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# The Kent Catchment Abstraction Management Strategy

March 2004



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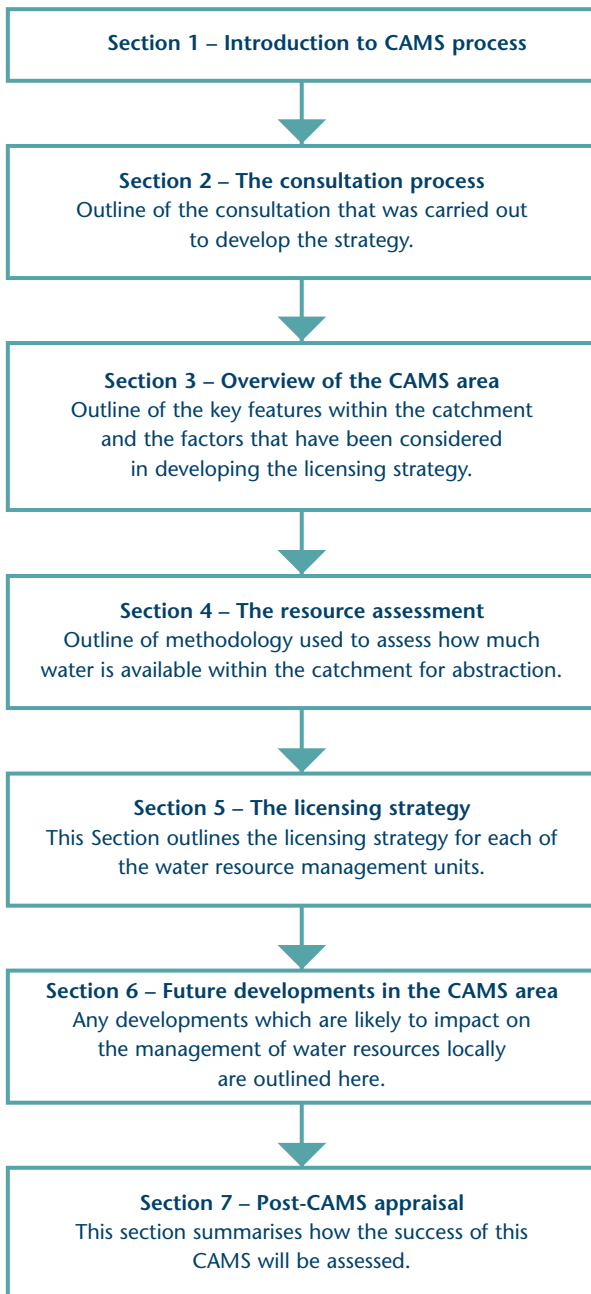
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# Document Overview



This document sets out the licensing strategy for the River Kent CAMS area. It should be read in conjunction with *Managing Water Abstraction*<sup>1</sup>, which provides additional information on the CAMS and licensing processes.

This strategy provides an indication of whether new abstraction licences are likely to be available and the conditions that should be expected on licences. It has been developed with the help of local stakeholders who have been given the opportunity to discuss and influence this licensing strategy for managing our water resources. A consultation document was published in September 2003 containing the proposed strategy for dealing with water resources in the Kent CAMS area. Responses to this document were taken into account in finalising the strategy and producing this document.

Water plays a vital role in the Kent catchment; the rivers support a diverse ecology and complement the superb surrounding countryside which attracts many visitors each year. Much of the catchment is recognised as being of international importance, having been designated as a candidate Special Area of Conservation (cSAC) for several species.

Water is used for industrial and agricultural abstraction and public supply, and for supporting recreation, such as angling and canoeing. Abstraction is on a small scale throughout the catchment.

The document is split into seven sections relating to the CAMS process. Sections 1 to 4 outline the CAMS process, and Section 5 outlines the licensing strategy for the Kent CAMS area. Section 6 highlights the future developments in the CAMS area and Section 7 outlines the post-CAMS appraisal.

<sup>1</sup> *Managing Water Abstraction: The Catchment Abstraction Management Strategy Process*, Environment Agency (2002).

# Introduction

The vision for the Kent CAMS is to manage water resources within the catchment in a sustainable manner in order to balance the needs of water users with those of the environment to benefit the whole community.

Catchment Abstraction Management Strategies (CAMS) are strategies for the management of water resources at a local level. They will make more information on water resources and licensing practice publicly available and allow the balance between the needs of abstractors, other water users and the aquatic environment to be considered in consultation with the local community and interested parties.

CAMS are also the mechanism for managing time-limited licences by determining whether they should be renewed and, if so, on what terms.

*Managing Water Abstraction: The Catchment Abstraction Management Strategy Process*<sup>2</sup> is the national document that supports the development of CAMS at a local level. It sets out the national policy and the regulatory framework within which CAMS operate, describes the process of developing CAMS and provides information on the structure and content of CAMS documents. This Catchment Abstraction Management Strategy should be read in conjunction with *Managing Water Abstraction*.

This Kent CAMS document gives an assessment of the water resources available in the catchment and sets out the strategy for managing the use of these resources now and in the future. It also identifies further monitoring that will be required for the next six years for the review of the Kent CAMS starting in 2008.

A *technical document*<sup>3</sup> (final version) for the Kent CAMS has been produced which provides the detailed technical information on which the development of the strategy has been based. If you wish to receive this document on CD-ROM, please contact us at the address below. A hard-copy version of the document is also available for viewing at the same office.

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<sup>2</sup> See footnote 1

<sup>3</sup> *The Kent CAMS Technical Document: Supporting the Kent CAMS Document*, Environment Agency (March 2004)

# Consultation on the Kent CAMS

Consultation is an integral part of the CAMS process. It is important because it ensures that the CAMS process is as transparent as possible and gives everyone the opportunity to get involved. For the Environment Agency (referred to as the Agency from this point on) to manage water resources in a catchment effectively and sustainably, it is important that as much information as possible is collated on water needs and uses. Comments and suggestions have been gathered during the early stages of development of this strategy through various pre-consultation activities. These were:

- awareness-raising leaflet;
- CAMS Stakeholder Group.

The leaflet was distributed in September 2002. Its aim was to raise awareness of the development of the CAMS in the local area and it also invited anyone with an interest to send in written comments, providing information, views and suggestions for consideration during the early development of the CAMS.

A Stakeholder Group was set up for the Kent CAMS. The role of the Stakeholder Group was to represent the key interests in the catchment and to help identify issues of local significance, provide views on proposals and to consider the likely implications of different strategy options. The members of the Kent CAMS Stakeholder Group and the interests they represented are as follows:

- Ian Winfield            Chair
- Rob Arrowsmith      Canals/waterways
- Hal Bagot              Agriculture
- David Brockbank    Hydropower generation
- Richard Duffell      Industrial abstraction
- Alan Hutton          Angling
- Helen Johnston      Conservation
- Helen Lancaster     Rural land and business owners
- Anna Miller            Local authority

<sup>4</sup> See footnote 3

There was also a formal consultation on the Kent CAMS through a consultation document distributed in September 2003. The responses received were analysed and taken into account as the strategy was finalised. This CAMS document now sets out the final strategy that has been developed for the Kent CAMS area.

We received 19 responses to the consultation document. In general, the respondents agreed with the proposed strategy. There were a number of issues raised, which were considered in finalising the strategy and the production of this document. These responses were also discussed at the final Stakeholder Group meeting. The Statement of Response to the Kent CAMS consultation document and minutes of all of the Stakeholder Group meetings can be found in the *technical document*<sup>4</sup> (final version), or a hard copy can be obtained from your CAMS officer (contact details in Section 1).

# The Kent CAMS area

## 3.1 Surface water and land use features

The Kent CAMS area covers approximately 550km<sup>2</sup>. In addition to the River Kent, the CAMS catchment includes the Rivers Sprint, Mint, Winster, Gilpin, and Bela. There are several tarns and small reservoirs within the catchment including Dubbs Reservoir, Kentmere Reservoir, Kentmere Tarn and Killington Reservoir. The Lancaster Canal originates within the catchment.

The upper reaches of the River Kent and its tributaries including the River Mint and Sprint rise within the south eastern fells of the Lake District. They tend to have steep gradients and are fast flowing. The river levels rise and fall rapidly in response to rainfall patterns. The area is predominantly rural, with sheep farming being the major land use. Industry has developed along the upper River Kent, taking advantage of the gradient of the river as a source of power.

The lower Kent covers both urban and rural areas. It flows through Burneside and the town of Kendal before continuing on through lowland farmland and parkland, into the Kent Estuary and Morecambe Bay. Historically, flooding has been an issue in Kendal, so major flood defence works have been carried out through the town.

The Rivers Winster and Gilpin rise in the lower fells in the south of the Lake District. The area is rural, with sheep and dairy farming being the predominant land use. Much of the lower agricultural land in the Lyth Valley has been drained extensively to improve its quality for agriculture. These drains enter the lower reaches of the Winster and Gilpin, which were modified at the end of the 19<sup>th</sup> century to cope with higher flows. The rivers enter the estuary directly, and are not tributaries of the River Kent. Both these rivers are entirely within the Lake District National Park.

The main tributaries of the River Bela (Peasey Beck, Stainton Beck and Lupton Beck) originate in the

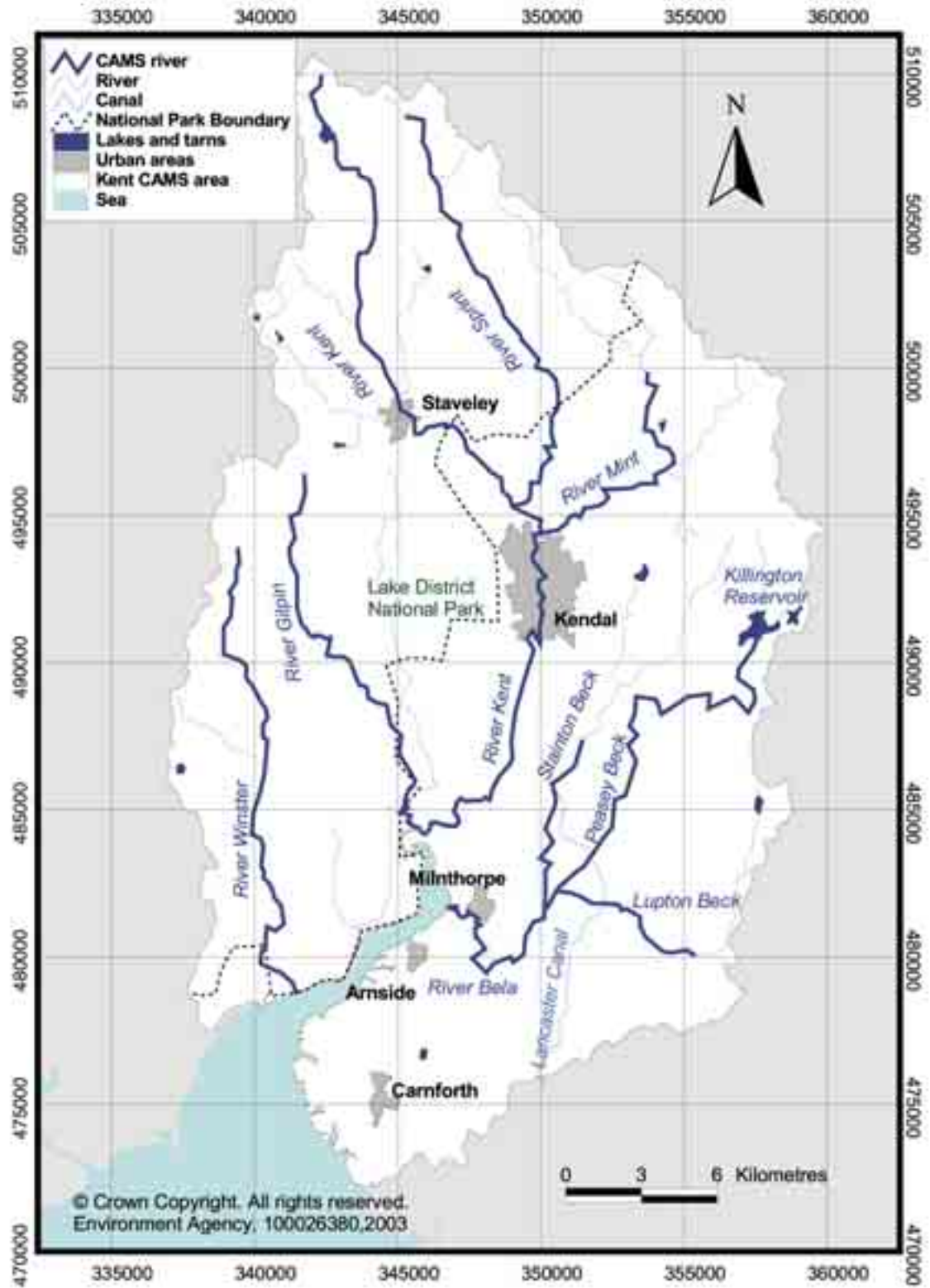
foothills of the Howgill Fells. Again, the area is predominantly rural with sheep and dairy farming being the main land uses. Historically, mills have used the lower reaches of the river at Milnthorpe and Beetham for industrial purposes, although only three remain today. Water for the Lancaster Canal comes from the tributaries of the River Bela and releases are made from Killington Reservoir for the canal's water supply. The canal was built between 1792 and 1819 with the intention to link Kendal and Wigan as a transport route for coal and other industrial materials. The stretch of canal north of Tewitfield Locks has been closed since the M6 crossed the route in 1968. However, there are plans to re-open the northern reaches of the canal to Kendal in the future.

The scenic nature of the catchment means that tourism is very important to the area. Much of the CAMS catchment is within the Lake District National Park and the towns and villages of Kendal, Staveley, Burneside and Milnthorpe benefit economically from their proximity to the park.

**Map 1** shows an overview of the surface water features in the Kent CAMS area. The watercourses which have been included in the CAMS assessment have been highlighted.



River Kent at Levens





### 3.2 Geology and hydrogeology

As illustrated in **Figure 1**, the Kent catchment is situated on the south eastern flank of the Lake District dome, the core of which is formed by volcanic and low-grade metamorphic (slatey) rocks of Ordovician age, which are overlain by a wide tract of Silurian rocks comprising slates and grits. These very old “basement beds” are considered to be effectively impermeable, except for some limited groundwater storage and movement in shallow fractured/weathered zones. Although classed as non-aquifer, they do support some small-scale private water supplies and abstractions, predominantly springs.

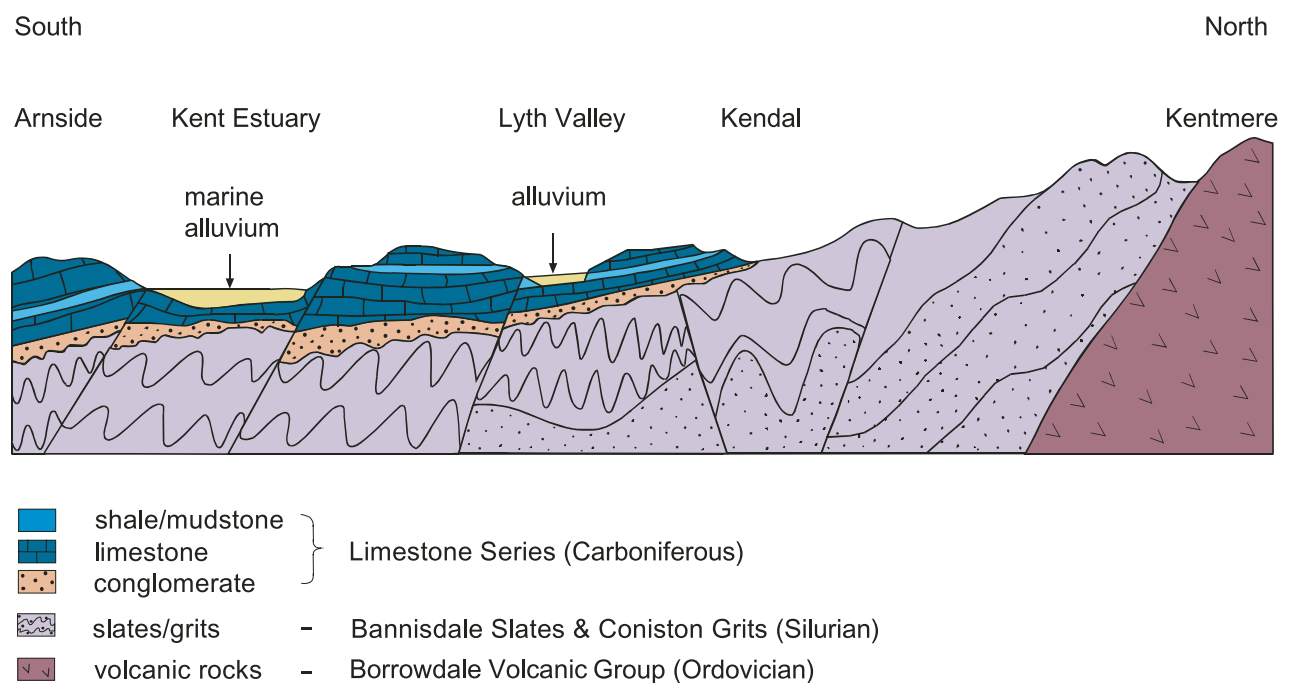
Carboniferous Limestone Series occur from Kendal southwards; these are made up of thick limestone layers interbedded with low-permeability shales and mudstones. Groundwater flows through the limestone via fissures and solution cavities, and as such is complex and rapid.

The geomorphology of the area has been strongly influenced by glaciation. The pre-Carboniferous Lakeland Fells are essentially drift-free, with the exception of localised alluvial deposits and glacial till in the deep incised valley bottoms, scree development on valley sides and some peat on the high ground. Moving towards the coast, the lower lying Carboniferous rocks are largely covered by alluvium.

Where thick permeable gravels are present the drift acts as minor aquifers which, as well as providing baseflow to watercourses, are exploited for industrial purposes, for example around Mintsfeet in Kendal.

Owing to the presence of only a few minor aquifers in the Kent catchment, the area has not been considered as a groundwater management unit (GWMU) for this CAMS.

**Figure 1** | Geological cross-section through the Kent CAMS area



### 3.3 Hydrological monitoring

A hydrometric network of rainfall and river flow gauging stations monitors water resources in the catchment. Data from this network are used on a routine basis for drought and flood monitoring and water resource investigations, and have also been used to assess resource availability in this CAMS. It is vital to maintain accurate long-term river flow records for successful water resources management.

The catchment is served by seven river flow gauging stations (**Table 1**). These stations measure river level and calculate flow every 15 minutes and record the data on the Agency’s hydrometric archive. (**Figure 2** shows Beetham gauging station on the River Bela). To supplement gauging station records, flow measurements are carried out at the sites on a monthly basis. There are also a number of temporary sites and spot measurements within the catchment to supplement coverage.

**Table 1** | Gauging stations in the Kent Catchment

Site Name	River	Grid Reference
Bowston	River Kent	SD 4993 9652
Sprint Mill	River Sprint	SD 5147 9610
Mint Bridge	River Mint	SD 5241 9447
Victoria Bridge	River Kent	SD 5181 9307
Sedgwick	River Kent	SD 5088 8741
Beetham	River Bela	SD 4962 8057
Durham Bridge	River Gilpin	SD 4482 9011

Rainfall is measured via a network of raingauges, which are read on a daily basis by voluntary observers. Supporting this network are a number of automatic raingauges, which record rainfall to determine rainfall intensity. Most of these are monitored continuously, to give vital information for the Agency’s flood warning role. These raingauges form part of the Agency’s national rainfall network. Average annual rainfall throughout the Kent catchment ranges from 1186mm on the lowland areas to 2106mm on the High Fells.

**Figure 2** | Beetham Gauging Station, River Bela

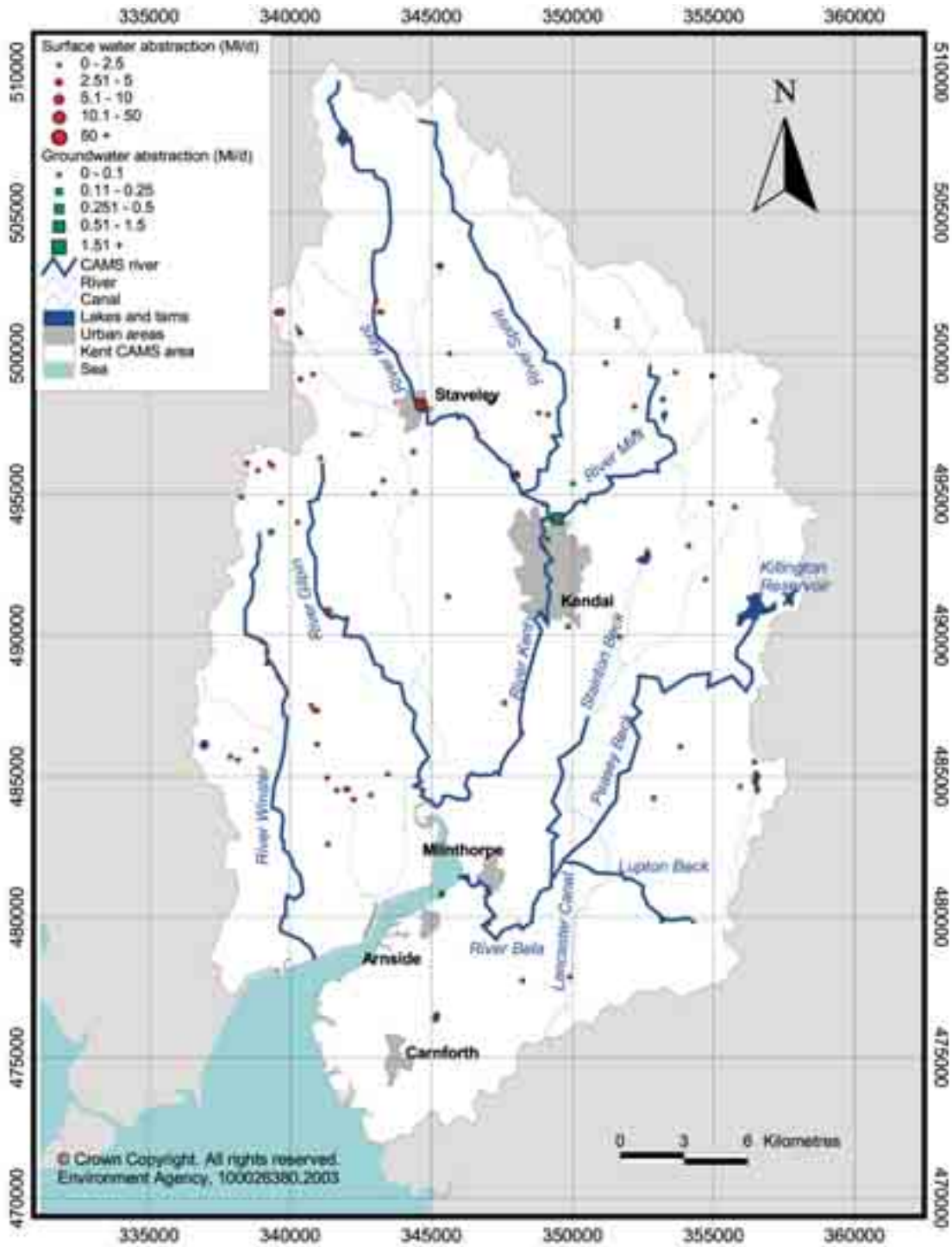


### 3.4 Major abstraction, transfers and discharges

Water is abstracted from surface water and a few groundwater sources in the Kent CAMS area for a variety of uses including industrial, agricultural and public water supply.

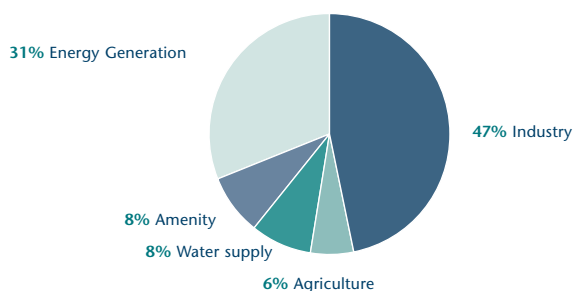
Map 2 illustrates the location and relative size of abstractions within the CAMS area. There are 28 licensed groundwater abstractions and 96 licensed surface water abstractions. The total volume of water licensed for abstraction is 42 megalitres per day (ML/d) used principally for industrial purposes and energy generation.

Map 2 Licensed abstractions in the Kent CAMS area



There are two small public water supply licences in the Kent CAMS area and a number of small domestic licences; together these comprise 8% of the full licensed water use in the catchment.

**Figure 3** illustrates the water usage in the catchment. Industrial licences comprise 47% of the full licensed water use. These are mostly located on the River Kent downstream of Bowston, around Kendal and on the lower River Bela around Beetham and Milnthorpe. Papermaking has occurred in the catchment for many years and still continues today.



**Figure 3** Licensed abstractions by use category

Traditionally, the rivers were used to generate power for industrial purposes. A small number of mills still exist in working order. The Heron Mill at Beetham is a museum of a corn mill in working condition. Kentmere Reservoir was built under a private Act of Parliament in 1845 by owners of the dams on the river at the time. It is now owned by a single mill owner who can use it to release water as required for their industrial processes. They have not released any water in recent years.

Although agriculture is one of the major land uses in the catchment, there is a relatively small volume of water abstracted for agricultural purposes. This is because the main agricultural practice is pastoral; dairy, cattle and sheep farming. The agricultural industry is undoubtedly undergoing a period of significant change, with considerable pressure for restructuring to maintain the viability of farming and the wider rural economy in the longer term. This process will include diversification and changes in farming practice, which may result in a change in demand for water resources.

There are also numerous abstractions for which a licence is not required. For example some parts of the catchment are not served by mains water supply and water users rely upon small, local sources. Exemptions from the general requirement for a licence are outlined in *Managing Water Abstraction, Annexe 2*<sup>5</sup>.

<sup>5</sup> See footnote 1

Water from the Kent CAMS area is used to supply the Lancaster Canal, which although not open for navigation within the catchment, is open south of Tewitfield. The canal has recently been linked at its southern end to the River Ribble in Preston, via the "Millennium Ribble Link". From here navigation is possible through to the River Douglas and then onto the national canal network.

There are three main abstractions to the canal in the Kent catchment, all of which are from tributaries of the River Bela. Peasey Beck has an artificial flow regime controlled by releases from Killington Reservoir, which was built for the canal. Water is then taken from Peasey Beck for the canal at Crooklands. A smaller quantity of water is also taken from Stainton and Lupton Becks. These abstractions by British Waterways are exempt from licensing under the Water Resources Act 1991.

There are a number of discharges into the Kent CAMS rivers, some from industrial processes, but the majority from wastewater treatment works (WwTW). Kendal WwTW into the lower River Kent is the largest discharge in the area. This is equivalent to a significant inter-catchment water transfer as the public water supply is provided from other CAMS areas. Effluent quality standards are determined by the Agency after discussion with the operator prior to a consent being granted, and effluent quality is regularly monitored.

### 3.5 Conservation and designations

The River Kent CAMS area includes a range of habitats of high conservation value. They vary from upland fells which are mainly within the Lake District National Park to lower coastal areas around Morecambe Bay, and also much of the Morecambe Bay Limestone Pavement outcroppings. They include terrestrial, aquatic and wetland sites.

The Natura 2000 network is a series of sites designated under the European Habitats and Birds Directive. These sites are afforded a high level of protection under European law. Two types of sites are designated; Special Protection Areas (SPAs) which provide protection to birds, eggs and habitats, and candidate Special Areas of Conservation (cSACs) which contribute to biodiversity by maintaining and restoring habitats and species of European importance. The majority of the reaches of the River Kent and tributaries are designated as a cSAC for populations of bullheads, white-clawed crayfish, freshwater pearl mussels and Ranunculus (water crowfoot) communities. Witherslack Mosses cSAC is designated for active raised bogs. A full list of areas designated within the Natura 2000 network is in **Table 2**.

In addition, Morecambe Bay is designated a Ramsar Site for its international importance as a habitat for wildfowl. The freshwater inputs to Morecambe Bay play an important part in the protection of the site but have not been considered in the context of CAMS. Under the Habitats Directive, assessments are being carried out to establish whether abstraction licences are having an adverse impact on the integrity of designated sites. Those licences found to be having an adverse impact may be altered or revoked to help improve the condition of the sites (see Section 5.2.1 for more details).

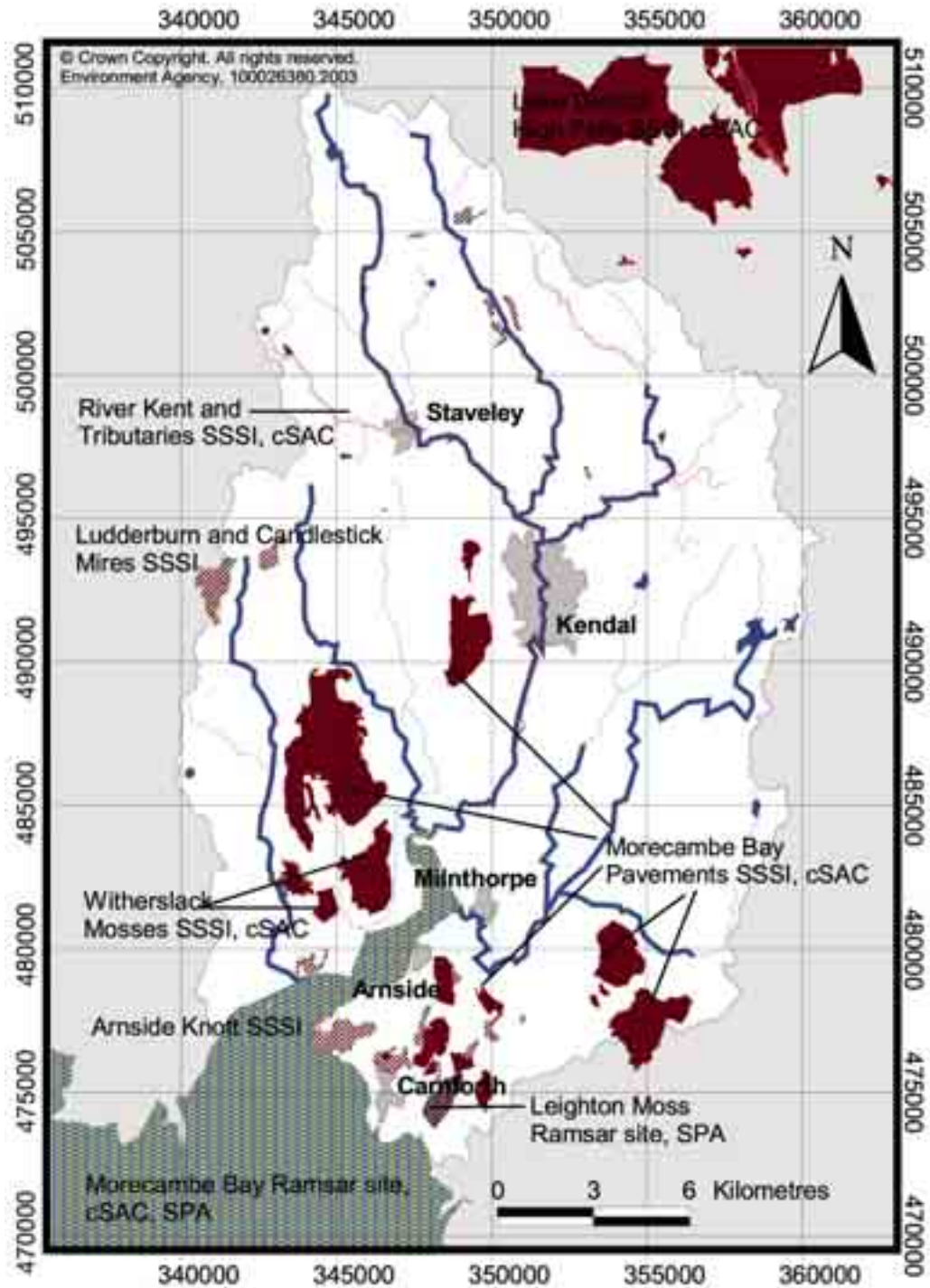
There are also a total of 35 Sites of Special Scientific Interest (SSSIs) which are of conservation importance on a national level within the Kent CAMS area. Some of these areas have obvious direct dependency on surface or groundwater such as Skelsmergh Tarn SSSI and wet areas such as Foulshaw Moss and Winstar Wetlands. **Map 3** shows the location of the SSSI and Natura 2000 sites.

Cumbria Wildlife Trust manages 15 nature reserves within the Kent CAMS area, which represent a wide variety of habitats found in Cumbria including peat bogs, limestone pavements and ancient woodland.

The Lake District National Park is renowned for its outstanding beauty and attracts large numbers of visitors each year. Conservation measures are undertaken in the park to preserve its diversity of landscape and wealth of wildlife. Part of the catchment is also within the Lake District Environmentally Sensitive Area (ESA). One of the primary aims of an ESA is to support the continuation of traditional farming methods, which have created or protected the distinctive landscape.

**Table 2** | Areas designated within the Natura 2000 Network in the Kent CAMS area

Site Name	
River Kent and Tributaries	cSAC
Witherslack Mosses	cSAC
Morecambe Bay	SPA/cSAC/Ramsar site
Morecambe Bay Pavements	cSAC
Lake District High Fells	cSAC
Leighton Moss	SPA



## 3.6 Ecology and fisheries

The Kent CAMS area includes a wide range of different aquatic habitats. Fast-flowing streams run through the upland areas, draining the high Lakeland Fells. The lower reaches of the rivers Kent and Bela are typical meandering slower-flowing lowland rivers. There are a number of small, still waterbodies, including natural upland tarns and reservoirs. Witherslack Mosses cSAC is an area of raised active peat bog. The water quality of rivers and still water in the majority of the Kent CAMS area is good (see Section 3.8).

The importance and diversity of ecology and fisheries in the Kent CAMS area is reflected by the variety of different areas of conservation importance (see Section 3.5). The rivers in the Kent CAMS area support populations of white-clawed crayfish, pearl mussels, otters and other species important on local, national and international levels.

The rivers in the Kent CAMS area are generally of high quality for salmon and sea trout. The River Kent is the most productive catchment in South Cumbria for salmon, and the existing population is thought to be almost at full capacity for the river. Bullheads are also among the designated species in the River Kent and Tributaries cSAC. The Rivers Winster and Gilpin also support good fish populations.

The natural weir at Beetham on the River Bela was raised in height during the Industrial Revolution which was a barrier to the passage of migrating fish. In the 1980s a fish pass was constructed in this weir and subsequently populations have increased in abundance and geographic range. Fish migration through Lupton Beck to areas suitable for spawning is impeded by weirs upstream of the canal crossing. However, proposed improvements to fish passage at these structures are currently being discussed. Peasey Beck is impacted by the artificial flow regime that results in low flows and siltation of the gravels.

The Lancaster Canal supports good fisheries for bream, carp, roach, tench, ruff, pike and eels. There are also a number of small lakes and reservoirs which support coarse and trout fisheries.

Localised habitat quality problems are thought to be amongst the most significant issues for the success of fish in the area.

## 3.7 Recreation and tourism

Tourism and recreation are vital to the economy of the Kent CAMS area. The beautiful scenery, picturesque towns and villages, cultural heritage and wide variety of outdoor activities attract many visitors each year. Hill walking is a particular attraction of the Lake District National Park, and there are a number of fells within the Kent CAMS area which are popular amongst walkers, a prime example being the fells of the "Kentmere Round".

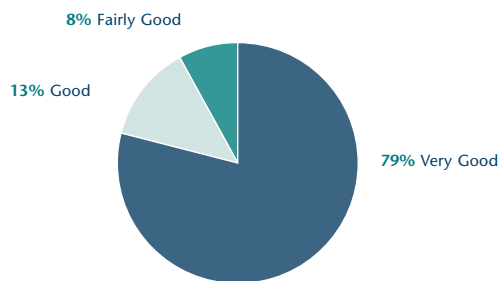
Bankside recreation in the Kent CAMS area includes angling for trout, sea trout and salmon, with stretches of the River Kent, in particular, being popular. Local communities and visitors to the area also use the river banks for walking, horse riding and birdwatching.

Canoeing is popular especially on the main River Kent and at high flows on the tributaries. Killington Reservoir is used for many water sports including sailing and windsurfing. Swimming and paddling are popular in many of the rivers in the area during the summer months; Stramongate Weir in Kendal is a particularly favoured spot.

### 3.8 Water quality

The Water Resources Act 1991 conferred a general duty on the Agency to maintain and improve river water quality for the benefit of present and future generations. The purpose of the General Quality Assessment (GQA) scheme is to provide a broad snapshot of river quality across England and Wales. It is a measure of the general state of river water quality, and results are divided into six grades representing “very good” to “bad” water quality.

The percentage of surface water in the Kent CAMS area in each of the water quality classes is summarised in **Figure 4**.



**Figure 4** Percentage of surface waters in each water quality class using data from 1999 to 2001 for the Kent CAMS area



River Winster

Due to the nature and land use of the Kent catchment, the majority of pollution incidents impacting on water quality are of agricultural origin. Incidents often correspond to periods of more intense agricultural activity such as silaging and sheep dipping or to periods of slurry spreading. Other impacts from industrial practice or due to construction work are more common in the urban areas of the catchment such as Kendal.

The Bela system, including St Sunday’s Beck, Peasey Beck and Lupton Beck has the added possibility of pollution from spillages on the M6 during road traffic accidents. Lupton Beck has limestone geology. Therefore, incidents associated with contaminated groundwater could potentially result in contamination entering streams many miles from the actual pollution source.



# Resource assessment and resource availability status

## 4.1 Introduction

To manage water resources effectively, we need to understand how much water is available and where it is located. This is achieved by undertaking a resource assessment, covering both surface water and groundwater.

Water is used for a number of different purposes, the principal categories being general agriculture, spray irrigation, industrial use, power generation and water supply. For each different use, the amount of water that is returned to the water environment close to where the water was abstracted may vary considerably. Where this loss is high, the Agency considers the abstraction to be consumptive. This may restrict the availability of water for these purposes, unless a significant proportion of the water abstracted is returned to the water course close to the point of abstraction.

To easily provide information on the availability of water resources within a catchment that may be used for consumptive purposes, a classification system

has been developed. This “resource availability status” indicates the relative balance between committed and available resources, showing whether licences are likely to be available and highlighting areas where abstraction needs to be reduced. This does not replace the need for the licence determination process which is applied to licence applications. More information on the determination process is given in Annex 2 of *Managing Water Abstraction*<sup>6</sup>.

There are four categories of resource availability status, as shown in **Table 3**.

So that water resources are assessed consistently in similar situations, a framework for resource assessment and management to be applied in all CAMS areas has been developed.

This framework involves the development of an understanding of the water resources of the CAMS area and assessment of the surface water and groundwater resources. These results are integrated to define the final resource availability status of different units within the CAMS area.

**Table 3** | Resource availability status categories

Indicative resource availability status	Definition	Colour coding for illustration on maps
Water available	Water likely to be available at all flows including low flows. Restrictions may apply.	Blue
No water available	No water available for further licensing at low flows although water may be available at higher flows with appropriate restrictions.	Yellow
Over-licensed	Current actual abstraction is resulting in no water available at low flows. If existing licences were used to their full allocation they would have the potential to cause unacceptable environmental impact at low flows. Water may be available at high flows with appropriate restrictions.	Orange
Over-abstracted	Existing abstraction is causing unacceptable environmental impact at low flows. Water may still be available at high flows with appropriate restrictions.	Red

<sup>6</sup> See footnote 1

Within and between catchments there are variations in characteristics. In order to measure, manage and regulate effectively, we need to break catchments down into smaller areas, recognising similarities in characteristics. In the resource assessment for CAMS, in areas where groundwater resources are significant, groundwater management units (GWMUs) are defined. For surface water, “assessment points” (APs) are located on the river network. These river APs and GWMUs are the focus of resource assessment and abstraction licensing.

**Map 4** shows the river APs that have been defined for the Kent CAMS. Further details on how these were defined are provided in the *technical document*<sup>7</sup> (final version) for the Kent CAMS. There are no major aquifers in the Kent CAMS area so no GWMUs have been defined.

**Map 4** | Kent CAMS river assessment points



<sup>7</sup> See footnote 3

## 4.2 Resource assessment of groundwater management units (GWMU)

For the groundwater resource assessment, various tests are applied to each unit to determine the resource availability status. These tests include examining the balance between recharge to the unit and abstraction from it, and the impact of abstraction on summer outflows from the unit.

Due to the absence of any major aquifers in the Kent CAMS catchment, no groundwater resource assessments were conducted. Groundwater abstractions were assessed however, within the surface water resource assessment, for their impact on river flow.

## 4.3 Resource assessment of river assessment points

The surface water resource assessment requires the definition of “ecological river flow objectives”. These are based on the sensitivity of the local ecology to flow variations (i.e. their vulnerability to abstraction impacts). It also takes account of other flow needs. These objectives represent the minimum flow that we are aiming to protect. This then affects the amount of water that is available for abstraction.

These ecological river flow objectives are developed by giving “environmental weighting” bands to each reach, representing their sensitivity to abstraction. These are then described as Very High (VH), High (H), Moderate (M), Low (L) or Very Low (VL). For further information about these environmental weighting bands refer to the *technical documents*<sup>8</sup> (final version).

**Map 5** and **Table 4** show the environmental weighting bands for each assessment point in the Kent CAMS area.

These ecological river flow objectives are then compared with a scenario flow which assumes that all licences are being fully utilised (i.e. the full licensed quantity is being abstracted). This comparison reveals a surplus, balance or deficit. The size of the surplus/deficit corresponds to a resource availability status for the unit.

The surface water resource availability classification gives an indication of whether new licences will be available from the river or whether some recovery of resources is required. However, there are significant variations in flow throughout the year. A classification

of “over-licensed” or “over-abstracted” generally indicates that no new licences will be granted. However, this applies only at times of low flow. During periods when flows are higher, there may be some water available for abstraction. The classification is, therefore, really a classification of resource availability at low flow.

Abstraction licences are sometimes managed in order to ensure this flow variability is maintained, by the use of “hands-off flow” conditions. These are conditions on licences that require abstraction to cease (or reduce) when the flow in the river falls below a specified level. Therefore, when river flows are above this hands-off flow, abstraction can take place but when flows are below this, no abstraction (or reduced abstraction) can occur. Low flows will occur more frequently during the summer months.

In order to maximise abstraction while maintaining the variability of flow (required for many aquatic species), a tiered system of hands-off flows can be applied. Licences are generally granted with the lowest hands-off flow possible on a first-come-first-served basis. As more licences are granted, the hands-off flow must be increased to maintain sustainable flows in the river.

For potential applicants for new abstraction licences, it is therefore important to know not only the likelihood of obtaining a licence, but also the reliability of a licence if granted with a hands-off flow condition. Within the CAMS resource assessment, reliability is expressed as a percentage. This percentage indicates the minimum amount of time over the long term that the scenario flow exceeds the river flow objective, therefore allowing abstraction to take place.

The resource assessments for both surface water and groundwater use a scenario which assumes that all licences are being fully utilised; that is, the full authorised volume is being abstracted. However, many licences are not used fully, and therefore, in reality, the resource availability can be different. If the result of a resource assessment is “over-licensed”, data of actual abstraction is then used to establish whether the status is “over-abstracted” (actual flows are lower than river flow objectives). “Over-abstracted” represents abstraction that is already unsustainable whereas “over-licensed” represents the potential for damage should the full licensed amount be abstracted.

<sup>8</sup> See footnote 3

Map 5

Kent CAMS environmental weighting bands

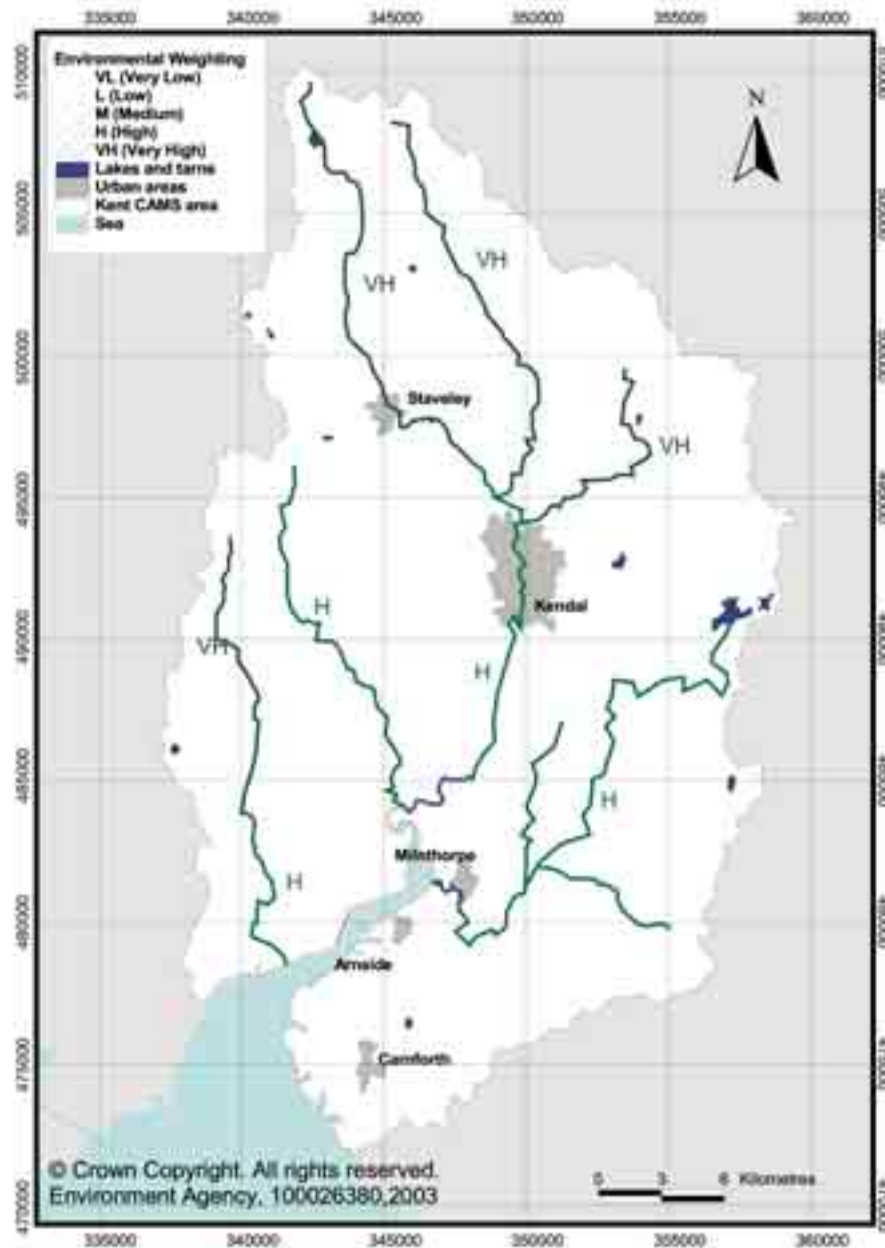


Table 4

Kent CAMS environmental weighting bands

Assessment Point Number	Name	Environmental Weighting Bands
1	River Kent at Bowston	VH
2	River Sprint at Sprint Mill	VH
3	River Mint at Mint Bridge	VH
4	River Kent at Levens Bridge	H
5	River Gilpin at Gilpin Bridge	H
6	River Bela at Beetham	H
7	River Winster at Winster Sluices	H
8	River Winster at Helton Tarn	VH

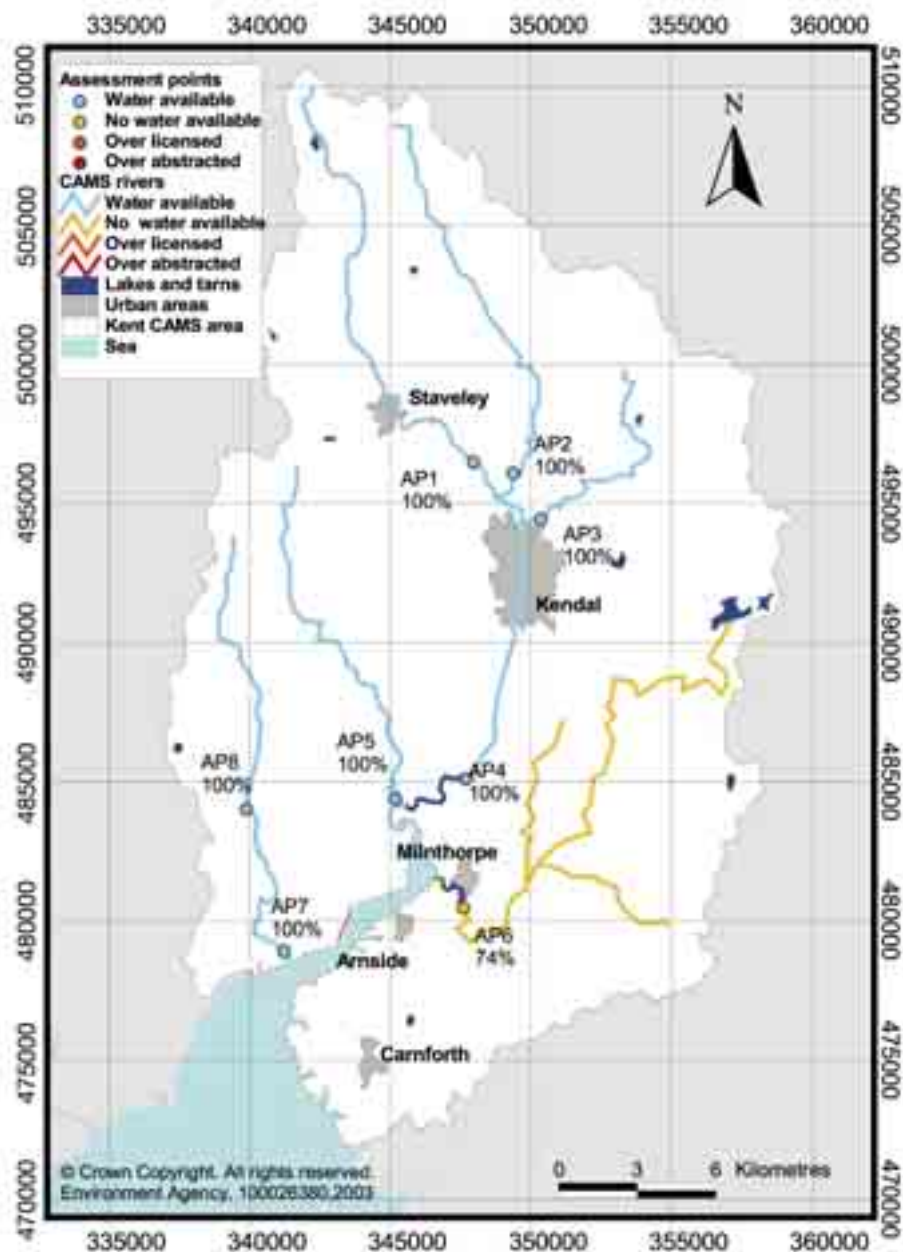
## 4.4 Integration of surface water and groundwater resource assessments

The resource availability results for river reach and groundwater management unit assessments are integrated and iterations made, where appropriate.

As no groundwater resource assessment was conducted for the Kent CAMS, integration of surface water and groundwater resource assessments was not necessary. Where groundwater abstractions were considered to have an impact on surface water streams, the impact has been taken into account in the assessment.

Map 6 shows the resource availability status of river reaches in the Kent CAMS area. For further information on the resource availability results for surface water please refer to the *technical document*<sup>9</sup> (final version) for the Kent CAMS.

Map 6 | Kent CAMS resource availability status



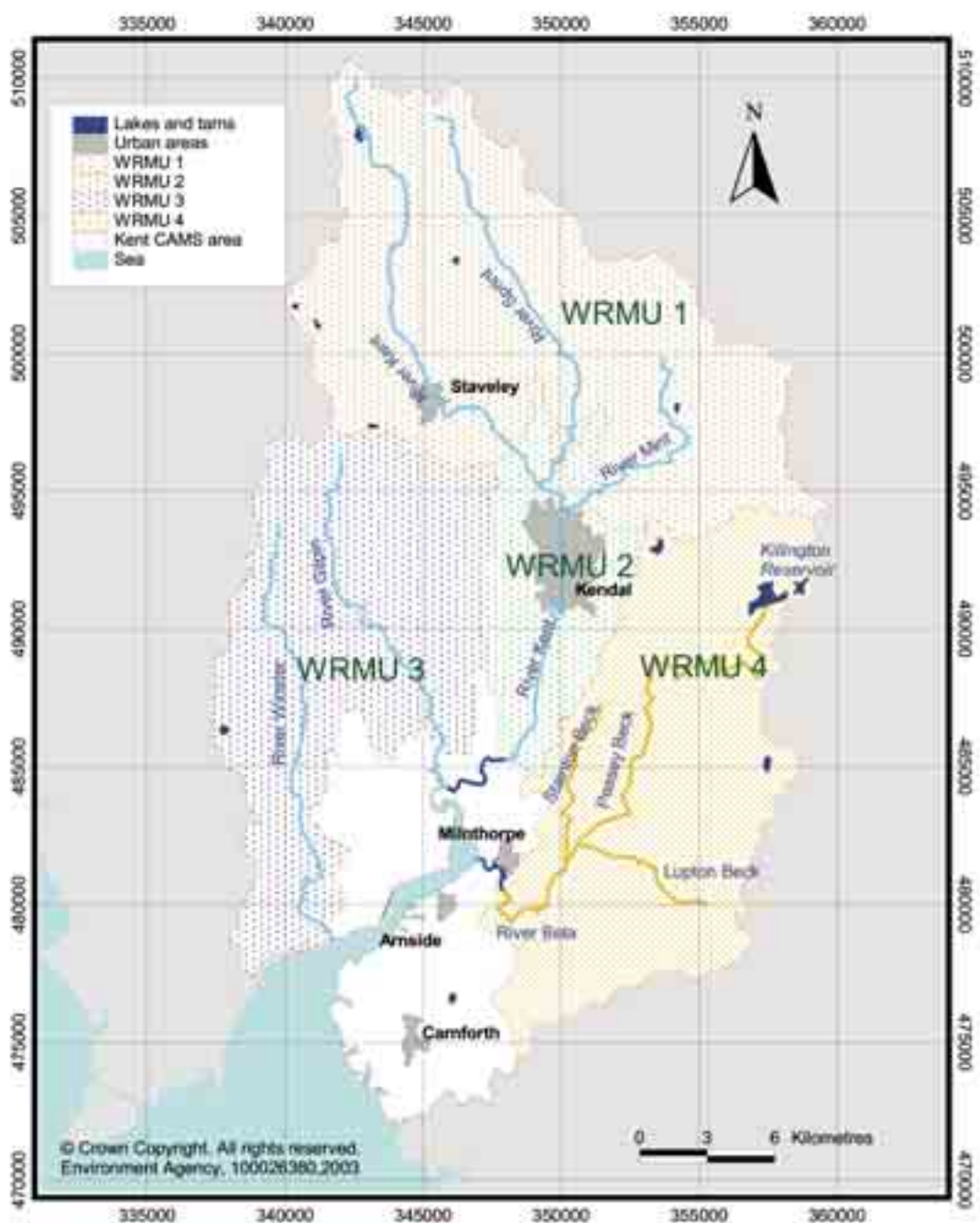
<sup>9</sup> See footnote 3

## 4.5 Summary of the resource assessment for the water resource management units (WRMU)

The following sections provide a brief overview of the resource availability for each WRMU. Resource assessment is restricted to the main rivers of the Kent CAMS area. Assessments have not been carried out on minor aquifers or tidal reaches.

Within the Kent CAMS area the surface water assessment points with a similar resource availability and local issues were grouped, giving four WRMUs (Map 7).

Map 7 | Kent CAMS Water Resource Management Units (WRMUs)



### 4.5.1 WRMU 1: River Kent upstream of Bowston, River Mint and River Sprint

WRMU 1 includes the upper reaches of the River Kent (AP1) the River Mint (AP2) and the River Sprint (AP3). These were grouped together because they all have environmental weighting bands of “Very High”. They also have similar resource availability status, location and upland character. All the rivers are independent of each other, with the Rivers Mint and Sprint joining the River Kent between Burneside and Mintsfeet, just north of Kendal.

Map 7 shows the location of WRMU 1. Figures 5-7 illustrate the balance between the amount of water required for the environment, the amount of water already licensed and the amount available at low flows at the assessment points in WRMU 1.

There are 39 licensed abstractions within WRMU 1, which are used for public and private water supplies, hydropower generation, agriculture and commercial and amenity purposes. No further water is available for abstraction at low flows from AP1. There is a small amount of water available for further abstraction at AP 2 and AP3 during low flows.

A large proportion of the Rivers Kent, Sprint and Mint within WRMU 1 are designated as part of the River Kent and Tributaries cSAC. There are also several SSSIs in WRMU 1 and of these, Skelsmergh Tarn SSSI and Browgill and Stockdale Becks SSSI are water-related. The majority of the catchment is within the Lake District National Park.

We do not believe that either of the SSSIs mentioned above is being adversely affected by abstraction. We are currently undertaking a Review of Consents as required by the Habitats Directive, to assess the impact of abstractions on the River Kent and Tributaries cSAC.

The scenic nature and landscape of the area means that tourism is of particular importance in WRMU 1.

The resource availability status of this unit is “water available”.

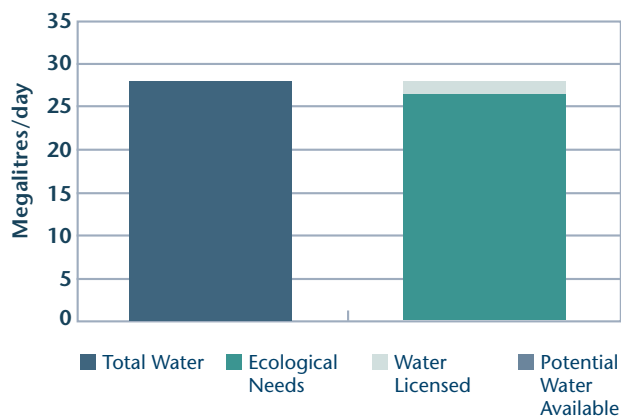


Figure 5 | Indicative resource availability at AP1 at low flows

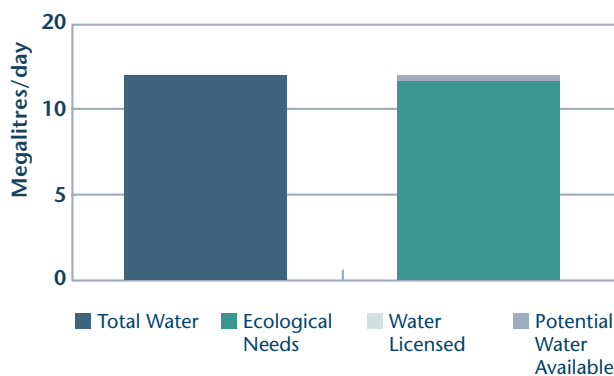


Figure 6 | Indicative resource availability at AP2 at low flows

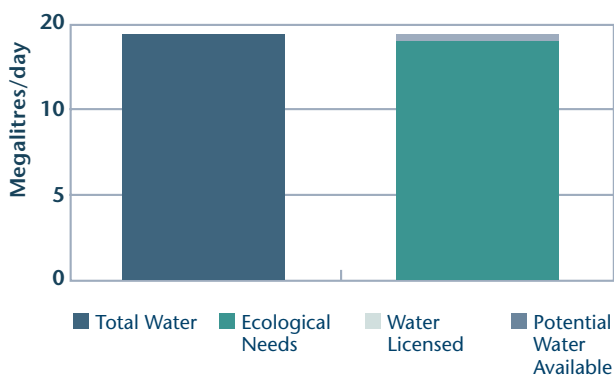
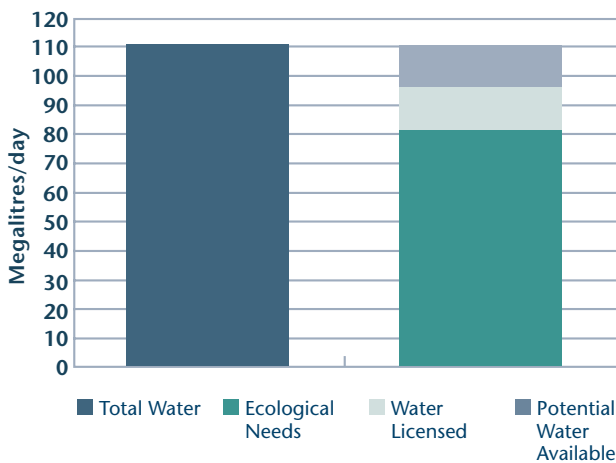


Figure 7 | Indicative resource availability at AP3 at low flows

### 4.5.2 WRMU 2: Lower River Kent

WRMU 2 contains the lower reaches of the River Kent (AP4) from Bowston to Levens Bridge, which is predominantly lowland in character. This reach has a “High” environmental weighting band.

**Map 7** illustrates the location of WRMU 2 and **Figure 8** illustrates the balance between the amount of water required for the environment, the amount of water already licensed and the amount available at low flows.



**Figure 8** Indicative resource availability at AP4 at low flows

There are 11 licensed abstractions within WRMU 2, which are used for industrial purposes (including paper making, laundry and dairy processes), public and private water supplies, agriculture (including fish farming) and amenity purposes. 14.7MI/day is available for further abstraction at low flows from the Lower Kent.

Public water supply in the Kent CAMS area mostly originates from Haweswater and Thirlmere Reservoirs, and is therefore imported into the catchment. After use, the water enters the catchment via the wastewater treatment works (WwTW), the main one of which is at Kendal. This adds approximately 14MI/day of treated water to the river system.

The majority of the River Kent within WRMU 2 is designated as part of the River Kent and Tributaries cSAC. Morecambe Bay Pavements cSAC is also partly within the WRMU although this site is not water-dependent. Part of the catchment is within the Lake District National Park and tourism is again a very important industry in the area.

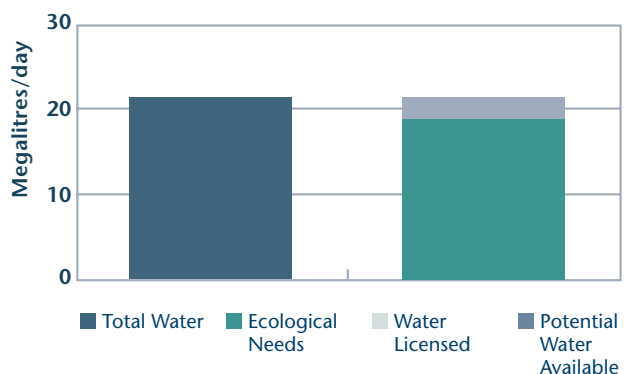
The resource availability status of this unit is “water available”.

### 4.5.3 WRMU 3: Rivers Winster and Gilpin

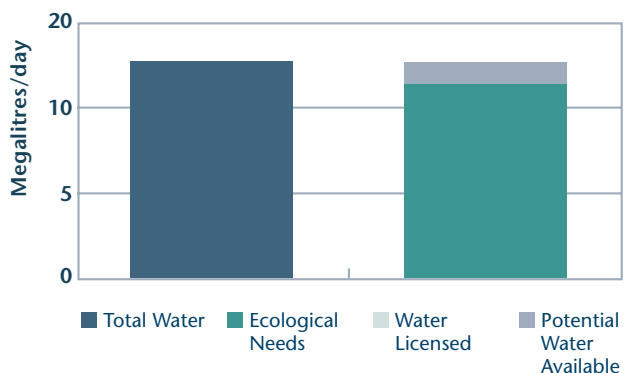
This WRMU consists of the entire lengths of the River Gilpin (AP5) and River Winster (APs 7 and 8) (see **Map 7**). Although their sources are in the foothills of the Lake District fells they are predominantly lowland in character. The environmental weighting band of the River Gilpin and lower River Winster is “High”, and the environmental weighting band of the upper River Winster is “Very High”. The unit is entirely within the Lake District National Park, although it does not contain any water-dependent cSACs or SSSIs.

There are 13 licensed abstractions within the WRMU, which are mainly for agriculture, domestic and amenity purposes. **Figures 9, 10 and 11** illustrate the balance between the amount of water required for the environment, the amount of water already licensed and the amount available at low flows (NB: the licensed abstractions tend to be very small or non-consumptive in this unit, which is why “Water Licensed” does not show on **Figures 9, 10 and 11**).

The resource availability status of this unit is “water available”.



**Figure 9** Indicative resource availability at AP5 at low flows



**Figure 10** Indicative resource availability at AP7 at low flows



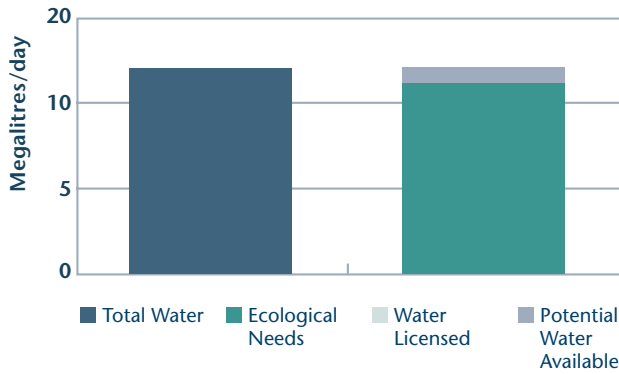


Figure 11 | Indicative resource availability at AP8 at low flows

available for licensing at higher flows. Water abstraction for canals is exempt from licensing at present. We have assessed water for the canal as if it were a licensed abstraction for resource assessment purposes so that as accurate a picture of the river as possible is presented.

Areas included within Morecambe Bay Pavements cSAC are situated within the WRMU, although they are not water-dependent. Hale Moss SSSI and Hale Moss Caves SSSI are within the WRMU; we do not believe that water abstraction is having an adverse effect on these sites.

The resource availability status of this unit is "no water available".

#### 4.5.4 WRMU 4: River Bela

This unit contains the entire length of the River Bela and its tributaries (AP6), which runs from the low Howgill fells and enters the estuary at Milnthorpe (see **Map 7**). Killington Reservoir is situated at the top of the catchment, and is used by British Waterways to supply water for the Lancaster Canal. This WRMU has been considered in isolation from the rest of the catchment in order to reflect the significance of the canal. AP6 has an environmental weighting band of "High".

There are 32 abstraction licences within the WRMU, which are used for paper making, agriculture, commercial and domestic purposes. **Figure 12** illustrates the total amount of water, the amount needed for the environment, and the amount already committed for abstraction. There is a deficit of 16MI/day of water at low flows at the assessment point, which reduces the amount of water available for environmental needs, although water is still

#### 4.5.5 Areas not included in the Water Resource Management Units

Water resource availability has been assessed for most areas within the Kent CAMS area, but the CAMS process does not require tidal waters or minor aquifers to be assessed. The following areas were not included:

- The tidal stretches of the catchment including tributaries, although local water resource requirements for the estuary will be assessed as part of our Habitats Directive duties.
- Upstream of Killington Reservoir.
- Groundwater has not been assessed for the Kent CAMS area as the catchment does not contain any major aquifers.

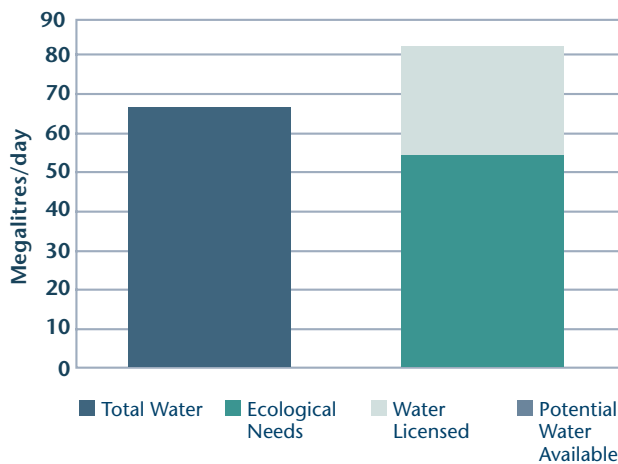


Figure 12 | Indicative resource availability across at AP6 at low flows

# Licensing strategy

## 5.1 Sustainability appraisal

A sustainability appraisal process has been developed to enable the Agency to take account of the costs and benefits in the production of CAMS. The process considers the government's four objectives of sustainable development, relating to environment, economics, society and resource use (see below). It uses a largely qualitative, proforma-based approach to consider what the resource availability status for each water resource management unit (WRMU) should or could be after each six-year cycle (Tier 1). This is undertaken for all units in all CAMS areas. It also allows the appraisal of options for recovering water resources, by taking into account the implications of different options on all aspects of sustainability (Tier 2). This is undertaken to determine the most sustainable options for the future management of the catchment including, where necessary, options for recovery of resources. More information on the sustainability appraisal process is provided in *Managing Water Abstraction: The Catchment Abstraction Management Strategy Process*<sup>10</sup>.

The sustainability appraisal of the Kent CAMS considered the impacts of a number of options for the management of water resources against;

- environmental criteria such as designated sites, non-designated sites, water quality, archaeology and heritage, and landscape and geomorphology;
- social criteria such as water company customers, angling, water-based recreation, bankside recreation, health and flood defence;
- economic criteria such as licensed abstractors, impacts on the wider economy, development opportunities, local strengths and disparities, and tourism;
- impacts on natural resources such as energy consumption, energy generation, water use, changes in land use, and waste and discharge.

<sup>10</sup> See footnote 1

<sup>11</sup> See footnote 3

<sup>12</sup> *Water Resources for the Future: A Strategy for the North West Region*, Environment Agency (2001) & *Water Resources for the Future: A Strategy for England and Wales*, Environment Agency (2001)

More details of the sustainability appraisal performed for the Kent CAMS can be found in the *technical document*<sup>11</sup> (final version) available from your CAMS Officer (for contact details see Section 1).

## 5.2 Catchment overview of licensing strategy

This section outlines elements of the final strategy that apply to the whole CAMS area. The Agency operates a rigorous enforcement policy and carries out regular inspections to ensure that licence holders are complying with the conditions of their licences. We are exploring options for reducing or revoking unused and underused licences throughout the CAMS area.

The Agency will continue to monitor all surface water units to increase our knowledge of flows throughout the catchment. Further fisheries and ecology monitoring is planned to ensure that there is sufficient information for environmental weighting assessment at the review of the Kent CAMS strategy in six years' time, and to monitor the impact of this strategy until then.

### 5.2.1 Links between the Kent CAMS and regional and national strategies

CAMS sit within a long-term framework provided by the Agency's national and regional water resources strategies *Water Resources for the Future*<sup>12</sup> published in 2001. The National Strategy defines a strategic framework for water resources management, including abstraction licensing, with a forward look of 25 years. It is based on the following key principles:

- Sustainable development: the idea of ensuring a better quality of life for everyone, now and for generations to come.

- The “twin-track” approach, which takes a balanced view, seeking the efficient use of water while recognising that additional abstraction may be necessary.
- Robustness to uncertainty and change (e.g. the ability to respond to climate change) – we must consider all the options, and adopt a flexible approach.
- The precautionary principle: where there is uncertainty about the consequences, decisions should be cautious, and we should seek to clarify the source of uncertainty. If there is a serious risk of environmental damage because of a proposed abstraction, the decision about that abstraction should ensure the environment is protected.

In addition to the National Water Resources Strategy, there are other national initiatives that have implications for the management of water in the Kent CAMS area. The national Restoring Sustainable Abstraction (RSA) programme catalogues sites that are affected or could be affected by abstraction, which includes Habitats Directive sites. Within the Kent CAMS area the following Habitats Directive sites are included in the catalogue:

- River Kent and Tributaries cSAC
- Witherslack Mosses cSAC
- Morecambe Bay Pavements cSAC
- Morecambe Bay SPA, cSAC
- Lake District High Fells cSAC
- Leighton Moss SPA

We are reviewing the impact of existing licences on the integrity of these sites as part of the ongoing Habitats Directive Review of Consents. If further investigation is required, we will contact each licence holder concerned at the appropriate stage in the process.

The Agency’s North West Water Resources Strategy considers how to meet regional needs for public water supply, industry and agriculture over the next 25 years in a sustainable manner.

## 5.2.2 CAMS and Drought

Droughts are prolonged periods of below average rainfall resulting in low river flows and/or low recharge of groundwater. Depending on the duration, intensity

and the area affected this may impose a significant strain on both water resources and the environment. Droughts are variable and relatively rare events and therefore considerable flexibility is required in their management.

The CAMS resource assessment uses river flow and groundwater data from the 1960s onwards (as available). This may include periods of drought, but does not necessarily include the worst events on record. The CAMS process looks at managing water resources in a range of conditions. However, it does not specifically address the management of drought situations.

Both the Water Company’s and the Agency produce specific drought plans which include a series of progressive actions to be taken as a drought is threatened, develops and abates. The Water Company’s drought plan sets out emergency measures that may be required in the event of a drought to reduce the risk to public water supply, for example, possible drought permits. The Agency’s drought plans document the arrangements for regulating the water companies, minimising environmental risk, and managing and co-ordinating drought activities. Further information about managing drought situations can be found in *Managing Water Abstraction*<sup>13</sup> and *the technical document*<sup>14</sup> (final version).

## 5.2.3 Licence Determination

*Managing Water Abstraction*<sup>15</sup> sets out a summary of who can apply for an abstraction licence, and how the Agency determines licence applications and impoundment licences. It also describes the circumstances in which a licence is not required. Refer to *Managing Water Abstraction*<sup>16</sup> (Annexe 2) for further information on exempt purposes.

The strategy outlined in this document will be achieved within the framework of the legislation for abstraction licensing; i.e. Water Resources Act 1991 and associated legislation. Any new applications that are within 3km of a Habitats Directive site will be required to demonstrate that they will not have a detrimental impact on the features of the protected site.

The strategy does not override the requirement to determine each licence application on its own merits. For example, it may not be possible to grant certain licences in areas with “water available” status due the need to safeguard local environmental interests and/or other abstractors.

<sup>13</sup> See footnote 1

<sup>14</sup> See footnote 3

<sup>15</sup> See footnote 1

<sup>16</sup> See footnote 1

### 5.2.4 Approach to time-limiting

Since 1 October 2001, our policy has been to issue new and varied licences with a time limit.

The common end date for the Kent CAMS is 31 March 2017. As this date approaches, licences will normally be issued for less than the normal 12 year period. However, the Agency also has the discretion to apply shorter time limits to licences and, in exceptional cases, permit longer durations, in accordance with our time-limiting policy.

Applications for renewals will be subject to the usual statutory application procedures. In any case, it will normally be dependent upon the applicant meeting three tests, as follows:

- continued justification of need;
- demonstration of efficient use of water;
- environmental sustainability.

Licence holders will be notified in advance as their licence reaches the expiry date, to allow them time to make an application for renewal, if required. If a licence is not likely to be renewed or will be renewed on significantly more restrictive terms, the Agency will aim to give six years' notice.

Applications to renew a licence should be submitted no less than three months before expiry to allow for determination of the application. However, contact should be made with the Agency earlier to allow for discussions, public notice advertising and a 28-day deposit period during which time representations may be made.

For further information on time-limiting, refer to *Managing Water Abstraction* (Section 5)<sup>17</sup>.

### 5.2.5 Approach to hands-off flow conditions

It is standard Agency practice to apply a flow condition to a new surface water abstraction using hands-off flow conditions or levels. These are conditions on licences that require abstraction to cease (or reduce) when the flow in the river falls below a specified amount.

Any proposed abstraction will need to be very small in relation to the flow in the river, or result in no net loss (even over a short river stretch), for a hands-off flow condition not to be included on the licence. The guiding principle is that the new abstraction must not adversely affect existing protected rights to abstract water, other lawful users and environmental interests.

Licences are generally granted with the lowest hands-

off flow possible on a first-come-first-served basis in order to safeguard existing rights. As more licences are granted, the hands-off flow must be increased to maintain sustainable flows in the river. In certain circumstances it may be necessary to use river levels rather than flows as a control.

The RAM Framework will be used to set hands-off flow conditions in order to manage the strategies outlined in Sections 5.4 and 5.5.

The principle of the RAM Framework is to allow abstraction, while meeting the ecological river flow objectives. It maintains the variability of flow by setting a series of hands-off flow conditions at low, moderate and high flows. Through the RAM Framework a small amount of water is available for unconstrained licensing. This is a small proportion of a low flow value (a flow exceeded for 95% of the time) for each assessment point. More details on the values used for the unconstrained portion of water available for licensing from each WRMU can be found in the *technical document*<sup>18</sup> (final version).

Wherever possible, the flow condition will be specified at an Agency flow gauging station. There are situations where this may not be feasible and applicants will be required to install and maintain a measuring device to appropriate British Standards. Applicants will be made aware of their responsibility and the conditions of the licence. Further guidance on hands-off flow conditions will be given to licence applicants.

### 5.2.6 Guidance on the conditions which may be applied to new groundwater abstractions

A resource assessment has not been carried out for groundwater in the Kent CAMS area as there are no major aquifers. However, groundwater abstractions in the catchment have been assessed for their impact on river flow. New applications for groundwater licences will continue to be assessed for their impact on other abstractors and river flows. Conditions will be applied to new groundwater abstraction licences dependent on the strategy for the individual WRMUs (see Sections 5.4 and 5.5 for more details) and will be appropriate to any potential impacts on river flows.

### 5.2.7 Water efficiency

The Agency will encourage all abstractors to employ water efficient methods to reduce demand. The Agency will continue to provide advice on this. These methods are largely a matter of common sense, thinking about ways water is used and then targeting

<sup>17</sup> See footnote 1

<sup>18</sup> See footnote 3

for reduction. Licence holders are notified that they will be required to demonstrate efficient use of water for the purpose of the renewal of time-limited licences.

## 5.3 Licensing strategy for individual WRMUs

As a result of the CAMS process, the same strategy has been developed for water resource management units 1, 2 and 3. This strategy is described below for these units, but it is important to remember that a different volume of water is available for licensing for each unit (see **Figures 5 – 11**). The licensing strategy proposed for the management of WRMU 4 is presented separately. The strategy for each WRMU is summarised in **Table 5**.

## 5.4 WRMU 1: the upper River Kent, River Mint and River Sprint; WRMU 2: the lower River Kent; WRMU 3: River Winster and River Gilpin

### 5.4.1 Resource availability and results of sustainability appraisal

All of the assessment points in WRMUs 1, 2 and 3 have a water resource availability status of “water available”. Assuming full use of licensed abstractions and discharges there is a surplus of water at all flows over and above the requirements of the ecological river flow objective for all of the assessment points in WRMUs 2 and 3. In WRMU 1 at the assessment points on the Rivers Mint and Sprint the ecological river flow objective is exceeded all of the time, however, at AP1 (River Kent at Bowston) the ecological river flow objective is met for 95% of the time. The reaches in WRMU 1 have a “Very High” sensitivity to changes in flow. The reaches of WRMUs 2 and 3 have “High” and “Very High” sensitivity to abstraction. Reaches within WRMUs 1 and 2 are designated as a cSAC under the Habitats Directive for water crowfoot communities, populations of bullhead, freshwater pearl mussels and white-clawed crayfish.

The strategy for the management of water resources in these WRMUs is to allow abstraction licensing to continue to allow for development opportunities. However hands-off flow conditions will be adopted on future consumptive abstractions using the RAM

Framework (see Section 5.2.5) in order to ensure that a resource availability status of “water available” is maintained. The most precautionary approach has been taken to limit the quantity of unconstrained abstraction to a minimum in this WRMU. This is because it has been designated under the Habitats Directive and also has a very high ecological sensitivity to abstraction. More details on the conditions likely to be applied in each WRMU can be found in the *technical document*<sup>19</sup> (final version).

### 5.4.2 Guidance on the assessment of new applications

The water availability status of the assessment points in WRMUs 1, 2 and 3 is “water available”. In order to implement this strategy:

- there is scope to grant new licences within these units, subject to normal determination criteria and local circumstances, in accordance with the Water Resources Act 1991 and associated legislation;
- hands-off flow conditions will be set to prevent the water resource availability status moving to “no water available”, and the RAM Framework will be used to set tiered restrictions to protect flow variability as appropriate;
- where hands-off flow conditions are not required (e.g. non-consumptive licences) new applications will be primarily determined by site-specific issues, such as derogation of existing licences and environmental protection.

As the number of licences granted increases each will be subject to more restrictive flow conditions and as a result the overall reliability of consumptive licences will be reduced.

As part of the current review of abstraction licences under the Habitats Directive, minimum flow requirements may be determined to protect the riverine habitat of the River Kent and Tributaries cSAC. This may have implications for current and future abstraction licensing in WRMUs 1 and 2.

### 5.4.3 Renewals and management of existing licences

There will be a presumption of the renewal of time-limited licences and time-limited variations in accordance with the Agency’s time-limiting policy and associated renewal criteria (Sections 5.2.4).

<sup>19</sup> See footnote 3

## 5.5 WRMU 4: the River Bela

### 5.5.1 Resource availability and results of sustainability appraisal

The River Bela has a water resource availability status of “no water available”. This river has been characterised as having a “High” sensitivity to changes in flow regime. Major demands on water from this WRMU include the existing Lancaster Canal network, but in the future may also include development of the Northern Reaches of the Lancaster Canal. Killington Reservoir and abstractions to the Lancaster Canal have exerted an artificial influence over the flows in the River Bela. The diversity of the macro-invertebrate community in the Bela implies that abstractions are only having a ‘slight’ impact on the ecology of this river. Fish populations have been affected by a number of weirs preventing migration to upland spawning areas. These weirs are being progressively fitted with fish passes. There are good and improving populations of salmon and sea trout in Stainton Beck. Migration up Lupton Beck however remains restricted at present so the impacts of abstraction on fish populations on this reach cannot be determined. It is thought that the artificial flow regime controlled by Killington Reservoir and abstraction to the canal may be impacting on fish populations in Peasey Beck.

The strategy developed for this WRMU, through the CAMS process, is to remain at “no water available”. This strategy allows further constrained licensing with hands-off flow conditions to ensure abstraction does not have a detrimental impact at low flows, and to maintain flow variability.

Discussions are currently ongoing between the Agency and British Waterways to develop a Memorandum of Understanding. This will establish a sustainable water resources management regime to meet the needs of both the Lancaster Canal and the wider water environment. This CAMS has emphasized the need for the development and successful operation of this agreement.

### 5.5.2 Guidance on the assessment of new applications

The strategy for this WRMU is that water is not available for new consumptive surface water licensed abstractions during low flow periods. In order to implement this strategy:

- some additional licences may be granted depending upon the abstraction volume, location and nature of the licence (e.g. small volumes, non-consumptive or winter only abstractions).

These licences will be subject to normal determination criteria and local circumstances, in accordance with the Water Resources Act 1991 and associated legislation;

- abstraction at low flows will be restricted appropriately using hands-off flow conditions as set by the RAM Framework (for further information please refer to the *technical document*<sup>20</sup> (final version);
- where hands-off flow conditions are not required (e.g. non-consumptive licences) new applications will be primarily determined by site-specific issues, such as derogation of existing licences and environmental protection.

As the number of licences granted increases they will be generally subject to more restrictive flow conditions and as a result the overall reliability of consumptive licences will be reduced.

### 5.5.3 Renewals and management of existing licences

There will be a presumption of the renewal of time-limited licences and time-limited variations in accordance with the Agency’s time-limiting policy and associated renewal criteria (Section 5.2.4).

## 5.6 Remaining CAMS areas not in a WRMU

Not all rivers were included in the resource assessment of the Kent CAMS, but the other areas were given some consideration through the resource assessment phase to ensure that there is a strategy for managing them.

### 5.6.1 Guidance on the assessment of new applications

Current licensing practice will apply to all areas not included in a WRMU. The Agency will retain the existing presumption that water is available for new licences, subject to normal determination criteria.

### 5.6.2 Renewals and management of existing licences

There will be a presumption of the renewal of time-limited licences and time-limited variations in accordance with the Agency’s policy and the associated renewal criteria together with any local considerations; however most of the existing licences within these areas are not time-limited.

<sup>20</sup> See footnote 3

Table 5 | Summary of the strategy for each WRMU

	WRMU1	WRMU2	WRMU3	WRMU4
<b>Current Status 2004</b>	“Water available”	“Water available”	“Water available”	“No water available”
<b>Target Status 2010</b>	“Water available”	“Water available”	“Water available”	“No water available”
<b>Adopt RAM Framework as a licensing tool</b>	✓	✓	✓	✓
	The RAM Framework will be used to set hands-off flow conditions. A small volume of water is available for unconstrained consumptive licensing at low flows at AP2 and AP3. No further water is available for unconstrained licensing at AP1 at low flows.	The RAM Framework will be used to set hands-off flow conditions. Some water is available for consumptive licensing at all flows.	The RAM Framework will be used to set hands-off flow conditions. Some water is available for consumptive licensing at all flows.	The RAM Framework will be used to set hands-off flow conditions to ensure the ecological river flow objective continues to be met for the same proportion of time as at present. All further consumptive licences will have hands-off flow conditions applied.
<b>Additional monitoring/modelling</b>	We will continue to monitor all of the surface water units to increase our knowledge of flows throughout the catchment. Further fisheries and ecology monitoring will ensure that we can firstly carry out the environmental weighting assessment for the review of the Kent CAMS in six years’ time, and secondly, monitor the impact of the strategy until then.			



River Bela, weir at Milnthorpe

## 5.7 Opportunities for water rights trading in the Kent CAMS area

One of the objectives of the CAMS process is to facilitate licence trading. The term "water rights trading" refers to the transferring of licensable water abstraction rights from one party to another, for benefit. It involves a voluntary movement of right to abstract water between abstractors, using the abstraction licensing process. Licence trading is essentially a new phrase to describe a particular application of existing licensing processes and occurs within these existing processes. More detailed information is available in Section 4 of *Managing Water Abstraction*<sup>21</sup>.

A guidance leaflet (*Water Rights Trading*) was published and sent to licence holders towards the end of 2002 explaining the scope for water rights trading within current legislation. Consultation on more detailed proposals followed in July 2003. After considering responses to the consultation exercise, in the winter of 2003, further information will be made available to update licence holders on the Agency's conclusions for a detailed framework within which water rights trading will take place.

## 5.8 The impact of the Water Act 2003

The Government, as well as the Agency and other organisations, considers that significant changes to the water abstraction authorisation system are now needed in order to help ensure that we continue to use water resources sustainably. Over the last few years, Government proposals and decisions have been set out in a series of consultation and decision papers, resulting in the publication of a draft Water Bill in November 2000. The Bill was debated in Parliament and received Royal Assent in November 2003. The new Water Act 2003 will complement existing Agency initiatives, such as the review and curtailment of damaging abstractions, the development of a framework for trading in water rights, implementation of the Agency's policy on time-limiting licences and the development of CAMS.

When enacted, the responsibility for many of its provisions will fall to the Agency and will result in significant changes to the water resources authorisation system over a period of years. In order to support the implementation of the new legislation, the Agency will produce clear guidance both for Agency staff and existing or potential licence holders and other key stakeholders in order to explain and facilitate the introduction of these important changes.

<sup>21</sup> See footnote 1



## Future developments in the CAMS area

We will continue to monitor all of the surface water units to increase our knowledge of flows throughout the catchment. Further fisheries and ecology monitoring will ensure that we can carry out the environmental weighting assessment to complete the review of the Kent CAMS in six years' time, and monitor the impact of the strategy until then.

We recognise that the abstraction for the Lancaster Canal is significant in the Kent catchment. The reopening of the northern reaches of the Lancaster Canal is currently within the planning stages. This is likely to have an even greater abstraction impact on the Kent CAMS area. Consequently the agreement of the Memorandum of Understanding to establish a sustainable operating regime for the canal to meet the needs of the canal and the wider environment is an "action" of this CAMS.

# Post CAMS appraisal

The Agency will review the Kent CAMS in 2008 and publish the reviewed strategy in 2010.

The success of the first CAMS can be assessed using the following indicators:

- New licences granted where there is a surplus of water available and applications satisfy the requirements.
- The resource status of each Water Resource Management Unit remains unchanged.
- A routine monitoring programme, which provides further information on flows and environmental conditions (including ecological, fisheries and physical factors) throughout the catchment is planned. This will identify any potential changes to the current situation, highlighting improvements or deterioration resulting from abstraction activity.
- We will continue to regularly visit licence holders to ensure they comply with licence conditions, and to encourage water efficiency measures.
- Protected rights of existing abstractors and existing lawful users are not adversely affected.
- A Memorandum of Understanding is agreed to establish a sustainable operating regime for the Lancaster Canal to meet the needs of the canal and the wider environment.

# Appendix 1

## Glossary

### Abstraction

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

### Abstraction – actual

The volume of water actually abstracted as opposed to the volume of water that may be abstracted under the terms of an abstraction licence. Some abstractors are required to submit returns of actual quantities abstracted to the Environment Agency each year.

### Abstraction impact

River abstractions directly from the river. For surface water abstractions behind impoundments, need to take storage into account. Similarly for groundwater abstractions, need to translate abstraction into stream flow depletion both spatially (identifying the river reaches impacted) and temporally (indicating the monthly profile of stream flow depletion).

### Abstraction licence

The authorisation granted by the Environment Agency and its predecessors to allow the removal of water from a source.

### Alluvial deposit

Layers of sediment resulting from the activity of rivers. Usually fine material eroded, carried, and eventually deposited by rivers in flatter areas such as flood plains or lake beds.

### Aquatic

Pertaining to the water environment.

### Aquifer

A geological formation, group of formations or part of a formation that can store and transmit water in significant quantities.

### Assessment point (AP)

Critical point in the catchment at which an assessment of available resources should be made. APs are located at the extremities of identified reaches and water resource management units.

### Baseflow

That part of the river flow that is derived from groundwater sources rather than surface run-off.

### Canal

An artificial watercourse used for navigation.

### Candidate Special Area of Conservation (cSAC)

Before a site is considered for SAC status, sites may be submitted as candidate SACs. Once a site has been identified as a candidate SAC and added to the “UK list” of sites sent to the European Commission, it should be treated as if it has been classified by the Commission, even if the formal decision is still awaited.

### Catchment

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

### Compensation flow

Water released from reservoirs to maintain a flow in the river downstream.

### **Conservation Regulations 1994**

Regulations that implement the Habitats Directive in UK law (also known as the Habitats Regulations).

### **Consumptive use**

Use of water where a significant proportion is not returned either directly or indirectly to the source of supply after use.

### **Consumptiveness**

Proportion of the water not returned either directly or indirectly to the source of supply after use e.g. water evaporated, or transferred elsewhere.

### **County Wildlife Sites**

Wildlife sites identified and managed by Wildlife Trusts.

### **Demand**

The requirements for water for all use.

### **Demand management**

The implementation of policies or measures which serve to control or influence the consumption or waste of water.

### **Derogate**

To depreciate or diminish – used in abstraction licensing where a proposed new licence would reduce resources to an existing authorised abstraction.

### **Derogation**

In legal terms, the taking away of protected rights under the Water Resources Act due to the granting of a new licence.

### **Discharge**

The release of substances (e.g. water, sewage) into surface waters.

### **Drift**

A loose deposit of sand, gravel, clay etc.

### **Drought**

A general term covering prolonged periods of below average rainfall resulting in low river flows and/or low recharge to groundwater, imposing significant strain on water resources and potentially on the environment.

### **Drought Order**

A means whereby water companies and/or the Environment Agency can apply to the Secretary of State for the imposition of restrictions in the uses of water and/or which restricts or stops abstraction where environmental damage is being caused.

### **EU directive**

Issued by the European Commission to member states with the objective of producing common standards in the European Union. Member states are then obliged to introduce appropriate legislation to comply with the directive.

### **Ecology**

The study of how living things relate to their environment and surroundings.

### **Ecosystem**

A functioning, interacting system composed of one or more living organisms and their environment, in a biological, chemical and physical sense.

### **Ecological river flow objectives (eRFO)**

The minimum river flows (or water levels) required to protect ecological objectives.

### **Effluent**

Liquid waste from industrial, agricultural or sewage plants.

### **Environmental impact**

The total effect of any operation on the environment.

### **Environmentally Sensitive Area**

An area where the landscape, wildlife and historic interest are of national importance. Payments are made by DEFRA/Welsh Office to ensure appropriate sensitive land use.

### **Environmental weighting**

An assessment of a river's sensitivity to abstraction based on physical characteristics, fisheries, macrophyte and macro-invertebrates.

### **Existing abstraction and discharge impacts**

The amount by which all abstractions reduced natural flows in the scenario year, taking into account the consumptiveness of the use, the location of any effluent return and any lags or smoothing effects between abstraction and outflow impact. Based on estimated abstraction returns from the scenario year.

### **Flow regime**

The statistical pattern of a river's constantly varying (mean daily) flow rates.

### **Gauging station**

A site where the flow of a river is measured.

### **General Quality Assessment (GQA)**

Method for assessing the general quality of inland and coastal waters.

### **Geomorphology**

Scientific study of land forms and of the processes that formed them.

### **Groundwater**

Water occurring below ground in natural formations (typically rocks, gravels and sands).

### **Groundwater management units (GWMUs)**

Administrative sub-divisions of aquifers, defined on geological and hydrogeological criteria, which form the basis for groundwater resource management and licensing policy decisions.

### **Habitat**

Place in which a species or community of species lives, with characteristic plants and animals.

### **Habitats Directive**

The EU Wild Birds Directive 1979 and the EU Habitats Directive 1992 – implemented in UK law through the Conservation (Natural Habitats, &c) Regulations 1994 are collectively known as the Habitats Directive. A network of sites has been established to protect important and threatened species.

### **Hands-off flow (HOF) condition**

A condition attached to the abstraction licence so that if the flow in the river falls below that specified on the licence then the abstractor may be required to stop or reduce the abstraction.

### **Hands-off level**

Level below which an abstractor may be required to stop or reduce abstraction (i.e. groundwater level or river stage, to be specified on a licence, as a condition of that licence).

### **Hydraulic continuity**

Where groundwater is linked to rivers/lakes or other groundwater units.

### **Hydrogeology**

Branch of geology concerned with water within the Earth's crust.

### **Hydrology**

The study of water on and below the Earth's surface.

### **Hydrometric network**

Networks of sites monitoring rainfall; river flow; river, lake, tidal and groundwater levels; and some climate parameters. The data are used extensively for water resources management and planning, water quality and ecological protection and improvement, flood defence design, flood forecasting and flood warning.

### **Hydropower**

Power generated from the natural gravitational fall of water by the installation of turbines, water wheels etc.

### **Impermeable**

Used to describe materials, natural or synthetic, which have the ability to resist the passage of fluid through them.

### **Impoundment**

A dam, weir or other work constructed on an inland water, whereby water may be diverted, or held in a reservoir.

## **Irrigation**

To supply land with water by means of artificial canals, ditches etc., especially to promote the growth of food crops.

## **Licence**

Formal permit allowing the holder to engage in an activity (in the context of this report, usually abstraction), subject to conditions specified on the licence itself and the legislation under which it was issued.

## **Licence application**

Formal request by an individual or organisation to the competent authority for a licence. For abstraction licences, that authority is the Environment Agency.

## **Licence determination**

A decision by the competent authority on whether, and on what terms, to grant or refuse a licence application, by reference to the authority's regulatory powers and duties.

## **Licence trading**

A commercial transaction for the purpose of transferring an abstraction licence between two parties.

## **Licensed abstraction and discharge impacts**

The impact of abstractions and discharges calculated on the full uptake of current licences.

## **Licensed entitlement**

Amount of water that may be abstracted within the terms of a licence. Generally specified in terms of maximum per day, month and year (or season), with the monthly/annual amounts being typically less than the factored daily equivalent.

## **Low flow**

The flow that is exceeded for a given percentage of the time. For example Q95 is the flow that is exceeded 95 per cent of the time, so the flow will only fall this low 5 per cent of the time.

## **Managing Water Abstraction**

Document produced in May 2001 on the CAMS process (subsequently updated in 2002).

## **Natura 2000**

The Habitats Directive will establish and protect a network across Europe of the most important areas for wildlife, to be known as Natura 2000. This will include all SPAs and cSACs on sites which are already SSSIs.

## **Natural flows**

Flows which would naturally leave an assessment point in the absence of any artificial impacts.

## **Non-consumptive**

This is where all abstracted water is returned to the source a relatively short distance downstream of the abstraction point.

## **Precautionary principle**

Where significant environmental damage may occur, but knowledge is incomplete, decisions made should err on the side of caution.

## **Precipitation**

Deposition of moisture including dew, hail, rain, sleet and snow.

## **Protected right**

Protected rights include all existing licensed abstractions and certain exempt abstractions for domestic and agricultural purposes (excluding spray irrigation) not exceeding 20 m<sup>3</sup>/d.

## **Public water supply**

The supply of water provided by a water undertaker.

## **Q95**

The flow of a river which is exceeded on average for 95 per cent of the time.

## **RAM Framework**

Resource Assessment and Management Framework – a technical framework for resource assessment (for the definition and reporting of CAMS) and subsequent resource management (including abstraction licensing).

### **Ramsar site**

A site of international conservation importance classified at the “Convention on Wetlands of International Importance” 1971, ratified by the UK Government in 1976.

### **Reach**

A length of river.

### **Recent actual abstraction and discharge impacts**

The impact of abstractions and discharges based on recent abstraction returns or from uptake.

### **Revocation**

Cancellation of a licence and its associated rights and benefits.

### **River flow objectives (RFOs)**

The minimum river outflows from the area required to protect ecological objectives, effluent dilution requirements, navigation and river amenities.

### **River reach**

Stretch of a river between two assessment points, delineated for the purposes of abstraction licensing and resource management.

### **Saturated zone**

The zone in which the voids in a rock or soil are filled with water at a pressure greater than atmospheric.

### **Scenario abstraction and discharge impacts**

The amount by which all the abstractions in the area reduce natural outflows from it, taking into account the consumptiveness of the use, the location of any effluent return and any lags or smoothing between abstraction and outflow impact. Based on an assumed abstraction and discharge scenario (e.g. full licensed rate, “existing”, “recent actual” etc.).

### **Scenario flows**

The flows that would leave the assessment point in the specified year, based on the assumed scenario abstractions and discharges.

### **Site of Special Scientific Interest (SSSI)**

Area given a statutory designation by English Nature or the Countryside Council for Wales because of its nature conservation value.

### **Source of supply**

Either an inland water (river, stream, canal, lake, etc.) or underground strata. See Section 221 Water Resources Act 1991.

### **Special Area of Conservation (SAC) (or candidate Special Area of Conservation – cSAC)**

Classified under the EU Habitats Directive and agreed with the EU to contribute to biodiversity by maintaining and restoring habitats and species.

### **Special Protection Area (SPA)**

Classified as such under the EU Birds Directive to provide protection to birds, their nests, eggs and habitats.

### **Spray irrigation**

Abstracted water sprayed onto grassland, fruit, vegetables etc. Can have a high impact on water resources.

### **Springs**

These occur where the water table intersects the ground surface.

### **Strata**

Layers of rock, including loose materials such as sands and gravels.

### **Surface water**

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

### **Surface water catchment**

The area from which run-off would naturally discharge to a defined point of a river, or over a defined boundary.

### **Surplus or deficit**

How much more or how much less abstraction impact is acceptable:

= Scenario flows – RFOs

### **Sustainable development**

Development that meets the needs of the present without compromising those of future generations. This involves meeting four objectives simultaneously:

- social progress which recognises the needs of everyone;
- effective protection of the environment;
- prudent use of natural resources;
- maintenance of high and stable levels of economic growth and employment.

### **Tidal limit**

The most upstream point within an estuary or river where water levels are subject to tidal variation.

### **Time-limited licence**

Licence with a specified end date.

### **Treatment works (also waste water treatment works)**

Waste water treatment works or water treatment works.

### **Tributary**

A stream or river which feeds into a larger one.

### **Underground strata**

A term used to signify geology under the surface soil layer. If groundwater exists, or if water is being discharged to the ground, the geology underneath the soil layer is known as underground strata.

### **Unlicensed abstraction**

An abstraction that is carried out unlawfully or that is exempt from licensing.

### **Uptake**

The degree to which a licensed entitlement is actually abstracted over a long period of time (sometimes related to the purpose and type of licence).

### **Watercourse**

A stream, river, canal or channel along which water flows.

### **Water resource**

The naturally replenished flow or recharge of water in rivers or aquifers.

### **Water resource management unit (WRMU)**

An area that has similar groundwater and/or surface water characteristics and is managed in a similar way.

### **Water resources strategies (The)**

Strategy for water resource planning in England and Wales over the next 25 years to ensure sustainable use and sufficient water for all human uses with an improved water environment. The strategies predict demand using different social and economic scenarios.

### **Water table**

Top surface of the saturated zone within the aquifer.

### **Wetland**

An area of low-lying land where the water table is at or near the surface for most of the time, leading to characteristic habitats.



# Appendix 2

## List of abbreviations

<b>AP</b>	Assessment point.	<b>RAM Framework</b>	Resource Assessment and Management Framework.
<b>BW</b>	British Waterways.	<b>RFO</b>	River Flow Objectives.
<b>CAMS</b>	Catchment Abstraction Management Strategy.	<b>RQO</b>	River Quality Objective.
<b>DEFRA</b>	Department for Environment, Food and Rural Affairs (succeeds former DETR).	<b>RSAp</b>	Restoring Sustainable Abstraction Programme.
<b>DETR</b>	Department of the Environment, Transport and the Regions.	<b>SAC</b>	Special Area of Conservation.
<b>eRFO</b>	Ecological River Flow Objectives.	<b>cSAC</b>	Candidate Special Area of Conservation.
<b>EU</b>	European Union.	<b>SPA</b>	Special Protection Area.
<b>EW</b>	Environmental Weighting of a river reach based on its physical, macrophyte, fisheries and macroinvertebrate scores.	<b>SSSI</b>	A Site of Special Scientific Interest i.e. an area given a UK statutory designation because of its conservation value.
<b>GQA</b>	General Quality Assessment.	<b>WRMU</b>	Water resource management unit.
<b>GWMU</b>	Groundwater management unit.		
<b>HOF</b>	Hands-off flow.		
<b>km</b>	Kilometres.		
<b>km<sup>2</sup></b>	Square kilometres.		
<b>MI, MI/d, MI/day</b>	= megalitres = 1,000,000 litres = 1,000 cubic metres = 1,000 m <sup>3</sup> = 220,000 gallons. MI/d = MI/day = MI per day, = tcmd, thousand cubic metres per day.		
<b>Q50</b>	Flow exceeded during 50 per cent of period over which flow data are being considered.		
<b>Q95</b>	Flow exceeded during 95 per cent of period over which flow data are being considered.		



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