



www.environment-agency.gov.uk/cams

Adur and Ouse Catchment Abstraction Management Strategy

Consultation Document
July 2004



**ENVIRONMENT
AGENCY**

www.environment-agency.gov.uk/cams

The Environment Agency is the leading public body protecting and improving the environment in England and Wales.

It's our job to make sure that air, land and water are looked after by everyone in today's society, so that tomorrow's generations inherit a cleaner, healthier world.

Our work includes tackling flooding and pollution incidents, reducing industry's impacts on the environment, cleaning up rivers, coastal waters and contaminated land, and improving wildlife habitats.

Published by:

Environment Agency
Rio House
Waterside Drive, Aztec West
Almondsbury, Bristol BS32 4UD
Tel: 01454 624400 Fax: 01454 624409


© Environment Agency July 2004

All rights reserved. This document may be reproduced with prior permission of the Environment Agency.

This report is printed using water based inks on Revive, a recycled paper combining at least 75% de-inked post consumer waste and 25% mill broke.

Front cover photograph by David Dennis, Environmental Images.

WOT


ENVIRONMENT AGENCY

Information Services Unit

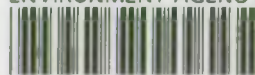
Please return or renew this item by the due date

Due Date	

Contents

1	Introduction	1
2	Consultation on the A&O CAMS	2
3	The CAMS area	4
3.1.	Hydrology and Hydrogeology	4
3.2.	Hydrometry	8
3.3.	Abstractions and discharges	8
3.4.	Conservation designations	11
3.5.	Status of fisheries and ecology in the CAMS area	14
3.6.	Water quality	15
3.7.	Stakeholder concerns	16
3.8.	Links with other plans	16
4	Resource assessment and resource availability status	17
4.1.	Introduction	17
4.2.	Resource assessment of river assessment points	18
4.3.	Resource assessment of groundwater management units	21
4.4.	Integration of the surface water and groundwater resource assessments	21
4.5.	Water resource management units in the A&O CAMS	23
5	Existing strategy	27
5.1.	National Environment Agency strategies and initiatives	27
5.2.	Southern Region water resources strategy	27
5.3.	Water company water resources plans	28
5.4.	Climate change	28
5.5.	Existing licensing policies relevant to the A&O CAMS	28
6	Proposed licensing strategy	30
6.1.	Introduction	30
6.2.	Sustainability appraisal	30
6.3.	Proposed licensing policy common to all WRMUs	30
6.4.	Promoting water efficiency	31
6.5.	Revocation of unused abstraction licences	32
6.6.	Proposed licensing strategy for the River Adur - WRMU 1	33
6.7.	Proposed licensing strategy for the River Ouse - WRMU 2	35
6.8.	Proposed licensing strategy for the Cockhaise Brook - WRMU 3	37
6.9.	Proposed licensing strategy for the Brighton Chalk - WRMU 4	39
6.10.	Proposed strategy for areas not in a water resource management unit	40
6.11.	The impact of the Water Act 2003	41
6.12.	Opportunities for licence trading in the A&O CAMS area	41
6.13.	Future developments in the A&O CAMS area	42
7	Summary of key issues for consultation	43
	Appendix 1: References/Useful Water Efficiency Contacts	44
	Glossary of terms	46
	List of acronyms, abbreviations and units	50

ENVIRONMENT AGENCY



107994

Introduction

The CAMS Vision – A shared strategy for the sustainable management of water resourced within a catchment.

The Environment Agency is committed to ensuring that water is managed in a sustainable way that benefits users and the environment both now and in the future. Catchment Abstraction Management Strategies (CAMS) set out how water resources are managed at a local level. They will make more information on water allocation and abstraction 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 mechanisms 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 consultation document should be read in conjunction with *Managing Water Abstraction*.

The Adur and Ouse (A&O) CAMS consultation document summarises the availability of water resources and the sustainability of the current abstraction regime. It also sets out the Environment Agency's proposed policy for managing surface and groundwater abstraction in order to maintain and, where necessary, restore sustainable abstraction.

We invite you to participate in this process by commenting on these proposals and value any information or suggestions you may have on the management of water resources in this area.

The A&O CAMS is the second of three CAMS to be produced in the Sussex Area of Southern Region of

the Environment Agency. CAMS operate on a six-year cycle and the document will be reviewed in 2009 and the updated strategy will be published in 2011.

Consultation on the Adur and Ouse CAMS

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

- The wide circulation of an awareness raising leaflet
- Setting up of a CAMS Stakeholder Group
- Presentations to the Sussex Area Environment Group
- Setting up of a multi-disciplinary CAMS project team
- Establishment of a regional CAMS project group

The leaflet was distributed in July 2003. Its aim was to raise awareness of the development of the CAMS in the local area and it also invited anyone with an interest to send in written comments, providing information, views and suggestions for consideration during the early development of the CAMS.

The key issues for the A&O CAMS area as summarised in the leaflet were:

- Developing a greater understanding of the water resources and water dependency of environments in the A&O CAMS area
- An evaluation of the sustainability of existing abstractions
- Assessment of water resource availability in the CAMS area
- The impact of surface water abstractions on river flows
- The impact of groundwater abstractions on river flows and the extent to which the major chalk aquifer is already exploited

- Providing a structure for managing time limited licences. Time limited licences are likely to be renewed provided they satisfy continued justification of need, efficient use of water and environmental sustainability
- Providing a greater opportunity for public involvement in the process of managing water abstraction

A stakeholder group has been set up for the A&O CAMS. The role of the group is to represent the key interests in the catchment and to help identify issues of local significance, provide views on proposals and to consider the likely implications of different strategy options. The members of the A&O CAMS stakeholder group and the interests they represent are as follows:

Mrs. Vivien Lyth	Horsham District Council - Chairperson
Dr. Tony Whitbread	Sussex Wildlife Trust
Mr. Trevor Passmore	Agriculture
Mr. Paul Holmes	Water Companies (South East Water)
Mr. Tony Barnard	Fisheries
Mr. Paul Seeley later replaced by Mr. Mark Potter	Water Companies (Southern Water)
Ms. Fenella Collins later replaced by Mr. Rupert Ashby	Country Land & Business Association
Mr. Peter Currell	Sussex Downs Conservation Board
Dr. Sam St. Pierre	Sussex Ouse Conservation Society

English Nature were also kept fully informed of all aspects of the process but were unfortunately unable to accept membership of the Stakeholder Group.

It was not possible to include representatives from all interested organisations on the Stakeholder Group. Contact was therefore established with a number of organisations inviting their input to the process. Representatives of these groups were sent minutes after each meeting. These included:

- Inland Waterways Association (IWA)
- NFU (South East Region)

A paper, summarising the responses to the circulation of the awareness-raising leaflet was presented to the second meeting of the Stakeholder Group. The following important local issues were drawn from the 19 written responses to the leaflet circulation exercise and information request:

- The impact of abstraction on river flows and in particular during the summer
- Winter storage of water to provide water for summer irrigation
- The impact of new development, increasing population demand and land-use change on water availability
- The requirements of the aquatic environment including fish passage and spawning
- Water efficiency and the sustainable use of water
- Impact of water management on navigational and recreational activities

This Consultation Document is the formal part of the A&O CAMS consultation process and provides the opportunity for all interested parties to comment on the strategy that is being proposed.

Responses should be sent, in writing to:

Helen Procter or Tom Nichols –
Technical Officers (Water Resources),
The Environment Agency,
Sussex Area Office,
Saxon House,
Little High Street,
Worthing,
West Sussex,
BN11 1DH

Tel: 08708 506506
Fax: 01903 215884

Or by e-mail to:
cams.sussex@environment-agency.go.uk

The closing date for the responses is 15th October 2004. Please ensure that you include where appropriate the reference to the element of the proposed strategy that you are addressing.

Once the responses have been analysed, a statement of response will be produced highlighting the main issues raised. It will be sent to all respondents and will also be available to others on request. Extracts from responses may be included in this statement. If you would like your response to be treated as confidential, please state this clearly.

A technical document (consultation version) for the A&O CAMS has been produced which provides detailed technical information on which the development of the strategy has been based. If you wish to receive a copy of this document on CD-ROM, please contact us at the address above. Additional copies of this document are also available from the same address.

The CAMS area

The Adur and Ouse (A&O) CAMS covers an area of 1073 km². See Figure 1. It encompasses the catchments of the Rivers Ouse and Adur. It also contains the Brighton Chalk, a major aquifer unit.

The CAMS area is characterised by a concentration of urban development along the south coast and includes the city of Brighton and Hove and the port areas of Shoreham and Newhaven. The area has been attracting tourists for over 200 years. Visitor numbers to Brighton and Hove alone are estimated at 8 million every year contributing £382 million to the local economy (Brighton and Hove City Council, 2004).

i.e. responding quickly to rainfall events and having low base flows. The river's "flashy" character means that summer flows are generally very low, but heavy rainfall during the winter leads to high flows and often flooding. The Adur is also fed by strong perennial springs emanating from the southern flank of the Brighton Chalk providing a limited quantity of baseflow to some sections of the river.

The River Ouse is the second largest river catchment in Sussex. Rising in the Tunbridge Wells sands of the Upper Weald, the river predominantly drains east and then south over the Weald Clay. The river naturally has a highly flashy character and is prone to winter



The Sussex Coast

Inland is predominantly rural with small and medium sized towns and villages interspersed in the attractive countryside. Much of the area is included within the Sussex Downs and High Weald Areas of Outstanding Natural Beauty (AONBs), which recognises and provides protection for the character and landscape value of these areas. Main inland towns include Lewes, Uckfield, Haywards Heath and Burgess Hill. There is limited industry and most employment is associated with the service sector, tourism and recreation and to a lesser extent agriculture.

3.1. Hydrology and hydrogeology

The CAMS incorporates the catchments of the Rivers Adur and Ouse. These watercourses support a diverse range of habitats and abstractions for public water supply (PWS), agriculture and industry.

The River Adur catchment is largely underlain by the impermeable Weald Clay. The geology plays a large part in determining the river's hydrological regime

loading (e.g. Lewes in 2000) and low flows during summer months (e.g. a drought permit was required to help maintain PWS following the dry summer of 2003). Its largest tributary, the River Uck also has a highly flashy character and is prone to flooding as are its other tributaries the Bevern and Clayhill Streams. The Shell Brook and Cockhaise Brook drain Tunbridge Wells and Ashdown Sands and feed into the river's upper reaches.

The Ouse has a rich history of navigation and has been managed to support varied uses including fisheries, flood defence for agricultural interests, industry in the form of mills and iron workings, and more recently, abstraction for public water supply. These have resulted in a legacy of complex arrangements of structures, such as weirs and pumping stations, to regulate the flow and levels in the river.

The river system is dominated by a large strategic PWS abstraction operated by South East Water (SEW). Abstraction takes place just above the river's tidal limit, immediately upstream of Barcombe Mills and

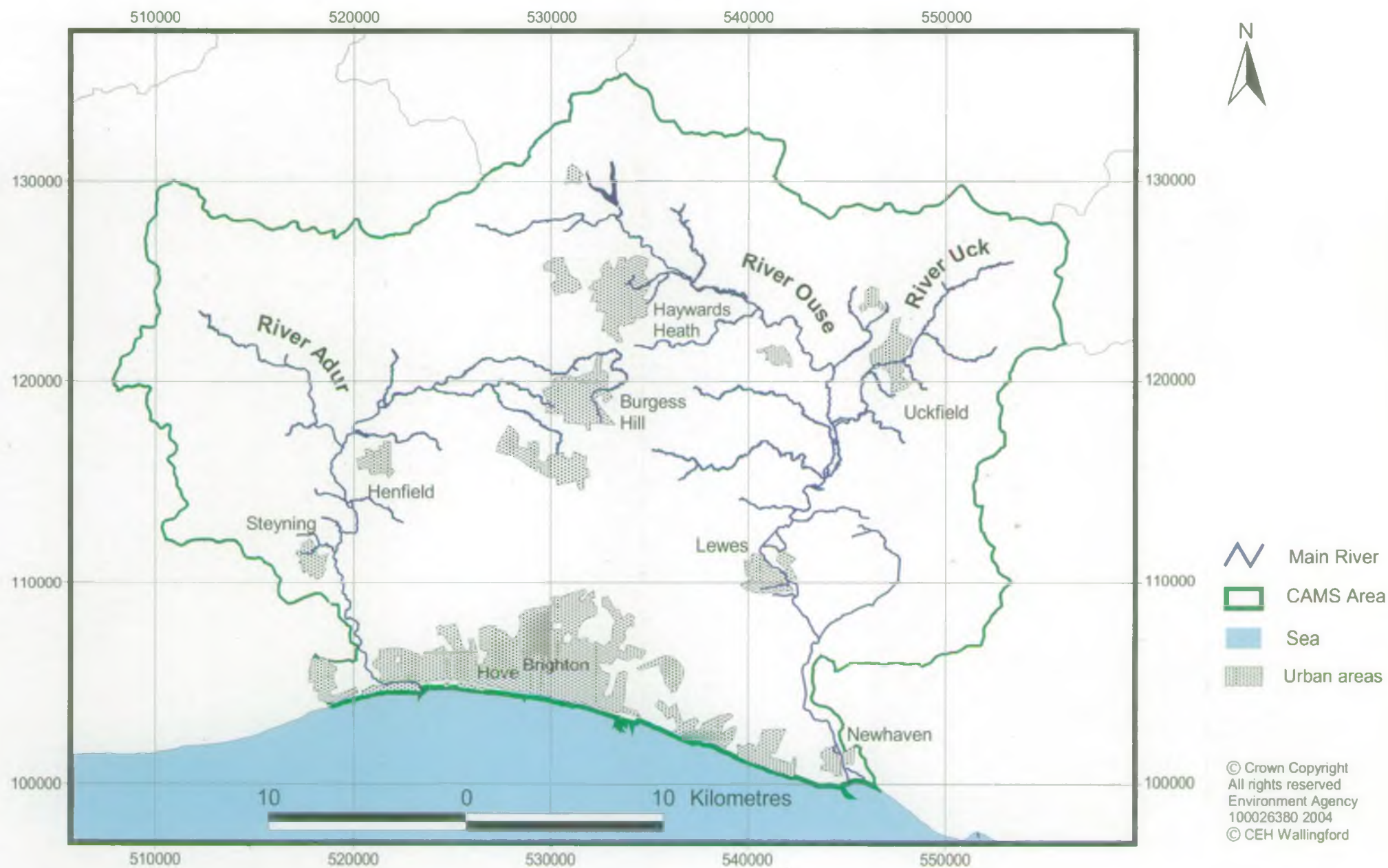


Figure 1 - The Adur and Ouse CAMS area

the permissible peak daily abstraction rate is the largest in Sussex. Due to the flashy nature of the river, summer flows are unable to support high levels of abstraction. Therefore the Barcombe abstraction is supported by augmentation releases from Ardingly reservoir situated on the Shell Brook at the top of the catchment (see Figure 2).

towns on the south coast.

The Ashdown Beds and Tunbridge Wells Sands, which underlie the north of the CAMS area, are minor aquifers. They provide important local groundwater sources for abstractions by industry, agriculture and PWS. They also help to support baseflow to the

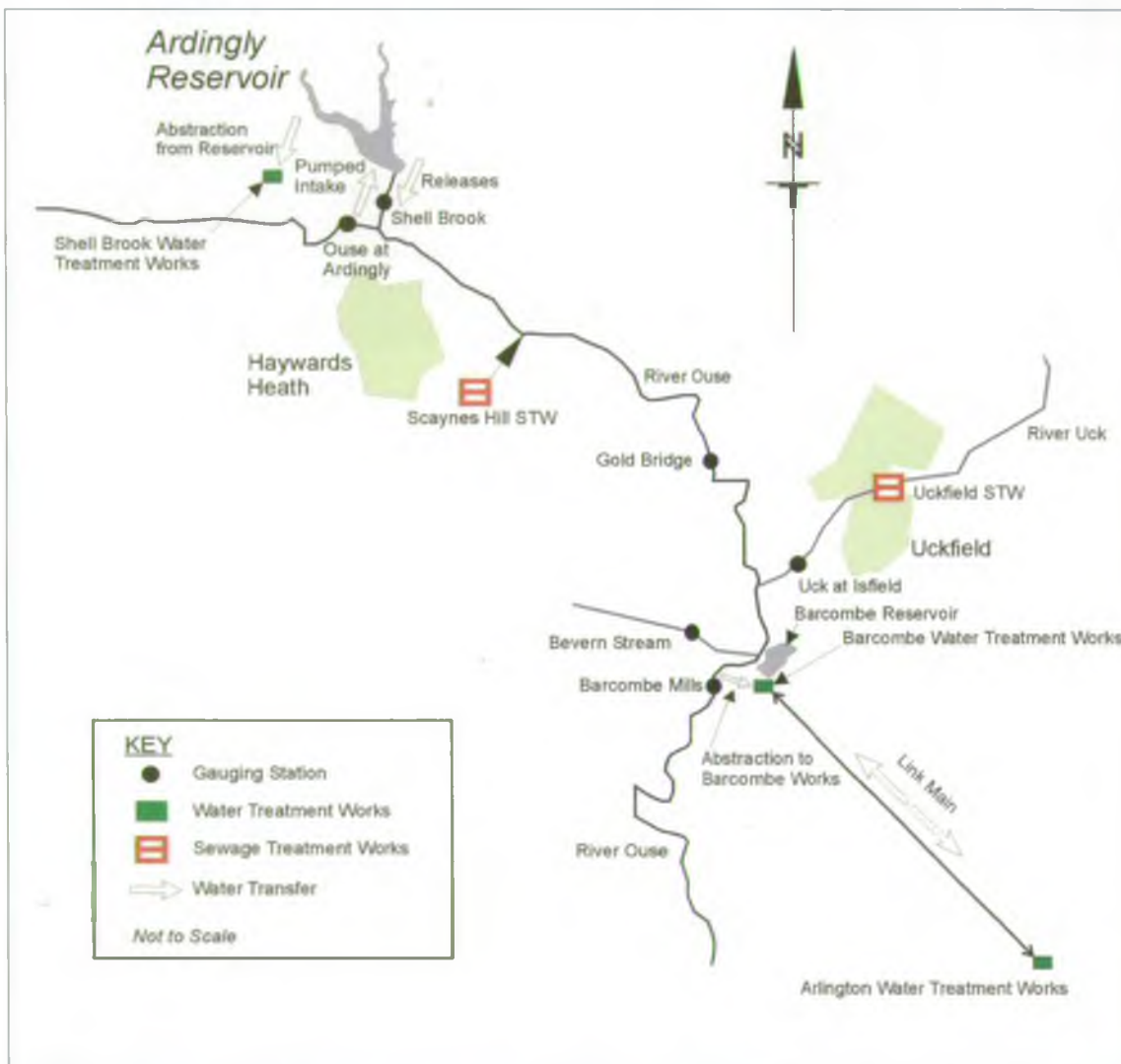


Figure 2. Schematic of the Ardingly-Barcombe abstraction system on the River Ouse

The river is effectively used as a conduit to move water from the reservoir to the abstraction point and the reservoir releases fundamentally alter the river's hydrological regime. Summer flows are increased well above those that would occur naturally. This has important consequences for water resource availability in the river.

One major aquifer, the Brighton Chalk, underlies much of the southern part of the CAMS area. It is a very important source of water for PWS and supplies the needs of Brighton and Hove and neighbouring

tributary streams of the River Ouse. Details of the area's geology are illustrated in Figure 3.

Although part of the area suffered from significant flooding during the winter of 2000/2001, pressure from new development and rising household demand is increasing the need for water. Resources are finely balanced between meeting the demands of existing abstractions and the need to protect river flows to meet environmental and other in-stream requirements. This is illustrated by Southern Region Environment Agency policy generally presuming

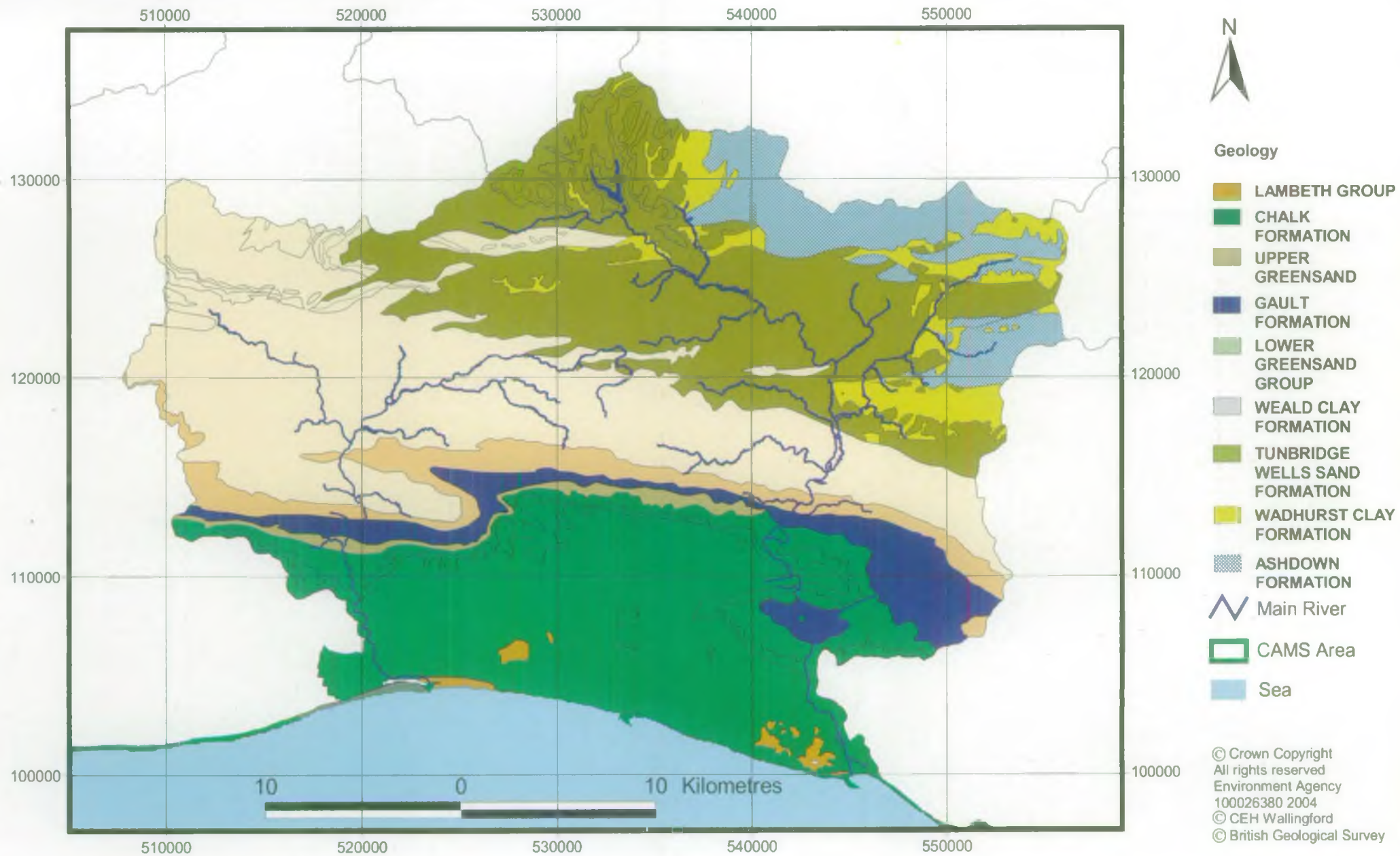


Figure 3 - Geology of the Adur and Ouse CAMS area

against further consumptive abstraction and from the Chalk aquifer and from rivers during the summer.

3.2. Hydrometry

Water resources are monitored via a network of hydrometric stations. River flows, rainfall and groundwater levels are monitored across the CAMS area (see Figure 4) and extensive historic records exist. These data are used on a routine basis for drought and flood monitoring, water resource investigations and have also been used to assess resource availability in this CAMS.

Table 1 | Main flow gauging Stations in the A&O CAMS Area

Gauging Station	Watercourse
Hatterell's Bridge	River Adur (western Branch)
Sakeham	River Adur (eastern Branch)
Chess Bridge	Chess Stream (tributary of the River Adur)
Fulking	Fulking Stream (tributary of the River Adur)
Ardingly	River Ouse
Shell Brook	Shell Brook (tributary of the River Ouse)
Holywell	Cockchaise Brook (tributary of the River Ouse)
Gold Bridge	River Ouse
Isfield	River Uck (tributary of the River Ouse)
Clapper's Bridge	Bevern Stream (tributary of the River Ouse)
Old Ship	Clayhill Stream (tributary of the River Ouse)
Barcombe Ultrasonic	River Ouse
Barcombe Mills	River Ouse
Lewes Winterbourne	Winterbourne Stream (tributary of the River Ouse)

Groundwater levels are measured in 60 observation boreholes, predominantly located in the Brighton Chalk aquifer. Rainfall is measured in rain gauges located at 45 sites.

The ongoing collection and analysis of hydrometric data is essential for assessing water resources and sustainability issues. The hydrometric network is currently under review and subject to improvement. In the A&O CAMS area, spring flow surveys are being conducted on the Chalk escarpment of the Sussex Downs.

3.3. Abstractions and discharges

Total licensed abstraction in the A&O catchments amounts to 231 MI/d which is about 20% of the area's average effective rainfall, see Figure 5. Approximately 98% of licensed groundwater abstraction is for PWS with the remaining 2% used for industrial and agricultural purposes. Approximately 94% of the licensed surface water abstraction in the CAMS area is for PWS, with around 4.4% for aquaculture (fish farming and watercress beds), 1.5% used for agricultural purposes and only 0.1% for industry.

The vast majority of water abstracted by Southern Water Services (SWS) from the Brighton Chalk aquifer is for PWS for the coastal urban area. There are several large PWS abstraction points in the unit operated and managed under a single group abstraction licence. Actual abstraction is close to licensed volumes and there is little headroom in most licences for increased abstraction in the future. Abstraction from the unit has strong seasonal trend, increasing sharply in the summer to meet the additional demands placed on water supply by tourists.

The River Ouse system is dominated by a large PWS abstraction operated by SEW on the River Ouse, see section 3.1 for details.

The abstraction licence for the Ardingly-Barcombe scheme has recently been revised and was subject to a lengthy determination process. The new licence conditions make the abstraction easier to operate and to enforce. Changes have also been incorporated that help secure an improvement in the availability of water for PWS, as well as improved environmental river flows. These include an increase in the minimal acceptable flow (MAF) that must pass over Barcombe Mills weir, restrictions on abstractions from the upper Ouse to secure summer spate flows for fish passage. There are also changes to the rules governing releases from Ardingly reservoir to create a more natural flow regime in the middle reaches of the Ouse. The revision has been undertaken in full consultation with local stakeholders and with various Agency functions. An "Ouse Working Group" was set up that included SEW and Agency staff members.

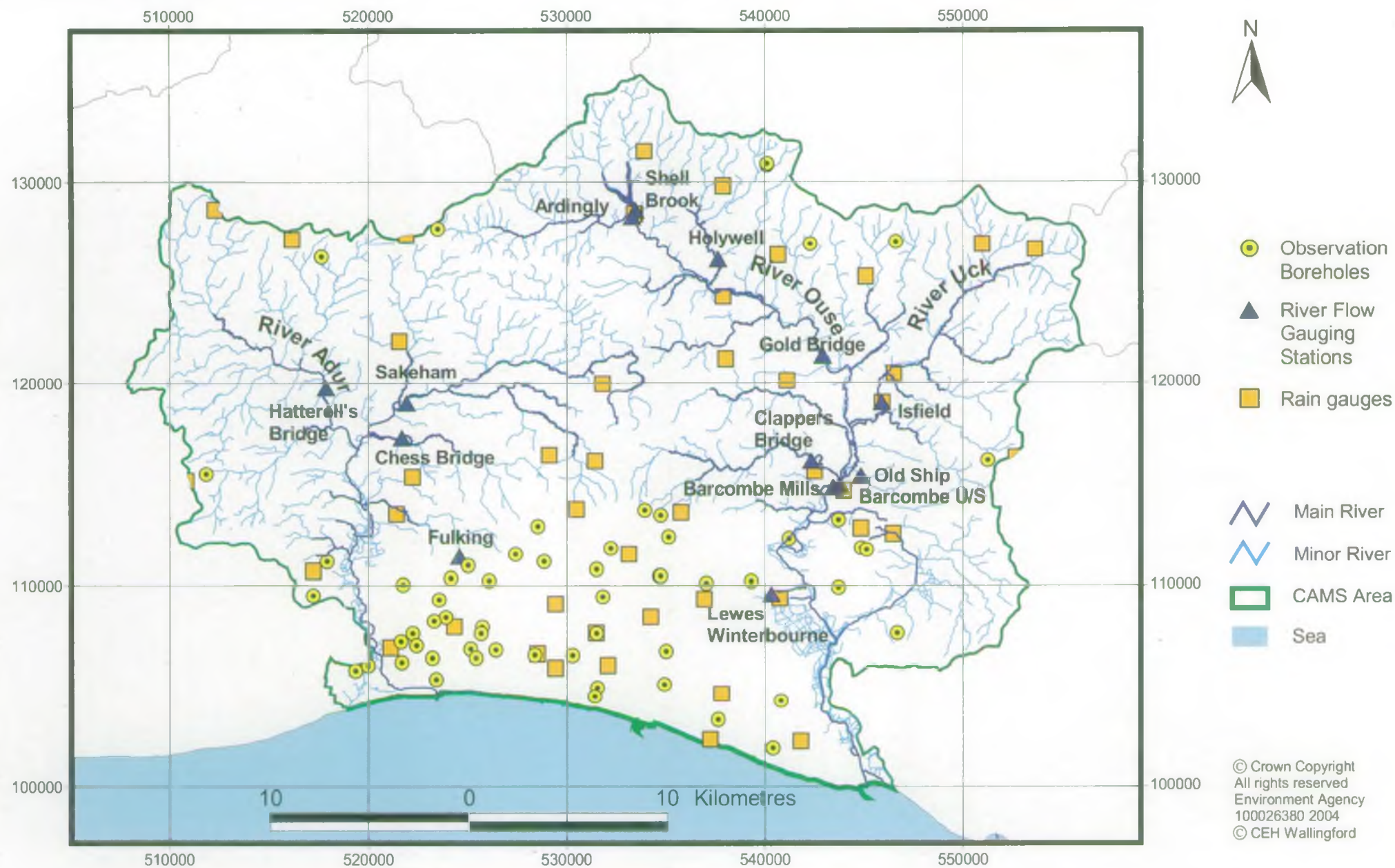


Figure 4 - Hydrometric monitoring network sites in the Adur and Ouse CAMS area

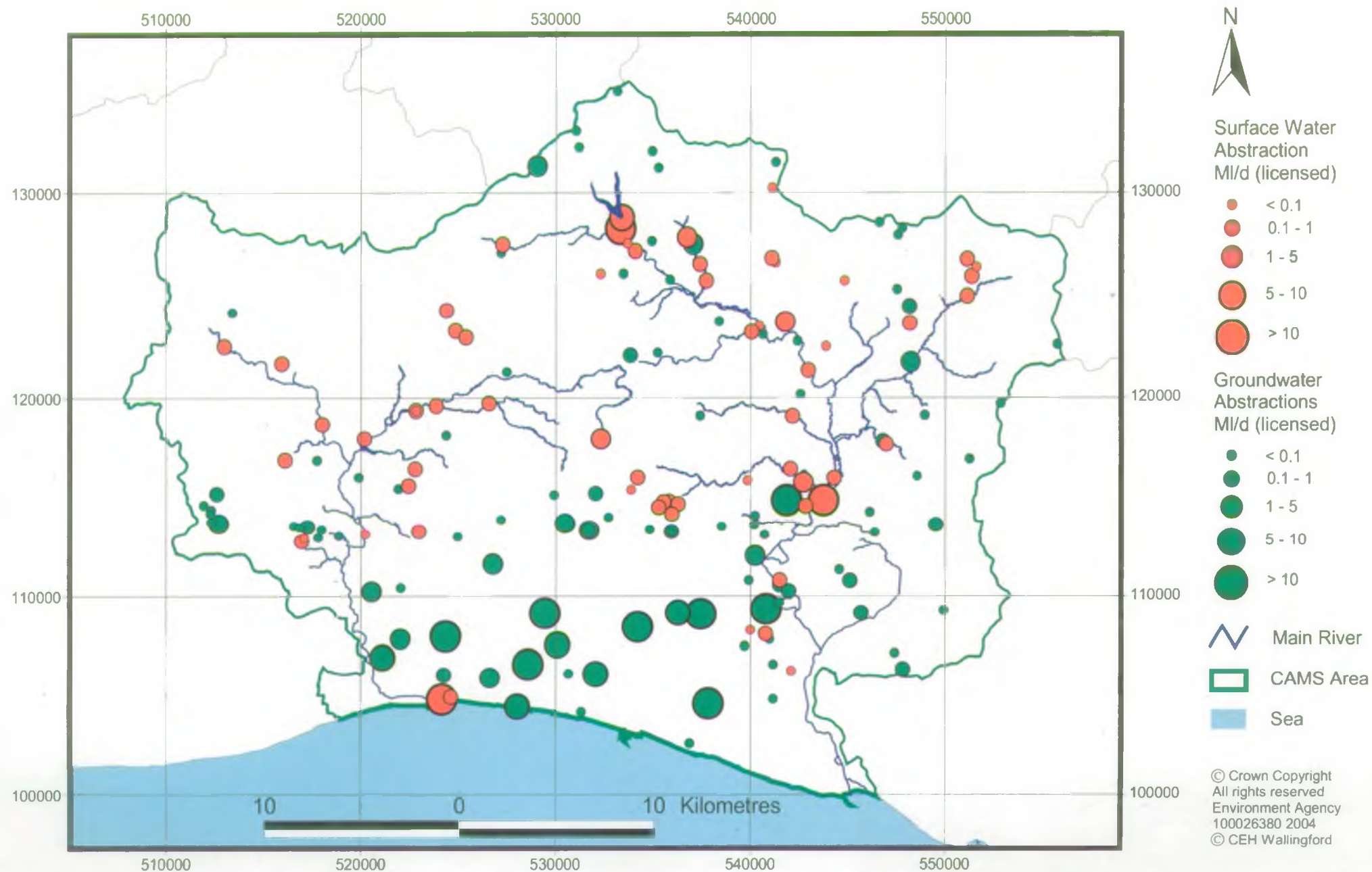


Figure 5 - Licensed abstraction in the Adur and Ouse CAMS area



Ardingly Reservoir

A total volume of approximately 135 Ml/d of treated effluent is discharged to the rivers and streams within the CAMS area and out to sea, see Figure 6. The Adur catchment is dominated by the discharge at Burgess Hill Waste Water Treatment Works (WWTW), operated by SWS, and comprises approximately one third of all the water discharged in the catchment on a daily basis. There are 6 significant discharges into the River Ouse catchment, 5 of which are from WWTW. The largest of these is from Scaynes Hill WWTW which accounts for 30% of all the discharges to the river. The majority of sewage effluent generated within the overall A&O CAMS area is disposed into the English Channel via Long Sea Outfalls at Shoreham, Portobello and Newhaven.



Goddards Green (Burgess Hill) WWTW
(Photograph courtesy of Southern Water Services Ltd)

3.4. Conservation designations

The CAMS area possesses a diverse range of habitats including a wealth of local, national and internationally designated areas of ecological importance principally related to coastal and chalk grassland features, see Figure 7. A large proportion of the rural area is included in the nationally designated High Weald and Sussex Downs AONB and the South Downs Environmentally Sensitive Area (ESA). The Sussex Downs are included within the area designated as the South Downs National Park (subject to final confirmation). Planning decisions already have to take this into account. An Interim South Downs Management Plan has just recently been produced (Sussex Downs Conservation Board March 2004). Much of the remaining rural area is covered by local landscape designations. The area also has rich archaeological and built heritage.



Devil's Dyke SSSI, Sussex Downs AONB

The A&O CAMS contains the following internationally important sites:

- Ashdown Forest cSAC and SPA
- Castle Hill cSAC
- Lewes Downs cSAC

These areas of high conservation value are designated under the Conservation (Natural Habitats & c.) Regulations, 1994, commonly referred to as the 'Habitats Regulations', which transposed the European Union Habitats and Birds Directives in to British law.

These European sites form a network known as 'Natura 2000'. It includes Special Areas of Conservation (SAC), designated under EC Council Directive 92/43 EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora 1992. It also includes Special Protection Areas (SPA), classified under EC Council Directive 79/409 EEC on the

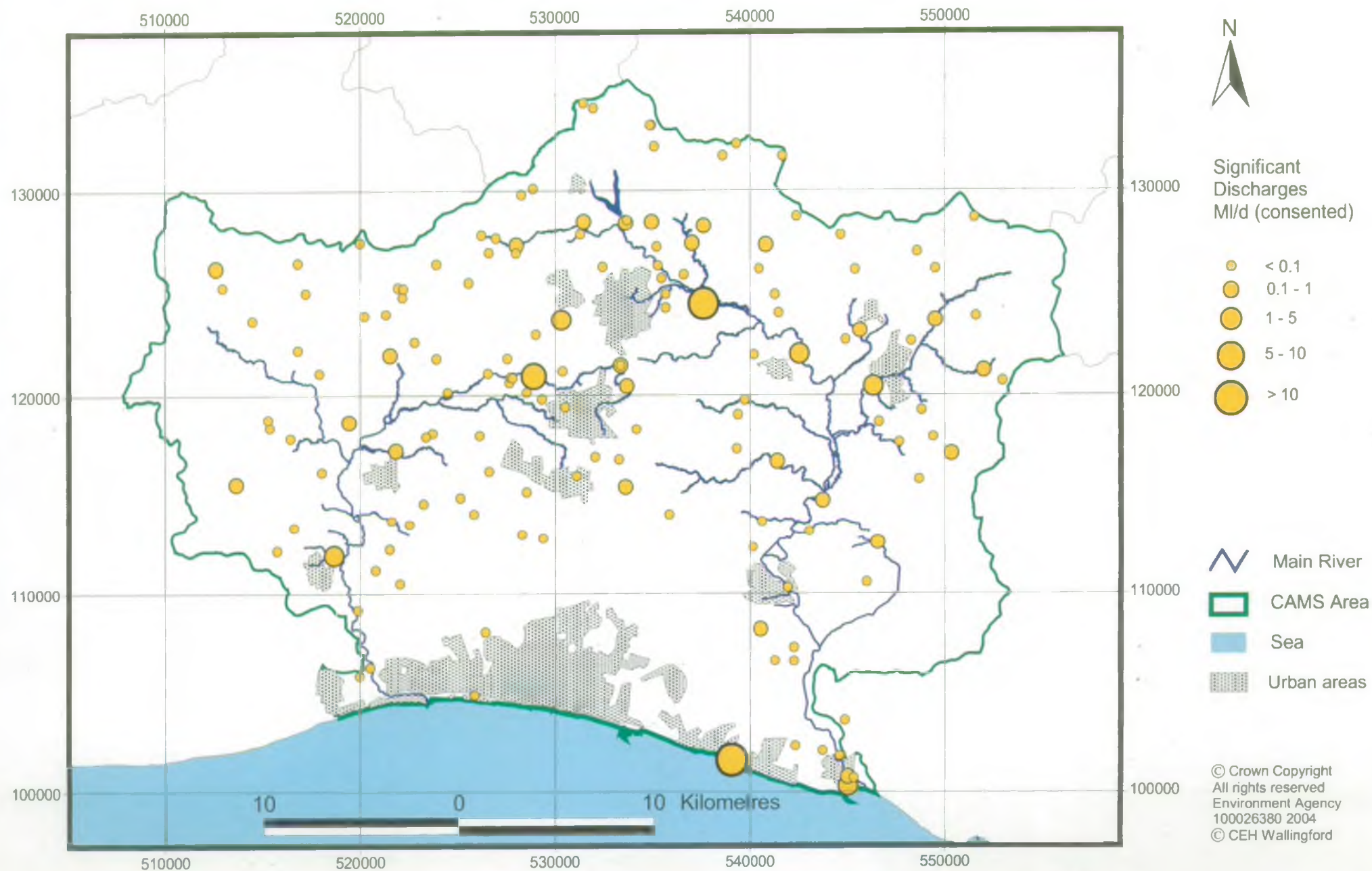


Figure 6 - Major discharges in the Adur and Ouse CAMS area

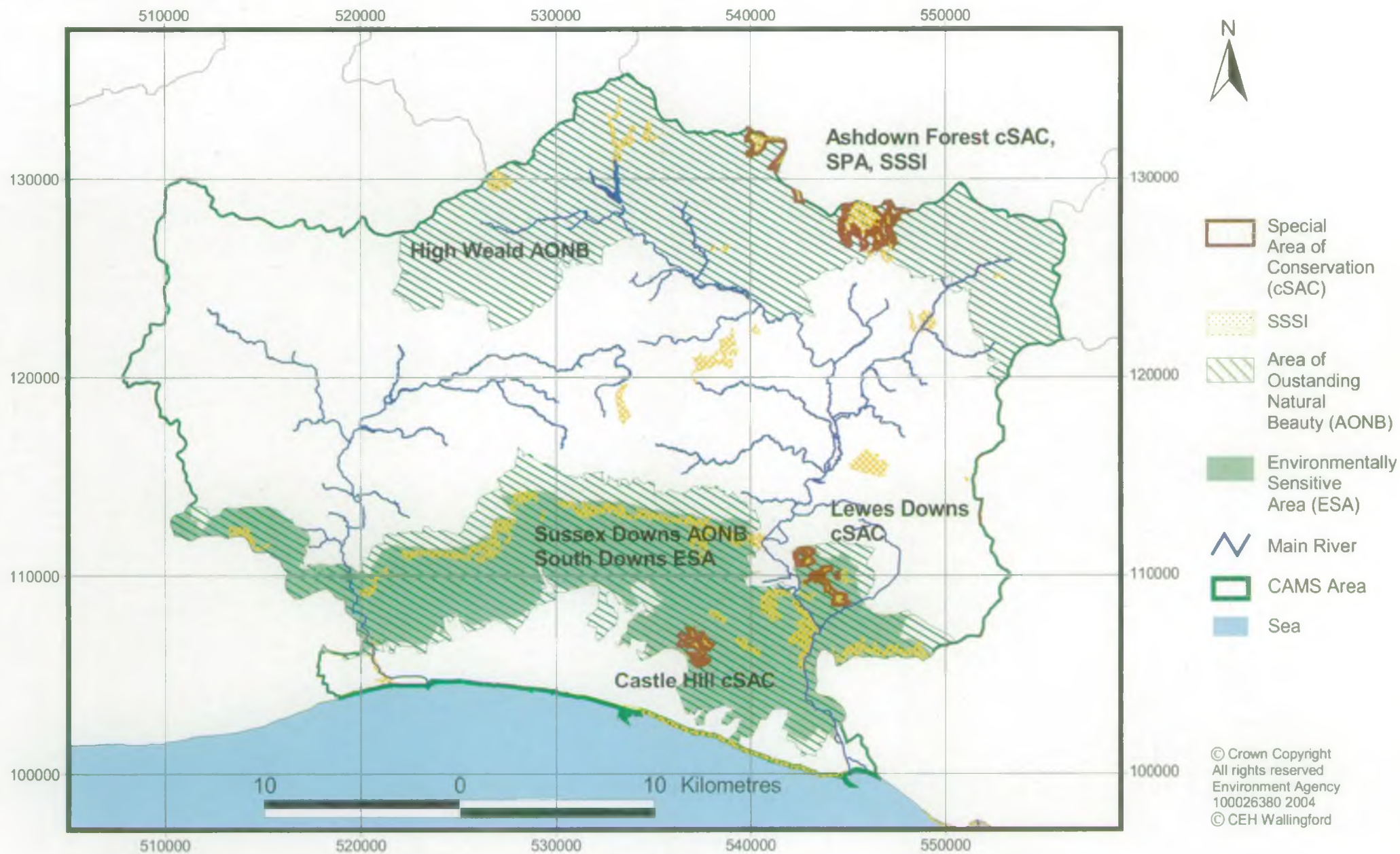


Figure 7 - Conservation designations in the Adur and Ouse CAMS area

Conservation of Wild Birds. In addition, sites designated under the Convention of Wetlands of International Importance especially as Waterfowl Habitat (known as 'Ramsar' sites after the town in Iran where the conference was held) are also afforded the same protection as Natura 2000 sites.



The High Weald AONB near Horsted Keynes

The Habitats Directive requires the assessment of the impacts of plans and projects on protected areas. This means that the Environment Agency must take full account of the Directive's requirements when considering new licences and permissions, or before carrying out operational work, such as flood defence maintenance. The Agency must review all existing consents to ensure compliance with the Directive and where necessary amend or revoke those that are found to be causing damage to habitats or species of European importance. The Agency is undertaking an extensive programme to review existing licences affecting all Natura 2000 sites. This full 'Review of Consents', and actions arising will be completed by 2010.

The sites identified in the CAMS area however, do not have features that are impacted by water resources activities. These "dry" Habitats Regulation designated



River Ouse and the Lewis Brooks SSSI

sites are very important to the local environment, but there is no direct linkage to the CAMS work. There are no Ramsar sites in the CAMS area.

In addition to the European sites, which are also Sites of Special Scientific (SSSI), there are also many other SSSIs in the CAMS area. In the lower River Ouse catchment there are some high quality wetland habitats, for example Offham Marshes SSSI and Lewes Brooks SSSI. Water Level Management Plans (WLMPs) have been prepared for these sites. WLMPs do not have to be prepared for any SSSIs in the Adur catchment.

There are numerous non-statutory Local Nature Reserves (LNRs) and Sites of Nature Conservation Importance (SNCIs) in the A&O CAMS area, which are identified because of their considerable wildlife value.

3.5. Status of fisheries and ecology in the CAMS area

The Agency annually collects and analyses a large amount of ecological data, particularly from electro-fishing surveys and routine macro-invertebrate sampling. Biological quality is historically assessed at 21 sites in the River Adur catchment and 28 sites in the River Ouse catchment. Such data are used to gauge river water quality as well as identifying stresses on the river such as low flows. These long-term data have been used to contribute to the assessment of the sensitivity of rivers to abstraction.

3.5.1. Fisheries

A review of the EU Freshwater Fisheries Directive has resulted in more river stretches in the CAMS area being designated, giving a greater proportion of rivers statutory water quality targets. This will afford the Agency greater authority in achieving these targets for any stretches that fail to meet the standards of the directive.

The Rivers Adur and Ouse and their tributaries are used extensively for coarse angling. There are no Salmon in the Adur or Ouse catchments but migratory Sea Trout do occur. Both rivers provide important spawning grounds for Sea Trout, although the Ouse has a more extensive Sea Trout fishery. Non-migratory salmonids such as Brown Trout are distributed throughout the middle and upper reaches of the River Ouse and many of its tributaries. They also occur widely within the Adur catchment. There are several stillwater coarse fisheries in both the Adur and Ouse catchments, for example Ardingly Reservoir.

There are fewer stillwater game fisheries, the largest being Barcombe Reservoir in the Ouse catchment.

The River Adur and River Ouse support Bullhead (*Cottus gobio*) and Lamprey (*Lampreta sp.*), which are Annex II species under the EU Habitats and Species Directive (92/43/EEC) and are also designated Biodiversity Action Plan (BAP) species.



Bullhead (*Cottus gobio*)

Fish passage in the Ouse is a major issue. Under periods of prolonged low flows additional “flushing” events may be simulated by enhanced reservoir releases to ensure that Sea Trout are stimulated to move upstream from tidal reaches. However, concerns over fish passage mainly relate to structures preventing movement rather than due to insufficient flows. These include Agency and privately owned structures such as Gold Bridge and Clappers Bridge weirs in the Ouse catchment and Chess Bridge weir in the Adur catchment. An Agency lead project is currently seeking solutions to fish passage issues and a number of modifications to structures in the Ouse and Adur catchments have already been proposed.



Fish passage issues – Chess Bridge gauging station on the Chess Stream a tributary of the River Adur

3.5.2. Ecology

The water quality of the River Adur and its main tributaries is variable. The river ecology in the upper headwaters of the Western Branch of the River Adur, above Burgess Hill on the Eastern Branch of the River Adur and all of the smaller tributaries are highly sensitive to changes in flow.

The river ecology in the Upper Ouse (including the Cockhaise Brook) and all of the tributaries is highly sensitive to changes in flow. The ecological sensitivity of the main river declines in the middle and lower reaches towards the tidal limit. The riverine ecology is compromised at Ardingly, Gold Bridge and Isfield. It is suspected Isfield is compromised due to water quality problems associated with the discharge from Uckfield WWTW. This is also thought to be the case at Gold Bridge, located down stream of a large discharge from Scaynes Hill WWTW. However impoundments in this reach may also impact on ecology.

In stretches where the water quality is not impacted by WWTW discharges, the sensitivity is dependent on the proximity of impoundments with downstream stretches more sensitive to changes in flows than upstream stretches. Sediment can also accumulate behind the numerous structures on the Rivers Adur and Ouse, which will also affect the ecology.

Other BAP priority species including Water Vole are present in the River Adur catchment. There are also plans to create favourable habitat for the Water Vole and Otter in the River Ouse.

3.6. Water quality

To assess surface water quality in the A&O CAMS area there is a network of 50 sampling points covering approximately 250 km of classified river. Routine monitoring shows that surface water quality is generally good. Meeting future water quality objectives and making water quality improvements relies on sufficient flows being available in the rivers and streams.

There are quality concerns associated with the large Burgess Hill WWTW discharge to the Eastern Branch of the River Adur, which would naturally have much lower summer flows downstream of this point. Upstream of the WWTW, urban drainage has been identified as the primary cause of poor water quality.

The issue of groundwater protection is also important because the majority of PWS abstractions are taken from aquifers. Groundwater in the Chalk aquifer is naturally of very high quality, however increasing

nitrate levels are of a concern and will be closely monitored.

The Agency has a groundwater protection policy designed to afford the highest protection to the recharge areas around Chalk PWS sources. If PWS sources are affected by pollution, alternative sources have to be used either in the short or long term. Therefore groundwater quality can affect water resources. The Agency will continue to apply the groundwater protection policy and to investigate where groundwater pollution is suspected. Successful campaigns have identified potentially polluting activities and advice has been targeted in these vulnerable areas.

3.7. Stakeholder concerns

The A&O CAMS Stakeholder Group have been invaluable at all stages of the CAMS development. The group was taken through all the key stages in the development of the CAMS. Pertinent expert comments were made at each stage, particularly on issues of importance to Members' specific interests. Some of the main issues are summarised below:

- The links between CAMS and other strategies such as the Water Framework Directive.
- Saline intrusion and management of abstraction from the Brighton Chalk aquifer
- The limitations and applicability of the Resource Assessment and Management (RAM) Framework in determining environment flow requirements, including reliability of data
- The reliability of using anecdotal evidence in addition to tools supplied in the RAM framework
- Future housing development and pressures on PWS
- Local environmental implications of increased domestic water consumption
- How changes in land management could affect recharge and the impact of diffuse pollution, including the impact of the recent Common Agricultural Policy (CAP) reforms
- Climate change and its effect on the Brighton Chalk aquifer and the reliability of river flows in the CAMS area
- Promotion of demand management such as water conservation and water efficiency measures
- Importance of fisheries and fish passage in the CAMS area
- Importance of ecology in non-designated sites
- The importance of ecology and hydrology of the scarp slope springs from the Brighton Chalk aquifer and tributaries of the River Adur and Ouse
- Navigation and water-based recreation, particularly on the River Ouse and the impact these activities may have on water quality
- Time-limiting of abstraction licences and how this will affect existing abstraction licence holders
- Coastal erosion and its effects on fresh water storage in the Brighton Chalk aquifer
- Concern was raised about the long-term decline in scarp slope spring flows from the Brighton Chalk aquifer, which contribute flows to tributaries of the River Adur and River Ouse.

3.8. Links with other plans

Developing links with other plans will ensure that other groups consider water resources issues. CAMS help both to implement and inform the Agency's Southern Region and National Water Resources Strategies. CAMS also links to other Agency plans such as:

- Water Level Management Plans
- Catchment Flood Management Plans
- Water Quality Improvement Plans
- Fisheries Action Plans
- Biodiversity Action Plans

Where possible links should be also encouraged with plans produced by external groups such as Regional and Local Development Plans, AONB Management Plans and Water Company Asset Plans. In the future CAMS will also input into the development of River Basin Management Plans that will be produced for all catchments as part of the implementation of the European Water Framework Directive.

Resource assessment and resource availability status

4.1. Introduction

This chapter summarises the results of the RAM framework used to assess the sustainability of abstraction in the CAMS area. For more detailed information please refer to the A&O Technical Document CD-ROM.

To manage water resources effectively, we need to understand how much water is available and where it is located. This is achieved by undertaking an integrated 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 varies. It may be close to the point of abstraction or many miles away or even to a different catchment altogether. Where this local water loss is high, the Agency considers the abstraction to be consumptive.

This may restrict the availability of water for these purposes, unless a significant proportion of the water abstracted is returned to the water 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 abstraction 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 individual 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 2.

Table 2 | Resource availability status categories

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

The RAM 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.

The CAMS area has been broken down into the following river reaches and associated APs and GWMUs. These are illustrated in Figure 8.

- The western branch of the River Adur; assessed at the Hatterell's Bridge AP
- The eastern branch of the River Adur; assessed at the Sakeham AP
- The Upper Ouse assessed at the Ardingly AP
- The Cockhaise Brook, a tributary of the River Ouse; assessed at the Holywell AP
- The Middle Ouse; assessed at the Gold Bridge AP
- The River Uck, a tributary of the River Ouse; assessed at Isfield AP
- The Bevern Stream, a tributary of the River Ouse; assessed at the Clappers Bridge AP
- The Lower Ouse; assessed at the Barcombe Ultrasonic AP
- The Lower Ouse; assessed at the Barcombe Mills AP

All the river APs are sited at existing gauging stations.

In addition, there is 1 standalone GWMU with no associated APs

- The Brighton Chalk aquifer

Further details on how the river reaches, APs and GWMU were defined are provided in the A&O CAMS Technical Document CD-ROM.

4.2. Resource assessment of river assessment points

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

These river flow objectives are developed by first giving "**environmental weighting**" scores to the reaches, which represent the sensitivity of the river reach to abstraction. Reaches are banded according to their sensitivity to abstraction, either Very High (VH), High (H), Moderate (M), Low (L) or Very Low (VL). VH being most sensitive to abstraction and VL being the least sensitive. Table 3 shows the environmental sensitivity for each river reach identified in the A&O CAMS area. These results are illustrated in Figure 9.

Table 3 | Environmental weighting results in the A&O CAMS area

Assessment point	Assessment Point Name	River	Environmental weighting score
1	Hatterell's Bridge	Adur (western branch)	Moderate (M)
2	Sakeham	Adur (eastern branch)	Moderate (M)
3	Barcombe Mills	Ouse	Moderate (M)
4	Barcombe Ultrasonic	Ouse	Moderate (M)
5	Clappers Bridge	Bevern Stream	High (H)
6	Isfield	Uck	High (H)
7	Gold Bridge	Ouse	Moderate (M)
8	Holywell	Cockhaise Brook	High (H)
9	Ardingly	Ouse	High (H)

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

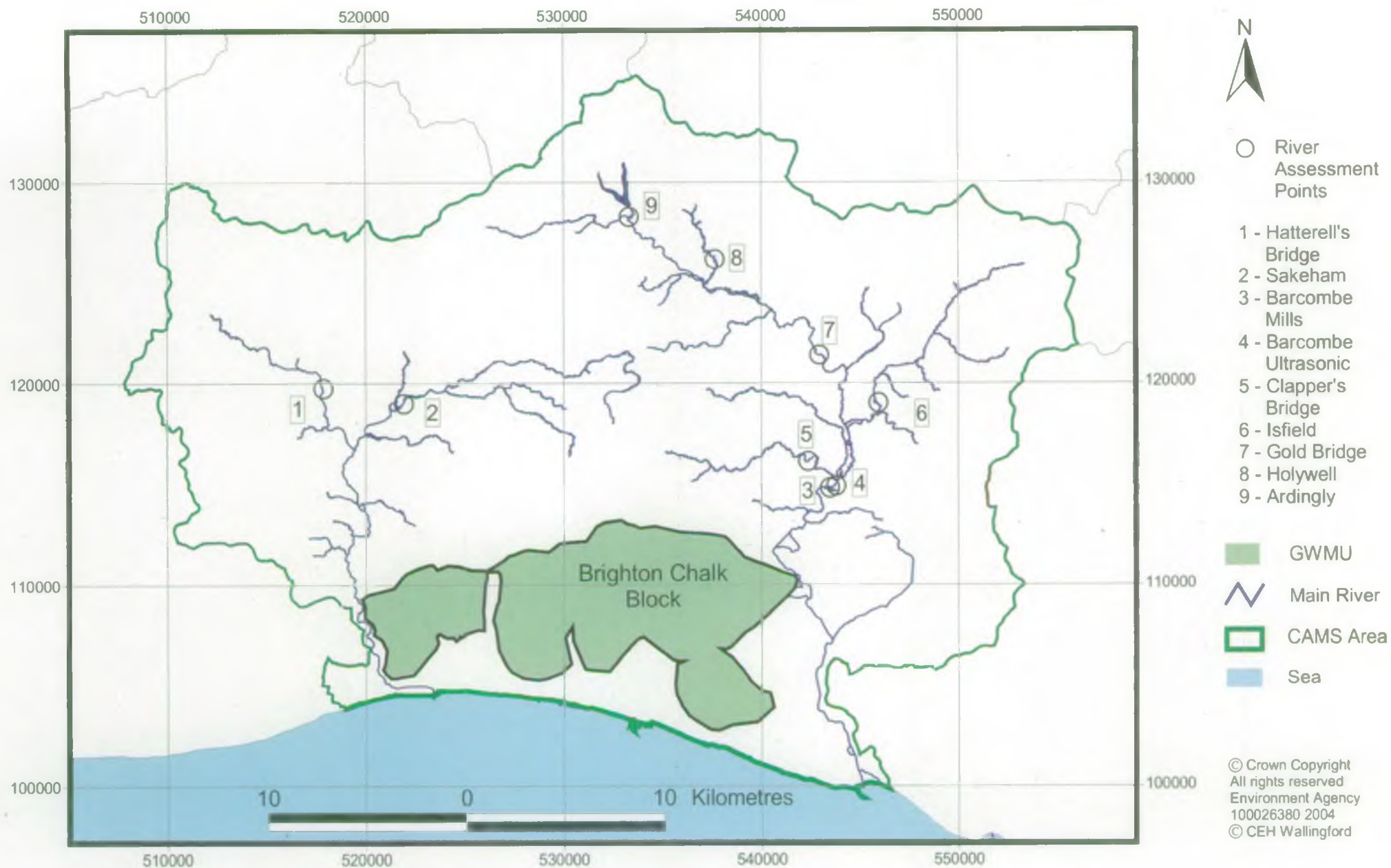


Figure 8 - River APs and GWMUs in the Adur and Ouse area

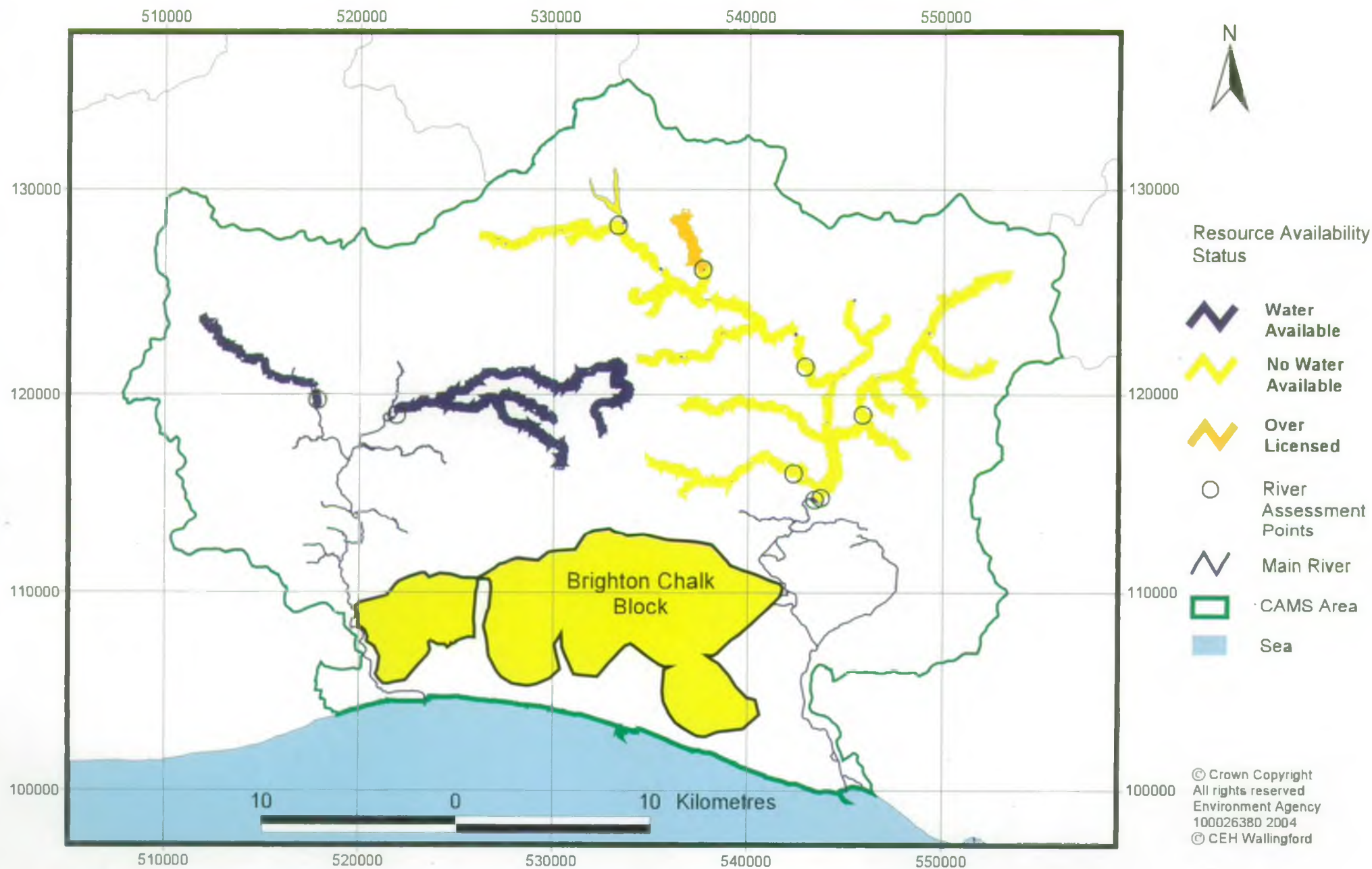


Figure 9 - Water resource availability for assessed river reaches and GWMUs

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.

In order to ensure this flow variability is maintained abstraction licences are sometimes managed by the use of "hands-off flow" (HOF) 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 HOF, abstraction can take place but when flows are below this, no abstraction (or reduced abstraction) can occur. Low flows will occur more frequently during the summer months.

In order to maximise abstraction while maintaining the variability of flow (required for many aquatic species), a tiered system of HOFs is applied. Licences are generally granted with the lowest HOF possible on a first-come-first-served basis. As more licences are granted, the HOF 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 HOF condition. Within the CAMS resource assessment, reliability is expressed as a percentage. This percentage indicates the minimum amount of time over the long term that the scenario flow exceeds the river flow objective, therefore allowing abstraction to take place.

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

4.3. Resource assessment of groundwater management units

For the groundwater resource assessment, various tests are applied to each unit to determine the resource availability status. These tests include examining the balance between recharge to and abstraction from the unit, the impact of abstraction on summer outflows from the unit and an assessment of long-term trends including groundwater levels and water quality.

4.4. Integration of the surface water and groundwater resource assessments

The A&O CAMS has 4 **water resource management units (WRMUs)**. These units have been defined to enable the management of water resources at a catchment level and include almost all of the major abstractions. They have been derived from the river reaches and associated APs and GWMUs defined to assess water resource availability.

One of the WRMUs, the Brighton Chalk, is groundwater dominated and has no associated APs. The other WRMUs are a combination of river reaches to form the following:

- The River Adur WRMU; formed of the river reaches to Hatterell's Bridge and Sakeham APs
- The River Ouse WRMU; formed of the river reaches to Barcombe Mills, Barcombe Ultrasonic, Clappers Bridge, Isfield Gold Bridge and Ardingly APs
- The Cockhaise Brook WRMU, formed of the river reach to Holywell AP

A summary of the resource availability in each of these units is given in Table 4 and illustrated in Figure 10. Details of the resource availability for each river reach are available in the A&O CAMS Technical Document CD-ROM.

Table 4 | Summary of water resource availability in the A&O CAMS area

WRMU	Water resource availability status
River Adur	Water Available
River Ouse	No Water Available
Cockhaise Brook	Over Licensed
Brighton Chalk	No Water Available

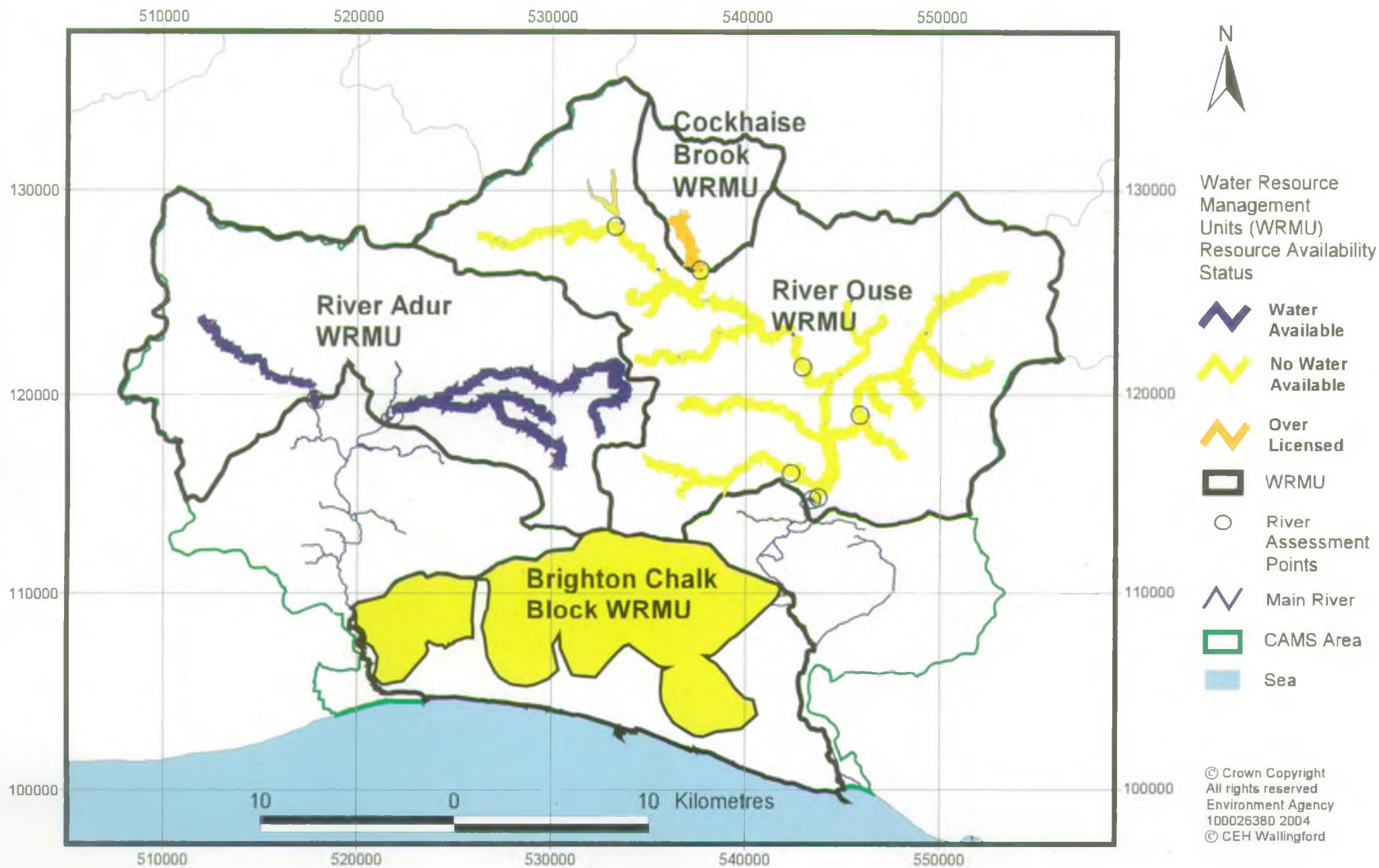


Figure 10 - Integrated Water Resource Availability Status for WRMUs

4.5. Water resource management units in the A&O CAMS

4.5.1. WRMU 1 - River Adur (Water Available)

The River Adur WRMU, 246 km², encompasses all of the non-tidal River Adur and its tributaries from its headwaters at Coolham to the tidal limit at Bines Green on the western Adur, and from its headwaters at Burgess Hill to the tidal limit at Shermanbury on the eastern Adur. The southern tributaries of the River Adur are fed by perennial Chalk springs flowing from the scarp face of the Brighton Chalk. The impact of abstraction from some of the Chalk escarpment has been included in the resource assessment for the Sakeham AP.



The Adur floodplain and Low Weald looking north from the Chalk escarpment

The WRMU is essentially rural in character and with the exception of PWS there is limited demand for water resources. The highly clayey geology means surface water flows dominate and the river naturally flashy character with very low summer flows and high winter spates.

The River Adur was assessed using the RAM methodology at two APs; the western branch was assessed at the Hatterell's Bridge AP and the eastern branch was assessed at the Sakeham AP. Both reaches were assessed as having Water Available.

The eastern branch has significantly enhanced summer flows because of the large discharge from the Burgess Hill (Goddards Green) WWTW. The discharge is in excess of all abstraction from this river reach and river flows **below the discharge point** are raised above those that would occur naturally (gauged river flows are c.8MI/d above estimated natural flows at Q95). Above Burgess Hill WWTW and in small

headwater and tributary reaches river flows are very small. During summer months there is unlikely to be additional water available for abstraction.

The western branch has very limited abstraction. Natural river flows are enough to ensure there is an excess of water, albeit a very small volume at times of low river flows (<1 MI/d), above the minimum required by the environment.



The River Adur at Hatterell's Bridge gauging station

4.5.2. WRMU 2 - River Ouse (No Water Available)

The River Ouse WRMU, 360 km², encompasses the main River Ouse to its tidal limit at Barcombe Mills. It includes the river reaches to Barcombe Mills, Barcombe Ultrasonic, Gold Bridge and Ardingly APs. It also includes the tributary reaches of the Bevern Stream to the Clapper's Bridge AP and the River Uck to the Isfield AP. It is predominantly a rural catchment, but does contain the towns of Haywards Heath and Uckfield and many other smaller villages.

Resource availability in the WMRU is complex. The river's hydrological regime is dominated by a large strategic PWS abstraction operated by SEW. Abstraction takes place just above the river's tidal limit, immediately upstream of the lowest designated AP at Barcombe Mills. The abstraction is supported at times of low river flows by augmentation releases from Ardingly reservoir, situated on the Shell Brook in the upper reaches of the catchment. The river is used as a conduit to move water from the reservoir to the abstraction point.

The river reaches to Gold Bridge and Barcombe Ultrasonic APs are directly affected by the augmentation releases. Barcombe Mills AP is affected by abstraction of the augmentation releases and natural river flows at Barcombe. Flows at Barcombe Mills are used to regulate the abstraction and

minimum acceptable flows (MAFs) must be maintained at this point. The Ardingly AP is also affected by the scheme, as it lies just downstream of an abstraction point that can be used to directly fill Ardingly reservoir. However this abstraction is rarely used and natural winter flows in the Ardingly Brook and Shell Brook are usually sufficient to fill the reservoir. The Ardingly-Barcombe system is illustrated previously in Figure 2.



New Weir - part of the Barcombe Mills complex, River Ouse

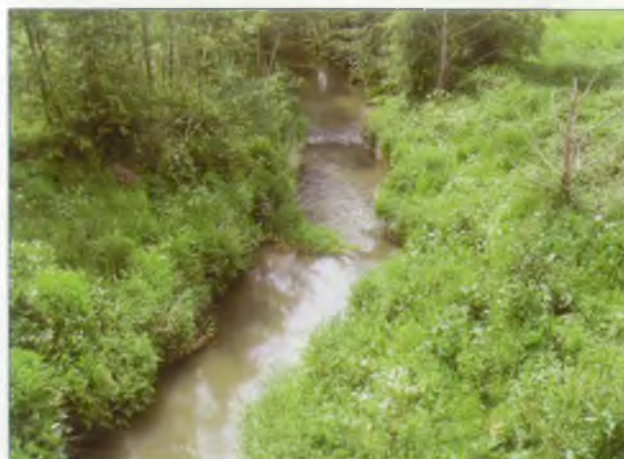
The 3 other APs situated on the river's main tributaries at Holywell on the Cockhaise Brook, Isfield on the Uck and Clapper's Bridge on the Bevern Stream are not directly impacted by the scheme. However they all contribute flows to the River Ouse above Barcombe Mills.



Clappers Bridge gauging station, Bevern Stream

The resource assessment revealed that there is notionally water available at Gold Bridge and Barcombe Ultrasonic. Summer flows at these sites are raised well above those that would occur naturally as a result of SEW augmentation releases. There is also water available at Isfield on the River Uck, due to the presence of a large WWTW discharge at Uckfield. There is also water available on the Bevern Stream

and at Ardingly AP due to limited abstraction in these reaches.



The River Uck at Uckfield

Critically the lowermost AP at Barcombe Mills was assessed as having No Water Available. Therefore, the assessment at all upstream APs was overridden to No Water Available in recognition of the need to maintain flows to this river reach. Furthermore, although there is notionally water available at Gold Bridge and Barcombe Ultrasonic APs, the additional water is a result of SEW augmentation releases from Ardingly reservoir in support of their abstraction at Barcombe. It would be a derogation of SEW's rights if this water were licensed for new abstractions.

The situation is complicated further by the fact that riverine ecology is compromised at Ardingly, Gold Bridge and Isfield (details are available in the Technical Document CD-ROM).

It was agreed at the SG meeting on 9 January 2004 that the result for all APs on the River Ouse should be No Water Available and that the augmentation releases from Ardingly reservoir should not be available for new abstraction.

4.5.3. WRMU 3 - Cockhaise Brook (Over Licensed)

The Cockhaise Brook WRMU, 36 km², is a tributary of the River Ouse. It is an attractive rural catchment with considerable areas of woodland and falls within the boundary of the High Weald AONB.

Abstraction in the catchment is limited with the exception of two comparatively large PWS abstractions, one from the brook and one from the underlying Ashdown Sands aquifer. These abstractions are at present not fully utilised and there is no evidence that current abstraction is having an adverse impact on riverine ecology. It was assumed that all licensed abstraction, including groundwater abstraction, in the unit has the potential to impact upon flows above the assessment point at Holywell.

Under this assumption if abstraction were to increase to full licensed limits there is the potential for river flows to be reduced below the minimum required to protect riverine ecology.

Therefore the unit was assessed as Over Licensed. Consequently the Cockhaise Brook is treated as a separate WRMU because it has a worse resource availability status than the rest of the River Ouse and requires a separate licensing strategy.



The Cockhaise Brook looking upstream from Holywell gauging station

4.5.4. WRMU 4 - Brighton Chalk (No Water Available)

The Brighton Chalk is the only major aquifer unit in the A&O CAMS area. It is a very important source for public water supply and is almost exclusively exploited by SWS to supply Brighton and the surrounding area. The recharge area to the main water supply boreholes (117 km²) was used to define the boundary of the unit.

There are limited data on outflows from the unit. With the exception of strong spring flows from the scarp slope (incorporated in the River Ouse and River Adur resource availability assessments) surface waters supported by the main unit are limited to Lewes Winterbourne and a number of small springs that feed the tidal Ouse, some via Lewes Brooks SSSI. The remainder of the outflows are either as baseflow to the south to the English Channel or to tidal reaches of the Rivers Adur and Ouse, which bound the unit to the west and east respectively. There are no associated surface water APs.

The unit is susceptible to saline ingress. A number of SWS's abstractions have to be carefully managed to prevent significant saline intrusion from the sea and from the tidal River Adur.



The Brighton Chalk aquifer (Sussex Downs)

A policy of no further consumptive abstraction from the Chalk aquifer has been in place for over a decade. This recognises that a large proportion of recharge to the aquifer has now been licensed (>50%).

The final assessment was that the unit should be classified as having No Water Available. There is currently no evidence of environmental degradation or long-term decline in water levels or water quality under recent actual abstraction rates. However, stakeholders have raised concern about the long-term decline in spring flows from the Chalk escarpment. A project had been put in place by the Agency to investigate these issues. The aquifer is heavily exploited and increased abstraction has and can lead to saline intrusion and an unacceptable reduction in outflows.

4.5.5. Areas which are not in water resource management units

Water availability has not been assessed for some parts of the A&O CAMS area. There are no APs on the tidal Adur or Ouse. The RAM methodology is not applicable to these reaches. The low-lying coastal fringe to the south of the CAMS where the Brighton Chalk is overlain by younger Tertiary strata has also been excluded, as this does not form part of the recharge area to the main aquifer. The minor aquifers of the Ashdown Sands and Tunbridge Wells Sands have also not been assessed under RAM.

Even in areas that are within defined WRMUs, the resource assessments are limited to defined river reaches and exclude smaller tributaries. Abstraction from these small streams can have significant impact on the local environment and greater restrictions may need to be applied in these areas.

In all areas not explicitly assessed under the RAM framework, applications for new or significantly varied abstraction licences will be subject to the normal

licence determination process and assessed on a case by case-by-case basis.



Hamsey Weir, tidal River Ouse

4.5.6. Further data needed before the next CAMS

The preparation of this CAMS and particularly the use of the RAM framework has identified the need for more information to be gathered before the next CAMS cycle. The RAM framework is regularly updated and will benefit from the experience gained nationally during CAMS preparation. There is a clear recognition of the need for further investigations in order to gauge whether RAM assessments are reflected by environmental damage. These proposed investigations are discussed later.

The A&O CAMS will be reviewed in 2009 and the updated strategy will be published in 2011. Groundwater modelling would also be useful to obtain a better understanding of the mechanics of the Brighton Chalk aquifer, particularly with regards to the outflows.

Existing strategies

5.1. National Environment Agency strategies and initiatives

There are National Agency initiatives, which have implications for this CAMS. Foremost amongst these are the National and Regional Water Resource Strategies, which were issued by the Agency in March 2001.

The Environment Agency has a duty to secure the proper use of water resources in England and Wales. The National Strategy defines the abstraction-licensing framework at high level. It looks some 25 years ahead and considers the needs of public water supply, agriculture, commerce and industry, as well as the environment. The Regional Strategy and at a local level individual CAMS implement and feed back to the National Strategy.

The periodic review of water company charges also has important implications for local water resources management. Water companies have to take vast amounts of water from rivers and underground to provide enough to supply our everyday use. The companies must protect the environment, promote the efficient use of water, and meet legal requirements. Water Companies submit their business plans to Ofwat for consideration in price setting. These plans are known as Asset Management Plans (AMPs) and cover a five-year period.

We are now implementing AMP3 (2000-2005) which include actions identified in the Agency's National Environment Programme (NEP). This was aimed at identifying environmental concerns caused by water company operations and to allow them to seek investment approval within the third periodic review to help overcome concerns on sustainability. Although no sites relating to abstraction impacts were identified in the A&O CAMS area, a number of improvements to SWS assets to raise water quality were included.

The Agency also has a national Restoring Sustainable Abstraction programme (RSA). Sites which may be impacted by abstraction are listed on a catalogue and

prioritised to allow further investigations and if necessary the identification of solutions. Although there are no RSA sites in the A&O CAMS area, the RSA programme could provide a route to resolving issues at any new sites identified through the CAMS process.

5.2. Southern Region water resources strategy

In March 2001 the Environment Agency published the document *Water resources for the future – a strategy for Southern Region*. This strategy identifies a preferred approach to meet the demand for water whilst protecting the environment in Sussex, Hampshire and Kent for the next 25 years. Assumptions were made about the potential development of new resources, the realistic potential for savings in forecast water use and the cut backs required to maintain or restore sustainable abstraction in some key areas. Key principles underlying the Regional Strategy include:

- Promoting efficient water use by industry, commerce, agriculture and in the home
- Making the best use of available water resources before developing new schemes
- Taking account of the potential impact of climate change
- Requiring water companies to explore the economic and environmental benefits of leakage control, metering and water efficiency measures, with all licence applications
- Refusing new abstraction or impoundment licences to companies with poor leakage or water efficiency statistics and activity
- Encouraging water company bulk transfers, sharing or resources between areas of surplus and deficit and other increased 'integration', providing there are no adverse effects

As public water supply is the major abstraction in the

Southern Region, this is considered in detail, but the strategy also considers other water users such as agriculture and industry. Total abstraction by local water companies has declined over recent years as a result of leakage control and a reduction in demand from some of the larger water users. However in response to an increase in house building and changes in house occupancy rates the companies expect demand to start rising again. Demand Management measures such as metering and water efficiency measures may offset this rise in demand. In our March 2001 Regional Strategy it is assumed that a minimum of 60% of households will be metered by 2025 and that water efficiency saving will be achieved in domestic and commercial water use. Even so, to meet public water supply demands over the next 25 years, resource supply enhancements will be necessary.

5.3. Water company water resources plans

The water companies, in conjunction with the Agency, are required to produce water resource plans looking at supply and demand over the next 25 years. These plans are updated on an annual basis and reviewed by the Agency. They in turn underpin the existing regional water resources strategy and will feed into future strategies. As described above, the 'twin track' approach, which balances the need for new resources with demand management and water efficiency, is key.

5.4. Climate change

Climate change is an important issue facing water resources management. The latest climate change scenarios from the UK Climate Impacts Programme suggest that temperatures will rise across England and Wales. By the 2050s, in southern England summers will become drier and winters will be wetter. This has important implications for water availability, as it will change groundwater and river regimes. For instance, rainfall is becoming both more seasonal and of increasing intensity, so this could lead to higher runoff and less water able to percolate into the aquifers which supply the bulk of PWS in this area.

It is likely that direct abstractions will become less reliable in summer, which means that farmers and industries who rely on these will have to consider adapting in some way if they wish to maintain current levels of reliability – this will increase the importance of using water wisely. The impact on

public water supply is less clear but recent modelling work suggests that the deployable output of some systems will be reduced.

For more information on the Agency's ongoing work on climate change, please refer to Appendix 1 of the Regional Water Resources Strategy. More details on climate change scenarios are available at www.ukcip.org.uk/scenarios.

5.5. Existing licensing policies relevant to the A&O CAMS

In general the aquifers and rivers of the region are heavily committed to abstraction. As this has been the case for many years, licensing policies have evolved which reflects the status of the catchments. Key policies operating across Southern Region to protect the environment when determining licences include:

Use of the "precautionary principle" - Where there has been uncertainty over the impacts of a proposed abstraction, the Agency has refused licences, or issued them with time limits, on the grounds of the 'precautionary principle'

Presumption against further consumptive summer abstraction - For most surface water catchments there is also a "presumption against" summer consumptive abstraction. This reflects the need to protect the lowest river flows. In some areas HOF conditions are also used to guarantee minimum flows. It is envisaged that updated HOFs generated by the RAM methodology will be used in the future to manage abstraction in order to protect low flows and flow variability.

Major aquifer licensing policy - There has been a "presumption against" further consumptive abstraction from the Chalk and Lower Greensand aquifers throughout the CAMS area. The groundwater drought of the late 1980's and early 1990's highlighted the vulnerability of these very important water sources. In response a groundwater management policy was introduced by the Agency's predecessor organisation the National Rivers Authority (NRA) in 1993. This embodied the general principle of prohibiting further consumptive abstraction from the region's major aquifers.

Encouraging winter storage - Where possible, potential abstractors are encouraged to apply to take water in the winter and provide reservoir storage for subsequent re-use during summer months. This allows abstractors to use water for consumptive purposes during summer months when surface water

resources are unavailable.

Recovering resources - A key aspect of the Regional Water Resource Strategy is the need to recover unused licences or portions of licences to correct past over licensing. This will help secure protection of the water environment, simplify the resources balance and clarify the potential for new licences across all sectors of abstraction.

The Regional Strategy provides an overview of water resources management into which the individual CAMS link. The CAMS document is expected to incorporate the principles and policies behind the Regional Strategy but it will provide the detailed approach to sustainable management of resources at a WRMU level.

Proposed licensing strategy

6.1. Introduction

This section contains details of our proposed abstraction licensing strategy for the A&O CAMS area. It provides details of whether licences are likely to be available and if so the conditions that are likely to be included to ensure the protection of low flows and flow variability. Where recovery of resources is required, the Agency preferred option(s) to achieve a more sustainable abstraction regime are also outlined.

We invite your written comments on these proposals and will consider them in consultation with the A&O CAMS Stakeholder Group. Following formal consultation, the final licensing strategy will be formulated and published in April 2005.

6.2. Sustainability appraisal

A sustainability appraisal of options to manage abstraction was carried out for each WRMU. The process enables the Agency to take account of costs and benefits in the production of CAMS. It allows the systematic consideration of 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 should or could be after each six-year cycle (Tier 1). This is undertaken for all WRMUs in all CAMS areas.

The process also has a second phase (Tier 2), which allows the appraisal of options for managing water resources in order to meet the target resource availability status. This is usually undertaken for WRMUs where action is required to improve sustainability and includes, where necessary, the assessment of options to recover resources. More information on the sustainability appraisal process is provided in *Managing Water Abstraction: The Catchment Abstraction Management Strategy Process*.

The completed forms can be seen in the Technical Document CD-ROM.

6.3. Proposed licensing policy common to all WRMUs

All proposals for new abstraction licences or variations to existing authorisations will continue to be considered under the requirements of the Water Resources Act (1991), the Environment Act (1995) and Water Act 2003. *Managing Water Abstraction* summarises how the Agency determines licence applications and also lists situations where a licence is not required.

Licences that are non-consumptive or aimed at mitigating environmental impacts are likely to be issued irrespective of a WRMU's resource availability status. However local issues of derogation and/or environmental impact will always be assessed and may override other considerations. Anyone is entitled to apply for a licence even where the CAMS shows abstraction to be unsustainable. Applicants for new impoundments are dealt with on a case-by-case basis.

In essence in all WRMUs, and particularly those, which are Over Abstracted or Over Licensed, the Agency will proactively seek to increase sustainability by reviewing existing licences in terms of three tests:

- Need
- Efficient Use
- No damaging environmental impact

All three tests will to a greater or lesser extent be influenced by climate change. The three tests will also be applied when applications are made for renewal of time limited licences. There is a presumption that time-limited licences will be renewed.

6.3.1. Groundwater licences

Most large PWS licences in the CAMS area are groundwater abstraction from the Chalk. The Ashdown Beds and Tunbridge Wells Sands also provide small but important local sources of water for PWS. These abstractions do not have conditions, which restrict their use in dry periods. Calculations to

determine the water availability status of the Chalk aquifer in the CAMS area show the aquifer has No Water Available. Therefore there is little scope for new groundwater licences.

The Agency proposes to continue with a presumption against issuing further consumptive abstraction licences from the Chalk.

There is no policy for abstraction from other minor aquifers. Local investigation will be required to determine potential environmental impacts and impacts on other abstractors.

6.3.2. Surface water licences

In accordance with regional policy, in recent years there has been a presumption against issuing licences for consumptive abstraction from surface waters during summer months. Winter storage licences have been and will continue to be granted for direct river abstraction between November 1st and March 31st with appropriate flow and level conditions.

This position is supported by recent analysis. A tiered system of HOF conditions has been calculated for APs in the River Adur and River Ouse WRMUs based on the RAM methodology. This provides a way to manage abstractions that will help to protect low flows and flow variability. The Agency proposes to use RAM generated HOFs for new or significantly varied licences on main river reaches.

Many existing surface water abstractions do not have any conditions restricting their use in periods of low flow. We will seek to incorporate existing licences into the RAM framework as and when these licences come up for renewal or are subject to a significant variation. This will include the option to impose HOF restrictions if the abstraction is shown to be causing an adverse impact to local riverine ecology.

Spray irrigation, if not from a reservoir filled in winter, can represent a very significant demand on rivers when flows are low. Section 57 of the Water Resources Act (1991) gives the Agency powers to impose a temporary restriction on spray irrigators if there has been an exceptional shortage of rain. We will continue to exercise these powers if required.

6.3.3. Time limiting of licences

Successful applications for all new or significantly varied licences received after 1st October 2001 will result in time-limited licences following Agency policy.

For the A&O CAMS area the normal renewal period is 12 years and the common end date for this CAMS is 2018. This renewal period will decrease depending on when any new licences are issued with respect to the common end date. Where significant capital

investment is made, e.g. major water company developments, longer time periods will be considered. Time limited licences are likely to be renewed provided they satisfy the three tests described above.

Licence holders will be notified of the need for licence renewal and will need to re-apply. If a licence is unlikely to be renewed, or it is likely to be significantly varied, then the licence holder will be given 6 years notice.

Further details on time limits are available in *Managing Water Abstraction: The Catchment Abstraction Management Strategy Process*.

6.4. Promoting water efficiency

Water efficiency measures can reduce water demand allowing us all to make a difference. For more information on how you can save water, either at home or at work, please refer to the Appendix.

Throughout this CAMS area, we will seek to reduce water demand by promoting water efficiency. This will be achieved through methods, policies and principles set out in the National and Regional Water Resources Strategies. Water companies have a duty under the Water Industry Act (1991), amended by the Environment Act (1995), to promote the efficient use of water by their customers and ensure that their own use of water is efficient. They also have a new duty under the Water Act 2003 to 'further water conservation', DEFRA are intending to produce guidance on the implications of this duty by the end of 2004.

6.4.1. Water metering

Metering can reduce water consumption by between 2% to 14% (with the average being 9%), depending upon the volumetric charge. The Agency's Southern Region Water Resources Strategy assumes that in 2025 a water meter will be installed in a minimum of 75% - 80% of Sussex households. The current take up of meters is about 23% in areas supplied by SWS and 25% in areas supplied by SEW (based on figures for 2002/03 reported in water company June returns submitted to Ofwat, 2003). There is a long way to go to get to the levels that the Agency judges to be necessary, to secure long term supplies and help protect the environment. However, the required 2025 metering levels are achievable within the opportunities that water companies have to meter within current legislation. These opportunities are:

- opting for a free meter
- new homes

- changes of home ownership
- unattended sprinkler users
- houses with swimming pools

compulsory metering, if "water scarcity status" is applied for by a water company and granted by the Secretary of State

6.4.2. Leakage

All water companies (SEW and SWS) operating in this CAMS area have reached their Ofwat leakage targets. The National and Regional Water Resources Strategy expects further economic leakage control progress to be made through the next 25 years.

6.4.3. Building design

Improved water efficiency should be a key component of all new housing developments, because on average only 3% of all household water consumption is actually for drinking. House builders can help reduce water consumption by installing water efficient domestic appliances, grey-water recycling schemes and rainwater systems.

The Office of the Deputy Prime Minister (ODPM) is currently reviewing whether the principle that all new buildings should be designed and equipped in such a way as to enable them to save up to 20% of per capita consumption should be included in the revised part H of the buildings regulations.

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

6.4.4. Water audits

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

6.5. Revocation of unused abstraction licences

Under the Water Act 2003, the Agency will not have to pay compensation if it revokes a licence that has not been used for 4 years. This section of the Act (Section 25/2) will commence on 1 April 2004. However, under Section 25/4, which will also commence in April 2004, the new provision (4 years rather than 7 years) only applies to those licences where the period of non-use started after the commencement of that section (1 April 2004). For all other abstractions, where the period of non-use started before 1 April 2004, the 7 year rule will still apply.

The revocation of licences will only take place after prior consultation with the licence holder and in some cases it might be more appropriate to reduce licence quantities.

6.6. Proposed licensing strategy for the River Adur – WRMU 1

Current water resource availability status – **Water Available**

Target water resource availability status – **Water Available**



River Adur near Shoreham

water, albeit a very small volume at times of low river flows, above the minimum required by the environment. Again there is unlikely to be any additional water available for summer abstraction in small tributary reaches.

It is proposed that future licensing policy will be based on new RAM based HOF constraints.



The Chalk escarpment near Fulking



River Adur WRMU

6.6.1. Resource availability status and results of the sustainability appraisal

The River Adur WRMU has been assessed as having a water resource availability status of Water Available.

The eastern branch has significantly enhanced summer flows because of the large discharge from the Burgess Hill WWTW. The resource availability status needs to be carefully understood in that there are no summer water resources available upstream of this discharge point or on small tributary reaches.

The western branch has limited abstraction. Natural river flows are enough to ensure there is an excess of

As a result of the sustainability appraisal process it is proposed that this WRMU remains at Water Available. There are concerns that reduced flows will impact on fish migration and on dilution of effluent. We propose that a HOF be adopted for all new and significantly varied licences to protect low flows, but water is likely to be available for winter abstraction.

6.6.2. Guidance on the assessment of new applications

Applications for abstraction of surface water on the western branch and on the eastern branch below the discharge point at Burgess Hill will be considered using RAM HOF constraints. Applications for surface water above the discharge point are likely to be restricted to the winter months and would require storage to allow subsequent use. Abstractions from underground strata or on tributaries not included in the RAM assessment, including those feeding to tidal reaches will be assessed on a case-by-case basis.

- All new and varied licences will be time limited to 2018
- HOF conditions based on the RAM methodology will be considered for all new and significantly varied licences.

6.6.3. Renewals and management of existing licences

There will be a presumption of renewal of licences subject to the three tests on water efficiency, demonstrable need and no damaging environmental impact. Existing licences may be subject to minor changes including the addition of water efficiency conditions.

We will seek to incorporate existing licences into the RAM framework. This will include the option to impose HOF restrictions if the abstraction is shown to be causing an adverse impact to local riverine ecology.

- All new and varied licences will be time limited to 2018
- RAM based HOF conditions may be added to existing licences in order to protect environmental flows

6.6.4. Key issues for consultation

A1 – Do you agree with the Resource Availability Status of Water Available for this WRMU?

A2 - Should the Agency seek to maintain a resource availability status of Water Available?

A3 – Do you think the artificially high summer flows on the River Adur should be protected or made available for abstraction?

A4 – Is the RAM methodology the best way to manage water resource allocation in the future?

A5 – Should the Agency be encouraging winter storage of water in this area?

A6 – Should any summer abstraction be allowed in the unit?

6.7. Proposed licensing strategy for the River Ouse – WRMU 2

Current water resource availability status – No Water Available

Target water resource availability status – No Water Available



River Ouse at Lewes

impacted by the large strategic abstraction just upstream. Therefore the assessment at all upstream APs was overridden to No Water Available in recognition of the need to maintain flows to this critical river reach.

As a result of the sustainability appraisal process it is proposed that the resource availability status should be maintained at No Water Available.



Outflow from Ardingly reservoir, Shell Brook



River Ouse WRMU

6.7.1. Resource availability status and results of the sustainability appraisal

The resource availability status of this hydrologically complex WMRU has been assessed as No Water Available. Water resource management in the unit is dominated by the Ardingly-Barcombe abstraction scheme. Augmentation releases from Ardingly reservoir are used to support abstraction at Barcombe. Summer flows are greater than would occur naturally throughout much of the WRMU. However, there is No Water Available at the lowermost AP at Barcombe Mills, where flows are

In addition it was recognised that the augmentation releases from Ardingly reservoir should be protected from derogation by new abstraction. HOFs generated using the RAM framework will be used to manage new abstractions to ensure the rights of existing abstractors are protected as well as flows required by the environment.

Local stakeholders have also raised concern over spring flows from the Chalk escarpment, which feed the upper reaches of the Bevern Stream. Although there is no evidence of ecological damage at the Clapper's Bridge AP this may not be the case for the uppermost headwaters, which are reliant on Chalk water. An Agency project is underway to help better understand the flow and water quality requirements of these streams the results of which will help inform future licensing policy in this WRMU.

These proposals were discussed and agreed in principle at the Stakeholder Group meeting held on 9th January 2004 and on 23rd March 2004.

6.7.2. Guidance on the assessment of new applications

Applications for abstraction of surface water on the main river will be considered using the RAM methodology. A HOF constraint is likely to be applied to new consumptive abstraction licences in order to ensure flows to the critical river reach at Barcombe

Mills are maintained and that the rights of existing abstractors are not derogated. Preliminary studies indicate that this is likely to be equivalent to a flow of around Q50 at most APs. Additional water for summer abstraction is very unlikely to be available, but there are additional resources for winter abstraction. As such the current policy presuming against new consumptive abstraction from surface waters during summer months will be retained.

Abstractions from underground strata or on tributaries not included in the RAM assessment, including those feeding into tidal reaches, will be assessed on a case-by-case basis. The Agency will be mindful to ensure that any abstraction from groundwater does not have an adverse impact on summer flows in the main river or its tributaries.

- All new and varied licences will be time limited to 2018
- There is a "presumption against" further summer consumptive abstraction
- New consumptive surface water licences will have HOF conditions to ensure summer flows are not derogated

6.7.3. Renewals and management of existing licences

There will be a presumption of renewal of licences subject to the three tests described above. Existing licences may be subject to minor changes including the addition of water efficiency conditions. We will seek to incorporate existing licences into the RAM framework. This will include the option to impose HOF restrictions if the abstraction is shown to be causing an adverse impact on local riverine ecology.

- All new and varied licences will be time limited to 2018
- There is a "presumption against" further summer consumptive abstraction
- RAM based HOF conditions may be added to existing licences in order to protect environmental flows where appropriate

6.7.4. Key issues for consultation

B1 – Do you agree with the Resource Availability Status of No Water Available for this WRMU?

B2 – Should the Agency seek to maintain a resource availability status of No Water Available?

B3 – Is the RAM methodology the best way to manage water resource allocation in this unit in the future?

B4 – Should the Agency be encouraging winter storage of water in this area?

B5 – Do you think we should retain our policy of presuming against further consumptive abstraction from surface waters during the summer months?

B6 – Should additional groundwater abstraction be permitted?

6.8. Proposed licensing strategy for the Cockhaise Brook–WRMU 3

Current water resource availability status – Over Licensed

Proposed water resource availability status – No Water Available



Cockhaise Brook looking downstream from Holywell gauging station



Cockhaise Brook WRMU

6.8.1. Resource availability status and results of the sustainability appraisal

The Cockhaise Brook has been assessed as having a water resource availability status of Over Licensed.

Its current status is due to the presence of two comparatively large PWS abstractions one from the brook and one indirectly from the underlying Ashdown Sands aquifer. It is assumed that the groundwater abstraction has an impact on river flows above the assessment point. Therefore if abstraction

were to increase to full licensed limits there is the potential for river flows to be reduced to a point where local ecology would be adversely impacted. These abstractions are presently not fully utilised and there is no evidence that current abstraction is having an adverse impact on riverine ecology.

Although the brook is a tributary of the River Ouse and helps to support flows in the main river, its “worse” sustainability status means that a separate licensing policy has been developed for this small catchment.

As a result of the sustainability appraisal process it is proposed that this WRMU should move to No Water Available. The first step will be to confirm whether the assumption used in the RAM assessment regarding the impact of groundwater abstraction on river flows is valid. After these investigations have taken place options to recover resources will be looked at if necessary.

6.8.2. Guidance on the assessment of new applications

There will be a presumption against any abstraction from surface water or groundwater that has the potential to further reduce river flows. The current status effectively limits any summer abstraction. However there may be limited capacity for small surface water abstractions at high flows or if the abstraction is for a non-consumptive purpose. Abstractions from groundwater sources will have to show that they do not have an adverse impact on river flows and will be judged on a case-by-case basis.

- All new and varied licences will be time limited to 2018
- There is a “presumption against” further summer consumptive abstraction
- There is a presumption against further groundwater abstraction unless it can be shown not to adversely impact on summer river flows

6.8.3. Renewals and management of existing licences

There will be a presumption of renewal of licences subject to the three tests. Existing licences may be subject to minor changes including the addition of water efficiency conditions.

- All new and varied licences will be time limited to 2018
- There is a “presumption against” further summer consumptive abstraction
- Existing abstraction may have HOF conditions attached if they are shown to be having an adverse impact on the environment

6.8.4. Resource recovery strategy and other changes to existing licences

Several options were assessed to identify the most sustainable way to move the unit to No Water Available. The Agency's preferred option is to undertake investigations to validate the RAM results and to maintain current licensing policies until these are complete.

If as a result of further work the Agency's assumption that groundwater abstraction impacts on river flows above the Holywell AP is correct, then options to reduce licensed capacities will be assessed. However if the Agency's assumption is shown not to be valid, then the resource availability status may change and any recovery of resources at the present time would not be justified.

6.8.5. Key issues for consultation

C1 – Do you agree with the Resource Availability Status of Over Licensed for this WRMU?

C2 – Do you agree that the further increases in licensed abstraction should be limited until further work has been carried out into the impact of groundwater abstraction on river flows?

C3 – Is the RAM methodology the best way to manage water resource allocation in this unit in the future?

C4 – Do you think we should retain our policy of presuming against further consumptive abstraction from surface waters during the summer months?

C5 – Should additional groundwater abstraction be permitted?

C6 – Do you agree with the Agency's preferred option for resource recovery in this unit?

6.9. Proposed licensing strategy for the Brighton Chalk–WRMU 4

Current water resource availability status – **No Water Available**

Proposed water resource availability status – **No Water Available**



The Brighton Chalk WRMU looking east from Steyning Bowl



Brighton Chalk WRMU

6.9.1. Resource availability status and results of the sustainability appraisal

The Brighton Chalk WRMU has been assessed as having a water resource availability status of No Water Available. The aquifer is almost exclusively exploited for PWS and has a long history of careful management to maximise yields whilst ensuring saline intrusion is prevented.

A policy of no further consumptive abstraction from the Chalk aquifer has been in place for over a decade. This recognises that a large proportion of recharge to the aquifer has now been licensed. There is currently no evidence of environmental degradation or long-term decline in water levels or water quality. The aquifer is heavily exploited and increased abstraction could lead to saline intrusion and reduce outflows to unacceptable levels.

As a result of the sustainability appraisal process it is proposed that this WRMU should remain at No Water Available and that the policy of no further consumptive abstraction should be retained.

6.9.2. Guidance on the assessment of new applications

There will be a general presumption against the issuing of new consumptive abstractions from the aquifer. Exceptions may apply for abstractions that return water close to or at the point of supply, provided they do not impact on groundwater quality, or for abstractions that have a significant benefit to the environment.

- All new and varied licences will be time limited to 2018
- There will be a presumption against issuing new consumptive abstraction licences

6.9.3. Renewals and management of existing licences

There will be a presumption of renewal of licences subject to the three tests. Existing licences may be subject to minor changes including the addition of water efficiency conditions. Increases in actual abstraction rates within licensed limits will be closely monitored to ensure existing outflows and groundwater quality is not adversely affected.

- All new and varied licences will be time limited to 2018
- Existing licences may be varied in the future if they are found to have the potential to adversely impact upon outflows or water quality

6.9.4. Key issues for consultation

D1 – Do you agree with the Resource Availability Status of Water Available for this WRMU?

D2 – Do you think the Agency should retain its policy of no further consumptive abstraction from this unit?

6.10. Strategy for Areas not in a water resource management unit

Some parts of the CAMS area do not lie within defined WRMUs, see Figure 9. These areas include tidal reaches and small tributary streams. Tidal reaches are not included in the RAM assessment as a robust system for determining the flow requirements of these environments has yet to be developed. Abstractions from small tributary streams can have a significant impact on flows and CAMS guidance formulated for main river reaches may not be applicable in some cases.

In this CAMS we also have no specific policy for the minor aquifers of the Tunbridge Wells Sands and Ashdown Sands. These aquifers are highly complex due to faulting and geological variability and there is limited information on outflows and water levels. They also only yield comparatively small volumes of water, but it is noted that these can be locally important.

In addition, we propose that the strategy outlined for the Brighton Chalk WRMU be extended to all areas of the Chalk outcrop in the CAMS area. The original resource assessment centred on the defined recharge area to the main abstraction boreholes. We feel that it is necessary to extend this area to include other parts of the aquifer, including that underlying Lewes Brooks in order to ensure outflows from the unit are adequately protected.

6.10.1. Guidance on the assessment of new applications

We propose that our existing regional licensing policy will apply to areas not included within a WRMU. There will be a presumption against further consumptive abstraction of summer surface waters and from groundwater. However we will assess any application on a case-by-case basis and take full consideration of the purpose of the abstraction and any impact on the environment.

6.10.2. Renewals and the management of existing licences

There will be a presumption of renewal of licences subject to the three tests. Existing licences may be subject to minor changes including the addition of water efficiency conditions.

6.10.3. Key issues for consultation

E1 – Should the Agency maintain its existing licensing policies for areas not in a WRMU?

E2 – Should the Agency extend its proposed strategy for the Brighton Chalk WRMU to other parts of the Chalk outcrop in the CAMS area?

6.11. The impact of the Water Act 2003

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

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

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 this 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
- New controls on previously exempt abstractions for mine and quarry de-watering, 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
- Stronger powers on water conservation

For more details on the Act and its implementation please see www.environment-agency.gov.uk. The Agency web-site will be updated to provide information as the Water Act is implemented.

6.12. Opportunities for licence trading in the A&O 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 mutual benefit. It involves a voluntarily movement of a right to abstract water between abstractors, using the abstraction licensing process. More detailed information is available in Section 4 of *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. 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 the Environment Agency web site.

6.13. Future developments in the A&O CAMS area

The South East of England is set to see significant development in coming years. Although the CAMS area will not be impacted by the substantial planned new developments such as the Thames Gateway, areas including Brighton, Haywards Heath and Burgess Hill are set to expand.

Domestic water consumption is also rising and planned development will place additional demands on water resources.

The Agency publication *Water resources for the future – a strategy for Southern Region* summarises how supply and demand will be managed in Southern Region over the next 25 years. Assumptions are made about the potential development of new resources, the realistic potential savings in forecast water use and the cut backs required to restore sustainability in certain areas. The strategy advocates a twin track approach to meet projected increases in demand and include options for increasing supply and managing consumption of water.

The following water resource schemes are being investigated by Water Companies, although to different degrees:

- Reservoirs – Investigating and promoting future reservoir development including in the A&O CAMS area (SEW)
- Bulk Supplies – continue to investigate the potential for bulk supplies from one company to another to meet demand (SWS and SEW).
- Desalination at Newhaven (SEW)

Water conservation options include:

- Further leakage control – especially on the Sussex coast (SWS)
- Metering – including on change of occupier (SWS)
- Water efficiency campaigns, both in household and commercial water company customers and with water abstractors (SWS and SEW)

More detailed options are discussed in the strategy, along with others such as rainwater harvesting and grey water recycling which are not selected in the proposed strategy, but could still be introduced.

Summary of key issues for consultation

The development of the A&O CAMS is designed to be an open and transparent process, which results in a shared strategy for managing water resources. We welcome your comments on any part of the proposed licensing strategy. Key issues are as follows:

Existing licensing strategy

There will be a presumption against further consumptive abstraction from the Chalk aquifer. This principle will also apply to the Ashdown Sands and Tunbridge Wells Sands aquifers unless no adverse environmental impact can be clearly demonstrated.

There will continue to be a presumption against further consumptive abstraction in summer months from surface waters, which are not covered by the RAM methodology.

The Agency will continue to adopt a precautionary approach to abstraction licensing and refuse applications where there is uncertainty over environmental impacts.

Proposed licensing strategy

Section 6 of this document outlines our proposals for managing new and existing abstraction licences. The main issues include:

Adopting the RAM methodology to manage abstraction licences in the Rivers Adur, Ouse and Cockhaise Brook WRMUs.

The imposition of HOF conditions to new and where necessary existing abstraction licences to ensure low flows and flow variability are protected.

Maintaining a Water Available resource status for the River Adur WRMU in light of uncertainties over how reducing flows will impact on fish passage.

Undertaking an investigation into the validity of the RAM result in the Cockhaise Brook WRMU before options to reduce licensed capacity are assessed.

Presuming against any further consumptive abstraction from the Brighton Chalk WRMU and extending this to the entire Chalk outcrop in the CAMS area.

Sustainability issues

There are also a number of wider issues concerning the sustainable management of water resources in the CAMS area that you may also wish to comment upon:

The resource assessment clearly highlights that although the majority of the A&O CAMS area currently has a sustainable abstraction regime, there is little if any scope for increasing abstraction without significant consequences for the environment. What are your views on how increases in demand should be met in the future?

Appendix

References

Brighton and Hove City Council. 2004. *A different kind of city – a unique destination - A strategic framework for tourism development for Brighton and Hove* [online]. Available from: http://www.brighton-hove.gov.uk/downloads/tourism/Tourism_Strategy_2004.pdf

(Accessed March 2004)

South East Water Plc. 2003 *JUNE RETURN 2003 BOARD OVERVIEW*.

[http://www.ofwat.gov.uk/aptrix/ofwat/publish.nsf/AttachmentsByTitle/jr03_mse_overview.doc/\\$FILE/jr03_mse_overview.doc](http://www.ofwat.gov.uk/aptrix/ofwat/publish.nsf/AttachmentsByTitle/jr03_mse_overview.doc/$FILE/jr03_mse_overview.doc)

(Accessed 14/06/04)

Southern Water Services Ltd 2003 *JUNE RETURN 2003 BOARD OVERVIEW*, SWS 2003

http://www.ofwat.gov.uk/aptrix/ofwat/publish.nsf/Content/jr03_srn_overview_tabled

(Accessed 14/06/04)

Sussex Downs Conservation Board (March 2004) *Interim South Downs Management Plan*.

Useful 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 or telephone 01903 832275.

Water companies

For local water efficiency advice, contact your water company. Consult www.southeastwater.co.uk or www.southernwater.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.

Business/commercial

Envirowise

Envirowise is a Government programme offering free, independent advice on practical ways for industrial and commercial SME's (Small & 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 & Energy helpline: 0800 585 794.

Public sector

Watermark

Watermark is an initiative from OGC buying 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 water companies aimed at National Curriculum Key Stage 2 and 3 pupils and their teachers. It provides a wealth of information for pupils on how to make savings. Consult www.waterintheschool.co.uk

Hospitals

Water UK

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

Agriculture & 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 (RDS)

DEFRA's Rural Development Service 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 or telephone: 0247 6413 911.

Glossary

Abstraction

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

Abstraction licence

The authorisation granted by the Environment Agency under section 38 of the Water Resources Act 1991 to permit water abstraction.

Asset Management Plan

Asset Management Plans are produced by the water companies for Ofwat and set out the investment programme for the water industry. These plans are drawn up through consultation with the Environment Agency and other bodies to cover a five year period and have to be agreed by DEFRA and Ofwat.

Aquifer

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

Area of Outstanding Natural Beauty

An area of land designated under the National Parks and Access to Countryside Act 1949 in order to conserve natural beauty.

Assessment point

Critical point on a river at which an assessment of available water resources is made.

Baseflow

The component of river flow that is derived from groundwater rather than surface runoff.

Biodiversity Action Plan

Established at a National level in 1995 as part of the Government's commitment to conserving biodiversity made at the 'Earth Summit' held in Rio in 1992. The plan identified over 100 species and 14 habitats for targeted action for protection. This national plan has now been translated into local actions and the Sussex Biodiversity Action Plan (BAP) focuses on habitats and species listed in the plan found in the local area.

Catchment

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

Catchment Flood Management Plans

High level plans developed by the Environment Agency at a catchment scale to facilitate the integrated management of flood risks to people and the developed and natural environment in a sustainable manner. These plans are being prepared across Sussex

Chalk

A soft white fine-grained limestone which underlies much of the South Downs and forms a major aquifer.

Consumptive Abstraction/Use

Use of water which results in a significant proportion of water abstracted not being returned either directly or indirectly to a source of supply e.g. spray irrigation.

Demand management

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

Deployable output

The output of a commissioned source or group of sources or of bulk supply as constrained by:

- environment
- licence, if applicable
- pumping plant and/or well/aquifer properties
- raw water mains and/or aqueducts
- transfer and/or output main
- treatment
- water quality

for specified conditions and demands.

Derogation

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

Discharge consent

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

Drought

A general term for 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.

Effluent

Liquid waste from industrial, agricultural or sewage plants.

Environmental flow requirement

The amount of water that is required to support the ecology of a river.

Fisheries Action Plan

A strategic plan for the local management and delivery of fisheries objectives and duties developed in partnership with local fisheries interests. The Western Rother Fisheries Action Plan is one of 5 pilot studies undertaken by the Agency in response to The Salmon and Freshwater Fisheries Review published in March 2000.

Gauging station

A site where the flow of a river is measured.

Groundwater

Water that is contained in underground rocks (aquifers).

Groundwater management unit

An area of aquifer delineated to allow the assessment of groundwater resources.

Groundwater protection policy

Environment Agency policy relating to groundwater recharge areas to control activities having the potential to pollute underground water.

Habitats Directive

The European Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna - known as the Habitats Directive - was adopted by the European Commission in 1992. The Directive is implemented in the UK by the Conservation (Natural Habitats & c.) Regulations 1994 - commonly known as the 'Habitats Regulations'.

Hands-off flow

A condition attached to an abstraction licence setting a river flow threshold below which abstraction must cease.

Headwaters

The uppermost reaches of a river system.

Hydrogeology

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

Hydrology

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

Hydrometry

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

Hydrometric network

A system of sites monitoring rainfall, river flow, groundwater levels, river and lake levels and some climatic parameters. The data is used extensively for water resources management and planning, water quality and ecological protection and improvement, flood defence, flood forecasting and flood warning.

Impoundment

A dam, weir or other work constructed in an inland water, whereby flows are obstructed or impeded or where water levels are raised above their natural position, and any works for diverting flows in an inland water associated with the construction of a dam, weir or other work.

Lower Greensand

A group of rock formations comprising mainly of sandstones, siltstones, and sand, silt and clay deposits and include the Hythe Beds, Sandgate Beds and Folkestone Beds.

Macro-invertebrate

An animal without a backbone which is retained in a 5mm sieve.

Minimum acceptable flow

The minimum acceptable flow of an inland watercourse as defined in Section 21 of the Water Resources Act 1991.

Natural flow regime

The river flow pattern experienced prior to the influence of man, with no abstraction from or discharge to the catchment.

Natura 2000

The collective name given to the pan-European network of sites created under the Habitats Directive. This internationally important network includes Special Areas of Conservation (SAC) and Special Protection Areas (SPA).

Non-consumptive abstraction

Abstraction where the water is used is returned to a source close to or at the point of supply, e.g. hydropower generation, fish farming etc.

National Environment Programme

The Environment Agency's programme as approved by ministers setting out improvements to be made by water companies between 2001/01 and 2004/05 to help meet the needs of European Directives and UK legislation.

Oestrogens

Natural and synthetic hormones found in sewage effluent. These chemicals are linked to the 'feminisation' of male fish.

Outflows

A term used to describe the movement of water out (losses) from a defined area of an aquifer and includes spring flows, baseflow to surface waters and movement of underground water past a defined boundary.

Ponded reach/stretch

A section of a watercourse upstream of an impoundment or natural restriction characterised by reduced velocity of flow and raised water levels.

Precautionary principle

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

Public water supply

Term used to describe the supply of water provided by a water undertaker.

RAM framework

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

Ramsar

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

Recharge

Water which percolates downward from the surface into groundwater.

Restoring Sustainable Abstraction

A programme set up in 1999 to catalogue river and wetland sites suspected of being affected by over abstraction and to establish a future strategy for investigations and implementation of solutions.

Review of Consents

The procedure by which the Environment Agency as a competent authority will apply the Habitats Regulations to review all relevant existing consents, licences, permissions and activities which are likely to be having an effect on a designated European site.

Revocation

Cancellation of licence and associated rights and benefits. **River reach** Unit of a river between two Assessment Points, delineated for the purposes of abstraction licensing and resource management.

Scarp slope

A steep sided slope often used in reference to the northern flank of the Chalk downland.

Site of Nature Conservation Importance

Sites designated by Local Authorities for planning purposes as locally important for conservation interests.

Site of Special Scientific Interest

A site given a statutory designation by English Nature or the Countryside Council for Wales because of its importance to nature conservation.

Special Area of Conservation

Internationally important nature conservation site designated under the EU Habitats Directive (92/43/EEC).

Special Protection Area

Internationally important nature conservation site designated under the EU Wild Birds Directive (79/409/EEC).

Spray irrigation

Abstracted water sprayed via a boom or rain gun etc. onto grassland, fruit, vegetables etc. Can have a high impact on water resources and is highly consumptive.

Spring

A surface water course that occurs where the water table intersects the ground surface.

Surface water

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

Sustainable development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This involves meeting four objectives simultaneously:

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

Tidal limit

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

Time limited licence

An abstraction licence with specified end date.

Twin track

The approach adopted by National and Regional Water Resources Strategies for the future management of water resources, balancing the need for efficient water use whilst bringing forward timely proposals for resource development where appropriate.

Water Level Management Plans

A written agreement between interested parties, providing the means by which the water level requirements for a range of activities in a particular area can be balanced and integrated.

Water resource management unit

An area that has similar groundwater and or surface water characteristics defined for the local management of water resources.

Water resources strategies

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.

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.

List of acronyms, abbreviations and units

AMP

Asset Management Plan

AONB

Area of Outstanding Natural Beauty

A&O

Adur and Ouse CAMS

AP

Assessment Point

BAP

Bio-diversity Action Plan

CAMS

Catchment Abstraction Management Strategy

DEFRA

Department for Environment, Food and Rural Affairs

EU

European Union

GWMU

Groundwater Management Unit

HOF

Hands-Off Flow

km²

Square kilometres

m

metres

MI/d

Megalitres (million litres) per day

NEP

National Environment Programme

NRA

National Rivers Authority

Ofwat

Office of Water Services

RAM

Resource Assessment and Management

RSA

Restoring Sustainable Abstraction Programme

SAC

Special Area of Conservation

SNCI

Site of Nature Conservation Importance

SPA

Special Protection Area

SSSI

A Site of Special Scientific Interest i.e. an area given a UK statutory designation because of its conservation value

WWTW

Sewage Treatment Works

SEW

South East Water

SWS

Southern Water Services

UKCIP

United Kingdom Climate Impacts Programme

WRMU

Water Resource Management Unit

CONTACTS:

ENVIRONMENT AGENCY HEAD OFFICE

Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol BS32 4UD
Tel: 01454 624 400 Fax: 01454 624 409

www.environment-agency.gov.uk

www.environment-agency.wales.gov.uk

ENVIRONMENT AGENCY REGIONAL OFFICES

ANGLIAN

Kingfisher House
Goldhay Way
Orton Goldhay
Peterborough PE2 5ZR
Tel: 01733 371 811
Fax: 01733 231 840

SOUTHERN

Guildbourne House
Chatsworth Road
Worthing
West Sussex BN11 1LD
Tel: 01903 832 000
Fax: 01903 821 832

MIDLANDS

Sapphire East
550 Streetsbrook Road
Solihull B91 1QT
Tel: 0121 711 2324
Fax: 0121 711 5824

SOUTH WEST

Manley House
Kestrel Way
Exeter EX2 7LQ
Tel: 01392 444 000
Fax: 01392 444 238

NORTH EAST

Rivers House
21 Park Square South
Leeds LS1 2QG
Tel: 0113 244 0191
Fax: 0113 246 1889

THAMES

Kings Meadow House
Kings Meadow Road
Reading RG1 8DQ
Tel: 0118 953 5000
Fax: 0118 950 0388

NORTH WEST

PO Box 12
Richard Fairclough House
Knutsford Road
Warrington WA4 1HG
Tel: 01925 653 999
Fax: 01925 415 961

WALES

Cambria House
29 Newport Road
Cardiff CF24 0TP
Tel: 029 2077 0088
Fax: 029 2079 8555



ENVIRONMENT AGENCY GENERAL ENQUIRY LINE

0845 9 333 111

ENVIRONMENT AGENCY FLOOD LINE

0845 988 1188

ENVIRONMENT AGENCY EMERGENCY HOTLINE

0800 80 70 60



**ENVIRONMENT
AGENCY**

www.environment-agency.gov.uk/cams

We welcome feedback including comments about the content and presentation of this report.

If you are happy with our service please tell us. It helps us to identify good practice and rewards our staff. If you are unhappy with our service, please let us know how we can improve it.

For further copies of this report or other reports published by the Environment Agency, contact general enquiries on 0845 9333111 or email us on enquiries@environment-agency.gov.uk



**ENVIRONMENT
AGENCY**