

EA-WATER RESOURCES

Box 8



ENVIRONMENT AGENCY

A Framework for Catchment Abstraction Management Strategies

April 2000

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ENVIRONMENT AGENCY



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This document sets out the framework that will be followed to provide the structure of a Catchment Abstraction Management Strategy (CAMS), produced following consultation. The aim of each section is detailed at the beginning (in green) followed by explanations (in bold italics) and text similar to that which will be seen in an actual CAMS (in normal type). From section 3 onwards this information is given on the left-hand pages and examples (in boxes) on the right-hand facing pages. The examples in this document are to give an indication of the type of information that will be contained in each section and should not be taken as being factually correct. References to the Consultation document are presented in shaded boxes. At the end of this framework document, in Appendix A, a brief summary of the type of information that will be given in the Technical Document, produced with each CAMS, is provided. A glossary is provided in the Consultation document.

FOREWORD

Aim: To familiarise the reader with the vision for the CAMS area (written by the Area Manager).

Example 1: Foreword

Catchment Abstraction Management Strategies provide a shared strategy for the sustainable management of water resources within a catchment. They are public documents produced following a consultation process. They will describe the availability of water resources, licensing policies for the allocation of the resource and future aspirations and strategies for the catchment.

The vision for this catchment is that the water resources of the area should be used in a sustainable way that does not harm the aquatic environment or the rights of existing users. Any existing harmful operations should be targeted for change, while legitimate development of water should be allowed where resources are still available.

1. INTRODUCTION TO CATCHMENT ABSTRACTION MANAGEMENT STRATEGIES

Aim: To explain what Catchment Abstraction Management Strategies (CAMS) are and detail the relationship between these and a national supporting document that will be produced in April 2001. To introduce, in some detail, the aims of a CAMS document.

This section will be similar in all CAMS documents in that it will explain why the process is being undertaken. It will also introduce the concept of CAMS and will explain, in broad terms, the roles that these documents and the national supporting document will fulfil.

In *Taking Water Responsibly*¹ a decision was made to introduce Catchment Abstraction Management Strategies (CAMS). The Agency's vision for these is a shared strategy for the sustainable management of water resources within a catchment. This initiative will significantly influence the way in which abstraction licensing is undertaken in England and Wales.

The national supporting document for CAMS (*due to be produced in April 2001*) explains the roles and responsibilities of the Environment Agency with respect to sustainable development of water resources. It provides details of national licensing strategy and policies. This document also provides information on the methods and approaches that can be used to address abstraction management issues at a local level.

A CAMS is undertaken in each catchment or group of catchments throughout England and Wales. They describe the water resources position for each of these areas and identify licensing practices. They highlight issues and facilitate the identification of changes that may be necessary to achieve a sustainable abstraction regime in each catchment. CAMS are developed through an open and transparent process of which public consultation is an integral element.

Taking Water Responsibly confirmed that the Agency should issue all new authorisations on a time-limited basis. Most existing licences will also be converted to time-limited status. This will enable the Agency to review the allocation of water in the light of changing circumstances and should significantly contribute to sustainable water resources management. CAMS will be a key mechanism in the implementation, management and renewal of time-limited licences within a catchment.

The CAMS process generates two documents. The first contains details of resource availability and commitment, policies, actions and future strategies. This document also contains details of future studies that will be required in the catchment. The second document, the Technical Document, provides factual information such as details of hydrometric networks, abstractions and discharges and ecological information. It also contains reference material. The management approach described in the first document is based on the factual information contained in the second.

Each CAMS provides the strategy for sustainable management of water resources in that catchment now and in the future. Every six years a new CAMS document will be produced for that catchment. This will, again, be developed through an open and transparent process encouraging public involvement. CAMS should always be read in conjunction with the national supporting document.

¹ *Taking Water Responsibly – Government decisions following consultation on changes to the water abstraction licensing system in England and Wales.* DETR and Welsh Office (1999).

2. CONSULTATION

Aim: To provide information on the consultation process that was undertaken prior to the production of this CAMS.

Details of how the consultation process was undertaken and the parties involved will be summarised here.

The process of consultation that will be undertaken in each CAMS area is being consulted on; details can be found in section 5.3 of the Consultation document. In future, a national strategy for consultation for each CAMS will be detailed in the national supporting document, which will be produced in April 2001.

3. INTRODUCTION TO THE CAMS AREA

Aim: To familiarise the reader with the CAMS area and its important features.

An introduction to the CAMS area will provide summary information on appropriate key features from the list below for each catchment:

- *areal extent*
- *topography*
- *main river and canal networks*
- *location of main towns*
- *land-use, including location of dominant industries*
- *European/International designated sites such as Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites that are water-dependent*
- *statement of number of Sites of Special Scientific Interest (SSSIs) that are water-dependent*
- *hydrology, hydrogeology and soils*
- *recent meteorological and hydrological history*
- *major abstractions (location and licensed use)*
- *ecological, fisheries and water quality information.*

This information will be presented as text, such as example 2 on the facing page.

A map of the catchment showing the key features will also be provided. Example 3 (page 6) gives an indication of how this may be presented. A second map will also be included showing the location of abstractions over an appropriate volume and indicating whether they are from surface or groundwater. An example of this can be seen on page 7 (example 4).

Example 2: The Ribble catchment

The River Ribble is one of the longest rivers in the north west of England, draining a catchment area of 2,128 square kilometres and covering a distance of 110 kilometres from source to mouth. The Ribble originates high in the Pennines at Newby Head Moss at an altitude of 422 metres. The river cascades down with the Yorkshire Dales National Park to the east and the Forest of Bowland to the west. The tidal limit is reached at Salmesbury. It then flows through the Ribble estuary where the River Douglas joins it before entering the Irish Sea.

In the upland catchment the major use of land is for farming, which is based around small villages and hamlets. This area attracts visitors enjoying many recreational activities including fell walking, salmon and coarse fishing. The middle Ribble is joined just south of Clitheroe by two major tributaries. The River Hodder rises in the Forest of Bowland and provides a large proportion of the drinking water supplies for Blackburn and Hyndburn. The River Calder, crossing urban areas of East Lancashire, contrasts with the Hodder in that it is in recovery from previous industrial activity, exhibiting many pollution relics such as mine water, contaminated land run-off and sewerage discharges.

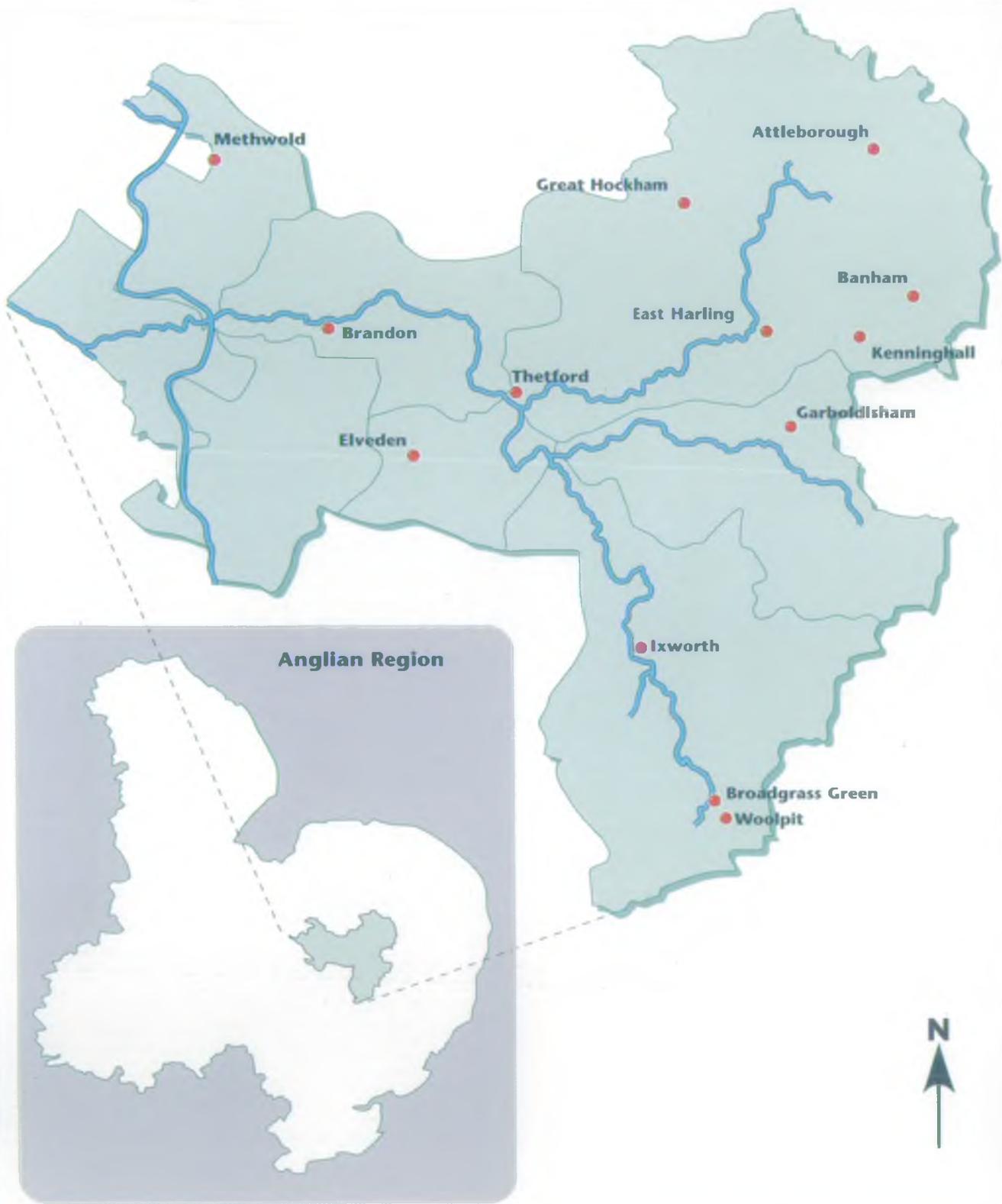
The Leeds to Liverpool canal passes through the towns of Colne, Nelson, Burnley and Blackburn in the catchment. Once a major link between the Liverpool Docks and the industrial mills of East Lancashire and Yorkshire, it is now an important recreational asset.

As a whole, the Ribble catchment is still predominantly rural although the towns of Preston, Blackburn and Burnley feature prominently and provide most of the area's industrial and manufacturing base. The main uses of water within the catchment are for public water supply, small-scale agriculture and industry such as the manufacture of paper, textiles, chemicals and cement.

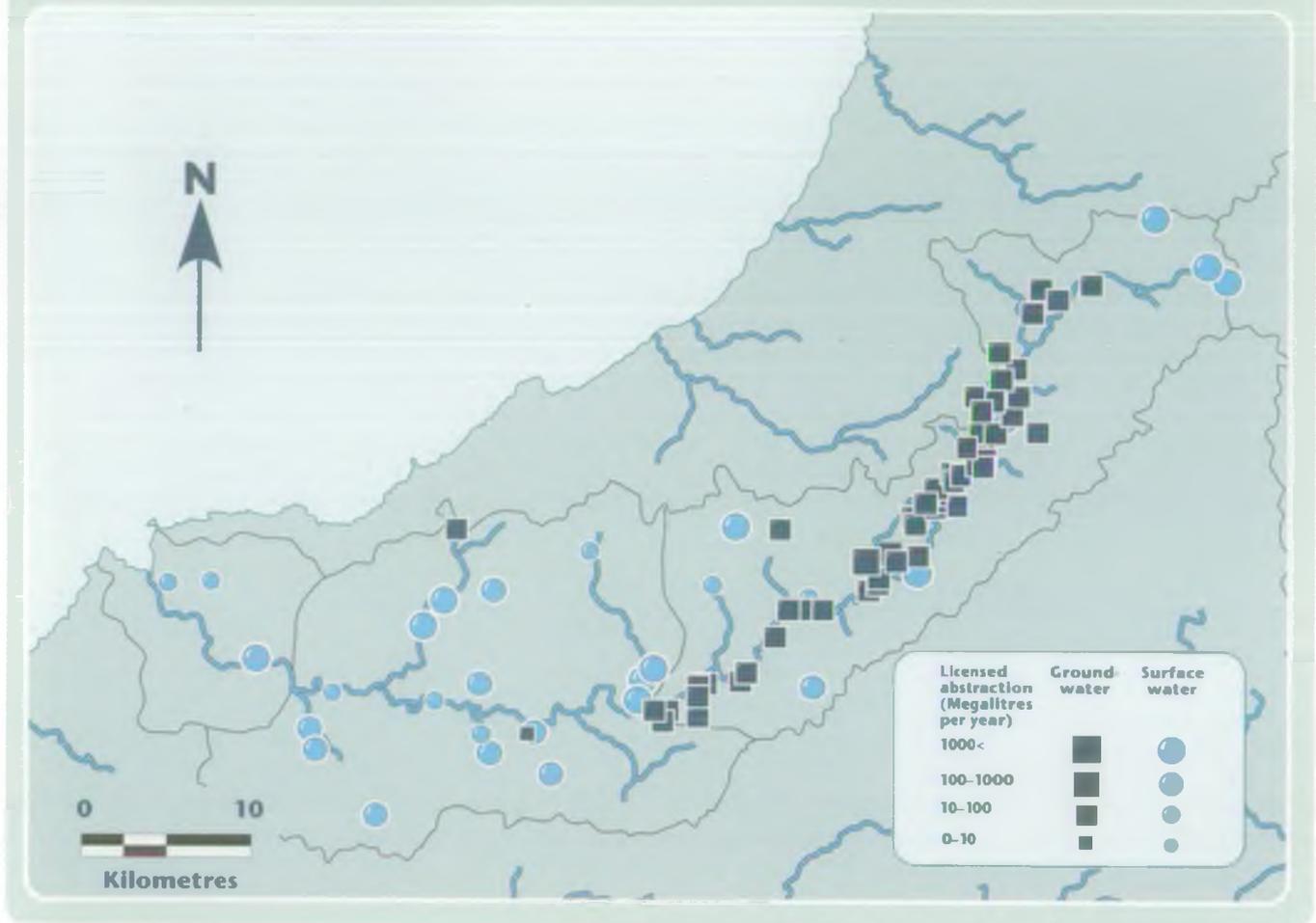
The Ribble is one of the most heavily fished catchments in England and Wales. It contains important salmonid fisheries and other species sought by rod fishermen and netmen. Approximately 25 angling clubs exist in the catchment, the majority of which are represented by the Ribble Fisheries Association.

The catchment also contains many important conservation sites, including SSSI, SPA, SAC and County Biological Heritage Sites (CBHS). The area contains many important species including otters, water voles and white-clawed crayfish, as well as a wide variety of bird-life.

Example 3: Map of the Little Ouse catchment, showing its position in Anglian Region



Example 4: Map of groundwater and surface water abstractions in the Teifi catchment



4. RESOURCE BALANCE/SUSTAINABILITY STATUS

Aim: To identify the individual water resource management units into which a CAMS area is divided and the steps necessary to define the sustainability status of each water resource management unit. The method used to assess the overall resource, the current licensed abstractions, the allocation of water required to meet environmental and water resource management needs and the sustainability status arrived at from these three factors will be summarised. Details of the national approach to resource assessment will be given in the national supporting document. Relevant data for this CAMS will be given in the Technical Document.

The Agency aims to achieve consistency in its approach to determining water resource assessment and environmental allocation. In each situation the most appropriate methods available will be used. Section 5.5 of the Consultation document contains some questions relating to resource assessment and environmental allocation.

A general introduction to this section will be given which will introduce the concept of water resource management units. This will be similar for all CAMS.

4.1 Introduction

The CAMS area is subdivided into water resource management units using common criteria with respect to hydrology, hydrogeology and the scale of development of abstraction. Where possible these will integrate both surface water and groundwater. In some areas the complexity of the hydrogeology or the lack of hydraulic connection between surface water and groundwater will necessitate a water resource management unit referring solely to surface water or groundwater.

The degree of availability or commitment of water resources will be assessed for each water resource management unit. This process will also need to take into account the National and Regional Water Resources Strategies. These are being developed to ensure that justifiable future demands can be met whilst ensuring the protection and enhancement of the aquatic environment for the future.

4.2 Water resource management units

The individual units will then be identified and a brief description of each unit will be given. Examples 5 and 6 on facing page give an indication of the type of information this section will provide.

A map will show the location and extent of the water resource management units. Example 7 (facing page) shows how this map may be presented.

Example 5: The Teifi catchment

The Teifi catchment is divided into three water resource management units, the Upper, Middle and Lower Teifi. The division was made to allow the non-uniformity in geology, rainfall and abstractions to be taken into account.

The Middle Teifi water resource management unit

The downstream limit of this unit is the Glanteifi Gauging Station near Abercych. The groundwater resources in this unit are less significant than for the Upper Teifi. The Clettwr, Ceri and Cych tributaries are particularly important for spawning salmon and there is a SSSI designated in the upper reaches of the Clettwr. There is some abstraction from this unit but it is mostly for non-consumptive uses.

Example 6: The Ribble catchment

Due to the diverse nature of the Ribble catchment, for the purpose of this strategy it is divided into 32 surface water reaches so that the characteristics and issues of each unit can be captured. Due to the lack of hydraulic connection between surface water and groundwater in this catchment two groundwater resource management units have also been identified and are considered separately from the surface water units.

The Fylde Aquifer water resource management unit

Downstream of Salmesbury the Ribble flows over the Permo-Triassic Sherwood Sandstone of the Fylde Aquifer. This major aquifer unit extends northwards and underlies part of the Wyre catchment, as well as the southern tip of the Lune catchment. The Fylde Aquifer is extensively used for public water supply, forming part of North West Water's LCUS (Lancashire Conjunctive Use Scheme), principally in the Wyre catchment, as well as for industrial purposes within the Ribble catchment.

Example 7: Map showing water resource management units for the Otter catchment



4.3 The resource balance

In order to achieve or maintain sustainable development of water resources, to meet the reasonable needs of abstractors while protecting the needs of the water environment, it is necessary to estimate the resource balance of each water resource management unit. This estimation must take into account the variation in resource availability that is experienced, ranging from floods to droughts.

The resource balance is calculated from the inflows to the unit such as rainfall and discharges, and outflows such as abstractions, surface water flow out of the unit and evaporative losses. Also included within the resource balance is an 'allocation' of water that is necessary to protect the environment.

4.3.1 Total water resource

Gross resource is calculated using long-term rainfall statistics, river-flow data and changes to groundwater levels, depending on information available and the characteristics of the catchment area and geology.

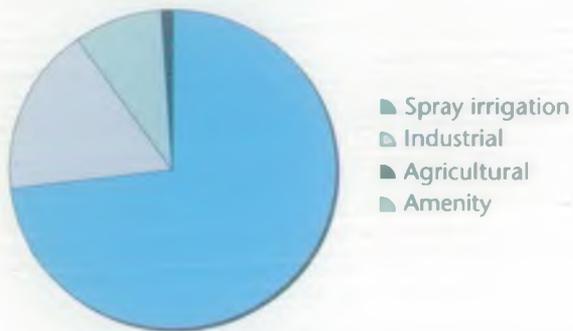
An appropriate method for determining the total water resource for the water resource management units will be used. The method used will be identified here and further details on the national approach to resource assessment given in the national supporting document. The method used will be justified here, including information on assumptions made and uncertainties associated with the method.

4.3.2 Abstractions

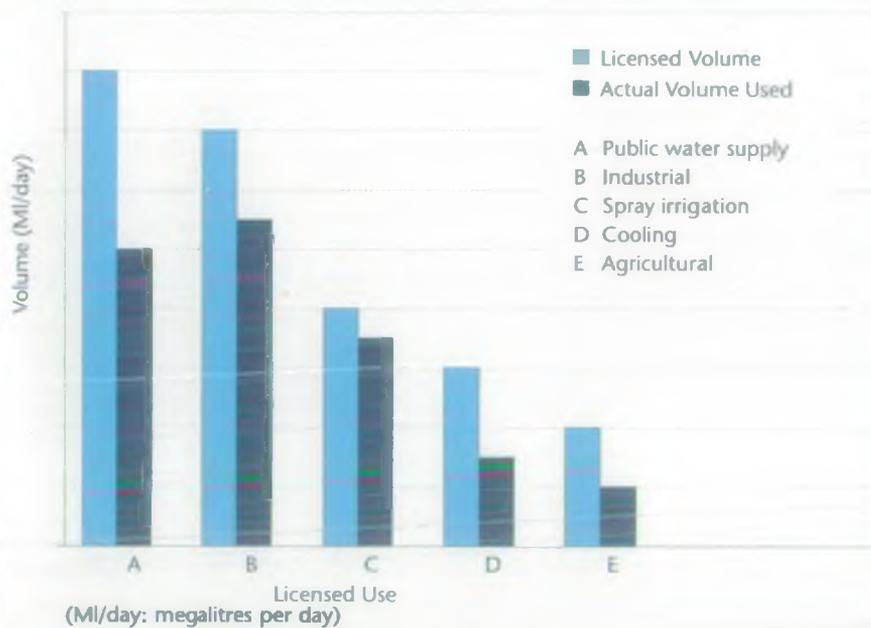
As part of the water resource balance, abstraction volumes need to be taken into account. These are generally based on current licensed quantities, but in some situations actual abstraction volumes are also considered. Within the resource balance it is necessary to take account of the percentage of water returned to the environment for each licensed use. For example, non-consumptive licences, which return water close to the point of abstraction, do not result in a net loss of water to the catchment. Other licences, such as those for spray irrigation, are assumed to be fully consumptive. A summary of licensed abstractions in the catchment is given below.

A table, pie chart or histogram will then be shown to give an indication of the scale of licensed abstraction and associated use in the catchment. Examples 8, 9 and 10 on the facing page show how this information may be presented. This information may be for the catchment as a whole or for individual water resource management units, depending on the scale of abstraction in that catchment. The data will be licensed volume and actual volumes from an appropriate dry year. (In different catchments the representative year of, for example, a 1-in-5-year dry year will vary. For this reason an appropriate dry year for each catchment will be chosen, which reflects a similar return period. The return period that will be used is still to be decided). Guidance on how consumptive the uses are may also be provided.

Example 8: Licensed volumes by use for a catchment (1995)



Example 9: Licensed and actual use for a catchment (1996)



Example 10: Licensed and actual volumes by unit (1995)

Volume licensed/ actual (ML/day)	Public water supply	Spray irrigation	Industrial	Cooling	Agricultural
Unit 1: Licensed	55	15	5	1	3
Unit 1: Actual	44	10	4	1	2
Unit 2: Licensed	20	25	2	0	5
Unit 2: Actual	15	22	2	0	4

(ML/day: megalitres per day)

4.3.3 Discharges

As part of the resource balance the annual volume of wastewater discharged into the water resource management unit is estimated. The location of these discharges is also taken into account.

A brief description of the approach taken for each catchment or water resource management unit will be detailed here. If appropriate, there may be a table of major discharges given.

4.3.4 Resource allocation for environmental and water resource management needs

There is a need to protect low flows and the range of flows experienced throughout the year in order to:

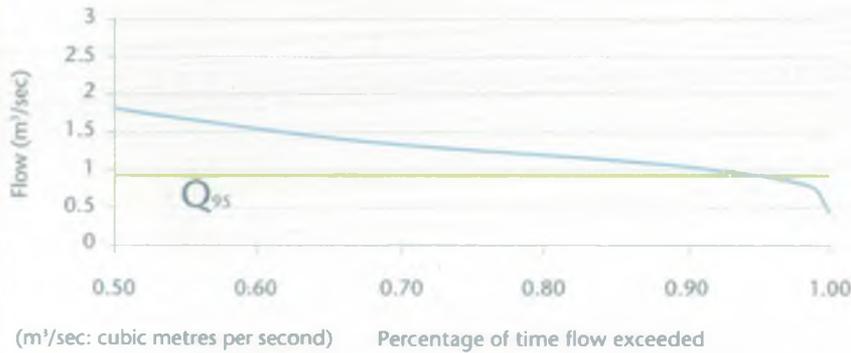
- maintain a healthy habitat for fish and the ecology of the river
- work towards the conservation objectives set for riverine SSSI and other designations
- protect groundwater and surface water levels in wetland sites
- protect the rights of abstractors and lawful users
- protect navigation, recreation, amenity and aesthetic interests associated with the river
- safeguard groundwater units against saline intrusion in some catchments
- maintain the water quality of the river
- take account of any other local factors such as Water Level Management Plans.

This may be achieved by allocating water to one or more of the above purposes. In some situations there are constraints imposed by water resource management obligations, for example, the protection of a very large licence may dominate a catchment.

The method used to calculate the environmental allocation will be mentioned here. Further detail on methods will be available in the national supporting document. There is a wide variety of approaches, but traditionally the 95 percentile flow exceedance value (Q_{95}) has commonly been used. (Q_{95} is, on average, the flow exceeded 95 per cent of the time). The environmental allocation can vary between water resource management units and the allocation for each unit will therefore be given, if they differ. This information may be presented in table or graph format. Examples of presentation are given on the facing page (examples 11 and 12).

Example 11: Environmental allocation for a catchment

In a catchment the Q_{95} flow is protected to ensure that environmental degradation does not occur. This flow, as can be seen on the graph below, is $0.937\text{m}^3/\text{sec}$. (Q_{95} flow: on average, the flow exceeded 95 per cent of the time).



Example 12: Environmental allocation for a catchment

In a catchment there is considerable seasonal variation in the requirements of the species of this river habitat. The environmental allocation therefore varies considerably from month to month and can be clearly seen below.

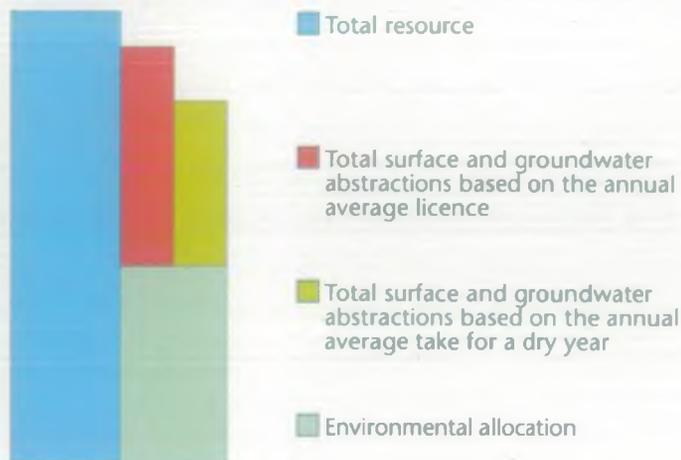


4.3.5 Calculated resource balance

Sections 4.3.1 to 4.3.4 detail the individual elements of the water resource balance calculation. These elements, the total water resource, abstractions, discharges and resource allocation for the environment all need to be considered together to produce a water resource balance for each water resource management unit. The calculated resource balance produces surplus and deficits on an annual or monthly basis.

The water resource balance for each water resource management unit will be presented. Examples of the presentation of this information are given on the facing page (examples 13 and 14). Text will be added as appropriate to explain factors such as seasonal variation in the resource balance. The most appropriate method of presentation will be used for each catchment.

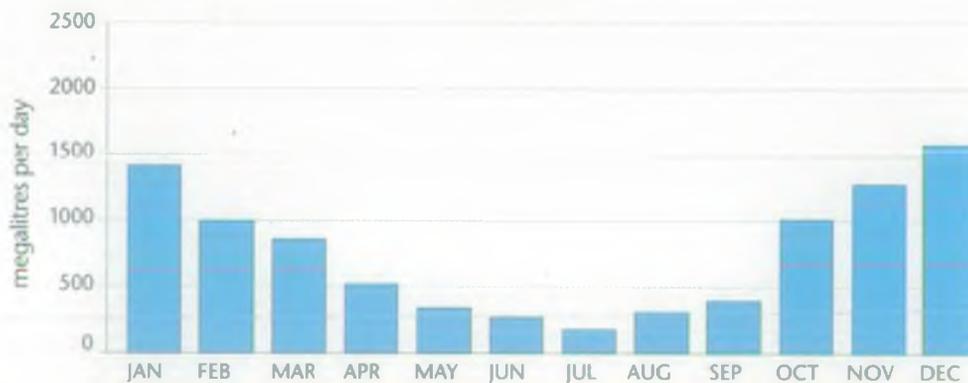
Example 13: Resource balance for a catchment



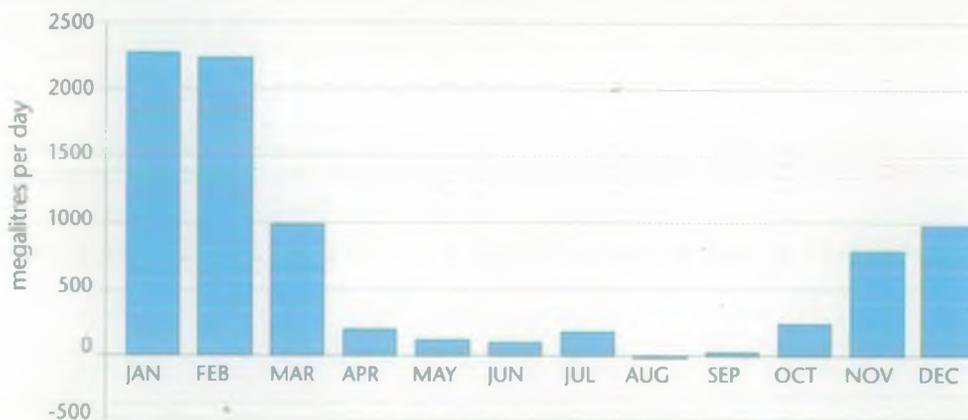
Example 14: Resource balance for a catchment

The following charts show the surplus and deficit on a monthly basis for a catchment for an average year and a dry year (*the dry year would be specified*). The chart clearly shows in which months more water resources are likely to be available.

Average year



Dry year



4.4 Sustainability status

Sustainability status is a criterion developed by the Agency to indicate the abstraction status of a water resource management unit. It is expressed as a five-fold classification, based on the results of the calculated water resource balance for each water resource management unit, detailed in section 4.3.5. It provides a basis for the licensing strategy detailed in sections 5 and 6 of this document.

We are developing sustainability status criteria and are consulting on this as part of this process. Details of sustainability status can be found in section 5.6 of the Consultation document.

Further details on sustainability status will be given in the national supporting document. In a CAMS, the sustainability status of each water resource management unit will be shown here. This may be presented in a table similar to example 15 on the facing page. Some text may also be given to help explain the significance of the sustainability status assigned and other factors that need to be considered.

A map will also be provided showing the water resource management units and their calculated sustainability status. An example from a catchment where the groundwater has been divided into two water resource management units is given in example 16 on the facing page.

The sustainability status of the water resource management units will then be used as the basis for the licensing practices described in section 5 and the future strategy detailed in section 6.

Example 15: Sustainability status of two water resource management units

The table below identifies the surplus or deficit for two water resource management units and the appropriate sustainability status category.

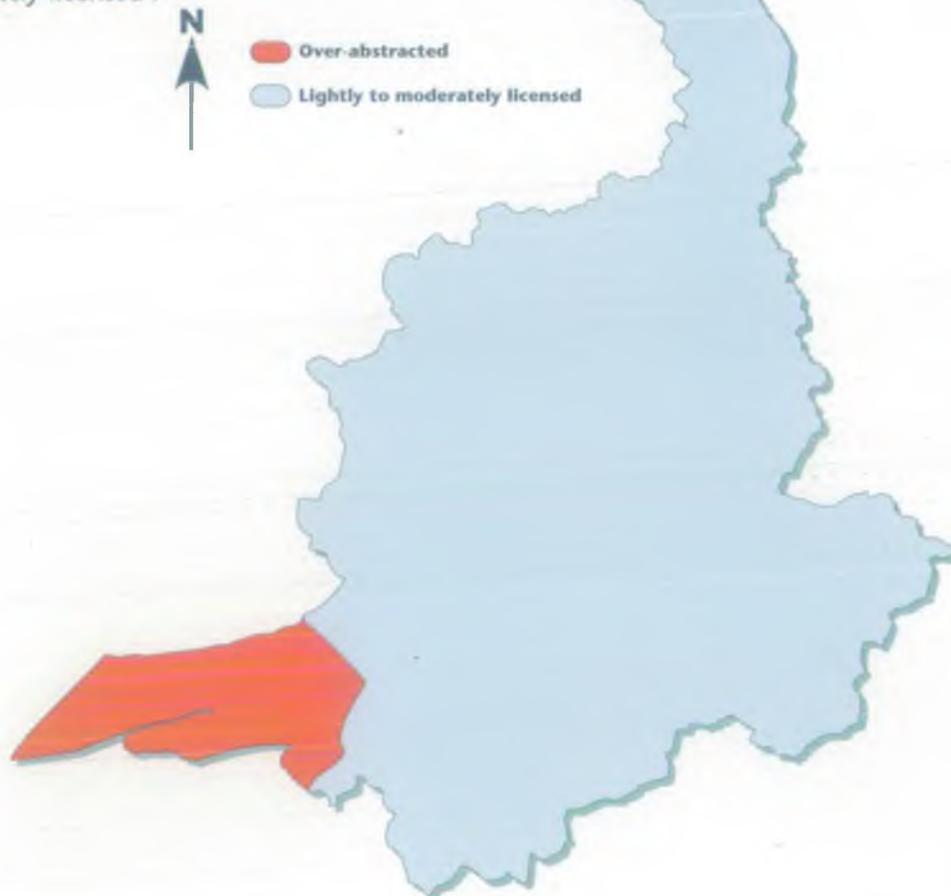
Water resource management units	Resource surplus or deficit		Sustainability status
	MI/day	% total resource	
Unit 1	19	13	Significantly licensed
Unit 2	-28	-11	Over-licensed

(MI/day: megalitres per day)

The sustainability status assigned above acts as guidance on available resources in each water resource management unit.

Example 16: Sustainability status of groundwater units in a catchment

The groundwater in this area does not have hydraulic connection to surface water and is divided into two water resource management units. One unit is 'Over-abstracted' and the other 'Lightly to moderately licensed'.



5. GUIDANCE ON THE ASSESSMENT OF NEW APPLICATIONS

Aim: To provide details of local abstraction and impoundment authorisation practices, which apply to the water resource management units of the CAMS area. This section gives guidance to potential licence holders on the factors the Agency will consider when determining a licence application in each unit. It provides the reader with an indication of the Agency's likely response to a licence application. It will provide details of the time-limiting policy that will be applied to the catchment and guidance on restrictions that could be expected. It will also give an indication of the likely severity of any restrictions by providing historical examples.

National policies will be detailed in the national supporting document. A general introduction to this section will be given, which will be similar for all CAMS.

5.1 Introduction

In general, abstraction and impoundment authorisation practices are based on the Agency's national licensing policy or practice. Where necessary, local practices are developed, within the national framework. This section explains how the policy is implemented locally as well as detailing exceptions that apply in this CAMS area. These are summarised for the area as a whole or for the individual water resource management units, as appropriate. The practices reflect the sustainability status calculated in the previous section, but local factors also have to be considered in every situation. All licence applications are treated on their own merits.

This section gives guidance to potential licence holders on the factors we will consider when determining a licence application in a particular catchment or water resource management unit. It may provide an indication of the Agency's likely response to a licence application and gives guidance on restrictions that could be expected. It also gives an indication of the likely severity of any restrictions by providing historical examples.

5.2 Licensing practices in the x catchment

Where appropriate, details of local practices that have been developed within the national framework will be given here. This will include the time-limiting policy that will be applied to the catchment. This could also provide, for example, information on the processes for managing drought, or the mechanism for implementing 'hands-off flow' licence conditions in the catchment. An example is given on the facing page (example 17). If there are no specific practices that apply to the catchment as a whole and all practices relate to individual water resource management units, section 5.3 will begin here.

Example 17: Licensing practice for a catchment

The sustainability status of this catchment is 'Significantly licensed'. Guidance on the normal time limits that will be applied to new licences in this catchment are given below. Examples of 'hands-off flow' conditions that may be applied are also given. All licence applications will, however, be treated on their own merits.

Time-limiting policy

Water is generally available during the winter period in this catchment and some water is available in summer months. In this catchment, a 12-year time limit for new licences is the norm.

Hands-off flow conditions

To protect the interests of existing water users and the environment, licences granted to allow abstraction of water from the river in summer will have an associated 'hands-off flow' condition. The area has several rare invertebrate species that require a certain level of flow in the river. When the flow reaches this level abstractors must cease abstracting. An example of flow conditions that can be expected on this river is given below. These are existing licences, so any new licence is likely to have a 'hands-off flow' condition at least as severe to protect existing users. An indication of the likely severity of these restrictions is also given, with examples of the number of days existing abstractors could not abstract due to the 'hands-off flow' conditions on their licences for an average year and a dry year.

Location of abstraction	Hands-off flow condition	Restriction in average year (days)	Restriction in dry year (days)
Location A	Q ₉₅	15	60
Location B	Q ₉₃	22	70
Location C	Q ₉₀	25	75

(Q₉₅, Q₉₃, Q₉₀: On average, the flow exceeded 95 per cent, 93 per cent or 90 per cent of the time respectively).

The restrictions given in the table above occurred in June, July and August.

More data on the severity of restrictions may be provided, for example, the number of days certain abstractors were prevented from abstracting for each of the last six years. 'Hands-off flow' may be expressed as a flow statistic or a water level.

5.3 Licensing practices in the water resource management units

In some water resource management units it is necessary to apply licensing practices that are specific to that unit, developed within the national framework. This may be necessary to deal with particular environmental problems or to protect certain water-dependent flora and fauna.

A brief description of why a water resource management unit requires special consideration and the approach that will be used to licence applications in that unit will then be given. Examples 18, 19 and 20, on the facing page, give an indication of situations where specific water resource management unit practices are necessary.

Example 18: A groundwater water resource management unit

This aquifer has a sustainability status of 'Over-abstracted' and the current level of abstraction is therefore unsustainable. For this reason there is a presumption against new licences. The management strategy of this aquifer is to prevent any increases in actual abstractions and to grant no further licences. This has been based on the conclusions and recommendations from the Aquifer Water Resource Study (Geological Consultants, 1997). Water Company Ltd is constrained in its use of existing licensed groundwater sources on this aquifer by a cessation level in several observation boreholes. This protects the rights of other licence holders.

Example 19: A wetland water resource management unit

A series of meres is situated within this water resource management unit. Most of these meres are SSSIs and they form part of a candidate SAC due to the presence of grey-hair grass and common bent grass. For this reason the Agency imposes a cessation condition on local groundwater abstractors to protect the meres. The cessation clause refers to the water level, as measured at Central Mere, and states that no abstraction may take place when the level on the gauge board is equal to or less than 27.5 metres Above Ordnance Datum (AOD).

In a zone surrounding the meres, which extends two kilometres, no abstraction will be permitted that could potentially result in the level nearest the groundwater-sensitive meres being reduced by more than five centimetres. For abstractions that will cause a loss of level of less than five centimetres, the Central Mere cessation level of 27.5 metres AOD will be applied.

Example 20: A groundwater water resource management unit

This aquifer has a management strategy designed to restrict the scale of development of the groundwater resources, which are already heavily exploited for public supply.

The groundwater unit represents the area equivalent to the theoretical 'area of recharge capture' for a source or combination of sources, for licensed abstractions greater than 0.045 MI/day (megalitres per day). The following restrictions apply:

- new abstractions should be limited to a maximum yield equivalent to 0.01 MI/day on a continuous basis and therefore 3.65 MI/year;
- no daily rate in excess of 0.025 MI/day should be allowed;
- variations will only be considered to existing sources of supply within the zone after the effects have been assessed in relation to the whole catchment involved;
- applications for spray irrigation or other high-loss abstractions are discouraged and may be refused.

6. FUTURE STRATEGY AND CHANGES TO EXISTING LICENCES

Aim: To set out the strategy that will be followed for the CAMS area as a whole and for separate water resource management units to maintain or achieve the sustainable development of water resources in this area. This strategy will take into account the needs of the environment and abstractors and the Water Resources Strategy for that region. It will include details of changes proposed for existing licences in areas where environmental problems have been identified. It will provide details of the conversion process of non time-limited licences to time-limited status that will be undertaken in the catchment. It will also give details of how existing licences will be renewed. It will identify opportunities for licence trading, if the Government decides that it should be introduced.

This section will also provide information on areas where the Agency is researching techniques or improving data, which could have an effect on the resource assessment or licensing practice for the CAMS area in future. Any significant new initiatives that would affect water resources will also be detailed here, for example, planned major new abstractions or the cessation of a major discharge.

A general introduction to this section will be given. This will be similar in all CAMS.

6.1 Introduction

The earlier sections of this document have described how the water resource has been assessed and current licensing practices. The Agency aims to manage water resources to achieve a sustainable balance between the needs of people, business and the environment. This Catchment Abstraction Management Strategy translates our vision into specific targets for this catchment. It describes the measures we propose to take, where necessary, to ensure those targets are met. Where environmental improvements are required it can take considerable time before they are seen in the catchment. The implications to existing licence holders or new applicants of aiming to meet the targets set for this catchment will be detailed in this section.

6.2 Objectives for the x catchment

In this section the Agency's vision for the catchment as a whole will be given. This will take into account the sustainability status calculated in section 4.4 and the goals that we wish to achieve. It will highlight any water resource issues associated with designated conservation areas.

An example of what could be expected in this section is given in example 21 on the facing page.

The amount of detail in section 6.2 will depend on how similar the aspirations and strategy for achieving them are over the catchment area. Where the individual water resource management units require different strategies to be followed within a catchment, the majority of the detail would be given in section 6.3, under the individual units.

Example 21: Objectives for a catchment

The designation of this river as a SSSI and its status as a candidate SAC indicates its current environmental value. We aim to ensure that any further abstraction from the catchment will not threaten the integrity of the site. This will be achieved by the protection from abstraction of the lowest flows that occur naturally in the river and also by the protection of flow variability. The authorisation policy set out in this strategy is designed to achieve these objectives and maintain the proper balance in future.

The resource balance of this strategy showed that the sustainability status of this catchment is 'Lightly to moderately licensed' in the majority of years. However, the resource does become 'Over-licensed' in a few summer months during drought years. Our strategy is to reduce the frequency of these 'Over-licensed' periods within the catchment. Our proposals to attain this goal are described in the following sections.

The strategy for achieving the vision for the catchment as a whole, stated in the introduction, will then be given. This will include the relevant sections taken from those given below.

6.2.1 Time-limiting

6.2.1.1 Strategy for conversion of non-time-limited licences

The reasons for time-limiting licences are explained in section 6.1 of the Consultation document.

Details of the conversion process that will be undertaken in the catchment will be given here.

6.2.1.2 Renewal of time-limited licences

The sustainability status calculated in section 4.4 of this strategy influences the licensing practices used to manage this catchment. This, in turn, affects the likelihood of renewal of some of the existing licences in the catchment.

A proposed approach for dealing with the renewal of time-limited licences is part of this consultation. Details can be found in section 6.3 of the Consultation document.

6.2.2 Resource recovery

Where resources are under stress the Agency will seek to reduce abstraction and to improve the sustainability status of the catchment or particular water resource management unit. Recovery plans will generally involve the reduction of licensed quantity, but there may be other options to obtain the same end such as relocation of a source or changes to the licence conditions. In some situations, whole licences may need to be revoked to restore a sustainable abstraction regime in a particular catchment or water resource management unit.

An example of a strategy for recovery for two water resource management units that are under stress is given in example 22 on the facing page.

6.2.3 Water-use efficiency

The Agency expects all customers to use water in an efficient manner and will actively promote the efficient use of water. The need for water is examined when an application is considered, whether the application is for new abstraction or renewal of existing permissions. The quantities authorised in any licence are those considered to be reasonable and justified for the use proposed. In some cases, the quantities granted are less than those applied for.

Research is currently being undertaken by the Agency with respect to the optimum use of water. Our future approach will take account of this research.

The national approach to water-use efficiency will be outlined in the national supporting document. Any elements of this that are locally significant will be detailed here. This is illustrated in example 23 on the facing page.

Example 22: Recovery strategy for a catchment

In this catchment the resource balance calculation has highlighted that two water resource management units are under stress and have both been assigned 'Over-licensed' sustainability status. The strategy that will be used to restore sustainable abstraction is as follows:

- During the six-year period of this CAMS the Agency will promote reduction or revocation of unused licensed resources by holders of all existing abstraction licences. This will be targeted where no justifiable case exists for the retention of all or part of their licence to meet anticipated future demands.
- A review will be made of the costs and benefits of other options for recovering licensed resources that may need to be considered, should the voluntary strategy prove ineffective. The Agency will consider, among other options:
 - i. Water audits for major consumptive abstractors to seek efficiency savings and consequent reductions in licensed volumes.
 - ii. The reduction of licensed quantities to actual-use volumes where the need for the full-licensed quantity cannot be proved and where records show actual use is consistently below full-licensed quantity.
 - iii. The potential for reductions through the exercise of realistic conjunctive use.
 - iv. A blanket reduction of 20 per cent of the authorisation volume on all licences.

Example 23: Water-use efficiency measures for a catchment

In this catchment the following options will be considered to promote the efficient use of water:

- promoting water conservation techniques such as recycling and irrigation best practice;
- reviewing all licences when application for renewal is considered, in particular seeking better justification of need and reducing the quantity on licences, where appropriate;
- reviewing all existing licences against the guidelines for optimum use of water and reducing or revoking licences accordingly.

6.2.4 Trading of licences

Details of the licence trading process, including identifying opportunities for and possible limitations to trading, will be given here. This section will appear if the Government decides that, following its intended further consultation on this topic, it should be introduced.

6.2.5 Resource assessment improvements

In this section any research that will be undertaken to improve resource assessment techniques or improvements to data collection, which are specific to the catchment, will be identified.

This could include commissioning a groundwater model, additional observation boreholes or gauging stations, or further research into hydroecology.

6.3 Objectives for the water resource management units

Within a catchment it is likely that different water resource management units will have different sustainability status categories. If this is the case different strategies to restore or maintain sustainability will be necessary for different units. In general, any units within the catchment that have severe sustainability problems will be addressed first. This section provides the key points of the strategy the Agency will use to manage the resources of each of the water resource management units.

Where possible, units with a similar strategy will be grouped together. If the management of a particular unit is similar to the overall strategy for the catchment as a whole, the detail of the strategy will be as given in section 6.2. If the management of a particular unit is different from the overall strategy then detail on objectives and actions covered in sections 6.2.1 to 6.2.5 above will be given for that unit under section 6.3.

To help find the information on the water resource management unit they are interested in, a table will be given, listing the units and referring to the appropriate sections. An example of this is given on the facing page (example 24). In the example, the catchment has four water resource management units. Units 1 and 4 are similar and have the same strategy to manage them, so they are therefore grouped together with the information given in section 6.3.1. Units 2 and 3 require a different strategy from the rest of the catchment and the strategy for managing these units are therefore given under sections 6.3.2 and 6.3.3 respectively.

Each water resource management unit, or group of units, will then have the strategy set out, either in text or table form, as appropriate. Examples of this can be seen on the facing page (examples 25 and 26).

6.4 Long-term future developments

In this section any developments that are expected to occur after the period of the current CAMS that will have a significant impact on water resources will be detailed. This could include a major new abstraction being proposed or the cessation of a major discharge.

Details of other relevant initiatives, for example, the appropriate Regional Water Resources Strategy, will be given here.

Example 24: Water resource management units of a catchment

Water resource management units	Table number/Text section
Unit 1	6.3.1
Unit 2	6.3.2
Unit 3	6.3.3
Unit 4	6.3.1

Example 25: Future licensing strategy for a water resource management unit

This water resource management unit has a sustainability status of 'Lightly to moderately licensed' and the future licensing strategy is therefore as follows:

Objective	Action
Improve efficiency of use of water resources	The Agency will encourage abstractors to use water efficiently through local initiatives such as water audits and waste minimisation projects. Metering of all abstractions will have the added benefit of improving our knowledge base on water resources in the unit
Reduce risks in water resource allocation by increasing the scope for changes	Conversion of existing licences to time-limited status
Improve availability of water for future abstractors and reduce risks in water resource allocation	Where appropriate, vary licences downward to reflect abstractors' needs. Revocation of licences that have not had beneficial use for seven years
Protect low flows or low water tables	Introduce 'hands-off flow' or level conditions on licences

Example 26: Future licensing strategy for a groundwater unit

This groundwater water resource management unit has a sustainability status of 'Over-abstracted' and the future licensing strategy is therefore as follows:

Objective	Action
Prevent further stress	No new licences
Remove the risk of increased abstraction causing the water resource status of the unit to become unsustainable	If all licences in this unit were fully utilised there would be serious environmental implications. Licences that are unused or not fully utilised will therefore be targeted for revocation or downward variation respectively. These licences will be reviewed to ensure optimum water use has been achieved
Address uncertainties in resource assessment	To convert all abstraction licences in this unit to time-limited status, with the highest priority attached to the largest licences and those with the greatest net use
Reduce water resource use and therefore improve flexibility in their management	Abstractors are expected to use water efficiently. This will be promoted through initiatives such as water audits and waste minimisation projects
Improve enforcement of licence conditions	Increase the frequency of visits by Licence Enforcement Officers to abstractions in this unit

APPENDIX A: PROPOSED CONTENTS OF TECHNICAL DOCUMENT

Aim: To provide background information that supports the management strategy set out in the main CAMS. The reader will be provided with data, description of methods and detailed information on policies. The information will be under the headings below (maps and tables will be provided as appropriate).

1. Hydrology and hydrometry

Description of catchment hydrology
Measurement network (gauging stations, observation boreholes, rain gauges)
Hydrometric data

2. Hydrogeology

Description of hydrogeology
Detail of any relevant groundwater studies

3. Fisheries

Description of fisheries status

4. Ecology/conservation

Ecological quality of rivers
Conservation sites

5. Water quality

Surface water/groundwater quality
Consented discharges

6. Water resource usage

Licensed abstractions (by use)
Guide to severity of licence conditions
Licences to be renewed in CAMS period

7. Resource assessment/sustainability status

Resource assessment methodology
Environmental allocation

8. Links to other plans/strategies

Environment Agency Water Resources Strategies
Environment Agency Drought Management Plans
Local Environment Agency Plans (LEAPs)
Water Company Asset Management Plans
Water Company Water Resources Plans
Water Company Drought Contingency Plans
Others (for example, Water Level Management Plans, Habitats Directive Consent Reviews)

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