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ENVIRONMENT AGENCY

# *Review of Water Company Plans to Safeguard Summer Water Supplies*

Environment Agency Report to the Secretary of State for the Environment, Fourth Report of a Series

**EMBARGOED UNTIL**
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EA: Water Resources - Box 4

## *Acknowledgements*

The Environment Agency wishes to acknowledge the co-operation of the various water companies and organisations associated with the water industry for their assistance with the preparation of this report.

# ENVIRONMENT AGENCY REPORT TO THE SECRETARY OF STATE FOR THE ENVIRONMENT

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# *ENVIRONMENT AGENCY REPORT TO THE SECRETARY OF STATE FOR THE ENVIRONMENT*

## *1. EXECUTIVE SUMMARY*

### 1.1 *Background*

This report has been prepared in response to a request from the Secretary of State for the Environment for an update on the current water resources situation and prospects for the summer of 1996. The report outlines:

- the state of water resources at the start of April which normally marks the end of the winter recharge season;
- the actions which companies have taken over the winter to assist resource recovery and secure supplies to their domestic, industrial and commercial customers;
- the prospects for water supplies in an average summer;
- water company plans for managing supplies in the event of a repeat of a hot dry summer such as that experienced in 1995; and
- contingency measures planned by water companies should the drought extend beyond the autumn.

### 1.2 *Hydrological Situation*

- Rainfall over the winter and the past 12 months has been well below average in most areas. The accumulated deficiencies in the worst affected areas are now equivalent to five months average rainfall. This has left some reservoirs in the North West, North Wales, Yorkshire and parts of the South West in a depleted state for the time of year.
- Limited groundwater recharge has occurred over the winter. Consequently a number of groundwater fed rivers and some aquifers have flows or levels which are below average for the time of year. This is likely to leave those companies reliant on groundwater sources less well provided for than at the same time last year.

- Particular concerns for groundwater are evident in parts of the Southern Water area (Sussex Coast, Thanet and Sussex West). Folkestone & Dover Water are also experiencing problems where levels are described as acutely low. Since there will be no significant recharge of aquifers before next winter the situation in these groundwater areas will depend on whether demands rise to 1995 levels, in which case they are likely to experience problems through the summer.

- Reduced river baseflows this summer are likely to limit the potential availability of water for Drought Orders and Drought Permits. The Agency will be actively seeking to limit detrimental environmental effects which can be caused to rivers and wetlands which are particularly vulnerable to the combined effect of abstraction and drought.

### 1.3 *Drought Permit Powers*

- The Agency has new powers to grant Drought Permits for securing additional water resources upon application by water companies at times of exceptional shortage of rain. These powers are subject to public advertisement and may require hearings where there are objections. Given the present drought situation, the Agency has already been called upon to use these powers for the first time during 1996.

### 1.4 *Company Actions Over the Winter Months*

- The Environment Agency acknowledges the significant measures taken by water companies over the winter period to assist recovery and improve the prospects for summer supplies. These measures have clearly involved significant capital and revenue expenditure and have included:

  - pumping spare river water during the winter to rest reservoirs;
  - distribution and other pipeline improvements;
  - pumping spare river water into reservoirs to assist refill.

- The Agency notes that in a move to control garden watering demands, an increasing number of companies such as Severn Trent and Essex and Suffolk Water have now started to compulsorily meter the use of sprinklers, with the necessary meter installation being carried out free of charge. The Agency is supportive of these measures in the interests of water conservation.

- In most company areas the demand for water over the winter months has increased since the winter of 1994/95. This has been attributed primarily to increased losses from bursts caused by the cold weather despite extra efforts to control leakage. The Agency strongly urges companies to recover the situation and to continue with their plans to reduce leakage to economic levels.

## 1.5 *Supply Prospects with an Average Summer*

- The majority of water companies have stated that given average summer conditions, supplies can be maintained without the need for new demand restrictions or additional resources. However, some companies are planning on the basis of extending existing drought measures or taking additional actions this summer even with average rainfall. These are:

  - Yorkshire Water
  - North West Water
  - South West Water
  - Southern Water
  - South East Water

  The Agency is in agreement with companies that the measures planned are an appropriate response to average summer conditions.

## 1.6 *Supply Prospects with a Hot Dry Summer*

- With a return of hot dry weather this summer, many companies are planning to implement new or additional hosepipe bans or non-essential use bans. A number of other companies propose new or additional Drought Orders or Permits in order to maximise resource availability. These include:

  - Essex & Suffolk Water
  - Yorkshire Water
  - North West Water
  - Severn Trent Water
  - Southern Water
  - South East Water
  - Folkestone & Dover Water
  - South West Water
  - Three Valleys Water
  - East Surrey & Sutton
  - Chester Water
  - Mid Kent Water

  Under these conditions all companies have stated that they plan to maintain essential supplies without recourse to rota cuts, standpipes or tankering operations.

## 1.7 *Environment Agency view of Company Plans*

- Overall, the Environment Agency considers that although resources are more fragile than at this time last year, water company plans are now in place and with improved distribution arrangements should be satisfactory to see essential supplies maintained even through a hot dry summer.

- Should dry weather continue a critical period is likely to occur towards the autumn when contingency plans such as environmentally sensitive Drought Orders for Windermere and Ullswater would be required in North West, the proposed Tees-Wiske transfer would need to be completed by Yorkshire Water and firm measures to support resources in South West's Roadford zone will need to be implemented by the company. These are particular areas of uncertainty and will require continued discussion with the Agency in order to ensure that satisfactory plans are developed.

- The plans put forward by water companies have raised a number of inter-company issues concerning the availability of resources. Should the drought continue into the autumn, plans will need to have been agreed by the Agency for the management of Kielder water for use by both Northumbrian Water and Yorkshire Water Services. In addition the Agency has advised companies to agree bulk transfer agreements with neighbouring companies to make best use of resources in preference to Drought Orders which impact on the environment.

## 1.8 *Other Resource Management Issues*

- The Agency itself is responsible for the management of certain strategic resources which may require action should the drought continue into the summer. In particular Drought Orders may be required to obtain additional supplies from the River Severn and the Ely-Ouse to Essex transfer.

- Spray irrigation for crop production can place exceptional demands on water resources at times of drought and needs to be controlled to give appropriate protection the water environment. This can be achieved through conditions written into licences which limit or prevent abstraction when flow or levels fall below pre-determined thresholds, or where these conditions have not been set, by voluntary restrictions agreed between the Environment Agency and farmers. Compulsory restrictions which may prevent abstraction for irrigation altogether or place partial restrictions on use will only be enforced after careful consideration of the overall situation and the practical options available.

The Agency has now assessed the outlook in its Anglian region (which accounts for the majority of spray irrigation) and some restrictions seem likely, reflecting the below average recharge in many parts of the region during the winter months.

- Many licensed abstractors have conditions on their licences which will limit abstraction when flows or levels fall below predetermined thresholds in order to protect the environment or other interests. These conditions normally take effect each year, but are likely to be more widespread at times of drought. All abstractors should therefore be aware of the potential for shortages in supply if the drought continues.

1.9 ***Environmental Issues***

- The aquatic environment is at greater risk during a drought than under normal conditions. The risk increases where Drought Orders are in place to relax statutory requirements which had originally been imposed to safeguard the environment, for example, restricting abstraction during low river flows. The Agency has required conditions to mitigate the effects of Drought Orders applied for by the water companies, in order to minimise the environmental impact and will continue to do so wherever necessary throughout the summer.

1.10 ***Environment Agency Drought Policies***

- Water companies are responsible for ensuring that they have an adequate water supply system to meet the needs of their customers and that their systems are planned on the basis of acceptable impact on the water environment.

- However, the Environment Agency recognises that competition for water resources during times of exceptional drought requires a balanced approach such that appropriate preference is given in the way in which water is used.

- The Environment Agency recognises that is has particular duties associated with companies water supply duties. In extreme situations where there is a serious threat that supply difficulties are likely to impair the economic or social well-being of people in the area and all reasonable measures have been taken to manage demand, the Environment Agency accepts that Drought Orders and Drought Permits may be necessary which could have significant impact on the environment. In these cases the Environment Agency will seek appropriate measures to monitor and alleviate the environmental effects and if these measures are agreed, will not object to the Drought Order or Drought Permit.

## 1.11 *Conclusions*

- Clearly, in terms of the prospects for summer water supplies, much now depends upon rainfall and weather patterns over the coming months. The Environment Agency is nevertheless reassured that companies have learned from the experiences of 1995 and are planning to implement timely actions. In particular the Agency warns that companies must not delay implementing demand restrictions and other measures if dry weather continues into the spring and early summer.

- Over the coming months the Environment Agency will maintain a high level of activity monitoring and reporting on the status of the drought. The Agency will take action as necessary to protect the environment from the more damaging effects of the drought. This will involve the Agency in actively monitoring the actions being taken by water companies and highlighting where appropriate measures are not in place or where there is a lack of timely action.

# *ENVIRONMENT AGENCY REPORT TO THE SECRETARY OF STATE FOR THE ENVIRONMENT*

## *INTRODUCTION AND BACKGROUND*

This report has been prepared in response to a request from the Secretary of State for the Environment for an assessment of the water resources position in England and Wales as at early April 1996. This request follows the dry summer of 1995 and the drier than average winter which has occurred in most areas. The report is in two sections; Section A deals with the current water resources position and the prospects given an average summer. Section B considers the water resources prospects given a severe drought in 1996.

Specifically, Section A of the report:

- gives a brief overview of the water resources outlook as at the end of the normal recharge season (beginning of April) and the implications this situation may have for water supplies throughout the summer;
- summarises the actions which companies have taken this winter in order to maximise resources;
- reviews the actions which companies are planning in order to maintain supplies in the event of an average summer.

Section B of the report:

- notes how each company views the current situation given the actions they have taken and detail company plans for maintaining supplies in the event of a dry summer;
- assesses the appropriateness of the company plans where necessary;
- notes any additional company plans to deal with a drought which extends through the summer and into next winter;
- summarises the Environment Agency plans for summer drought management;
- briefly reviews some longer term water resources issues.

This drought report represents the fourth in a series of assessments which have been called for by the Secretary of State for the Environment. The report also marks the first to be presented by the newly established Environment Agency. The Agency was effective as of 1 April 1996 and combines the functions of the former National Rivers Authority, Her Majesty's Inspectorate of Pollution, the Waste Regulation Authorities and certain functions of the Department of Environment.

In the context of drought management, the Agency has new powers under the Water Resources Act 1991 (as amended by the Environment Act 1995) to issue Drought Permits under certain circumstances, on application by water undertakers. The Drought Permit powers parallel those for Drought Orders to the extent that it is now possible for the Agency as well as the Secretary of State to authorise new arrangements for abstraction as described below. The Secretary of State has however retained powers to authorise restrictions to water supply.

The new Drought Permit powers can be used to authorise additional abstraction, abstraction from unlicensed sources, compensation flow reduction and prescribed flow reductions. Permits can only be issued where the Agency is satisfied that, by reason of an exceptional shortage of rain, a serious deficiency of supplies of water in any area exists or is threatened. As of 1 April 1996, given the circumstances described above, water companies may now apply to the Agency for a Drought Permit, rather than to the Secretary of State for a Drought Order. Given the current water resources situation, the Environment Agency will be called upon to use these powers for the first time this coming summer.

# *SECTION A*

## *Current Resources & Prospects Given an Average Summer*

# 1. WATER RESOURCES POSITION AS AT THE END OF THE RECHARGE SEASON

## 1.1 Rainfall

Rainfall over the winter period (October to March) has generally been poor with only two months, December and February, in which above average quantities were recorded. Figure 1.1 shows total rainfall for England and Wales from the winter of 1994 to the present, and clearly demonstrates the current drought sequence. Figure 1.2 shows the accumulated deficits which this rainfall sequence has caused both over the winter and since April of last year. Details of these deficits are summarised in Table 1.1 below.

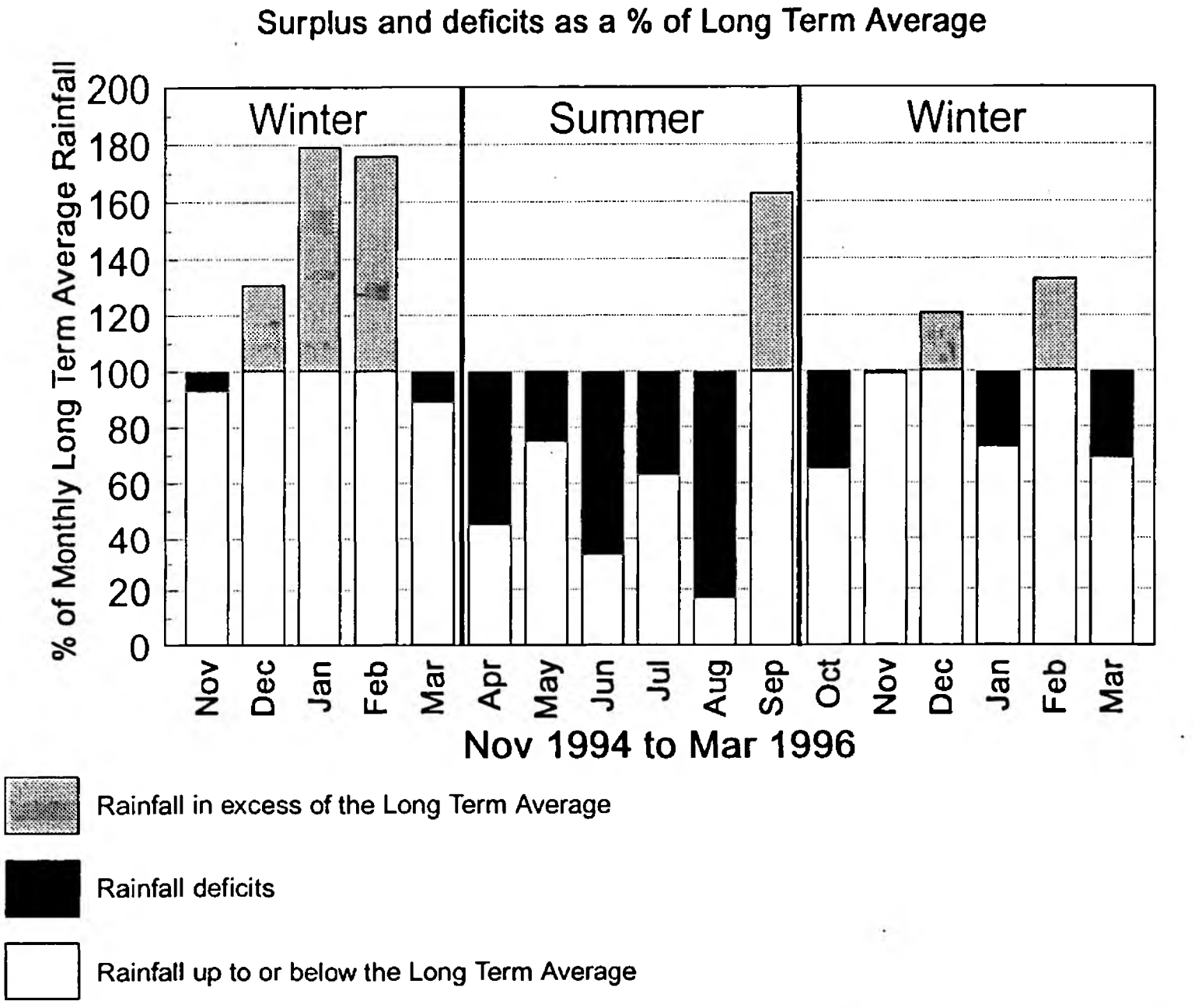
***Table 1.1 Accumulated Rainfall Deficits***

| Water Service Company Region | Actual Rainfall Deficit October 1995 - March 1996 (mm) | Actual Rainfall Deficit April 1995 - March 1996 (mm) |
|---|---|---|
| Anglian | 29 | 128 |
| North West | 237 | 477 |
| Northumbrian | 56 | 191 |
| Severn Trent | 58 | 213 |
| Southern | 52 | 157 |
| South West | 0 (26 surplus) | 107 |
| Thames | 15 | 126 |
| Welsh | 158 | 352 |
| Wessex | 5 | 90 |
| Yorkshire | 97 | 241 |

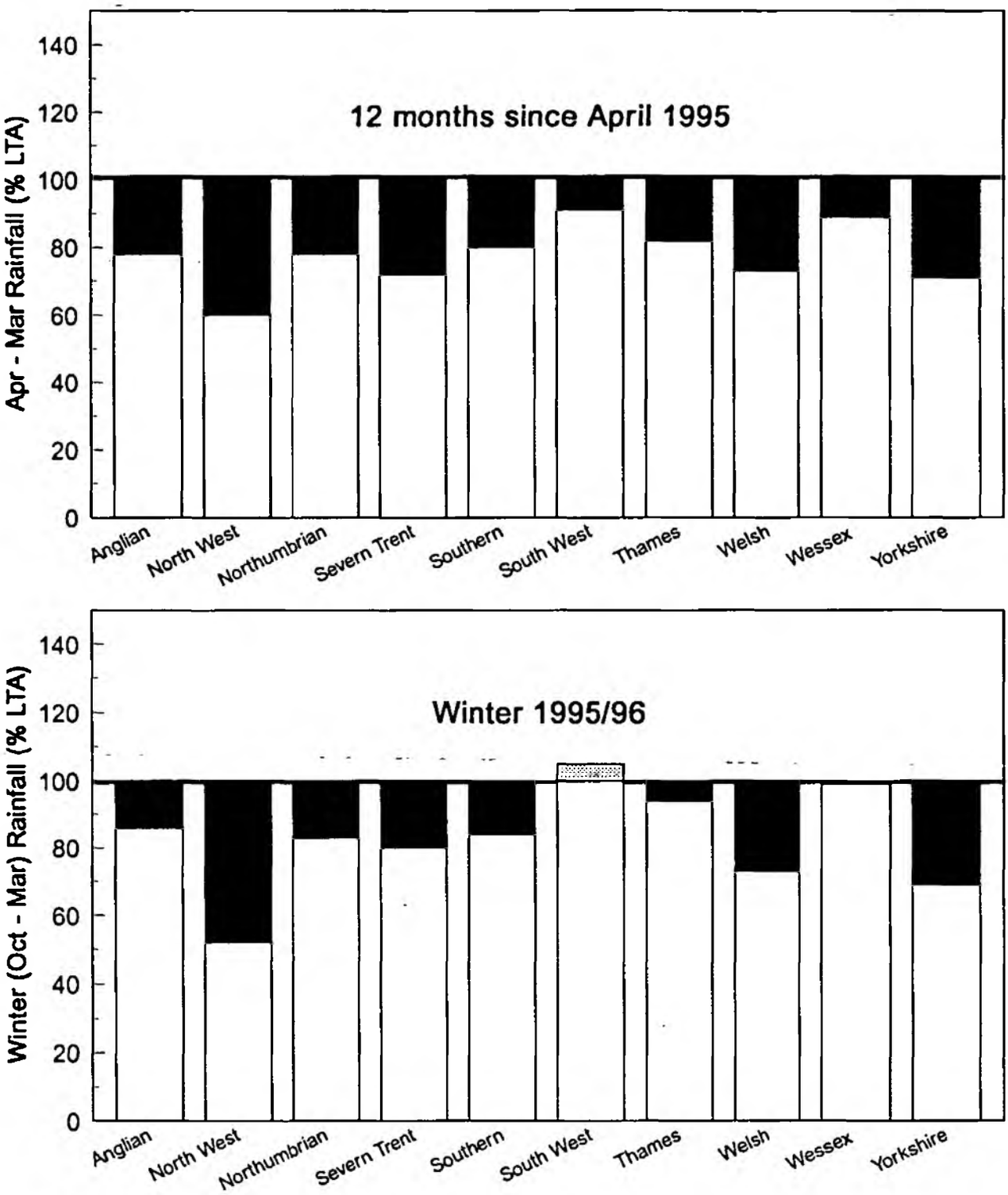
Figures 1.3 & 1.4 show the spatial variation in rainfall which has occurred over the last year and which has been a feature of the current drought. These figures demonstrate how the rainfall deficits both over the winter and since April 1995 are focused on specific areas of the country, notably in the North East, North West and in North Wales. On a catchment scale the rainfall patterns in the South West have also been exceptional. For example the winter rainfall total for the Roadford catchment is 86% of the Long Term Average. Similar variability has been experienced in North Wales, where the upper Dee catchment received only 59% of Long Term Average rainfall during the period April 1995 to March 1996.

Countrywide the accumulated rainfall deficiencies are remarkable, being equivalent to between three and five months average rainfall, and emphasise the peculiarity of general rainfall patterns over the last 12 months.

Figure 1.1 NATIONAL AVERAGE RAINFALL BETWEEN NOVEMBER 1994 AND MARCH 1996

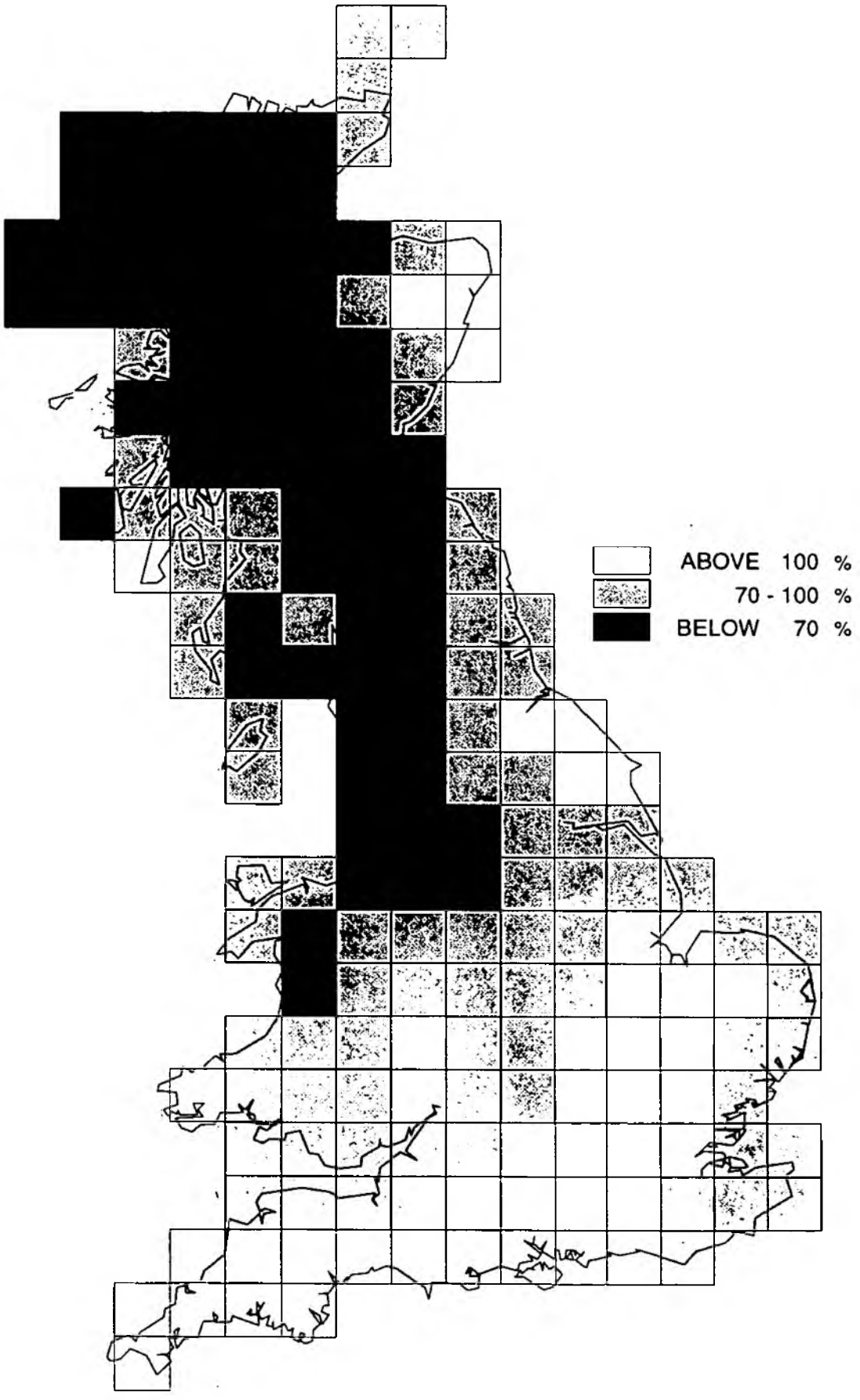


# Figure 1.2 ACCUMULATED RAINFALL DEFICITS



# Figure 1.3 Spatial rainfall Patterns December 1995 to March 1996

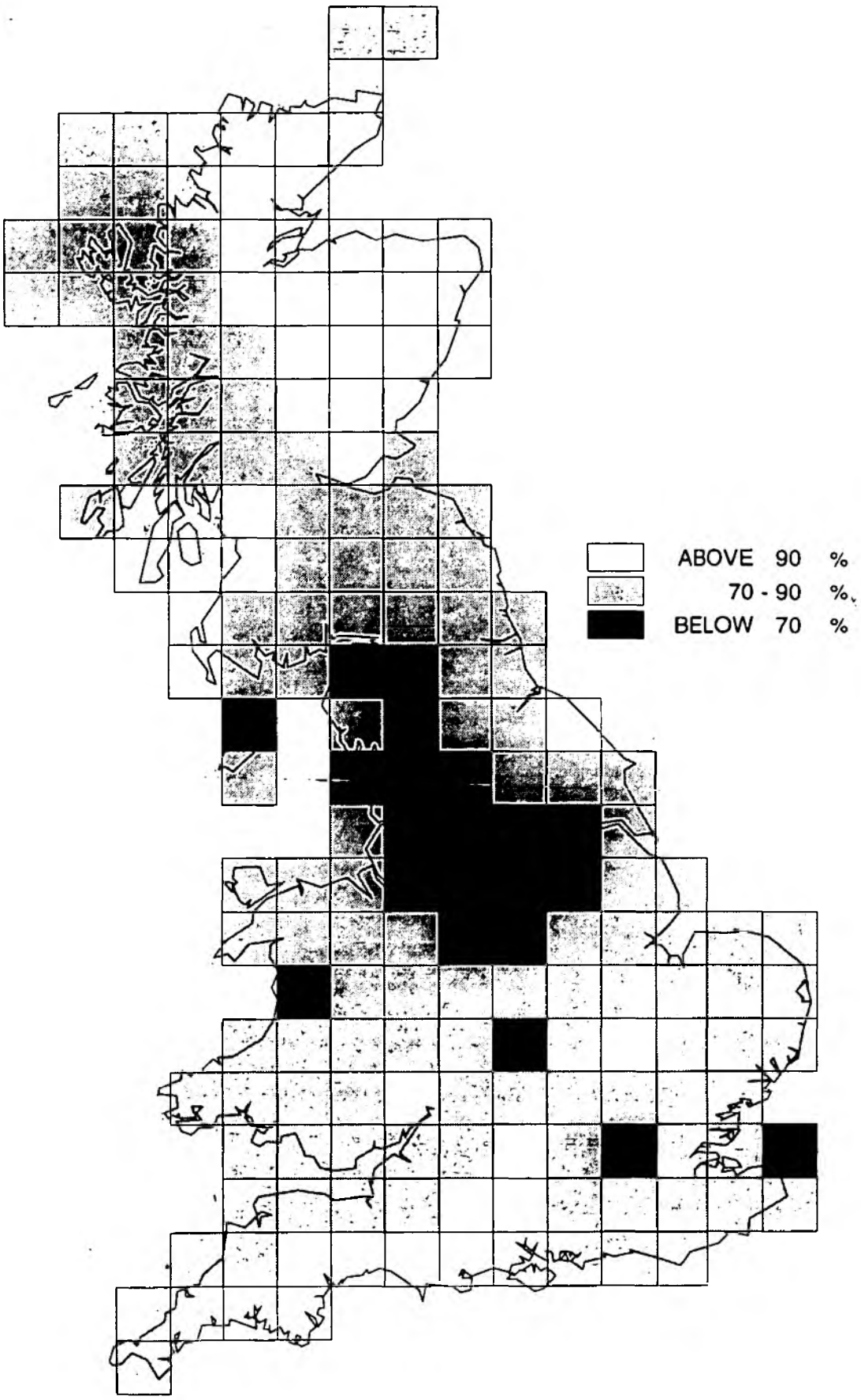
**(Shown as % of Long Term average)**




Source: MORECS

# Figure 1.4 Spatial rainfall Patterns in the 12 months from April 1995 to March 1996

**(Shown as % of Long Term average)**




Source: MORECS

## 1.2 *Reservoir Levels*

Figure 1.5 shows selected combined reservoir stocks over the last 12 months for each Water Service Company Region. Appendix 1 also shows the current storage for the individual reservoirs represented in Figure 1.5. The graph illustrates the levels which may be expected in an average year and this serves to emphasise the severely depleted stocks which existed in a number of areas during the middle of the winter.

Nevertheless, these individual graphs also show that since the beginning of the year most reservoir levels have been rising progressively. Given that since the beginning of 1996 rainfall has generally been below average, the increase in reservoir stocks, particularly in the worst affected areas, will have been helped by the efforts made by water companies to maximise refill. However, despite these efforts reservoir levels currently remain well below average in Yorkshire, South West, North West, Severn Trent and North Wales areas and the outlook for the summer and autumn is still uncertain in these parts of the country.

## 1.3 *River Flows*

River flows at the beginning of April were generally below average for the time of year (see Appendix 2) reflecting not only the lower than average rainfall in March, but also the effect of increased abstraction allowed by Drought Orders granted to maximise public water supply resource recovery. This is particularly the case in the worst affected areas of the North West, Severn Trent and Yorkshire. Given the lower than normal stocks in many strategic reservoirs, pressure on river flows seems likely to persist into the summer.

## 1.4 *Soil Moisture Deficits*

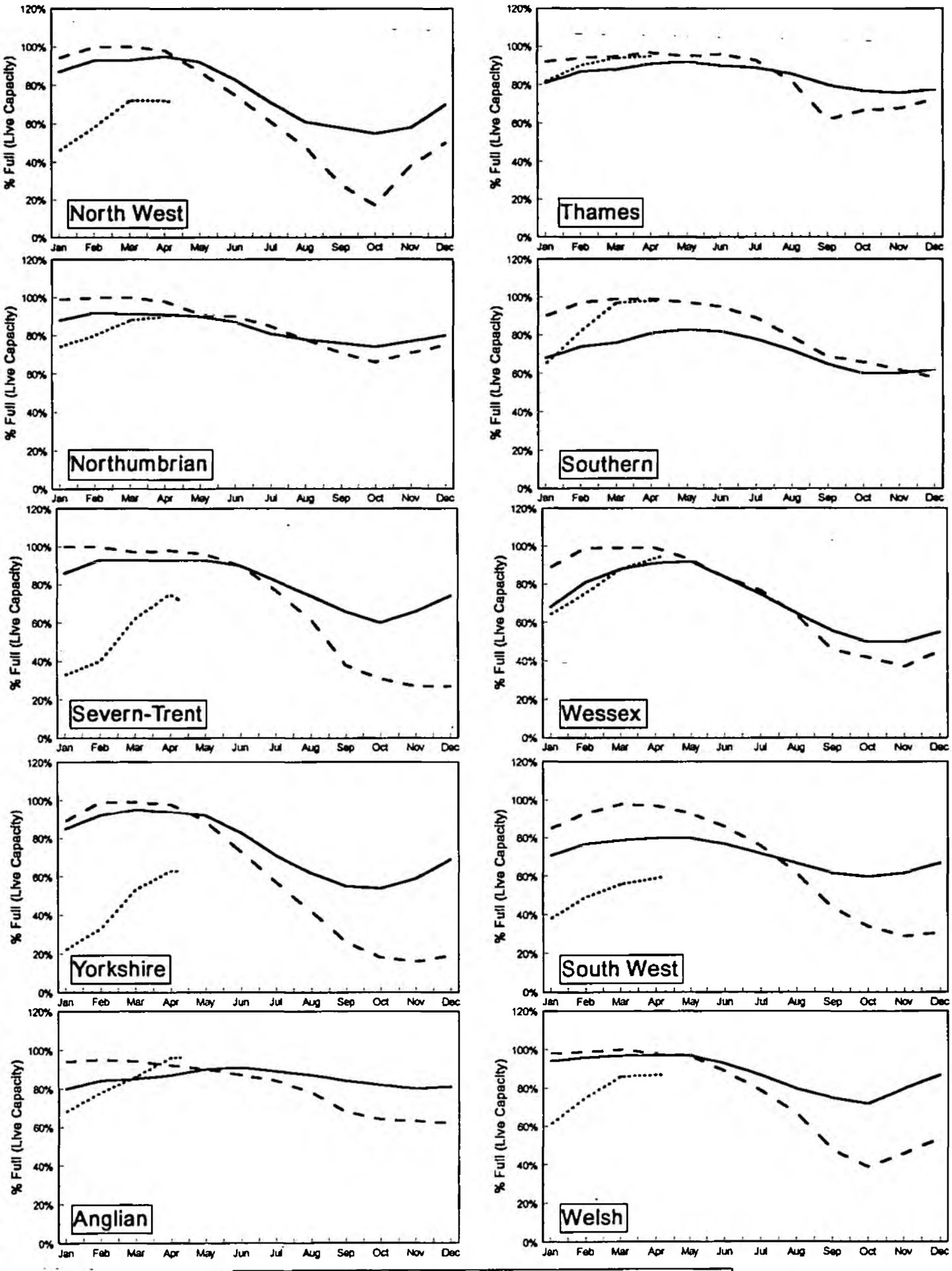
Early April has seen soil moisture deficits begin to climb quickly once more, heralding the first signs of warmer spring temperatures and also reflecting the lower than average rainfall. The onset of soil moisture deficits also marks the end of the period in which any significant groundwater recharge will take place.

## 1.5 *Groundwater Levels*

Groundwater recharge during the winter of 1995 has generally been less than average.

# Figure 1.5 A guide to aggregate storage for each Water Service Company Area at 18th April 1996

Note: The following graphs are intended as a guide based on the Institute of Hydrology index reservoirs and not as a representation of the total stocks for each area



Prolonged groundwater recessions into the winter and poor subsequent recharge has occurred in many parts of the country, leaving some aquifers in a depleted state, and many more with levels considerably lower than at the same time last year. However, in general, aquifers that have a large storage capacity are unlikely to experience supply problems this summer. But, concerns do exist for some that are shallow in depth, have lower storage or have experienced more prolonged recessions and poor recharge this winter. Specific aquifers or locations where problems may occur are listed by region below:

- Anglian — There has been little recharge to aquifers during the winter and many are at low levels. However, almost all are within the operating range experienced during the 1988 - 92 drought and (with one exception) no problems are expected with public supply boreholes.

  Flows in many spring fed rivers are expected to be low during the summer leading locally to environmental problems - including poorer water quality in some places and limited availability for spray irrigation.

- North West — Groundwater levels in many areas have failed to show normal seasonal recovery. The main consequence will be reduced baseflow to watercourses leading to a reduction in the volume available for abstraction affecting both agricultural and public water supplies. Problems may also occur in shallow or spring fed sources.

  The groundwater sources under most stress from the continuing lack of recharge have been those in the Carboniferous sandstones and grits. In certain cases pumping water levels are considerably lower than in more normal years resulting in marked reduction, and sometimes loss of yields. Water levels in the Permo-Triassic sandstone aquifer of the Fylde plain are also well below their normal levels for this time of the year resulting in a decline in yields, particularly in the southern half of the aquifer where the drift cover is thicker.

  Water levels in the West and East Cheshire Permo-Triassic and also in the Penrith sandstone aquifer are slightly below normal levels but not to the extent that yields are significantly affected.

- North East — Most concern is now focused on the southern zone of the eastern chalk aquifer, particularly around Hull. This will affect Yorkshire Water.

- **Midlands** — There has been little recharge to most aquifers in this region and levels are still falling in many areas. No water supply problems are anticipated in the major aquifers which still have healthy levels, though low storage aquifers are more vulnerable.

- **Southern** — Several chalk areas are low following below average winter recharge. Demand management measures and Drought Orders may well be required as the summer progresses. Particular risk areas are Folkestone and Dover, Thanet and parts of the Sussex coastal aquifer.

- **South West** — Though some groundwater levels are below average none are at levels which give particular cause for concern.

- **Thames** — Groundwater levels in Thames region are close to average for the time of year except for the North Downs (Sutton & East Surrey) and Lee Chalk (Three Valleys) around London. In the event of a repeat of last summer some localised supply difficulties may occur.

- **Welsh** — Groundwater levels throughout Wales are below average following limited winter recharge. The Carboniferous aquifers of West and South Wales and to a lesser extent the Sherwood Sandstone of North Wales are particularly affected. The main effect will be lower baseflows, exacerbating low river flows and reducing the volume available for abstraction.

## 1.6 *Public Water Supply Demands*

The demand for public water supply over the winter period has generally been higher than that which was recorded in the same period during the year prior to the drought. Table 1.2 below shows the percentage change in Distribution Input for each water company.

***Table 1.2 Percentage Change in Distribution Input (October to March) Between 1994/95 and 1995/96***

| ***Company*** | ***% Change in Distribution Input*** |
|---|---|
| ***Anglian*** | + 0.7% |
| Essex & Suffolk Water | + 2.7% |
| Cambridge | + 4.9% |

| ***Company*** | ***% Change in Distribution Input*** |
|---|---|
| ***Table 1.2 continued.*** | |
| Tendring | + 4% |
| ***Northumbrian*** | N/A |
| Hartlepools | - 2.7% |
| ***Yorkshire*** | - 1.8% |
| York Water | + 1.3% |
| ***North West*** | - 2% |
| ***Severn Trent*** | 0% |
| South Staffs | - 0.5% |
| ***Southern*** | + 2.3% |
| Portsmouth | + 8% |
| South East | + 1.8% |
| Mid Kent | + 3.2% |
| Folkestone | + 0.5% |
| ***South West*** | + 3% |
| ***Wessex*** | + 1% |
| Bournemouth & West Hampshire | + 3.3% |
| Bristol | + 2.8% |
| ***Thames*** | + 4% |
| Three Valleys | + 4.4% |
| North Surrey | + 5% |
| Mid Southern | - 2% |
| Sutton & East Surrey | + 3.4% |
| ***Dŵr Cymru*** | 0% |
| Wrexham | + 4.9% |
| Chester | + 8% |

N/A - Data not provided by company.

Where increases in demand have occurred most water companies have suggested that they are primarily due to the increased incidence of leakage caused by bursts brought on by the cold winter. However, other reasons have also been put forward including:

- increased consumption by domestic customers;
- increased consumption by certain commercial customers;
- re-wetting of dry clay soils following the dry summer causing mains bursts.

Whatever the cause of these general demand increases, they will obviously not have helped the process of conserving water in order to maximise resource recovery. Increased leakage caused by bursts over the winter can be reduced by companies undertaking active leakage control during the spring in preparation for the summer.

## 2. *COMPANY ACTIONS OVER THE WINTER OF 1995*

### 2.1 *Overview*

As previous NRA drought reports to the Secretary of State have served to highlight, water companies have generally been implementing plans and measures aimed at ameliorating the pressure on their resource systems and maximising the potential for resource replenishment over the winter months. However, for companies which were broadly unaffected by the drought last summer the implementation of specific action plans over the winter period has justifiably been more limited.

### 2.2 *Summary of Company Actions to Date*

The salient features of the water company actions over the winter period can be summarised as follows:

#### 2.2.1 *Anglian Region*

***Anglian Water***

- Maximised abstraction from rivers for reservoir refill (within licensed conditions and without need for drought orders);
- operated river transfer scheme as appropriate to facilitate reservoir refill;
- commenced construction, commissioning and licensing of 20 additional boreholes (all to be licensed within existing licensed quantities);
- 65 teams dedicated to leakage detection and repair;
- continued with programme of domestic meter installation and meter option schemes;
- planned for an active and progressive marketing programme on water conservation to commence April/May.

***Essex & Suffolk Water***

- Metering policy revised to require customers using sprinklers for garden watering to be metered;
- resource simulation exercise undertaken to assist in the timing of drought management decisions;
- tightening of abstraction procedures to ensure minimal loss of water transferred via the Ely-Ouse to Essex scheme (Ely-Ouse to Essex scheme is owned and operated by the Agency);
- commissioning of an improved source at Rickinghall in Suffolk;
- company started an active PR campaign;
- completion of a new scheme to abstract water at Little Glemham in Suffolk;
- the planning and test pumping of an existing source at Mendlesham and new source at Beddingfield, both in the Suffolk area;
- the lowering of pump depths to cope with low water table conditions;
- the advancement of plans to re-open three well sources in the Essex area (to be completed by the end of 1996);
- increased leakage control detection across the Company.

***Cambridge Water***

Cambridge Water gathers its water resource totally from groundwater and to this extent was largely unaffected by the events of the 1995 summer drought. In 1992 Cambridge Water metered all sprinkler users and since that date the company have pursued a progressive metering policy such that currently approximately 20% of their customers are metered. The result has been to keep base demands down to 1989 levels, although winter demand has been higher this year.

***Tendring Hundred Water***

- The Anglian Water Balkerne borehole in Colchester is now available when required to augment Ardleigh reservoir via the River Colne. The estimated benefit to Tendring Hundred is 2.5 Ml/d;
- the augmentation of Ardleigh reservoir via Essex and Suffolk Water Company's raw water mains is now available. This augmentation is seen as a reserve against short term problems;
- a scheme to increase storage at Ardleigh Reservoir by 170 Ml (8%) is in progress but will not be completed until after summer 1996;

- a scheme to increase borehole source transfer capacity is in progress and should be available by July 1996, subject to planning approvals;
- other improvement works have or will soon be commissioned to improve peak flow distribution capacity.

### 2.2.2 *North East Region*

***Northumbrian Water***

- Abstraction available from the Tyne Tees Tunnel at Waskerley;
- Balderhead reservoir release ceased in October 1995 to allow maximum storage gain;
- continuing leakage control.

***Hartlepools Water***

- Hartlepools Water was largely unaffected by the 1995 summer drought and no special measures to conserve, redistribute or augment water resources have been considered necessary over the winter months.

***Yorkshire Water***

- Supply re-balancing;
- increased leakage detection and repair;
- free repair of customer service pipes in areas affected by restrictions;
- free leakage detection advice service for business customers;
- commissioning of standby and emergency schemes;
- publicity including direct customer communications, newspaper, radio and TV advertisement;
- hosepipe restrictions covering North, West and South Yorkshire;
- restrictions of Use Drought Orders covering North (part), West and South Yorkshire;
- reservoir compensation reduction Drought Orders;
- abstraction from non Yorkshire Water Services sources Drought Orders;
- river abstraction Drought Orders;
- tankering water from East and North Yorkshire into West Yorkshire;
- construction of emergency pipeline and pumping schemes costing over £100 million;

- following the very dry March, particularly in the Calder area, further investment totalling £25 million has been committed to increase flexibility between the area and the rest of the Grid.

***York Water***

- No supply problems have been experienced by the company and no special actions taken.

### 2.2.3 *North West Region*

***North West Water***

- Increased transfer capacity from the regional aqueducts into the more critical local areas of east Lancashire and areas to the east and south of Manchester;
- plans are in place to gain additional sources of water totalling 100 Ml/d mainly from boreholes and existing river abstractions and by restoring a number of disused sources;
- a new 80 Ml/d water treatment plant is currently under construction at Huntington near Chester, to enable additional abstraction from the River Dee;
- a 12 km long 900mm diameter pipeline is under construction to transfer up to 100 Ml/d of water from the River Dee and boreholes in the west of the region to support the more critical Pennine areas;
- an enhanced programme of leakage reduction gaining 50 Ml/d;
- a sustained publicity campaign and hosepipe ban gaining 60 Ml/d;
- reservoir compensation water reductions gaining 65 Ml/d;
- additional abstractions from Ullswater and Windermere gaining 145 Ml/d;
- maximising abstractions from river sources (mainly River Dee and Rivers Lune and Wyre) during the winter period;
- £45 million expenditure on leakage control over the next 4 years, and accelerated asset refurbishment programme costing an additional £9.3 million/year, equivalent to 120 km refurbished main/annum;
- target savings from customer side leakage repair scheme 75 Ml/d over 12 months.

### 2.2.4 *Midlands Region*

***Severn Trent Water***

Severn Trent Water have instigated and pursued a seven point plan over the winter involving:

- maximising reservoir refill;
- providing additional yield by uprating sources, making treatment works improvements and seeking 33 abstraction licence variations;
- implementing additional distribution schemes (166 in total) and laying 252 km of new main;
- spending on extra £25 million between 1995/96 and 1996/97 on improving leakage detection and repair;
- improvements to water distribution control;
- introduction of a free meter fitting service and making meters compulsory for swimming pool owners and those customers who use a garden sprinkler;
- implementation of a customer awareness and water conservation campaign.

***South Staffordshire Water***

- Maximum use of the company's Nethertown Scheme which returns flow in the Lower Blithe back to Blithfield reservoir;
- maximum use of the River Severn, when not under regulation, to preserve levels in Blithfield in anticipation of another hot summer;
- use of more expensive sources in the interests of minimising summer resource risk.

### 2.2.5 *Southern Region*

***Southern Water***

- Promotion of the River Medway Drought Order to fill Bewl Water;
- the extension of the Bewl to Darwell Reservoir transfer Drought Order;
- the sustaining of the hosepipe restrictions in East Sussex;
- the increased use of surface water through water treatment works to rest groundwater wherever possible;
- the promotion of new schemes in Sussex to increase supply outputs this summer;

- increased activity on leak repairs with the stated aim for leakage levels to reach single figures as a percentage of supply by 2000;
- continued PR activity in the media regarding drought measures;
- PR programmes prepared for day by day `punchlines' throughout the spring;
- sponsorship of a local TV gardening programme.

***Portsmouth Water***

- Leakage detection concentrated in the east;
- widespread mains renewal planned for Bognor Regis town centre;
- low pressure zones reinforced;
- groundwater sources improved;
- garden watering advice being made widely available.

***South East Water***

- Hosepipe and sprinkler ban in force since 23 August 1995;
- drought orders in place restricting minimum flows from 8 January to 31 March 1996;
- launch of water awareness campaign on 1 February 1996;
- system reinforced in areas where difficulties experienced last year, particularly in respect of low/poor pressure;
- three additional sources refurbished since last summer which will provide approximately 8 Ml/d more water;
- preliminary discussions have been held with the Environment Agency regarding improvements/drought orders at the company's Hartlake source to enable better utilisation of the existing licence;
- purchase of additional bowsers and tankers.

***Mid Kent Water***

- Increased leakage detection activity especially in the more sensitive areas;
- fast track commissioning of pressure management schemes in more sensitive areas;
- completion of 100% coverage with district Metered Areas;
- introduction of free licence for sprinklers providing the whole house is metered. Where a meter is not provided this will cost the customer £150;
- augmentation of supplies by developing new sources;
- strategic main laying between water into supply zones;
- distribution mains reinforcement;
- increased public relations.

***Folkestone & Dover Water***

- Additional leakage detection and repair effort was introduced from January 1996 by the use of contractors;
- charges for the company's optional domestic metering scheme were suspended in March to encourage demand management;
- a hosepipe and sprinkler ban was introduced from 1 March 1996;
- the company's redundant open storage reservoirs at the Cherry Garden Upper Works (84 Ml) were refilled over the winter period during commissioning of new treatment plant;
- work commenced before the end of March on five schemes to maximise the use of available resources and increase transfer capability;
- all customers were advised of the hosepipe and sprinkler ban in February through the annual billing;
- the use of PR and public information is being maximised whenever the opportunity arises and in conjunction with a planned PR and public information programme for 1996;
- the feasibility of inter-company transfers and transfers from abroad via the Channel Tunnel and sea tankers is being evaluated;

2.2.6 ***South West Region***

***South West Water***

Operational and other measures have been put-in place at an additional capital cost of over £20 million and;

- improved abstraction and treatment capability using river and borehole sources, to provide an additional 30 Ml/d by summer 1996;
- enhanced effort on leakage control in the Roadford supply zone to reduce leakage by an additional 5 Ml/d below existing target levels, by summer 1996. This is utilising the recently completed Zonal Leakage Monitoring System, which now covers all the company's distribution system;
- temporary abstractions under Drought Orders have been implemented to supplement inflows to the three strategic reservoirs at Roadford, Wimbleball and Colliford;

- reduction in winter compensation flows for Roadford and Wimbleball reservoirs. Negotiations have recently been concluded with riparian owners and the Environment Agency to agree a reduced prescribed flow in the River Tamar at Gunnislake intake;
- negotiations for the purchase of sites, which have potential for public water supply use, from an existing abstraction licence holder in the River Tavy catchment;
- review of operational practices to ensure maximum availability of water storage, treatment and distribution capacity;

***Wessex Water***

- £5 million expenditure on improving source security, reinforcing the trunk main and distribution system and providing additional flexibility in use of water resources;
- managing resources so as to maximise the volume of water held in storage at the start of the summer;
- major increase in investment programme aimed at progressively reducing leakage over the next 10 years;
- joint funding of the Wimbleball pump storage scheme with South West water which should be available for use by November 1996 and help ensure Wimbleball fills in dry winters;
- the provision of a free meter installation option for all domestic customers;
- agreement with the Environment Agency on a programme of measures to be undertaken during the summer of 1996 to help protect rivers that are particularly vulnerable to the combined effect of groundwater abstraction and drought.

***Bournemouth & West Hampshire Water***

- The company report significant improvements to their meter option package and are pro-actively encouraging customers to take up the option and to assist in managing demand throughout the summer. Because the majority of the company's sources are direct river abstractions there has been little scope for water conservation over the winter months.

***Bristol Water***

- Work to enable greater quantities of River Severn water to be distributed has been carried out. This will allow full use to be made of the recently enlarged Purton Treatment Works during periods when the Severn is not subject to river regulation;
- the company have sought additional abstraction licence capacity from the Gloucester and Sharpness Canal which, subject to discussions between the Environment Agency and British Waterways (the licence holder), should be available within three months;
- approximately £1 million has been spent on the reinforcement of strategic mains and pumping stations in the southern part of the company's area, to deal with the unprecedented peaks in demand experienced last summer;
- the company have managed its resources to ensure that the impounding reservoirs were rested as much as possible over the winter. Despite less than average rainfall, a recovery from 40% full in late November to 95% full at the start of April was achieved. This incurred substantial additional operating costs.

2.2.7 ***Thames Region***

***Thames Water***

- The implementation of a major leakage reduction programme, allowing dedicated management to target increased activity at the areas of highest risk to customers;
- conjunctive use of surface and groundwater sources ie; switching between surface water abstractions and groundwater abstractions to conserve groundwater or surface water resources respectively;
- carrying out some artificial recharge of the North London Artificial Recharge Scheme and developing a more proactive and comprehensive water efficiency campaign than in previous years;
- the company have strengthened their infrastructure within water resource zones where last year's extreme supply/demand conditions exposed weakness. This will provide a more robust support for surface water sources vulnerable to prolonged periods of minimum run-off conditions.

***Three Valleys Water***

- The company reports adopting a measured approach to the water resources situation bearing in mind groundwater supplies are only affected to a limited extent by one season of low rainfall;
- consolidation of temporary measures to optimise supplies last summer including local mains reinforcement and booster pump installations to deal with local supply problems;
- advancement of trunk main construction, 7 km of 700mm diameter pipeline, to secure the company's strategic mains network;
- recommissioning sources out of service due to industrial pollution problems eg, hydrocarbons;
- minimisation of resource planned `outage' for repair or refurbishment;
- improved flexibility in the operation of the company's strategic mains network by automation of flow control valves and additional telemetry facilities.

***North Surrey***

- Garden sprinklers now permitted only if the property is metered. A significant number of customers have requested meters;
- contract staff employed to provide additional leakage detection resources. Improvements to district meter and pressure control installations;
- direct contact with all domestic customers through customer newsletter containing water saving tips and emphasising the change to metering of garden sprinklers. Regular weekly `Waterwatch' broadcast on local radio used strategically for advice to customers;
- additional bulk import of treated water available from the Iver Works of Three Valleys Water;
- agreement concluded with Mid Southern Water for a reduced maximum rate of bulk supply.

***Sutton & East Surrey Water***

- Winter Drought Order for Bough Beech Reservoir to allow extra abstraction from the river;
- maintain leakage at low levels - 5.5 to 6 litres per property per hour;
- introduction of a new water source at Hackbridge with a licensed output of 3 Ml/d.

***Mid Southern Water***

- Water awareness campaign commenced;
- optional provision of water meter installation to all customers, free of charge;
- £640,000 expended upon distribution reinforcement;
- £260,000 expended upon supply improvements;
- £5.8m expended upon resource completion and improvement;
- implemented a leakage initiative, including reorganising operating structure and methodologies and improved equipment;
- company resources augmented using river derived water in order to promote a recovery of ground resources;
- rehabilitation and surveys of existing boreholes to improve peak day performance;
- review and adjustment of operational regime in preparation for high demand in order to maximise storage and transfer capacity.

2.2.8 ***Welsh Region***

***Welsh Water (Dŵr Cymru)***

Whilst there have been a number of measures to conserve resources in South Wales (eg, extended operation of the Towy abstraction to conserve the Usk Reservoir Storage) most of the efforts have concentrated in the North. These include the following:

- support for Alwen by substituting a combination of pumping from the unregulated River Dee and Vale of Clwyd boreholes;
- reduction of Alaw Reservoir on Anglesey by support from Cefni;
- Cwmystradllyn supported from Dolbenmaen river abstraction;
- Tecwyn Uchaf support by Dolbenmaen.

***Wrexham Water***

- Conserving impounding reservoir capacity by increased winter pumping from the unregulated River Dee;
- increasing leakage detection effort by 50%, although the effects of this have not been completely realised due to very high leakage levels resulting from severe weather in December/January.

***Chester Water***

- Capital works started at Boughton Treatment Works in January 1996 to reduce abstraction from the River Dee by 1 Ml/day by recycling wash water from rapid and pressure filters and recycling filter water from slow sand filters. The work is 50% completed and scheduled for 100% completion in May;
- as from 1 April households with sprinklers are subject to measured charges. This is a long term programme but the new policy will be featured in publicity during the summer;
- leakage control activities to be sustained at a high level.

## 2.3 *Company Actions over the Winter - Conclusions*

From the summaries given above it is clear that all drought affected companies, and many of those less affected too, have been deploying significant resources in order to limit the impact of the current drought. The Environment Agency is of the view that this level of activity was required, and acknowledges the actions taken by companies to maximise the benefits of the less then average rainfall received this winter. An overview of the common features of the company actions over the winter months is given in Table 2.1 overleaf.

# 3. *COMPANY ACTIONS IN AN AVERAGE SUMMER*

## 3.1 *Overview*

Having actively pursued a raft of measures aimed at maximising resource recovery over the winter, the water companies were asked by the Environment Agency to assess the need for additional measures to secure supplies in the event of an ***average summer***. The majority of companies have stated that given average summer run-off, supplies can be maintained without the need for new demand restrictions or additional drought actions. However, some companies, particularly those worst affected by limited winter refill of reservoirs or aquifers, have noted the need for additional measures and these are summarised in the following sections by Environment Agency region.

## *Table 2.1 Summary of Common Features of Company Actions Reported over the Winter to Maximise Resources*

| *Company* | *Resting reservoir sources* | *Distribution & pipeline improvements* | *Increased leakage control* | *Drought Orders to assist refill* | *Non-essential use bans* | *Hosepipe & sprinkler bans* | *Tankering or transfer feasibility* | *Negotiation for purchase of water rights* | *Free meter installation* | *Compulsory sprinkler metering* | *Customer awareness campaign* | *Reinstatement of disused sources* | *New resource provision* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Anglian | ✓ | | ✓ | | | | | | | | ✓ | | ✓ |
| Essex & Suffolk Water | | | ✓ | | | | | | | ✓ | | ✓ | ✓ |
| Cambridge | | | | | | | | | | ✓ | | | |
| Tendring | | ✓ | | | | | | | | | | | ✓ |
| Northumbrian | ✓ | | ✓ | | | | | | | | | | |
| Hartlepools | | | | | | | | | | | | | |
| Yorkshire | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | |
| York Water | | | | | | | | | | | | | |
| North West | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | | ✓ | | ✓ |
| Severn Trent | ✓ | ✓ | ✓ | ✓ | | ✓ | | | ✓ | ✓ | ✓ | | ✓ |
| South Staffs | ✓ | | | | | | | | | | | | |
| Southern | ✓ | | ✓ | ✓ | | ✓ | | | | | ✓ | | ✓ |
| Portsmouth | | ✓ | ✓ | | | | | | | | ✓ | | |
| South East | | ✓ | | ✓ | | ✓ | | | | | ✓ | ✓ | |
| Mid Kent | | ✓ | ✓ | | | | | | | | ✓ | | ✓ |
| Folkestone | ✓ | ✓ | ✓ | | | ✓ | ✓ | | ✓ | | ✓ | | |
| South West | ✓ | | ✓ | ✓ | | ✓ | | ✓ | | | | | |
| Wessex | | | ✓ | | | | | | ✓ | | | | |

| Company | Resting reservoir sources | Distribution & pipeline improvements | Increased leakage control | Drought Orders to assist refill | Non-essential use bans | Hosepipe & sprinkler bans | Tankering or transfer feasibility | Negotiation for purchase of water rights | Free meter installation | Compulsory sprinkler metering | Customer awareness campaign | Reinstatement of disused sources | New resource provision |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bournemouth & West Hants | | | | | | | | | | | | | |
| Bristol | ✓ | ✓ | | | | | | | | | | | |
| Thames | ✓ | ✓ | ✓ | | | | | | | | | | |
| Three Valleys | | ✓ | | | | | | | | | | ✓ | |
| North Surrey | | | ✓ | | | | | | | ✓ | ✓ | | |
| Sutton & East Surrey | | | ✓ | ✓ | | | | | | | | | ✓ |
| Mid Southern | | ✓ | ✓ | | | | | | ✓ | | ✓ | | |
| Dŵy Cymru | ✓ | | | | | | | | | | | | |
| Wrexham | ✓ | | ✓ | | | | | | | | | | |
| Chester | | | ✓ | | | | | | | ✓ | ✓ | | |

N.B. This table is not exhaustive - other specific actions have been taken by some companies, please refer to Section 2.2. Some companies may also have carried out some of these common actions but have not reported these to the Agency.

## 3.2 *Worst Affected Companies and Required Actions*

### 3.2.1 *Anglian Region*

***Essex & Suffolk Water***

Given average summer run-off conditions, low groundwater levels in the small rural Hartismere supply zone in Suffolk may cause supply problems. Proposed measures include:

- customer liaison and requests to conserve water;
- the lowering of pump suctions in existing boreholes;
- emergency transfers of water, if tower water levels cannot be maintained;
- intensified leakage control to minimise leakage; and
- hosepipe or non-essential use bans if the situation significantly deteriorates.

### 3.2.2 *North East Region*

***Yorkshire Water***

Yorkshire Water report that under average rainfall conditions, with all current restrictions remaining in place, most water resources would return to normal by autumn 1996. Most restrictions and Drought Orders could then be lifted. The company is however taking the precaution of pursuing a range of measures as outlined in Appendix 3.

### 3.2.3 *North West Region*

***North West Water***

Under average summer run-off conditions, the measures now in hand would be adequate to maintain supplies to all customers. Reservoir storages would remain lower than normal, and the enhanced level of support to Pennine areas from the regional aqueducts would need to continue. There would be no requirement for further restrictions on water use or for additional conservation measures. Most of the current drought measures would need to remain in place to assist reservoir refilling. The company is however taking the precaution of pursuing a range of measures as outlined in Appendix 3.

### 3.2.4 *South West Region*

***South West Water***

As a prudent measure, new hosepipe restrictions will be introduced in early spring to reduce demand on Roadford Reservoir. This will be progressed in discussion with the Environment Agency, but it is considered vital that such restrictions are introduced as soon as garden watering starts to influence demand levels and local reservoirs begin to be drawn down. The area expected to be covered by the hosepipe restrictions will be North, South and West Devon, which has a population of around half the companies customers.

Current projections for average summer run-off conditions for the other parts of the region, that is those supported by Wimbleball and Colliford Reservoirs, indicate that no customer use restrictions will be required.

### 3.2.5 *Southern Region*

***Southern Water Services***

Due to the promotion of capital schemes there should be an extra 10% of water available for customers in the Sussex Coastal area but given average rainfall it is unlikely that groundwater recharge will occur during the next six months and usage restrictions are highly probable. All customers in this area have received a personal letter requesting voluntary constraint.

Similar action has been taken with regard to the Thanet area of East Kent, usages restrictions here cannot be ruled out for the summer. A Drought Order is in preparation for the temporary relaxation of licence conditions at Hardham to increase the availability of water supplies for West Sussex customers into the summer. A Drought Order on the River Stour (in advance of abstraction licence revision) will be required to sustain flows for the Plucks Gutter Treatment Works.

***South East Water***

Under average run-off conditions the measures currently in place should prove adequate to maintain supplies. However a Drought Order may be required at the Hartlake source to enable better utilisation of the existing licence.

## 3.3 *Summary of Current Resource Position & Prospects for Summer Under Average Conditions*

The current water resource position and outlook for parts of England and Wales must be described as fragile. Many companies are however reasonably confident about their current resource situation and their ability to maintain supplies in the event of an average summer. Nevertheless, it is clear that the normal replenishment season has now ended leaving water resources in an impoverished state especially in parts of the North West, North East, and parts of the South West.

The general lack of significant groundwater recharge this winter leaves those companies reliant on groundwater sources less well provided for than at the same time last year. Particular concerns are evident in parts of the Southern Water area (Sussex Coast, Thanet and Sussex West) and for Folkestone and Dover Water, where levels are described as acutely low. Since there will be no recharge of aquifers before next winter these groundwater areas dependent on the level of demand experienced through the summer. Above average demands will trigger the need for restrictions on supply whereas average rainfall conditions should result in lower demands that can be met with lower restrictions being required.

Table 3.1 below summarises the company's positions and actions under average conditions this coming summer.

## *Table 3.1 Summary of Company Position & Actions for an Average Summer*

| *Company* | *With existing measures, no supply problems anticipated* | *Existing measures includes Hosepipe ban* | *Existing measures includes Non-essential use ban* | *Existing measures includes additional abstraction under Drought Order* | *Additional measures will be required possibly including Hosepipe bans, Drought Orders & Non-essential use bans* |
|---|---|---|---|---|---|
| ***Anglian*** | ✓ | | | | |
| Essex & Suffolk Water | | | | | ✓ |
| Cambridge | ✓ | | | | |
| Tendring | ✓ | | | | |
| ***Northumbrian*** | ✓ | | | | |
| Hartlepools | ✓ | | | | |
| ***Yorkshire*** | ✓ | ✓ | ✓ | ✓ | ✓ |
| York Water | ✓ | | | | |
| ***North West*** | ✓ | ✓ | | ✓ | ✓ |
| ***Severn Trent*** | ✓ | | | ✓ | |
| South Staffs | ✓ | | | | |
| ***Southern*** | | ✓ | | ✓ | ✓ |
| Portsmouth | ✓ | | | | |
| South East | | ✓ | | | ✓ |
| Mid Kent | ✓ | | | | |

| Company | With existing measures, no supply problems anticipated | Existing measures includes Hosepipe ban | Existing measures includes Non-essential use ban | Existing measures includes additional abstraction under Drought Order | Additional measures will be required possibly including Hosepipe bans, Drought Orders & Non-essential use bans |
|---|---|---|---|---|---|
| Folkestone & Dover | ✓ | ✓ | | | |
| **South West** | | ✓ | | ✓ | ✓ |
| **Wessex** | ✓ | | | | |
| Bournemouth & West | ✓ | | | | |
| Bristol | ✓ | | | | |
| **Thames** | ✓ | | | | |
| Three Valleys | ✓ | | | | |
| North Surrey | ✓ | | | | |
| Mid Southern | ✓ | | | | |
| East Surrey & Sutton | ✓ | | | | |
| **Dŵr Cymru** | ✓ | | | | |
| Wrexham | ✓ | | | | |
| Chester | ✓ | | | | |

Footnote: Companies in bold are Water Service Companies.

## *SECTION B*

## *Water Supply Prospects Given Continuing Drought*

# 4. CONTINUING DROUGHT AND PUBLIC WATER SUPPLY PROSPECTS

## 4.1 *Overview and Approach*

As Section A of this report has demonstrated, the water resources situation at the end of the recharge season is well below average in some parts of England and Wales. Nevertheless, the actions taken so far by water companies to secure supplies for the summer, together with further modest measures by some companies to augment resources or manage demand appear adequate to meet demands with limited restrictions given an average summer.

In order to assess the adequacy of proposed company actions should the drought continue the Environment Agency invited all water companies to submit *comprehensive management plans* for maintaining essential water supplies throughout the summer and autumn of 1996. Specifically each company was asked to:

- assume that the driest recorded summer could occur;
- assume that essential water supply must be maintained without recourse to rota cuts or stand pipes;
- be mindful of the possibility of the need for further measures to deal with supply problems in the event of drought which extends beyond the autumn of 1996, and present contingency plans as appropriate;
- present action plans for Operational Management measures, Demand Management measures and Source Management measures.

The submitted company plans are included in Appendix 3, and are presented for each water company. These tables give an indication of the actions required for affected areas or sources and show whether these measures are firm plans or outline proposals. The tables represent each company's view of the actions which are required in order to maintain essential supplies given a continuing severe summer and autumn drought.

## 4.2 *Company by Company Detail*

The following sections give an overview of how each company perceives the present water resources situation affecting their company and is presented as background to the detailed plans presented in Appendix 3. These overviews are as reported by the companies.

The following section also gives details of each company's additional contingency plans for a drought extending into next winter, again as reported by the companies. A commentary on how the Environment Agency views both the detailed plans in Appendix 3 and the further contingency measures is also given.

## 4.3 *Anglian Region*

### 4.3.1 *Anglian Water*

#### *Company's Overview*

Despite low winter rainfall all reservoir stocks are in a healthy position and more than sufficient to maintain supplies this summer. Groundwater levels are below average but within historical operating ranges and similar to or above those of the groundwater drought of 1991/92. No abstraction problems are anticipated. River flows are low but the company's direct river intakes can be supported from other resources and account for only 5% of supplies.

#### *Contingency Plans for Drought Extension Beyond Next Autumn*

Water conservation will continue to be promoted together with maximisation of reservoir refill. Additional boreholes are being constructed this year to maintain security of supply in the event of lower groundwater levels.

#### *Environment Agency Commentary*

The Environment Agency is satisfied with the plan submitted by the company.

### 4.3.2 *Essex & Suffolk Water*

#### *Company's Overview*

Water storage in Essex area as at early April 1996 was 84% and 95% for Hanningfield and Abberton Reservoirs respectively. Despite low river flows, the company anticipate that with continued support from the Ely-Ouse to Essex Transfer System, the rate of refill will be maintained in the short term. Given normal climatic conditions, the outlook is satisfactory for maintaining supplies in the Essex area over this summer.

In the Suffolk area, soil moisture deficits are still above zero in certain locations, and groundwater levels continue to be below those expected for this time of year. If these conditions continue, there is a risk of isolated local supply problems in those areas supplied by groundwater sources.

***Contingency Plans for Drought Extension Beyond Next Autumn***

Given average summer run-off conditions, low groundwater levels in the Hartismere area in Suffolk may cause supply problems. Proposed measures include:

- customer liaison and requests to conserve water;
- the lowering of pump suctions in existing boreholes;
- emergency transfers of water, if tower water levels cannot be maintained;
- intensified leakage control to minimise leakage; and
- hosepipe or non-essential use bans if the situation significantly deteriorates.

Future contingency plans for Suffolk include acceleration of the completion of a proposed new source at Beddingfield.

If the drought continues beyond autumn 1996 refill of the company's major reservoirs at Abberton and Hanningfield could become a problem. Contingency plans include:

- Drought Permit/Order at Denver to reduce the `hands off flow' to summer levels. Possible increase in annual quantity to cover possible licence exceedances;
- possible increased volume of bulk transfer of raw water from Thames Water Utilities to Chigwell Works;
- completion of the re-opening of three wells in Essex; and
- consideration of further demand management measures such as hosepipe and non-essential use bans.

***Environment Agency Commentary***

The Environment Agency agree the company submission in principle but any Agency Drought Order to reduce the Denver minimum residual flow may result in environmental damage (particularly increased siltation). Before the Agency would apply for any Order it would expect the company to have implemented a hosepipe ban in sufficient time to have made significant savings.

### 4.3.3 *Cambridge Water*

***Company's Overview***

The Cambridge Water Company is totally sourced from groundwater. Although winter rainfall has been patchy in East Anglia the company is in an area where there has been rainfall and as a result some recharge in the major aquifer.

The indications are that the chalk aquifer locally is at similar levels to the spring of 1990 and thus not at the low levels experienced in 1991 and 1992. The company does not expect supply difficulties or restrictions even if the summer is hot and dry.

***Contingency Plans for Drought Extension Beyond Next Autumn***

Given another two dry winters and groundwater levels falling to their 1992 level the company would consider the introduction of hosepipe bans and subsequently seek to restrict other non-essential uses.

***Environment Agency Commentary***

The Environment Agency is satisfied with the plans submitted by the company.

### 4.3.4 *Tendring Hundred Water*

***Company's Overview***

Despite below average rainfall in 10 of the 12 months to March 1996 the company's Ardleigh Reservoir surface source (shared equally with Anglian Water Services) has been refilled over the winter period and will be maintained at or above the control curve during 1996. An Anglian Water Services borehole is available to support Ardleigh abstraction via the River Colne and will be used as required during the year.

Although the company's chalk groundwater boreholes are slightly lower at March 1996 than March 1995 the groundwater drought has not yet reached the severity of 1991/92 and no water resource problems are anticipated during 1996.

***Contingency Plans for Drought Extension Beyond Next Autumn***

In addition to the actions already in hand the extra storage proposed at Ardleigh Reservoir should be available for filling at the end of 1996. The company has an outstanding chalk borehole abstraction licence application which is expected to make an additional two boreholes yielding 4 Ml/d (+ 14% of existing groundwater licence) available to begin development by summer 1996.

Assuming the licence is received the borehole equipping and pipelaying etc. to bring these additional boreholes into service will be made available by summer 1997. Should the drought period persist more use will be made of surface water over the winter of 1996/97 to conserve groundwater stocks. This will require a seasonal alteration to Distribution Water Quality Zones.

***Environment Agency Commentary***

The Environment Agency is satisfied with the plans submitted by the company.

## 4.4 *North East Region*

### 4.4.1 *Northumbrian Water*

***Company's Overview***

The current impounding reservoir storages are slightly low for April with Balderhead being the main reservoir that is lower than normal even though there have been no releases from there since October 1995.

The Northumbrian Water reservoirs have received moderate inflows during the winter period, reflecting the below average rainfall. The spring season starts with all the catchments being drier than normal with the prospect of lower than normal run-off during rainfall events.

These dry ground conditions will result in greater garden watering and possibly prolonged garden watering during the summer. The lower total storage of the Tees reservoirs will affect their capability to supply the total requirements of river regulation and direct supply during 1996 resulting in the need for support from River Tyne transfers, possibly starting by early June 1996. (in average rainfall summer there will be minimal need of River Tyne transfers to the Tees).

There will be support from the River Tyne for Derwent Reservoir and Mosswood Treatment Works and to maintain the flows in the Rivers Wear and Derwent. Abstractions from the Tyne Tees Tunnel will be used to support the Weardale Reservoirs. Fontburn Reservoir will be managed, if a drought year develops, to allow moderation of the River Tyne peak abstractions at Barrasford and Ovingham and from the River Coquet. The ability to move water around the region should prevent any water resource shortage from developing during 1996.

***Contingency Plans for Drought Extension Beyond Next Autumn***

The minimum run-off conditions will not affect Northumbrian Water's resources too severely as water can be transferred from the Tyne, with Kielder support, to all the main treatment river abstraction works or can be used through, treated water connections, to augment supplies from the Warkworth and direct supply treatment works.

The major challenges to the treated water system may commence in 1997 if the dry ground conditions results in high garden watering consumption and continuing high water usage during the summer of 1996 with dry conditions in the winter 1996/97. This will reduce the options to conserve direct supply storage especially for Lartington from the Teesdale Reservoirs and for Fontburn Water Treatment Works, however there will be sufficient storage to maintain flows to treatment works through 1996 and the winter of 1996/97.

1995 water consumption conditions have been used as a basis for our analysis through 1996 and indicate that by June action will need to be taken to conserve direct supply storages while more expensive river abstracted water is substituted. A drought end date has been taken as the usual 15 November. For this scenario there should be no raw water resource problems.

***Environment Agency Commentary***

The Agency is satisfied with the plans submitted by the company.

### 4.4.2 *Hartlepools Water*

***Company's Overview***

Rainfall in the groundwater recharge areas was around 94% of the long term average in 1995. Despite erratic rainfall patterns this winter, groundwater sources appear sound therefore assuming customer demand in line with past experience, no supply problems are envisaged in 1996.

***Contingency Plans for Drought Extension Beyond Next Autumn***

None submitted, this is acceptable to the Agency since no supply problems are anticipated.

***Environment Agency Commentary***

The Agency is satisfied with the submission of the company and no plans were necessary for Appendix 3.

### 4.4.3 *Yorkshire Water Services*

***Company's Overview***

Rainfall in March was again very low with the regional average at 58% of Long Term Average (LTA) and much lower figures in some areas, for example:

| | |
|---|---|
| Great Walden Edge (near Halifax) | 50% LTA |
| Cottingham (Hull) | 39% LTA |

November to March rainfall has averaged 52% in the Huddersfield area and 57% in the Halifax area. On 1 April, reservoir stocks for the region stood at 59% with the lowest reservoirs averaging 44% in the Calder area of West Yorkshire. Overall stocks are in line with predictions for a very dry winter except in the Calder area and, as a result, additional investment on improving links into the area has been committed this month.

The latest prognosis for 1996 has been based on the most comprehensive evaluation possible to date of actual 1995 run-off data and of forecast demands for 1996. In the event of a repeat of the 1995 run-off, stocks of water in major reservoir groups will be between 20% and 30% full on 1 October 1996. These are well above the very low levels which threatened water rationing during 1995. In addition, the extension of Hosepipe restrictions to cover the whole region is being prepared. Restriction of Use (RoU) Drought Orders will be sought for the Hull area and existing RoU's renewed as appropriate.

***Contingency Plans for Drought Extension Beyond Next Autumn***

The situation is being monitored closely and contingency plans for further investment have been prepared which would safeguard the situation should the summer be drier than 1995. Features of this plan include:

- ***St Aidan Emergency Source*** - use of a flooded open-cast mine site by means of a pumping station, pipeline and reverse osmosis treatment plant delivering 20 Ml/d.

- ***Pipeline from River Ouse at Moor Monkton to Elvington*** - A 23 km pipeline from the River Ouse to the treatment works at Elvington together with a new Drought Order/licence on the River Ouse.

- ***Tees-Wiske Transfer*** - A 13 km pipeline together with a new abstraction on the River Tees will enable abstractions from the River Ouse to be supported during low flows. This in turn will support abstractions from the River Derwent at Elvington. A Drought Order will be required on the River Tees, including consent to discharge on the River Wiske. The applications for a licence and Drought Order on the River Derwent are being withdrawn.

The cost of these three projects is around £47 million.

***Environment Agency Commentary***

As shown on the water company's management plan (see Appendix 3), there are Drought Orders for compensation reductions and increased abstractions already in place. The Orders in effect cover all the main river abstractions in the company's region, with the exception of the River Hull and River Derwent, and compensation reductions from all the main reservoir groups, apart from the Winscar reservoir group. The company are just withdrawing the Drought Order for the River Derwent but plans to obtain Drought Orders for these remaining locations should the dry weather continue.

These Drought Orders severely impact the river flows and were originally granted in recognition of the severe drought in the west of Yorkshire and the serious drought in much of the rest of region. There is very little opportunity for further abstractions from the rivers of Yorkshire unless new intakes are constructed on rivers such as the Aire, where currently no abstractions are taking place. However, these rivers generally have poor quality water and present very difficult treatment problems.

With a repeat of the 1995 summer, the worst case in much of the region, the results of modelling carried out by the Agency suggests that difficulties will be experienced in maintaining public water supplies should the drought continue into the autumn, even with the current and proposed Drought Orders in place for the summer. This modelling assumes that the demand is kept at the current rate and does not rise significantly through the summer. The company have successfully managed to reduce the peak winter demand following winter bursts to a level which is below the rate in 1995.

If the drought continues through the summer further sources will be required. The Agency is pleased to note that Yorkshire Water have recently announced specific measures for providing new supplies from St. Aidans and the River Tees to guard against problems in the event of a dry summer and autumn.

By abstracting from St. Aidans open cast mine, Yorkshire Water are in effect utilising the River Aire indirectly as it was the River Aire which flooded the mine originally.

As the River Tees can be supported by Kielder Reservoir, if necessary, the volume of water available to Yorkshire Water will be restricted largely by the transmission capacity of the River Wiske. The Agency does not yet have details of the company's plans, and so it is not yet clear whether these measures will be adequate. In any event, continency plans will still need to be in place should engineering problems delay the commissioning of the Tees-Wiske transfer.

The environmental impacts of such a transfer will have to be given careful consideration and mitigation measures put in place should the emergency transfer prove necessary in the autumn. The issue of the longer term use of such a transfer, or its incorporation into a longer pipeline, is a separate one which will require further study and a full environmental assessment.

The Drought Orders granted during 1996 and the early part of 1996 have reduced residual flows and cut compensation flows in many rivers to levels below those previously experienced. The very low flows have caused clearly detectable changes to the ecology of the rivers, as shown by monitoring required by the Agency as conditions of the Drought Orders. The longer term effects of these changes are not yet clear, but fish spawning has been impacted by the drying out of gravel beds which will lead to lower populations in future years. No fish kills have been experienced, largely as a result of the tightened discharge consents on some sewage works, the greater attention given to the operation of these works, the presence of fish havens, fish rescues and other mitigation measures carried out by the Agency and the water company. Some of the flora and fauna can recover quickly when flows are restored but others cannot. The monitoring of the impacts by the Agency will continue.

### 4.4.4 *York Water*

***Company's Overview***

Water stocks are not a problem for York as the company rely entirely on abstraction direct from the river. The river has a flow well in excess of our requirements and our abstraction licence is not subject to any prescribed river flow limitations. Hence the company do not anticipate any problem.

***Contingency Plans for Drought Extension Beyond Next Autumn***

No contingency plans are considered necessary.

***Environment Agency Commentary***

The Environment Agency is satisfied with the submission of the company. No plans were necessary for Appendix 3.

## 4.5 *North West Region*

### 4.5.1 *North West Water*

***Company's Overview***

Due to exceptionally low rainfall over the winter months, most of North West Water's reservoirs have not refilled. The overall stock at the start of April was 66% of average, and there are significant differences between the storages in the Lake District (74%), the Pennines (only 32%) and North Wales (64%).

The company has a comprehensive drought management plan to safeguard essential supplies to all customers. This involves measures for demand management, provision of additional supplies, reinforcement of the supply system, and water conservation. Further restrictions on water use and additional Drought Orders will be required if the summer is very dry.

***Contingency Plans for Drought Extension Beyond Next Autumn***

Under average summer run-off conditions, the measures now in hand would be adequate to maintain supplies to all customers. Reservoir storages would remain lower than normal, and the enhanced level of support to Pennine areas from the regional aqueducts would need to continue. There would be no requirement for further restrictions on water use or for additional conservation measures. Most of the current drought measures would need to remain in place to assist reservoir refilling.

North West Water's drought management plan aims to safeguard water supplies under minimum historic run-off conditions. In general this amounts to a repeat of the 1995 weather pattern. Under this scenario, all the current drought measures would continue, and full use would be made of the on-going reinforcements and enhancements.

It would become necessary to re-introduce the ban on prescribed water uses and to apply for further Drought Orders to allow additional abstractions from Ullswater and Windermere.

***Environment Agency Commentary***

North West Water's submission summarises their comprehensive management plan for summer and autumn 1996. This was drawn up after extensive liaison and discussion between the company and the Environment Agency. The Environment Agency has required the company to:

- reduce wasteful and non-essential use of water;
- make best use of existing supplies, for example by reintroducing sources which though licensed have not been used for some time. Some difficulty has been experienced in reinstating groundwater sources because of quality problems. To overcome this the company has expressed interest in aquifer storage and recovery schemes;
- improve treatment and aqueduct capacities to increase transferability of water from areas of surplus to those at most risk.

There are 18 Drought Orders in force (total benefit from compensation water reductions 65 Ml/d, with around 145 Ml/d additional benefit from a relaxation of pumping restrictions at Windermere and Ullswater). Mitigation measures have been required at the most environmentally sensitive sites. These and the adoption of best operating practice are now formalised by a Memoranda of Understanding between North West Water and the Environment Agency. Since 1 April the Agency has received 7 Drought Permit applications for the North West, which are now under consideration.

North West Water have put together a wide ranging package of measures to cope with a potentially extremely serious situation. They have made significant advances in leakage control and in transferability of sources. The Environment Agency will continue in close and proactive contact with North West Water to monitor the operation of sources for maximum efficiency, progress on leakage control, and the impact of demand management measures, to enable the smooth operation of plans.

These will be adapted as necessary to keep abreast of the developing situation. It is envisaged that the current proposals will cater for a repeat of last year's weather conditions, starting from the current depleted resource position. However, if weather conditions are more extreme than 1995, and/or demand is not constrained within the water resources `budget', progressively more severe and environmentally damaging measures will be required. It should be noted that North West Water's proposals for additional Drought Orders for Windermere and Ullswater, are highly sensitive and controversial, and would therefore need an extremely sound case.

As these plans are based on regular reassessment of current sustainable yields, there is no assumption made regarding the end date of the drought. Available resources will be compared against demand to indicate whether additional actions are necessary. The plans will therefore be operational until resources recover. These plans are based on minimum historic inflow data, with preliminary allowances made to reflect 1995.

Detailed inflows for 1995 are currently being derived by the Agency and will be incorporated into ongoing reliable yield assessments in the near future. Indications are that some yields may be further reduced.

Overall, the Agency believes that these plans benefit from last year's experience and represent a very significant step forward. By operating in a prudent and sustainable manner, and undertaking the additional measures detailed in the plan, essential public water supplies in the North West will continue to be protected in the event of another dry summer and autumn.

## 4.6 *Midlands Region*

### 4.6.1 *Severn Trent Water*

#### *Company's Overview*

The last 12 months have been particularly challenging in upland catchments in mid-Wales and the Peak District. Eleven of these 12 months have delivered significantly below average rainfall. Notwithstanding this, the company's seven point programme and expenditure of around £150 million has provided a good base to withstand another dry summer in 1996. The company expect to provide water throughout the summer without any water restrictions given a period as severe as that seen in 1995. Should the weather be more severe than this, then modest restrictions may be necessary.

Work is due to start shortly on a new £6 million, 14.5 km pipeline from Rutland Water in Anglian Water's region to bring up to 31 Ml/d to customers in the Leicestershire area.

#### *Contingency Plans for Drought Extension Beyond Next Autumn*

The company has `hot weather plans' for all its operating districts. These cover a very wide range of issues from prolonged drought to very short duration operational emergencies. The plans are very detailed and specific to each operating area.

#### *Environment Agency Commentary*

The Agency supports the company's plans for demand management measures in relation to:

- publicity;
- leakage control;
- distribution control through pressure management;
- metering of sprinkler users;

However, there is uncertainty at this stage whether these measures will achieve the full level of savings anticipated by Severn Trent Water given a repeat of last summer's weather. Therefore, demands should be closely monitored and the company should be prepared to impose hosepipe bans if demands rise such that there is cause for concern in relation to available water resources.

There remains some uncertainty about the probable total availability of additional resources this year. However, sensible measures are being taken by the company to conserve water resources and to secure additional resources and treatment capacity for this summer as far as seems practicable.

### 4.6.2 *South Staffordshire Water*

***Company's Overview***

The current water resource situation for South Staffordshire is moderate. Groundwater levels are low, comparable with those immediately post 1976, with the level in Blithfield around 80%. The company expect Blithfield to be full on 1 April in a more typical year. The prospects for the summer, even with a repeat of 1995 demands, are satisfactory. It is considered exceptionally unlikely, even under drought conditions, that the company will seek to impose restrictions on its customers.

***Contingency Plans for Drought Extension Beyond Next Autumn***

If a drought continues beyond next autumn, then it is conceivable that this may require restrictions. Long standing drought management procedures are in place which can be initiated if necessary.

***Environment Agency Commentary***

The Agency is in agreement with the company's action plans for operational and demand management measures in the event of a minimum historic drought and takes the view that sensible measures have been taken over winter to conserve resources.

## 4.7 *Southern Region*

### 4.7.1 *Southern Water*

***Company's Overview***

The successful promotion of winter Drought Orders has enabled most of the surface sources to recharge satisfactorily. Bewl Water will be entirely full whilst Darwell should be better than 80% and will continue to benefit from the Bewl Water to Darwell Reservoir transfer.

However some groundwater sources will be critical particularly in the Brighton/Worthing area of Sussex Coast and in the Thanet area of East Kent. If dry weather persists throughout the summer West Sussex sources will come under strain. Local sources on the Isle of Wight may also become stressed and there will be a growing dependence upon the potable water transfer pipeline from Hampshire.

***Contingency Plans for Drought Extension Beyond Next Autumn***

Contingency plans are now being prepared to improve the robustness of the water supply situation across the company's region. The immediate pinchpoints will be Sussex coast and the Thanet area of East Kent. The company is considering the promotion of a pipeline from Hardham southwards towards Worthing and Brighton to enable water originating in the Western Rother catchment to be treatment at Hardham and used along the Sussex Coast in order to rest groundwater sources for the spring and summer of 1997.

In Kent wider use of Burham Treatment Works will be explored in order to extend eastwards the area that it currently serves and thereby make available greater quantities of water from the groundwater sources in the Medway area for use further east towards Thanet. A possible duplication of the Selling/Fleete potable water transfer main is under consideration.

***Environment Agency Commentary***

The Environment Agency is broadly satisfied with the plans submitted by Southern Water. Under average summer run-off conditions the proposed Drought Orders for Hardham and the River Stour are appropriate under average conditions since they anticipate possible future licence variations to use available water above existing prescribed flows and do not involve changes to prescribed flows. Under minimum historic run-off conditions a hosepipe ban would be likely in the Sussex Coast area from May onwards and would also be a possibility in the Sussex west area. With these additions, the Environment Agency believes the measures proposed by the company should be adequate.

There is no reference in the Southern Water plan to bulk supplies to other companies. The Environment Agency has urged Folkestone and Dover Water to discuss the possibility of a small supply (1 - 2 Ml.d) from Southern Water in East Kent. Similarly South East Water should discuss increasing their bulk supply with Southern Water from Weir Wood Reservoir. In the event of the latter being agreed it is likely that Southern Water would seek a further Drought Order to relax abstraction conditions at Hardham to allow the company to make up its own shortfall from Weir Wood. None of these measures appear in Southern Water's report because discussions have yet to proceed in earnest.

However, under minimum run-off conditions the Agency will expect possible bulk supply agreements to be used in preference to more environmentally damaging Drought Orders. If Drought Orders to take additional supplies from rivers are required, the Agency will prefer them to be limited to a few sites where the impact is likely to be less damaging (eg, Hardham).

### 4.7.2 *Portsmouth Water*

***Company's Overview***

River and groundwater levels to the west of the company's area are average for the time of year. To the east, groundwater levels are 80% of average but rising. The prospects for the summer are satisfactory. Hose restrictions may be necessary if there is a sudden drawdown in water levels coupled with a prolonged hot spell.

***Contingency Plans for Drought Extension Beyond Next Autumn***

None submitted.

***Environment Agency Commentary***

The Environment Agency is satisfied with the company's assessment of the current situation and with the proposed company actions given above. No detailed plan was submitted by Portsmouth Water for Appendix 3 but this is accepted given the company's current position.

### 4.7.3 *South East Water*

***Company's Overview***

Surface water sources are at full capacity following the introduction of Drought Orders on the Rivers Ouse and Cuckmere which reduced minimum flow controls. Chalk boreholes are at the minimum levels for this time of year.

Where possible rezoning on to alternative sources has occurred to rest these sources and enable recharge if weather conditions permit. The rezoning has mainly been achieved by extending the surface water sources.

The sandstone boreholes are generally small sources supplying discrete zones or supplemented with surface water. The majority are at or about average levels for the time of year. Subject to average rainfall the company do not foresee any major problems during the coming year.

If however, a summer similar to last year was experienced, difficulties could be experienced in areas supplied from the chalk sources and from the Pembury Treatment Works.

***Contingency Plans for Drought Extension Beyond Next Autumn***

Under minimum historic run-off conditions water resources along the Sussex coastal strip and within the Tunbridge Wells area could become critical. All measures would need to be introduced to control both demand and to obtain additional water from the surface sources. The timing and implementation of the measures would need to be advanced if minimum historic run-off conditions are experienced.

***Environment Agency Commentary***

In discussion with the company the Environment Agency has expressed the view that environmental measures on the River Ouse and River Cuckmere should be deferred until at least October for winter refill and the possibility of additional supplies from Southern Water and Mid Kent should be pursued first. Increased abstraction at Hartlake would only be acceptable as a short term measure ending in December.

### 4.7.4 *Mid Kent Water*

***Company's Overview***

The cumulative rainfall across the company's area for 1995/96 to early April is between 56% and 77% of the long term average. The consequent recharge to aquifers is between 28% and 72% of the LTA to date. Little further recharge can be expected. Storage in aquifers becomes more critical towards the east where design drought conditions are being approached with water levels showing little recovery following the low recharge.

Demands for water continue to be higher than forecasted but providing demand for water in the summer does not reflect the sustained high patterns experienced in 1995, available supplies should meet demand. If however the demands for water exhibit a similar patterns to those experienced in the summer of 1995, supplies are expected to be only very marginally in excess of demands which may result in some localised difficulties. Sustained high demand patterns, more severe than the summer of 1995, would result in supplies being unable to meet unrestrained demands in some areas.

***Contingency Plans for Drought Extension Beyond Next Autumn***

Should the autumn/winter rainfall fail to materialise sufficiently to remove soil moisture deficits and allow recharge to commence by January 1997, measures will be taken to advise customers of the situation seeking voluntary restraint in water consumption initially. Some proposed source enhancements will be accelerated. Other measures will be implemented as appropriate.

***Environment Agency Commentary***

The increase in demand during the winter months began in January 1996 and may be due to increased leakage. This should be reduced with the increased leak detection effort reported by the company. In discussions with the company they have agreed to pursue the possibility of additional temporary supplies from Southern. The increases in abstraction at Ospringe, Newnham and Forstal have not been agreed with the Environment Agency.

4.7.5 ***Folkestone & Dover Water Services***

***Company's Overview***

Groundwater, from which the company abstracts all if its supplies, continues to be at acutely low levels. Limited recharge in 1996 has only brought levels up to the historic lows of 1992 which followed four years of drought rather than the current nine months and emphasises the severity of the present situation. A hosepipe and sprinkler ban was introduced from 1 March 1996 and a series of contingency measures are either in progress or in advanced stages of feasibility study. These are described elsewhere in the report.

***Contingency Plans for Drought Extension Beyond Next Autumn***

All the company's area of supply is affected by lack of recharge and gives cause for concern that actual supply difficulties will be experienced, irrespective of run-off conditions. Regarding 1997, the situation will be kept continually under review.

Resources development at Dover Priory in 1996 and completion of the Dover Spine Main by autumn 1996 should improve the situation. Dover Priory is subject to conclusion of a contract with Railtrack. The extent of the improvement will depend on test pumping and a revised licence to be agreed with the Environment Agency. Further contingency options which would be extremely limited will therefore be considered in due course.

***Environment Agency Commentary***

The Environment Agency understands that the company has discussed the possibility of a bulk supply from Southern Water at Aylesham. The Agency encourages this measure together with any other bulk supply agreements that can be negotiated with neighbouring companies, including Mid Kent. With these additions, the Environment Agency is satisfied with the plan submitted by the company.

## 4.8 *South West Region*

### 4.8.1 *South West Water*

***Company's Overview***

Despite below average rainfall over the winter period, nearly all reservoirs have recovered to adequate levels. The exception is Roadford, one of three strategic regional reservoirs, which was 37% at the beginning of April. However, it is expected that, with some customer use restrictions in the Roadford area, essential supplies will be maintained to all customers across the region this summer, even with a repeat of the 1995 conditions.

In summary, for the South West's most critical reservoir, Roadford, projections on the worst case scenario show that essential supplies could be maintained to customers, provided that the full range of measures indicated are implemented. These include hosepipe and non-essential use restrictions. However, the reservoir would be drawn down to very low levels and schemes to ensure adequate winter refill would be required. Schemes are already in place, such as temporary pumped storage from the Rivers Thrushel and Lyd, although these would require a re-application for the current Drought Order. Other river transfer options are being actively pursued.

As a contingency, measures to support Roadford, should a more severe situation occur this summer, are also being examined. These include the installation of desalination units, as well as the works that would be needed should it prove necessary to transfer additional water into the Roadford area.

The situation at the other two strategic reservoirs of Wimbleball and Colliford is less critical than Roadford. Current projections indicate that, with the measures already put in place, a repeat of 1995 conditions could be handled without the need for customer use restrictions. However, if the worst historic conditions of 1976 or 1984 appears likely to occur, then hosepipe restrictions would be required as a prudent measure to conserve resources.

***Contingency Plans for Drought Extension Beyond Next Autumn***

If this summer produces a drought as severe as 1976, all the regional reservoirs will again be at very low levels in the Autumn. Plans are therefore being progressed to ensure adequate refill over next winter.

Options for obtaining licences for water as additional support to Roadford Reservoir are under review. These include the purchase of sites from an existing abstraction licence holder in the River Tavy catchment. This would provide a reliable source for the winter refill of Roadford, although it is accepted that there will need to be extensive environmental investigations to support any permanent abstraction licence applications.

At Wimbleball, construction of the permanent pumped storage pipeline is due to start in June. The pipeline itself is targeted to be completed by November and , if required, temporary pumps will be used to exploit the existing licence. At Colliford, if necessary, re-application for a Drought Order for winter use of a quarry source will be made in the autumn. This source has performed well over the autumn and winter period and extensive monitoring is being carried out, with a view to a future application for a permanent licence.

***Environment Agency Commentary***

Concerns remain over the supply situation in the South West Water supply zones this summer and into next year. A significant number of measures have already been taken by the company and many further measures are in hand. Agency staff have been helping the company work out which measures will require Drought Permit, Drought Order or Licence application. They will continue to work with the company to identify appropriate environmental mitigation and monitoring arrangements for each scheme.

***Colliford and Wimbleball Supply Zones:*** Current storage in Wimbleball (80%) is slightly less than its drawdown last year (83%). Storage in Colliford (64%) is slightly greater than its drawdown last year (57%), though demand restrictions in 1995 would have influenced the latter figure. Resources now appear to be available within both the Colliford and Wimbleball strategic reservoirs to meet supply needs within their respective supply zones in a drought when taken together with the actions already planned by the company.

***Benefits from seeking further buffer storage:*** to maximise existing resources, the Agency are working with the company to review whether it would be prudent to take steps to reduce demand in early summer to create an element of buffer storage. This could provide some security in meeting an emergency such as occurred in Torbay last year, and may help minimise the scale of measures necessary in the Roadford supply zone later in the year.

***Roadford Supply Zone:*** the situation for the Roadford supply zone provides the most serious challenge. Comparing the current state of Roadford Reservoir (38% full) with its drawdown from 31 March to 12 November last year (79%) gives an indication of the scale of measures which the company require to ensure essential supplies will be maintained. The drought measures already in place and planned should augment the current resources (38% full) by about 9,000 Ml, equivalent to a further 26% of reservoir volume being available. It is as yet too early to confirm whether this will be sufficient to provide the necessary security of stored water. In these circumstances the Agency would support the company in seeking water savings by customers within the Roadford supply zone as soon as demands start to drawdown strategic resources. Water demand across the whole of the company's region will be kept under review to ensure maximum appropriate support for the Roadford supply area.

Dialogue continues with the company, and the Agency will be seeking further information on the company plans to ensure sufficient measures are in place, or agree what further actions may be necessary. The mechanism for achieving timely decisions on when to implement each particular drought contingency plan remains a key issue to be resolved.

The Agency previously identified the need for water conservation control rules in this process. They allow the company and the regulators to plan and agree the timing for particular contingency plans to maintain storage at safe levels. These are now approaching finalisation. Until they are agreed the Agency believes the company must take a precautionary approach.

Commissioning winter resource augmentation schemes in time to make full use of available resources over the entire winter period is crucial, given the levels the company's reservoirs are predicted to reach next autumn if a drought continues. This is so under both average winter rainfall and drought winter rainfall scenarios. Discussions are under way concerning the company's plans to advance infrastructure schemes to make better use of existing licensed resources by overcoming operational limitations. These will continue over the next few weeks in the process of ensuring the comprehensiveness of the company's drought contingency plans.

### 4.8.2 *Wessex Water*

***Company's Overview***

Groundwater levels are currently at or just below average for the time of year. The main surface reservoirs are all full with the exception of Wimbleball which is currently 80% full and rising. From this position supplies are considered to be secure this summer and autumn, even under minimum historic run-off conditions. No supply problems are anticipated under minimum historic run-off conditions, although under such a scenario very low groundwater and reservoir levels would occur toward the end of the drought period.

The summer and autumn of 1990 represents minimum historic run-off conditions in a single year in Wessex. Such conditions were assessed at the time as having a return period of 1 in 50 years. If these conditions were repeated in 1996 the yield of groundwater sources which provide 75% of supplies in Wessex would remain largely unaffected. Groundwater levels would generally fall to marginally lower levels than those recorded in 1990, but not as low as those recorded in the two year drought of 1975/76. Surface reservoirs would probably fall to lower levels than previously recorded, but would still be operating within their design parameters. Resources would be used conjunctively with groundwater sources helping to augment the predominantly surface water zones in Somerset.

As well as meeting customer demands Wessex would also maintain its commitment to the environment by implementing a series of measures agreed with the Environment Agency to help protect low flow rivers. These include reducing abstraction from sensitive groundwater sources and pumping groundwater into rivers.

***Contingency Plans for Drought Extension Beyond Next Autumn***

Should a repeat of the worst single season drought on record extend into winter 1996/97 it is expected that resources would be safeguarded through the availability of the Wimbleball pump storage scheme.

***Environment Agency Commentary***

The state of the company's resources is generally satisfactory for meeting supply needs if a drought occurs. The only drought contingency plans which the Agency wish to discuss over the next few weeks are:

- what additional measures should be planned to meet an unforeseen emergency within the Wimbleball Reservoir supply zone as a whole; and

- what `back-up arrangements' are appropriate in case the measures proposed to help protect rivers that are particularly vulnerable to the combined effect of the company's groundwater abstractions and drought, prove to have only a limited success;
- no plans were presented for Appendix 3 but this is considered appropriate.

### 4.8.3 *Bournemouth & West Hampshire Water*

***Company's Overview***

The large majority of the company's resources are obtained by direct abstraction from the Rivers Avon and Stour. It is anticipated that flows in these rivers during the summer of 1996 will be sufficient to enable licensed quantities to be obtained. Groundwater levels are above average for the time of year and groundwater sources are not expected to cause any problems.

***Contingency Plans for Drought Extension Beyond Next Autumn***

None submitted.

***Environment Agency Commentary***

Resources appear satisfactory to meet supply needs even if a summer drought re-occurs and no special drought management plans appear necessary, and are therefore absent from Appendix 3.

### 4.8.4 *Bristol Water*

***Company's Overview***

The recovery of the company's key resources over the winter has been very satisfactory, and the company face summer 1996 in a stronger position that at the same time last year. A repetition of last year's exceptional conditions would, as in 1995, not require restrictions to be imposed on the company's customers.

***Contingency Plans for Drought Extension Beyond Next Autumn***

The only resource factor not directly in Bristol Water's control is the regulation and availability of the River Severn. Clywedog Reservoir has not refilled completely this winter, although the company are assured that this is not a cause for concern. If the Environment Agency found it necessary to reduce the amount of support to the river in the event of exceptional conditions in the upper catchment, then this could affect Bristol's resource strategies next autumn.

***Environment Agency Commentary***

The state of the company's resources are satisfactory, subject to the continued availability of resources from the River Severn. This aspect has been considered and is discussed in Section 5. No special drought management plans appear necessary over and above the current discussions between the company, the Agency and British Waterways over the provision of additional licence capacity from the Gloucester and Sharpness Canal.

## 4.9 *Thames Region*

### 4.9.1 *Thames Water*

***Company's Overview***

At the start of April reservoir storage was 98% of useable capacity, river flows slightly below average and groundwater levels were generally around average in the major aquifers to the west of London. This means the company can expect summer and autumn baseflows in the Thames and most of its tributaries to be around average throughout the summer and autumn months. Simulation modelling indicates that even under minimum historic conditions sufficient resources are available to maintain normal supplies throughout the summer and early autumn without any significant difficulties.

If the minimum historic condition is continued into the winter then the North London Artificial Recharge Scheme may need to be used for several weeks in the late autumn and early winter. Simulation of even the most extreme scenario (minimum historic rainfall combined with summer and autumn 1995 demands) indicated that there will be no significant water resource problems throughout the summer and autumn months up to the end of October.

***Contingency Plans for Drought Extension Beyond Next Autumn***

If the minimum historic condition is continued into the late autumn and early winter of 1996/97 then by the beginning of November storage in the London reservoir group will have reached the trigger level for the North London Artificial Recharge Scheme. In this unlikely extreme scenario the scheme would be needed to supplement supplies in the London area for up to 14 weeks. The company will also have the benefits of enhanced leakage reduction programme.

Supplies to the west of London are largely reliant on groundwater sources or groundwater fed rivers both of which are generally robust for the minimum historic run-off condition and not likely to give rise to supply problems. The major storage resource in this area (Farmoor) remains above the minimum trigger level at which additional operational management measures are needed to maintain supplies.

***Environment Agency Commentary***

Given the current reservoir storage and groundwater situation, resource problems are not anticipated this year and the company's plans are acceptable to the Agency. The company has commenced a long term water efficiency campaign (referred to generally within the table) which should supersede the need for appeals for restraint on the use of water during the summer. The campaign may need to be re-emphasised towards late summer - early autumn should minimum historic conditions persist.

### 4.9.2 *Three Valleys Water*

***Company's Overview***

Surface water sources and storage, which satisfy 30% of demand, are satisfactory but as winter rainfall and effective rainfall has been only about 80% of average, recharge has been limited. Groundwater levels are generally just below the long term average and there is little prospect of further increases in levels. Overall the resources situation is similar to that at the same time in 1991 but the company does not anticipate any significant supply difficulties over the summer under normal weather and summer demand conditions.

***Contingency Plans for Drought Extension Beyond Next Autumn***

Further contingency plans if the drought extends beyond next autumn include:

- alternative publicity campaign strategies to reflect either a `hosepipe ban' or a `Drought Order' scenario;
- deferment of refurbishment schemes to minimise planned `outage' to ensure maximum resource availability to meet demand and to spread the risk of operational problems from groundwater recession;
- installation of additional controls to facilitate flow monitoring and reversal in the strategic mains network to maximise resource availability;

- operational procedures agreed with neighbouring water suppliers for optimisation of cross-border transfers through all cross-connections;
- feasibility studies into additional resources in the confined aquifer and recommissioning disused sources to increase both average and peak resource availability;
- review of abstraction licences to explore the possibility of increases in peak output;
- deployment of additional resources as part of leakage saving programme including extension of district metering principles to areas of passive leakage control and installation of wide scale pressure reduction schemes;
- introduction of meters for customers wishing to use a sprinkler in selected demand sensitive areas. A pilot scheme has been introduced in 1996 to evaluate the effect of such a policy;
- comprehensive programme of zonal demand monitoring. 30 zones to be reconstructed to improve the monitoring of demand to ensure demand management techniques are appropriately focused; and
- installation of 'point of use pressure control devices' for domestic customers to limit excess local pressure and thus flow rate. A pilot scheme has begun to evaluate the effect through the peak demand period this year.

***Environment Agency Commentary***

The Agency regards the company plans as a comprehensive plan. Some of the Drought Order/Permit proposals under exceptional conditions are likely to be contentious and will need early consideration and planning if required. This is particularly so in the case of a Drought Order for the River Thames which, although unlikely to be required as early as indicated (see Appendix 3), will require very early planning and promotion.

### 4.9.3 *North Surrey Water*

***Company's Overview***

North Surrey's two principal sources are the River Thames and the Thames Valley gravels. On average, the River Thames contributes over 80% of total abstraction. The yield of the gravel source is influenced by rainfall and declines during the summer.

Taken together, these sources provide an adequate yield not critically affected by drought conditions. Demand in prolonged hot dry weather is characterised by very high peaks and a very high peak to average ratio. This is mainly due to garden watering. Bulk supply imports of treated water are used to support the distribution system at times of highest demand. It is unlikely that there will be a resource shortage during the summer of 1996.

***Contingency Plans for Drought Extension Beyond Next Autumn***

None submitted.

***Environment Agency Commentary***

The company plans submitted are acceptable to the Agency.

### 4.9.4 *Mid Southern Water*

***Company's Overview***

Mid Southern Water resources are recovering as a result of using river derived water, from the River Thames, to augment and promote a recovery of groundwater resources. Current indications are that groundwater resources are recovering despite a moderately dry winter. The dry early spring weather has focused concerns on the recovery of the chalk groundwater.

***Contingency Plans for Drought Extension Beyond Next Autumn***

None submitted.

***Environment Agency Commentary***

The newly commissioned Bray surface water source should provide adequate strategic resource capability for the company which together with recent infrastructure developments referred to by the company should address local supply difficulties experienced in recent years. No detailed plans are included in Appendix 3.

### 4.9.5 *Sutton & East Surrey Water*

***Company's Overview***

In the company's area groundwater levels are well below average, but are above historic minima for the time of year. The company's pumped storage reservoir at Bough Beech is full, and it is expected that this situation will continue until the end of April when pumping will cease under the terms of the licence.

It is expected that demand in the East Surrey area will be met this summer without the need for any restrictions, even if it reaches the level experienced in 1995.

In the Sutton area extra water can be made available from the East Surrey system, together with some bulk supplies from Thames Water, which it is hoped will relieve the necessity for a sprinkler ban in the event of a hot dry summer. For next year, in the event of 50% rainfall this coming winter, hosepipe bans would be required in the summer of 1997. In the event of 75% rainfall this winter, then some limited restrictions (sprinkler bans) would be required in the summer of 1997. In the event of a very hot summer, demand for garden watering will be high. As stated previously this is unlikely to cause problems in the East Surrey area. In the Sutton area there would be the possibility of a ban on the use of sprinklers if the measures being taken to obtain additional supplies are not sufficient.

***Contingency Plans for Drought Extension Beyond Next Autumn***

In the event of very low rainfall in the winter of 1996/97, then restrictions on the use of water for gardens in the summer of 1997 would be necessary.

***Environment Agency Commentary***

The company plans submitted are acceptable to the Agency.

## 4.10 *Welsh Region*

### 4.10.1 *Welsh Water*

***Company's Overview***

In South Wales reservoir refills have been successfully achieved over the winter despite a succession of months of below average rainfall. The storage position during early April is equivalent to the same period in 1995. Completion of a number of major treatment works refurbishments which were ongoing during the summer of 1995, has now been achieved. This will allow easier management of the major resources during the coming summer.

In North Wales the rainfall has been lower than the rest of the company's area, with some months enjoying less than 50% of average rainfall. As a consequence, refill of a number of reservoirs has not been accomplished. In particular the Brenig and Celyn Reservoirs used to regulate the Dee for the benefit of a number of public water supply abstractions are currently only some 71% of capacity.

In the Gwynedd area the company has been working hard to maximise the chances of refilling some of the smaller reservoirs.

Under minimum historic run-off conditions the resources in South Wales would maintain supplies to satisfy demand at summer 1995 levels and without the need for any Drought Order or other demand management measures. In North Wales the supply systems are divided between an Eastern and a Western region.

In the East, the company envisage that the Dee and Alwen systems would operate without the need for restrictive demand management given the measures already in place and those identified on the attached proforma of Operational Management Measures. Whilst these would sustain demand for the summer and autumn of 1996, Dŵr Cymru is looking ahead to the performance of these resources during the following summer. In the west the sources requiring most attention are those at Morwynion and Conwy. Further operational management measures to sustain these sources are identified on the separate proforma.

***Contingency Plans for Drought Extension Beyond Next Autumn***

None submitted.

***Environment Agency Commentary***

The overall resource situation in Welsh Region is of less concern than it was two or three months ago. However, there is still real concern in North Wales where two distinct resource problems have been identified.

The regulated River Dee system still has a combined storage of only 70%. This is just sufficient to survive a repeat of 1995 conditions in 1996. However this would leave the Dee system very low and unlikely to refill in 1997. Based on simulations of current demand under drought conditions this could lead to a sequence of restrictions on four water companies and other abstractors as well as an environmental impact on the river. This resource provides water to well over 2 million customers in North East Wales and North West England.

The Dee Regulation Scheme is operated by the Environment Agency, working with the statutory Dee Consultative Committee (DCC). The DCC comprises the designated abstractors (Dŵr Cymru - Welsh Water, Chester Waterworks, Wrexham and East Denbighshire Water Company, North West Water, and British Waterways) who together advise the Agency.

The DCC has considered what measures may be necessary to conserve and enhance resources, in order to maintain the security of supplies and minimise the environmental impact. Many of these measures, such as reduction in the River Dee's residual flow to the estuary, and a Drought Order reducing Llyn Celyn's compensation discharge, are already in place.

It had been considered that an emergency scheme to over pump Llyn Tegid (Bala Lake) to maintain flows in the Dee might be necessary in the autumn of 1996, and perhaps 1997. However, the environmental appraisal identified significant environmental, social and amenity impact, and the Agency was unable to support the scheme: a view reinforced unanimously by the DCC. A longer term proposal to pump excess winter flows to help ensure the refill of Llyn Celyn is now under consideration, and will be the subject of a detailed environmental assessment.

In the interim, it is imperative that all abstractors from the Dee do all they are able to reduce demand and conserve resources. The Agency is in the process of agreeing with abstractors packages of measures to achieve these aims, including high profile publicity campaigns. Demands and resource stocks are monitored routinely. The requirement for actions over and above those currently proposed will be reviewed regularly as the summer progresses.

The below average rainfall has also affected numerous direct supply reservoirs across North Wales. Some are already capable of conjunctive use, and Dŵr Cymru is seeking to increase the opportunities for this though the majority depend on engineering works. Alwen Reservoir is of most concern by Llyn Conwy, Llyn Cynwch and Llyn Morwynion are presently isolated and are equally essential to their respective communities. The NRA granted Dŵr Cymru two time limited licences to maximise winter refill but these have now expired.

The Agency is pleased to see the measures proposed for these sources, but expects to see them coupled to measures to manage demand.

### 4.10.2 *Wrexham Water*

***Company's Overview***

The River Dee provides approximately 70% of the summer resources and, as such, the company's prospects for 1996 are very much linked into this resource and its prospects. It seems likely that Dee General Directions Stage 1 will be in force on 1 May 1996 and, as such, the company are required to reduce the abstraction by 1 Ml per day below those in 1995.

Initially the company plan to achieve this by recommissioning a previously abandoned borehole supply which will provide the necessary quantity. As a further measure, the company are presently promoting a free optional metering scheme which, although not considered to have an effect on demand in 1996, will assist in the implementation of the company's compulsory metering policy for sprinkler users.

***Contingency Plans for Drought Extension Beyond Next Autumn***

None submitted.

***Environment Agency Commentary***

The Environment Agency is satisfied with the company plans submitted.

### 4.10.3 Chester Water

***Company's Overview***

The Dee Consultative Committee, of which Chester Waterworks Company is a member, meets on a regular basis to review the water resources situation affecting the company and the other River Dee abstractors. Low rainfall levels in March mean that there will be little change in the cumulative total of only 59% of the long term average for October 1995 to March 1996. The Dee Reservoir storage system at approximately 1100 cumec days is unlikely to reach the target of 1234 cumec days storage by 1 May. The Committee's agreed view is that the Dee system will support abstractions in 1996 but measures and plans should be put in place to respond to the consequences of below average summer run-off conditions followed by below average winter run-off conditions.

***Contingency Plans for Drought Extension Beyond Next Autumn***

The company is dependent on the River Dee for 95% of supplies and does not consider its small borehole source as material for this report. Contingency plans to deal with supply problems in the event of a drought are the subject of discussions by the Dee Consultative Committee.

***Environment Agency Commentary***

The Environment Agency is satisfied with the company plans submitted.

## 4.11 *Summary of Company Positions & Actions in the Event of a Continuing Summer Drought*

The above sections demonstrate that a considerable number of actions and measures will need to be implemented by the companies in order to maintain essential supplies if the summer months are hot and dry. In all cases these measures have been planned in order that rota cuts and standpipes can be avoided. Table 4.1 below summarises the company actions necessary under the minimum historic run-off scenario.

Nearly a third of companies have indicated the ability to cope with a summer of minimum historic run-off without measures being taken to enforce supply restrictions or secure additional resources.

Companies reliant on groundwater sources are likely to be encountering some difficulties this summer regardless of the run-off sequence, since groundwater recharge this winter has been limited and cannot be expected to commence again until October/November.

In contrast with the same time last year it is important that companies make early and effective use of demand restrictions including hosepipe bans and non-essential use restrictions. A number of these measures are now in place and have been so over the winter but the Agency warns against any form of delay in reintroducing demand restrictions which have now been lifted.

The detailed company plans contained in Appendix 3 show that the Environment Agency will be called upon to make extensive use of its new powers to grant Drought Permits in order to ensure that available resources are used in the most sensible and effective way. Drought Permits will only normally be granted once demand restrictions are in place and having ensured that environmental concerns have been taken into account.

In the event that the drought extends through the summer and into the autumn and winter of 1996 companies will need to implement their contingency plans, and some companies will need firm winter plans even if average winter rainfall occurs. The Agency will be monitoring the drought situation closely and will aim to ensure that companies are planning for an extended winter drought as well as the challenges of meeting supplies this summer.

## *Table 4.1 Summary of Company Positions & Possible Actions Necessary in the Event of a Hot Dry Summer*

| *Company* | *Company reports it will maintain essential supplies without any Drought Orders /Permits* | *Hosepipe or Sprinkler Ban required/ possible* | *Non-essential Use Bans required/ possible* | *Drought Orders or Permits required/ possible* |
|---|---|---|---|---|
| ***Anglian*** | ✓ | | | |
| Essex & Suffolk Water | | ✓ | ✓ | ✓ |
| Cambridge | ✓ | | | |
| Tendring | ✓ | | | |
| ***Northumbrian*** | ✓ | | | |
| Hartlepools | ✓ | | | |
| ***Yorkshire*** | | ✓ | ✓ | ✓ |
| York Water | ✓ | | | |
| ***North West*** | | ✓ | ✓ | ✓ |
| ***Severn Trent*** | | ✓ | | ✓ |
| South Staffs | ✓ | | | |
| ***Southern*** | | ✓ | | ✓ |
| Portsmouth | | ✓ | | |
| South East | | ✓ | ✓ | ✓ |
| Mid Kent | | ✓ | ✓ | ✓ |
| Folkestone | | ✓ | ✓ | ✓ |
| ***South West*** | | ✓ | ✓ | ✓ |
| ***Wessex*** | ✓ | | | |
| Bournemouth & West | ✓ | | | |
| Bristol | ✓ | | | |
| ***Thames*** | ✓ | | | |
| Three Valleys | | ✓ | ✓ | ✓ |
| North Surrey | ✓ | | | |
| Mid Southern | ✓ | | | |
| East Surrey & Sutton | | ✓ | | ✓ |
| ***Dŵr Cymru*** | ✓ | | | |
| Wrexham | | ✓ | | |
| Chester | | ✓ | | ✓ |

## 5. *INTER-COMPANY ISSUES*

The plans submitted by water companies have raised a number of inter-company issues over the use of resources:

- ***Kielder Reservoir.*** The additional demand from the Tees-Wiske transfer will need to be considered within the overall management arrangements for operating the Kielder sources. Revised operating procedures for the Tyne/Tees resources will need to be established to ensure that sufficient water can be made available to meet the needs not only of Northumbrian Water but also to provide additional water to Yorkshire Water.

- ***Dee Reservoirs.*** The Dee reservoir system essentially comprises Brenig and Celyn reservoirs and Lake Bala which are used to regulate the River Dee for supplies to North West Water, Welsh Water and Chester and Wrexham Water Companies. Resources are also made available for British Waterways (BW). Decisions on the operation of these resources are made by the Environment Agency on the advice of representatives from these major abstractors who collectively form the Dee Consultative Committee (DCC) which is a statutory committee established to balance the interests of abstractors and the environment. Details of recent DCC decisions which affect the management of this important inter-company resource is given in Section 4.10.1. A further meeting of the DCC is planned to give further consideration of management plans.

- ***Bulk Transfers.*** Transfers of water between companies are important components of water company strategies for meeting demand both during periods of normal weather conditions and at times of drought. The Agency will expect water companies to investigate and agree transfers in preference to Drought Orders which impact on the environment. In particular the Agency requires Folkestone and Dover Water and South East Water to seek bulk supplies from Southern Water in advance of possible applications for additional resources.

- ***River Severn.*** Both Severn Trent Water and South Staffordshire Water have River Severn resources as a major component of their strategies. However, under the minimum historic run-off sequence it is likely that there would be a need to conserve resources by restricting abstractions from the River Severn and reducing the level of supporting releases from Clywedog Reservoir and in an extreme situation to seek Drought Order powers on the River Severn. This is an area of concern for the Agency and reinforces the need for both companies to maintain their demand management initiatives.

- ***Vyrnwy Reservoir.*** Vyrnwy Reservoir is used as a direct supply source to North West Water, but also retains a water bank to provide environmental benefits by releases to the River Severn. Consideration will need to be given to relative benefits of the deployment of this bank should this become an issue later in the summer.

# 6. AGRICULTURAL WATER PROSPECTS FOR THE SUMMER OF 1996

## 6.1 *Overview to Summer Agricultural use of Water Resources*

Spray irrigation is the most significant agricultural water use over the summer months. In recent years there has been a move toward producing vegetables under contract to large retail outlets who demand a high quality product in dependable quantities. Irrigation is essential to growers in order to ensure that the crops they produce meets these rigorous conditions.

Spray irrigation accounts on average for only about 1% of water abstraction in England and Wales, but is concentrated in the driest times of the year and in the driest parts of the country. In some areas, peak irrigation rates can be similar to the amount of water abstracted for public water supply. Unlike public water supply however, little or no water is returned to the source of supply. Therefore irrigation can have a particularly marked effect on the availability of water resources.

It is sometimes necessary to control irrigation abstractions during periods of drought, in order to protect the water environment and make scarce resources last longer. There are three ways in which the Environment Agency can achieve this:

- through conditions written into abstraction licences which limit or prevent abstraction when flow or levels fall below predetermined thresholds;

- voluntary restrictions agreed between the Environment Agency and farmers;

- compulsory restrictions under Section 57 of the Water Resources Act 1991. These restrictions may prevent irrigation altogether or place partial restrictions on use eg; limiting the volume abstracted.

## 6.2 *Restrictions During 1995 and Prospects for 1996*

Table 6.1 below shows the number of spray irrigation restrictions of various types which were in force towards the end of the 1995 summer.

***Table 6.1 Number of Irrigation Abstraction Licences Affected by Restrictions in 1995***

| REGION | S.57 TOTAL BAN | S.57 PARTIAL RESTRICTION | VOLUNTARY RESTRICTION | RESTRICTION THROUGH LICENCE CONDITIONS | REGIONAL TOTAL |
|---|---|---|---|---|---|
| Anglian | 0 | 500 | 213 | 257 | 970 |
| Northumbria & Yorkshire | 0 | 0 | 0 | 154 | 154 |
| North West | 0 | 74 | 0 | 0 | 74 |
| Severn Trent | 0 | 0 | 0 | 579 | 579 |
| Southern | 0 | 8 | 0 | 97 | 105 |
| South Western | 0 | 0 | 0 | 53 | 53 |
| Thames | 0 | 0 | 0 | 11 | 11 |
| Welsh | 125 | 0 | 0 | 70 | 195 |
| TOTAL | 125 | 582 | 213 | 1221 | 2141 |

Out of a total of nearly 11,000 spray irrigation licences, only 125 were subject to total bans under Section 57 of the Water Resources Act. A further 582 were partially restricted (which usually means a limit of 50% of the licensed quantity or irrigating during specified hours only). During 1995, close co-operation between the NRA, farmers and their representatives meant that drought restriction were managed without the need for widespread compulsory restrictions under Section 57. During 1996 the Environment Agency aims to repeat this close co-operation with farmers in order to ensure successful agricultural water management throughout the summer.

However, in contrast with the same time last year, the outlook for agricultural water supplies throughout the summer is less certain this year for the following reasons:

- there has been very limited groundwater recharge over the winter and this will affect the quantity which is available for direct abstraction;
- the limited groundwater recharge will also affect the flows in groundwater fed rivers and this will also limit the volume of water available for abstraction;
- soil moisture deficits are beginning to climb rapidly marking the onset of the irrigation season.

The Anglian region of the Environment Agency, which accounts for the majority of spray irrigation, has already issued a formal forecast for spray irrigation prospects this summer as part of its normal routine operations. This year the forecast is moderate to poor, locally poor, reflecting the below average recharge in many parts of the region during the winter months. Further details are available from the regional head office.

The likely impact of current impoverished water resources on agricultural abstraction could be:

- the earlier than normal introduction of restrictions via flow determined conditions on abstraction licences;

- depending upon summer weather patterns, earlier calls for voluntary restrictions where such systems operate;

- possible earlier imposition of restrictions under Section 57, again dependent upon summer weather.

The Environment Agency is mindful of the effect that spray irrigation restrictions can have on growers and therefore actively promotes on farm winter storage of water for use in the summer. Water taken and stored over the winter is not subject to irrigation restrictions and therefore can guarantee growers as much water as they have stored for their summer irrigation needs.

The Agency encourages farmers to determine the risks to the reliability of their supplies as a consequence of irrigation restrictions and to assess the costs and benefits of providing on farm winter storage to meet their own specific needs. The Agency is nonetheless aware of the financial consequences of restricted irrigation and places an emphasis on seeking voluntary restrictions though discussions with growers, in an effort to achieve the necessary conservation of water resources in as flexible and open a manner as possible. The Environment Agency only utilises blanket bans in selected catchments after careful consideration of the overall situation and the options available.

The Agency is also of the view that where appropriate restrictions through flow or level dependent conditions written into abstraction licences is an effective way of securing the necessary reductions in abstraction. Using licence conditions ensures that farmers are aware from the day that the licence is granted of the general reliability of their supplies and can therefore plan their water supply provisions accordingly.

## 7. *ENVIRONMENTAL ISSUES*

The identification of environmental effects of the drought are in many instances currently difficult to establish, because the environment may recover from a short period of degradation, but will suffer permanent damage as the drought continues. Also some of the impacts may not be visible immediately, for example the long term impact on fisheries of the drying out of spawning grounds

The high temperatures and low river flows have lead to poor salmon runs in parts of the country. Fisheries have been badly affected with fish kills associated with weed growth, low dissolved oxygen levels, low river flows and low still water levels. For example, between 50,000 - 100,000 coarse and game fish juveniles will have perished in parts of the North West region alone. The Agency has been heavily involved in fish rescues throughout the country. Throughout the winter, a Drought Order (the first of its kind, applied for by the Agency under the new Environment Act legislation) has been in place to protect a thriving fishery at a reservoir near Macclesfield.

There has been a general deterioration in overall ecology of rivers. Water quality has also been affected but in both positive and negative ways. For example, some catchments show an improvement in water quality due to reduced operation of combined sewage outflows, reduced impact of agriculture nutrients, or reduced highway drainage. Elsewhere there has been deterioration due to lack of dilution and reaeration of industrial and sewage works effluents.

Dry weather can also increase the risk of pollution as lower river flows mean than there is less water to dilute any pollutants entering watercourses.

## 8. *THE ENVIRONMENT AGENCY & SUMMER DROUGHT MANAGEMENT*

It will be clear from the general contents of this report that water resources prospects for the summer of 1996 are finely balanced at present in some parts of England and Wales. Much depends on weather patterns over the spring and summer but water companies have demonstrated that they are currently preparing for the possibility of a dry summer. It is however inevitable that a number of companies will enter the spring and early summer with Drought Orders already in place, restrictions such as hosepipe bans and non-essential use bans in force in the worst affected areas.

The Environment Agency will maintain a high level of activity in fulfilling its obligation to protect the environment. This will involve:

- working with companies where necessary in order to ensure that available water resources are being managed effectively throughout the current situation. However the Environment Agency emphasises that throughout the summer it will be the responsibility of water companies to implement the actions planned to deal with any developing supply difficulties because of drought;

- maintaining pressure on companies to follow their drought management plans and to develop these further should the situation require this;

- working to minimise the environmental impacts of the drought by ensuring the appropriate timing of demand restrictions before the use of Drought Permits/Drought Orders;

- the Agency operating or managing the interbasin transfers for which it is responsible;

- maintaining close liaison with growers and farmers and keeping them informed of the status of agricultural water availability;

- the preparation of *ad hoc* reports, including those required by the Secretary of State for the Environment;

- providing timely information to the public;

- continual monitoring of the prevailing hydrological and meteorological conditions;

- the Agency in increased enforcement activities to protect the environment and legitimate water users;

- weekly Water Resources Reports detailing the up to date hydrological status of England and Wales together with information on restrictions in place; and

- the Agency in carrying out fish rescues and operating oxygen bubblers in order to protect the water environment where appropriate.

## 9. *ACTIONS IN THE LONGER TERM*

Water companies have the responsibility to develop water resources for the purposes of maintaining an efficient and economical system of water supply in their areas of supply. The Environment Agency's role includes the authorisation of abstraction licences to water companies to augment their available water resources. In determining applications for new licences the Agency will take account of the reasonable needs for the additional water together with the potential environmental impact of the proposed abstraction. Where the applicant believes that an Agency decision to refuse a particular application is unjustified an appeal may be made to the Secretary of State for the Environment.

The Agency recognises its duty to have special regard to the water supply duties of the water companies and is in dialogue with the water companies over the long term planning of water resources to meet their reasonable needs. During the NRA's existence regional and national water resources strategies were published and the Agency in due course will be updating these.

As part of the Government's long term review of the drought, the Agency is working with the Water Services Association, Water Companies Association and OFWAT concerning the implications of the drought for the long term planning of future water resources and supply.

## APPENDIX 1

*Reservoir Levels as at 18 April 1996*

## *Appendix 1*

# *Reservoir Levels as at 18 April 1996*

| *Region* | *Reservoir* | *% Full* |
|---|---|---|
| *ANGLIAN* | Grafham | 95 |
| | Rutland | 93 |
| *NORTH EAST* | Teesdale | 89 |
| | Kielder | 92 |
| | Washburn | 73 |
| | Bradford supply | 55 |
| *NORTH WEST* | Northern Command Zone | 74 |
| | Vyrnwy | 64 |
| *MIDLANDS* | Clywedog | 88 |
| | Derwent Valley | 53 |
| *SOUTHERN* | Bewl | 98 |
| | Ardingly | 100 |
| *SOUTH WEST* | Clatworthy | 98 |
| | Bristol West | 95 |
| | Colliford | 64 |
| | Roadford | 38 |
| | Wimbleball | 80 |
| | Stithians | 97 |
| *THAMES* | London | 98 |
| | Farmoor | 98 |
| *WELSH* | Celyn and Brenig | 72 |
| | Brianne | 100 |
| | Big Five | 94 |
| | Elan Valley | 95 |

## APPENDIX 2

*River Flow Data for Early April 1996*

# Early April Riverflow data for Major Rivers in England and Wales as % of Early April Average

| Region | River | Flow as % of Monthly LTA |
|---|---|---|
| ANGLIAN | Bedford Ouse at Offord | 64 |
| | Witham at Claypole | 47 |
| | Stour at Langham | 40 |
| NORTH EAST/YORKSHIRE | Wharfe at Flint Mill | 46 |
| | Derwent at Buttercrambe | 126 |
| | South Tyne at Hayden Bridge | 66 |
| NORTH WEST | River Mersey at Ashton Weir | 23 |
| | River Lune at Caton | 16 |
| | River Derwent at Camerton | 19 |
| MIDLANDS | Severn at Bewdley | 110 |
| | Derwent at Derby | 39 |
| | Dove at Marston | 58 |
| SOUTHERN | Itchen at Easton | 104 |
| | Western Rother at Iping Hill | 97 |
| | Ouse at Gold bridge | 161 |
| | Darent at Otford | 116 |
| | Medway at Teston | 164 |
| | Stour at Horton | 55 |
| | Eastern Rother at Udiam | 58 |

## Appendix 2

# Early April Riverflow data for Major Rivers in England and Wales as % of Early April Average (cont.)

| Region | River | Flow as % of Monthly LTA |
|---|---|---|
| SOUTH WEST | Exe at Thorverton | 61 |
| | Tamar at Gunnislake | 52 |
| | Tone at Bishop Hull & Halsewater | 108 |
| | B. Avon at Bathford | 76 |
| | M. Avon at G. Somerford | 72 |
| THAMES | River Colne at Bilbury | 78 |
| | River Kennet at Theale | 92 |
| | River Thames at Kingston | 79 |
| | River Lee at Fieldes Weir | 55 |
| WELSH | Wye at Redbrook | 241 |
| | Usk at Chainbridge | 154 |
| | Taff at Pontypridd | 86 |
| | Conwy at Cwn Llanerch | 41 |
| | Dee at Manley Hall | 62 |

# APPENDIX 3

## *Detailed Company Drought Management Plans in the event of a Hot Dry Summer*

## *ANGLIAN REGION*

***Companies Included:***

- ***Anglian Water Services***
- ***Essex & Suffolk Water***
- ***Cambridge Water***
- ***Tendring Hundred Water***

# 1996 DROUGHT MANAGEMENT PLAN FOR: ANGLIAN WATER SERVICES

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| Northern Chalk - Lincolnshire | OM | Supply balance between groundwater and surface water | N/A | Yes | | | | | | | | | |
| Company | DM | Continued leakage control | N/A | Yes | | | | | | | | | |
| Company | DM | Publicity - water conservation | N/A | Yes | | | | | | | | | |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

OM = Operational Management
SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: ESSEX & SUFFOLK WATER

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| Hartismere supply area local groundwater units | OM | Pressure reduction by valving | N/A | No | | | ——— | ——— | ——— | | | | |
| Hartismere supply area local groundwater units | OM | Emergency transfer of additional supplies from nearby source | N/A | No | | | - - - | - - - | - - - | | | | |
| Hartismere supply area local groundwater units | OM | Bowsers on standby for use by irrigators/golf courses | N/A | Yes | | | ——— | ——— | ——— | | | | |
| Hartismere supply area local groundwater units | OM | Lowering suction of pumps to cope with low water table | N/A | Yes | ——— | | | | | | | | |
| Hartismere groundwater unit | SM | Drought Permit - Additional abstraction and/or unlicensed source | Drought Permit | No | | | - - - | - - - | - - - | - - - | | | |
| Denver/Ely Ouse | SM | Drought Order - Additional abstraction and/or prescribed flow reduction | Ordinary | No | | | | | - - - | - - - | - - - | - - - | - - - |
| Companywide | DM | Request to conserve water this summer included in billing round (Publicity & appeals) | N/A | Yes | ——— | | ——— | | | | | | |
| Suffolk | DM | Notices to holiday camps advising tourists on water usage (Publicity & appeals) | N/A | Yes | | ——— | ——— | ——— | ——— | | | | |
| Zone as required | DM | Voluntary requests to conserve water (Publicity & appeals) | N/A | No | | | | - - - | - - - | | | | |
| Companywide | DM | Check that sprinkler users own meters (Publicity & appeals) | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Companywide | DM | Maintain high level of leakage control | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Zone as required | DM | Consider use of hose pipe ban | N/A | No | | | - - - | - - - | - - - | - - - | | | |
| Zone as required | DM | Consider use of non essential use ban | Ordinary | No | | | - - - | - - - | - - - | - - - | | | |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

OM = Operational Management
SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: CAMBRIDGE WATER COMPANY

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| All zones | DM | Continuing installation of meters and present leakage control | N/A | Yes | | | | | | | | | |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

OM = Operational Management
SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: TENDRING HUNDRED WATER SERVICES

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| Ground water borehole sources | OM | Uprating borehole source transfer capacity | N/A | No | ——— | ——— | ——— | | | | | | |
| Ardleigh reservoir pumped from River Colne | SM | River Colne base flow to be augmented by Anglian water services Balkerne borehole as required to maintain Ardleigh at or above control curve | N/A | Yes | - - - | - - - | - - - | - - - | - - - | - - - | - - - | - - - | - - - |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

OM = Operational Management
SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

## *NORTH EAST REGION*

***Companies Included:***

- ***Northumbrian Water***
- ***Yorkshire Water***

# 1996 DROUGHT MANAGEMENT PLAN FOR: NORTHUMBRIAN WATER

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| River Tees | OM | Transfer from River Tyne supported by Kielder | N/A | Yes | | | | ——— | ——— | ——— | ——— | ——— | |
| Weardale Reservoirs | OM | Transfer from River Tyne to Wasberley /Tunstall supported by Kielder | N/A | Yes | | | ——— | ——— | ——— | ——— | ——— | ——— | |
| Fontburn Reservoir | OM | Retain storage for drought minimum flows - use RTAS earlier | N/A | Yes | | | ——— | ——— | ——— | ——— | ——— | ——— | |
| Kielder | SM | Releases (as designed) to the River North Tyne | N/A | Yes | | | ——— | ——— | ——— | ——— | ——— | ——— | |
| All Areas | DM | On going leakage control | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |

Key: ——— FIRM PLAN

• • • • • • • • • POSSIBLE COURSE OF ACTION

OM = Operational Management
SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: YORKSHIRE WATER

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 |
|---|---|---|---|---|---|
| | | | | | A M J J A S O N D |
| Nidd/Barden/Grimwith | OM | Minimise output with support from Wharfe DO | N/A | Yes | |
| Washburn/Eccup | OM | Minimise output with support from Wharfe and Ouse DO | N/A | Yes | |
| Calder Group | OM | Minimise output with support from Grid | N/A | Yes | |
| Winscar Group | OM | Minmise output with transfer from neighbouring reservoir groups | N/A | No | |
| Southern Pennine Group | OM | Minimise output with support from Grid | N/A | Yes | |
| Harrogate Group | OM | Minimise output with support from Ure DO | N/A | Yes | |
| Rivers | OM | | | | |
| - River Wharfe | | Maximise use subject to DO's | N/A | Yes | |
| - River Ouse | | | | Yes | |
| - River Ure | | | | Yes | |
| - River Hull | | | | Yes | |
| Groundwater Units | OM | | N/A | | |
| - Hull and Wolds | | Reduce output with Grid support | | Yes | |
| - Sherwood sandstone (Shelby & Doncaster) | | Maximise to support Grid | | Yes | |
| - North Yorks (Carb Lime/Milst Grit) | | Minimise supply area | | Yes | |
| Calder Group | SM | Compensation reduction | Ordinary | Yes | ● E |
| Calder Group | SM | Compensation elimination | Emergency | No | |
| Winscar Group | SM | Compensation reduction | Ordinary | No | |
| Southern Pennine Group | SM | Compensation reduction | Ordinary | Yes | ● E |

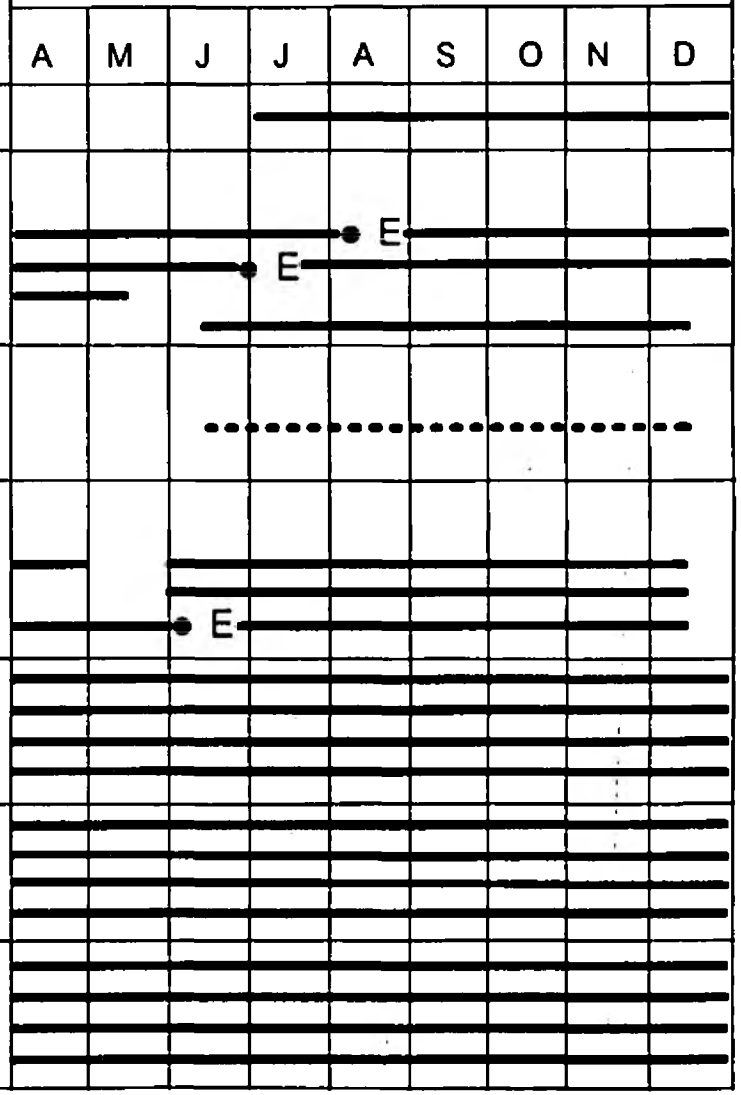
Key:
- ——— FIRM PLAN
- - - - - - POSSIBLE COURSE OF ACTION
- ● E EXTENDED

OM = Operational Management
SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: YORKSHIRE WATER (cont.)

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) |
|---|---|---|---|---|
| Harrogate Group | SM | Compensation reduction | Ordinary | No |
| Rivers | SM | | | |
| - River Wharfe | | Additional abstraction, Prescribed flow reduction | Ordinary | Yes |
| - River Ouse | | Additional abstraction, Prescribed flow reduction | Ordinary | Yes |
| - River Ure | | Additional abstraction | Ordinary | Yes |
| - River Hull | | Residual flow reduction | Ordinary | No |
| Groundwater Units | SM | | | |
| - Sherwood sandstone (Shelby & Doncaster) | | Additional abstraction | Ordinary | No |
| Other Sources | SM | | | |
| - Silsden Reservoir | | Additional abstraction | Ordinary | Yes |
| - Chellow Dean, Haigh Cote | | Unlicensed source | Ordinary | No |
| - Old Town | | Unlicensed source | Ordinary | Yes |
| Bradford/Calder/Skipton | DM | Hosepipe Ban | Ordinary | Yes |
| | | Non Essential Use Ban | | Yes |
| | | Publicity and Appeals for Restraint | | Yes |
| | | Leakage Control | | Yes |
| Harrogate/Richmond /Hambleton | DM | Hosepipe Ban | Ordinary | Yes |
| | | Non Essential Use Ban | | Yes |
| | | Publicity and Appeals for Restraint | | Yes |
| | | Leakage Control | | Yes |
| Leeds/Wakefield | DM | Hosepipe Ban | Ordinary | Yes |
| | | Non Essential Use Ban | | Yes |
| | | Publicity and Appeals for Restraint | | Yes |
| | | Leakage Control | | Yes |




Key:
- FIRM PLAN
- POSSIBLE COURSE OF ACTION
- ● E EXTENDED

OM = Operational Management
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Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: YORKSHIRE WATER (cont.)

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 A | M | J | J | A | S | O | N | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sheffield/Barnsley /Doncaster | DM | Hosepipe Ban<br>Non Essential Use Ban<br>Publicity and Appeals for Restraint<br>Leakage Control | Ordinary | Yes<br>Yes<br>Yes<br>Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Hull | DM | Hosepipe Ban<br>Non Essential Use Ban<br>Publicity and Appeals for Restraint<br>Leakage Control | Ordinary | No<br>No<br>No<br>Yes | | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Malton | DM | Hosepipe Ban<br>Non Essential Use Ban<br>Publicity and Appeals for Restraint<br>Leakage Control | Ordinary | No<br>No<br>No<br>Yes | | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

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Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

Note: Plans have also been announced on 26 April by Yorkshire Water Services for:

- Tees - Wiske transfer
- St. Aidan's pit
- Moor Monkton to Elvington pipeline

## *NORTH WEST REGION*

***Companies Included:***

- ***North West Water***

# 1996 DROUGHT MANAGEMENT PLAN FOR: NORTH WEST WATER

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 |
|---|---|---|---|---|---|
| | | | | | A M J J A S O N D |
| Pennine reservoirs | OM | -Balance supplies from local and regional sources | N/A | Yes | |
| | | - Ensure local source operated at sustainable rates | N/A | Yes | |
| Lake District and LCUS regional sources | OM | -Maximise pumping from Ullswater, Windermere and River Lune/Wyre<br>- Operate Stocks and Barnacre reservoir at sustainable rates<br>- Adjust output from Thirlmere and Haweswater to meet demand<br>- Maximise Fylde groundwater output when Rivers Lune/Wyre not available<br>- Conserve storage in reservoirs whenever possible | N/A | Yes | |
| River Dee | OM | - Construct new treatment plant at Huntington | N/A | Under construction | |
| | | - Maximise output when river flow is not being supported by regulation releases | | Yes | |
| | | - Minimise output when river flow is being supported by regulation releases, in accordance with SCZ operating plan. | | No | |
| | | - During May to July, reduce output below rate required under Dee Drought General Directions by maximising borehole output | | No | |
| | | - From August, increase River Dee output to enable increased west-to-east transfer | | No | |
| | | - In Autumn, when river flow is not being supported by regional releases, maximise output and west to east transfer to assist re-fill of NCZ reservoirs | | No | |
| Lake Vyrnwy | OM | - Minimise output whilst River Dee fully available | N/A | Yes | |
| | | - Operate within sustainable output | | Yes | |

Key: FIRM PLAN

POSSIBLE COURSE OF ACTION

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Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: NORTH WEST WATER (cont.)

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 |
|---|---|---|---|---|---|
| | | | | | A M J J A S O N D |
| SCZ boreholes | OM | - Maximise outputs to meet SCZ demand and to support west to east transfers<br>- Modifications to increase outputs within existing licence constraints | N/A | Yes<br>In hand | |
| - Rossendale<br>- Rochdale<br>- Oldham<br>- Tameside | OM | Further reinforce connections from Haweswater Aqueduct | N/A | No | |
| SCZ - NCZ link | OM | Construct new trunk pipeline and pumping stations to enable west to east transfer of up to 100 Ml/d | N/A | Under construction | |
| Various unused sources, already licensed | OM | Re-commission, or transfer to other sources | N/A | Yes | |
| Sunnyhurst and Earnsdale reservoirs Darwen | OM | Construct new pipeline and transfer to Fishmoor WTW to support Blackburn supplies | N/A | No | |
| All areas except Cumbria | DM | Continue hosepipe ban | Ordinary | Yes | |
| All areas | DM | Implement detailed publicity strategy | N/A | Yes | |
| All areas | DM | Introduce incremental prescribed uses ban | N/A | No | |
| All areas | DM | - Regular drought updates<br>- keep leakline open<br>- Install meters at high water-using properties<br>- Enhanced leakage control measures<br>- Letters to all customers | N/A | Yes<br>Yes<br>Yes<br>Yes<br>Yes | |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

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Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: NORTH WEST WATER (cont.)

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| Ullswater and Windermere | SM | Prescibed flow reduction | Ordinary | Yes | ——— | ——— | ——— | ——— | ——— | | | | |
| Ullswater and Windermere | SM | Prescibed flow reduction | Ordinary | No | | | | - - - | - - - | - - - | - - - | - - - | - - - |
| Pennine Reservoirs | SM | Compensation reduction | Drought Order /Drought Permit | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Pennine Reservoirs | SM | Compensation reduction | Drought Order /Drought Permit | No | | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Vyrnwy | SM | Compensation reduction | Drought Order /Drought Permit | Yes | ——— | ——— | - - - | - - - | - - - | - - - | - - - | - - - | - - - |
| Ennerdale<br>Fylde groundwater<br>Red Scar boreholes | SM | Compensation reduction<br>Other variation to licence conditions<br>Unlicensed source | Drought Order /Drought Permit | | | | - - - | - - - | - - - | - - - | - - - | - - - | - - - |
| River Dee<br>- Llyn Celyn/River Tryweryn | SM | Compensation reduction | Ordinary | Yes | | ——— | ——— | ——— | ——— | ——— | | | |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

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Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

## *MIDLANDS REGION*

***Companies Included:***

- ***Severn Trent Water***
- ***South Staffordshire Water***

# 1996 DROUGHT MANAGEMENT PLAN FOR: SEVERN TRENT WATER

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| River Severn | OM | Maximise abstraction within licence limits | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ••••• | ••••• |
| River Dove | OM | Maximise abstraction within licence limits | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| River Derwent | OM | Majority of supply for Church Wilne from Draycott | N/A | Yes | | ——— | ——— | ——— | ——— | ——— | ——— | | |
| Derwent Valley reservoirs | OM | Average drawoff held below 100 Ml/d | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ••••• | ••••• |
| West - east link flows | OM | Target supply 25 Ml/d | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ••••• | ••••• |
| All groundwater units | OM | Maximise abstraction within licence limits | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| All other reservoirs | OM | Achieve minmum abstraction through conjunctive use | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ••••• | ••••• |
| River Derwent | SM | Drought Order compensation reduction | Ordinary | Yes | ——— | | | | | | | | |
| River Derwent | SM | Drought Order prescribed flow restriction | Ordinary | Yes | ——— | | | | | | | | |
| Company wide | DM | Publicity and appeals for restraint | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ••••• | ••••• |
| | DM | Leakage control | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| | DM | Distribution control | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| | DM | Meter sprinkler users | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |

Key: ——— FIRM PLAN

••••••••• POSSIBLE COURSE OF ACTION

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SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: SOUTH STAFFORDSHIRE WATER

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| All groundwater units | OM | Abstraction at licence limit | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| River.Severn | OM | Abstraction at licence limit | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| River Blithe | OM | Balancing abstraction to meet supplies | N/A | No | | | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| All zones | DM | Leakage control | N/A | No | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

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Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

## *SOUTHERN REGION*

***Companies Included:***

- ***Southern Water***
- ***South East Water***
- ***Mid Kent Water***
- ***Folkestone & Dover Water***

# 1996 DROUGHT MANAGEMENT PLAN FOR: SOUTHERN WATER SERVICES

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| River Medway | OM | Increased use of river to allow resting of groundwater | N/A | Yes | ——— | ——— | - - - | - - - | - - - | | | | |
| Deal Source | OM | Plant enhancement to increase output | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| West Sussex Groundwater | OM | Increased use of river to allow resting of groundwater | N/A | No | | | ——— | ——— | ——— | | | | |
| Sussex Coast Groundwater | OM | Operation of storage / leakage system | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| East Sussex Groundwater | OM | Resting of Brede Wells | N/A | Yes | ——— | | | | | | | | |
| Powdermill Reservoir | OM | Reduced abstraction to allow recovery | N/A | Yes | ——— | | | | | | | | |
| Sussex Coast | OM | Transfer of River Water from Hardham to rest groundwater | N/A | No | | | | | | - - - | - - - | - - - | - - - |
| River Medway | OM | Transfer from Medway to Thanet | N/A | No | | | | | | | - - - | - - - | - - - |
| River Stour (Plucks Gutter) | SM | Additional abstraction to match effluent discharge to river | Ordinary | No | | ——— | ——— | ——— | ——— | ——— | ——— | | |
| River Stour (Plucks Gutter) | SM | Licence variation to above | N/A | No | | | | | | | | ——— | ——— |
| Darwell Reservoir | SM | Transfer of water from Bewl (temporary) | Ordinary | Yes | ——— | ——— | ——— | ——— | ——— | ——— | | | |
| Darwell Reservoir | SM | As above but Permanent | N/A | No | | | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Hardham (surface) | SM | Additional abstraction | Drought Permit | No | | | ——— | ——— | ——— | - - - | - - - | - - - | |
| Hardham (surface) | SM | As above with Licence variation | N/A | No | | | | | | ——— | ——— | ——— | ——— |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

OM = Operational Management
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DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: SOUTHERN WATER SERVICES (cont.)

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| East Sussex (Hastings) | DM | Hosepipe Ban | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | - - - | - - - | - - - |
| Sussex Coast | DM | Publicity and appeals for restraint | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | | | |
| West Sussex | DM | Publicity and appeals for restraint | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | | | |
| East Kent | DM | Publicity and appeals for restraint | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | | | |
| Company Wide | DM | Leakage Control | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

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Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: SOUTH EAST WATER

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| All zones | DM | Hose pipe ban | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| All zones | OM | Publicity and appeals for restraint | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Any district | DM | Non essential use ban | Ordinary | No | | | ——— | ——— | ——— | ——— | - - - | - - - | - - - |
| Any district | OM | Increased leakage control | N/A | Yes | - - - | - - - | - - - | - - - | - - - | - - - | - - - | - - - | - - - |
| Coastel and Tunbridge Wells | OM | Increased leakage control | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | - - - | - - - | - - - |
| Any district | OM | Increased emergency stock of tankers /bowsers | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| River Ouse, Ardingley Res | SM | Compensation reduction | Ordinary | No | | | | ——— | ——— | ——— | ——— | ——— | ——— |
| Ardingley, Barcombe | SM | Prescibed flow reduction | Ordinary | No | | | | ——— | ——— | ——— | ——— | ——— | ——— |
| River Cuckmere Arlington | SM | Compensation reduction<br>Prescibed flow reduction | Ordinary | No | | | | ——— | ——— | ——— | ——— | ——— | ——— |
| River Medway | SM | Licence variation to permit direct river abstraction within existing licence (increase of licenced abstraction would be considered) | N/A | No | | - - - | - - - | ——— | ——— | ——— | ——— | ——— | ——— |

Key: ——— FIRM PLAN

- - - POSSIBLE COURSE OF ACTION

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Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: MID KENT WATER PLC

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| Ospringe Pumping Station | OM | Increase licence to average day licence take (within joint licence regime) | N/A | No | | ——— | ——— | ——— | ——— | ——— | | | |
| Newham Pumping Station | OM | Increase licence to average day licence take (within joint licence regime) | N/A | No | | ——— | ——— | ——— | ——— | ——— | | | |
| Forstal Pumping Station | OM | Increase licence to average day licence take (within joint licence regime) | N/A | No | | ——— | ——— | ——— | ——— | ——— | | | |
| Kingston Pumping Station | OM | Increase output to above present normal output to support Folkestone and Dover | N/A | No | | - - - | - - - | - - - | - - - | - - - | | | |
| Thanington | SM | Prescibed flow reduction | Ordinary | No | | | - - - | - - - | - - - | - - - | | | |
| Howfield | SM | Prescibed flow reduction | Ordinary | No | | | - - - | - - - | - - - | - - - | | | |
| Wichling No. 5 | SM | Unlicensed source | Ordinary | No | | | - - - | - - - | - - - | - - - | | | |
| Companywide | DM | Publicity and appeals for restraint<br>- Magazine in bill<br>- Sponsor Kent gardening<br>- Local press | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Companywide | DM | Leakage control - completion of 100% DMA | N/A | Yes | ——— | | | | | | | | |
| Companywide | DM | Leakage control - pressure management scheme | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Maidstone Zone | DM | Targeted Letters | N/A | No | - - - | - - - | | | | | | | |
| North Downs Zone | DM | Targeted Letters | N/A | No | - - - | - - - | | | | | | | |
| Canterbury Zone | DM | Targeted Letters | N/A | No | - - - | - - - | | | | | | | |
| Maidstone Zone | DM | Hosepipe Ban | N/A | No | | | - - - | - - - | - - - | - - - | | | |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

OM = Operational Management
SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

1996 DROUGHT MANAGEMENT PLAN FOR: MID KENT WATER PLC (cont.)

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| North Downs Zone | DM | Hosepipe Ban | N/A | No | | | ---- | ---- | ---- | ---- | | | |
| Canterbury Zone | DM | Hosepipe Ban | N/A | No | | | ---- | ---- | ---- | ---- | | | |
| Maidstone Zone | DM | Non Essential Use Ban | Ordinary | No | | | ---- | ---- | ---- | ---- | | | |
| North Downs Zone | DM | Non Essential Use Ban | Ordinary | No | | | ---- | ---- | ---- | ---- | | | |
| Canterbury Zone | DM | Non Essential Use Ban | Ordinary | No | | | ---- | ---- | ---- | ---- | | | |

Key: ——— FIRM PLAN

---------- POSSIBLE COURSE OF ACTION

OM = Operational Management
SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: FOLKESTONE AND DOVER WATER SERVICES

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| Hythe Town Springs Groundwater units | OM | Transfer main from source to treatment works | N/A | No | ——— | ——— | | | | | | | |
| Lower Standon Groundwater units | OM | Transfer main from source to treatment works | N/A | No | ——— | | | | | | | | |
| Kingsdown Groundwater units | OM | Test pumping for licence variation | N/A | No | ——— | | | | | | | | |
| Holmestone Groundwater units | OM | Test pumping for licence variation | N/A | No | ——— | ——— | | | | | | | |
| Cherry Garden Upper Works (Reservoir) | OM | Temporary treatment plant | N/A | No | ——— | ——— | ——— | | | | | | |
| Saltwood | OM | Refurbishment and temporary treatment plant | N/A | No | ——— | ——— | ——— | ——— | | | | | |
| Stonehall Groundwater units | SM | Prescribed flow reduction for river augmentation | Drought Permit | No | - - - | - - - | - - - | - - - | | | | | |
| Primrose Groundwater units | SM | Additional abstraction | Drought Permit | No | - - - | - - - | - - - | - - - | | | | | |
| Rakeshole Valley Groundwater units | SM | Additional abstraction | Drought Permit | No | - - - | - - - | - - - | - - - | | | | | |
| Companywide | DM | Hosepipe Ban | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | - - - | - - - |
| Companywide | DM | Non Essential Use Ban | Ordinary | No | ——— | ——— | - - - | - - - | | | | | |
| Companywide | DM | Publicity and appeals for restraint | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Companywide | DM | Leakage control | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Companywide | DM | Free optional metering | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Chalksole Zone | DM | Compulsory domestic metering | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

OM = Operational Management
SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

## *SOUTH WEST REGION*

**Companies Included:**

- ***South West Water***
- ***Bristol Water***

# 1996 DROUGHT MANAGEMENT PLAN FOR: SOUTH WEST WATER Roadford Strategic Supply Zone

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| Colliford | OM | Increase supply to Saltash from Colliford | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | | | |
| Littlehempston | OM | Increase Ranney output from 12 Ml/day to 18 Ml/day by 1 June and 24 Ml/day by 1 July | N/A | No | | | ——— | ——— | ——— | ——— | ——— | | |
| River Dart | OM | Arrangement for use of River Dart water at Littlehempston in April and May | N/A | Yes | ——— | ——— | | | | | | | |
| River Tavy | OM | Recycle Morwelham canal water into Tavy and improve pumps to allow increased abstraction at Lopwell after 1 July | N/A | No | | ——— | ——— | ——— | ——— | ——— | | | |
| Roadford | OM | Improved operational control system for Roadford releases and Gunnislake abstraction | N/A | No | | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| North Devon | OM | Increased treatment capacity at North Devon WTW's to maximise existing licences | N/A | No | | | | | | | ——— | ——— | ——— |
| Pynes | OM | New main linking Pynes to Crediton area to utilise refurbished borehole sources | N/A | No | | | | | | ——— | ——— | ——— | ——— |
| Roadford Zone | OM | Desalination options (under evaluation) | N/A | No | | | | | | | | | |
| Roadford Zone | OM | Options to transfer (tanker) additional water into Roadford area (under evaluation) | N/A | No | | | | | | | | | |
| Rydon Springs | OM | Possible purchase of private source for public water supply use | N/A | No | | | | | - - - | - - - | - - - | - - - | - - - |
| Roadford Compensation Flow | SM | Compensation reduction | Ordinary | Yes | ——— | | | | | | | | |
| Reduction in prescribed flow at Gunnislake | SM | Prescribed flow reduction | N/A | No | | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| River Lyd and Thurshel Pumped storage | SM | Additional abstraction | Ordinary | Yes | ——— | ——— | ——— | ——— | | | | | |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

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Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: SOUTH WEST WATER
## Roadford Strategic Supply Zone (cont.)

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| Torrington refurbished WTW (below DO prescribed flow on 1976 scenario) | SM | Additional abstraction | Ordinary | Yes | | ——— | ——— | ——— | ——— | | | | |
| No compensation releases when supply releases being made and no losses allowance | SM | Prescribed flow reduction | Drought Permit | No | | ——— | ——— | ——— | ——— | ——— | ——— | | |
| Torrington possible Drought Order abstraction of Meldon compensation flow releases | SM | Additional abstraction | Drought Permit | No | | | | ——— | ——— | ——— | ——— | ——— | |
| River Lyd and Thrushel pumped storage using new Drought Order for winter refill of Roadford | SM | Additional abstraction | Drought Permit | No | | | | | | | - - - | - - - | - - - |
| Tavy, Meldon and other catchments; options for winter refill transfer to Roadford (under evaluation) | SM | Additional abstraction | Drought Permit | No | | | | | | | | ——— | ——— |
| Roadford Zone | DM | Hosepipe Ban | N/A | No | ——— | ——— | ——— | ——— | ——— | ——— | | | |
| Raw Water main leakage reduction project | DM | | N/A | No | ——— | ——— | ——— | | | | | | |
| Additional leakage reduction in Roadford Zone | DM | | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | | | |
| Roadford Zone | DM | Drought Order Non essential use restriction | Ordinary | No | | | - - - | - - - | - - - | - - - | - - - | - - - | |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

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Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: SOUTH WEST WATER Wimbleball Strategic Supply Zone

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| Exe Boreholes | OM | Refurbishment of Exe boreholes (Assume transferred to Roadford Zone) | N/A | No | | | | ——— | ——— | ——— | ——— | ——— | ——— |
| Wimbleball | OM | Improved operational control system for releases and Exe Taw transfer | N/A | No | | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| North Devon | OM | Desalination options (under evaluation) (No plans) | N/A | No | | | | | | | | | |
| Wimbleball Compensation Flow reduction | SM | Compensaton reduction | Ordinary | Yes | ——— | | | | | | | | |
| River Haddeo Temporary Pumped Storage | SM | Additional abstraction | Ordinary | Yes | ——— | ——— | ——— | ——— | ——— | | | | |
| No compensation releases when supply releases being made and no losses allowance | SM | Prescribed flow reduction | Drought Permit | No | | ——— | ——— | ——— | ——— | ——— | ——— | | |
| Permanent pumped storage scheme (licence obtained; interim pumping scheduled winter 1996) | SM | Prescribed flow reduction | N/A | No | | | | | | | | ——— | ——— |
| Reduction in Thorverton prescibed flow | SM | Prescribed flow reduction | Drought Permit | No | | | - - - | - - - | - - - | - - - | - - - | - - - | |
| River Culm abstraction | SM | Additional abstraction | Drought Permit | No | | | - - - | - - - | - - - | - - - | - - - | - - - | |
| River Haddeo pumped storage using new Drought Permit for Wimbleball winter refill | SM | Additional abstraction | Drought Permit | No | | | | | | | - - - | - - - | - - - |
| Hosepipe Restriction - SWW area | DM | Hosepipe restriction | N/A | No | | | - - - | - - - | - - - | - - - | - - - | | |
| Wimbleball area | DM | Drought Order Non Essential Use Ban | Ordinary | No | | | | - - - | - - - | - - - | - - - | | |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

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DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

1996 DROUGHT MANAGEMENT PLAN FOR:

**SOUTH WEST WATER**
**Colliford Strategic Supply Zone**

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently In place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| Colliford | OM | Improved operational system for releases | N/A | No | | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Trekeivesteps | OM | Replacement main from Trekeivesteps intake to St Cleer WTW to increase available resources within existing licence | N/A | No | | | | | | | - - - | - - - | - - - |
| Various pump storage options | OM | Review of scheme for pumped storage to Colliford | N/A | No | | | | | | | | - - - | - - - |
| Hawk's Tor pit temporary pumped storage | SM | Additional abstraction | Ordinary | Yes | ——— | ——— | - - - | | | | | | |
| Colliford total annual licence increase | SM | Additional abstraction | Drought Permit | No | | | | | | - - - | - - - | - - - | - - - |
| Colliford compensation flow reduction | SM | Compensation flow reduction | Drought Permit | No | | | - - - | - - - | - - - | - - - | - - - | - - - | |
| No compensation releases when supply releases being made and no losses allowance | SM | Prescribed flow reduction | Drought Permit | No | | ——— | ——— | ——— | ——— | ——— | ——— | | |
| Hawk's Tor pit pumped storage using new Drought Permit \licence for winter use | SM | Additional abstraction | Drought Permit | Yes | | | | | | | | - - - | - - - |
| Colliford Supply Area | DM | Hosepipe restriction | N/A | No | | - - - | - - - | - - - | - - - | - - - | - - - | | |
| Colliford Area | DM | Non essential use restriction | Ordinary | No | | | | - - - | - - - | - - - | - - - | | |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

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Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: BRISTOL WATER PLC

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| River Purton T.W. | OM | Application for increase in licensed quantity for new T.W. | N/A | No | | | | | | | | | |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

OM = Operational Management
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DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

## *THAMES REGION*

***Companies Included:***

- ***Thames Water***
- ***Three Valleys Water***
- ***North Surrey Water***
- ***Sutton & East Surrey Water***

1996 DROUGHT MANAGEMENT PLAN FOR: THAMES WATER UTILITIES LIMITED

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| North London artificial recharge scheme | OM | Artificial recharge of NLARS | N/A | Yes | ---- | ---- | | | | | | | |
| North London | OM | Use of NLARS scheme | N/A | No | | | | | | | | ---- | ---- |
| River Thames | SM | Prescribed flow reduction in line with lower Thames operating agreement | Ordinary | No | | | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| Lower Thames SW Darent chalk and Green Sand source | SM | Conjunctive use | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Upper Thames Farmoor SW Cotswolds/chalk groundwater source | SM | Conjunctive use | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| All | DM | Leakage control | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| All | DM | Water efficiency campaign | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |

Key: ——— FIRM PLAN

---------- POSSIBLE COURSE OF ACTION

OM = Operational Management
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DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: THREE VALLEYS WATER

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| District meter zones | OM | Open zones to integrate network | N/A | Yes | | - - - | - - - | ——— | ——— | - - - | - - - | - - - | - - - |
| Pressure control zones | OM | Reset pressure or bypass control | N/A | Yes | | - - - | - - - | ——— | ——— | - - - | - - - | - - - | - - - |
| Boreholes | OM | Monitor borehole levels | N/A | Yes | ——— | ——— | ——— | ——— | ——— | | | | |
| | | Lower pumps to maintain pumping | N/A | Partial left in place during 1988/92 groundwater drought | | | - - - | - - - | - - - | - - - | - - - | - - - | - - - |
| | | Replace pumps with higher duty to sustain abstraction from deeper pump locations | N/A | No | | | - - - | - - - | - - - | - - - | - - - | - - - | - - - |
| Borehole source supplied zones with no alternative means of supply | OM | Booster pumps, reinforcement mains (include overland and temporary measures | N/A | No | | | | - - - | - - - | - - - | - - - | - - - | - - - |
| Borehole sources with river flow constraints | OM | Implement river support | N/A | No | | | | | | - - - | - - - | - - - | - - - |
| North London chalk various sources | SM | Additional abstraction | Drought Permit | No | | | | | - - - | - - - | - - - | | |
| North London chalk Utilesford Bridge | SM | Prescribed flow reduction | Drought Permit | No | | | | | - - - | - - - | - - - | | |
| North London chalk Thundridge | SM | Prescribed flow reduction | Drought Permit | No | | | | | - - - | - - - | - - - | | |
| North London chalk Slip End | SM | Compensation reduction | Ordinary | No | | | | | - - - | - - - | - - - | | |
| North London chalk Fulling Mill | SM | Prescribed flow reduction | Drought Permit | No | | | | | - - - | - - - | - - - | | |
| River Thames | SM | Prescribed flow reduction | Ordinary | No | | | - - - | - - - | - - - | - - - | - - - | | |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

OM = Operational Management
SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

## 1996 DROUGHT MANAGEMENT PLAN FOR: THREE VALLEYS WATER (cont.)

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| River Ouse | SM | Prescribed flow reduction | Ordinary | No | | | ---- | ---- | ---- | ---- | ---- | | |
| Harlow and Saffron Walden areas | DM | Sprinkler users to require a meter in demand sensitive areas | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | | | |
| All zones | DM | Leakage control | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| All zones | DM | Publicity - wise use of water | N/A | No | | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| All zones | DM | Publicity - appeals for restraint | N/A | No | | | | ---- | ---- | ---- | ---- | | |
| All zones | DM | Hosepipe ban | N/A | No | | | | | ---- | ---- | ---- | | |
| All zones | DM | Non essential use ban | Ordinary | No | | | | | | ---- | ---- | | |

Key: ——— FIRM PLAN

---- POSSIBLE COURSE OF ACTION

OM = Operational Management
SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: NORTH SURREY WATER LTD

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| Company | DM | Metering of sprinklers | N/A | Yes | | ——— | ——— | ——— | | | | | |
| Company | DM | Enhanced leakage control | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Company | DM | Publicity and appeals for restraint | N/A | No | | - - - - | - - - - | - - - - | - - - - | | | | |

Key: ——— FIRM PLAN

- - - - - POSSIBLE COURSE OF ACTION

OM = Operational Management
SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: SUTTON AND EAST SURREY WATER

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| East surrey area | OM | Balance output between underground and surface resources | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Sutton area | OM | Provide connection for transfer of water from East surrey system | N/A | No | ——— | ——— | | | | | | | |
| East surrey area | SM | Compensation reduction (Bough Beech) | Drought Permit | No | ——— | | | | | | ——— | ——— | ——— |
| Whole area | DM | Maintain leakage at no more than 6 l/p/hr | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Sutton area | DM | Complete district metering & pressure reduction programme | N/A | No | | - - - | - - - | - - - | - - - | - - - | - - - | - - - | - - - |
| Sutton area | DM | Ban on use of sprinklers in event of other measures being unsuccessful | N/A | No | | | | - - - | - - - | - - - | - - - | - - - | - - - |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

OM = Operational Management
SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

## *WELSH REGION*

***Companies Included:***

- ***Welsh Water***
- ***Wrexham Water***
- ***Chester Water***

## 1996 DROUGHT MANAGEMENT PLAN FOR: DWR CYMRU - WELSH WATER North West Wales

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| Conwy reservoir | OM | Conwy - Cowlyd link | N/A | | | | | | | | | | |
| Morwynion | OM | Commission Gelligain WTW | N/A | | | | | | | | | | |
| All Zones | DM | Publicity and appeals for restraint | N/A | No | | | | | | | | | |

Key: FIRM PLAN
POSSIBLE COURSE OF ACTION

OM = Operational Management
SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

## 1996 DROUGHT MANAGEMENT PLAN FOR: DWR CYMRU - WELSH WATER North East Wales

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| Alwen reservoir | OM | Cilcain WTW | N/A | No | | | | | | | | | |
| | | Washwater recycling | N/A | No | | | | | | | | | |
| | | Aled - Alwen transfer | N/A | No | | | | | | | | | |
| All Zones | DM | Publicity and appeals for restraint | N/A | No | | | | | | | | | |

Key: FIRM PLAN
POSSIBLE COURSE OF ACTION

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DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: WREXHAM WATER

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| River Dee | OM | Reduce abstraction by 1 Ml/day below 1995 | N/A | No | | ——— | ——— | ——— | ——— | ——— | ——— | | |
| Talwen Borehole | OM | Recommission pump to provide 1 Ml/day | N/A | No | | ——— | ——— | ——— | ——— | ——— | ——— | | |
| Companywide | DM | Publicity and appeals for restraint | N/A | No | | ——— | ——— | ——— | ——— | ——— | ——— | | |
| Companywide | DM | Leakage control | N/A | Yes | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— |
| Companywide | DM | Hosepipe ban | N/A | No | | | | | - - - - | - - - - | - - - - | - - - - | |

Key: ——— FIRM PLAN

- - - - - - - - - POSSIBLE COURSE OF ACTION

OM = Operational Management
SM = Source Management
DM = Demand Management

Assuming minimum historic runoff for summer & autumn 1996 and resource available as at March 1996

# 1996 DROUGHT MANAGEMENT PLAN FOR: CHESTER WATERWORKS COMPANY

| Source Type\Name\Location | Type of Measure (OM, SM, DM) | Detail of Measures needed to maintain supplies | Ordinary or Emergency Drought Order or Drought Permit | Measure Currently in place ? (Yes/No) | PLAN OF ACTION FOR 1996 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | A | M | J | J | A | S | O | N | D |
| River Dee | OM | Recycle wash water Boughton treatment works | N/A | Yes<br>50 % now<br>100 % May | | | | | | | | | |
| River Dee | SM | Prescribed flow reduction<br>Dee consultative committee agreed | N/A | Yes | | | | | | | | | |
| Companywide | DM | Publicity through Dee consultative committee | N/A | Yes | | | | | | | | | |
| Companywide | DM | Appeals for restraint | N/A | No | | | | | | | | | |
| Companywide | DM | Compusory metering of sprinklers from 1/4/96 and policing of policy | N/A | Yes | | | | | | | | | |
| Companywide | DM | Hosepipe ban | N/A | No | | | | | | | | | |
| Companywide | DM | Leakage control | N/A | Yes | | | | | | | | | |

Key: ——— FIRM PLAN

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