction Management Strategies (CAMS) set out how we will manage the water resources of a catchment and contribute to implementing the WFD.

CAMS contribute to the WFD by:

- providing a water resource assessment of rivers, lakes, reservoirs, estuaries and groundwater referred to as water bodies under the WFD;
- identifying water bodies that fail flow conditions expected to support good ecological status;
- preventing deterioration of water body status due to new abstractions;
- providing results which inform River Basin Management Plans ([RBMPs](#)).

When is an abstraction licence required?

You need a licence from us if you want to abstract more than 20m³/day (4 400 gallons) of water per day from a:

- river or stream
- reservoir, lake or pond
- canal
- spring or
- an underground source

Whether or not a licence is granted depends on the amount of water available after the needs of the environment and existing abstractors are met and whether the justification for the abstraction is reasonable.

If you want to apply for an abstraction licence or make changes to a licence that you already have then, please contact us:

- by telephone on 03708 506 506
- by email at enquiries@environment-agency.gov.uk
- or visit our website at www.environment-agency.gov.uk or our [Abstraction Licensing](#) web page

Sustainable abstraction

This licensing strategy has been produced using evidence and information gathered during the Catchment Abstraction Management Strategy (CAMS) process. Through this process we consider the impact of abstraction at all flows. This helps to manage future abstraction more sustainably.

We now assess water resources at a sub-catchment level called water bodies. This means that we can provide more detailed information on the availability of water resources in the Mole CAMS area compared to the scale used in the previous strategy.

Within this strategy we also outline where we may need to reduce current rates of abstraction and our approach on time limiting licences.

The background, aims and principles of CAMS, the over arching principles we use when managing abstraction licences and links with other initiatives are detailed in our document: [Managing Water Abstraction](#). You should read Managing Water Abstraction when reading this catchment specific licensing strategy.

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2. Mole CAMS area

The Mole catchment covers an area of 477.35km² and forms nearly 5% of the River Thames catchment above Teddington. The upper reaches of the river Mole meander through broad lowland valleys. The Mole flows northwards and in the middle of the catchment the river flows through a valley with the North Downs either side. The river then flows through wide floodplains to join the Thames at Molesey. The Mole has several tributaries, including Gatwick Stream, Burstow Stream and Salfords Stream.

The north and south of the Mole catchment is dominated by London Clay and Weald Clay respectively, resulting in significant surface run-off due to the impermeable nature of the geology. These two Clay formations are separated by the Chalk outcropping in the middle of the catchment forming the North Downs. Chalk forms one of the principal aquifers in this catchment with the Lower Greensand and gravels forming the other two aquifers. The springs around Leatherhead receive water from this aquifer and this part of the Mole can have large amounts of baseflow. The Lower Greensand outcrops south of the Chalk and north of the Weald Clay. The Lower Greensand provides baseflow to the tributaries to the east and west of Dorking. Gravels are found along the course of the river Mole. The water tables in the gravels are quite shallow and can provide some baseflow to the Mole.

The Tunbridge Well Sands are a secondary aquifer and can be found in the south of the catchment. Several tributaries to the south and east of Crawley have springs fed by this sandstone including the Gatwick and Burstow Streams. The Bagshot Formation is also a secondary aquifer and outcrops in the north of the catchment where several springs near Cobham emerge. Both of these secondary aquifers provide additional baseflow to the Mole and its tributaries.

There are several large sewage treatment works within the Mole catchment which supplements the river flows. There is a large volume of water imported into the upper reaches of the Mole from the river Eden. The urban areas of the catchment surround Gatwick airport with the towns of Crawley and Horley. This combined with the Weald Clay in these areas will create a flashy flow regime.

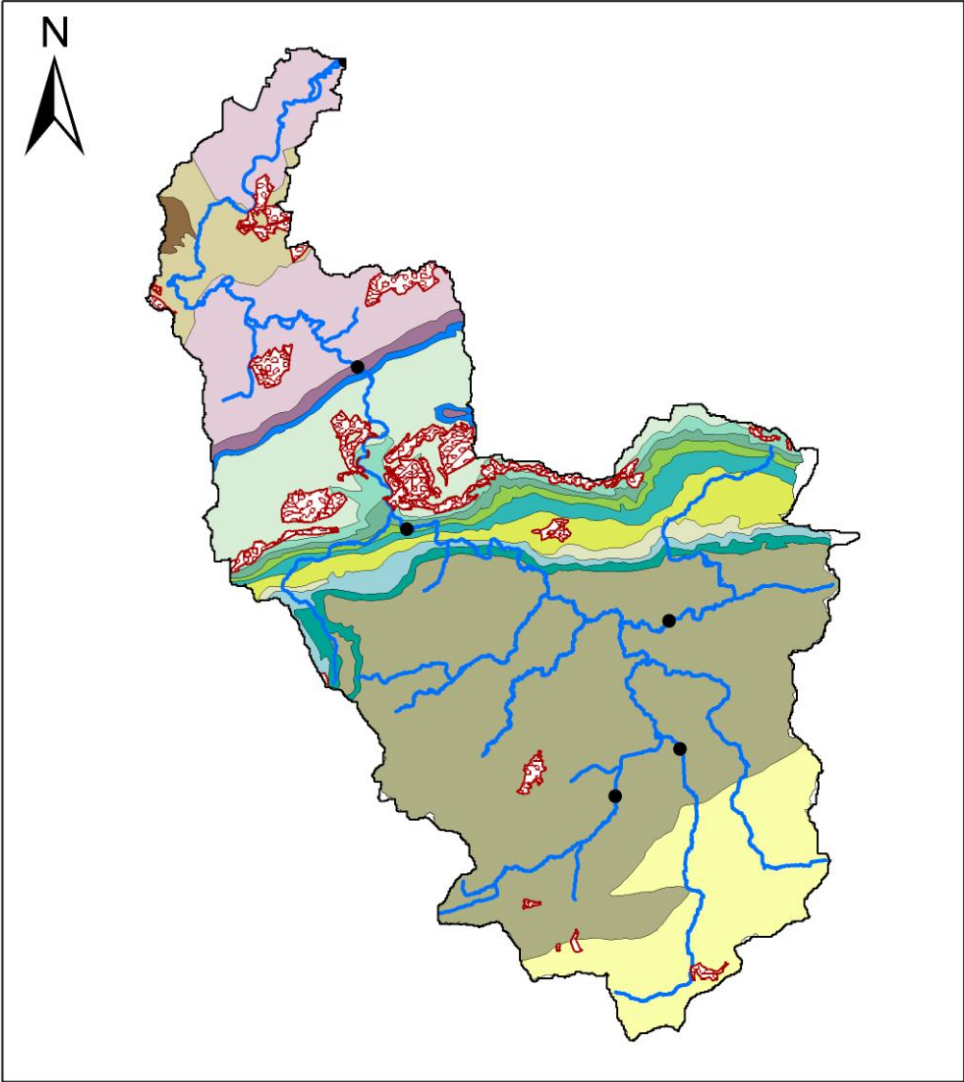
The major towns in the CAMS area are Crawley, Reigate, Leatherhead and Esher. There are also smaller towns in the catchment such as Horley, Dorking and Cobham, and a large number of rural villages, predominantly in the south of the catchment.

The River Thames at Walton-on-Thames is the northern boundary of the CAMS area, and the area around Crawley is the southern boundary. There is a distinct divide between the north of the CAMS area, which has seen significant growth in housing and retail development, and the south of the area, which is more rural - although Gatwick airport is present. However, the Upper Mole urban areas have increased due to the transport links along a commuter belt to London and the A23 and M23 Motorway links to Gatwick Airport and towns such as Redhill, Crawley and Horley. Approximately 23% of the catchment is urban, 26% woodland and the remainder is agricultural.

Groundwater abstraction accounts for 72% of all licensed abstractions in the Mole Catchment. The majority of these groundwater abstractions are from the Chalk aquifer. The needs of public water supply accounts for 77% of licensed water abstracted in the Mole catchment, almost all abstraction for public water supply is from the Chalk, with a smaller proportion being from the Lower Greensand. Golf course irrigation also accounts for a significant volume of the water licensed for abstraction in the catchment. Abstractions are also licensed for a variety of industrial uses such as manufacturing processes and mineral extraction, although most of these are from surface water sources.

Map 2 shows the geology and designated sites within the Mole catchment.

MOLE CAMS



0 1.5 3 6 9 12 Kilometres

- MOLE_CAMS_APs
- MOLE Rivers
- ▨ SACs
- ▩ SPAs
- ▧ SSSIs
- Windlesham Formation
- Bagshot Formation
- London Clay
- Lambeth Group
- Thanet Sand Formation
- Upper Chalk (undifferentiated)
- Middle Chalk (undifferentiated)
- Lower Chalk (undifferentiated)
- Upper Greensand
- Gault
- Folkestone Formation (Lower Greensand)
- Sandgate Formation (Lower Greensand)
- Hythe Formation (Lower Greensand)
- Atherfield Clay (Lower Greensand)
- Weald Clay
- Tunbridge Wells Sand

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3. Water resource availability of the Mole area

3.1 Resource assessment

Resource assessment is at the heart of abstraction management. To manage water effectively we need to understand how much is available and where it is available, after considering the needs of the environment. We have a monitoring network to measure river flows and groundwater levels. We use this data along with our knowledge of human influences and environmental needs to establish a baseline of water availability for each water body that builds into a picture for the catchment. The main components of this assessment that help us to understand the availability of water resources are:

- a resource allocation for the environment defined as a proportion of natural flow, known as the Environmental Flow Indicator (EFI);
- the Fully Licensed (FL) scenario - the situation if all abstraction licences were being used to full capacity;
- the Recent Actual (RA) scenario – the amount of water which has actually been abstracted on average over the previous six years.

River flows change naturally throughout the year, so we want to protect flow variability in our rivers from low to high flow conditions. We use flow statistics to help to do this. Flow statistics are expressed as the percentage of time that flow is exceeded. Resource availability is calculated at four different flows, Q95 (lowest), Q70, Q50 and Q30 (highest).

This information gives a realistic picture of what the current resource availability is within a given water body. Water bodies are sub-catchment surface water units or groundwater units on which we carry out assessments and map results.

***NB:** Natural flows for CAMS AP water bodies have been taken from information provided in the CAMS ledgers. Natural flows for other water bodies have been derived based on simple interpolation between, or downstream of, CAMS APs, based on catchment area.*

Map 3 Water resource availability colours for Mole CAMS Provides an opportunity to reflect different CAMS colours for smaller coastal water bodies should this be required.

3.2 Resource availability

3.2.1 Surface water

If you want to abstract water, you need to know what water resources are available within a catchment and where abstraction for [consumptive](#) purposes is allowed. To show this we have developed a classification system which indicates:

- the relative balance between the environmental requirements for water and how much is licensed for abstraction;
- whether water is available for further abstraction;
- areas where abstraction may need to be reduced.

The availability of water for abstraction is determined by the relationship between the fully licensed and recent actual flows in relation to the EFI. The results mapped onto these water bodies are represented by different water resource availability colours showing the availability of water resource for further abstraction. The water resource availability colours are explained in Table 1. In addition to these water resource availability colours we've classified some surface water bodies as 'high hydrological status' which are coloured blue on the maps. In these water bodies very little actual abstraction occurs and they show virtually undisturbed, or close to natural, flow conditions.

Another category of water body are Heavily Modified Water Bodies (HMWB). These can be classified for many reasons but for water resources they are classified if they contain a lake and/or

reservoir that influences the downstream flow regime of the river. The downstream 'flow modified' water bodies are also classified as heavily modified.

We'll add any conditions necessary to protect flows to a new licence during the licence determination procedure. We will base licence conditions on the water resource availability at different flows (high to low). Table 1 lists the implications for licensing for each water resource availability colour.

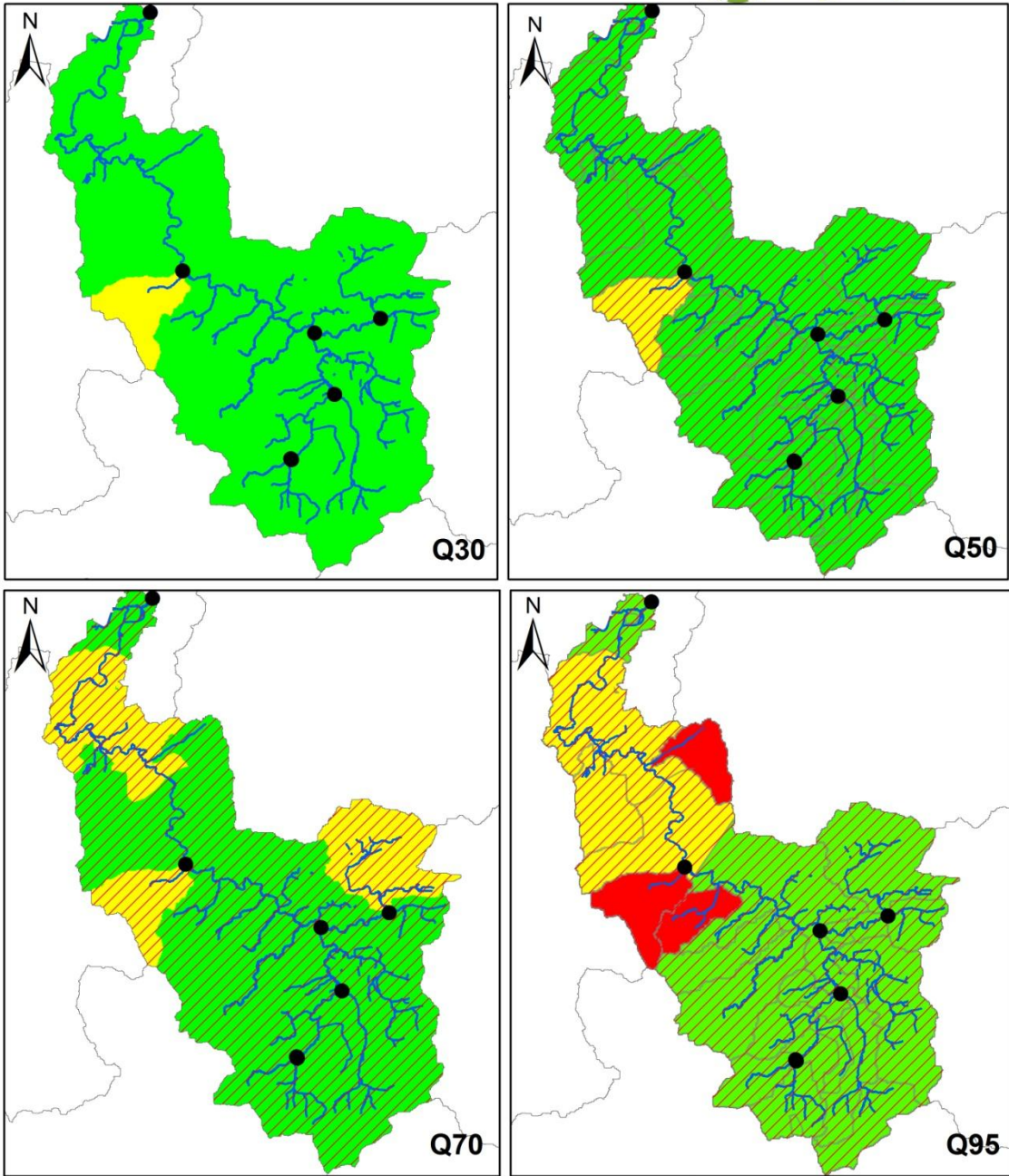
In cases where there is a flow deficit (RA is below the EFI) or risk of a flow deficit (FL below the EFI), there may be water available for abstraction at higher flows. This means that water may be scarce at low flows, but may be available to abstract at medium or high flows. A licence may still be granted but with conditions which protect the low flows. This usually takes the form of a Hands off Flow (HOF) condition on a licence which requires abstraction to stop when the river flow falls below a certain amount. It's important to realise that artificial influences in a catchment (such as abstractions, discharges or releases from reservoirs) can act to both decrease and increase river flows at different times of the year. However, Hands Off Flows and other conditions that we might apply to licences can be used to protect vulnerable flows whenever they occur.

Water resource availability colour	Implication for licensing
High hydrological regime	There is more water than required to meet the needs of the environment. However, due to the need to maintain the near pristine nature of the water body, further abstraction is severely restricted.
Water available for licensing	There is more water than required to meet the needs of the environment. New licences can be considered depending on local and downstream impacts.
Restricted water available for licensing	Full Licensed flows fall below the EFIs. 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 may also be appropriate to investigate the possibilities for reducing fully 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	Recent actual flows are below the EFI. This scenario highlights water bodies where flows are below the indicative flow requirement to help support Good Ecological Status (as required by the Water Framework Directive Note: we are currently investigating water bodies that are not supporting GES / GEP). No further consumptive licences will be granted. Water may be available if you can buy (known as licence trading) the amount equivalent to recently abstracted from an existing licence holder.
HMWBs (and /or discharge rich water bodies)	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. More detail if applicable can be found in section 4.2.1 Surface Water There may be water available for abstraction in discharge rich catchments, you need to contact the Environment Agency to find out more.

Table 1 Implications of water resource availability colours.

Map 3 Water resource availability colours for Mole CAMS.

**Mole CAMS
Resource Colours**



● Mole CAMS AP's	CAMS Colour	0 2 4 8 12 16
— Rivers	■ - Water Available for Licensing	Kilometers
□ Mole CAMS Water Bodies	■ - Restricted Water Available for Licensing	
//// Thames Q50 HoF	■ - Water Not Available for Licensing	

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3.2.2 Groundwater

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

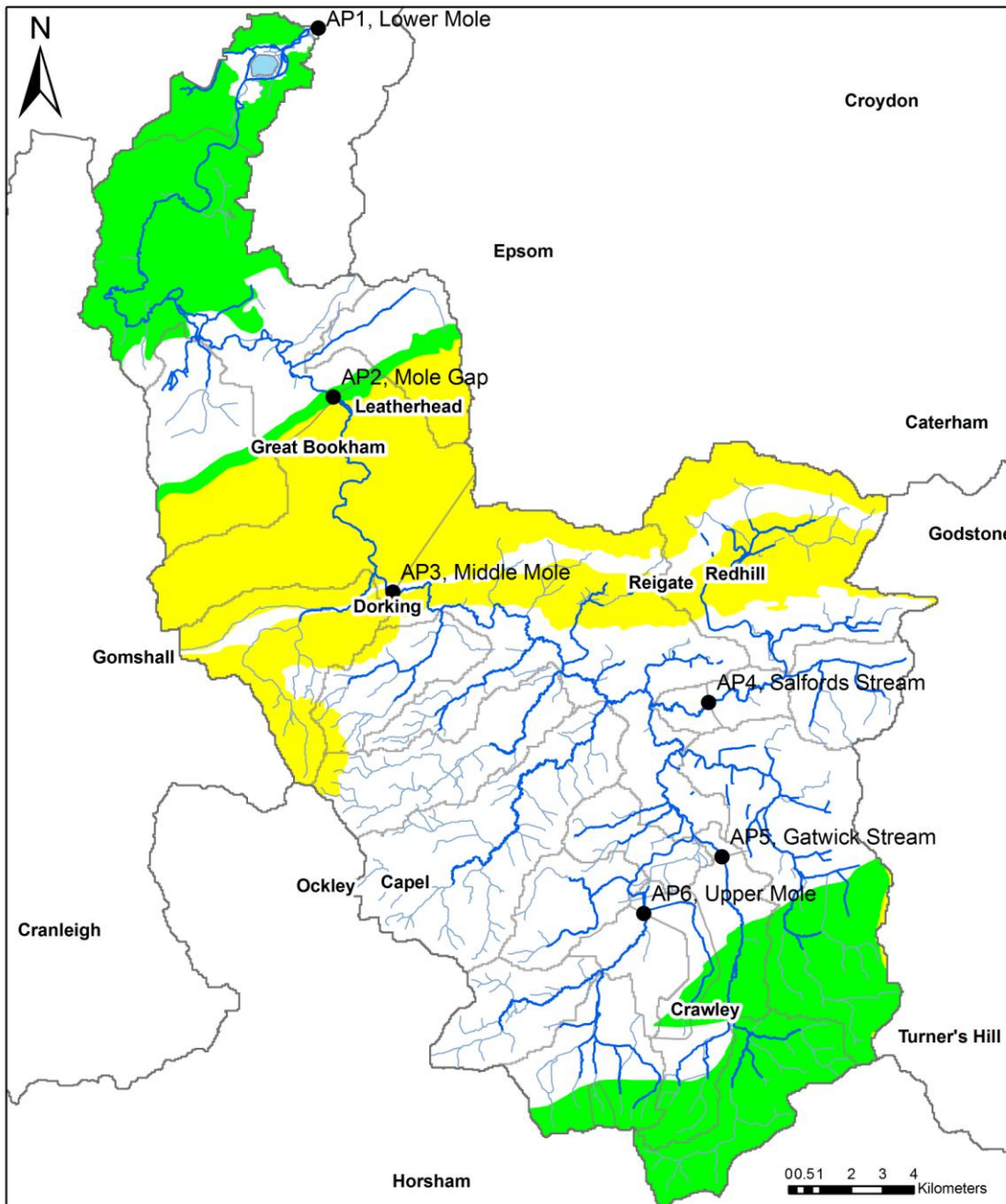
Map 4 shows the groundwater resource availability colours in the Mole area.

Map 5 shows how the groundwater units are defined; the shape of the Unconfined Chalk corresponds with the groundwater flow direction. Further details on how the units are treated are explained under section 4.2.2.

GWMU resource availability colour	Implication for licensing
Water available for licensing	Groundwater unit balance shows groundwater available for licensing. New licences can be considered depending on impacts on other abstractors and on surface water.
Restricted water available for licensing	<p>Groundwater unit balance shows more water is licensed than the amount available, but that recent actual abstractions are lower than the amount available OR that there are known local impacts likely to occur on dependent wetlands, groundwater levels or cause intrusions but with management options in place.</p> <p>In restricted groundwater units no new consumptive licences will be granted. It may also be appropriate to investigate the possibilities for reducing fully licensed risks. Water may be available if you can 'buy' (known as licence trading) the entitlement to abstract water from an existing licence holder.</p> <p>In other units there may be restrictions in some areas e.g. in relation to saline intrusion</p>
Water not available for licensing	<p>Groundwater unit balance shows more water has been abstracted based on recent amounts than the amount available.</p> <p>No further consumptive licences will be granted.</p>

Map 4 Groundwater Resource Availability Colours

Mole CAMS
Groundwater Colours



- Mole CAMS AP's
- Rivers
- Mole CAMS Water Bodies
- Water Available for Licensing
- Water restricted for Licensing

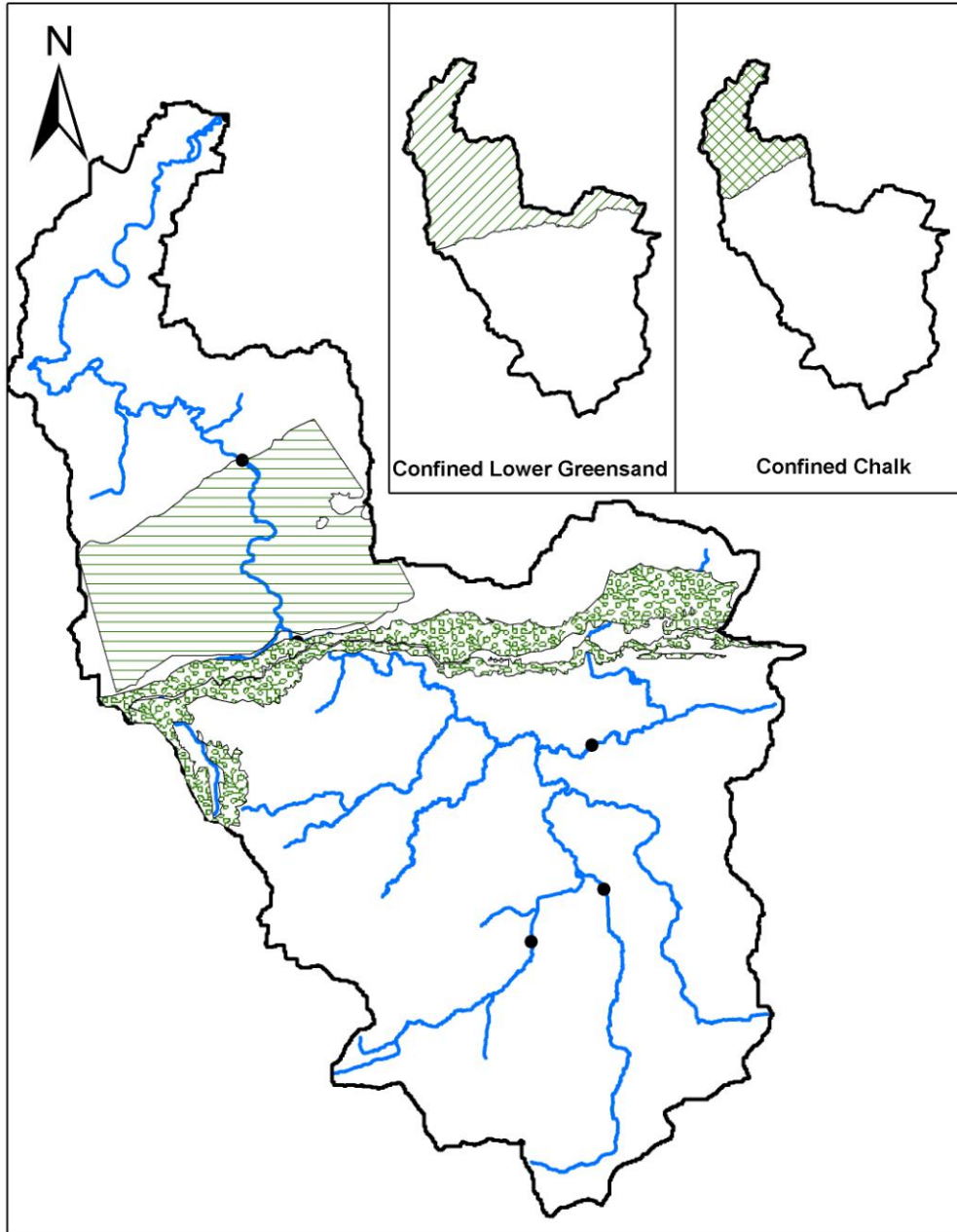
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Map 5 Groundwater Management Units

MOLE CAMS



● MOLE_CAMS_APs	Confined Lower Greensand	
— MOLE Rivers	Unconfined Lower Greensand	
	Confined Chalk	© Crown copyright. All rights reserved. Environment Agency 100026380. 2013.
	Unconfined Chalk	Some features of this map are based on digital spatial data licensed from the Centre for Ecology and Hydrology, © CEH.

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3.3 Resource reliability

If you want to apply for a licence, it is worth considering that in some areas a new, consumptive abstraction may not be 100% reliable. Reliability information is based on CAMS resource availability colours and is a way of presenting the reliability of new abstractions at all flows.

The availability of water for abstraction within a river varies greatly from high to low flows. By assessing the quantity of water available at different flows it is possible to see when there is a surplus or deficit of water and the associated reliability of an abstraction. This is an indication only; actual reliability of a licence will be discussed on application.

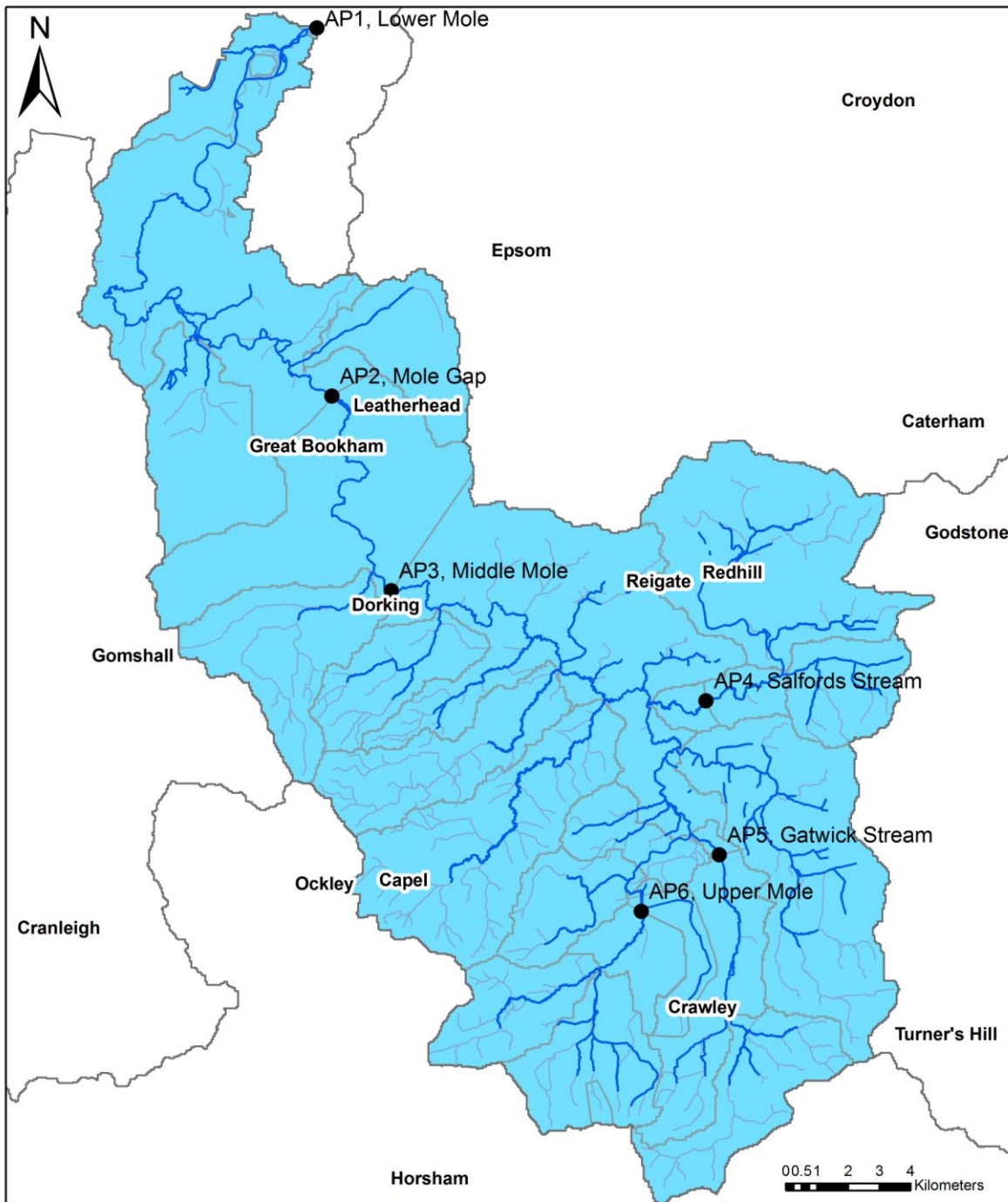
Table 2 shows the resource availability colour associated with the percentage reliability of consumptive abstraction. Map 6 gives an indication of the resource reliability in Mole area expressed as percentage of time.

Resource	Percentage of the time additional consumptive resource may be available
	Consumptive abstraction available less than 30% of the time.
	Consumptive abstraction available at least 30% of the time.
	Consumptive abstraction available at least 50% of the time.
	Consumptive abstraction available at least 70% of the time.
	Consumptive abstraction available at least 95% of the time.
	Not assessed

Table 2 Percentage reliability of consumptive abstraction.

Map 6 Water resource reliability expressed as percentage of time available.

**Mole CAMS
Resource Reliability % of the time**



- Mole CAMS AP's
- Rivers
- Mole CAMS Water Bodies
- Water Resources available less than 30% of the time
- Water Resources available at least 30% of the time
- Water Resources available at least 50% of the time
- Water Resources available at least 70% of the time
- Water Resources available at least 95% of the time

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4. How we manage abstractions in the Mole area

4.1 Principles

The document [Managing Water Abstraction](#) outlines the over-arching principles that we follow in managing our water resources. How we apply these principles in the Mole area is outlined in this section. If you want to abstract water it outlines where water is available for further abstraction and the principles we follow in assessing your application for a licence.

Abstraction licence application process

Anyone wanting to take more than 20m³/day (4 400 gallons) from a 'source of supply' (river, stream, lake, well, groundwater, etc) must have an abstraction licence. The application process for abstraction is similar to the planning process in that we may require the application to be advertised and may require supporting environmental information. When considering the application we check that the quantities applied for and the purpose of the abstraction are reasonable, that there is sufficient water available to support it and that the potential impacts on the environment and other water users are acceptable. Depending on the outcome of our investigations we will issue a licence either as applied for, or with conditions that restrict the abstraction to protect the environment or other users. In certain cases we may have to refuse the application. Any applicant who is not happy with our determination (decision) has the right to appeal against it.

Each application is determined on its own merits

Whilst this document may say that water is available for further abstraction, this does not guarantee that all applications will be successful. We'll determine each application upon its own merits and any local impacts.

A licence does not guarantee that water is available

It's important to understand that when we issue a licence we do not guarantee the supply of water. We have to protect the environment and rights of other abstractors. To do this we may add constraints to licences. Licence holders need to understand the implications of this as it affects the reliability of supply. For example, in drier years it's more likely that conditions will come into effect and abstraction is more likely to be stopped.

Abstractions are managed to protect the environment.

No ecological deterioration

We assess the impact of new applications for water to make sure that the resultant river flows:

- will maintain a good ecology or if the ecology is not good, will not deteriorate the ecology of our rivers further;
- will maintain the near pristine condition of high hydrological regime water bodies.

We'll also take action if necessary to limit the increase in current abstraction, if we think this will lead to deterioration of the ecology or the near pristine condition of our high hydrological regime water bodies.

These principles apply to the water body in which the abstraction is located and also to all downstream water bodies that may be affected by any reduction in abstraction related flow. Doing this means that we will maintain the water body status as reported in the River Basin Management Plans (2009) and ensure compliance with the European Union Water Framework Directive.

Water efficiency and demand management

We need to make the best use of our existing water resources. Adopting water efficiency and demand management measures can help us achieve this goal. Water efficiency is one of the tests that will need to be satisfied before we grant a new licence or renew a time limited licence. We will promote the wise and efficient use of water and actions to limit demand (and reduce leakage) to curb the growth in abstraction and limit the impact on flows and any consequent impact on the ecology. For further details on our general approach to licensing please see the document [Managing Water Abstraction](#).

Building Design

The South East is densely populated with household water use being the highest in the country at 164 litres per capita consumption (PPC) in comparison to the national average of 148 PCC. Throughout the area we are working closely with local authorities to ensure water conservation and efficient water use is embedded within their spatial strategic planning policies. One mechanism by which this can be achieved is through requiring all new homes and business units to be designed to achieve a minimum water efficiency level. Water efficiency and the reduction in household water demand are crucial elements of good water resource management planning especially as the South East is under increased pressure from climate change and population growth.

Sustainable urban drainage systems (or SUDS)

SUDS is the practice of controlling surface water runoff as close to its origin as possible, before it is discharged to a watercourse or the ground. This involves moving away from traditional drainage systems to softer engineering solutions. The benefits are reduced flood risk, improved water quality and increased groundwater recharge. This water can also be collected and reused for non-potable purposes.

Water audits

All businesses can use their water wisely. By investing a little time and money in implementing a simple water management plan, an organisation may reduce its water consumption by up to 80%, releasing money to be invested in other parts of the business and establishing 'green' credentials. Water audits allow the volume of water used during an average year to be calculated and suggest ways to reduce water use and therefore costs.

Environment Agency

The Environment Agency provides a range of free guidance on water efficiency, including best practice case studies for agriculture, business, industry, public sector and the domestic consumer. Consult www.environment-agency.gov.uk/savewater.

Water companies

For local water efficiency advice, contact your water company.
Southern Water www.southernwater.co.uk
South East Water www.southeastwater.co.uk
Thames Water Utilities www.thameswater.co.uk/
Affinity Water www.affinitywater.co.uk
Sutton & East Surrey Water www.waterplc.com

Water Regulations Advisor Service

WRAS provides advice on the Water Supply (Water Fittings) Regulations which prevents waste, misuse, undue consumption or contamination of wholesome water. Consult www.wras.co.uk or telephone 01495 248454.

Business/Commercial

Waterwise

Waterwise is a UK NGO focused on decreasing water consumption in the UK and building the evidence base for large scale water efficiency. www.waterwise.org.uk/pages/save-water.html

Public sector

Water in the Schoolbenchmarks

Water in the School is a website supported by a number of water companies aimed at National Curriculum Key Stage 2 and 3 pupils and their teachers. It provides a wealth of information for pupils on how to make savings. Consult www.waterintheschool.co.uk

Hospitals

Water UK has collaborated with NHS Estates and Watermark to produce *Water Efficient Hospitals*, an information pack to help hospitals use water wisely and save money by cutting both water and energy bills. Consult www.water.org.uk/index.php?cat=3-4701

UK Irrigation Association (UKIA)

The UKIA provides information on irrigation to its members and runs technical workshops. Consult www.ukia.org

DEFRA's Rural Development Service (RDS)

DEFRA's Rural Development Service provides grants for agricultural water resources management schemes under its Rural Enterprise Scheme. Consult www.defra.gov.uk/rural/rdpe/ or telephone 0845 9335577.

Linking Environment & Farming (LEAF)

LEAF promote and develop integrated farm management, this includes whole farm water savings. Consult www.leafuk.org or telephone the Kent LEAF office 01580 712488.

Impoundments

Applications for impoundments will be dealt with on a case-by-case basis. An impoundment is a dam, weir or other construction in an inland waterway that obstructs or impedes flow and/or raises water levels.

Hydropower

Water abstraction for hydropower schemes is non-consumptive, with all water used returned to the watercourse. Hands off Flows and maximum abstraction volumes are determined in line with the Environment Agency's Hydropower Good Practice Guidelines and based on the assessment of environmental risk for each scheme. For further information please refer to our [website](#).

4.2 Abstraction restrictions

When issuing a licence we have to protect the environment and rights of other abstractors. To do this we may add conditions to licences.

Time limited licences

In recognition of changing pressures on water resources all new licences and variations (other than downward variations or minor variations having no environmental impact) will have a time limit imposed. This allows for the periodic review and changes to abstraction licences where circumstances have changed since the licence was granted.

All new licences within a CAMS area have a **common end date** (CED) so they can be reviewed at the same time. When an application is made within six years of the CED, we will generally apply the subsequent CED to any licence granted. This is to avoid issuing shorter and shorter duration licences as the CED approaches. This means that the initial CED on a licence may be between six and 18 years duration. On replacement the normal duration will then usually be 12 years.

However, where we are uncertain about the long term impacts of an abstraction we will grant a short term licence during which time potential impacts are monitored.

17% of the licences in Mole CAMS are time-limited. CEDs occur every twelve years. The next CED for Mole CAMS is 2029 and the subsequent one is 2041.

Time-limited licences may be renewed with more restrictive terms and conditions to protect the environment, i.e.:

- Licensed quantity may be reduced to reflect actual abstraction rates;
- We will endeavour to provide licence holders notice of significant changes to their abstraction permission. These could include:
 - A dual Hands Off Flow (HOF) system may be imposed: a local HOF and a Q50 HOF at Kingston on the river Thames to protect flows in the Lower Thames.
 - And/or, a hands-off groundwater level may be imposed to ensure no further dewatering of the aquifers.
 - Increased monitoring of abstraction volume, and/or monitoring of surface/ groundwater levels.

Additional information about the replacement of time limited licences is available in [Managing Water Abstraction](#).

Hands off flow conditions

To protect the environment we may issue a licence with a condition referred to as a 'Hands-Off Flow' (HOF). This specifies that if the flow in the river drops below that which is required to protect the environment abstraction must stop, hence 'Hands-Off Flow'.

4.2.1 Surface water

We assess surface water flows at Assessment Points (APs) which are significant points on the river, often where two major rivers join or at a gauging station. Where flows fall below the EFI, new abstractions may be subject to HoFs.

Table 3 gives an indication of how much water is available for further abstraction and the associated restrictions that we may apply to new and varied abstraction licences from the main river. Tributaries to the main river may be subject to different restrictions and quantities.

Each HOF is linked to an AP and is dependent on the resource availability at that AP. In some cases additional restrictions may apply to licences where there is a more critical resource availability downstream to protect the ecological requirements of the river. This is detailed in the last column of Table 3 if applicable.

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

Reading from top to bottom in Table 3 are the APs in the Mole CAMS 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 and the approximate volume of water in MI/d that may be available. In cases where there is water available at all flows we may apply a Minimum Residual Flow (MRF) to protect very low flows. We'll decide this on a case by case basis.

Mole CAMS area

AP	Name	Water Resource reliability expressed as a percentage of time available	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 AP name and restriction
1	Lower Mole	Water Resource available at least 50% of the time	28.7 (1780)	365 (182)	17.0	Yes	<p>Within these catchments at a local level there is Water Available. Details to the left only show the local flow restrictions.</p> <p>However this river flows into the non-tidal River Thames and as such, this strategy needs to take into account the flow requirements of the River Thames, which is heavily over abstracted.</p> <p>Therefore all surface abstractions will be subject to a dual HOF system, with a local HOF to protect flows within the unit and the Q50 HOF at Kingston Gauging station to protect the flows in the Lower Thames, this is equivalent to water being available for 182 days a year.</p> <p>Figures in brackets represent the River Thames HOF restrictions</p> <p>See Thames Corridor CAMS for further details.</p>
2	Mole Gap	Water Resource available at least 50% of the time	45.1 (1780)	365 (182)	2.0	Yes	
3	Middle Mole	Water Resource available at least 50% of the time	18.3 (1780)	365 (182)	40.9	Yes	
4	Salfords Stream	Water Resource available at least 50% of the time	13.1 (1780)	263 (182)	0.6	No	
5	Gatwick Stream	Water Resource available at least 50% of the time	0.6 (1780)	365 (182)	22.2	Yes	
6	Upper Mole	Water Resource available at least 50% of the time	1.9 (1780)	365 (182)	0.8	Yes	

Table 3 HOFs for the assessment points of Mole CAMS.

Resource Availability Status –

The river and streams in the Mole catchment are tributaries that feed into the Thames Corridor CAMS. River flow in these tributaries will have a cumulative impact on flows within the River Thames. In order to prevent the over-abstracted reaches of the Thames worsening, water abstracted within tributary CAMS must consider the requirements of that water for the River Thames.

The status of all tributary CAMS upstream of Teddington have been overridden to a status of 'water not available for licensing'. This is to reflect the contribution of flows from the tributaries to the River Thames, and more accurately shows the influence of the Thames HOF of Q50. The Q50, and associated 'water not available for licensing' resource availability status, means that water will not be available for licensing at low flows but will be available at high flows.

Assessment Point descriptive

AP1, Lower Mole

The Lower Mole incorporates the lower-most stretch of the River Mole as it meanders across the low-lying London Clay and higher ground formed by the Bagshot Formation. The Lower Mole is 100 km² in area. The natural course of the Mole has been altered where the M25 crosses the river at three points and also below Hersham, where the River Mole divides to form the Ember. The Bagshot Formation provides some baseflow component to this catchment, as does the Chalk, Gravels and Lower Greensand from upstream; the river flows are further supplemented by a discharge at Esher. There is little abstraction within this sub catchment, the Bagshot Formation and the River Terrace Deposits are secondary aquifers, thus have no significant abstractions. There are small amounts of surface water abstraction for spray and trickle irrigation in the Lower Mole.

AP2, Mole Gap

The Mole Gap sub catchment contains the Chalk Downs between Dorking in the south and Leatherhead in the north. In the south of the Mole Gap the river loses water through swallow holes at least as far as Mickleham, roughly 5km south of Dorking. In extreme weather some stretches can dry up completely. In the north of the sub catchment the river and Chalk aquifer are in continuity; the river is fed by springs in the riverbed south of Leatherhead. Water that is not returned to the river by the Chalk springs, flows into the Confined Chalk aquifer.

The Pipp Brook, which is fed by the Lower Greensand, joins the River Mole downstream of Dorking. Rain falling on the Chalk Downs percolates down into the Chalk. It enters the river near Leatherhead where the groundwater levels are in continuity with the river bed level, if not the water will enter the confined chalk aquifer to the north. There are some significant consumptive abstractions especially for public water supply, which are from the unconfined Chalk aquifer near Leatherhead. These abstractions take water away from what would otherwise supplement the flow through baseflow and flow which would go into the confined Chalk. Discharges into the Mole Gap are small in relation to abstraction amounts.

AP3, Middle Mole

Most of this sub catchment is underlain by Weald Clay. Where the River Mole crosses the Weald Clay, it is joined by a number of tributaries including the Deanoak Brook and the Leigh Brook. The Chalk and Lower Greensand aquifers feed the Betchworth Stream, Shag and Wallace Brooks. The Mole also gains water from the Lower Greensand aquifer near Brockham. The Middle Mole has a smaller proportion of flow coming from groundwater sources due to the higher proportion of clay covering the sub catchment.

The flow in this sub catchment is sustained by the sewage treatment works discharges at Horley and Reigate, especially during dry periods. There is some public water supply abstraction from the Lower Greensand, but when compared to the discharge quantities it is small. Abstractions from the Lower Greensand west of Dorking take water which would otherwise supplement the flow in the Mole upstream of Dorking where the river flows over the Lower Greensand. The abstractions are

close to the boundaries of the confined and unconfined aquifer so some abstractions will take water at the expense of the storage within the confined aquifer.

AP4, Salfords Stream

This AP has a catchment area of 55.5km². The Salfords Stream is a major tributary of the Mole and drains an area dominated by Weald Clay to the east of the Mole. The Salfords Stream is largely rural with just the town of Redhill within this sub catchment. Its confluence with the River Mole is at Sidlow Bridge just downstream of Kinnersley Manor gauging station on the Mole. The Salfords Stream is joined by the Redhill Brook near to Redhill Aerodrome. The Redhill Brook rises at the base of the scarp slope of the North Downs Chalk to the east of Merstham. The Chalk and the underlying Lower Greensand provide a negligible baseflow into the Redhill Brook.

This sub catchment is dominated by artificial influences. In the Holmethorpe area there has been large scale dewatering for sand processing and landfill. This lowered the groundwater levels, however this water was discharged back into the Redhill Brook, which is part of the same sub catchment. In recent years, levels have recovered where dewatering has stopped. The flows in this sub catchment are further sustained by sewage treatment discharges at Merstham and Warwick Wold.

AP5, Gatwick Stream

The Gatwick Stream rises on the Weald Clay and from small springs in the Hastings Beds. Joined by the Stanford Brook in the Pease Pottage area, the Gatwick Stream flows north through the eastern side of Crawley over the Tunbridge Wells Sands and along the eastern boundary of Gatwick Airport to meet the River Mole near Horley. The sub catchment area is 38.7km² and it has the largest percentage of urbanisation in the Mole catchment. This urbanisation can cause the stream to have a relatively flashy regime.

The Gatwick Stream sub catchment has the largest discharge in the Mole at Crawley. This sub catchment has a number of groundwater abstractions, but only one surface water abstraction. Large volumes of water are imported into the area from the catchment of the River Medway to the east of the Mole, due to the limited water resources in this area. Much of this imported water is discharged at Crawley and Horley sewage treatment works.

AP6, Upper Mole

The Upper Mole catchment area is 31.8km². The source of the River Mole is in the hills of North Sussex in the vicinity of Rusper on the northern limb of the Wealden anticline. Springs emerge on the gently dipping Hastings Beds before it passes under the Weald Clay. Weald Clay dominates, covering 85% of the sub catchment. The Upper Mole is fed by a number of small tributaries in the west and is joined at Ifield by the Ifield Brook, which has a number of small tributaries flowing into it including the Broadfield Brook, Creasys Brook, Douster Brook and Spruce Hill Brook. These flow to the north along the western edge of Crawley.

The area to the west is largely rural and to the east is the town of Crawley. North of Crawley the Mole flows under Gatwick Airport where additional runoff is collected in the river. In the past, the course of the River Mole has been altered on several occasions to accommodate the development of the airport.

The Hasting Beds provide some baseflow to the river but this is a very small proportion, as most of the catchment has Weald Clay at the surface. The Weald Clay causes a flashy flow regime which is exacerbated by the runoff from Gatwick Airport and Crawley. There are no significant abstractions or discharges within this sub-catchment that have an impact on the Upper Mole. There are only very minor discharges, in the form of treated sewage effluent discharge from private sewage systems.

Catchment Wide Strategies

The Mole is a tributary of the River Thames. The Thames is dependent on flows from all its tributaries to ensure minimum flows are maintained for the environment, navigation, water users and current licences, which include key abstractions for public water supply. All CAMS that contribute to the River Thames must take into account the Thames' water resource availability, which is 'over abstracted' in its upper and lower reaches. All new surface water licences, and groundwater licences in close proximity and direct hydraulic continuity with a river, upstream of Teddington, will be constrained with a Hands-Off-Flow (HOF) of Q50. The Q50 is the flow that would be present in the River Thames 50% of the time in an average year. This HOF will be enforced when observed flows at Kingston Gauging Station reach Q50, which usually will be in the summer months (April-October), but could include dry winters.

Encouraging Storage reservoirs

Winter storage licences have, under the current strategy, been granted for direct surface water abstraction between 1st November and 31st March inclusive with appropriate flow constraints. The use of reservoirs will be encouraged by the Agency, but filling the reservoirs will be controlled by flow instead of being operated by seasonal restrictions. Before a reservoir can be filled river flows will need to be either at or above the prescribed flow constraint level.

Abstracting water at high flows and storing it for use at low flows should alleviate restrictions associated with the proposed strategy of no consumptive abstractions being allowed during low flows. An applicant will need to explore any planning requirements for such a storage facility before submitting an application. There are many options for off-stream reservoirs, so no explicit rules for construction can be given.

Licence Strategy for new and varied licenses:

Surface Water Abstraction:

There is a presumption against licensing consumptive abstractions at low flows in heavily abstracted rivers, although water may be available at high flows with a hands-off flow (HOF) to protect river flow.

In the Mole a dual HOF system will operate with one HOF linked to local flows and the other linked to the Thames. All new surface water abstraction licences issued for consumptive uses will have a local HOF of Q95 or higher to protect low flows during times of drought.

Licence holders with the dual flow constraint (local HOF and Thames HOF) will be required to cease abstraction when flows drop below either of the constraint values. For example, if flows in the Thames fall below the Thames HOF, but local flows are not lower than the local HOF, abstractors will be required to cease abstraction until flows in the Thames are higher than the Thames flow constraint.

Where an existing abstractor already has a local HOF condition on their licence all new abstractors upstream of this abstraction will also have the same, or higher, HOF applied to protect the existing licence from derogation.

Abstractions that are considered to be non-consumptive may be considered irrespective of the resource availability, subject to the normal local impact assessment. These applications will be considered on a case-by-case basis and where issued may be subject to conditions designed to ensure the environment is protected.

4.2.2 Groundwater

Where groundwater (GW) abstractions directly impact on surface water flows, the impact is measured at the surface water AP. Restrictions may be applied to these licences.

On principal aquifers we have divided the area into confined and unconfined units. We use the information and assessments on these units to determine water availability and licence restrictions.

Secondary aquifers, Bagshot Formation and Tunbridge Wells Sands currently receive little pressures from abstraction and will be considered on an individual case by case basis subject to local assessment.

Where groundwater abstractions are likely to impact surface water features, or reduce baseflow to a river, a Hands off Level (HoL) condition may be applied to the abstraction. This is a groundwater level below which, an abstractor is required to reduce or stop abstraction.

Licence Strategy for new and varied licenses:

With regard to groundwater resources, management is specific for each unit and is detailed below. The local HOF and Thames HOF will be applied to a groundwater licence if an abstraction has a direct and immediate impact on a river of close proximity.

Confined Chalk and Confined Lower Greensand

Abstraction from the confined aquifers does not impact on surface water flows as they are not in direct hydraulic continuity with the surface water.

For new consumptive abstractions from the Confined Chalk and Confined Lower Greensand aquifers, new proposals may be considered on a case by case basis, subject to local assessment. This is on the condition that the Chalk aquifer is full to the base of the overlying clay, and groundwater does not show unacceptable trends of long-term decline. Proposals from the Confined Lower Greensand will be considered on an individual case by case basis, and will be subject to the extent of the groundwater levels within the Lower Greensand aquifer, to ensure no unacceptable trends or long term decline of the water levels are caused.

All new abstraction licences will follow licence determination procedure to demonstrate need, efficiency and sustainability. There is a presumption that year-round abstraction would be permitted if there were no environmental damage or derogation issues. There may be occasions where such proposals will be subject to controls by prescribed groundwater levels.

Unconfined Chalk and Unconfined Lower Greensand

Abstraction from the unconfined aquifers can impact on the surface water flows as they are in direct hydraulic continuity with the nearby water course.

New consumptive abstraction licences from the Unconfined Chalk for large abstractions are unlikely to be granted, but proposals will be considered on a case by case basis. Small scale abstractions with a direct and immediate impact on the river, or where the groundwater flow is towards the river (rather than the Confined Chalk) will only be permitted at times of high flow with suitable constraints to protect the river environment. Abstractions where the groundwater flow is towards the Confined Chalk may be permitted subject to a local assessment and to resource implications for the confined aquifer. All new abstraction licences will follow licence determination procedure to demonstrate need, efficiency and sustainability. There is a presumption that year-round abstraction would be permitted if there were no environmental damage or derogation issues. There may be occasions where such proposals will be subject to controls by prescribed groundwater levels.

Where appropriate the Environment Agency will continue to apply other conditions to a licence in order to protect the environment and other abstractors. Such conditions may include efficiency measures or monitoring requirements (it is a legal requirement for all licence holders to comply with conditions on their licence). The Agency operates an enforcement policy and inspections are carried out regularly (depending on the perceived impact of an abstraction on the local environment and water resources) to ensure abstractors are complying with the conditions of their licence.

Important local features that may affect water availability

European law provides a very high level of protection to two types of designated sites due to their special environment. These are:

- 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

Ramsar sites and Sites of Special Scientific Interest (SSSI) also carry a high level of environmental importance. Further information can be found in Section 4.5 – Restoring Sustainable Abstraction.

The Mole catchment is home to a diverse range of habitats and species, a number of which are water-dependent. Ponds are particularly important in this catchment, while other habitats reliant on water include streams, wet woodland, fens, mires, wet heath and marshy grassland.

The Mole catchment contains small composite parts of two SPA. Knight and Bessborough Reservoirs SSSI is a component SSSI of the South West London Waterbodies SPA, which is also a Ramsar Site. This particular SSSI consists of two connected artificially embanked water storage reservoirs which support a variety of waterfowl, including nationally important numbers of wintering shoveler. This species is one of the designated features of interest for both the SPA and the Ramsar site. Wintering gadwall, cormorant and goldeneye also occur in notable numbers.

The Mole catchment supports one SAC known as the Mole Gap to Reigate Escarpment, which consists of the majority of the Mole Gap to Reigate Escarpment SSSI. There are seven designated features of European interest in this SSSI, most of which are not water-dependent. However, one of the features of interest is the presence of great crested newts, for which this area is considered to support a significant population. This species needs ponds and pools for breeding, but also suitable adjacent terrestrial habitats to hibernate and feed for most of the year. This site fulfils these habitat requirements and is therefore one of the best sites in Europe for this species.

The Mole catchment contains all or part of 15 SSSI, 12 of which support wetland features. These include ponds, streams, wet woodland, fens, mires, wet heath and some marshy grassland. A number of the SSSIs contain ponds, some of which support rare and declining species, often in association with other surrounding wetland habitats. Bookham Commons SSSI, situated on the London Clay, has several woodland ponds that support thread-leaved water-crowfoot, which is rare in Surrey, and fat duckweed, which is uncommon in the county. Tall fen vegetation occurs in the chain of ponds and support orange foxtail and eared willow, which are both scarce in Surrey. The Bookham Brook, a tributary of the Mole, also flows through the woodland.

Buchan Hill Ponds SSSI includes three ponds that are the best example in West Sussex of Wealden hammer ponds on acid Tunbridge Wells sands, and these together with the marginal fen communities, support a range of wetland plants. The ponds and surrounding vegetation support 17 species of dragonfly which represents a nationally significant population and includes the hairy dragonfly and brilliant emerald which are both nationally uncommon. The ponds are surrounded by wet woodland.

Reigate Heath SSSI supports a range of habitats including wet alder carr woodland and marshy meadows. The site had a rich ground flora including white sedge in the woodland and southern marsh-orchid in the meadows, but these have since greatly declined. The Wallace Brook runs along the eastern edge of the meadows and provides a feeding area for birds such as kingfisher. Since the 1970s this site has suffered from severe adverse hydrological impacts, the peat soil is drying out and shrinking, resulting in soil erosion and the invasion by terrestrial species. There is a Water Level Management Plan for Reigate Heath and investigations are currently underway to ascertain the reasons for the site drying out and to propose potential solutions. Consequently any new consumptive abstraction near to the site must be carefully considered, and would only be permitted with suitable constraints to protect the environment. All new licences will follow licence determination procedure to ensure need, efficiency and sustainability.

4.3 Opportunities for licence trading

We want to make it easier to trade water rights. 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 on a permanent or temporary basis. In the majority of cases a trade will involve a change in abstraction location and/or use which we will need to approve through the issue or variation of abstraction licences.

In licensing trades, as with new abstraction licences, we need to make sure that we do not cause any deterioration in WFD water body status both within the water body / bodies where the trade will take place or to downstream water bodies. The table below provides a guide to the potential for trading in water bodies of a particular CAMS water resource availability colour, as shown on map 3.

CAMS water resource availability colour, including downstream requirements	Our approach to trading
High hydrological regime	Opportunities for trading water rights will be limited
Water available for licensing	Allow trades of recent actual abstraction and licensed abstraction, but little demand for trading expected within water body as water available for new abstractions.
Restricted water available for licensing	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
Water not available for licensing	We will only trade recent actual abstraction but no increase in recent actual abstraction is permitted in water body. Licensed abstraction will be recovered for the environment.
HMWBs	Opportunities for trading will depend on local operating agreements and local management.

To find out more about licence trading please go to our [website](#).

4.4 New Authorisations

The Water Act 2003 brought all significant water abstraction under licensing control. This will result in trickle irrigation, dewatering of mines, quarries, engineering works and construction sites, abstractions related to Internal Drainage Districts, navigation abstraction and abstraction for ports and harbour authorities and other local exemptions coming into the licensing regime.

As a result we'll be able to manage water resources more effectively by ensuring that all significant activities influencing the availability of water and its impact on the environment are undertaken in a sustainable manner.

Government are still developing their policies as to how to resolve some of the issues raised during the consultation process. Government will publish their proposals before new regulations are implemented and expect to do this at least three months before commencement so that we can issue guidance to those affected by the changes.

Where we have details of these abstractions we have included them in our assessments to consider how they impact on the catchment.

4.5 Restoring Sustainable Abstraction

Where water abstractions cause or potentially cause actual flows to fall short of the EFIs and result in environmental damage, we may need to change or even revoke existing abstractions in order to achieve a sustainable abstraction regime. Within the Mole CAMS there are three water bodies in which recent actual flows have fallen below the EFI. The abstraction licences within these water bodies that cause these issues are being investigated. Investigations into the impact caused by these licences, individually or cumulatively, will result in options being developed with licence holders on how to improve sustainability. Investigations will include a cost/benefit analysis. Information on how licences in the RSA programme are dealt with can be found in our Step by Step guide on our website.

Investigation Water Framework Directive Water bodies

In addition to the RSA programme, we are investigating whether reduced water flow may be causing problems under the Water Framework Directive (WFD). About 4% of rivers are failing to support WFD good ecological status due to pressures from over-abstraction.

Habitats Directive

Under the Habitats Regulations we have assessed the effects of existing abstraction licences and will assess new applications to make sure they are not impacting on internationally important nature conservation sites. These sites are known as Special Areas of Conservation (SAC's) and Special Protection Areas (SPA's). If your current licence has been reviewed under this legislation to assess its impact you will already know about the review. If we haven't contacted you yet then your licence is either not near a SAC/SPA or isn't having an impact on these sites. If our assessment shows that a new application could have an impact on a SAC/SPA we have to follow strict rules in setting a time limit for that licence. These are:

- we may be able to grant the licence but only with a short time limit. This allows us to monitor the impact of the abstraction on a SAC/SPA and change the licence if necessary;
- if we can't determine that your application will not affect the site we have to either put conditions on the licence so that it cannot affect the site or refuse the application. If we grant the licence we may ask you to monitor its impact;
- if our assessment shows that there isn't an impact on the site we will manage the application according to the principles in this document.

Thank you for taking the time to read this Licensing Strategy. If you have any questions about it, or if you want to apply for an abstraction licence or make changes to a licence that you already have, then please contact us:

- by telephone on 03708 506 506
- by email at enquiries@environment-agency.gov.uk
- or visit our website at www.environment-agency.gov.uk or our [Abstraction Licensing](#) web page

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Glossary of terms

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 Unit	Point at which the flow from upstream catchment is assessed.
Catchment	The area from which precipitation and groundwater will collect and contribute to the flow of a specific river.
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.
Discharge	The release of substances (i.e. water, sewage, etc.) into surface waters.
Environmental flow indicator	Flow indicator to prevent environmental deterioration of rivers, set in line with new UK standards set by UKTAG.
Full licence	A licence to abstract water from a source of supply over a period of 28 days or more
Groundwater	Water that is contained in underground rocks.
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 river flow or borehole (groundwater) level below which an abstractor is required to reduce or stop abstraction.
Impoundment	An impoundment is a structure that obstructs or impedes the flow of inland water, such as a dam, weir or other constructed works.
Protected right	Means a right to abstract, which someone has by virtue of the small abstractions exemptions defined in the Water Act 2003 or by virtue of having an abstraction licence. The right protected is the quantity that can be abstracted up to that allowed by the exemption or the terms of the licence. The small abstraction exemptions defined by the Water Act 2003 are for domestic and agricultural purposes (excluding spray irrigation) not exceeding 20 m ³ /d.
Surface water	This is a general term used to describe all water features such as rivers, streams, springs, ponds and lakes.
Transfer licence	A licence to abstract water from one source of supply over a period of 28 days or more for the purpose of; <ol style="list-style-type: none"> 1. transferring water to another source of supply; or, 2. transferring water to the same source of supply, but at another point, in the course of dewatering activities in connection with mining, quarrying, engineering, building or other operations (whether underground or on the surface); without intervening use.
Water body	Units of either surface water or groundwater at which assessments are completed for WFD.

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List of abbreviations

AMP	Asset Management Plans
AP	Assessment Point
ASB	Abstraction Sensitivity Bands
AWB	Artificial Water body
CAMS	Catchment Abstraction Management Strategies
CED	Common End Date
Defra	Department of Environment Fisheries and Rural Affairs
EA	Environment Agency
EFI	Ecological Flow Indicator
FL	Full Licensed (scenario)
GEP	Good Ecological Potential
GES	Good Ecological Status
GW	Groundwater
HES	High Ecological Status
HMWB	Heavily Modified Water Body
HoF	Hands off Flow
HoL	Hands off Level
LDE	Level Dependent Environment
MI/d	Megalitres per day
maOD	Metres above ordnance datum
Q95	The flow of a river which is exceeded on average for 95% of the time.
RA	Recent Actual (scenario)
RSA	Restoring Sustainable Abstraction
RBMP	River Basin Management Plans
SAC	Special Areas of Conservation
SPA	Special Protection Areas
SSSI	Sites of Special Scientific Interest
SW	Surface water
UKTAG	United Kingdom's Technical Advisory Group
WB	Water body
WFD	Water Framework Directive
WRGIS	Water Resources Geographical Information System

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