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Mersey and Bollin Catchment Abstraction Management Strategy

August 2005



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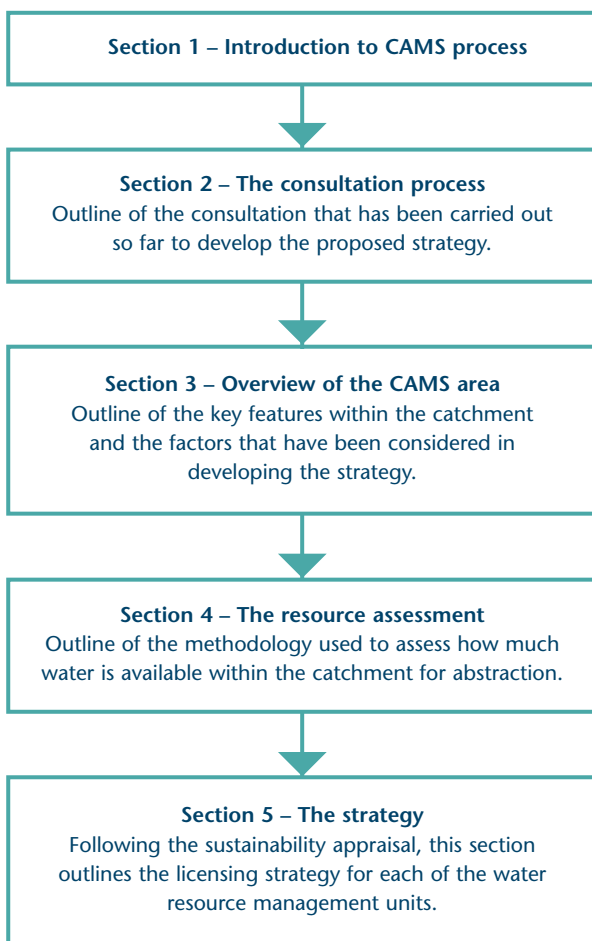
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Document overview



This document sets out our licensing strategy for the Mersey and Bollin CAMS Area for the next six years. This document should be read in conjunction with *Managing Water Abstraction* and the recent *Interim Update* (see *Appendix 1*) which provides additional information on the CAMS and licensing processes and will aid the interpretation of this document.

The 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 January 2005 containing the proposed strategy for dealing with water resources in the Mersey and Bollin CAMS area. Responses to this document were taken into account in finalising the strategy and producing this document.

The document is split into five sections relating to the CAMS process. Sections 1 to 4 outline the CAMS process, and Section 5 outlines the licensing strategy for the Mersey and Bollin CAMS area. It is important to note that this strategy deals with groundwater and surface water abstractions separately; Sections 4 and 5 are split to differentiate between the surface water and groundwater results. Section 6 highlights the future developments in the CAMS area and Section 7 outlines the post-CAMS appraisal.

Introduction

The vision for the Mersey and Bollin CAMS is to manage the water resources within the catchments in a sustainable manner that preserves and enhances the area's natural and cultural heritage alongside its recreation value. This will balance the needs of water users such as agriculture, industry and public water supply, with those of the environment, to the benefit of 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 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 CAMS document should be read in conjunction with *Managing Water Abstraction*. There has been an interim update to this document which details changes to the licensing system as a result of the Water Act 2003 and some changes to CAMS boundaries. These documents and a leaflet specifically on the Water Act

(*The Water Act; Modernising the Regulation of Water Resources*) are available from your local Environment Agency Office or can be found on the *Technical Document* CD-ROM.

This Mersey and Bollin CAMS document sets out how much water is available for abstraction in the Mersey and Bollin catchment and our strategy for managing this water now and for the next six years.

A *Technical Document* for the Mersey and Bollin 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 paper version is also available for viewing at the same office:

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Consultation on the Mersey and Bollin CAMS

Consultation is an important part of the Catchment Abstraction Management Strategies (CAMS) process. We want to make sure that our CAMS process is as transparent as possible and that everyone has the opportunity to get involved. For us to manage water resources in the catchment effectively and sustainably, it is important that as much information as possible is collated on water needs and uses. We have collected comments and suggestions during the development stages of this strategy through various activities. These were:

- an awareness-raising leaflet; and
- a CAMS stakeholder group

We distributed the leaflet in September 2003. The aim of the leaflet was to raise awareness in the local area and it also invited anyone with an interest to send in written comments, views and suggestions for our consideration.

A stakeholder group was set up for the Mersey and Bollin CAMS. The role of the stakeholder group was to:

- represent the key interests in the catchment;
- help identify issues of local significance;
- provide views on proposals; and
- consider the likely implications of different strategy options.

The members of the Mersey and Bollin CAMS stakeholder group and the interests they represented are:

Name	Interest represented
Ted Manders	Chair
Phil Merrin	Water supply
Mike Brady	Industrial abstractors
Andrew Makin	Industrial abstractors
Phil Whelan	Navigation interests
Eric Jones	Angling interests
Trevor Bithell	Local Authority
William Blackburn	Agricultural interests
Barry Cook	Recreation and heritage

There was also a formal consultation on the Mersey and Bollin CAMS through a consultation document, distributed in January 2005. The responses we received were considered and taken into account as the strategy was finalised. This CAMS document now sets out our final strategy for the Mersey and Bollin CAMS area.

The Mersey and Bollin CAMS area

3.1 Surface water features

The Mersey and Bollin Catchment Abstraction Management Strategy (CAMS) covers an area of 535km² and includes the River Mersey (upstream of the Manchester Ship Canal) and the River Bollin and their tributaries, as shown on **Map 1**. The Mersey catchment begins in Stockport and flows west towards Sale; the Bollin catchment commences in the Macclesfield Forest, flows west towards its confluence with the River Dean at Wilmslow and flows on towards Agden, where it enters the Manchester Ship Canal.

The River Mersey originates in Stockport, where the rivers Tame and Goyt converge at an altitude of 40m Above Ordnance Datum (AOD). From Stockport, the river flows in a westerly direction, initially in an artificial walled channel until it reaches Heaton Mersey. Here, the river meanders across the flood plain. Prior to outfalling into the Manchester Ship Canal over Irlam Weir, the river flows through Northenden, Chorlton, Ashton-on-Mersey and Flixton. As the urban area of Manchester has expanded, development adjacent to the river has narrowed the river corridor and much of the channel has been embanked to control flooding on the neighbouring land.

Micker Brook is the largest tributary of the Mersey and drains areas within Stockport and Poynton, with a confluence with the Mersey to the north of Cheadle.

The River Bollin drains the urban areas of Macclesfield, and Alderley Edge, as well as the southwest of Manchester. It rises in the foothills of the Pennines within Macclesfield Forest and flows through towns including Macclesfield, Bowdon and Dunham and, some 30 miles later, flows into the Mersey and Manchester Ship Canal at Lymm.

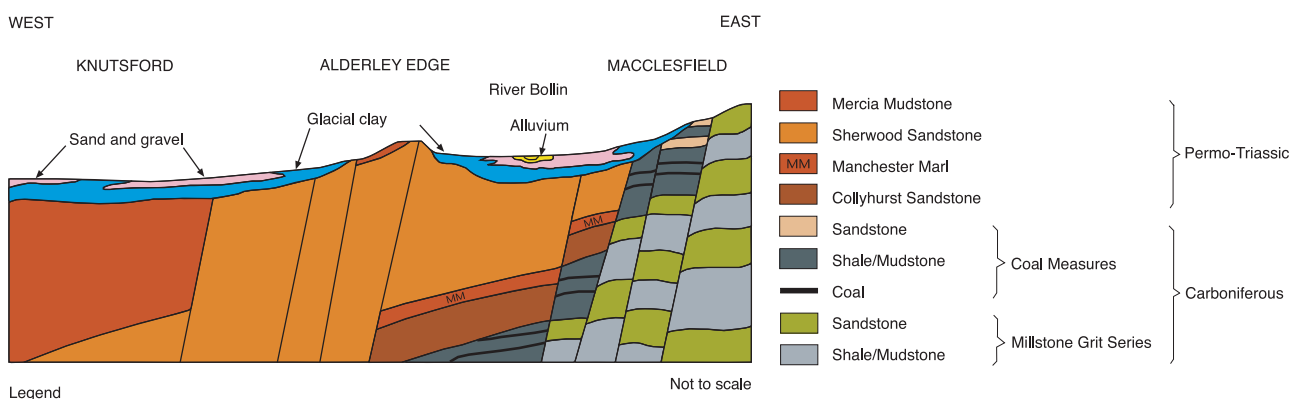
The River Dean flows through mainly rural areas; its only urban route is via Wilmslow. Headed by the Lamaload Reservoir, the River Dean flows into the River Bollin just south of Styal.

The Bridgewater Canal and the Macclesfield Canal are included within the Mersey and Bollin CAMS area, along with a small section of the Ashton Canal in the northeastern area. These canals and their towpaths form important recreation areas. The Macclesfield Canal is supplied by Sutton Reservoir, which is supported by Rossendale Brook.

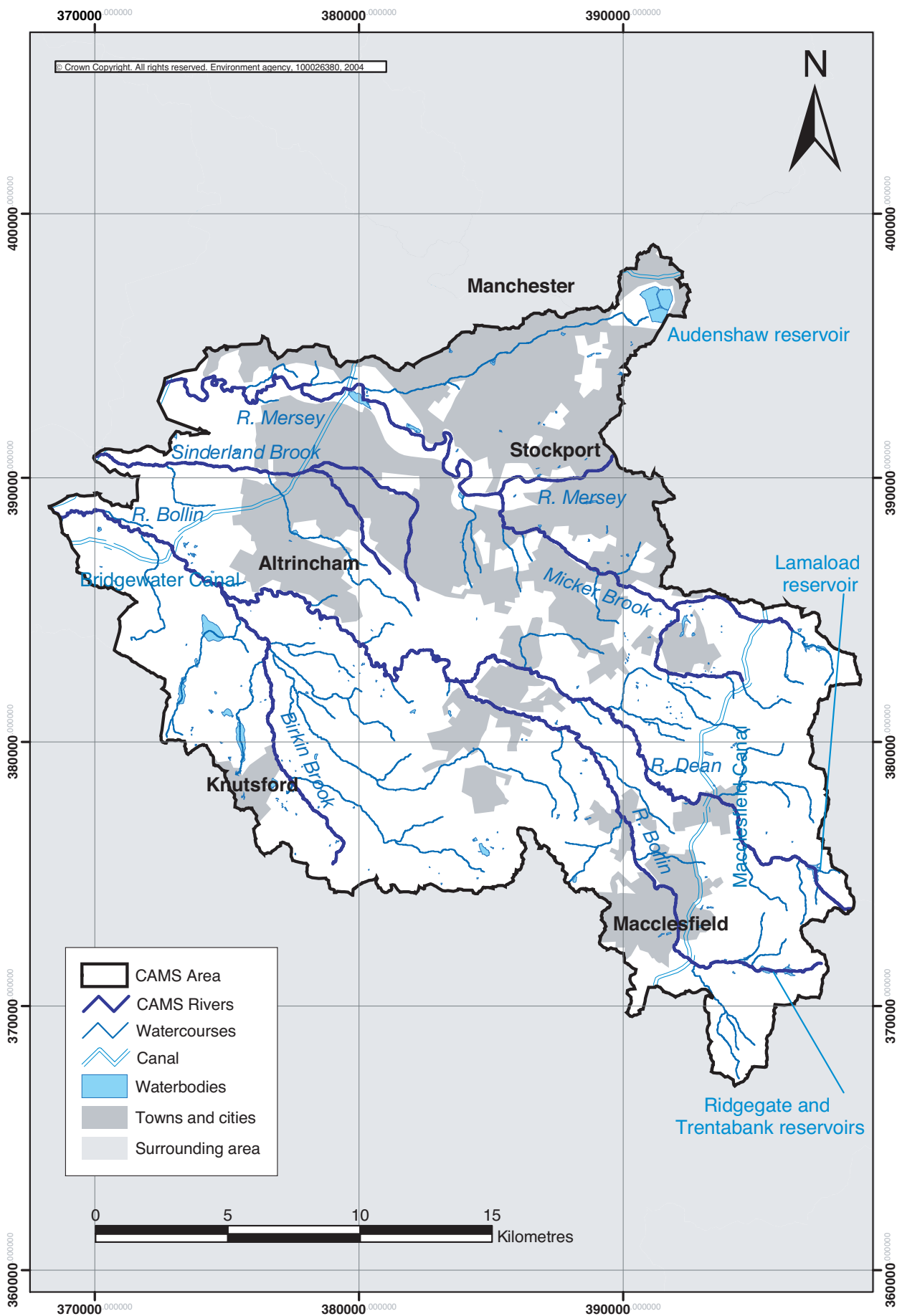
3.2 Geology and hydrogeology

The rocks underlying the Mersey and Bollin CAMS area contain important water resources within minor and major aquifers (water-bearing strata). As illustrated by **Figure 1** the eastern part of the catchment is formed by rocks of Carboniferous age. In the southeast these comprise alternating sandstone and shale/mudstone

Figure 1 | Schematic geological cross section through the Mersey and Bollin CAMS area



Map 1 | The Mersey and Bollin CAMS area



layers of the Millstone Grit Series; the more resistant sandstone layers form marked ridges, e.g. Teggs Nose and Kerridge near Macclesfield. Further north, Coal Measures are present; these have fewer thick sandstones, but also include coal seams.

These Carboniferous rocks form the eastern boundary to, and underlie, younger Permo-Triassic age sandstones and mudstones of the Cheshire Basin. The basal part of the sandstone sequence (the Collyhurst Sandstone) is separated from the overlying, much thicker Sherwood Sandstone by the Manchester Marl (a mudstone). In turn, the Sherwood Sandstone is overlain by Mercia Mudstones in the western half of the catchment.

Drift deposits, mainly boulder clay, cover much of the catchment, however they tend to be absent on the higher ground to the east.

The Carboniferous sandstone layers tend to act as individual minor aquifer units capable of supporting small to medium sized water supplies. The sandstone in the Millstone Grit Series also produce springs which contribute to the watercourses that cross them. Groundwater movement generally occurs by movement through cracks and faults in the rock rather than permeating through. The movement of groundwater can be complicated by the presence of old coal workings in the Coal Measures, giving rise to complex and rapid groundwater flow. These mine workings can also adversely affect groundwater quality.

The Sherwood Sandstone and Collyhurst Sandstone form part of a major aquifer unit that extends from Macclesfield, northwards through Stockport and Manchester, and then westwards to Liverpool. The Mersey and Bollin CAMS area falls within the 'Manchester and East Cheshire' aquifer unit. The sandstone is heavily utilised for public water supply within the catchment, and it is also used for industrial purposes further north. In contrast, the younger Mercia Mudstones are effectively impermeable, and so are generally considered to be a 'non-aquifer'.

Groundwater flow in the sandstone is generally from south to north. We understand that, in places, the aquifer is subdivided into poorly connected blocks due to the geological structure and presence of low permeability faults.

The presence of low permeability boulder clay drift cover over much of the aquifer has the effect of both reducing hydraulic connection between groundwater and surface water, and limiting recharge to the aquifer. In parts of the CAMS area, the drift sequence includes relatively extensive glacial sand and gravel layers. Often these are poorly connected to the deeper sandstone aquifer, but in this case they are well

connected and so provide baseflow support to the rivers, e.g. within the Dean and Bollin catchments.

We have recently completed a detailed investigation into the groundwater resources of the Manchester and East Cheshire aquifer unit (see *Appendix 1*). The resulting conceptual and numerical models have been used to support the resource assessment for the catchment.

3.3 Hydrological monitoring

Water resources in the area are monitored by a hydrometric network. Data from this network is used on a routine basis for drought and flood monitoring and water resource investigations. We have used this data to assess resource availability in this CAMS. It is vital we maintain accurate long-term river flow records to help us with water resources planning and investigations.

The Mersey and Bollin CAMS area is served by a network of four permanent gauging stations, which measure flow within these rivers. In addition, there are a number of temporary hydrometric stations at additional sites throughout the catchment measuring river levels. We also monitor groundwater levels within the main aquifers in the CAMS area.

Rainfall is measured by a network of rain gauges, which are read daily by voluntary observers. Supporting this network are a number of automatic rain gauges, which record rainfall by the minute to determine rainfall intensity. Most of these automatic rain gauges are monitored using telemetry to a central computer, and provide vital information for our flood warning role. These rain gauges form part of our national rainfall network. Average annual rainfall in the Mersey and Bollin is high and varies from 810mm to 1,244mm, with an average of 870mm.

Groundwater level trends in the Permo-Triassic sandstone aquifer are monitored in a series of observation boreholes within the catchment.



Hydrometric gauging in the Bollin catchment

3.4 Major abstractions, transfers and discharges

Water resources have been developed over a long period within the Mersey and Bollin CAMS area. Water is abstracted today throughout the catchments from both surface waters and groundwater for agriculture, spray irrigation, industry and public water supply purposes.

The economic expansion at the time of the Industrial Revolution led to increasing development within the area and also the creation of a canal network to transport materials between Manchester and the surrounding towns.

Homes and industries within this CAMS area receive their water supply from United Utilities Water Plc. There are a number of important public water supply reservoirs in the catchment, including Ridgegate, Trentabank, Lamaload and the Audenshaw Reservoirs. There are also reservoirs within this CAMS area whose sole purpose is to provide compensation water to rivers downstream of them (including Bottoms and Teggs Nose Reservoirs, near Macclesfield).

All of the public water supply abstractions within the Mersey and Bollin CAMS area feed into the water company integrated system. This integrated system is used to supply water to 95 per cent of customers in the northwest of England. The water company source water from as far afield as Thirlmere Reservoir in the Lake District and Lake Vyrnwy in mid-Wales to meet the demand for water within this system.

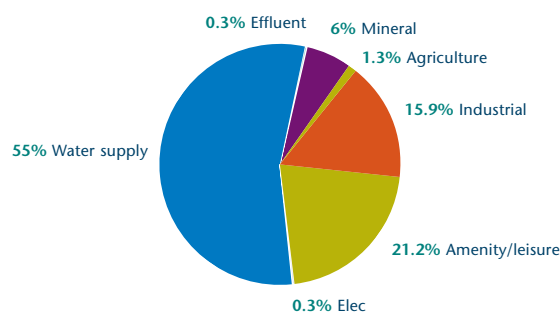
In addition to the reservoirs mentioned above, the water company abstract from boreholes drilled into the aquifers of the Mersey and Bollin catchment. These boreholes provide the water company with greater flexibility when meeting the seasonally-varying demand for water.

Water is abstracted throughout the catchment for a variety of other purposes. Currently there are 96 licensed abstractions; 49 from groundwater and 47 from surface water, used for a variety of purposes, including agriculture, industry, leisure and amenity, plus public water supply. **Figure 2** shows water abstraction by use category (%). Volumetrically, the majority of water is used for public water supply. Following the deregulation of abstractions 20m³ per day or less in April 2005, the overall number of licences in force across the CAMS area has reduced (see *Section 5.4.5 regarding exemption thresholds*). **Map 2** illustrates the location and relative size of all surface water and groundwater abstractions within the CAMS area.

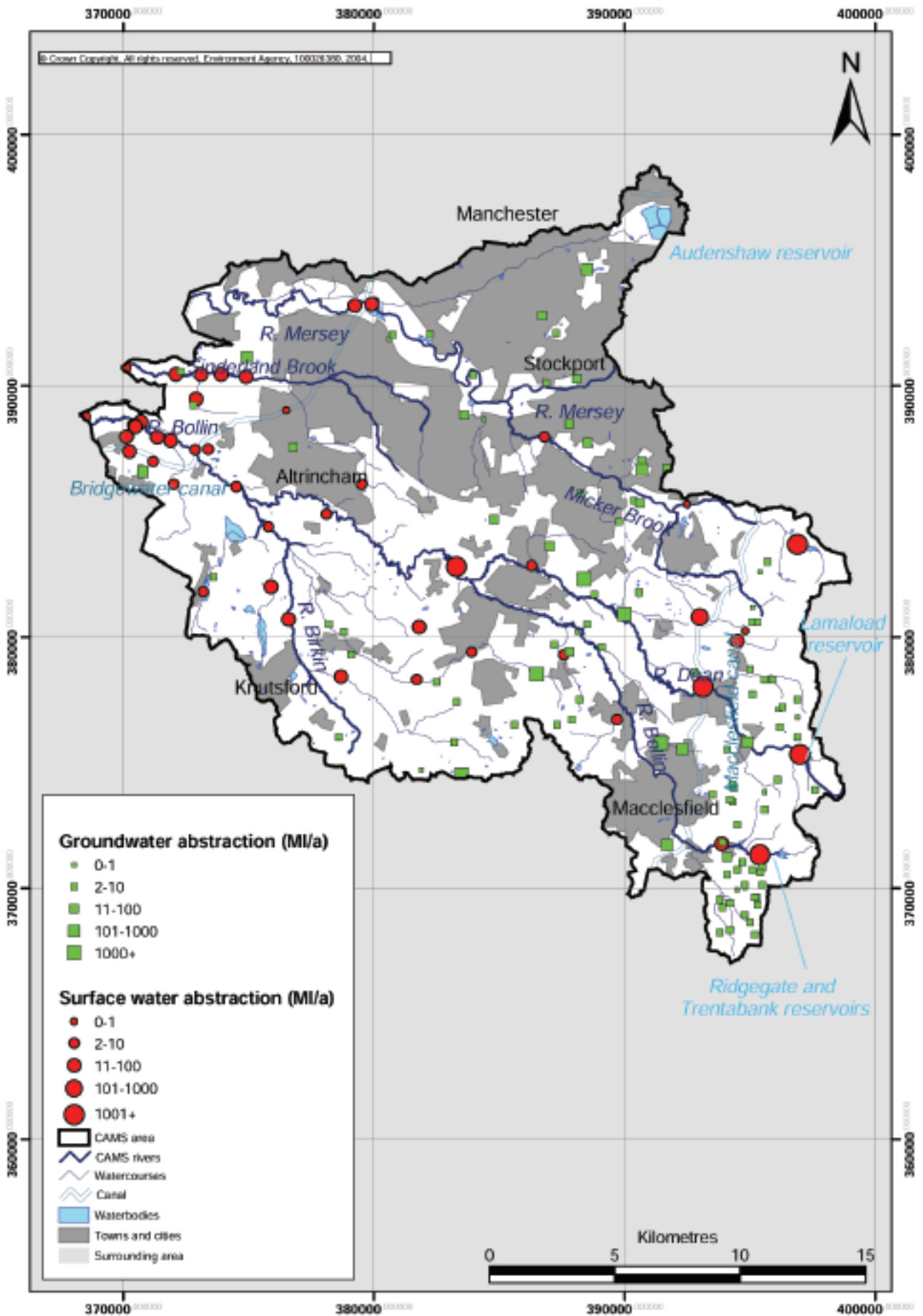
Within the Mersey and Bollin catchments, industrial licences mainly use groundwater sources. In the upper reaches of the Bollin catchment, owing to historical legislation, many licences do not have restrictions on abstractions under low flow conditions. Some of the licensed abstractions are, however, subject to “hands-off” level or flow conditions when abstraction must cease to protect existing abstractors, river ecology or for other local issues.

The major discharges into watercourses within this CAMS area relate to wastewater. The major wastewater treatment works are at Prestbury, Altrincham, Stretford and Stockport.

Figure 2 | Water abstraction by use category (%)



Map 2 | This map illustrates the location and relative size of both surface water and groundwater abstractions within the CAMS area.





Weir at Quarry Bank Mill

3.5 Landscape and landuse

The Mersey and Bollin CAMS area is very diverse; the large sprawl of urbanisation in the north is countered by the gently rolling rural nature of the southern area. In the eastern reaches, the Cheshire countryside rises up to meet the Peak District National Park, whilst heading west, the land becomes flatter and gives way to farmland and country parks.

The main landuse overall is mixed agriculture, but only slightly more so than urban use. The land around South Manchester has been redeveloped over the last decade, as the remains of the traditional heavy industries are replaced by leisure and service industries.

Woodland is scattered and covers only a small amount of land, the most notable being the Macclesfield Forest area in the south east of the CAMS area. It is here that the main surface water storage reservoirs are located, supplying public water.

3.6 Ecology and fisheries

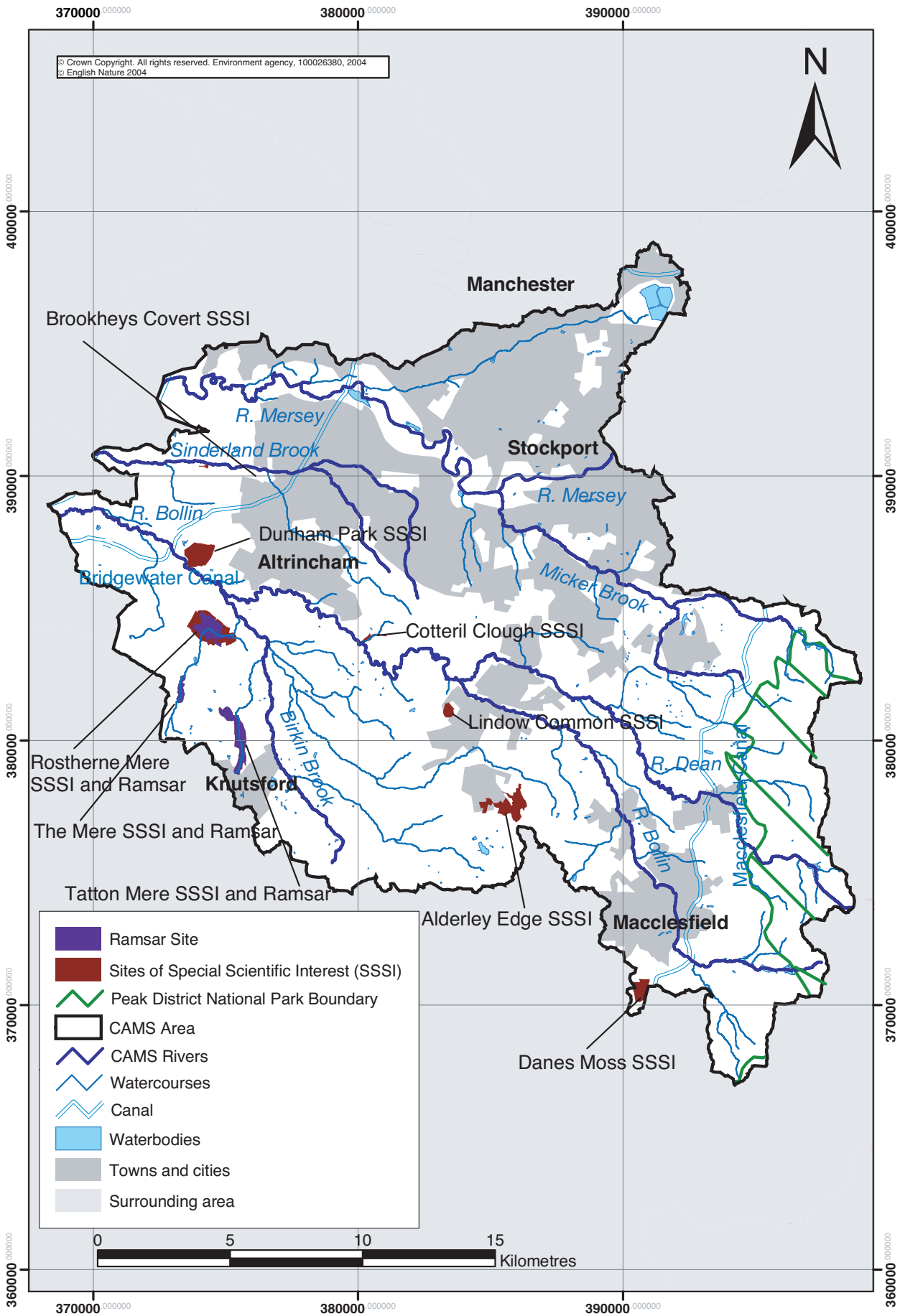
There are no sites within the CAMS area designated under the European Habitats or Birds Directive as part of the Natura 2000 Network. However, there are three sites within the CAMS area – The Mere at Mere, Roshtherne Mere and Tatton Mere – that form part of the Ramsar-designated West Midland Meres and Mosses.

Map 3 illustrates the conservation designations that apply within the CAMS area. There are a large number of designated conservation areas in the catchment.

There are also Sites of Special Scientific Interest (SSSI) which are of conservation importance nationally within the Mersey and Bollin CAMS area. The largest of these SSSIs is Roshtherne Mere, a National Nature Reserve, situated on the northern edge of the West Midland Meres and Mosses Ramsar complex. It is the deepest mere in Cheshire and, owing to its depth, it rarely freezes over. This ensures that Roshtherne Mere offers an excellent home to large numbers of wintering wildfowl. With associated reed bed, woodlands and grazing land, the reserve comprises 152 hectares.

In contrast to these sites is the Alderley Edge SSSI, a site noted for its geological interest. A dramatic sandstone escarpment dominates this landscape.

Map 3 | Major conservation designations in the Mersey and Bollin CAMS



There are over 160 Sites of Biological Importance (SBIs) including large sites such as Lyme Park. A concentration of SBIs follows the Bollin's route through the Cheshire countryside.

The large number of ponds and several reservoirs form many standing water habitats, supporting a wide range of plants and animals. In addition, there are several compensation reservoirs, which provide regular flows to streams and rivers to provide water for fisheries, river ecology and to compensate for water supply impoundments and abstractions.

Whilst the area is dominated mainly by coarse fish, such as roach, perch and chub, populations of brown trout have been found in the upper reaches of the catchment. Migrating salmon have also been observed in the lower reaches of the Mersey and Bollin.

3.7 Recreation and amenity

The Mersey and Bollin CAMS area is distinctively split into two areas – the large urban conurbation of South Manchester, Stockport, Altrincham and Sale in the north, and a much more rural landscape in the south.

This has led to a wide variety of recreational uses within the area.

Both organised and informal coarse angling on the rivers and canals is widespread. Several major angling clubs are present in the area, covering the rivers, tributaries, and canals, as well as several reservoirs. Fly fishing for salmonid fish also occurs on some rivers and reservoirs.

Many of the waterbodies within the area are used for both recreational and educational purposes such as guided walks, pond dipping, activity days, river clean-up campaigns and river studies. There are two waterparks at Sale and Chorlton, providing a variety of water sports, as well as offering excellent opportunities for bird-watching. Sale also boasts two nature reserves.

Much of the area has existing public rights of way and publicly owned or managed land. However, open spaces are not always linked and river corridors are fragmented making it difficult to walk along the watercourses. Local authorities in the area have a countryside or leisure service undertaking a wide range of work including river corridor improvements, however, many of the recreational routes are still in poor condition or are not way marked.



Meadow View, Lymm

The main walk along the River Bollin is the Bollin Valley Way, which provides approximately 23 miles of well-marked footpath with access to the riverbank in most areas. There are also walks and cycle routes that cross the river, attracting visitors locally and nationally, for example the Trans Pennine Trail.

The Bridgewater Canal and the Macclesfield Canal are included within the Mersey and Bollin CAMS area, along with a small section of the Ashton Canal in the north-eastern area. These canals and their towpaths form important recreation areas. They form part of the South Pennine Ring and the Cheshire Ring; two very popular cruising circuits.

There are several countryside parks within the CAMS area, including Lyme Park and Tatton Park, as well as monuments to the areas industrial heritage such as Quarry Bank Mill at Styal. This is complemented by many buildings, which date back hundreds of years, and offer ample opportunity for tourism.

3.8 Water quality information

We monitor the chemical quality of significant watercourses and the aquatic life supported by those watercourses. The results of this monitoring are used to classify the quality of these watercourses and to report compliance against various EC Directives. A General Quality Assessment (GQA) scheme is used to classify rivers and canals into one of six water quality classes using water quality data collected on a rolling three-year basis. Overall, water quality is fair or better in the Mersey and Bollin catchment, with only a small stretch, flowing westward from Sale rated as poor. To improve on the quality even further, we are working towards objectives called 'River Quality Objectives'. These objectives set water quality standards in relation to the requirements for aquatic ecosystems. **Figure 3** outlines water quality in the Mersey and Bollin CAMS area.

We monitor water quality improvements based on the River Ecosystem (RE) classification scheme. In the Mersey and Bollin CAMS area, there is currently 81 per cent compliance with the set targets. Agriculture is widespread throughout the southern area of the Mersey and Bollin CAMS and can cause diffuse pollution problems. Diffuse run-off from cultivation, fertiliser usage and slurry spreading can result in nitrate and phosphate pollution of rivers and streams.

Capital investment by the region's water company has led to improvements in water quality in the majority of rivers. The water company also aims to upgrade wastewater treatment works and sewerage networks. This will lead to improved compliance of some of these failing rivers and help to maintain and improve the quality of other reaches. We identified some 6000 locations nationally to be included in the AMP4 (Asset Management Plan) period to improve water quality by 2010. Approved AMP4 projects for the Mersey and Bollin area include improvements to six wastewater treatment works at Sale, Altrincham, Stretford, Alderley Edge, Macclesfield and Partington to protect fish and meet requirements of the EC Freshwater Fish Directive. In addition, a scheme to improve Mere Platt pumping station, in terms of aesthetic control, has been approved.

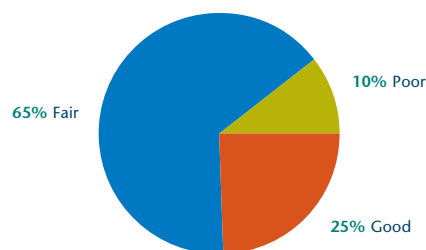


Figure 3 | Percentage of surface waters in each water quality class in the Mersey and Bollin CAMS area.

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 new abstractors, unless a significant proportion of the water abstracted is returned to the water source 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 Annexe Two of *Managing Water Abstraction*.

There are four categories of resource availability status, as shown in **Table 1**.

Table 1 | Resource availability status categories of river reaches

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



River Bollin upstream of Macclesfield WwTW (AP4)

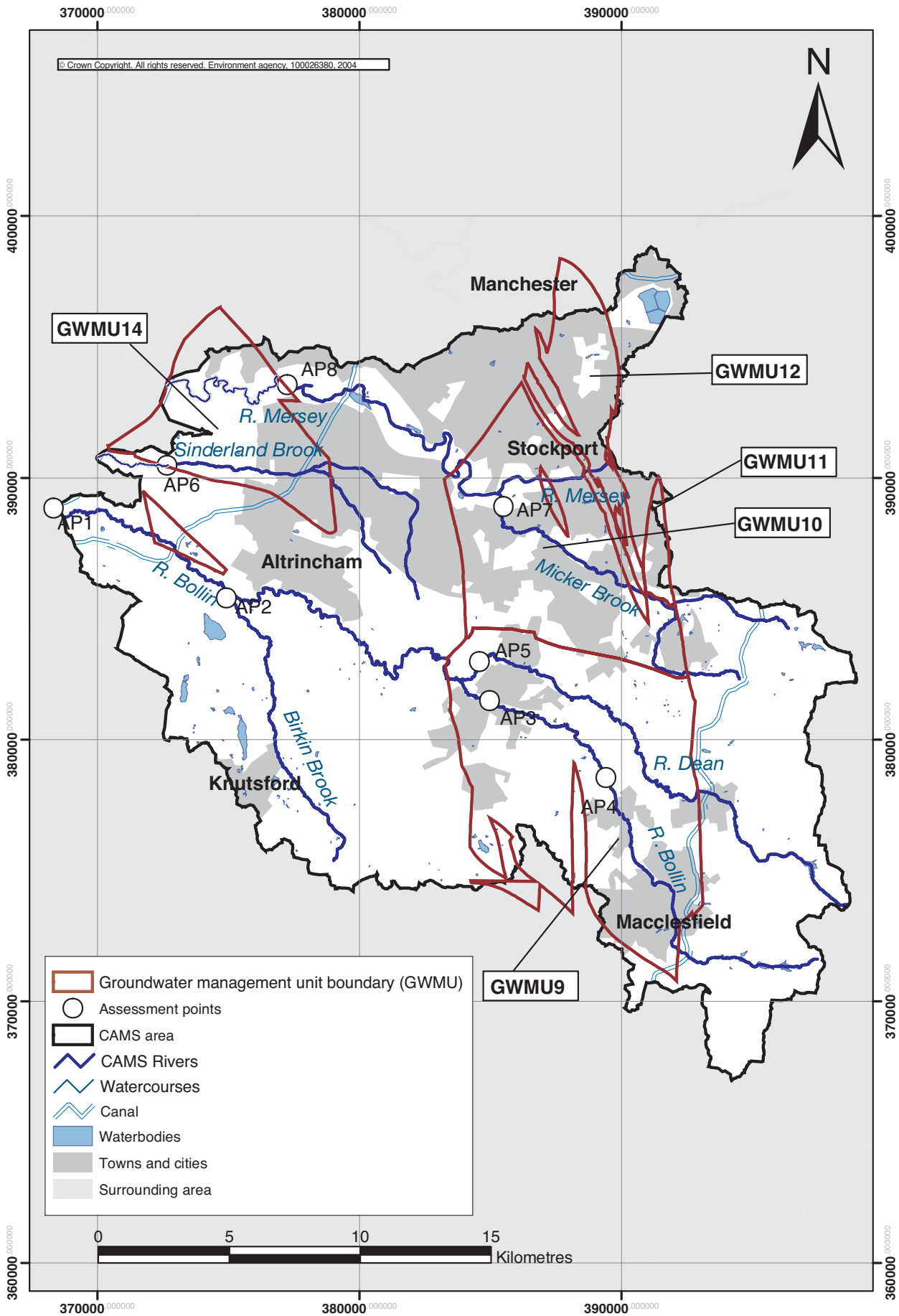
To ensure water resources are assessed consistently in similar situations, a framework for resource assessment and management, to be applied in all Catchment Abstraction Management Strategies (CAMS) areas, has been developed.

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

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 GWMUs and river APs that have been defined for the Mersey and Bollin CAMS. Further details on how these were defined are provided in the *Technical Document* for the Mersey and Bollin CAMS.

Map 4 | Mersey and Bollin CAMS groundwater management units and assessment points



4.2 Resource assessment of Groundwater Management Units (GWMUs)

GWMUs have been defined for the Mersey and Bollin CAMS. These are illustrated in **Map 4** and **Table 2**

Table 2 | GWMUs assessed in Mersey and Bollin CAMS

Groundwater management units	Name
GWMU 9	Dean and Bollin
GWMU 10	Cheadle
GWMU 11	Hazel Grove
GWMU 12	Reddish
GWMU 14	Carrington

Groundwater resource availability in GWMU 13 (Trafford) has not been assessed within the Mersey and Bollin CAMS. This is because most of this GWMU falls within the Lower Mersey and Alt CAMS area. We will therefore publish our resource assessment for GWMU 13 in the Lower Mersey and Alt CAMS (due to be completed in 2008).

For the groundwater resource assessment, five tests can be applied to determine the resource availability status. These tests include an examination of the balance between recharge to the unit and abstraction from it. If the long-term average annual recharge to the GWMU is greater than the total quantity licensed to be abstracted from groundwater sources located within it, the unit is classed as “water available”.

If, on the other hand, licensed abstraction exceeds long-term recharge, the unit is “over-licensed”.

Table 3 | Mersey and Bollin CAMS Environmental Weighting Bands

Assessment Point No	Assessment Point Name	Environmental Weighting Band
1	Bollin prior to confluence with Manchester Ship Canal	M
2	Birkin Brook prior to confluence with River Bollin	M
3	Bollin at Wilmslow Gauging Station	H
4	Bollin at Macclesfield Wastewater Treatment Works	VH
5	Dean at Stanneylands Gauging Station	H
6	Sinderland Brook at Partington Gauging Station	L
7	Micker Brook at Cheadle Gauging Station	M
8	Mersey at Ashton-on-Mersey Gauging Station	M

Another of these tests is based on the identification of long-term trends in groundwater levels or water quality monitoring data. The tests also consider any evidence of significant abstraction-related damage to the environment, which would indicate that the groundwater is “over-abstracted”. For further information about these tests refer to the *Technical Document* (see *Appendix 1*).

4.3 Resource assessment of river assessment points

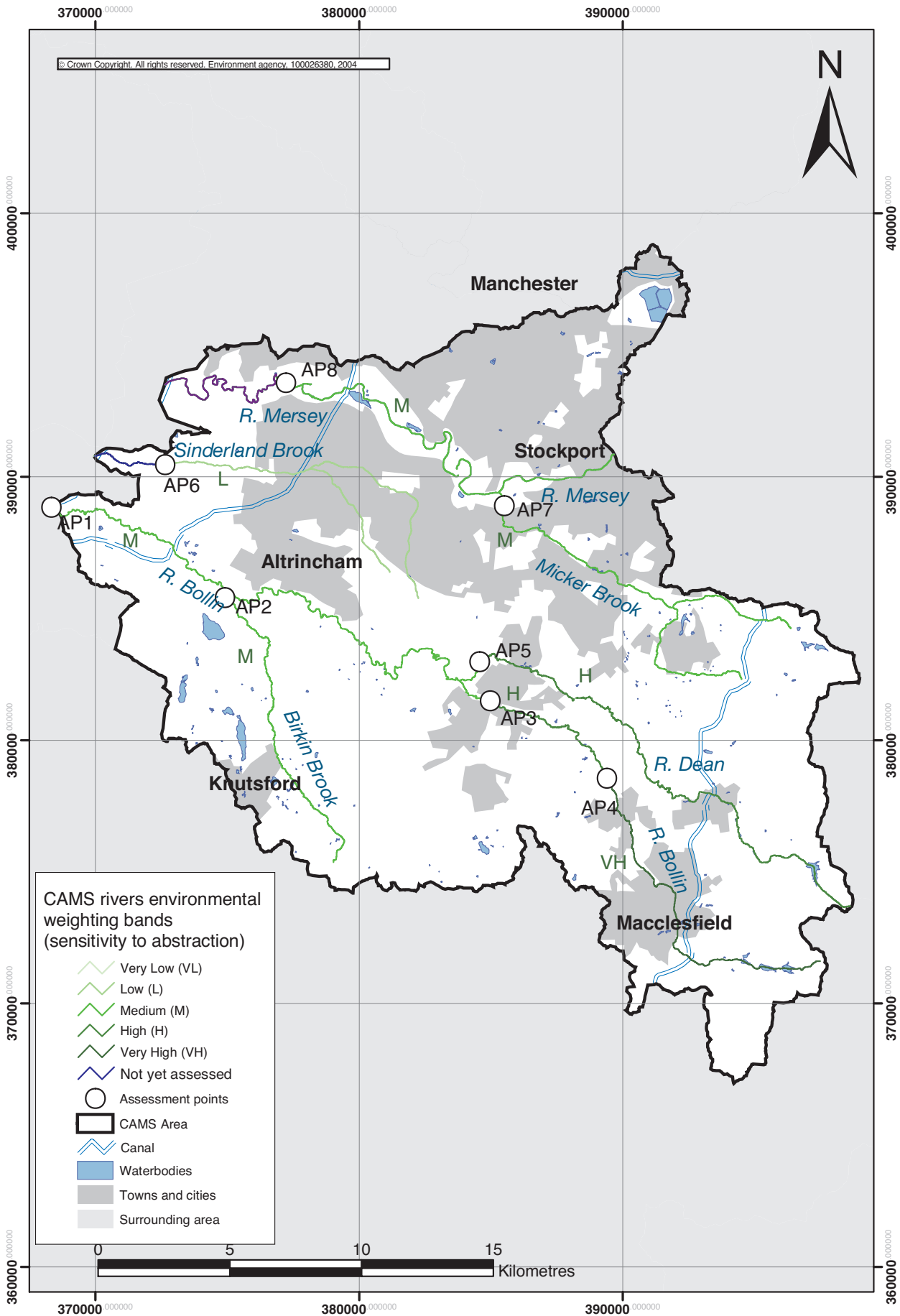
The surface water resource assessment requires the definition of “ecological River Flow Objectives”. These are based on the sensitivity of the local ecology to flow variations (i.e. their vulnerability to abstraction impacts). It also takes account of other flow needs. These objectives represent the minimum flow 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 first giving “environmental weighting” scores to the reaches. These represent the sensitivity of the river reach to abstraction. Reaches are banded according to their sensitivity to abstraction, either Very High (VH), High (H), Medium (M), Low (L) or Very Low (VL).

Map 5 and **Table 3** show the environmental weighting for each assessment point in the Mersey and Bollin 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 either a surplus, balance or deficit. The size of the surplus or deficit corresponds to a resource availability status for the unit.

Map 5 | Environmental weighting bands in the Mersey and Bollin CAMS area



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 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.

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 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 ecological 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.

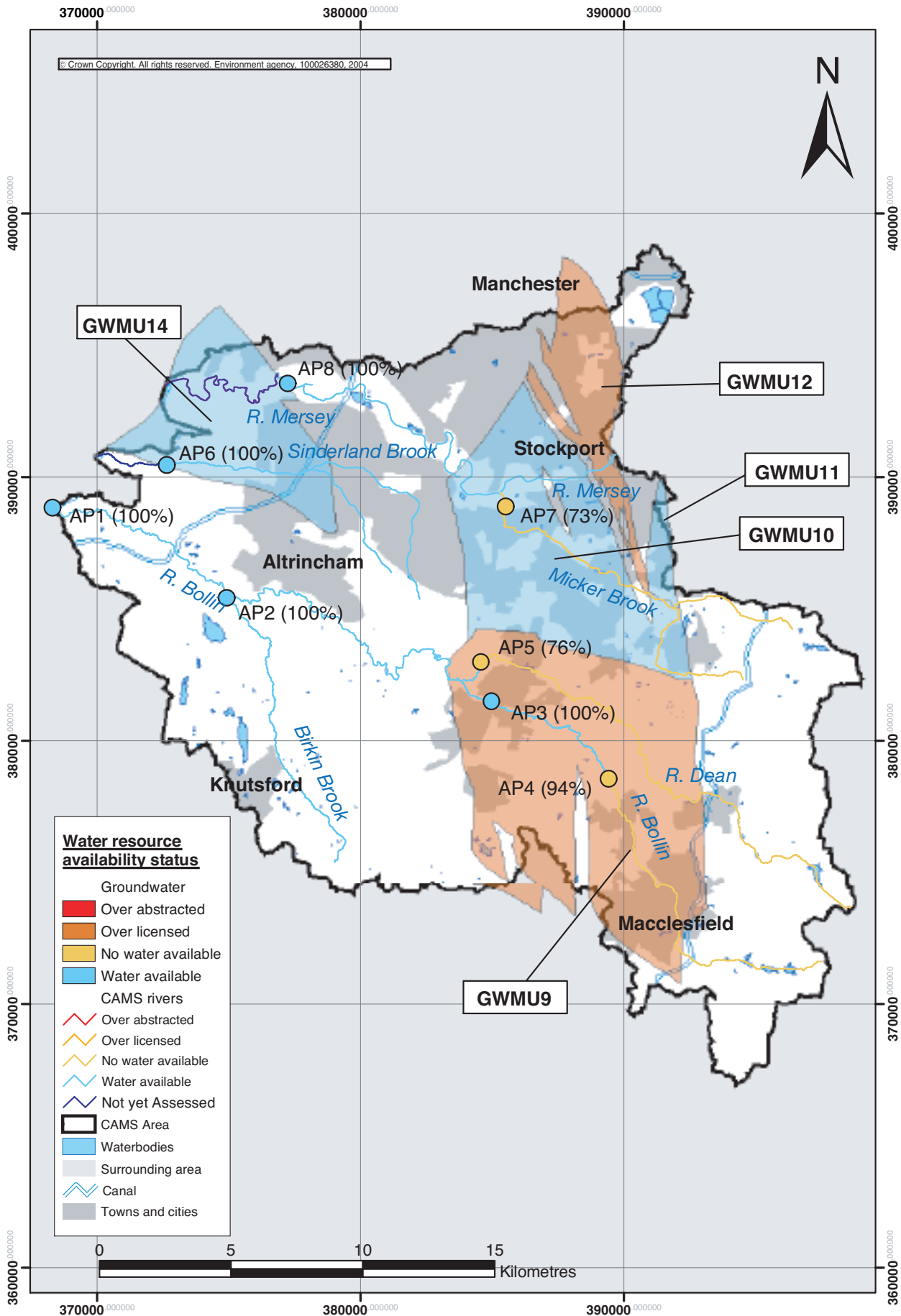
4.4 Integration of the surface water and groundwater resource assessments

Under the Resource Assessment and Management (RAM) process, the resource availability results for river reach and GWMU assessments are normally integrated.

However, owing to the nature of the geology of the Mersey and Bollin CAMS area, the major aquifer and surface waters have limited connectivity. Therefore, we considered it inappropriate to fully integrate the groundwater/surface water resource status in this catchment. Where groundwater abstractions were believed to have an impact on surface waters, the impact has been considered in the assessment, but the more isolated GWMUs have been assessed independently and assigned their own resource availability status which may be different to the overlying surface water status.

Map 6 shows the resource availability status of GWMUs and river reaches in the Mersey and Bollin CAMS area. The results of the separate surface water and groundwater assessments are available in the Mersey and Bollin CAMS *Technical Document*.

Map 6 | Mersey and Bollin CAMS water resource availability. The long-term resource availability percentage is shown in brackets



4.5 Summary of resource assessment for the Water Resource Management Units

Based on the characteristics of the catchments, e.g. size of the rivers, designated sites, land use, demand for water etc, and water resource availability status, the river reaches have been combined into Water Resource Management Units (WRMUs). A similar process was used to combine the groundwater units into separate WRMUs. These WRMUs define the areas for the development of the strategy for the future management of abstraction licensing (see *Section 5*).

Map 7 shows the boundaries of the surface water only WRMUs for the Mersey & Bollin CAMS and **Map 8** shows the location of the separate groundwater only WRMU.

The following sub-sections provide a brief overview of the resource assessment results for each of these WRMUs.

4.5.1 Water Resource Management Unit 1 (Lower Mersey and Sinderland Brook)

This surface water unit comprises Sinderland Brook (AP 6), the River Mersey (AP 8) and has input from a total catchment area of 511 km² from the upstream Tame Goyt and Etherow CAMS. These points were combined together owing to their “water available” status and the surface characteristics across this unit are similar. The length of watercourse in this unit is 43.1 km.

Map 7 illustrates the reaches in WRMU 1 and **Figures 4** and **5** illustrate the amount of water required for the environment, the amount of water already licensed and the amount of water available at low flows.

Within this WRMU the main licensed use of water is for agriculture. There are four major wastewater discharges at Stockport, Sale, Altrincham and Stretford. Much of the water discharged here comes from outside this unit and represents a significant artificial influence.

The lower reaches of this (surface water) unit overlies the Carrington groundwater management unit (WRMU 5). Some reaches of Sinderland Brook flow over sand and gravels, which are deposits above the main sandstone aquifer. Depending on the local degree of connectivity between the bedrock and surface water, abstraction from the sandstone (or sands and gravels) may affect flows in Sinderland Brook. This has been taken into account in developing our approach to licensing new groundwater abstractions (see *Section 5.5.2*).

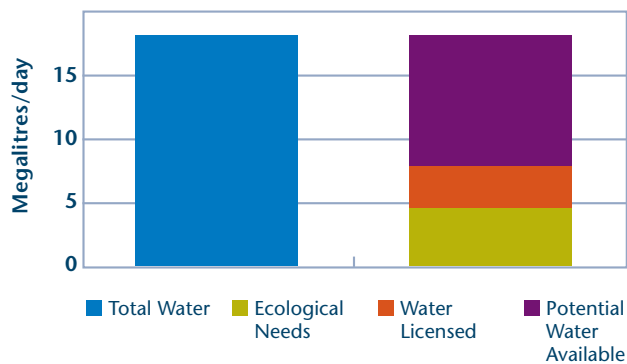


Figure 4 | Indicative resource availability across AP 6 (Sinderland Brook) at low flows

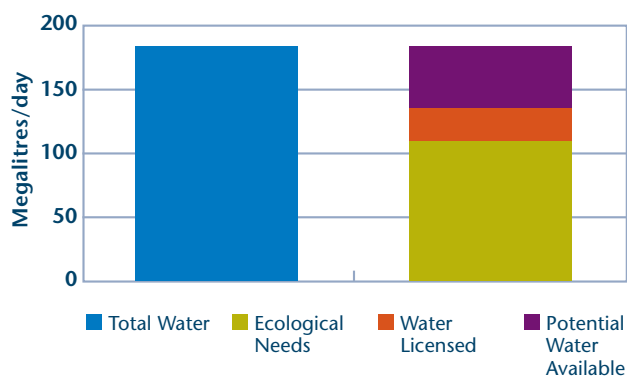
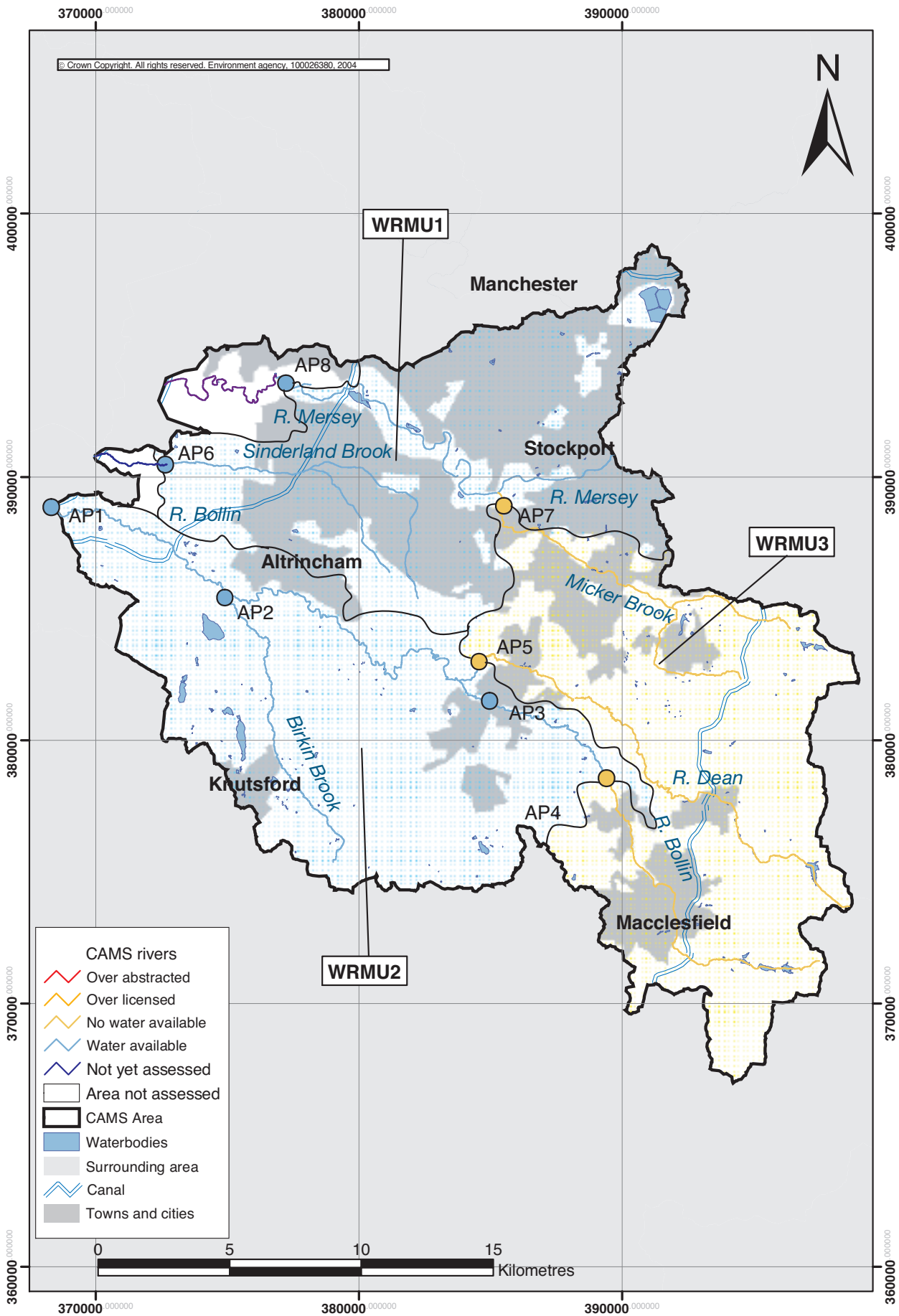


Figure 5 | Indicative resource availability at AP 8 (Lower Mersey) at low flows

Map 7 | Mersey and Bollin CAMS surface water WRMUs



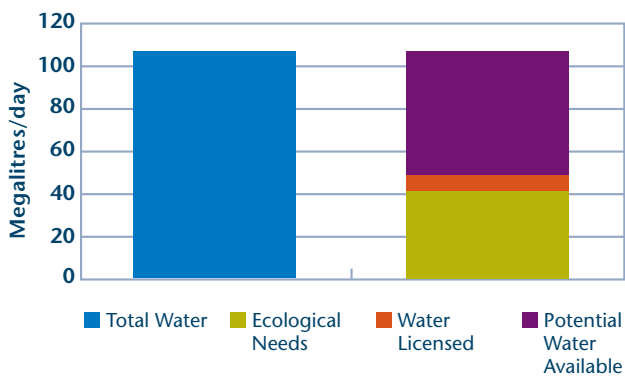


Figure 6 Indicative resource availability at AP 1 (Manchester Ship Canal) at low flows

There are a small number of designated sites in this unit and some non-statutory Sites of Biological Importance (SBIs) that are not adversely impacted by current abstraction. In addition, there are a number of locally important Biodiversity Action Plan (BAP) species. However, these species have no specific flow requirements over and above the ecological River Flow Objectives.

The unit is of importance for recreation and leisure activities including angling and riverside walks.

The resource availability status of the Lower Mersey and Sinderland Brook is “water available”.

4.5.2 Water Resource Management Unit 2 (Lower Bollin and Birkin Brook)

This surface water unit includes the River Bollin (AP 3), the Bollin upstream of joining the Manchester Ship Canal (AP 1) and Birkin Brook prior to its confluence with the River Bollin (AP 2). The length of watercourse in this unit is 92.9km.

These river stretches were grouped together owing to their “water available” status at low flows and as a result of sharing similar landscape and landuse.

Map 7 illustrates the reaches in WRMU2 and Figures 6, 7 and 8 illustrate the amount of water required for the environment, the amount of water already licensed and the amount of water available at low flows.

Within this WRMU there are a limited number of licensed abstractions, though the main licensed use of water is for agriculture. There are three major wastewater discharges at Macclesfield, Alderley Edge and Wilmslow. For more information about how we would licence within this unit, see Section 5.5.2.

The unit is of importance for recreation and leisure, for example, the area of Alderley Edge, with its dramatic sandstone escarpment and the beautiful scenery at Rostherne Mere, The Mere, and Tatton meres. Birkin Brook is an important brown trout fishery. A number of angling clubs also have angling stretches on the Lower Bollin.

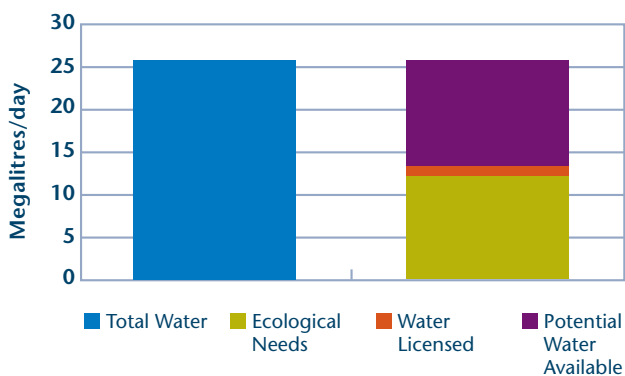


Figure 7 Indicative resource availability at AP 2 (Birkin Brook) at low flows

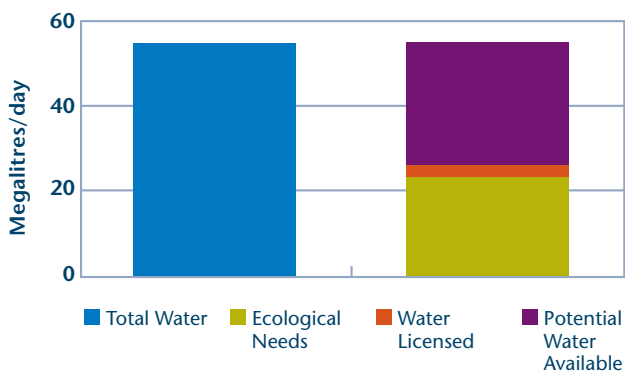


Figure 8 Indicative resource availability at AP 3 (River Bollin, Wilmslow) at low flows

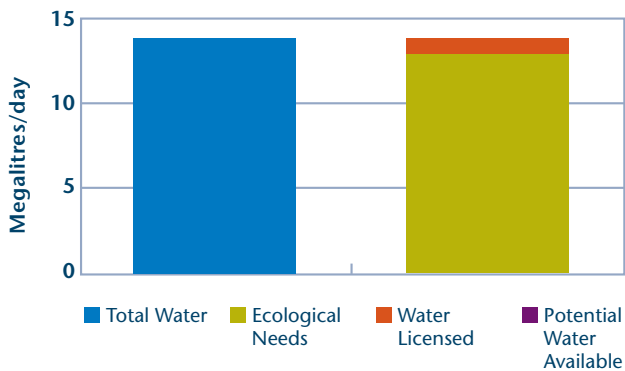


Figure 9 Indicative resource availability at AP 4 (River Bollin, Macclesfield) at low flows

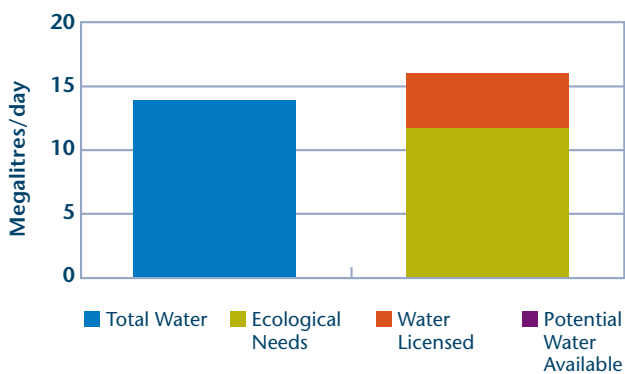


Figure 10 Indicative resource availability at AP 5 (River Dean) at low flows

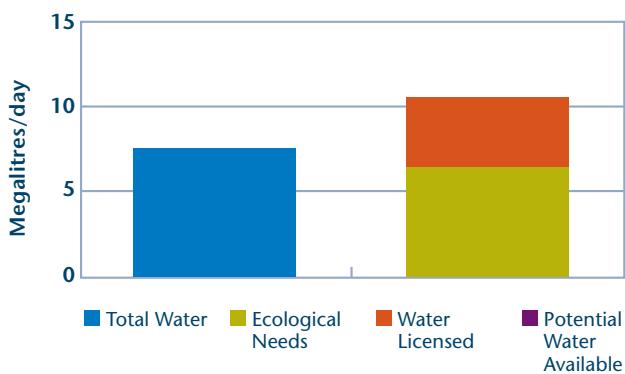


Figure 11 Indicative resource availability at AP 7 (Micker Brook) at low flows

There are a small number of designated sites in this unit and some non-statutory Sites of Biological Importance (SBIs) that are not considered to be adversely impacted by current abstraction. In addition, the meres are located within the internationally designated Midlands Meres and Mosses Ramsar site. However, these particular sites have no specific flow requirements over and above the ecological river flow objectives.

The resource availability status of the River Bollin is "water available".

4.5.3 Water Resource Management Unit 3 (Upper Dean, Upper Bollin and Micker Brook)

This surface water unit includes Micker Brook at Cheadle (AP 7), the River Dean (AP 5) and the River Bollin (AP 4). These river stretches were grouped together, owing to their shared status of having "no water available". The length of watercourse in this unit is 68.4km.

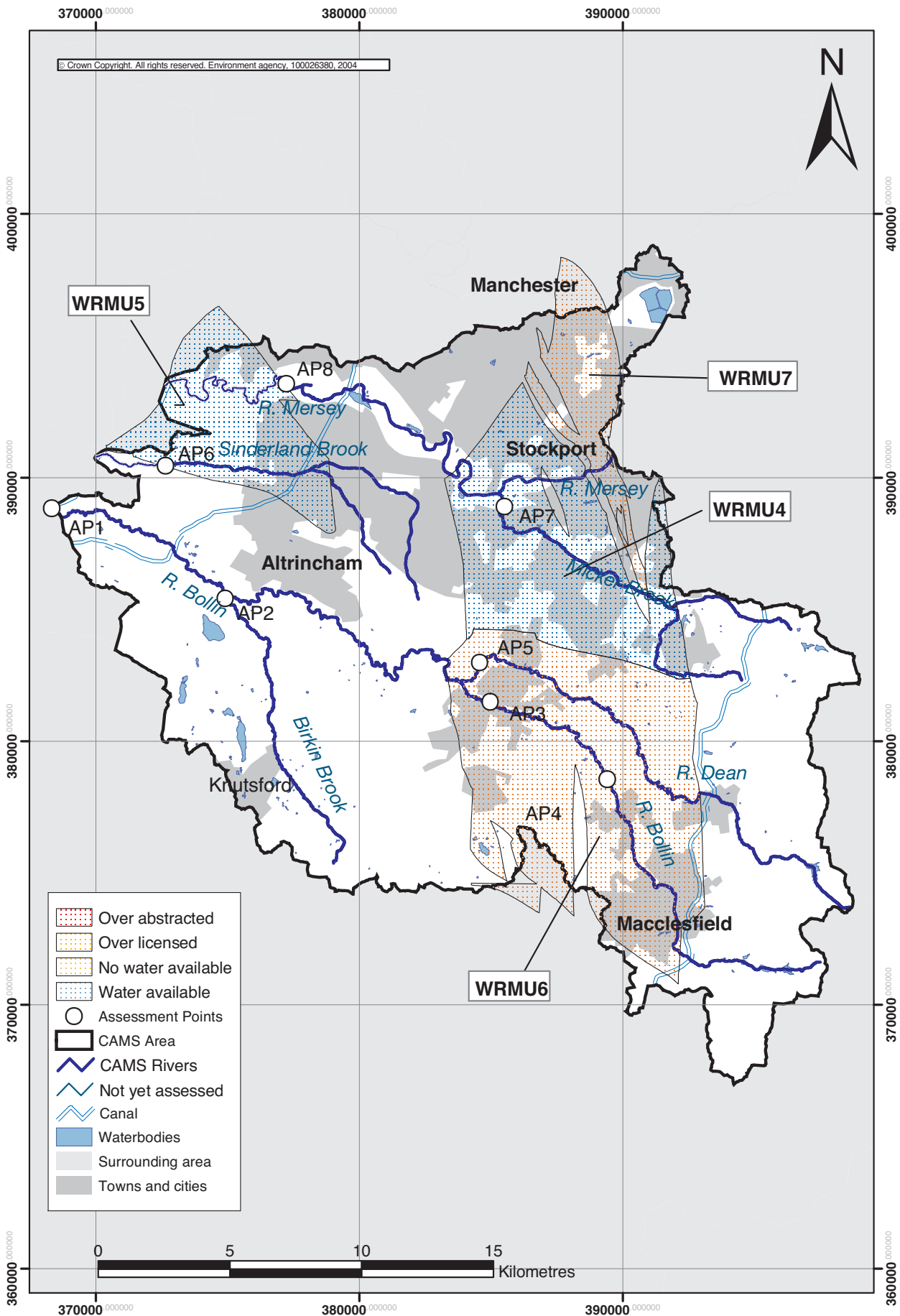
Map 7 illustrates the reaches in WRMU 3 and Figures 9, 10 and 11 illustrate the amount of water required for the environment, the amount of water already licensed. In Figures 9 and 10 it is possible to see that there is a deficit between the environmental needs and the licensed abstraction at low flows. For more information on how we would licence within this unit, see Section 5.6.2.

The underlying aquifer (groundwater only WRMU 6) has been assessed as being "over-licensed", i.e. there is potential for impact from groundwater abstraction on rivers in this unit.

Within this unit, the main licensed use of water is public water supply reservoirs at the top of the catchment, to the east of Macclesfield and includes Bollington and Lyme Park. There are many small abstractions within this unit that are exempt from the control of licensing regulations.

The resource availability status of the Upper Dean, Upper Bollin and Micker Brook unit is "no water available".

Map 8 | Mersey and Bollin CAMS groundwater resource management units



4.5.4 Water Resource Management Unit 4 (Cheadle and Hazel Grove)

This groundwater unit is an amalgamation of the Cheadle and Hazel Grove groundwater management units (GWMUs 10 and 11 respectively), which both have a water resource availability status of “water available”.

The assessment for the Hazel Grove GWMU, which extends into the Tame, Goyt and Etherow catchment, was deferred when that CAMS was published (2004), pending the outcome of the *Manchester and East Cheshire Aquifer Study* (see *Appendix 1*). The results of the study form the basis for the current resource assessment and management strategy for this unit (see *Section 5.7.1*); these will be reviewed during the next six years.

Map 8 shows that this (groundwater) management unit underlies part of the surface water WRMUs 1 and 3. However, the deeper sandstone aquifer is generally poorly connected to surface waters; hence the groundwater and surface units have been treated separately. (The water resource availability status of the overlying WRMU 3 is “no water available” and WRMU 1 is “water available”).

WRMU 4 also encroaches into the South West Peak CAMS area.

This groundwater WRMU combines both GWMUs 10 and 11 and shares water resource availability status of “water available”.

Information used to assess this unit was gathered from the *Manchester and East Cheshire Aquifer Study* (see *Appendix 1*). This study will continue to increase our understanding of the aquifer and guide our proposed management strategy for the next six years. For more information on how we would licence within this unit, see *Section 5.7.2*.

Figure 12 shows the groundwater level trends in this unit.

There is potential for groundwater to impact surface water units and surface water APs in this area, with no direct interaction between the sources. The current abstraction regime within this unit poses little threat to the surface water environment or local economic factors.

Within this WRMU the main licensed use of water is spray irrigation for agriculture and leisure facilities, for example golf courses.

The resource availability status of the Cheadle and Hazel Grove unit is “water available”.

4.5.5 Water Resource Management Unit 5 (Carrington)

This is the Carrington groundwater only management unit (GWMU14), for which the assessed water resource availability status is “water available”. However, resources will be limited, in part by restricted recharge and also because of the potential connectivity with surface water in the Sinderland Brook catchment (WRMU1, APs 6 and 8 – see *Section 4.5.1* and **Map 8**). For more information about how we will licence within this unit, see *Section 5.7.2*.

Figure 13 shows long-term groundwater level trends in the unit.

Within this WRMU the main licensed use of water is spray irrigation, for both agriculture and leisure facilities.

The resource availability status in the Carrington unit is “water available”.

4.5.6 Water Resource Management Unit 6 (Dean and Bollin)

This WRMU is the Dean and Bollin GWMU (GWMU9) (as illustrated in **Map 8**) and is the southern part of the Manchester and East Cheshire aquifer. The water resource availability status is “over-licensed”, owing to the fact that the licensed abstraction quantity exceeds the calculated recharge to the sandstone aquifer over the unit as a whole.

We are aware that, in hydrogeological terms, the aquifer within this unit is subdivided into a series of compartments because of its geological structure, and in particular the presence of a number of major low permeability faults that act as barriers to flow. This, combined with the nature of the overlying drift deposits, will control the balance between abstraction and recharge and hence resource availability on a local scale.

The main licensed groundwater abstractions within this unit are for public water supply and industry. Although not currently being operated continuously at their full licensed quantities, the public water supplies are of strategic importance and form part of the drought contingency resources across the region. Because of local sustainability concerns, these abstractions are already subject to ongoing groundwater level monitoring to assess their long-term impact. For more information on how we would licence within this unit, see *Section 5.8.2*.

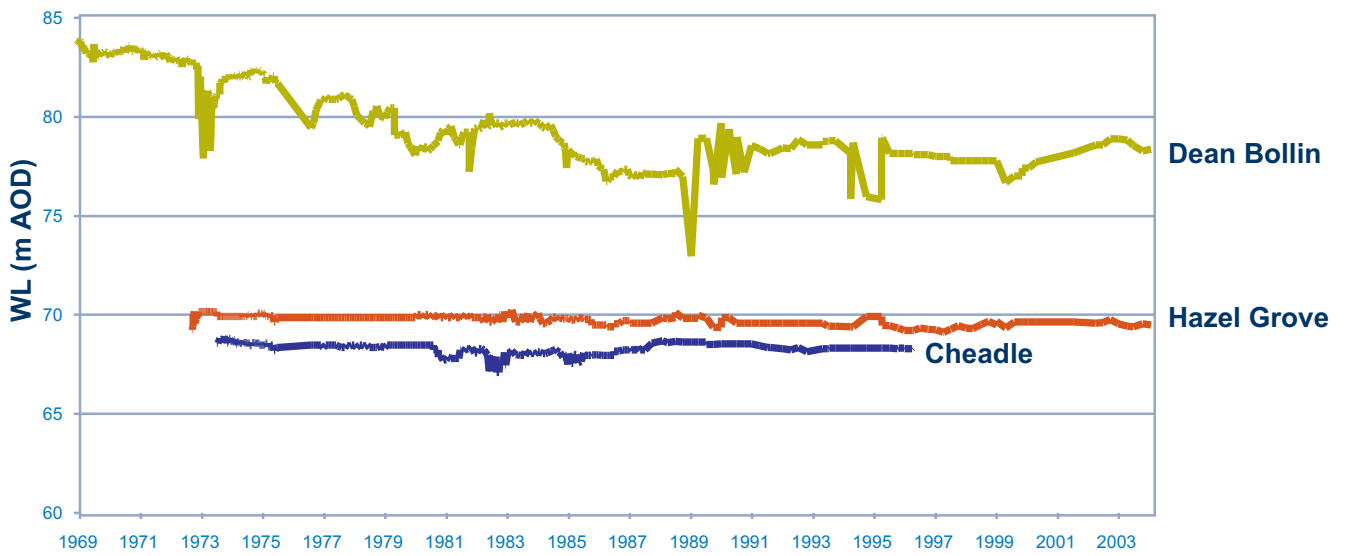


Figure 12 | Groundwater level trends WRMU 4 and 6 (1969-2003)

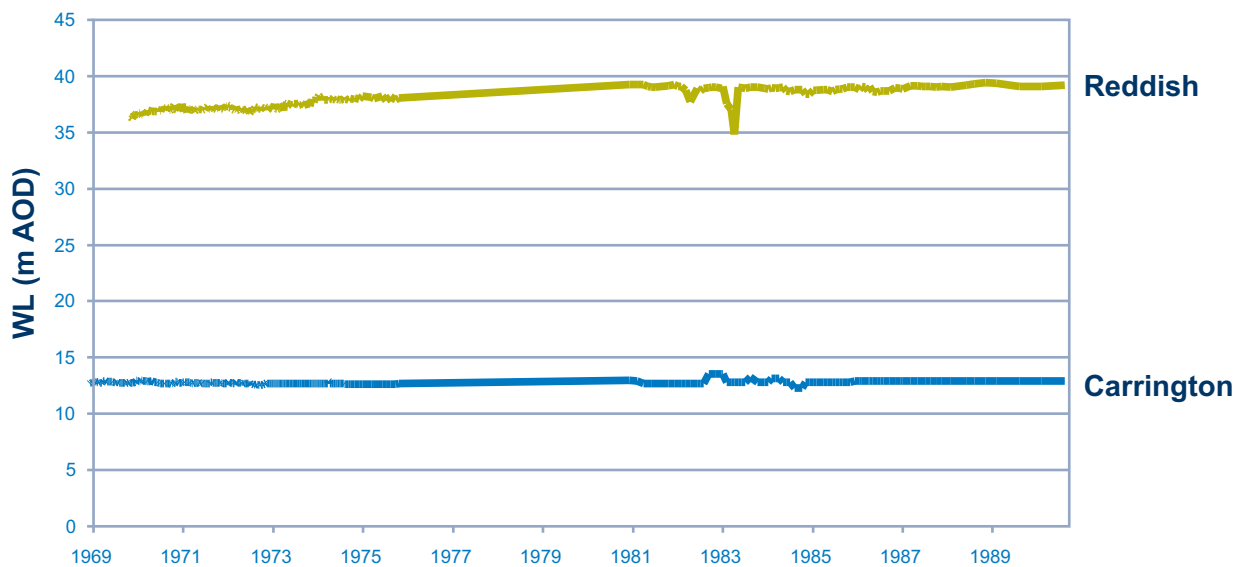


Figure 13 | Groundwater level trends WRMU 5 and 7 (1969-1990)

Figure 12 shows representative groundwater level trends within the main Dean and Bollin unit, along with those to the north in the Cheadle and Hazel Grove units. This illustrates the impact of (mainly public water supply) abstraction, with a gradual decline since 1969, with some recovery from 1999 in response to reduced actual abstraction. There will be localised variations to these trends because of the aquifer compartmentalisation.

The resource availability status of the Dean and Bollin unit is “over-licensed”.

4.5.7 Water Resource Management Unit 7 (Reddish)

This is the Reddish groundwater management unit (GWMU 12), which is part of the Manchester and East Cheshire Sandstone aquifer and has been assessed as having a resource availability status of “over-licensed” (illustrated in **Map 8**). The unit underlies, but is considered relatively isolated from, surface water WRMUs 1 and 3 (which have a resource availability status of “water available”); it also extends into the Tame, Goyt and Etherow CAMS area.

The current licensing strategy, as outlined in *Section 5.8.2*, is based on our understanding developed during that study. It will be reviewed throughout this CAMS cycle and refined if necessary in the future

The main use of groundwater within the unit is for industrial purposes. Historically, groundwater abstractions within the Stockport area were greater than they are today; this is reflected in long-term groundwater level trends within the Reddish unit (See **Figure 13**). The current resource availability status indicates that actual abstraction is significantly less than the full licensed volume.

Figure 13 shows the groundwater level trends within the Reddish unit. The overall rise from 1969 to 1981 reflects a recovery of groundwater levels in response to reduced industrial abstraction in the Stockport area prior to and during that period.

Within this WRMU the main licensed use of water is industry.

The resource availability status of the Reddish unit is “over-licensed”.

4.5.8 Areas not included in the Water Resource Management Units.

Water resource availability has been assessed for most areas within the Mersey and Bollin CAMS area, however the following areas were not assessed:

- river reaches downstream of AP 6 and AP 8; these will be assessed in the Lower Mersey and Alt CAMS;
- catchments upstream of the CAMS area reservoirs. These features are considered to be fixtures of the catchment and the ecology downstream of longstanding reservoirs is generally regarded to have adapted to the flow regime;
- groundwater management unit 13 Trafford falls largely outside this CAMS area and will be assessed in the Lower Mersey and Alt CAMS (due to start in 2006); and
- minor aquifers.

Licensing strategy

5.1 Sustainability appraisal

We have developed a sustainability appraisal process to help us to take account of 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. 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 Catchment Abstraction Management Strategy (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*.

The sustainability appraisal of the Mersey and Bollin 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, bank-side recreation, health and flood defence;
- economic criteria such as licensed abstractors, impacts on the wider economy, development opportunities, local strengths and disparities, and tourism; and
- impacts on natural resources such as energy consumption, energy generation, water use, changes in land use and waste and discharge.

More details of the sustainability appraisal completed for the Mersey and Bollin CAMS can be found in the *Technical Document* (see *Appendix 1*) available from your CAMS contact (details in *Section 1*).

5.2 Links between the Mersey and Bollin CAMS and national and regional strategies

CAMS sit within a long-term framework provided by our national and regional water resources strategies *Water Resources for the Future* (see *Appendix 1*) published in 2001. The National Strategy defines a strategic framework for water resources management, including abstraction licensing, with a forward look of 25 years. Since its publication, we have produced a review each year to re-evaluate the prospects for water resources into the 2020s. These strategies are 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; and
- maintaining the security of public water supplies.

In addition to our National Water Resources Strategy, there are other national initiatives that have implications for the management of water in the Mersey and Bollin CAMS area. Our Restoring Sustainable Abstraction Programme (RSAP) catalogues sites that are affected or could be affected by abstraction. This catalogue includes National Environment Programme (NEP) sites, Asset Management Plan (AMP) schemes and Habitats Directive sites, where consents need to be reviewed.

We have completed preliminary assessments for a number of these sites under the Habitats Directive and, if further investigation of licences is required, we will contact the licence holder at the appropriate stage in the process. For further information on the Habitats Directive, refer to *Managing Water Abstraction* (see *Appendix 1*).

Our North West Water Resources Strategy considers how to meet regional needs for abstraction for public water supply, industry and agriculture over the next 25 years in a sustainable manner. Some of these considerations could have an impact on the Mersey and Bollin catchment, although they are more likely to be important in the future.

5.3 The Water Act 2003

Following the first major review of the abstraction licensing system since its inception in 1963, the Government set out, in 1999, a new framework for managing water resources. The CAMS process and the move to time-limited licences are key elements of the new framework, which is completed by revisions to the statutory framework introduced by the Water Act 2003. The Act updates the Water Resources Act 1991 in several key areas:

- deregulation of small abstractions, i.e. 20m³ or below per day;
- new controls on previously exempt abstractions for mine and quarry dewatering, trickle and other forms of irrigation, transfers into canals and internal drainage districts;
- stronger powers for water resources planning and management;
- changes to the legal status of abstraction licences;
- more flexibility to the licensing regulations to improve its efficiency and to encourage trading; and
- stronger powers on water conservation.

For more details on the Act and its implementation, see our website, www.environment-agency.gov.uk. Our website will be updated to provide information as the Water Act is implemented.

5.4 Catchment overview of licensing strategy

This section outlines elements of the strategy that apply to the whole CAMS area.

We operate a rigorous enforcement policy and carry out regular inspections to ensure that licence holders are complying with the conditions on their licences.

Monitoring will continue to be carried out for all surface water units to increase our knowledge of flows throughout the catchment. This will include further fisheries and ecology monitoring to ensure there is sufficient information available for the environmental weighting assessment at the review of the Mersey and Bollin CAMS in six years time, and to monitor the impact of this strategy until then.

5.4.1 Licence determination

Managing Water Abstraction sets out a summary of who can apply for an abstraction licence, and how we determine licence applications and impoundment licences. It also describes the circumstances in which a licence is not required. There have been changes to the way we manage licences for abstracting water. For more information consult the leaflet *The Water Act 2003 – Modernising the Regulation of Water Resources* (see *Appendix 1*). The strategy outlined in this document will be achieved within the framework of the legislation for abstraction licensing; i.e. Water Resources Act 1991, Water Act 2003 and associated legislation.

Any new applications that are near, or within, a Habitats Directive site will need to demonstrate that the application/proposal will not have a detrimental impact on the features of the protected site. Contact our Birchwood Office for further guidance (see *Section 1* for more details).

The strategy does not override the continuing 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, owing to the need to safeguard local environmental interests and/or other abstractors; existing licence holders will be safeguarded.

Conversely, the water resource availability status of “no water available” applies specifically to surface water at low flow conditions, however licences may be available with restrictions at higher flows.

5.4.2 Approach to time-limiting

Applications for new and varied licences received since 1 October 2001 have had a time limit applied. There is now a legal requirement, following the implementation of the Water Act 2003 (see *Appendix 1*), to issue all new licences and licence variations with a time limit.

The normal renewal period is 12 years and the common end date for the Mersey and Bollin CAMS is 31 March 2018. All new licences will be issued to this common end date but the renewal period may shorten as this date approaches. At our discretion we may apply shorter time limits to licences and, in exceptional cases, permit longer durations.

Applications for renewals will be subject to the usual statutory application procedures. In any case, the renewal of a licence will normally be dependent upon the applicant meeting three tests:

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

Licence holders will be notified in advance of the licence 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, we will aim to give six years notice.

Applications to renew a licence should be submitted at least three months before expiry to allow for determination of the application. For further information on time-limiting, refer to *Managing Water Abstraction, Section 5* (see *Appendix 1*).

When considering new applications or increases in groundwater abstractions, shorter time limits may be applied where there is considerable uncertainty over the balance between abstraction and recharge and a significant risk to sensitive surface water features or other abstractors.

5.4.3 Approach to hands-off conditions

It is our standard 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 not result in a net loss of flow (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. Successive proposals may result in higher hands-off flow conditions to safeguard previously established rights. In certain circumstances it may be necessary to use river levels, rather than flows, as a control. Where necessary we will use a tiered approach as set out in the Resource Assessment and Management (RAM) Framework hands-off flows to meet the ecological River Flow Objective.

Wherever possible we will specify the flow condition at our flow gauging stations so that enforcement is as effective as possible. There are situations where this may not be possible and the applicant will be required to install and maintain a measuring device to appropriate British Standards. It will be made clear to the applicant the conditions of the licence and their responsibility. Further guidance on hands-off flow conditions will be given to licence applicants.

In the case of groundwater abstractions, in certain high risk settings, hands-off levels may be applied to new licences, based on groundwater levels measured at or around the site. (We expect the applicants to monitor groundwater levels in their abstraction boreholes, and for larger abstractions we may require the construction of purpose drilled observation boreholes).

5.4.4 Water efficiency

As part of the implementation of the Water Act 2003, there is an increased focus on water conservation. Water companies now have new duties to conserve water and all public bodies will need to consider how to conserve water supplied to premises. The Government has new responsibilities for monitoring and reporting progress in this area.

We will encourage all abstractors to employ water efficient methods to reduce demand. These are largely a matter of common sense, thinking about the ways water is used and then targeting for reduction. Licence holders are notified that they will be required to demonstrate efficient use of water for the renewal of time-limited licences.

There are a number of organisations that can provide more information on how to save water. A list of contacts is included in *Appendix 2*.

5.4.5 New exemption threshold

The Water Act 2003 makes significant changes to the current abstraction licensing legislation. With effect from 1 April 2005, any abstraction of water less than or equal to 20m³ per day in aggregate will no longer require a licence to abstract. Licences which were in force prior to 1 April 2005, will cease to have effect, i.e. will be deregulated, because the Act says that such abstractions no longer require licensing. The protected rights to abstract water formerly enjoyed by licence holders under a licence which has been deregulated will be preserved.

It is an offence to abstract more than 20m³/day (0.02 Ml/day) without an abstraction licence or a specific exemption from water resource abstraction licensing. If you are thinking about abstracting water and are unsure whether you need a licence or not you are advised to contact our office in Birchwood (see *Section 1* for more details).

5.4.6 Opportunities for licence trading in the Mersey and Bollin CAMS area

One of the objectives of the CAMS process is to facilitate water rights trading. The term water rights trading refers to the transferring of licensable water rights from one party to another, for benefit. It involves a voluntary movement of a right to abstract water between abstractors, using the abstraction licensing process. More detailed information is available in *Managing Water Abstraction*.

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 (see *Appendix 1*). Consultation on more detailed proposals followed in 2003. After considering the responses to this consultation exercise, 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. This information and guidance will be timed to coincide with the expected implementation of the sections of the Water Act 2003 that are most relevant to trading.

Further information on Water Rights Trading is available on our website; (www.environment-agency.gov.uk/subjects/waterres).

5.4.7 CAMS and drought

Droughts are prolonged periods of below average rainfall resulting in low river flows, low reservoir levels, and/or low recharge of groundwater. Depending on the duration, intensity, and 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). 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 companies and ourselves produce specific drought plans that 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. Our drought plan documents 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* and the *Technical Document* (final version).

5.5 Water Resource Management Unit 1 (Lower Mersey and Sinderland Brook) and Water Resource Management Unit 2 (Lower Bollin and Birkin Brook)

5.5.1 Resource availability status and results of sustainability appraisal

WRMUs 1 and 2 have a resource availability status of "water available". Using our sustainability appraisal, we identified the agreed options to apply, as illustrated in **Table 4** (see *page 36*). The strategy for these WRMUs is to remain at the current status of "water available" and allow some scope for further abstraction. The rivers within these units have a range of environmental sensitivity to abstraction (See **Map 5**).

This option allows further abstraction, whilst protecting the ecology and the recreation interests in the unit. When issuing new licences, we will consider the environmental sensitivity of the different river reaches, and how to protect lawful users downstream.

5.5.2 Guidance on the assessment of new applications

Currently water is available all the time based on long-term average conditions. Therefore:

- there is a presumption to grant new licences within this unit, subject to normal determination criteria and local circumstances, in accordance with the Water Resources Act 1991, Water Act 2003 and associated legislation;
- when assessing new licence applications, we will consider any impacts on the Sites of Special Scientific Interest (SSSIs) at Brookheys Covert and Sinderland Brook, the Midland Meres and Mosses, or Rostherne Mere (Ramsar);
- new licence applications will need to be accompanied by environmental reports to ensure there are no adverse environmental impacts; and
- where hands-off flows are required, we will set tiered restrictions to protect flow variability using the RAM Framework as appropriate. As the number of licences granted increases they will be 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 our time-limiting policy and associated renewal criteria (see *Section 5.4.2*).



Spray irrigation

5.6 Water Resource Management Unit 3 (Upper Dean, Upper Bollin and Micker Brook)

5.6.1 Resource availability status and results of the sustainability appraisal

WRMU 3 has a resource availability status of “no water available”. Using our sustainability appraisal, we identified the agreed options to apply, as illustrated in **Table 4**. The strategy for this WRMU is to remain at the “no water available” resource status. This option balances the economic and environmental needs of WRMU 3 by limiting further abstraction to times when river flows are high.

5.6.2 Guidance on the assessment of new applications

Currently there is no water available at low flow periods of the year based on long-term average conditions. Therefore:

- there will be a presumption against the granting of consumptive abstraction during times of low flow. Non-consumptive abstractions will be considered provided they do not compromise the current ecological status of the reaches within WRMU 3, subject to normal determination criteria and local circumstances, in accordance with the Water Resources Act 1991, Water Act 2003 and other associated legislation;
- where hands-off flows are required, we will set tiered restrictions to protect flow variability using the RAM Framework as appropriate. As the number of licences granted increases they will be subject to more restrictive flow conditions and as a result the overall reliability of consumptive licences will be reduced; and
- there is some scope to grant new licences within this unit at higher flows.

5.6.3 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 our time-limiting policy and associated renewal criteria (see *Section 5.4.2*).

5.7 Water Resource Management Unit 4 (Cheadle and Hazel Grove) and Water Resource Management Unit 5 (Carrington)

5.7.1 Resource availability status and results of the sustainability appraisal

These groundwater management units share resource availability status of “water available”. They are part of the Manchester and East Cheshire aquifer.

The Cheadle and Hazel Grove unit crosses the CAMS boundary with the Tame, Goyt and Etherow CAMS area. Assessment of groundwater resource availability for this unit was originally postponed during the production of the Tame, Goyt and Etherow CAMS, pending completion of the *Manchester and East Cheshire Aquifer Study*. The results of the study have formed the basis of the groundwater resource assessments reported here. It concluded that there is only limited water available within the Carrington GWMU, as there is a close connectivity between groundwater and surface water. The findings of the study will be reviewed and updated as our understanding of the aquifer evolves. This information will guide our management strategy for the next six years and for future CAMS cycles.

Using our sustainability appraisal, we identified the agreed options to apply, as illustrated in **Table 4**. The strategy for both WRMUs is to stay at “water available”

– we have assessed that there is limited water available and we will continue to monitor the situation over the next six years.

5.7.2 Guidance on the assessment of new applications

Owing to uncertainty over actual rates of recharge to the aquifer and the degree of river/groundwater interaction, new licences may be time-limited to less than the CAMS common end date (31 March 2018).

New licensed abstractions may also require groundwater level monitoring from the abstraction borehole and/or purpose-drilled observation boreholes to reduce this uncertainty and safeguard surface water reaches from the impacts of groundwater abstraction.

In some situations we may have to apply hands-off level conditions, to protect other users and the sustainability of sensitive aquatic ecosystems, particularly at Sinderland Brook (AP 6) for the Carrington unit.

New applications within the Carrington unit will therefore be considered with caution and we will expect them to be supported by a detailed assessment of the potential effects on flows in Sinderland Brook.

5.7.3 Renewals and management of existing licences

There will be a presumption of the renewal of existing time-limited licences and time-limited variations in accordance with our time-limiting policy and associated renewal criteria (see *Section 5.4.2*).



Spittle House water level recorder on the River Bollin

However, new licences may be time-limited to less than the CAMS common end date (31 March 2018) to safeguard surface water reaches from the uncertainty of groundwater abstraction impacts.

5.8 Water Resource Management Unit 6 (Dean and Bollin) and Water Resource Management Unit 7 (Reddish)

5.8.1 Resource availability status and results of the sustainability appraisal

The Dean Bollin (WRMU 6) and Reddish (WRMU7) groundwater management units form the southern and eastern sections of the Manchester and East Cheshire aquifer respectively. They both have a resource availability status of “over-licensed”, based mainly on the findings of the *Manchester and East Cheshire Aquifer Study*.

When considering management options in sustainability appraisal, we have recognised the strategic importance of groundwater for public water supply. We have taken account of uncertainty over actual recharge to the sandstone aquifer, its storage characteristics and hence relatively slow rate of response to abstraction and the poor connectivity with surface waters.

Using our sustainability appraisal, we identified the agreed options to apply, as illustrated in **Table 4**. The strategy for these WRMUs is to stay at “over-licensed” status. The main objective of the resulting licensing strategy is to ensure long-term sustainability of abstraction, whilst allowing operational flexibility. It is proposed that in order to achieve this balance over the next six years we will have a presumption against issuing new licences and we will work with existing licence holders to voluntarily reduce actual abstraction rates where this is achievable (see *Section 5.4.6* for further information on water rights trading).

To avoid worsening the resource availability status of this WRMU, our aim is that the volume of actual abstractions does not approach the overall licensed annual volumes over time.

In other words, reducing actual volumes abstracted will reduce the risk of over-abstraction of the aquifer in the medium to long-term and will lengthen the overall sustainability of the water resources yielded by the aquifer. Energy consumption will also be reduced owing to less pumping.

5.8.2 Guidance on the assessment of new applications

Because the aquifer is considered to be over-licensed, we will have a presumption against issuing any new licences.

5.8.3 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 our time-limiting policy and associated renewal criteria (see *Section 5.4.2*).

5.8.4 Resource recovery strategy and other changes to existing licences

We will work closely with licensed abstractors to encourage them to use water efficiency measures to reduce actual abstraction rates.

We will continue to seek formal agreements with major abstractors to monitor their own groundwater levels and provide this information to us. This will help to improve the understanding of the groundwater resource and optimise the balance between abstraction and recharge.

The *Manchester and East Cheshire Aquifer Study* forms the basis for our groundwater resource assessment for this round of CAMS. We will review and update our assessment as more information becomes available during this and future CAMS cycles.

5.9 Remaining areas not in a WRMU

Not all rivers and aquifers were included in the resource assessment for the Mersey and Bollin CAMS. However, these areas were given some consideration at the resource assessment phase to ensure that there is a strategy for managing these areas.

In particular, the northern section of the Manchester and East Cheshire aquifer in the Trafford Park area will be included in the Lower Mersey and Alt CAMS to be published in 2008. This will allow the resource assessment and licensing strategy to take into account the results of a forthcoming water resource study to be commissioned by us. This study is an ongoing phase of the *Manchester and East Cheshire Aquifer Study* and will be focusing on the groundwater quality and resource availability in and around Trafford Park.

5.9.1 Guidance on the assessment of new applications

There is a current presumption against any new licences in the Trafford aquifer area due to the uncertainty of the existing situation.

For all the other remaining areas not assessed within the CAMS catchment the current licensing practice will apply. We will presume that water is available for new licences, subject to normal determination criteria.

New applications may need to be accompanied by environmental reports to ensure that they are sustainable.

5.9.2 Renewals and management of existing licences

There will be a presumption of the renewal of existing time-limited licences and existing time-limited variations in accordance with our time-limiting policy and associated renewal criteria (see *Section 5.4.2*).

Table 4 | Summary of licensing strategy for each WRMU

	WRMU 1	WRMU 2	WRMU 3	WRMU 4	WRMU 5	WRMU 6	WRMU 7	Comments
Current Status 2005	Water Available	Water Available	No Water Available	Water Available	Water Available	Over Licensed	Over Licensed	
Target Status 2011	Water Available	Water Available	No Water Available	Water Available	Water Available	Over Licensed	Over Licensed	
Management options								
Adopt RAM Framework	✓	✓	✓	✓	✓			<p>WRMU 1 &2: This option will allow surplus water at low flows to be abstracted but will protect flow variability through setting tiered hands-off flow conditions. This option provides benefits to both the economy and the environment.</p> <p>WRMU 3: New licences may be granted to abstract water at higher flows, with the use of tiered hands-off flows conditions. No water is available for abstraction at low flows in order to protect the environmental needs of these reaches.</p> <p>WRMU 4 &5: Groundwater abstractions in these units will be granted in consideration of the surface water environmental needs, this may mean shorter than normal time limits and borehole level monitoring and hands-off conditions.</p>
Presumption against new licences						✓	✓	This option protects the existing groundwater licence holders and the long-term sustainability of the aquifer.
Voluntary reduction in abstraction.						✓	✓	<p>This option involves voluntary reduction of actual abstraction (e.g. Water Efficiency) only where this is achievable and appropriate. This option will not affect existing licence holders rights.</p> <p>This would contribute to a reduction in overall volumes of water actually abstracted. This will reduce the risk of over-abstraction of the aquifer and will lengthen the sustainability of the water resources yielded by the aquifer.</p>

Future developments in the CAMS area

Over recent decades there has been no net increase in abstraction and more recently a decline in actual abstraction has been seen. In terms of public water supply, groundwater demand is likely to continue to fluctuate as the use of groundwater sources is balanced with surface water resources, as part of the strategic supply, and these form a key aspect of the water company's drought contingency resources.

Climate change is likely to be a gradual process and so the six-yearly CAMS cycle will allow us to continue to manage water resources effectively. We are working with experts to better understand the potential impacts of climate change on water resource availability into the future.

Post-CAMS appraisal

We will review the Mersey and Bollin CAMS in 2011 and publish the reviewed strategy in 2013. The success of the first CAMS will be assessed using the following indicators:

- New licences granted where there is a surplus of water available providing applications satisfy the statutory determination requirements;
- The resource status of each Water Resource Management Unit remains unchanged or improves;
- Where we have “over-licensed” status, voluntary reductions in abstraction rates (where achievable and appropriate) will arise, with the objective of ensuring long-term sustainability;
- A routine monitoring programme is undertaken which includes monitoring flows throughout the catchment and monitoring the environment, including ecological, fisheries and physical factors. This will identify any potential changes to the current situation, highlighting improvements or deterioration resulting from abstraction activity;
- We will continue to visit licence holders to ensure compliance with licence conditions and to encourage water efficiency measures; and
- Increased monitoring network to be established in order to improve our understanding of the water availability within the groundwater units. This will be done by gaining agreements between new groundwater licence holders and ourselves.

Appendix 1

References

Managing Water Abstraction:

The Catchment Abstraction Management Strategy Process, Environment Agency (2002)

Managing Water Abstraction – Interim Update:

The Catchment Abstraction Management Strategy Process, Environment Agency (March 2005)

The Water Act 2003 –

Modernising the Regulation of Water Resources, Environment Agency (2004)

Manchester and East Cheshire Water Resources Study,

Environment Agency ESI Ltd (2004)

Mersey and Bollin CAMS Technical Document (final version),

Environment Agency (2005)

Water resources for the future:

A strategy for England and Wales, Environment Agency (2001)

Water resources for the future:

A strategy for the North West Region, Environment Agency (2001)

Water Rights Trading,

Environment Agency (2002)

Appendix 2

Water efficiency contacts

General/all sectors

Environment Agency

The Environment Agency provides a range of free guidance on water efficiency, including best practice case studies for agriculture, business, industry, public sector and the domestic consumer.

Consult www.environment-agency.gov.uk/savewater

Water companies

For local water efficiency advice, contact your water company. Consult www.uuplc.co.uk

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

Water Regulations Advisor Service

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

Business/Commercial

Envirowise

Envirowise is a Government programme offering free, independent advice on practical ways for industrial and commercial SME's (Small and Medium sized Enterprise) to minimise waste and convert turnover into profit. Envirowise has a specific water section on their site called 'Waternet', which includes links to guidance published around the world and a benchmarking tool. Consult www.envirowise.gov.uk/waternet or telephone the Environment and Energy helpline: 0800 585794.

Public sector

Watermark

Watermark is an initiative from OGCbuying.solution (part of the Office of Government Commerce in the Treasury) for public sector organisations. It has produced benchmarks for a wide range of public sector

buildings, and offers access to a shared savings scheme for the installation of new, water efficient, devices. Consult www.watermark.gov.uk

Water in the School

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

Hospitals

Water UK

Water UK has collaborated with NHS Estates and Watermark to produce Water Efficient Hospitals, an information pack to help hospitals use water wisely and save money by cutting both water and energy bills. Consult www.water.org.uk

Agriculture and Horticulture

UK Irrigation Association (UKIA)

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

Defra Rural Development Service

Defra's RDS provides grants for agricultural water resources management schemes under its Rural Enterprise Scheme. Consult www.defra.gov.uk/erdp/default.htm or telephone 0845 9335577.

Linking Environment & Farming (LEAF)

LEAF promote and develop integrated farm management, this includes whole farm water savings. Consult www.leafuk.org/leaf/

Appendix 3

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 licence

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

Alluvial deposit

Layers of sand, clay, gravels or other material created by river action. Usually this is very fine material that is removed, carried, and then dropped by rivers in flat areas such as flood plains, river mouths or lakes.

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.

Artificial impacts

The effects of abstraction and discharge (waste water) on flows at the assessment point.

Artificial influences

Activities such as surface water abstractions, wastewater returns and groundwater abstractions which either on their own, or together, affect natural river flows, etc.

Assessment point

A point in the catchment at which an assessment of available resources is 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.

Biodiversity

The living part of the natural world. It includes all plants and animals and their environment.

Biodiversity Action Plan

The UK Biodiversity Action Plan was produced by the UK Government in 1994 in response to the Convention on Biological Diversity held in Rio de Janeiro. The plan lists species and habitats and assigns actions to various organisations. Each local authority is required to produce a local Biodiversity Action Plan (LBAP). Other organisations, including ourselves, have produced their own plans.

Borehole

A well sunk into water bearing rock from which water will be pumped.

Boulder Clay

Material laid down by rivers and ice sheets. The material ranges from very fine clays to boulders and rocks of large size. This material is also called Till or Glacial Till.

Canal

An artificial watercourse used for navigation.

Carboniferous

A period of time 360-286 million years ago, used to describe rocks of that age.

Catchment

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

Coal Measures

Layers of rock that contain coal. The coal part usually follows layers of sandstone and shale (mudstone) in a repetitive pattern.

Collyhurst Sandstone

Name given to sandstone strata of Permo-Triassic age.

Compensation flow

Water released deliberately from reservoirs to keep river flow at a certain minimum level. This is usually a legal duty for water companies.

Confluence

The point where two or more streams or rivers meet.

Conservation Regulations 1994

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

Consumptive use

A use of water where a large amount of the water is not returned to the source of supply after use.

Consumptiveness

An amount of water not returned to the source of supply after its use, e.g. evaporated or water moved elsewhere.

Demand

The need for water for human use.

Derogate

To reduce or make worse. This is used in abstraction licensing where a new request for permission to use water may affect an existing licence holder by limiting their water supply and/or their protected rights.

Derogation

In legal terms, the taking away of protected rights under the Water Resources Act 1991 due to the granting of a new abstraction licence.

Discharge

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

Discharge Consent

A statutory document issued by us which defines the legal limits and conditions on the discharge of an effluent into controlled waters.

Drift

A loose layer of sand, gravel, clay etc, often left from rivers or ice sheets.

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 the environment.

Drought contingency

Plans or actions to be brought into place in the event of a drought, e.g. using water more efficiently, increasing supply from boreholes or moving water from one place to another.

Drought Order

A legal way that we, and water companies can apply to the Secretary (ies) of State to put limits on the uses of water and/or to limit or stop abstraction where environmental damage is being caused.

EC Directive

Issued by the European Commission to member states with the objective of producing common standards in the European Community – member states are then obliged to introduce appropriate legislation to comply with the Directive.

EC Freshwater Fish Directive

The EC Freshwater Fish Directive), adopted on 18 July 1978, seeks to protect those fresh waters identified by Member States as waters suitable for sustaining fish populations. For those waters it sets physical and chemical water quality objectives for salmonid waters and cyprinid (carp family) waters.

Ecological River Flow Objectives/level requirements

The lowest river flows (or water levels) needed to protect ecology (plant and animal life).

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.

Effluent

Liquid waste from industrial, agricultural or sewage works.

Environmental impact

Any effect on any activity on the environment.

Environmental River Flow Objectives

The minimum river flows from the area required to protect ecology and other environmental targets.

Environmental Weighting

An assessment of a river's sensitivity to abstraction based on physical characteristics, fisheries, macrophyte and macro-invertebrates for a catchment/sub-catchment. Generates Environmental Weighting Scores.

EU Water Framework Directive

First major review of European water policy. Seeks to improve water quality in rivers and groundwater in an integrated way (see Integrated River Basin Management). This was transposed into UK law in 2003.

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 changing pattern of a river's (average) daily flow rates.

Gauging station

A site where the flow of a river is measured.

General Quality Assessment

A way of measuring the quality of rivers etc.

Geomorphology

A study of land forms and of the natural processes that formed them.

Groundwater

Water that occurs below the surface of the ground in rock, gravels sands, etc.

Groundwater baseflow

River flow from groundwater sources, rather than surface run-off, e.g. soils water, reservoir releases, wastewater etc.

Groundwater catchment

The area from which aquifer water is released to a defined point on a river, or other boundary.

Groundwater Management Units

Geologically defined blocks of aquifer (water bearing rock), which are different enough to be able to be measured in terms of their water resource content. Geological faults or different rock types often separate units. Groundwater may possibly move in a different way within each unit.

Habitat

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

Habitats Directive

The EU Wild Birds Directive 1979 and the EU Habitats Directive 1992 were brought into UK law through the Conservation (Natural Habitats) Regulations 1994 and are collectively known as the Habitats Directive.

Hands-Off Flow

A condition on an abstraction licence where the abstractor may be required to stop or reduce the abstraction if the flow in the river falls below a set flow.

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).

Hectare

A metric unit equal to 10,000 square metres.

Hydraulic continuity

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

Hydrogeology

Study of geology connected with groundwater.

Hydrology

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

Hydrometric network

A group of water measuring sites (for weather, rainfall; river flow; river, lake, tide and groundwater levels). The information is used widely, e.g. for water resource management, to protect ecology, to improve water quality and to protect from flooding.

Hydrometry

The measurement of water on or below the earth's surface.

Impoundment

A dam, weir or other construction in a river etc. where water is stored behind that construction. An impoundment includes works that divert flows to allow larger constructions to happen, e.g. moving the path of a river for a temporary time to build a dam.

Integrated Resource Zone

A name given to a public water supply area in which all resources, including transfers, can be shared. The Integrated Resource Zone applies to the majority of the North West Region.

Integrated River Basin Management

The way the EU Water Framework Directive will be carried out to consider all the effects on a river and how any negative effects will be improved. A river basin includes a stretch of river from its sources to the sea. It also includes the area of land where it receives rainfall and any groundwaters and artificial sources that pour into the river. CAMS is one part of River Basin Management.

Irrigation

A way of moving water to where it is most needed by using artificial canals, ditches etc, This is especially important to help the growth of food crops.

Licence

Legal document allowing the holder to do an activity (e.g. abstraction), subject to conditions written in the licence and the legislation under which it was issued.

Licence application

Written request by an individual or company for a licence. Licence applications need to follow set legal guidance to be considered by us. We will provide help and advice on how to do this.

Licence determination

A decision by us on whether we agree or refuse a licence application. If we agree, the decision includes what conditions we think need to be set to ensure there is no damage to the environment, existing licence holders or other water users.

Licence of Right

Historic abstractions that were immediately given a licence as they were already taking place when the Water Resources Act was first brought in. (*Section 23 of the Water Resources Act 1963*).

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 is allowed to be abstracted by the licence. Usually the licence allows the holder a maximum per day, month and year (or season).

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, this means that flow will only fall this low five per cent of the time.

Macro invertebrate

An animal, lacking a backbone that is large enough to be seen by the naked eye.

Macrophyte

A plant large enough to be seen by the naked eye (usually lives in water)

Major aquifer

Very permeable aquifers which are usually able to support large abstractions for public water and other uses.

Managing water abstraction

Document produced by us in 2001 to explain CAMS (This document was updated in 2002)

Managing Water Abstraction Interim Update

An interim report (March 2005) on our strategy for managing water abstraction in England and Wales. This document highlights recent changes to the licensing system as the Water Act 2003 came into force and changes to some CAMS Boundaries.

Manchester and East Cheshire Aquifer Study

A report prepared for the Agency by consultants, Environmental Simulations International Limited, in April 2004, to measure the sustainable level of abstraction in the aquifer blocks of Manchester and East Cheshire.

Manchester Marl

Name given to mudstone strata of Permo-Triassic age.

Mercia Mudstones

Name given to mudstone strata of Permo-Triassic age.

Millstone Grit

Name given to sandstone and shale stratum of Carboniferous age.

Natura 2000

The Habitats Directive will protect some of the most important areas for wildlife across Europe. These are to be known as Natura 2000 areas. This will include all SPAs and SACs on sites which are already SSSIs. (See abbreviations)

Natural flows

What the river flows would be without any abstraction or discharge.

Non-aquifer

Rock with very low permeability that usually does not contain enough water to be worthwhile for abstraction purposes.

Non-consumptive

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

Permeability

The way in which particular rock or soil types affect the rate at which liquids pass through them.

Permo-Triassic

Rock of a Permian or Triassic age. Permian rocks formed 280 to 225 million years ago; Triassic rocks approximately 225 to 195 million years ago. It is common practice in geology to group these two periods of time together as Permo-Triassic

Precautionary principle

Where we think major environmental damage may occur, but our knowledge is incomplete. In these situations our decisions will be made with caution and care to protect the environment.

Precipitation

Any way in which water falls to the ground from the air, including dew, hail, rain, sleet and snow.

Protected right

A protected right means a right to abstract, which someone has by virtue of the small abstractions exemptions defined in the Water Act 2003, or by virtue of having an abstraction licence. The right protected is the quantity that can be abstracted up to that allowed by the exemptions or the terms of the licence.

Public water supply

A water company's supply of water.

RAM Framework Resource Assessment and Management Framework – a way we use to work out resource assessments within CAMS and subsequent management of water (including abstraction licensing).

Ramsar site

These areas are important for conservation internationally. (Wetlands of International Importance 1971, ratified by the UK Government in 1976).

Reach

A length of river

Recent actual abstraction and discharge impacts
The effects of abstractions and discharges based on recent abstraction returns or estimated from use and consumptiveness.

Recharge

Water which sinks downward from the surface into groundwater.

Regime (flow)

The different patterns of a river's daily flow rates.

Regulated river

A river where the flow is increased (or augmented) by the addition of water from another source.

Restoring Sustainable Abstraction Programme (RSAP)

The programme for resolving environmental problems caused by over-abstraction in certain catchments.

River

An open channel in which inland, surface water can flow.

River corridor

A continuous area of river and the land that lies right beside it.

River Ecosystem Classification (RE)

Each stretch of river is given a target from our

River Ecosystem Classification scheme.

These range from very good quality (suitable for all fish species) to poor quality (likely to limit fish species).

River Flow Objectives (RFOs)

The lowest river flows from an area required to protect ecology (plant and animal life) wastewater dilution, navigation and in-river leisure needs.

River Quality Objective (RQOs)

An agreed target, expressed using River Ecosystem standards, which are used to plan all activities affecting the water quality of a river, etc.

River reach

Unit of a river between two assessment points defined for abstraction licensing and resource management.

Salmonids

Members of the family salmonidae, includes Salmon, Trout and Charr.

Saturated zone

The area in rock and soil where any gaps are filled with water.

Scenario abstraction and discharge

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

Scenario flows

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

Sewer network

How surface water and wastewater is collected and removed from urban areas.

Sherwood Sandstone

Name given to sandstone strata of Permo-Triassic age.

Site of Special Scientific Interest

A Site of Special Scientific Interest is an area given a legal standing by English Nature or the Countryside Council for Wales because of its importance to nature conservation.

Source of supply

Inland waters (river, stream, canal, lake, etc.) or direct from underground (wells, boreholes, etc)

Special area of conservation (SAC)

A Special Area of Conservation is graded under the EC Habitats Directive and agreed with the EC to add to our biodiversity, protecting the variety of plants and animals.

Special Protection Area (SPA)

A Special Protection Area is one graded under the EC Birds Directive to provide protection to birds, their nests, eggs and habitats.

Specific yield

The ratio between the volume of water that will drain by gravity from a saturated rock or soil, compared to the volume of the rock or soil.

Specified or illustrative year

An example year picked to show flows, flow objectives and licensable resources.

Spray irrigation

Abstracted water sprayed onto grassland, fruit, vegetables etc. This can have a high effect on water resources.

Springs

These occur where the water table (level of water in the ground) meets the ground surface.

Strata

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

Surface water

Water features such as rivers, streams, springs, ponds and lakes.

Surface water catchment

The area from which run-off would naturally join a defined point of, or boundary with, a river.

Surplus or deficit

How much more or how much less abstraction effects are acceptable:

= Scenario flows – River Flow Objectives.

Sustainable development

Development that meets the needs of the present without affecting the future. This involves meeting four aims:

- social growth;
- protection of the environment;
- careful use of natural resources;
- economic growth and employment.

Telemetry

Telemetry is a means of collecting information that has been collected by unmanned monitoring stations (often for river flows or rainfall) using a computer that is connected by telephone.

Time limited licence

Licence with a set end date. To continue abstraction, the licence holder has to request a renewal.

Topography

Physical features of a geographical area.

Trickle irrigation

The irrigation of crops by taking water direct to roots of plants, but without spraying into the air.

Underground strata

A term used to describe geology under the surface soil layer.

Unlicensed abstraction

An illegal abstraction that occurs without a licence or one 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).

Water resource

The natural flow or recharge of water in rivers or aquifers.

Water Resource Management Unit

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

Water resources strategies (The)

Water resource planning in England and Wales over the next 25 years to ensure sustainable use and enough water for all human uses with an improved water environment. Demand is estimated using different social and economic factors.

Water rights trading

The transfer of licensable water rights from one person (or company) to another for benefit.

Water table

Top surface of the saturated zone within the aquifer.

Watercourse

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

Wetland

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

Yield

The reliable rate at which water can be drawn from a water resource.

Time-limited licence

Licence with a specified end date.

Treatment works

(also wastewater treatment works)
Wastewater treatment works or water treatment works.

Triassic

A period of time 245-208 million years ago, used to describe rocks of that age.

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.

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

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 4

List of abbreviations

AMP	Asset Management Plan produced by the Water Companies for Office of Water Services (OFWAT). It sets out the water industry investment programme. These plans are drawn up through consultation with the Environment Agency and other bodies to cover a five year period. AMP's have to be agreed by Defra and OFWAT.	m ³ /s	Cubic metres per second.
		MI, MI/d, MI/day	MI = megalitres = 1,000,000 litres = 1,000 cubic metres = 1,000m ³ = 220,000 gallons. MI/d = MI/day = MI per day, = tcmd, thousand cubic metres per day.
		MI/a	MI/a = MI per year = Megalitres per year.
AOD (also m AOD)	Above Ordnance Datum: Land levels are measured relative to the average sea level at Newlyn in Cornwall. This average level is referred to as "Ordnance Datum". Contours on Ordnance Survey maps of the UK show heights above AOD in metres, hence m AOD.	mm	Millimetres.
		NEP	National Environment Programme
		OFWAT	Office of Water Services.
		Q95	Flow exceeded during 95 per cent of period over which flow data are being considered.
AP	Assessment point.	RAM	Resource Assessment and Management
BAP	Biodiversity Action Plan.	RDS	Defra Rural Development Service
BW	British Waterways	RE	River Ecosystem
CAMS	Catchment Abstraction Management Strategy.	RFO	River flow objectives.
Defra	Department of the Environment, Food and Rural Affairs	RQO	River quality objective.
EU	European Union.	RSAp	Restoring Sustainable Abstraction Programme.
EW	Environmental weighting of a river reach based on its physical, macrophyte, fisheries and macroinvertebrate scores.	SAC	Special Area of Conservation.
		SBI	Sites of Biological Interest
GQA	General Quality Assessment.	SME	Small and Medium sized Enterprises
GWMU	Groundwater management unit	SPA	Special Protection Area.
HOF	Hands-off flow.	SSSI	A Site of Special Scientific Interest, i.e. an area given a UK statutory designation because of its conservation value.
km	Kilometres.	UKIA	UK Irrigation Association
km ²	Square kilometres.	WRAS	Water Regulations Advisor Service
LBAP	Local Biodiversity Action Plan	WRMU	Water Resource Management Unit.
LEAF	Linking Environment & Farming		
m AOD	Metres above Ordnance Datum (mean sea level at Newlyn Cornwall 1915-1921).		

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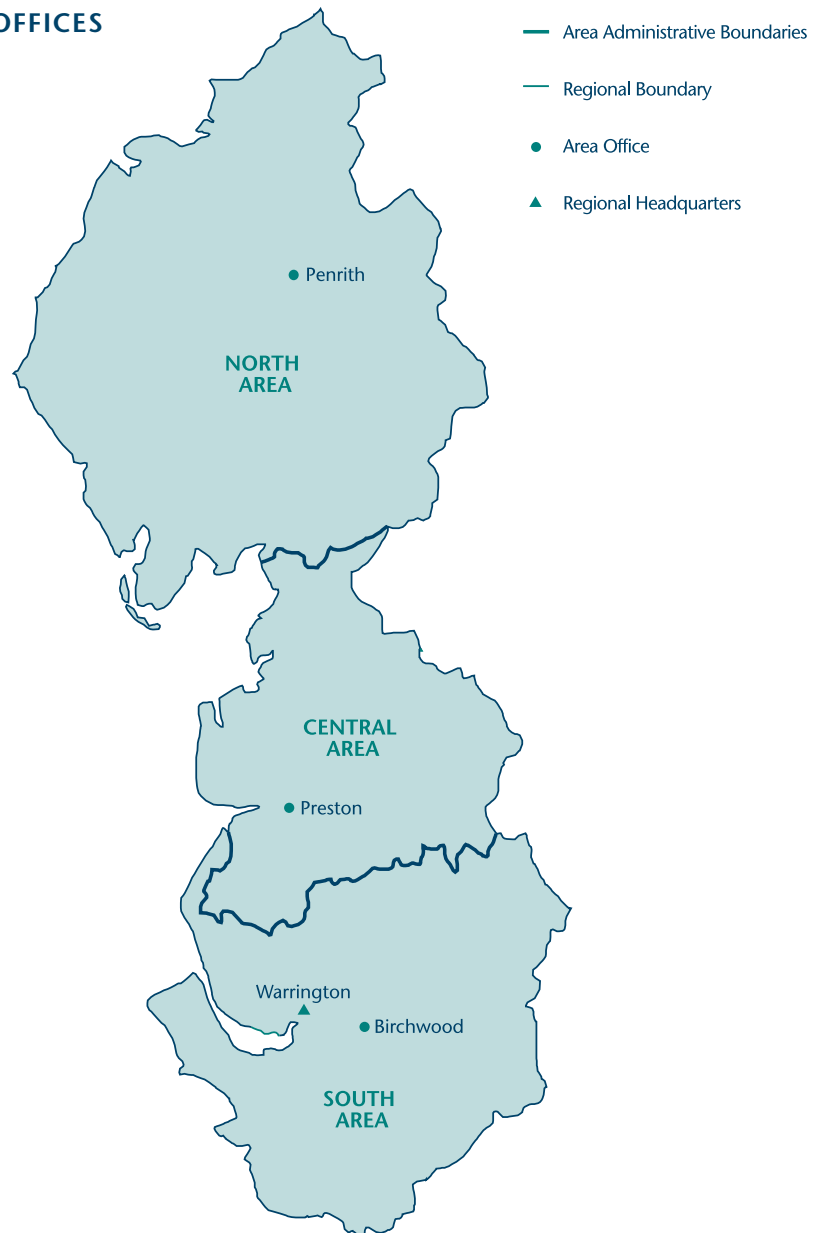
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