

24. Sustainable Dev-2

# Sustaining our Resources

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Update 1997



ENVIRONMENT  
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# I n t r o d u c t i o n

## 1 Updating the strategy

In November 1994, the NRA Southern Region published its Regional Water Resources Strategy document: "Sustaining our Resources - the Way Forward". This document set out the NRA's strategy for sustainable development until the year 2021 and comprised four main elements:

- promotion of demand management
- protection of existing resources
- transfers of supplies from areas of surplus to areas of deficit
- assessing the environmental impact of new resources schemes that might be required over the next 30 years

The strategy concluded that "existing resources need only relatively small scale enhancements in order to satisfy projected demands for the next 27 years, provided existing sources are protected, leakage is reduced and surplus supplies are transferred to areas in deficit. Higher rates of

growth in demand can be accommodated by the development of one, or perhaps two, major new resource schemes and appropriate transfers between areas of surplus and deficit. Demand management and transfers of supplies both play a crucial role in the strategy."

The functions of the NRA were taken over by the Environment Agency on 1 April 1996. This position statement reviews the Agency's resources strategy for the Southern Region, two and a half years after publication of the 1994 strategy document. It identifies the changes which have occurred which influence the strategy, the progress that has been made, and the areas that remain to be addressed to ensure sufficient resources are available in the medium to long term future.

As with "Sustaining our Resources - the Way Forward", this document concentrates on public water supply as the area of greatest demand and potential growth.

## 2 Review of Events from November 1994 to May 1997

### The 1995/96 Drought

#### Impact within Southern Region

The long, hot and dry summer of 1995 led to high peak demands within the Southern Region, mainly as a result of high increases in non essential water uses such as garden watering. The very dry conditions and associated peak demands caused water supply problems throughout the Region which led to the implementation of hosepipe bans in parts of Sussex and Kent in order to conserve supplies.

A continued lack of rainfall during the winter of 1995/96 led to reduced recharge of both groundwater and surface water sources across the Region and as a result a number of drought orders were required to assist with the refilling of reservoirs. The orders permitted the temporary relaxation of minimum flows to allow more water to be abstracted from rivers during the winter months. The Agency took the view that reduced prescribed flows in winter would

have less environmental impact than further reducing summer flows. The environmental implications of these temporary flow reductions are now being assessed by the Agency and water companies as data is collected.

The dry spell continued across the Region throughout the summer of 1996 with hosepipe bans remaining in force in some parts of Sussex and Kent. This was followed by another dry winter (1996/97) which led to the issue of further drought orders to assist with the recharge of surface water storage.

Figures supplied by the Institute of Hydrology have shown that during the last 25 months rainfall across England and Wales has been at its lowest level for 200 years. The period from December 1996 to April 1997 was the driest ever recorded except for the drought years of 1928/29 and 1975/76. Between April 1995 and May 1997 there were only seven months in which rainfall across the Region exceeded the long term average.

### **“Water Resources and Supply: Agenda for Action”**

In September 1995, largely as a result of the drought, the Department of the Environment started a review of water resources and water supply arrangements for the longer term. This has drawn on inputs from the Agency, the Office of Water Services (OFWAT), the Water Services Association and the Water Companies Association.

The review sought to establish the framework for a sustainable water policy. It acknowledged that there would usually be costs in protecting the environment and recommended that costs and benefits had to be balanced for each case considered. The Agency will play a key role in determining this balance.

The review set out policies to be taken into account when considering demand and resource assessment, security of supply, demand management, emergency supplies, and customer compensation in the

event of supply failures. The final report, “Water Resources and Supply: Agenda for Action”, published in October 1996, provides a framework for national and regional water resource strategy development over the next few years. The report sets out a number of actions to be taken by Government, The Environment Agency, OFWAT, The Drinking Water Inspectorate, and the water companies. Actions to be addressed by the Environment Agency include:

- co-ordinate reliable yield estimates and publish results,
- lead the testing of reliable yield results against climate change scenarios,
- revise as necessary the Agency’s national and regional water resources strategies in consultation with water companies,
- assist water companies in the development of company resource development plans.

## **"Water Conservation and Supply"**

Following the drought of 1995/96 all aspects of water conservation and supply have been investigated by the House of Commons Environment Committee. The Committee's first report "Water Conservation & Supply" was published in November 1996. This document includes a number of recommendations applicable to the water companies and the Agency. Matters to be considered by the Agency include:

- development of a suitable methodology for the inclusion of environmental costs in the economic analysis of leakage control.
- development of a methodology for setting mandatory leakage targets together with water companies and OFWAT.
- the alleviation of peak agricultural demands through the promotion of winter storage schemes.
- reducing the need for drought orders wherever possible through consultation with water companies.

- development of an accountable water resource planning process in association with water companies, considering all long term demand options, environmental assessments and financial implications.

### **Concern over Wetlands**

The drought of 1995/96 has again drawn attention to the dangers of over-abstraction and possible effects on wetland Sites of Special Scientific Interest (SSSI). In September 1996, English Nature published a report on the impact of 152 such sites across England, 11 within Southern Region. Among the sites considered at risk were the River Itchen, Swanbourne Lake, and the Dungeness and Preston Marshes in Kent.

A further report "High and Dry", by the Biodiversity Challenge Group, identified rivers and wetlands in England, Scotland and Wales, thought to be at risk from current or future abstractions, including 50 sites within Southern Region.

The Agency welcomes these contributions to the debate over the sustainable use of water

resources and will work with those involved to investigate the scale of the problem, and where over-abstraction is confirmed will pursue solutions where achievable.

The EC Habitats Directive, under which certain SSSI's will be designated as having European significance for birds and rare habitats, requires the Agency to review all abstraction licenses, and other consents, that may have an impact on the designated sites, known collectively as Natura 2000. The first phase of this project is now underway and the Agency expects to begin the actual review of priority sites in 1998.

## Climate Change

For some years there has been concern over the potential effects of climate change on water resources. The issue was addressed in the development of the NRA National Water Resources Strategy, "Water, Nature's Precious Resource", published in March 1994. However due to the uncertainties involved, the likely effects of climate change were not quantified at the time.

Since publication of the National Water Strategy, recent work on climate change, undertaken by the Intergovernmental Panel on Climate Change, suggests that the most probable scenario is that:

- annual precipitation over the UK will increase by about 5% by the 2020's;
- winter rainfall will increase everywhere, but more so in the south;
- summer rain will decrease in the south and increase in the north;

- evaporation losses will increase throughout the year, reducing effective rainfall;
- despite heavier winter rain, groundwater recharge may be reduced by high evaporation and longer periods of soil moisture deficit.

In terms of resource development, this means that winter storage schemes for use in the summer months will be favoured. Demand management will also be of increasing importance to reduce summer peak demands.

Recognition of the increasing likelihood of long term changes in climate patterns will be a factor when demand forecasts for the Region are reviewed.

## Major Water Resource Developments

Two major resource developments have been undertaken by water companies since November 1994, the Yalding Scheme and the Bewl/Darwell Link. Both of these developments were identified in the 1994 NRA strategy document.

- The Yalding Scheme was completed in 1996 and provides an additional 29 Ml/d to Southern Water Services and Mid Kent Water from Bewl Reservoir.
- The Bewl/Darwell Link allows water to be transferred between Bewl and Darwell, increasing Southern Water's ability to meet demand in East Sussex without increasing abstraction from rivers. The pipeline link was completed in 1996.

## Proposed Bid for Mid Kent Holdings plc

In 1995 General Utilities PLC and SAUR Water Services plc announced a proposed bid for Mid Kent Holdings plc on grounds that this would improve the strategic management of water resources in Kent. The proposal was referred to the Monopolies and Mergers Commission in June 1996 but was refused in January 1997 due to concerns that such a merger would reduce comparative competition within the water industry.

### 3 Balance between Available Resources and Demand

#### Update on Present Position

The water company boundaries within Southern Region are illustrated by Figure 1. Although as a whole the Region has a resource surplus, it is not evenly distributed with some areas in surplus and others in deficit. Generally, resources are more plentiful in the west and decline towards the east. In view of the uneven resource distribution there is a need for

co-operation between water companies to allow the transfer of water to those areas where resources are under stress.

In the 1994 strategy document the overall resource surplus for the Region was estimated at 20%. Existing groundwater and surface water yields are currently being reviewed in accordance with the UKWIR methodology and a new estimate for the supply/resource

balance should be available for the Region on completion of this work early in 1998.

It is the Agency's view that there has been little significant change in distribution of resources across the Region since November 1994, but the overall surplus is likely to have declined due to a high increase in demand as discussed on page 8.

Figure 1: Water Companies within Southern Region





**Public Water Supply-  
Demand Trends**

In 1994, the NRA produced demand forecasts for all water companies within the Southern Region. Two scenarios were considered as follows:

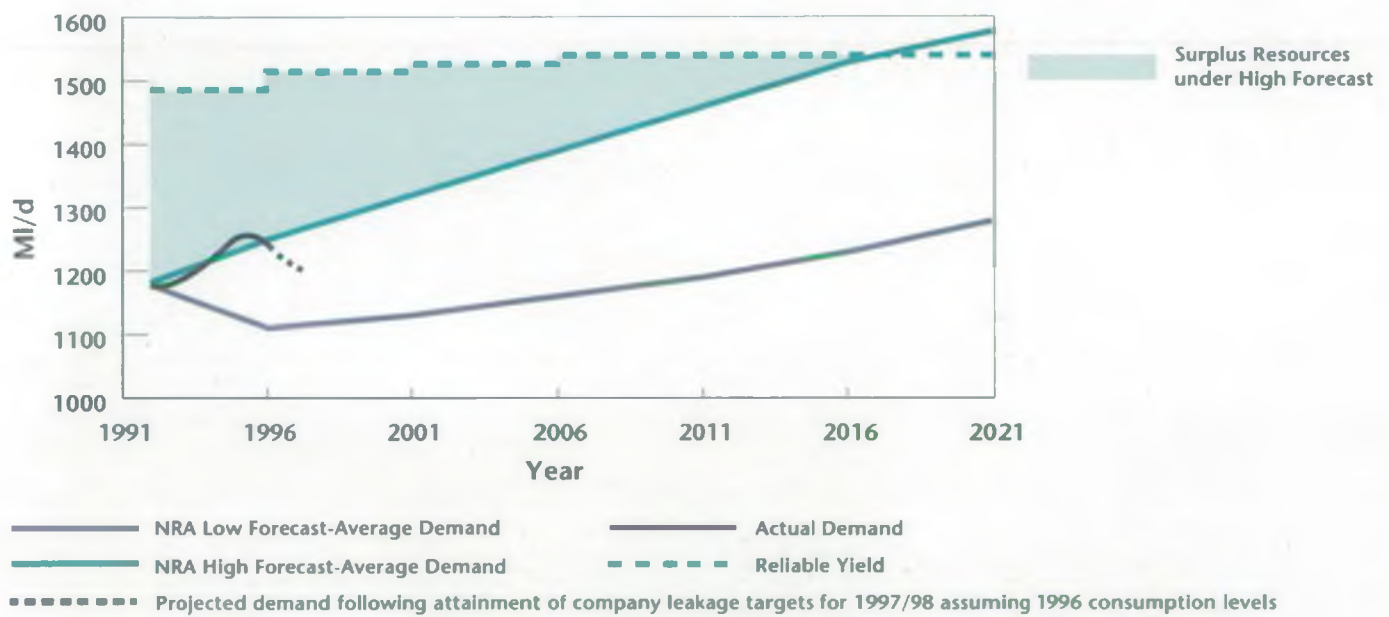
- high growth - assuming no reduction in leakage and high growth in household and non-household consumption,
- low growth - assuming improved leakage control and

suppression of household demand through domestic metering.

Demand for water within the Region over the past three years has grown faster than the predicted low growth scenario, with the highest demand recorded during the drought year of 1995, as shown by Figure 2. Average demand has increased from 1180 Ml/d in 1992 to 1218 Ml/d in 1996, an overall increase of approximately 40 Ml/d, based on annual water into supply figures supplied by the water companies.

However, a saving in distribution input of up to 30 Ml/d across the Region is expected by the spring of 1998 provided that the water companies can achieve their leakage targets, discussed later on page 15. The effect of this leakage reduction on the demand/supply balance is illustrated by Figure 2, where average demand has been projected for 1997 assuming 1996 consumption levels.

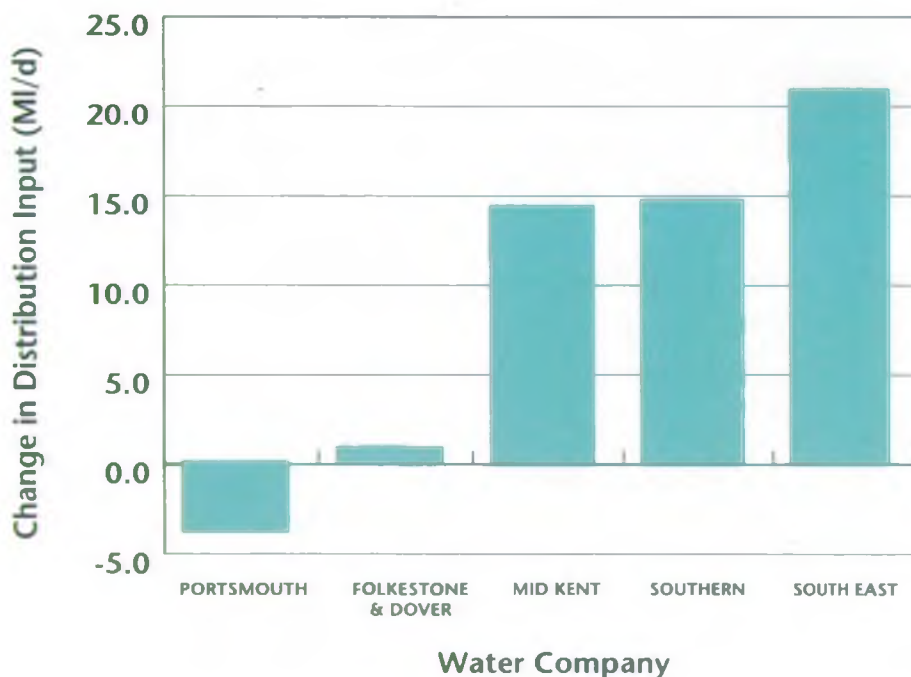
**Figure 2: Comparison of Demand and Resources 1992 - 2021**



The distribution of the demand increase across the Region between 1992/93 and 1995/96 is shown by Figure 3, based on published OFWAT data. Whilst some companies have reported a large increase in demand, Portsmouth Water's distribution input has in fact decreased, due to reduced non household consumption and reduced leakage. Similarly there has been little increase in distribution input within the Folkestone & Dover area.

The major components of public water supply are household consumption, non-household consumption, and leakage including losses from the water company's distribution systems and from customer supply pipes. Changes in these components, from 1992/93 to 1995/96, have been plotted separately, as illustrated by Figure 4, in order to explain the overall demand increase within the Region.

**Figure 3: Southern Region-Changes in Distribution Input from 1992/93 to 1995/96**



Note: Data obtained from the OFWAT reports on the cost of water delivered and sewage collected 1992/93 and 1995/96.

## Domestic Consumption

This is the area of greatest growth with an increase of around 60 MI/d (9%) in the three years from 1992/93 to 1995/96. By contrast the assumptions used in the NRA low scenario would have led to growth over the same period of only 2%. Explanations for the demand increase include:

- The drought year of 1995 and the associated high peak demand.
- 1992/93 was a period of economic recession and as the economy has grown appliance ownership may have increased, increasing household demand.
- The rate of domestic metering across the Region has been less than the NRA low scenario resulting in a smaller suppression of household demand.

## Industrial and Commercial Consumption

As forecast this sector of demand has remained fairly static rising by around 6 MI/d (2%) between 1992/93 and 1995/96.

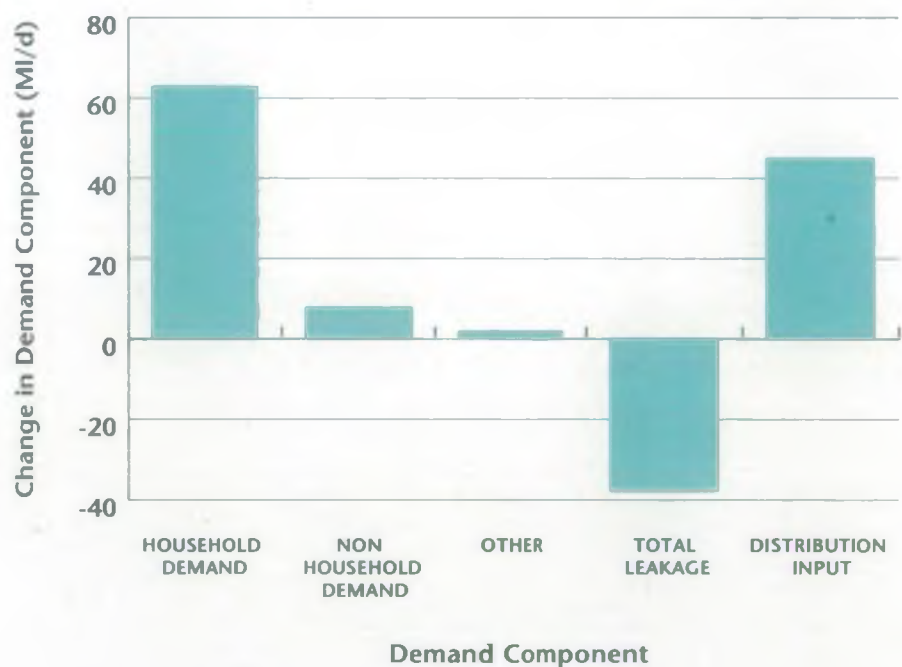
### Leakage

There has been a considerable reduction in total leakage within the Region between 1992/93 and 1995/96 of around 38 MI/d, which is equivalent to approximately 3% of distribution input. Although this saving is encouraging it is the Agency's view that further significant reductions can be achieved. Water company progress regarding leakage control is discussed on page 15.

In addition to average demands, as summarised above, peak demands

also have an important influence on the need and timing of new resource development, especially in areas heavily dependent on groundwater. The record peak demands experienced during the summer of 1995 which led to the implementation of hosepipe bans in some parts of Sussex and Kent reinforce the Agency's view that companies should work together to secure the best use of current resources. The metering of garden sprinklers has now been widely introduced across the Region and will help to suppress peak demands in future years.

**Figure 4: Southern Region-Changes in Demand Components 1992/93 to 1995/96**



Note: Data obtained from the OFWAT reports on the cost of water delivered and sewage collected 1992/93 and 1995/96.

## 4 Implementation of Water Resources Strategy

### Sustainability, the Precautionary Principle and Environmental Protection

As part of its water resources strategy the Agency has followed the three key policies set out nationally in 1994:

- **Sustainable Development:** There should be no long term systematic deterioration in the water environment due to water resource development and water use.
- **Precautionary Principle:** Where significant damage might occur, but knowledge on the subject is incomplete, decisions made and measures implemented should err on the side of caution.
- **Demand Management:** The promotion of policies or measures which serve to control the consumption and waste of water.

### Licensing

In "Sustaining our Resources - the Way Forward", November 1994, it was stated that the "NRA will require the environmental impacts of all new developments affecting the water environment to be rigorously investigated". All applicants need to justify the need for the application and demonstrate that alternative demand management options would not be more appropriate or economic. This policy continues under the Agency.

The general licensing policy in the Region has been progressed as follows:

**groundwater:** general presumption against further abstraction for consumptive purposes from most of the chalk aquifer in the Region.

**surface water:** presumption against summer abstractions for consumptive purposes, unless winter storage is provided.

During 1995 and 1996 five licence applications from water companies were refused on environmental grounds.

**Groundwater Protection Zone Modelling**

Work has continued on defining the groundwater protection zones and vulnerability maps necessary to support the Agency's "Policy and Practice for Protection of Groundwater" within the Region.

Groundwater vulnerability maps have been completed covering all but the extreme western boundary of the

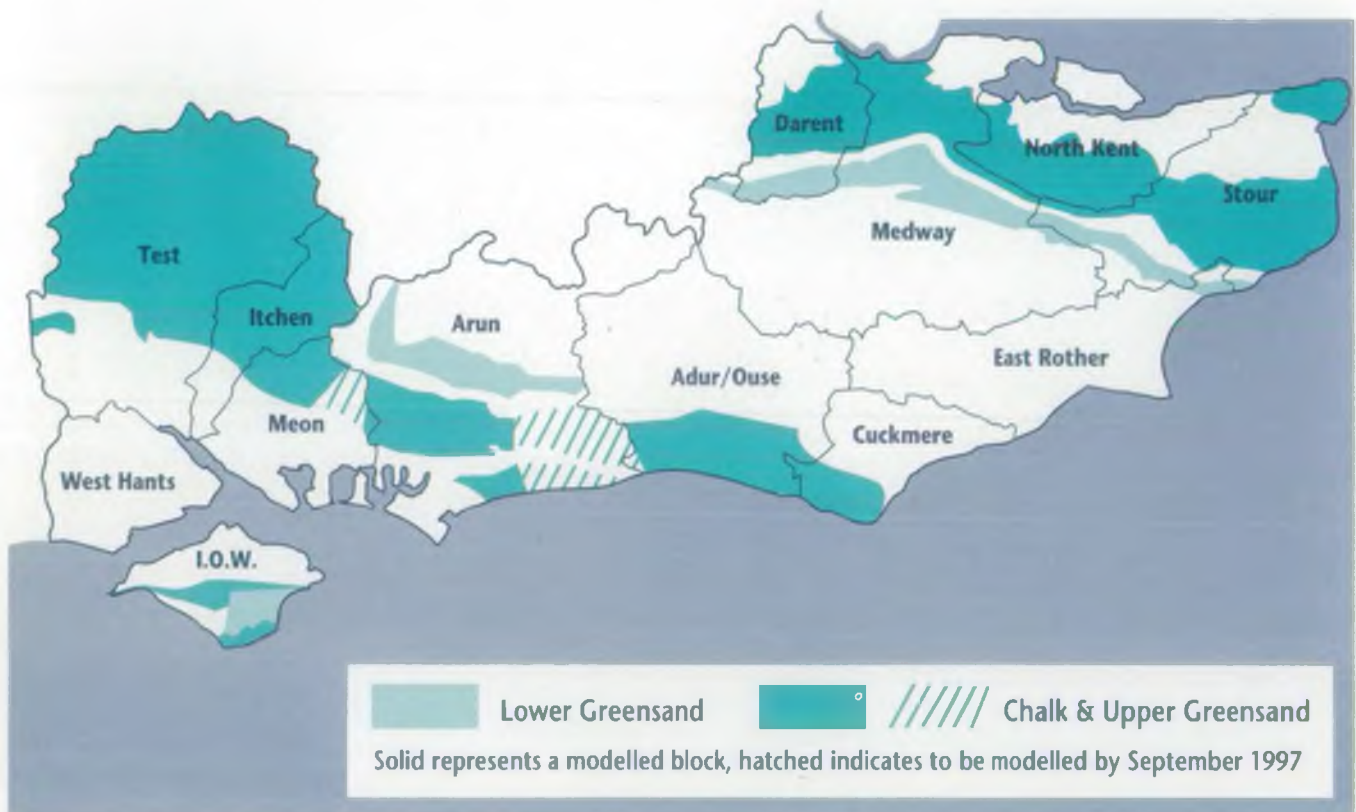
Region in Hampshire. These maps may now be purchased from HMSO.

Protection zones for public water supply sources have been modelled for over 90% of the main aquifers across the Region as shown in Figure 5. These are now being agreed with the relevant water companies. Source protection zones along the route of the proposed Channel Tunnel Rail Link in Kent have also been defined and

agreed in consultation with the water companies involved.

Nitrate Vulnerable Zones have been designated by the Ministry of Agriculture, Fisheries & Food (MAFF) for the Munster, Boxley/Boarley & Thurnam groundwater public supply sources. The Agency is providing input to MAFF for the next review of these zones which is expected to be completed by early 1998.

**Figure 5: Modelled Groundwater Protection Zones**



### Low Flow Alleviation Schemes

Five rivers within the Region were identified in "Sustaining our Resources - the Way Forward" as suffering from over abstraction and reduced river flows. The status of the alleviation work is set out below in Table 1.

Table 1: Low Flow Alleviation Schemes

Scheme	Status
Darent	Alleviation measures being implemented
Hamble	Implementation pending subject to water company negotiations
Little Stour	Agency investigation in progress
Dour	Joint Agency/water company investigation in progress
Swanbourne Lake	New site identified in 1996. Investigation in progress
Wallop Brook	Solution dependent on negotiation with water company

Work on these schemes is ongoing although progress has been slowed in some cases due to lack of water company expenditure. Only the Darent scheme was approved during the last periodic price review in 1995.

- For the Darent scheme, five augmentation boreholes have been drilled and tested, and headworks will be completed in 1997. Six Thames Water licences have been varied downwards by 30%.
- For the Dour scheme a number of investigative boreholes have been drilled. Test pumping has been undertaken by the Agency in 1996 and by Folkestone & Dover Water Services in 1997.
- Swanbourne Lake has also been added to the list for alleviation work. Modelling of the Chichester chalk block identified that abstractions are having a detrimental affect on the lake levels and a long term solution is being sought with the water companies, English Nature, and the lake owners.

## Demand Management

### "Saving Water"

In September 1995, the NRA published a consultation report entitled "Saving Water" concerning the NRA's approach to water conservation and demand management. The report reviewed current UK and overseas water conservation and demand management practice. It also established the potential for saving water in England and Wales and considered ways in which to develop a water conservation and demand management strategy.

The consultation period, following publication of the document, showed that there is general agreement that water conservation and demand management should play a more important role in water resources strategies and that there is clear need for greater co-operation between water companies, regulators, customers and opinion shapers.

Priority areas of work to be carried forward by the Agency's National Water Demand Management Centre include, co-ordination of national water saving initiatives, and continued promotion of water conservation and demand management issues.

### Water Company Duty to Promote the Efficient Use of Water

The Environment Act 1995 has amended Section 93 of the Water Industry Act 1991 to impose a new duty on water undertakers to promote the efficient use of water by its customers.

During 1996 the Agency advised OFWAT on the Water Efficiency Plans prepared by the water companies in the Region. The Plans set out company strategies for the promotion of water conservation amongst customers, and the actions that the companies will take to reduce demand through leakage control and other demand management options.

## Leakage

With the exceptionally dry weather experienced over recent years and the associated impact on water resources, the issue of leakage has received a high level of publicity. If water companies can demonstrate that they are actively seeking to

reduce leakage to economic levels customers are more likely to help in conserving water themselves.

Company leakage targets, taken from the OFWAT report "Leakage of water in England and Wales", published in May 1996, and from the companies' Water Efficiency

Plans, are summarised by Table 2. If achieved these leakage targets will serve to reduce overall leakage within the Region by around 40 Ml/d compared to 1995/96 levels. The Agency expects all companies to continue to set challenging leakage targets.

**Table 2: Total Leakage-Actual Performance and Leakage Targets**

Company	Unit	Total Leakage			
		Actual Performance		Leakage Target	
		1992/93	1995/96	Target	Year
Folkestone and Dover	Ml/d	14	12.7	8	1997/98
	l/prop/d	—	182	120	1997/98
	m <sup>3</sup> /km/d	—	—	—	—
Mid Kent	Ml/d	39	39.7	28	1998/99
	l/prop/d	—	174	120	1998/99
	m <sup>3</sup> /km/d	—	—	6.8	1998/99
Portsmouth	Ml/d	33	30.3	29	1997/98
	l/prop/d	—	109	103	1997/98
	m <sup>3</sup> /km/d	—	—	9.0	1997/98
South East	Ml/d	36	39.5	33	2000/01
	l/prop/d	—	142	118	2000/01
	m <sup>3</sup> /km/d	—	—	4.2	2000/01
Southern Water	Ml/d	159	120	100	1997/98
	l/prop/d	—	125	103	1997/98
	m <sup>3</sup> /km/d	—	—	7.6	1997/98



**Domestic Metering**

Following the results of the National Metering trials, and more recent study results, it is now widely accepted within the industry that domestic metering, with an appropriate tariff structure, can lead to significant reductions in domestic consumption, particularly at times of peak demand. By paying for the actual volume of water used, metered customers are more likely to use water efficiently within the home, and to repair plumbing and supply pipe leaks.

The suppression of domestic consumption as a result of metering is illustrated by Figure 6 which compares 1995 water consumption patterns for metered and unmetered properties within one of the Region's supply zones.

The Agency supports the use of domestic metering in areas where resources are under stress, and the metering of garden sprinklers to control peak demand.

Water company policy on domestic metering varies throughout the Region. Table 3

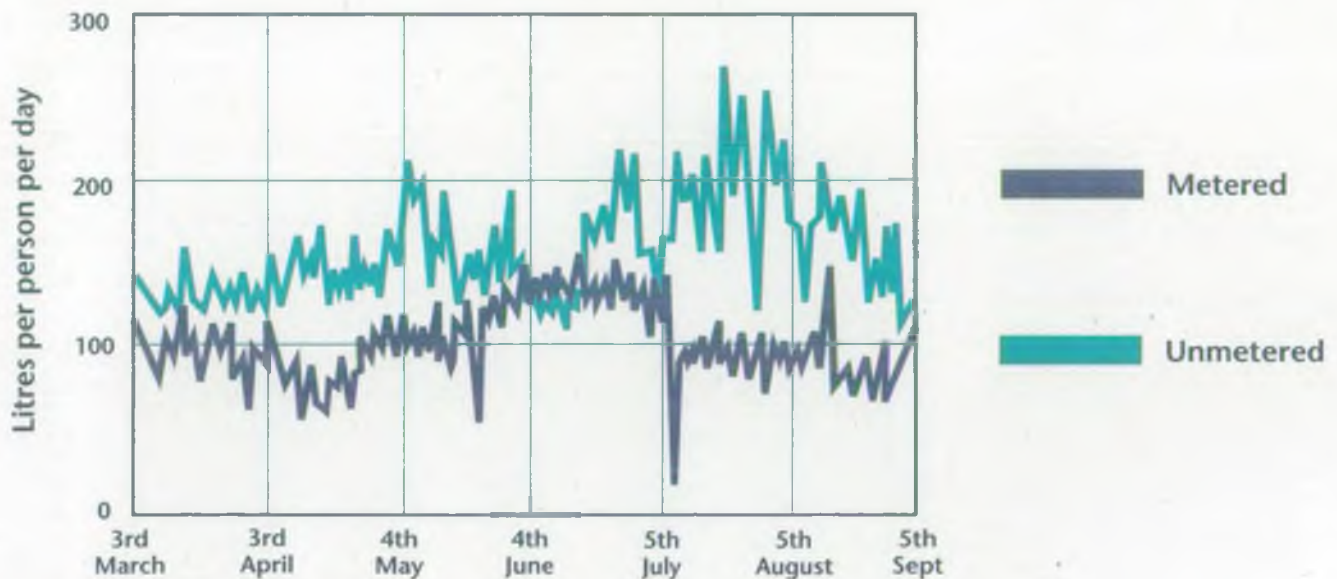
shows the current metering coverage for each company, in terms of the percentage of properties metered. Table 4 on page 19 summarises key elements of demand management policy for each company, based on their Water Efficiency Plans.

**Table 3: Domestic Metering Coverage**

Company	Domestic Metering (% of total properties)	
	1992/93	1995/96
Folkestone & Dover	2.7	11.4
Mid Kent	2.6	6.8
Portsmouth	0.1	0.1
South East Water	3.3	12.0
Southern Water	9.6	11.4

Note: Data obtained from the OFWAT reports on the cost of water delivered and sewage collected 1992/93 and 1995/96.

**Figure 6: Water Consumption Patterns 1995: Metered vs Unmetered Households**



## Resource Transfers

In general the companies within the Region have been reluctant to consider water transfers as an option for sharing the overall surplus of resources to meet resource deficits. The Environment Agency still believes that progress can be made in sharing resources and will continue to press for this option in preference to new resource development and has made this clear in determining licence applications. The transfer of resources from areas of surplus to deficit was also one of the recommendations made by the Monopolies and Mergers Commission concerning the proposed bid for Mid Kent Holdings plc.

There are currently existing bulk supply agreements in operation between Southern Water and South East Water, Southern Water and Mid Kent, and between Mid Kent and Folkestone & Dover.

## Research and Development

Considerable research and development has been undertaken by the Agency nationally, often in conjunction with the water company research organisation UKWIR. Projects undertaken which will improve knowledge of water resources include:

- surface water yield assessment methodology
- groundwater yield assessment methodology
- demand forecasting framework
- economics of demand management

These projects are essential for estimating accurately the water supply/demand balance and the resulting recommendations will be incorporated into Agency strategies.

Table 4: Demand Management-Current Water Company Policies

Company Policy	Folkestone & Dover	Mid Kent	Portsmouth	South East	Southern Water
Free domestic supply pipe leakage detection	✓	✓	✓	✓	✓
Subsidised repair/renewal of domestic supply pipe	✓	X	Trial Area	✓	✓
Free domestic meter option scheme	✓	X	X	✓	X
Subsidised domestic meter option scheme	Not Applicable	✓	✓	Not Applicable	✓
Compulsory metering of sprinkler users	✓	✓	✓	✓	✓
Compulsory metering of new properties	✓	✓	X	✓	✓
Trials of water saving devices	✓	✓	X	✓	✓
Free water saving advice to customers	✓	✓	✓	✓	✓
Research and development into water saving issues	✓	✓	X	✓	✓

## 5 Future Actions

Future actions which are to be taken by the Agency as part of their water resources strategy are as follows:

- address the relevant actions and recommendations set out by “Agenda for Action” and “Water Conservation & Supply”.
- co-ordinate the review of available source yields, taking into account the effects of climate change.
- progress investigations into low flow sites with water companies and develop solutions for implementation.
- complete the regional programme of Groundwater Protection Zone definition and mapping.
- work with water companies to encourage transfers of supplies and investigate resource development options.
- manage drought actions so as to minimise adverse environmental impacts, whilst maintaining essential public water supplies.
- encourage water conservation measures by all water users and provide information to help abstractors use water more efficiently.
- review abstraction licences having an impact on Natura 2000 sites, as required by the EC Habitats Directive.
- work with water companies to assess the environmental impact of strategic resource development options.
- undertake full regional strategy review in line with national programme in 1999.

## Assessment of Resource Options

The Agency is beginning to assess the potential environmental impacts of the major resource options identified in "Sustaining our Resources - the Way Forward". This work will allow future resource schemes to be prioritised in terms of their environmental impact.

Subject to further investigation, including environmental assessment, possible new resources within the Region include:

- Development of Hardham groundwater
- Lower Hamble groundwater
- Raising of Darwell Reservoir
- Raising of Bewl Reservoir
- Potential for further abstraction from the River Itchen
- Construction of Broad Oak Reservoir
- Construction of Havant Thickett Reservoir
- Development of Test groundwater

In future years desalination may also provide an economically viable water resource for some supply areas within the Southern Region, particularly when used to meet peak demands during the summer period. However questions of overall sustainability must be addressed as the desalination process requires a considerable supply of electricity.

The Agency welcomes the recommendation of "Water Conservation & Supply" that water companies, together with the Agency and OFWAT, develop an accountable water resource planning process which considers all options to meet demands for water in the long-term.

The Agency understands the water companies' argument for a "twin track" approach to water resources where demand and leakage are controlled at the same time as developing new resources. However new resources will only be approved when companies can clearly demonstrate that leakage levels have been driven down to economic levels and that other demand management options have been fully exploited where economically viable.

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