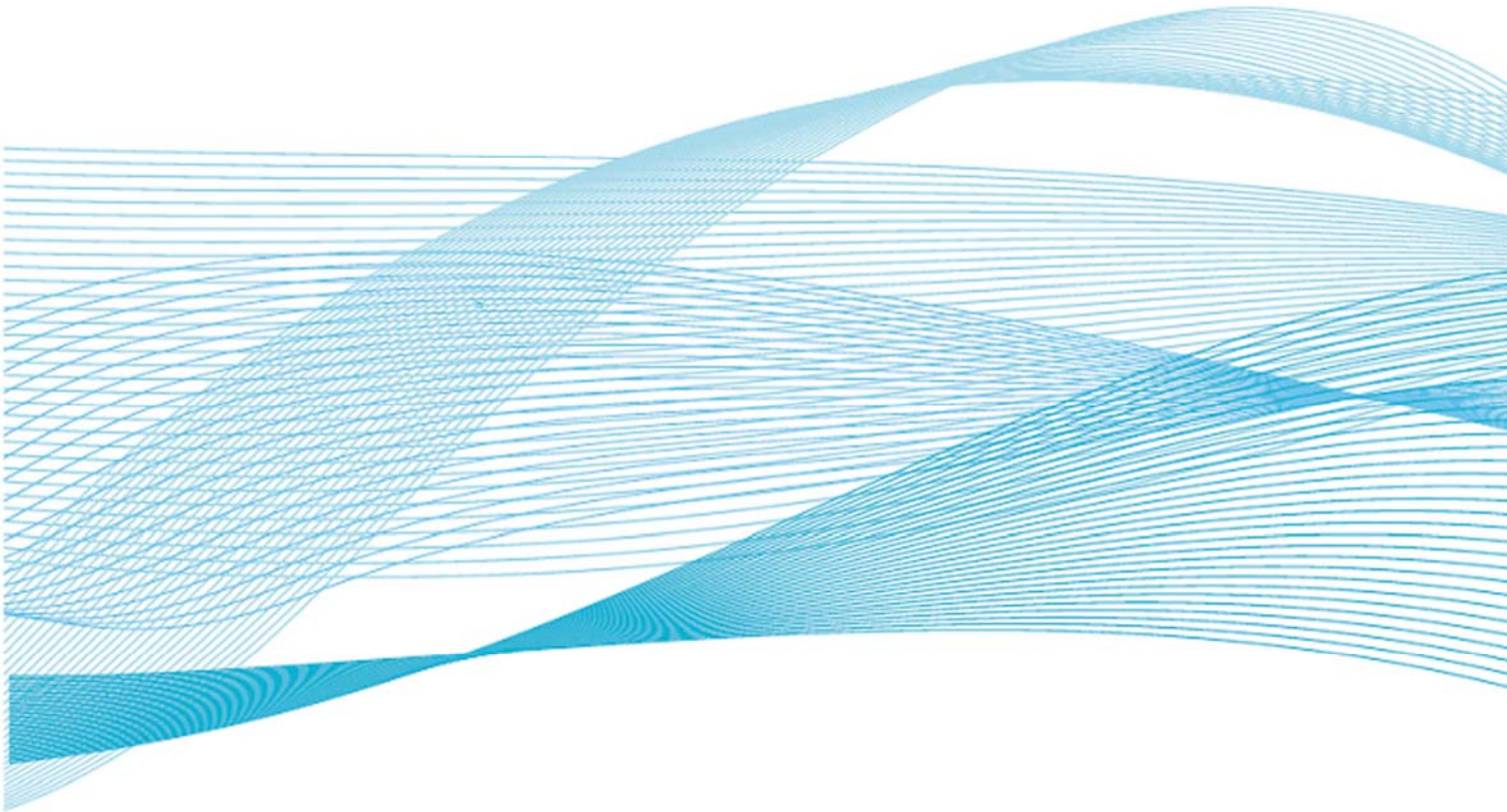
Environment Agency

Water for people and the environment

Water Resources Strategy
Regional Action Plan for Southern Region



We are the Environment Agency. It's our job to look after your environment and make it **a better place** - for you, and for future generations.

Your environment is the air you breathe, the water you drink and the ground you walk on. Working with business, Government and society as a whole, we are making your environment cleaner and healthier.

The Environment Agency. Out there, making your environment a better place.

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Foreword

Water is precious. It is essential for people, the economy and the environment. The Environment Agency has a responsibility to manage water resources and plan for their future use.

In Southern Region, water is a scarce and often over-committed resource. The pressures on water resources and the water environment mean that careful planning is essential to ensure there will be enough water for people and the environment in future.

Southern Region's water environment is characterised by small catchments, a long coastline and a dependence on groundwater. Our aquifers are of major importance to both people and the environment. Our rivers and wetlands are valuable for recreation, fisheries and wildlife – many have national and European designations – and we rely on them for public water supplies, farming, fisheries, and industrial uses. Water resources are key to our region's economy.

Population growth and climate change are likely to lead to increasing pressure on water resources in Southern Region and throughout the South East. We need to find solutions that help us to mitigate climate change, as well as adapt to the impacts of climate change. Finding low carbon solutions and minimising greenhouse gas emissions must be central to how we manage water resources in future. The environmental pressures we face mean that we need to develop new, innovative and cost-effective technologies to tackle the challenges ahead.

Our high quality environment is one of our region's major assets. We need to protect this asset and get the balance right between the needs of people and the needs of environment. We are committed to working with others to find economically, socially and environmentally sustainable solutions to the problems that we face. By working together, we can ensure that we emerge from the current economic downturn in a stronger position to secure sustainable growth and prosperity for the South East.

The Environment Agency has the dual responsibility of managing water resources for people - ensuring secure and sustainable supplies - and the environment. But we cannot do this alone. This action plan shows how we will work together with a wide range of organisations to secure water supplies and a better water environment for future generations.

Toby Willison Regional Director, Environment Agency Southern Region

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1 Introduction

Water is precious. It is essential for life. It supports valued and diverse ecosystems in wetlands, lakes, rivers, estuaries and the sea. It is vital to economic prosperity and growth, and important for health, recreation and tourism. It is used to generate power, run industries, grow food and in our homes.

Pressure on water resources will grow from increases in population, changes in lifestyle, climate change, the development of new technologies, and from changes in the use of land. These pose significant challenges to the way water resources are managed, and as a result, the way water is valued will become more important.

We are planning for what we know the future will bring, but we also need to plan for what the future might bring. We need a strategic approach to water management, otherwise we risk an expensive and damaging impact on the economy and the environment, which will affect lifestyles.

Our aim for water is 'enough water for people and the environment'. The management and use of water and land must be shown to be sustainable - environmentally, socially and economically. We require the right amount of good quality water for people, agriculture, commerce and industry, and the environment.

In Southern Region (figure 1.1), we already face some significant challenges:

- More than 50 per cent of catchments in this Region are over-abstracted or over-licensed at low flows[1].
- 15 designated nature conservation sites are at risk from, or are being damaged by, too much abstraction[2].

If we do nothing, these pressures may get worse because of the impact of climate change and from a growing population.

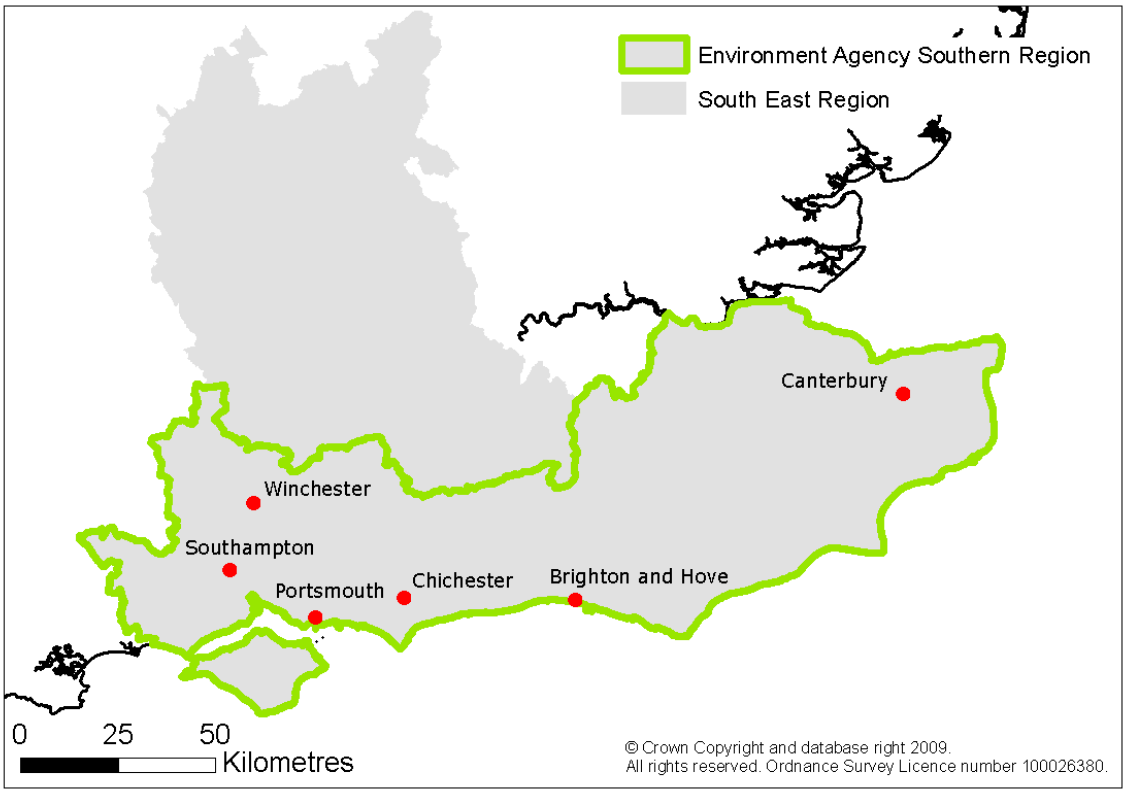

Figure 1.1. Location of the Environment Agency Southern Region.

Our water resources strategy for England and Wales, *Water for People and the Environment*, sets out a number of actions that are reflected in this regional action plan (RAP). This plan takes the aims and objectives of the strategy and identifies regional actions that will enable:

- water to be abstracted, supplied and used efficiently;
- the water environment to be restored, protected and improved so that habitats and species can better adapt to climate change;
- supplies to be more resilient to the impact of climate change, including droughts and floods;
- water to be shared more effectively between abstractors;
- improved water efficiency in new and existing buildings;
- water to be valued, and for prices to act as an incentive for efficient use, while safeguarding vulnerable sectors of society;
- additional resources to be developed where and when they are needed in the context of a twin-track approach with demand management;
- sustainable, low carbon solutions to be adopted;
- stronger integration of water resources management with land, energy, food and waste.

We intend to work with water companies and others to understand and quantify the scale of the challenge and the solutions needed to address it.

Every region within the Environment Agency has developed a RAP. This plan shows how we propose to implement the actions within the water resources strategy for England and Wales locally. It considers local pressures and priorities, and reflects the measures in River Basin Management Plans (RBMPs) and our new corporate strategy. In parallel, we have developed a Water Resources Action Plan for England and Wales, which covers the actions which will be progressed at a national level.

By working together with other organisations our aim is to ensure there is enough water for people and the environment whatever the future might have in store for us.

2 Current and future pressure on water resources in Southern Region

We have used future scenarios to look at future pressures on water resources[3]. They are not forecasts, but show a range of possible demands in the future. The scenarios consider a range of responses by government, regulators, water companies, abstractors and individuals to the way that water is used and managed.

Under the worst case scenario, a further 500 million litres per day may potentially be necessary in the South East River Basin by 2050 to meet the additional needs of the public, industry and agriculture.

Our work also shows that by 2050, climate change could reduce water resources by 10 to 15 per cent on an annual average basis, and could reduce summer river flows by 50 to 80 per cent.

As action is taken to restore abstraction to sustainable levels where there is shown to be an unacceptable impact on the environment, there are likely to be further pressures on supplies as abstraction licences are changed to introduce appropriate environmental safeguards.

In order to address future deficits, a range of actions are necessary. Demand management, greater sharing of existing resources and resource development will all be required. Our water resources strategy shows that near universal metering in areas of serious water stress, such as the South East of England, is generally more cost effective than resource development and is one of the lowest cost options in terms of carbon.

Our discussion document *Water for the Future: Managing Water Resources in the South East of England*[4] showed that the South East of England (including Southern Region) is facing significant water resources pressures and that not enough is being done by water companies to share existing resources.

Planned levels of investment by water companies in water resources result in over-capacity when the South East of England is considered as a whole. In their 2004 plans, water companies in the South East of England were planning to develop approximately 500 million litres per day over and above what was identified as being required by 2029/30. This is equal to a surplus investment cost of £1.4 billion and is enough water to supply 3.2 million people – that's all the existing customers in South East Water, Portsmouth Water, Bournemouth & West Hampshire Water and Veolia Water South East combined. With the current round of water company plans being finalised at the time of writing, we plan to revisit our assessment during 2010.

Water for the Future also showed that water companies were not being ambitious enough in planning for the right level of demand management solutions. Our work suggested that by incorporating a moderate amount of cost effective demand management measures into their plans, a significant number of resource development proposals would not be required.

Appendix A contains more information about the state of water resources in Southern Region.

3 Links with other strategies, plans and programmes of work

3.1 River basin management

As the Competent Authority under the Water Framework Directive (WFD), we co-ordinate activity to improve and maintain water quality, quantity and morphology (channel shape) through river basin management. We develop River Basin Management Plans (RBMPs) in partnership with others which set out measures for achieving the 'good' status or potential of all waters, including groundwater, wetlands, rivers, canals, lakes, reservoirs, estuaries and coastal waters. The plans include measures to protect the most valued and sensitive water-reliant habitats and species, and to protect sources of drinking water. The plans also include measures to promote efficient and sustainable water use.

The WFD includes a series of environmental targets that aim to protect and improve the aquatic environment and provides the framework for achieving sustainable water use. RBMPs set out the necessary actions in cycles until 2027.

The WFD is wider than just water resources, and covers many other actions, including those relating to the management of ecology, land, water quality, fisheries, channel morphology and flood risk.

The water resources strategy for England and Wales sets out a number of aims and objectives relating to the vision of enough water for people and the environment. The strategy's aims include securing a better environment, which complement RBMPs.

However, the water resources strategy for England and Wales has a longer planning horizon than RBMPs – it looks to 2050 and beyond. It also covers some water resources elements such as drought management and ensuring security of supply, which are not core to the WFD. While there is overlap and the water resources related actions within RBMPs and regional action plans must be consistent with one another, RBMPs by themselves will not fully meet the objectives of the water resources strategy regional action plans and vice versa. They are both required.

In summary, the strategy and the WFD have some common elements relating to achieving sustainable water use, but water resources strategy regional action plans ensure a coherence to the suite of actions relating to water quantity.

3.2 Water company water resources management plans and business plans

All water companies have a statutory duty to prepare and maintain a water resources management plan (WRMP) to show how the water company intends to maintain the balance between supply and demand for water over the next 25 years. Implementation of WRMPs will be the mechanism by which some of the actions in this RAP are delivered; for example, the actions on metering and tariff developments, leakage reduction and achieving the best public water supply solutions for the South East.

Water companies are also required to produce a business plan on a 5 yearly basis which sets out the company's overall strategy and the implications for price limits and customer bills. The business plan sets out the company's strategic objectives around standards of service, water quality and environmental improvements, and identifies the actions that will be required to meet these objectives. Water company business plans will be key to delivering a number of actions in this RAP including protecting critical infrastructure from flood events, delivering the schemes in the National Environment Programme (NEP) and achieving reductions in greenhouse gas emissions.

3.3 Water company drought plans and Environment Agency drought plans

Water companies and the Environment Agency produce drought plans which outline how we will manage water resources during a drought and define our respective roles and responsibilities.

3.4 Restoring Sustainable Abstraction and National Environment Programme

The Environment Agency has established the Restoring Sustainable Abstraction (RSA) programme to review the environmental impact of existing licensed abstractions and make changes where this impact is found to be unacceptable. This is driven by an overall need to ensure long-term sustainability and, more immediately, to meet the requirements of European Directives, UK law and other environmental and local concerns.

A prioritised programme of investigations, options appraisals and implementation of solutions at specific sites is underway. Where an investigation identifies that a site is being damaged by abstraction we work with abstractors to find and implement an appropriate, cost-effective solution. In cases where the abstractor is a water company, sites may be included in the National Environment Programme (NEP) for investigation, options appraisal or implementation, and funded through water company business plans.

3.5 Catchment Abstraction Management Strategies

Catchment Abstraction Management Strategies (CAMS) provide an assessment of the water resources available in local catchments, and set out local water abstraction licensing practice to help balance the needs of water-users and the environment on a local scale.

3.6 Environment Agency corporate strategy

The water resources strategy for England and Wales, the corporate strategy and the supporting sub strategy for water are aligned and reflect the same aims, objectives and priorities for water resources management. The activities to deliver the corporate strategy, its sub strategy for water and those within this regional action plan are captured within our Regional Contribution, and in the regional business plan which supports it, ensuring that resources are allocated and work appropriately scheduled.

3.7 Other strategies and plans

To achieve management and use of water in Southern Region that is environmentally, socially and economically sustainable, we need to link in with other relevant strategies and plans at both regional and local level.

Up to now we have had a Regional Spatial Strategy (also called the South East Plan) and a Regional Economic Strategy (RES) for the South East, but regional planning arrangements are changing; the recently established South East England Partnership Board is responsible for commissioning and implementing a single integrated strategy for the South East. It is also possible that the emphasis could shift away from regional planning, more towards local planning. It is therefore crucial that we maintain and strengthen our links with Local Development Frameworks (LDFs), particularly in areas where water resources are already under stress, as these will be key to delivering many of the actions in our RAP, for example around water efficiency, reducing per capita consumption and reducing greenhouse gas emissions.

On a local level, some Local Planning Authorities and partnerships in Southern Region have developed local water strategies and plans, for example the Partnership for Urban South Hampshire (PUSH) Integrated Water Management Study, and the Ashford Water Cycle Strategy.

3.8 Other programmes of work

The Environment Agency also operates environmental monitoring programmes to gather appropriate data to assess and report on the state of the environment in general, and for use in particular site studies.

For water resource management work, we also maintain and develop a suite of hydrological and hydrogeological models, used in association with water quality and ecological modelling.

Figure 3.1 shows how the regional action plan and other plans and strategies fit together to provide a coordinated approach to water resources management.

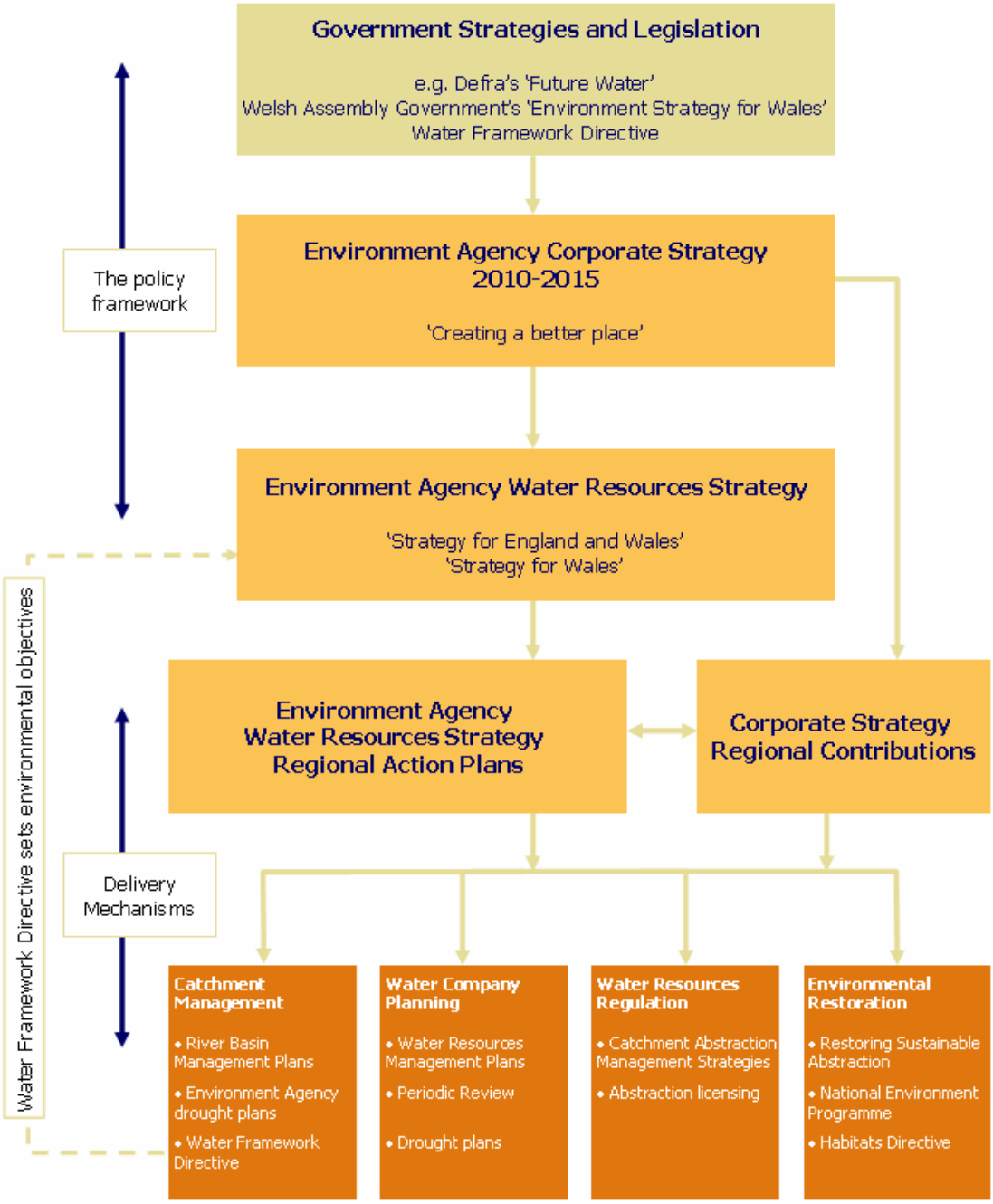

Figure 3.1. Water resources management: Linkages with other strategies and plans.

4 Regional strategy actions

The following sections outline the actions we are going to take in Southern Region to meet the four aims of the water resources strategy for England and Wales (see figure 4.1). The actions reflect our regional priorities and local needs.

Adapting to and mitigating climate change	Sustainable planning and management of water resources
The Environment Agency is able to manage and protect the water environment in the face of climate change. 	Good water management contributes to sustainable development by supporting people and the economy in an improved environment. 
A better water environment	**Water and the water environment are valued**
Species and habitats that depend on water are restored, protected, improved and valued. 	People value water and enjoy their water environment and understand how it contributes to their quality of life. 

Figure 4.1. The four aims of the water resources strategy for England and Wales. Some of the actions and objectives which contribute towards meeting these aims are cross-cutting.

Our Southern Region action plan is weighted towards actions we intend to complete over the next five years. We have identified where other strategies, plans or programmes of work are expected be the primary mechanism for implementing an action, and we refer to them in the tables below.

As we planned how we will implement many of the actions from the water resources strategy for England and Wales, we considered which aspects are likely to be delivered locally, which will be progressed at a national level and, in some cases, which are likely to need a mixture of both.

This plan focuses on the actions or parts of actions which will be progressed within Southern Region. For detail on the work which will be progressed at a national level, please refer to the water resources action plan for England and Wales, which has been developed in parallel.

4.1 Our regional priorities

- **Driving water efficiency**
- **Protecting the water environment**
- **Greater integration between policy, planning and operations of water resources and water quality**
- **'Design standards' for public water supply and the related risk to the environment**
- **Water industry progress**

Our regional action plan sets out our priorities for Southern Region. Addressing these priorities will be key to ensuring that the management and use of water is environmentally, socially and economically sustainable in future.

Our regional priorities cut across the four aims of the water resources strategy for England and Wales (see Figure 4.1). The actions we have identified in the tables below will all make a contribution towards addressing these priorities.

4.1.1 Driving water efficiency

Policy development, information and action on water efficiency, metering and tariffs, and leakage control are vital to achieving and maintaining sustainable water resources management in Southern Region. We aim to help reduce household and non-household consumption through planning and delivering a programme of water efficiency work in a more integrated way and working with a range of partners.

4.1.2 Protecting the water environment

The impact of climate change and population growth will further increase the pressure on water resources in Southern Region, which in many places are already seriously stressed. In the face of these increasing pressures, our water resources strategy for England and Wales suggests we will need to reconsider how we protect and enhance our environment in future. We need to ensure we prioritise our efforts toward achieving the best possible environmental outcomes, in line with the issues raised in the national strategy. We will continue to develop best practice, seeking innovative lowest-cost solutions to impacts of abstraction on the environment.

4.1.3 Greater integration between policy, planning and operations of water resources and water quality

We will continue to develop the links between the Environment Agency's water resources and water quality activities to better integrate planning and policy, and strengthen our influence on external organisations, including their considerations of investment economics. For example, we will consider the role that demand management can play in meeting environmental water quality standards.

4.1.4 'Design standards' for public water supply and the related risk to the environment

In our recent review of Southern Region water companies' draft water resources management plans, we found some fundamental inconsistencies that need to be addressed. Working with our Head Office teams, we aim to establish a clearer, firmer and quantitatively defined expectation of water resources management plans, drought plans and the relationship between them. We intend this to be expressed in terms of reliability of public water supplies, the scale of impact on the environment and measures of cost.

4.1.5 Water industry progress

We have led the 'Water Resources in the South East' group for a number of years. Whilst this has led to some further sharing of resources between water companies, more can yet be achieved to the further benefit of bill-payers and the environment. We want to ensure that all avenues leading to the development of a shared resource strategy across existing water companies are fully explored. We also want to see the Environment Agency at the forefront of water industry regulatory and structural review, helping bring about benefits for bill-payers and the environment. We will draw on our experience of the issues that arise in a region where water supply infrastructure is very fragmented.

4.2 About this plan

Where the actions within this regional action plan result in specific plans or activities, we will take full account of the potential impact they may have on designated sites under the Habitats Regulations.

A formal Habitats Risk Assessment has been produced for the Water Framework Directive River Basin Management Plans and many of the actions relating to the environment are consistent with this assessment. We do not believe that the remaining actions can be considered in terms of their potential for significant impact on specific designated sites.

Referencing used	
Reference to other plans	*Biodiversity Action Plans: BAP* *Catchment Abstraction Management Strategies: CAMS* *Local Development Frameworks: LDF* *River Basin Management Plans: RBMP* *Water Resources Management Plans: WRMP*

4.3 Adapting to and mitigating climate change

A co-ordinated and longer term approach to adapting to and mitigating climate change is needed to guarantee reliable water supplies for all types of abstraction and to ensure that the water environment continues to be protected.

Our objective is to limit the future extent of climate change and some of the implications for water resources; to do this we will need to address the man-made causes of climate change. Irrespective of how successful these efforts are, there will still be some degree of unavoidable climate change, to which our society will need to adapt.

In Southern Region we expect to experience, on average, hotter drier summers and warmer wetter winters, but with increased variability so that floods and droughts may increase in frequency and severity[5]. Drier winters may be part of this. We are also vulnerable to sea level rise. We should expect that impacts may include:

- reduced reliability of yield from storage reservoirs;
- increased and different patterns of demand for water;
- different patterns of seasonal river-flow;
- altered baseline water quality and capacity of rivers to receive effluent;
- increased saline intrusion up rivers and in coastal groundwaters, including those currently relied upon for public water supplies;
- increased need to consider effluent re-use and desalination as supply options;
- changing patterns of groundwater recharge.

Radian Homes: Water efficiency in new homes

We have funded a project officer with Radian Homes for two years to learn about the practicalities of installing and maintaining water efficiency measures. Housing associations such as Radian are required to build houses to the Code for Sustainable Homes level 3 standard. Homes built to this standard use 105 litres per person per day (or less) within the home, which is much less than current average water use of 150 to 160 litres per person per day.

Radian has installed low flow taps, showers, toilets and appliances in new build at a cost of £300 per house, plus rainwater harvesting costing £3000. The results have been impressive with daily consumption below 100 litres per person. We have also learnt valuable lessons about rainwater pumps freezing up in winter and the need to ensure low flow appliances, fixtures and fittings are fit for purpose and accepted by householders.

The next step for this project is retro-fitting water efficiency devices into existing homes.

Flexible and incremental solutions like this will help us adapt to the impacts of climate change as well as minimise greenhouse gas emissions.

The following table sets out our objectives as well as the actions we plan to take to contribute to climate change mitigation, and to help abstractors, species and habitats adapt to the effects of climate change.

Water resources strategy objective	Ref no.	Regional action	Reference to other plans and strategies	Other organisations that need to be involved	Timescale for action
Ecology is more resilient to climate change because abstraction pressures have been reduced and a diverse network of habitats has been allowed to develop	A1	We will help to deliver Southern Region's 'Wetland Vision' and other partnership projects, working with others to restore, create and manage wetlands in the face of climate change and changing water availability. Working with the RSPB, we will identify future sites for wetland and reed bed creation and through the South East England Biodiversity Forum - a partnership which champions biodiversity in the South East - we will work with others to develop 'Wetland Vision' projects across the region.	BAP RBMP	Defra, RSPB, South East England Biodiversity Forum	Short (5 years)
	A2	We will work with partners to help river habitat adapt to the impacts of climate change. For example, our Wriggle Room for Wildlife project will ensure that key river habitat in the Adur and Ouse catchments are connected to allow space for plants and animals to adapt to predicted climate change impacts.		Farmers, Landowners	Short (5 years)
The resilience of supplies and critical infrastructure is increased to reduce the impacts of climate change	A3	Where economically justified we will expect water companies to increase the connectivity of water supply infrastructure within and between Southern Region water supply zones.	WRMP	Water companies	Medium (5 to 25 years)
	A4	We will improve our understanding of the future reliability of non-public water supplies, including those dependent on small scale reservoirs. We will use this information to help abstractors adopt good practice in water use and identify opportunities for developing small-scale reservoirs.			Short (5 years)
	A5	We will work with the water companies to ensure that schemes are in place to protect critical infrastructure from flood events. We will identify effective methods of communicating with		Water companies	Medium (5 to 25 years)

Water resources strategy objective	Ref no.	Regional action	Reference to other plans and strategies	Other organisations that need to be involved	Timescale for action
		the different types of abstractors to ensure they are aware of the impacts of climate change. We want to make sure that they are adequately accounting for the risks posed by climate change on the reliability of their abstraction in the future.			
Flexible and incremental solutions in water resources management allow adaptation to climate change as it happens	A6	We will encourage water companies to assess the future reliability of resource options relative to climate change scenarios and a full range of historical drought events.	WRMP	Water companies	Medium (5 to 25 years)
	A7	We will develop our South East England water resources options modelling to include greater emphasis on environmental economics and demand management options.		Water companies, Ofwat	Short (5 years)
	A8	We will work with Natural England to understand the implications of their work to review designations of conservation sites.		Natural England	Medium (5 to 25 years)
Everyone is able to make more informed decisions and choices about managing water resources, protecting the environment and choosing options to avoid security of supply problems	A9	We will improve our understanding of the hydrological and hydrogeological reliability of existing and future public water supplies, including consideration of climate change predictions.			Short (5 years)
	A10	We will evaluate the risks to the current environment and, working with water companies, the risks to public water supplies from possible saline intrusion due to sea level rise.		Water companies	Short (5 years)
	A11	We will carry out further analysis using a range of scenarios including future demand due to growth, water efficiency and climate change to assess their possible impact on water resources and the environment. We will use this evidence base to set the strategic direction for water resources management in the region.		South East Partnership Board, Water companies	Short (5 years)
Greenhouse gas emissions from using water resources	A12	We will support hydropower and ground source heat pump developments across Southern Region where the needs of			Short (5 years)

Water resources strategy objective	Ref no.	Regional action	Reference to other plans and strategies	Other organisations that need to be involved	Timescale for action
are minimised and properly considered in future decisions		the local environment are protected since schemes could provide a positive contribution to the UK's green energy target. Where proposals are inappropriate, we will work with developers and others in attempting to agree viable, environmentally sustainable projects.			
	A13	We will expect water companies in Southern Region to commit to government targets for greenhouse gas emissions and to set out detailed approaches to achieving this.		Water companies	Medium (5 to 25 years)
	A14	In our water efficiency promotional work we will emphasise the link between hot water use and energy use and how using less hot water reduces CO_2 emissions.	Energy Saving Trust strategy 2009-14	Energy Saving Trust	Short (5 years)

4.4 A better water environment

We are faced with some real challenges when protecting and improving the water environment. We need to protect catchments, groundwater and valuable wildlife sites, while supplying water to large and growing populations.

There are a number of legacy issues that need to be resolved where abstraction could have an adverse impact on the environment, and where abstraction in catchments is at a level where sustainability is in question. This will require significant effort and investment.

Our Catchment Abstraction Management Strategies indicate that in many parts of our region, there is no further water available for abstraction and we have had a presumption against issuing consumptive licences for decades. We will find it harder and harder to grant reliable abstraction licences because of the protection now needed for the environment.

Added to this, climate change is likely to significantly alter the water environment. We need to identify what is the right level of security of supply and environmental protection for the future, given the expected changes to the climate.

Whilst coping with these pressures, we will look for opportunities to improve the water environment, wherever there is enough water available. Demand management (reducing current water consumption) must play a part in this in Southern Region.

In Southern Region we have already achieved some notable success in protecting our environment from the impacts of abstraction. For example, a continuing reduction in under-used licences, reducing abstraction impacts and improving management of the Rivers Darent and Dour in Kent and Swanbourne Lake in West Sussex. But there is more to do, not least to ensure that a solution is implemented to safeguard the River Itchen following the findings of our Review of Consents under the Habitats Directive.

River Itchen: Resolving environmental problems

The River Itchen is a classic chalk river which provides habitats for a number of nationally and internationally important plants and animals. The river's ecology depends on maintaining a uniform, fast flow of water and there is a need to maintain minimum flows to ensure that the ecology of the river is not damaged.

Recent investigations have shown that abstraction of water from the system has the potential to reduce river flows, particularly in dry summer months when demand for water is high.

We have looked at all of the abstraction licences which could affect the River Itchen and have decided to change nine of those licences to protect the sensitive ecology of the river. These include abstractions for public water supply and to supply fish farms as well as two of the Environment Agency's own licences used to augment river flows.

Working together with the water companies we are finding ways to change their licences as soon as possible whilst still enabling them to provide a secure supply of water to their customers. We expect demand management, alongside development of existing supplies, to play an important part in protecting the ecology of the river.

As well as changing abstraction licences, we are also modifying discharge consents to ensure the water quality of the river meets the high standards we aim for. However, changing permissions alone will not restore the river to favourable condition, due to unregulated impacts. Therefore we have identified a number of further actions including the need to reduce sediment levels in the river which are largely caused by run-off from agricultural land; this requires improved land management practices.

Managing water resources is not just about managing abstraction. Integrated catchment management will become more important as water quality, flood risk management and land management all have the potential to affect our water resources. The following table sets out our objectives as well as the actions we plan to take to restore and improve the environment in Southern Region.

Water resources strategy objective	Ref No.	Regional action	Reference to other plans and strategies	Other organisations that need to be involved	Timescale for action
Measures will be in place to make sure that water bodies achieve Water Framework Directive objectives	B1	We will support the implementation of water resources measures specified in the South East and Thames River Basin Management Plans. This will include activities such as site specific actions to restore sustainable abstraction, river and wetland restoration initiatives and water efficiency promotion.	RBMP	See RBMP	Medium (5 to 25 years)
Abstraction is sustainable, the environment is protected and improved, and supplies remain secure	B2	We will assess the quantity of water required to achieve a status of 'No Water Available' in all Southern Region catchments, and identify the potential costs of achieving this.	CAMS		Medium (5 to 25 years)
Environmental problems caused by historic unsustainable abstractions are resolved	B3	We will resolve unsustainable abstraction issues through our Restoring Sustainable Abstraction programme. We will continue to develop best practice, seeking innovative, least cost solutions to do this.		Licence holders	Medium (5 to 25 years)
	B4	We will investigate the effect of known and predicted future sustainability reductions on water resources in the region.			Short (5 years)
	B5	We will regularly report progress on Restoring Sustainable Abstraction.			Short (5 years)
Catchment management is integrated so that impacts on water resources and the water environment are managed together	B6	We will move to a more integrated approach towards managing our licensing of abstraction, by increasing our knowledge of the whole water cycle especially with respect to the relationships between discharges, water quality and abstractions. By the end of 2010, we will complete a pilot desk-study, making use of available information on water supply and sewerage infrastructure of a selected catchment.	CAMS		Short (5 years)
	B7	We will promote an integrated approach towards planning of water company investment for water supply and wastewater management to ensure they are looked at as	Water company business	Water companies	Medium (5 to 25 years)

Water resources strategy objective	Ref No.	Regional action	Reference to other plans and strategies	Other organisations that need to be involved	Timescale for action
		a whole cycle rather than as separate activities, achieving greater cost and environmental benefits by managing the impacts of both together.	plans		

4.5 Sustainable planning and management of water resources

A growing population results in significant pressures. By 2035, a further half a million people could be living and working in Southern Region[6]. Additional water demands may arise from global movement of goods and services as well as from the needs of agriculture and industry.

In our recent review of Southern Region's water companies' water resources management plans, we found we still have some fundamental inconsistencies to address. The reliability of supply that is built into a water company water resources management plan has implications for the way drought will be managed, including the number and impact of drought permits that may be sought for additional abstraction during drought. We want to establish a more transparent, quantified understanding of these relationships, including the protection of the environment.

We need to manage water resources carefully with more understanding of the reliability of water supplies and related protection for the environment. The following table sets out our objectives as well as the actions we plan to take to ensure that policies support sustainable development, while accounting for the considerable pressures facing water resources in Southern Region.

Water Resources in the South East: Sharing resources

The Water Resources in the South East (WRSE) group is led by the Environment Agency and includes water companies, other regulators and regional planning bodies.

Water companies contribute information about water resources and transfer options, including data on the potential yields and costs. The WRSE group uses these data to model the selection of future water resources options within a regional model, in order to identify the most economic options to balance supply and demand on a regional scale.

In the last 10 years the WRSE group has successfully implemented four new Bulk Supply agreements. Current work is identifying more economical resource sharing opportunities for further consideration by the companies.

Actions C12 and D1 set out how we intend to develop and improve this model to help identify sustainable options for managing water resources in the South East in future.

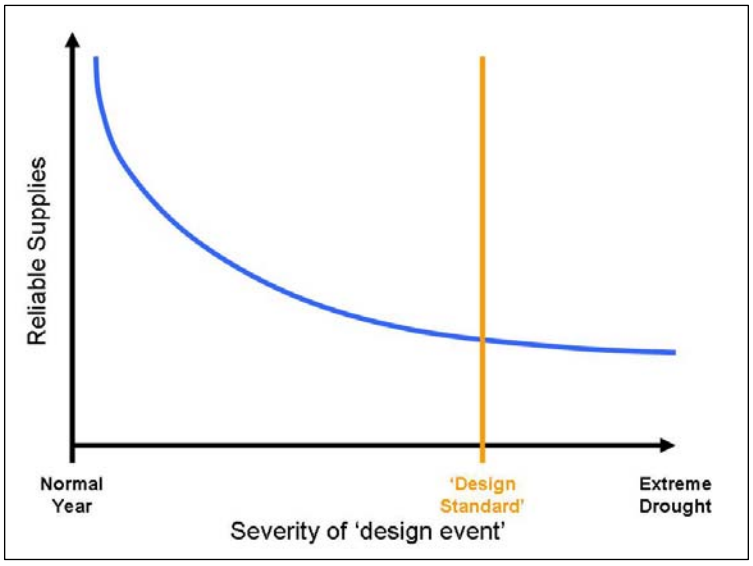

Figure 4.2. Design Standards and reliability of supplies: This graph illustrates how the choice of design event upon which a company's water resource management plan is based influences the reliability of supply that will be provided by the plan. Basing a plan on very extreme drought event can lead to costly over-investment, whereas a plan based toward the other end of the scale may provide undue risk to the environment and to the security of supply. Actions in our regional action plan aim to help understand the issues around this decision and contribute to future guidance on it.

Water resources strategy objective	Ref No.	Regional action	Reference to other plans and strategies	Other organisations that need to be involved	Timescale for action
The twin track approach of resource development with demand management is adopted in all sectors of water use	C1	The twin track approach should be applied to planning at a strategic level through regional spatial planning, local development frameworks, water resources management plans, price reviews, and in licence determination and enforcement. We will work with the South East Partnership Board to ensure that water issues are prominent in the new Single Regional Strategies. Water resources planning will be further integrated with the regional and local planning system. Working with key partners, we will ensure that sufficient understanding of water resources pressures are built into regional and local authority thinking behind plans at an early stage.	Single Regional Strategies	South East Partnership Board, Local Planning Authorities	Short (5 years)
In England, the average amount of water used per person in the home is reduced to 130 litres each day by 2030	C2	We will influence reduction in per capita consumption towards meeting the Regional Economic Strategy target of 135 litres per person per day by 2016, en route to the government aspiration of 130 litres per person per day by 2030, or 120 litres per person per day with technological development.	WRMP, LDF	Water companies, Local Authorities, Consumer Council for Water, SEEDA	Medium (5 to 25 years)
	C3	We will work with regional partners to develop a multi-stakeholder approach to water efficiency, initially through the 'Ensuring Water for All' project'.		Water companies, Consumer Council for Water, Energy Saving Trust, GOSE, SEEDA	Short (5 years)
The Environment Agency targets and adapts its	C4	We will influence reductions in non-household water use by continuing to undertake water audits and promoting		Envirowise, Sustainable	Short (5 years)

Water resources strategy objective	Ref No.	Regional action	Reference to other plans and strategies	Other organisations that need to be involved	Timescale for action
approach to reflect the location and timing of pressures on water resources		water efficiency in the industrial sector. We will make greater use of the Integrated Pollution Prevention and Control element of the Environmental Permitting system to help improve water efficiency.		Business Partnerships	
	C5	We will expect companies to investigate specific opportunities for effluent re-use in Southern Region, building on our recent study. We will also explore opportunities for direct re-use for commercial water uses and 'dual supply' implementation for housing developments.	WRMP	Water companies, developers, industry	Short (5 years)
	C6	We will investigate the feasibility of returning more effluent to aquifers in Southern Region. In particular, we will explore the level of treatment that would be required to gain overall water quality benefits, while improving the quantitative status of groundwater bodies through increased recharge.		Water companies	Short (5 years)
In England water companies implement near-universal metering of households, starting in areas of serious water stress	C7	We expect Southern Region's water companies to implement full metering as quickly as possible. Given that Southern Region is designated an area of 'serious water stress' our view is that water companies should implement full metering by 2015 or 2020 at the latest.	WRMP, Water company business plans	Water companies, Consumer Council for Water	Medium (5 to 25 years)
Leakage from mains and supply pipes is reduced	C8	We expect to see continued improvements in leakage management through active leakage control and customer supply pipe repair policies. We expect water companies to reduce leakage by at least five million litres per day across Southern Region by 2015.	WRMP, Water company business plans	Water companies	Short (5 years)
New and existing homes and buildings are more water efficient	C9	We will work with water users, planning authorities and developers to promote full metering, with tariff developments, and ensure that, as a minimum requirement, homes built before 2016 achieve internal	LDF	Planning authorities, developers, South East	Short (5 years)

Water resources strategy objective	Ref No.	Regional action	Reference to other plans and strategies	Other organisations that need to be involved	Timescale for action
		water use of 105 litres per person per day (as required by Code for Sustainable Homes level 3), or 80 litres per person per day (Code for Sustainable Homes level 5/6) in EcoTown developments, such as the proposed Whitehill-Bordon EcoTown - provided that this is achieved without increasing carbon emissions, or failing this, any emissions are included in meeting zero carbon targets for the eco town as a whole. This should help reduce the overall amount of energy currently required to provide water supplies and dispose of effluent across the Region.		Partnership Board, GOSE	
	C10	We commissioned a study that refines and explores the concept of water neutrality, and demonstrates that it provides an overall economic as well as environmental benefit to society. We have also explored the potential funding strategies and a refinement of the criteria considered in achieving water neutrality. We will use the findings of this project to develop our approach to water neutrality in this region. For example, we will review the scale at which it might be applicable and how it could work in practice.		Water companies, planning authorities, developers	Short (5 years)
	C11	We will continue to support the 'retro-fit trials' (fitting water efficient appliances and devices in existing homes) being carried out by Southern Region's water companies and look for ways of doing this on a large scale.		Water companies, Local Authorities	Short (5 years)
Water resources are allocated efficiently and are shared within regions where there are areas of surplus	C12	We will expect water companies to plan towards achieving the best water resources management solutions for the South East, by sharing resources across the region, reducing demand, and investing in new resources only where they are really needed. If necessary we will use our powers to propose that a water company seeks a	WRMP	WRSE Group	Short (5 years)

Water resources strategy objective	Ref No.	Regional action	Reference to other plans and strategies	Other organisations that need to be involved	Timescale for action
		supply of water from, or in conjunction with, another water company.			
	C13	We will work proactively to achieve catchment sustainability, using a number of different approaches. Options may include, for example, the use of licence trading, reverse auctions and modifying licensed volumes to more closely reflect actual or planned abstractions. We will review and define appropriate tools to meet this objective.	CAMS	Licence holders	Short (5 years)
	C14	In drought situations, where water companies' supplies cause impact on common resources in the region, we will encourage the companies to follow similar patterns of restriction so that risks to the environment and to customers security of supply are shared between companies. In particular we will focus on existing and proposed shared resources and bulk supply arrangements. For example, we will look to ensure that the management measures that evolved between Southern Water and South East Water around the difficulties with Weir Wood reservoir in 2004 to 2006 are used to develop good practice, taking account of customers' interests.		Water companies	Short (5 years)
	C15	We will improve our understanding of design assumptions within water resources planning and drought planning. We will use this understanding to contribute to a national review of methods. Our aim is that the reliability of public water supplies and the scale of impact on the environment are expressed quantitatively, with measures of cost, within Southern Region water companies next plans, expected in 2014/15.		Water companies	Short (5 years)
	C16	We will improve our understanding of Levels of Service and other assumptions set by water companies. This will		Water companies	Short (5 years)

Water resources strategy objective	Ref No.	Regional action	Reference to other plans and strategies	Other organisations that need to be involved	Timescale for action
		include improving understanding of the impacts on the environment. We will use this understanding to contribute to a national review and will work closely with other regulators and water companies to do this.			
	C17	We will promote and support Water Abstraction Groups as appropriate where a specific need dictates, for example in a drought situation or to achieve catchment sustainability.		Licence holders	Medium (5 to 25 years)

4.6 Water and the water environment are valued

Everyone needs to value water and use it more efficiently. This means recognising water as a valuable resource and investing in technology and communications that will improve the way it is managed.

In Southern Region, we will continue to work within national approaches:

- guiding water companies' assessments of 'environmental and social costs' and scrutinising the estimated capital and operating costs of 'options' considered within their water resources planning work;
- undertaking cost-benefit assessments of elements of our National Environment Programme.

We also intend to continue to play a lead role in work to:

- quantify the investment in resource development that can be saved if water efficiency can be achieved;
- assess the economics of issues across water resources and water quality investment planning.

The following table sets out our objectives as well as the actions we plan to take, with others, to make sure that people value water and the water environment. By using water efficiently, changing habits and providing more and better information, people can make more informed choices.

Savings on Tap: Delivering water savings in existing homes

We worked in partnership with Kent County Council, South East Water and Ashford's Future, to offer householders in Ashford, Kent, low cost, robust water saving devices and advice.

Water efficiency improvements were made to 264 households (50 per cent of all households within the project area), with an average cost per household for materials and labour of £64.

We are now monitoring water use to identify water savings and expect to achieve a 5 per cent water saving at the neighbourhood level, with a possible 10 per cent saving at the household level.

Alongside this we have produced a leaflet and tea towel explaining the link between people's water use behaviour and the health of the local water environment. These have been sent to the project area and we will be watching closely to see if this has any additional impact on overall water use.

To take the findings from this project forward we are developing a combined energy and water retro-fit project, in partnership with Ashford's Future, Kent County Council and Ashford Borough Council. This will explore and demonstrate how energy and water retro-fit can be delivered and funded together at a neighbourhood level.

Water resources strategy objective	Ref No.	Regional action	Reference to other plans and strategies	Other organisations that need to be involved	Timescale for action
Water pricing for the abstraction and use of water acts as an incentive for the sustainable use of water resources	D1	We will develop our modelling of the economics of Southern Region water resource management to include more consideration of environmental and social economics. For example we will explore alternative abstraction licence charging regimes. Please refer to the water resources action plan for England and Wales for detail on how we are progressing related work at a national level.		WRSE Group	Short (5 years)
Abstractors and users make informed choices to use water more efficiently	D2	We will better illustrate the value of water to people, the economy and the environment. To do this, we will establish an up-to-date view of target groups and their information requirements so that the information we provide will most effectively promote greater understanding of the value of the water environment. For example, we will produce material tailored towards the needs of planning authorities.			Short (5 years)
	D3	We will link our understanding of public water supply yields with the resource assessment methodology we apply in our Catchment Abstraction Management Strategies work, aiming to establish a more integrated view of the sustainability of our water resources and supplies across water resources planning and abstraction licensing strategy scenarios.	CAMS		Short (5 years)
	D4	We will encourage water companies to provide water use information on their customer bills and information about how their water use affects the environment.		Water companies	
Innovative tariffs are adopted by water companies to maximise savings and minimise issues of	D5	We will encourage Southern Region water companies to expand upon their planned metering tariffs trials to identify tariffs which will provide incentives to use water wisely and safeguards for vulnerable households. We will encourage		Water companies	Short (5 years)

Water resources strategy objective	Ref No.	Regional action	Reference to other plans and strategies	Other organisations that need to be involved	Timescale for action
affordability		discussion of existing trials and lessons learnt through workshops.			
The needs of wildlife, fisheries, navigation and recreation, as well as the environment and abstractors, are fully taken into account when allocating water resources	D6	No new regional actions. Please refer to water resources action plan for England and Wales for further details.			
Innovative technology is developed to improve water efficiency by all water users	D7	No new regional actions. Please refer to water resources action plan for England and Wales for further details.			

5 Implementing the regional actions

5.1 A better regulation approach

We will continue to follow a risk-based approach, so that we can focus our resources on those areas that will have the greatest potential impact or potential benefit.

We will continue to adhere to the seven obligations set out in the Regulators' Compliance Code. Obligations[7] with particular relevance to this regional action plan are:

- the provision of authoritative, accessible advice easily and cheaply;
- recognising that a key element of our activity will be to allow, or even encourage, economic progress and only to intervene when there is a clear case for protection;
- using comprehensive risk assessment to concentrate resources in the areas that need them most.

5.2 The role of others

Many individuals and organisations are involved in, or have an interest in, water resources management. There is no single or simple solution to the pressures that we face, and it is essential that all organisations work together.

We have identified roles for others in the actions tables.

Appendix A
Water resources in Southern Region: Current and future pressures

The region's available water resources and the state of its water environments are determined by the balance between the amount of water received from rainfall, its passage through our rivers and aquifers, the needs of their ecology and habitat and the demands made upon this water by users.

Many people believe that we have more than enough water in England and Wales to meet everyone's needs. However, in Southern Region, when population pressures are considered in addition to the rainfall we normally receive, we actually have less water per person than many hotter and drier countries (figure A1).

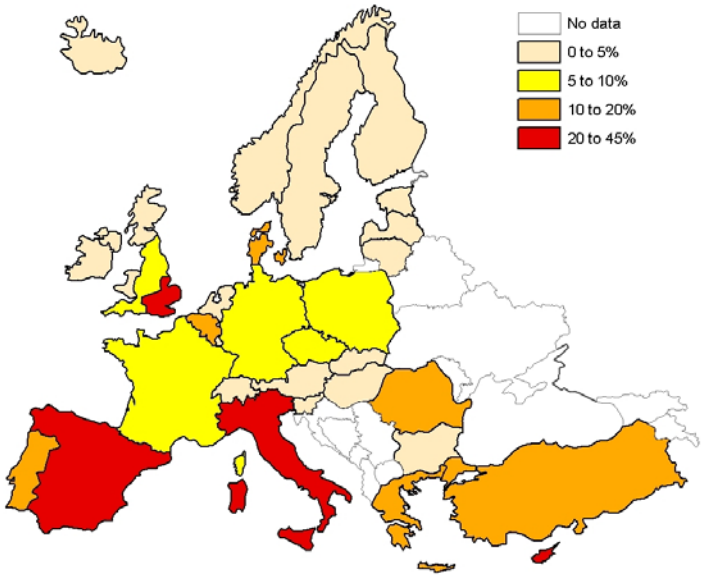

Figure A1. Water exploitation index (actual abstraction as a proportion of effective rainfall). Based on European Environment Agency data, and our own data.

A1.1 Sources of water

A1.1.1 Rainfall

Southern Region is characterised by low rainfall; its average annual rainfall varies across the region from between 800 and 1000 mm in the west and on higher ground, to between 550 and 650 mm in parts of Kent. But much of this water evaporates or is used by plants, so that useful or 'effective' rainfall is far less, especially in summer.

The variability in the rainfall throughout the year can pose additional risk to the 'effective' rainfall. Dry winters can limit groundwater recharge and reservoir storage recovery. Heavy summer storms may produce short periods of high flows which cannot always be captured for use. Year to year

variability of rainfall is an important influence on the reliability of sources of water and on stress to the ecology of our water environments.

A1.1.2 Rivers

The flow characteristics of our rivers depend upon the topography, geology, soil type and land use of their catchment areas. No single river dominates the region – in the north and centre of the region the drainage pattern is made up of a series of rivers flowing from the High Weald, while in the western part of the region the main rivers are more dominated by the Chalk geology.

Those rivers which rise from the Chalk, such as the River Itchen, River Test, River Darent and Great Stour generally have their peak flows in the spring as a result of winter recharge, the flows then recede gradually throughout the summer with only small fluctuations. Rivers rising from the area between the North and South Downs, such as the Medway and Ouse, where there are steeper valleys and the geology is made up of a mixture of sand and clays, have more variable flow regimes.

Nationally, over 50 per cent of water abstracted for public water supply is returned to the freshwater environment but, in Southern Region, a large proportion of effluent discharges are made directly to the sea and the water is therefore lost from our rivers (figure A2). This is largely a consequence of a predominantly coastal population and Directives that have, to date, encouraged discharge of effluent to sea via long sea outfalls.

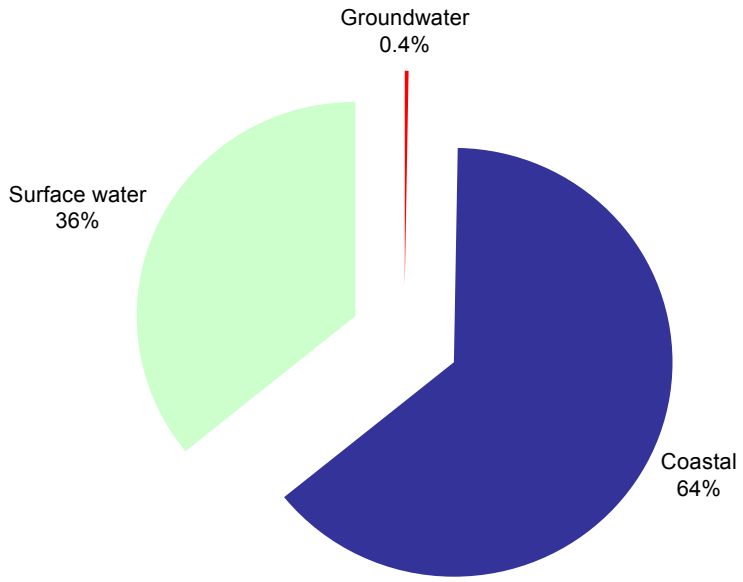

Figure A2. Receiving waters for effluent discharge in Southern Region. Based on data reported to the Environment Agency.

Most Southern Region rivers have less than 20 per cent effluent supporting their low flows[8]. However, in some of our river catchments significant effluent discharges are added to river flows, especially where the population is located away from the coastal fringes, for example in the Great Stour catchment and in the upper Arun, where discharges from a large inland waste water treatment works lead to the catchments being classed as 'Water Available' in the Catchment Abstraction Management Strategies. Return of effluent to aquifers is also important in our groundwater-dominated region, although risks to groundwater quality have to be controlled.

This variability in patterns of rainfall, geology and effluent discharges means that it is difficult to characterise the flow regime of the region in simple terms; it is necessary to evaluate the flow regime for each individual catchment and sub-catchments.

A1.1.3 Groundwater

The prime aquifer in the region is the Chalk of the North and South Downs, although in parts of the region the Lower Greensand aquifer is of equal importance. The Upper Greensand is also significant aquifer, often connected to the Chalk.

Most of the Chalk aquifer is unconfined, which means it is not covered by other geological layers. In some areas the Chalk is highly fissured so it responds fairly rapidly to recharge but it also releases water easily through springs and streams. Consequently, it can provide an excellent annual supply of water during summer months, as long as adequate recharge is received in the previous winter.

The Lower Greensand comprises two important aquifers - the Hythe Beds and Folkestone aquifer, which are primarily made up of layers of sands separated by the relatively impermeable clays of the Sandgate/Bargate Beds. Sandy aquifers have high storage capacity and although they may not respond rapidly to recharge, they can hold water for longer periods and are therefore not so dependent upon the previous winter's rainfall.

There are other minor aquifers within the region which are locally important with respect to water resources. For example, the Dungeness gravel aquifer provides approximately 10 per cent of Veolia Water South East's supply. The Hastings Beds, which make up the majority of the Weald, are extensively faulted; good groundwater sources are only found at isolated locations and it is very difficult to evaluate their sustainability because recharge areas can be very fragmented.

Groundwater is the prime water resource of the region making up over 80 per cent of public water supply. It also contributes baseflow to many rivers, enabling them to continue flowing during dry periods.

A1.1.4 Reservoirs

There are seven surface storage reservoirs in the region which are used for public water supply and their details are summarised in Table A1 below.

Table A1. Surface storage reservoirs in Southern Region.

Reservoir	Capacity (Ml)	Water company	Source of water	Method of fill
Ardingly	5 623	South East Water	River Ouse	Pumped
Arlington	4 000	South East Water	River Cuckmere	Pumped
Bewl Water	31 300	Southern Water / South East Water	River Medway	Pumped
Bough Beech	10 100	Sutton and East Surrey Water	River Eden	Pumped
Darwell	5 650	Southern Water	River Rother (East)	Pumped + transfer from Bewl Water
Powdermill	864	Southern Water	River Brede	Pumped
Weir Wood	8 650	Southern Water	River Medway	Direct catchment only

All these reservoirs, apart from Weir Wood, have facilities to support their refill by pumping water into the reservoir from an abstraction point downstream of the impoundment or from an adjacent river. These pumped inflows support the natural inflows to each reservoir, which are relatively small and unreliable. Generally, water is abstracted directly from the reservoirs into supply although releases are made from Bewl Water and Ardingly to be abstracted much further downstream nearer the demand centres. These releases provide support to river flows between the impoundment and the re-abstraction point during the summer. Dry winters can affect the ability to fill pumped storage reservoirs if the river levels at the off-take point are very low, as was experienced in 2005/06, but generally this is a rare event.

Over the last 20 years, we have been encouraging the farming community to invest in storage reservoirs. This gives them more flexibility to use water for irrigation at any time during the year regardless of the flow conditions of the rivers provided the reservoir has filled before-hand. There are now 164 such reservoirs in the region.

A1.2 Uses of water

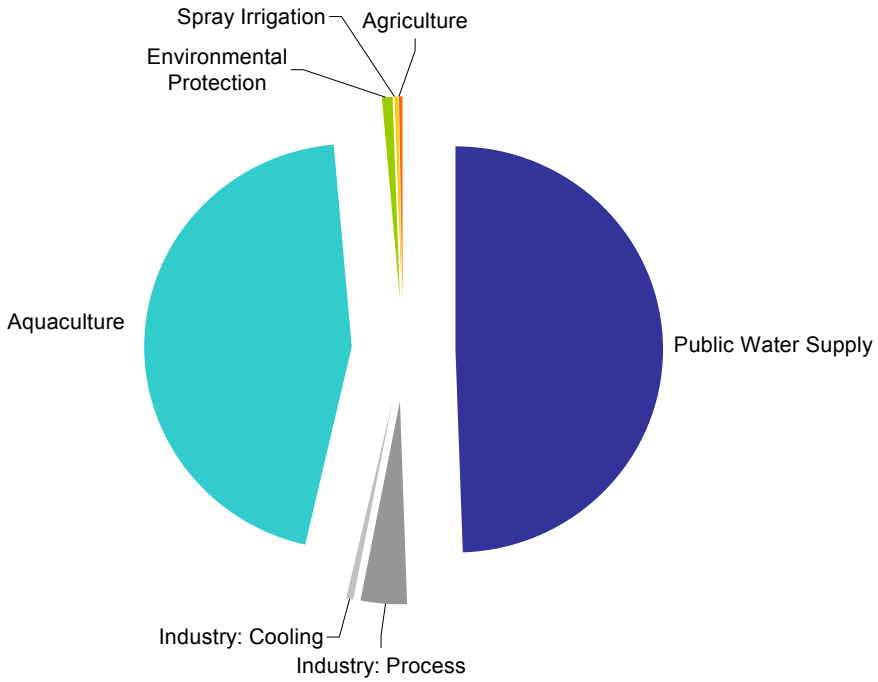

Figure A3. What water is used for in Southern Region. Based on licensed abstracted volumes actually abstracted during 2007, reported to the Environment Agency.

A1.2.1 Environment

Southern Region has 46 European wildlife sites (also referred to as Natura 2000 sites), many of which are wetlands. This includes 13 Special Protection Areas (SPAs) and 33 Special Areas for Conservation (SACs) which are shown in figure A4. There is also one international site in Southern Region, a Ramsar site at Pevensey Levels, as well as around 400 nationally important Sites of Special Scientific Interest (SSSIs). Two new Natura 2000 sites are currently being proposed, in Margate and Longsands and in the Thames Estuary. More than 80 per cent of the Hampshire and Isle of Wight coastline is covered by SPAs or SACs. Freshwater flows are an important aspect of our estuaries and coastline as they increase the variability in the flora and fauna.

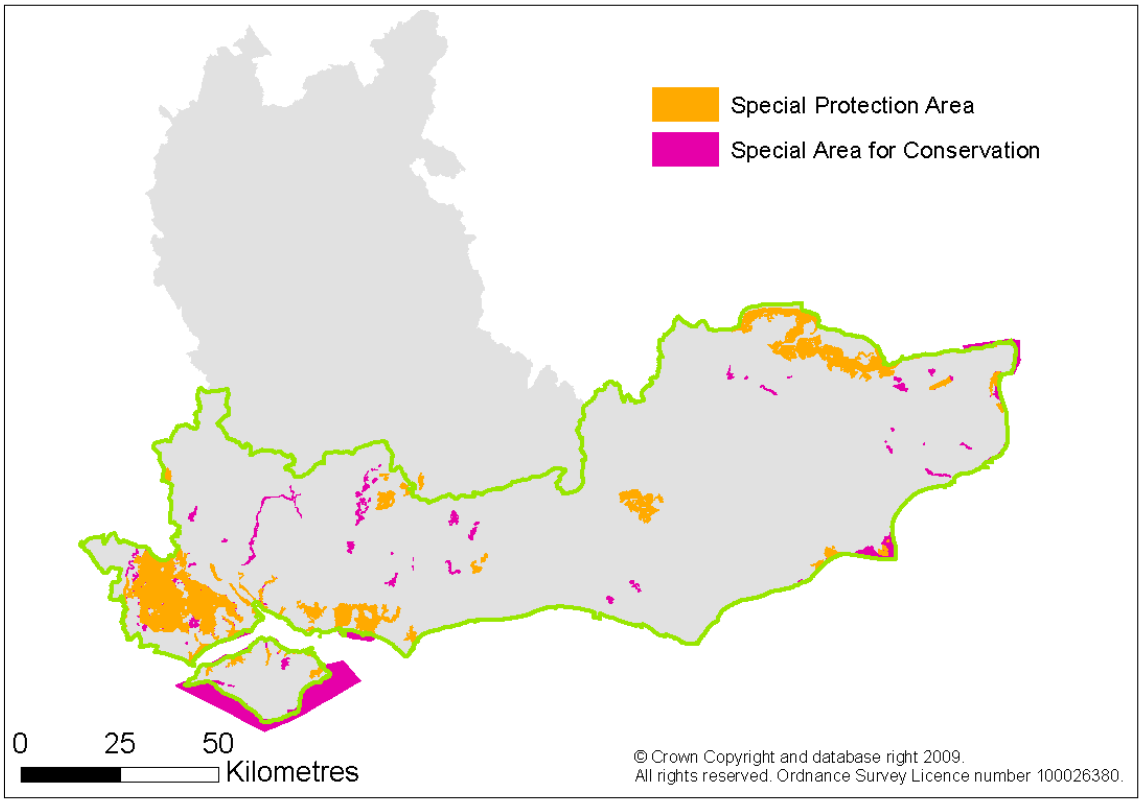

Figure A4. European wildlife sites in Southern Region.

Chalk Streams are also a nationally important habitat and are included within the National Biodiversity Action Plan (BAP); within Southern Region, the Itchen, Test, Meon, Darent, Dour and Great Stour rivers fall into this category. Their importance is due to the prevalence of high quality baseflow which comes from the Chalk aquifer through springs and high groundwater levels. The consistently low temperature of the baseflow allows specific flora and fauna to be sustained in the river and is vitally important for the breeding of migratory salmonid fish such as salmon and sea trout. It is essential that abstraction does not significantly reduce the baseflow of these rivers, otherwise this important habitat may be damaged.

A1.2.2 Public water supply

The population of Southern Region in 2008 was approximately 4.2 million. It has been growing consistently over the last few decades (approximately 15 per cent between 1981 and 2005) and it is expected to continue increasing in the future[9].

The greatest population densities are found along the South Coast coastal fringe between Southampton and Brighton, and in North Kent between Gravesend and the Isle of Thanet. Being so close to London, many of the towns in the centre of the region are dormitory towns for commuters and so increase the population over and above the expected level for the rural environment.

Historically, public water supply in Southern Region has been supplied by small fragmented water companies. In the early 1990s there were eight companies which reported in to Southern Region; now there are four (Southern Water, South East Water, Veolia Water South East and Portsmouth Water), but even these have isolated water supply zones (figure A5). The structure, priorities and regulatory incentives of the water companies in the Region has hindered development of an integrated resource and supply system. This has made it difficult to implement conjunctive use schemes which could optimise the joint use of groundwater and surface water (including effluent)

resources. There are significant costs associated with improving the integration and flexibility of this water supply infrastructure but progress is gradually being made.

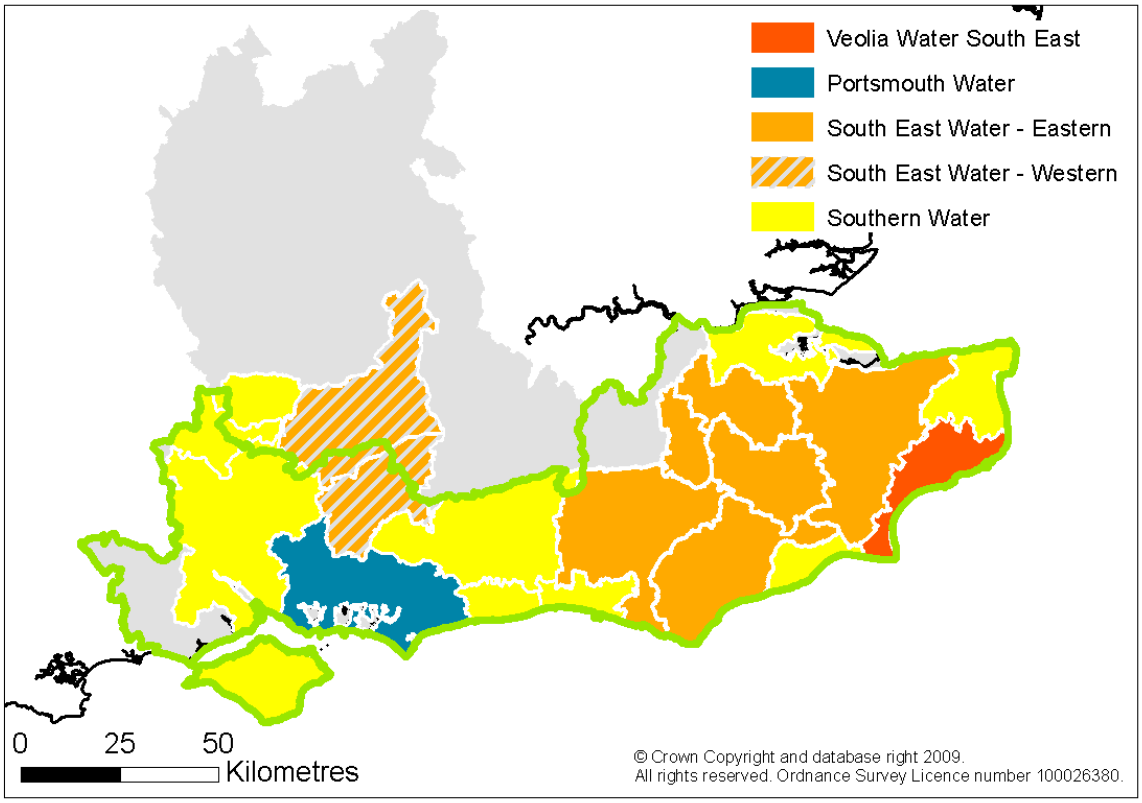

Figure A5. Water companies and public water supply zones in Southern Region.

As figure A6 shows, some water resources planning zones in Southern Region have a more comfortable level of resources available, but there are other water resources planning zones which either already have a deficit in their supply-demand balance, or will experience a deficit in the near future. We encourage water companies to share their resource but this does not always sit comfortably with their company philosophy and their preference to have complete security and responsibility of their own supplies. We have made some progress in greater sharing of resources over the last 10 years and we continue to encourage this through our lead role in the Water Resources in the South East (WRSE) group, where we work with Ofwat, all the companies in Southern and Thames Regions, and other stakeholders for a shared resources strategy for the South East. Where planning scenario deficits already exist schemes are already underway, or are planned, to restore a supply-demand balance.

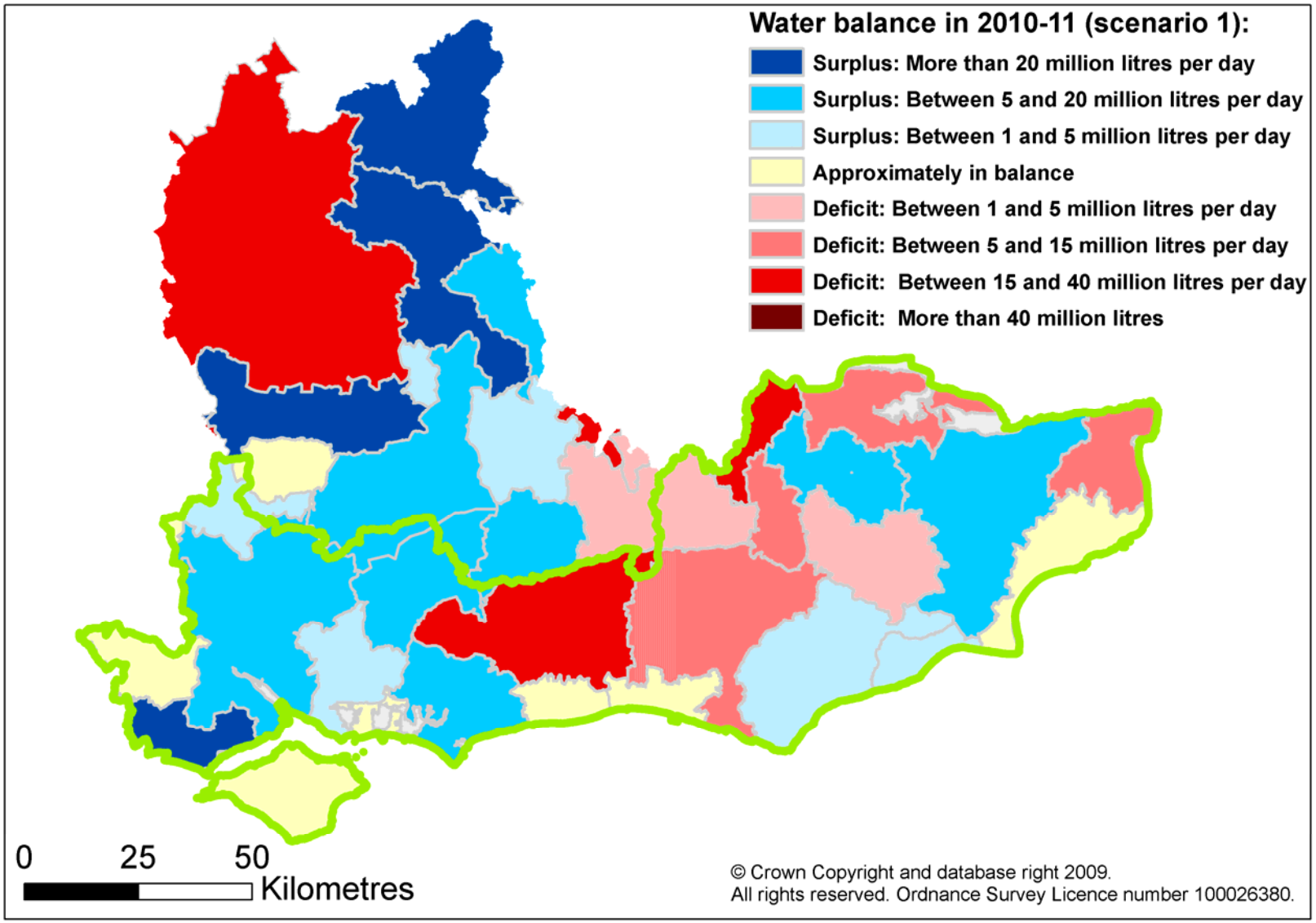

Figure A6. Water companies 'dry year' planning scenario supply-demand balances, 2010-2011.

Based on data from water companies draft water resource management plans (dWRMPs), published in March 2008. This information will be superseded by final WRMP data (not yet available).

A1.2.2.1 Per capita consumption and metering

Figure A7 shows the average water usage per person for 2008/09 for Southern Region water companies, compared with other water companies in England and Wales. The tendency towards higher current water usage in Southern Region, compared with the rest of the country, is possibly linked to the general affluence of the region but is mainly due to the warmer drier summers typically experienced in the South East and a tendency (to date) towards higher external use of water.

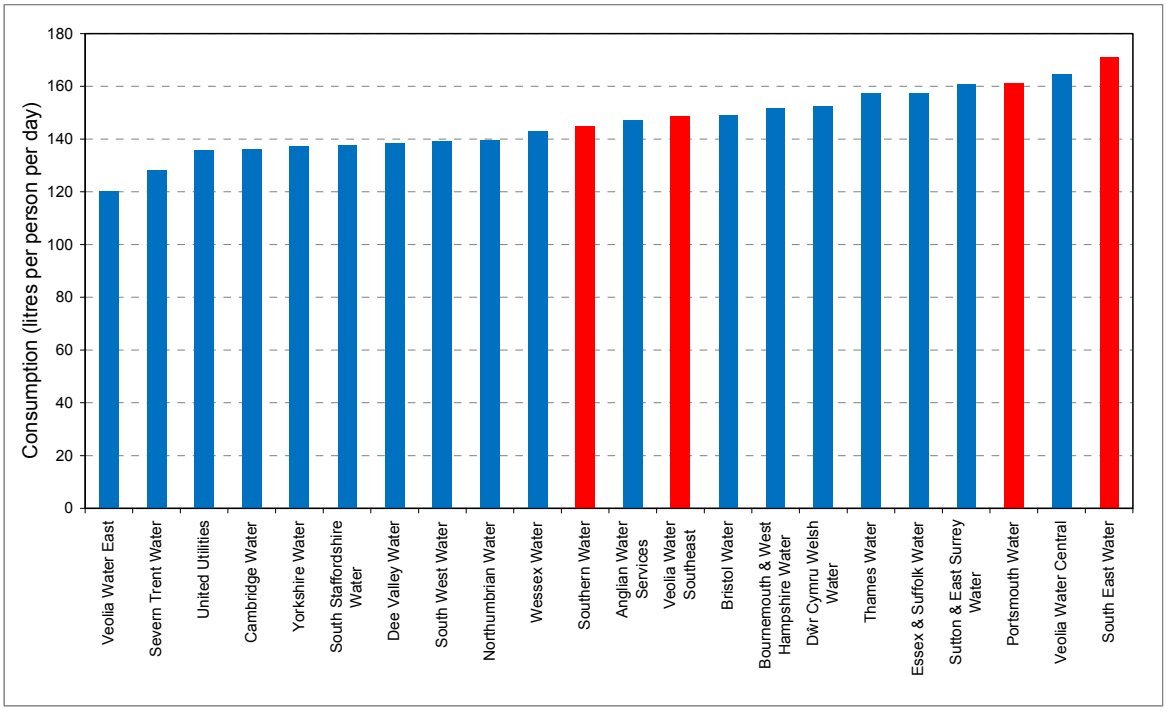

Figure A7. Average per capita consumption in 2008/09. Based on data reported to Ofwat, 2009.

Figure A8 shows the current and planned levels of metering for Southern Region water companies, compared with other water companies in England and Wales. The planned significant increase in the percentage of households that have water meters is expected to make a large contribution to managing (reducing) forecast per capita consumption.

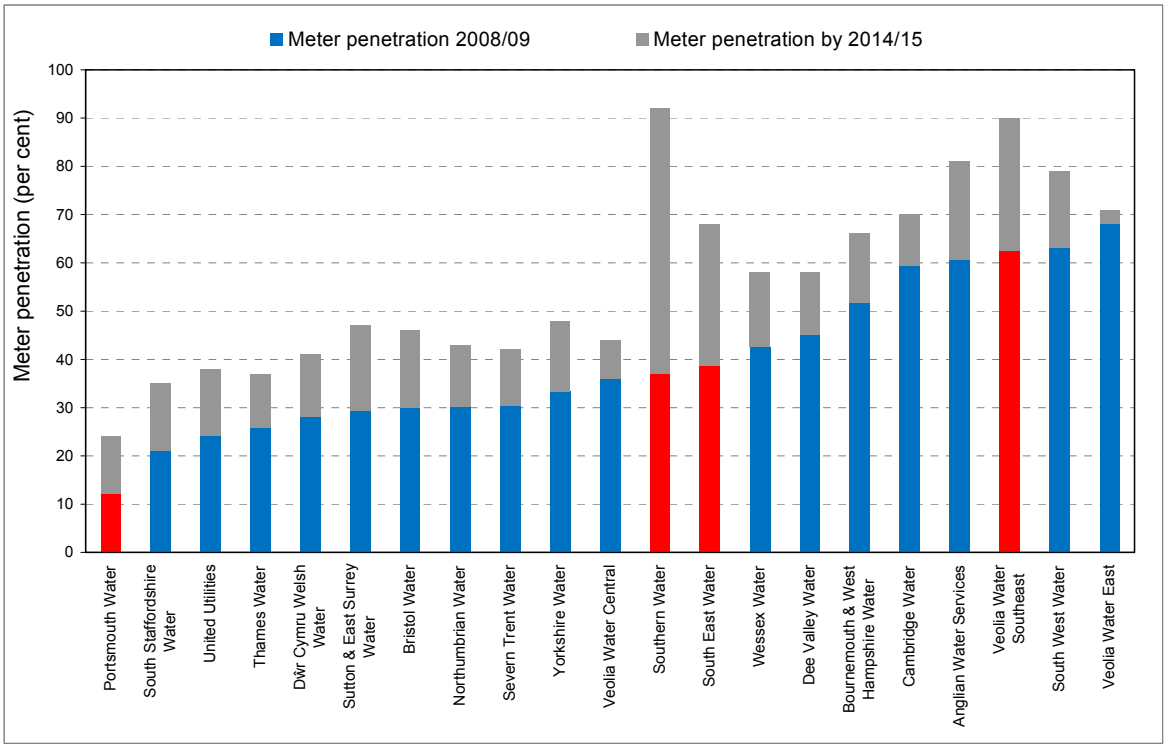

Figure A8. Household metering in Southern Region. Current meter penetration is from data reported to Ofwat, 2009. Planned meter penetration (2014/15) is from assumed levels of metering supported by Ofwat, in the Final Determination of the Price Review 2009.

A1.2.2.2 Leakage

Figure A9 shows current levels of leakage for Southern Region water companies, compared with other water companies in England and Wales.

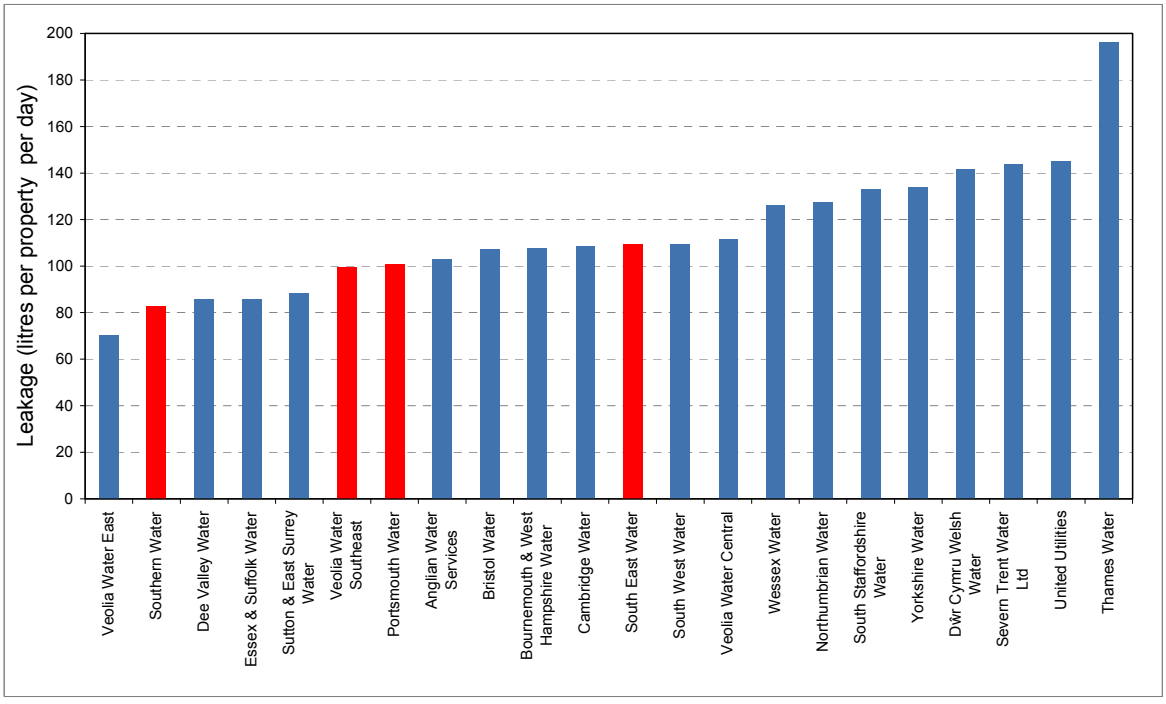

Figure A9. Leakage in Southern Region. Based on data reported to Ofwat, 2009.

A1.2.3 Industry

The heaviest industrial activity in Southern Region is concentrated in North Kent and in South Hampshire. Generally it has declined considerably over the last 25 years. In North Kent there has been significant decline with closure of large paper mills, cement works and pharmaceutical industries. In Hampshire the reduction in Ministry of Defence (Navy) activities has influenced overall demand for water. Even for those industries still in existence, we have found that their water use has declined due to water efficiency and introduction of the Environmental Permitting Regulations 2007. These regulations require industries to review all their activities and seek reductions in their waste streams. This in turn has an impact on their usage of raw materials.

A1.2.4 Agriculture

Despite being one of the driest part of the country, agriculture uses less than one per cent of the water licensed for abstraction within the region. However, there are pockets of intensive horticultural and agricultural activity within the region where there a greater proportion of total licensed volume is used, for example in the Isle of Wight and East Kent. Abstraction for agricultural uses tends to be concentrated over short periods of time, often when resources are most scarce, and usually with little or no return to the environment. In some areas unlicensed abstractions for agricultural uses are also significant.

A1.2.5 Recreation

Southern Region has 13 major river catchments and a coastline of more than 1100 km which all offer opportunities for people to enjoy the outdoor environment and take part in water-related sport and recreation. Many of the reservoirs in Southern Region also offer opportunities for recreation and provide important habitats for wildlife.

There are a number of important fisheries in Southern Region, for example in the Test and Itchen rivers, and the River Medway is important for navigation.

A1.3 Water Availability

A1.3.1 Abstraction of water from the environment

Within Southern Region, there are 1790 abstraction licences. Each licence defines the volumes that may be abstracted within an hour, day and year, the location and source of the abstraction point, and may include restrictive conditions to protect the environment, for example, related to seasonal river flows. The national abstraction charging scheme includes a loss factor (plus seasonal and supported river factors) which is related to the amount of water we would expect to be returned to the environment after abstraction; it varies depending on what the water is being abstracted for. For example, when water is being used to act as through-flow for a fish farm we would expect negligible losses, but if it is used for spray irrigation we expect all the water abstracted to be lost from the catchment.

When licences were first issued following the Water Resources Act 1963, the volumes allowed to be abstracted were a reflection of previous activities. These volumes were often set by the specifications of the infrastructure and did not always consider the true availability of water. We now find that, for many of our licences, the volume actually abstracted is considerably less than the licensed volumes. In 2007, only 57 per cent of the total licensed volume was abstracted (see figure A10). There is more water licensed for abstraction on ‘paper’ than has ever been abstracted and on many licences it is either more than will ever be needed by the abstractor, or it will never be possible to abstract reliably the full licensed volume. These ‘paper’ licenses distort the water balance calculations that we do to assess water availability for new abstractors.

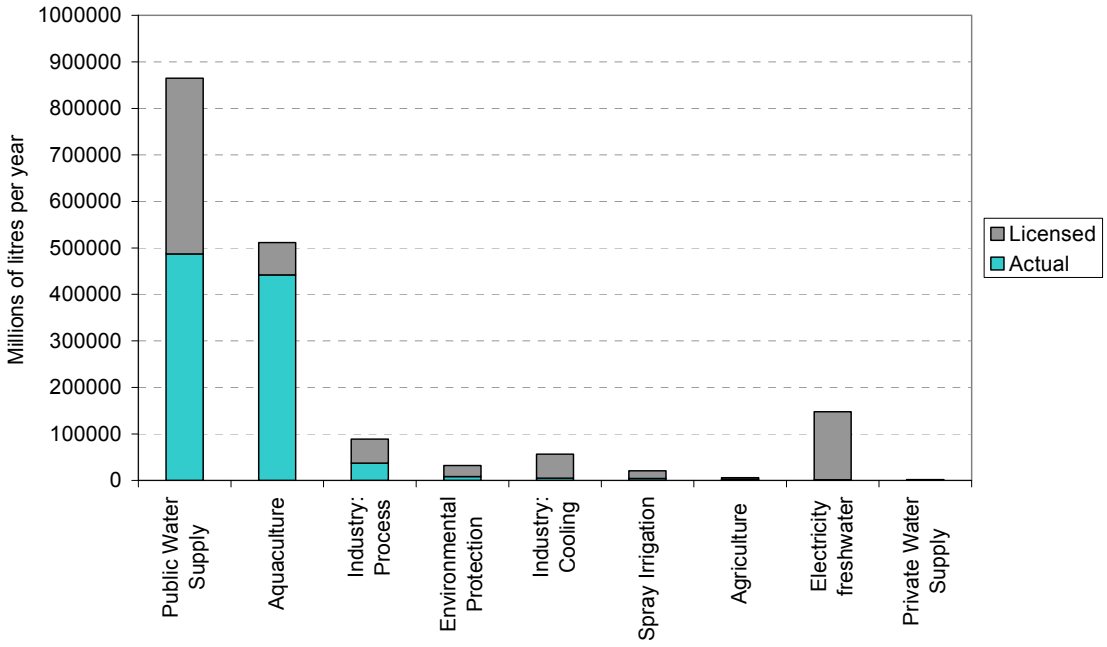

Figure A10. Water actually abstracted in Southern Region in 2007, compared with licensed volumes. Based on licensed abstracted volumes reported to the Environment Agency, 2009.

The Environment Act 1995 confirmed the 'duty to secure the proper use of water resources' and 'the conservation of flora and fauna which are dependent on an aquatic environment'. When we issue new abstraction licences these are now time-limited so that we have the option of changing them in the future if we have evidence that that the abstraction is unsustainable or the abstracted water is no longer required, or is not being used efficiently. However most abstraction licences, including the majority of water company licences, are not time-limited.

In 1993, Southern Region introduced a Groundwater Abstraction Policy which states that there is a presumption against any new abstraction for consumptive purposes from the Chalk and Lower Greensand aquifers.

For some years, abstraction policy for further consumptive use has presumed against summer abstraction. For example, encouraging winter abstraction to storage for subsequent summer agricultural use, instead of summer abstraction. We have also negotiated with licence holders to reduce existing summer abstraction licences.

A1.3.2 Available water resources.

We assess the water resources that are available for abstraction through our Catchment Abstraction Management Strategies (CAMS). CAMS consider how much freshwater is reliably available, how much water the environment needs and the amount of water already reliably licensed for abstraction. For each Water Management Unit we define its water availability status ranging from 'water available', 'no water available', 'over-licensed' to 'over-abstracted'.

CAMS assessments are based on an initial assessment of available data. In many cases, where Water Management Units are over-abstracted or over-licensed, we add them to the Restoring Sustainable Abstraction (RSA) programme to carry out more detailed investigations of the perceived abstraction problem.

Our current CAMS assessments (figure A11) are based upon a (worst case) scenario of the full licence quantities being abstracted. They show that very few Water Management Units currently have water available for abstraction. Apart from the upper reaches of the Rivers Adur and Arun,

Water Management Units with water available are confined to either small streams or water level managed systems such as Romney Marsh.

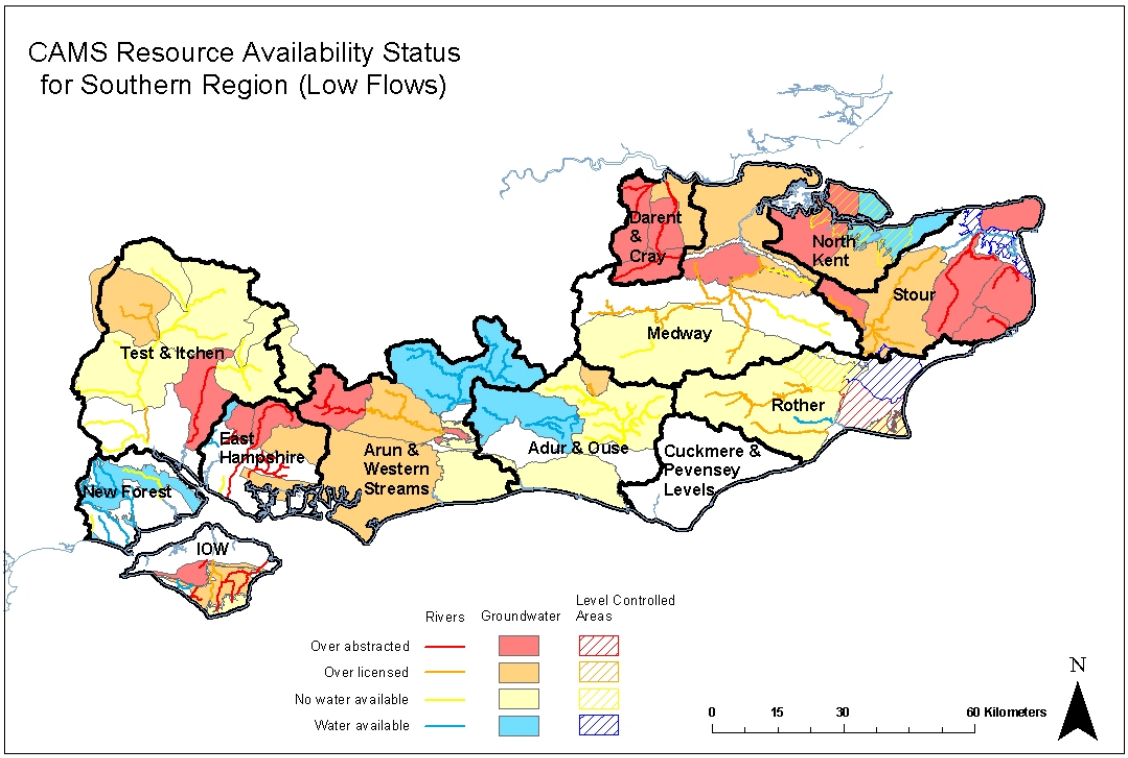

Figure A11. CAMS resource availability status for Southern Region.

Over 50 per cent of our Water Management Units are 'at risk' of being either over-licensed or over-abstracted. Figure A12 shows this is considerably greater than the national average and emphasises the vulnerability of our water resources in Southern Region. Most of these 'at risk' Water Management Units are groundwater units within the Chalk aquifer.

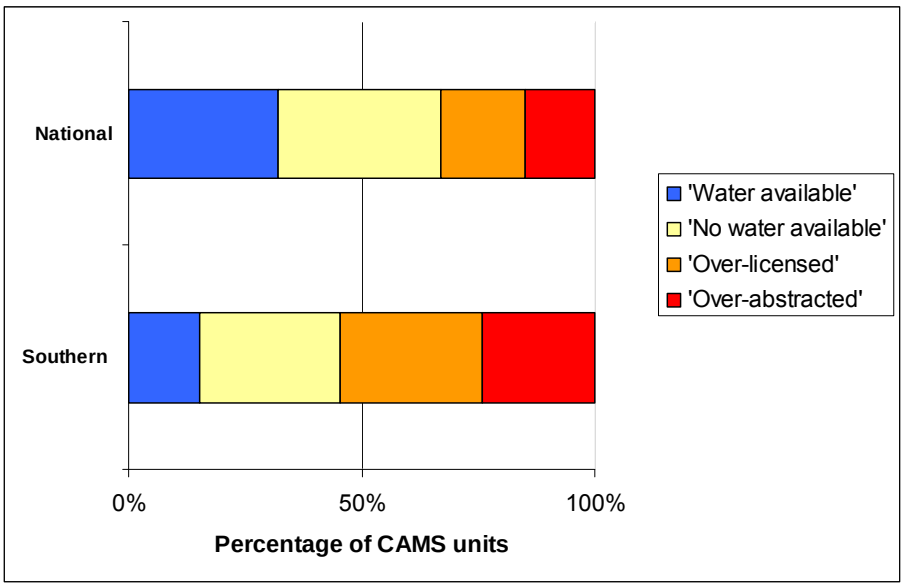

Figure A12. CAMS resource availability status of Water Management Units (CAMS units) in Southern Region, compared with the national average.

A1.3.3 Reliable public water supplies

We also assess the reliability of public water supplies by guiding and reviewing water companies water resources management plans (WRMPs) and drought plans. In their WRMPs, companies assess the 'deployable output' of each of their sources and should also carry out water resource (planning) zone assessments, covering all the sources in each zone. The 'deployable output' is the estimate of the reliable yield of each of the sources that form the basis of the supply-side assessment of the supply-demand balance for water resources planning and drought planning. We have found a greater level of inconsistency in these deployable output estimates than we believe is appropriate. We have some concerns that not all sources are being assessed against sufficiently stressful 'design' events.

A1.4 Future pressures on water resources

A1.4.1 Climate change

It is predicted that climate change will result in more variable rainfall patterns in the future. In Southern Region, climate change is expected to lead to increased temperatures, especially during the summer, and it is likely that, although we may have wetter winters, on average they will be shorter and our summers will be longer and drier[10]. These changes will further reduce the 'effective' rainfall, which will impact on river flows (figure A13). The expected increase in variability could also impact on the crucial recharge season for groundwater, meaning that aquifers may not always be replenished during the winter months with the same degree of reliability that they are now. Drier winters could also have serious consequences for the reliable yields of some existing and future water resources options. For example, preliminary assessments show that reservoir yields decline under climate change scenarios.

Sea levels are currently rising by 1.5 mm per annum and UKCP09 modelling scenarios predict sea levels are likely to rise by 18 centimetres or more by the 2050s. This could reduce the reliability of supplies from some boreholes in coastal aquifers, because of the increased risk of saline intrusion. It will also cause more saline intrusion within estuaries and tidal reaches of rivers, particularly during low flows.

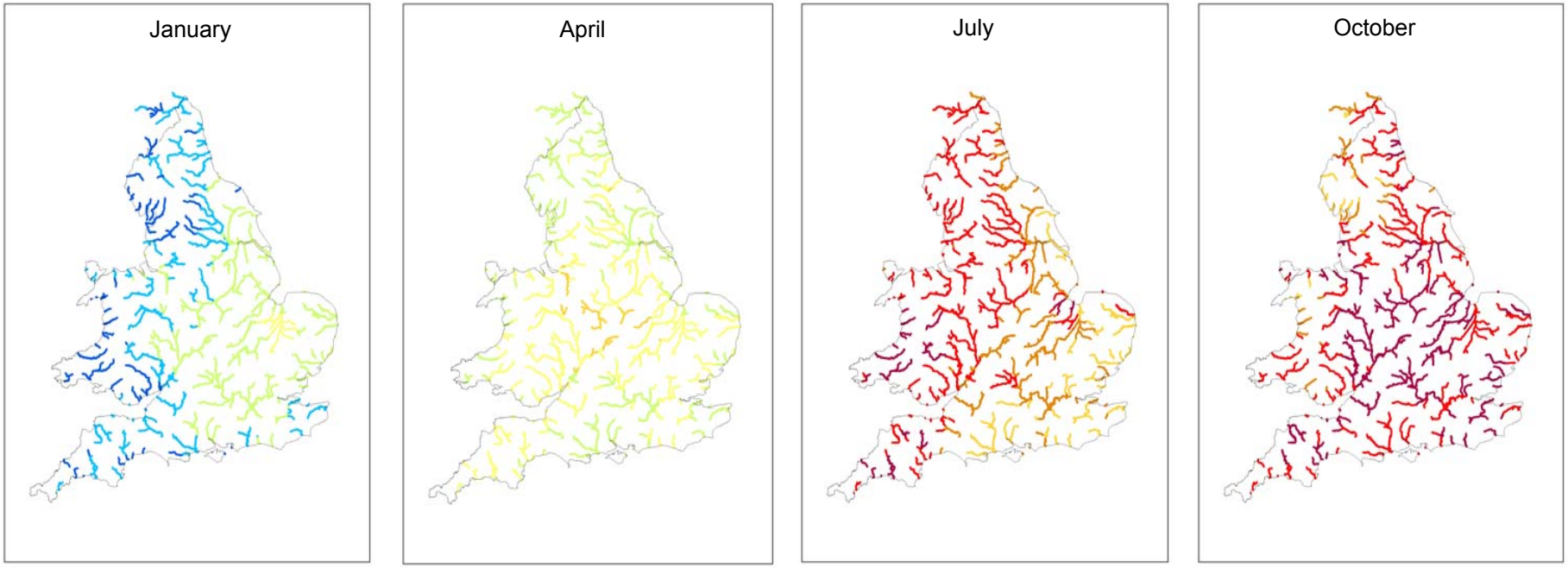

Figure A13. Percentage change in mean naturalised monthly flows by 2050. More information about this work can be found in section 1.3.1 of our water resources strategy for England and Wales.

A1.4.2 Development and growth

The South East Plan is the Regional Spatial Strategy, prepared by the South East England Regional Assembly (SEERA); it includes planned housing growth (figure A14) and expected population growth. The figures for population growth show that, in some parts of the region, we should expect to see rises of over 30 per cent within the period covered by the South East Plan. This growth will not be evenly distributed across the region but will be concentrated in Growth Areas and around regional Hubs. The main Growth Areas in Southern Region are Ashford in East Kent, the Thames Gateway in North Kent, and in South Hampshire around Portsmouth and Southampton. The most recent South East Plan also identifies considerable growth on the Sussex Coast around Shoreham. Parts of the Growth Area of Gatwick also fall within the Southern Region and other regional 'hubs' where we would expect high population increases are Maidstone, Dover and Tonbridge/Tunbridge Wells in Kent.

Although we are currently in a recession and housing growth has slowed in the past year we are continuing to plan on the basis of housing targets being met in the longer term.

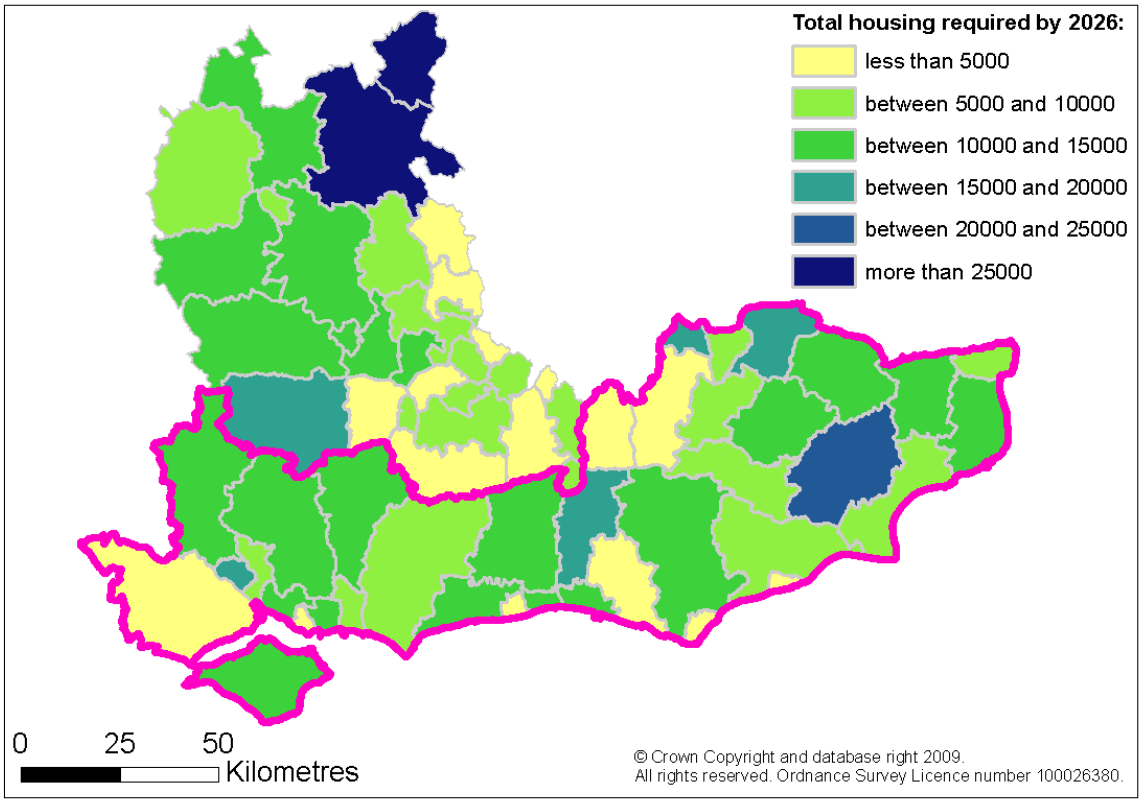

Figure A14. Total housing required for the South East to 2026. (From the South East Plan, 2009)

Influencing future demand through planning

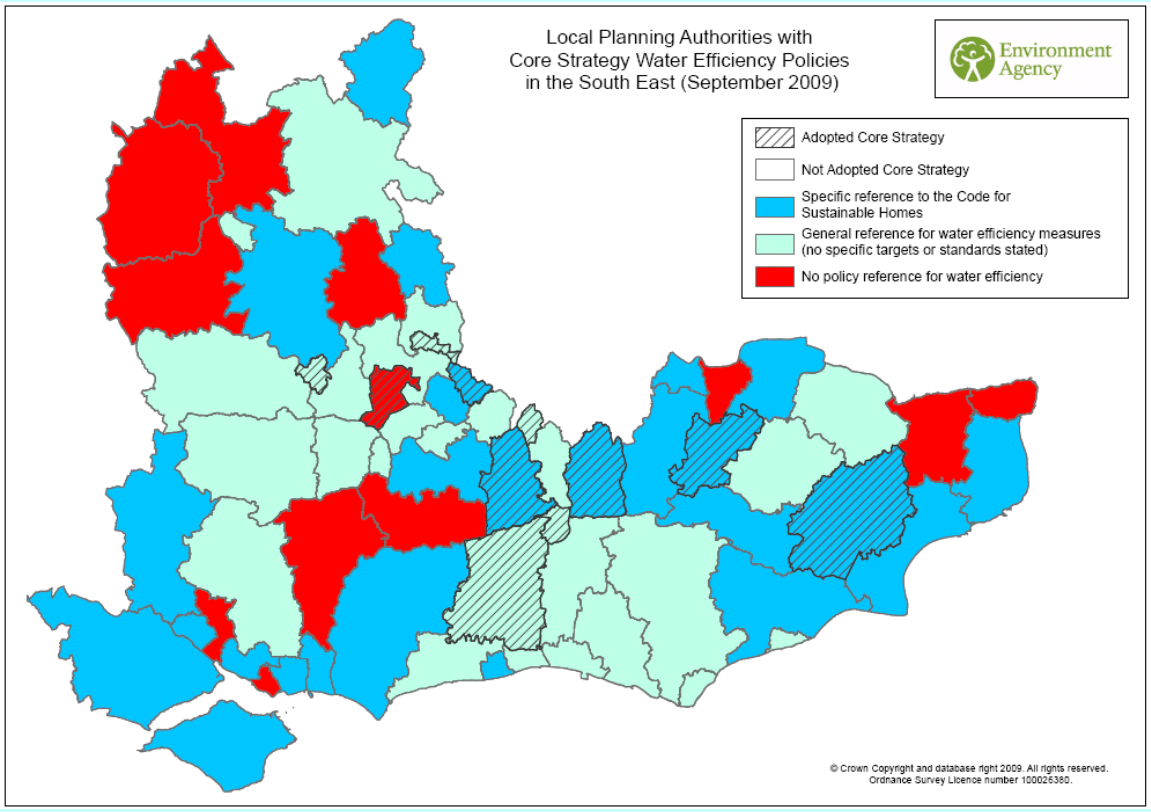

Figure A15. Local planning authorities with core strategy water efficiency policies in the South East. (Based on situation in September 2009).

Our Regional Spatial Strategy (the South East Plan) called for 'high levels of water efficiency' in new homes but without reference to the Code for Sustainable Homes or a specific water consumption level. As of September 2009 26 local planning authorities have referenced the Code for Sustainable Homes (commonly Code Level 3) as a requirement for new build in the core strategies of their Local Development Frameworks (LDFs). Of these, five of those core strategies have been adopted (see figure A15). A similar number of local planning authorities have general references to water efficiency measures but without specific targets or standards.

A1.5 Future demands for water

A1.5.1 Developing national forecasts

In developing demand forecasts for our water resources strategy for England and Wales, we have looked at a range of possible future scenarios. We have considered a range of possibilities around how society may value water and use water differently in future. These scenarios allow us to consider how shifts in economy, in behaviour and in politics may affect water resources in the future.

Our forecasts show that total demand for water is likely to continue to rise steadily over the next 10 years (figure A16). By 2020, demand, if not managed, could be around 5 per cent more than it is today. By 2050, total water demand could be between 15 per cent less than today to 35 per cent more, depending on which scenario our future most closely resembles.

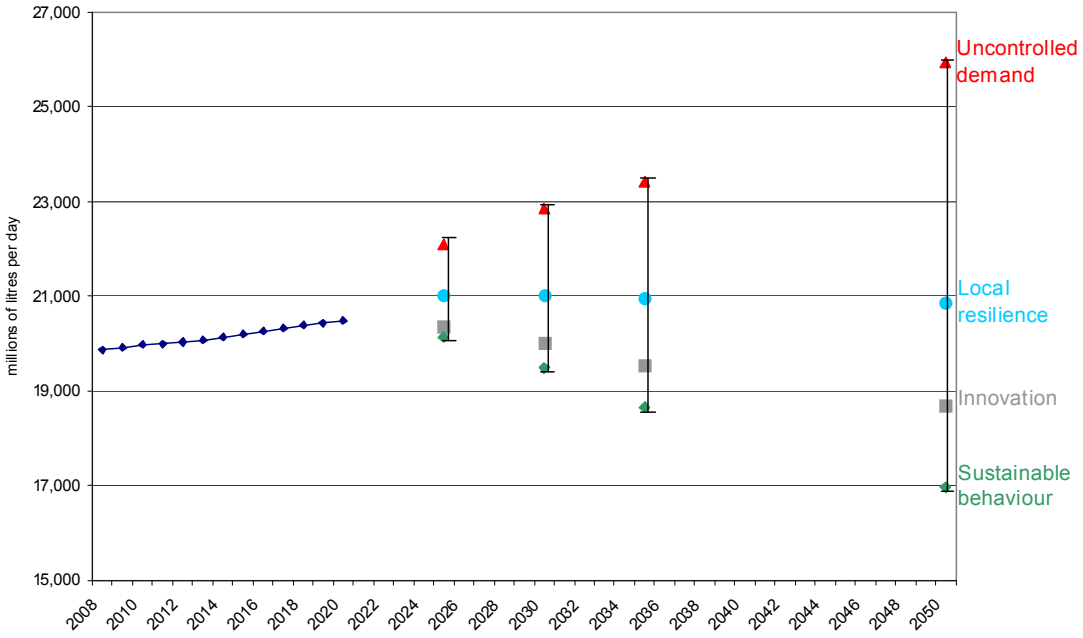

Figure A16. Forecast total water demand. More details of this approach can be found in the water resources strategy for England and Wales (Section 1.5.2 and Appendix 2).

A1.5.2 Southern Region demand forecasts

We have also done some detailed scenario-based forecasting on a regional level, looking at the potential impact of changes in per capita consumption (pcc), housing growth and population growth between now and 2035. Much of our work has been done in association with the preparation of the South East Plan.

Figures A17, A18 and A19 illustrate some of the scenarios we have considered. For example, for the east of Southern Region, figure A17 shows that if average pcc can be reduced to 130 litres per person per day by year 2030, present supply resources will comfortably meet demand throughout the planning period (to 2035), even with a much higher housing (and population) growth than is assumed in the current South East Plan. Figure A18 shows that achieving an average pcc of 130 litres per person per day will ensure that all the water resources (planning) zones of the South East Plan region will have a secure or surplus water resources planning supply-demand balance at year 2030. In contrast, Figure A19 shows how widespread and severe the water resources planning scenario supply-demand deficit will be by 2030 if demand (pcc) grows as forecast by water companies in their (March 2008) draft water resources management plans and no new supply resources are developed.

Defra included the aspiration to achieve annual average pcc of 130 litres per person per day by year 2030 in its 'Future Water' strategy, published in February 2008. Defra states that:

> 'We are confident that with today's technology for metering, tariffs and water efficiency that pcc of water can be reduced, through cost effective measures, to an average 130 litres per person per day by 2030. We hope that developments in new technology and future innovation will improve the cost effectiveness of these measures over time and that this can drive consumption down further to an average of 120 l/p/d by 2030.'

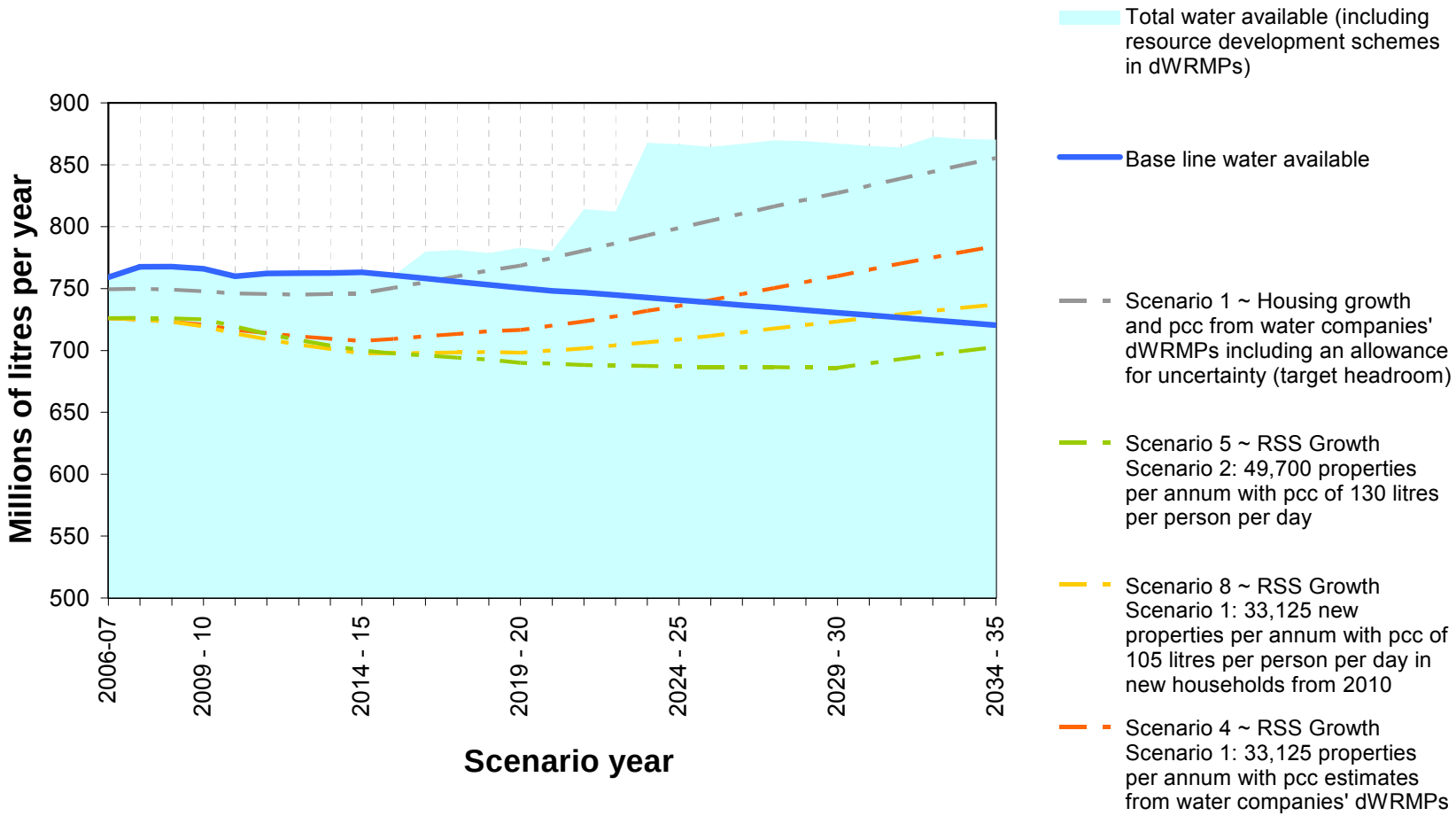

Figure A17. Results of scenario-based forecasting for the east of Southern Region.

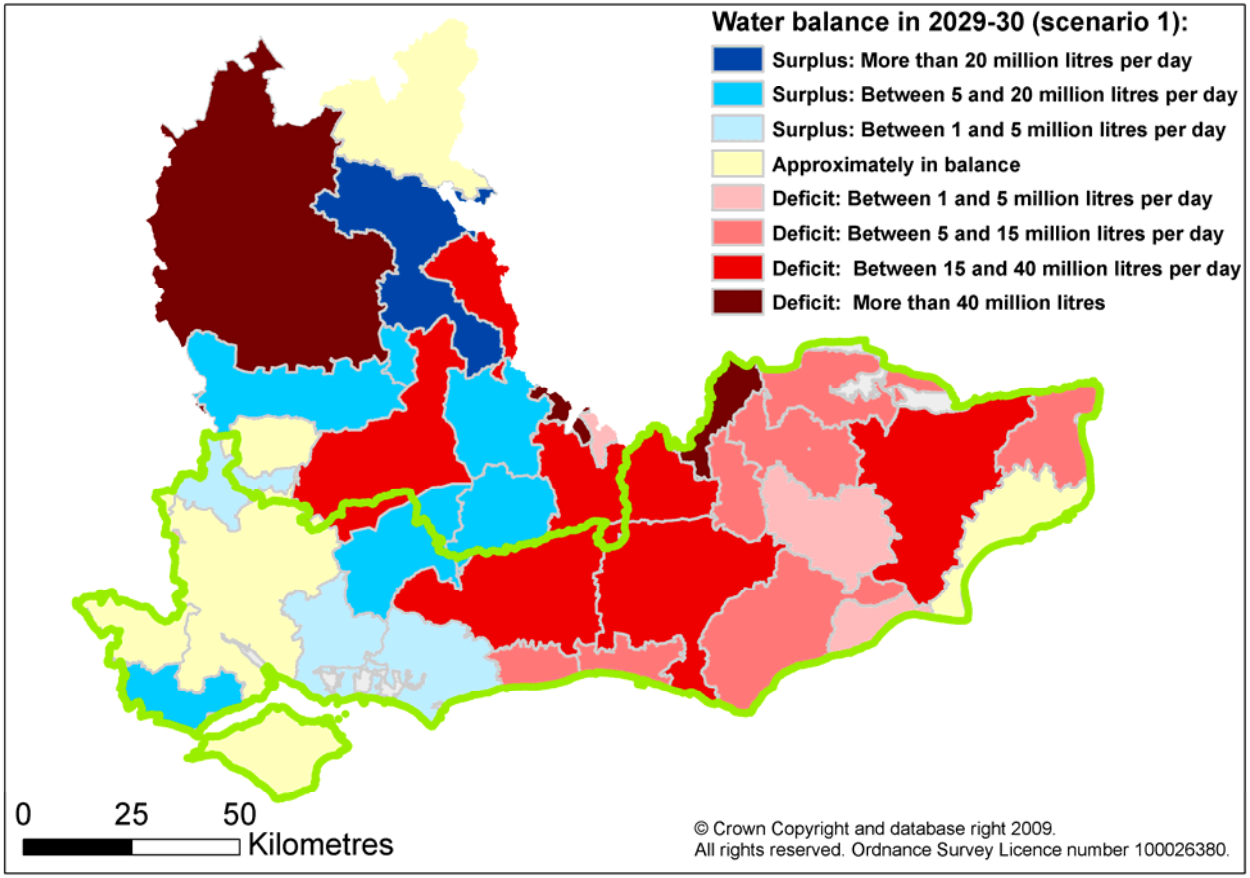

Figure A18. Water resources surplus-deficit forecast, assuming water company (dWRMP) forecast per capita consumption growth, which significantly exceeds the Defra aspiration of 130 litres per person per day (except in the case of Veolia Water South East, formerly Folkestone and Dover Water). The forecasts in this figure and in figure A19 are based on housing growth assumed in water company dWRMPs (March 2008), which is close to the housing growth assumed in the South East Plan. Built into this forecast is an assumption that we have implemented the reductions we need to make to current water company abstraction licences on the River Itchen in Hampshire and that the companies proposed replacement supplies have been implemented.

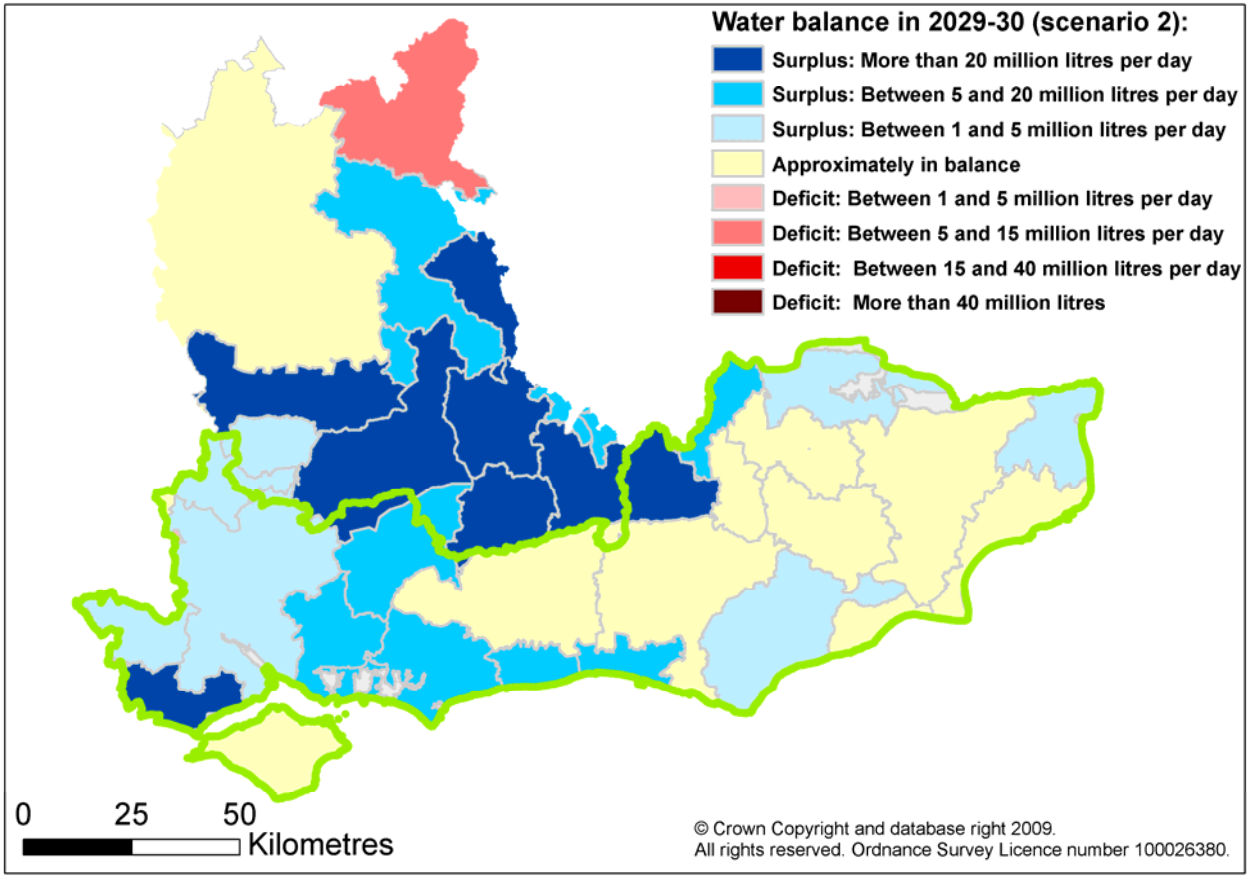

Figure A19. Water resources surplus-deficit forecast, assuming normal year annual average per capita consumption of 130 litres per person per day is achieved at year 2030. The forecasts in this figure and in figure A18 are based on housing growth assumed in water company dWRMPs (March 2008), which is close to the housing growth assumed in the South East Plan. Built into this forecast is an assumption that we have implemented the reductions we need to make to current water company abstraction licences on the River Itchen in Hampshire and that the companies proposed replacement supplies have been implemented and Southern Water has implemented a new abstraction on the Lower Arun which is currently under application (as at December 2009).

A1.6 Resolving historical problems

Whilst more recent abstraction licences include conditions which provide protection for the environment and other abstractors, there are some licences which were granted many decades ago that do not provide the level of protection that is needed today. For those areas which are protected under the European Habitats and Birds Directive, we must pay particular attention to the impact of existing authorised activities. If these are presenting a risk to the site we must take action to remove that risk. We are resolving these 'legacy issues' as part of our work on Restoring Sustainable Abstraction (RSA).

A1.7 Pressure from diffuse pollution

Diffuse pollution is pollution that, within the scale of observation, cannot be attributed to a single point source. In Southern region, over 90 per cent of our groundwater bodies are at risk from diffuse pollution and our surface waters are similarly at risk. Nitrate pollution has a significant impact on public water supplies by either increasing treatment costs or, in some severe situations, making the source unusable.

List of abbreviations

BAP	Biodiversity Action Plan
CAMS	Catchment Abstraction Management Strategies
CC Water	Consumer Council for Water
dWRMP	Draft water resources management plan
GOSE	Government Office for the South East
LDFs	Local Development Frameworks
NEP	National Environment Programme
pcc	Per capita consumption
RAP	Regional Action Plan for water resources
RBMP	River Basin Management Plan
RSA	Restoring Sustainable Abstraction programme
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SEEDA	South East England Development Agency
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
WFD	Water Framework Directive
WRMP	Water company water resources management plans
WRSE	Water Resources in the South East group

References

[1] Figure is based on current Catchment Abstraction Management Strategies classifications.

[2] Figure is based on the number of sites currently included in the Restoring Sustainable Abstraction programme.

[3] There is more information on the future scenarios we have looked at in Section 1.5 of the water resources strategy for England and Wales - *Water for People and the Environment.*

[4] A summary of our work on managing 'Water Resources in the South East of England' can be found at http://www.environment-agency.gov.uk/research/library/publications/40731.aspx

[5] Based on headline findings of the UKCP09 climate projections http://ukclimateprojections.defra.gov.uk/content/view/515/675/

[6] Based on planned population increase in the South East Plan.

[7] The Regulators' Compliance Code is a Statutory Code of Practice issued to Regulators by the Government. A copy of the code can be found here http://www.berr.gov.uk/whatwedo/bre/inspection-enforcement/implementing-principles/regulatory-compliance-code/page44055.html

[8] Based an analysis of hydrological records and data reported to the Environment Agency.

[9] Based on data from the Office for National Statistics, and planned population increase in the South East Plan.

[10] Based on headline findings of the UKCP09 climate projections http://ukclimateprojections.defra.gov.uk/content/view/515/675/

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