

The River Ouse, Barcombe Mills



Guardians of the Water Environment



NRA

*National Rivers Authority
Southern Region*

NATIONAL RIVERS AUTHORITY PRESENTATION TO

KENT COUNTY COUNCIL

9TH OCTOBER 1990

THE ROLE OF THE NATIONAL RIVERS AUTHORITY

- * THE 1988-90 DROUGHT AND ITS EFFECTS
- * WATER RESOURCES IN KENT
- * ENVIRONMENTAL PROTECTION AND WATER RESOURCES DEVELOPMENT

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THE 1988-90 DROUGHT AND ITS EFFECTS

Peter Herbertson, NRA Resources Manager

The current UK drought began with three exceptionally dry months, November 1988 to February 1989.

The Southern Region had only 46% of average rainfall. At Canterbury this was the lowest November to February rainfall in over one hundred years of records.

But after a couple of wet months in Spring 1989 there was an exceptionally hot dry summer. This was followed by yet another dry winter, relieved again by two more wet months in the spring of 1990 with double average rainfall. This helped with reservoir and groundwater levels, but it did not bring conditions to normal and this was followed by a second exceptionally hot dry summer.

In the Southern Region there is a big difference between rainfall in the east and west. Rainfall in West Sussex and Hampshire has been 40-50% more than in East Kent, which explains why there have been no water supply restrictions in the west.

The Southern Region and Thames have had less rainfall than other parts of the country, with less than 50% of the long term average.

The drought has been significant in Europe. In California their drought started a year earlier in 1987 and still continues.

In Kent, river flows and groundwater levels have reached record low levels.

Although the NRA has provided a co-ordinating forum for Water Company Managers it is the Water Companies' responsibility to introduce supply restrictions when they think appropriate. With many companies involved in Kent it has been sensible to co-ordinate restrictions and the public relations aspects of conserving supplies. The NRA has worked with all Water Companies in connection with drought orders and has mounted its own "Save Water - Save the Environment" media campaign, as well as responding to immediate enquiries on water resources.

Two levels of restriction were introduced by the Water Companies:

- (i) Hosepipe bans
- (ii) Drought Order restrictions on non essential water use.

Further Drought Orders were obtained to modify abstraction licence conditions.

Four other regions have implemented hosepipe bans and Drought Orders.

It must be remembered that there are two reasons why it may be difficult to meet demands during a drought:

- (i) Trunk mains and distribution systems may not have the capacity or flexibility to meet peak demands.
- (ii) Water resources in rivers, reservoirs and groundwaters may be insufficient to meet peak abstraction rates.

Conclusion

We have been experiencing a particularly severe drought of continental scale. In the UK, Kent has been one of the driest areas in the country. Rainfall has been on the limit of what water supply engineers design for in terms of cost effectiveness. There has been a very good response to restrictions with consumption reduced by at least 15-20% of what might have been expected in such a hot, dry summer.

By comparison, in California, where customers are metered, a 30% reduction in consumption was achieved by increasing water charges by first two and then three times during the summer months.

The issue for water companies and their consumers is how much people are prepared to pay for watering their gardens in a severe and infrequent drought.

Secondly should customers pay for the extra capacity, or only those who will actually use a great deal of extra water. This introduces the debate about paying for water.

The issue for the NRA is the effect on the water environment of new water resource developments. Are water companies making the best possible use of their existing water resources before they develop new resources?

KENT COUNTY COUNCIL - WATER RESOURCES IN KENT: THE NRA ROLE

P W Herbertson, NRA Resources Manager

The respective roles of the NRA and water companies, are set out in the Water Act 1989.

THE NRA HAS A DUTY TO:

"CONSERVE, RE-DISTRIBUTE, AUGMENT AND SECURE THE PROPER USE OF WATER RESOURCES."

(S.125 Water Act 1989)

WATER UNDERTAKERS HAVE:

"AN OBLIGATION TO DEVELOP WATER RESOURCES."

(S.125 Water Act 1989)

and

"A NEW DUTY TO DEVELOP AND MAINTAIN AN EFFICIENT AND

ECONOMIC SYSTEM OF WATER SUPPLY".

(S.37 Water Act 1937)

The NRA's role is particularly pertinent in a region such as Southern where there are many water companies competing for scarce water resources.

We have developed 12 policy points for water resources planning which interpret national NRA aims in the context of the South East.

NRA SOUTHERN LOCAL RESOURCES POLICY

1. PROMOTE FULL USE OF EXISTING RESOURCES.
2. ENCOURAGE RE-ALLOCATIONS AND CONNECTIONS BETWEEN COMPANIES.
3. ABSTRACT AT DOWNSTREAM LIMIT OF RIVERS.
4. USE CONTROLLING FLOWS IN ABSTRACTION LICENCES.
5. AUGMENT RIVER FLOWS BY GROUNDWATER OR RESERVOIR RELEASES.
6. PROMOTE EFFLUENT RE-USE.
7. PROMOTE WATER CONSERVATION MEASURES.
8. SUPPORT DOMESTIC METERS.
9. MONITOR WATER COMPANY LEAKAGE.
10. ABSTRACTION CHARGES TO REFLECT ENVIRONMENTAL IMPACT.
11. REMEDY "OVER-ABSTRACTED" CATCHMENTS.
12. PLAN FOR CLIMATE CHANGE.

This policy builds upon the formally agreed policy of the Southern Water Authority and private water companies, by adding a number of new NRA features which the water companies may, or may not, agree with.

Turning to the water supply situation there are ten discrete water supply units to be considered in Kent and East Sussex;

Southern Water - Medway
Southern Water - Thanet
Folkestone
Mid Kent
West Kent
Eastbourne
Southern Water - Hastings

and on the outside:

Mid Sussex
East Surrey
Thames Water

all of whom export water from Kent.

This immediately illustrates the difficulties facing those who suggest greater interconnections between sources of supply and supply districts in the form of a "water grid".

However over the last fifteen years there has been co-operation between companies and this must continue if water resources are to be properly used in the area.

Water resources in Kent may be summarised as follows:

WATER RESOURCES IN KENT
(and EAST SUSSEX)

Groundwater: NORTH DOWNS CHALK AQUIFER
SANDSTONE AND ALLUVIAL AQUIFERS.

Rivers: MEDWAY AND TRIBUTARIES
STOUR AND TRIBUTARIES

Reservoirs: BEWL WATER(SOUTHERN/MID KENT 1976)
BOUGH BEECH(EAST SURREY 1971)
WEIR WOOD (SOUTHERN 1954)
DARWELL (SOUTHERN 1950)
POWDERMILL (SOUTHERN 1933)

Bowl Water Reservoir, completed just too late for the 1976 drought, is a major water resources scheme which allows water stored in the reservoir to be released down the River Teise and to the Medway for abstraction at Maidstone, with a yield of 77Ml/d.

Broad Oak Reservoir was the next major resource proposal for Kent. It was to be a reservoir by pumping from the River Stour at Canterbury, with a yield of 94Ml/d.

Following a six week public inquiry at Canterbury in 1979, the Secretary of State refused the application in 1980.

BROAD OAK RESERVOIR 1979

"THE PROMOTERS HAVE NOT STRUCK THE RIGHT BALANCE BETWEEN THEIR OWN INTERESTS AND THE INTERESTS OF OTHERS."

ALTERNATIVE SCHEMES SHOULD HAVE REGARD TO:

- (i) MATCHING RESERVOIR YIELD TO DEMAND OVER THIRTY YEARS.
- (ii) REVISED DEMAND FORECASTS WITH REDUCED WASTAGE.
- (iii) REVISED DEMAND FORECASTS.
- (iv) EFFECTS OF ABSTRACTION ON RIVER STOUR FLOWS AND WATER QUALITY.

As a result of this decision water resources planning was extensively reviewed. It was decided to look at supply and demand over Kent and parts of East Sussex using a computer model to explore the possibilities for better "grid connections".

This would lead to greater flexibility in meeting demands and improved security of supply. The computer studies have particular regard to investment costs of new sources and mains, as well as the operating costs of pumping and treating raw water.

The resource development strategy for the 1980's is summarised as follows:

RESOURCE DEVELOPMENTS IN THE 1980'S

(1) SOURCES AND MAINS

- | | |
|------------------------------|---------|
| - PLUCKS GUTTER | 10 Ml/d |
| - NORTH KENT GROUNDWATER | 34 Ml/d |
| - MEDWAY - STOUR "GRID" LINK | |
| - MISCELLANEOUS BOREHOLES | 16 Ml/d |

The strategy looked ahead for thirty years from 1981 and 1986. Further developments for the 1990's were identified.

RESOURCE SCHEMES FOR THE 1990'S AND BEYOND

YALDING	20Ml/d
MEDWAY RESIDUAL FLOWS	20 Ml/d
DARWELL	42 Ml/d
BROAD OAK	94/60 Ml/d
LEAKAGE SAVINGS (KENT WATER COMPANIES)	68 Ml/d

In parallel with this work demand forecasting techniques were improved and leakage targets for all companies incorporated into the forecasts. For the first time this linked the timing of new resource developments to the achievement of leakage targets. This methodology was reviewed by the Monopolies and Mergers Commission in 1986.

A particularly important development was the establishment of eighty zones to monitor domestic consumption across the Southern Region. As well as identifying the differences in domestic consumption, it also helps to estimate leakage, or "unaccounted for water" more reliably. This data is used for each company in their demands forecasts.

Following privatisation the NRA Southern Region has inherited the Southern Water Regional Demand Forecasting System and it also carries out the regional co-ordination of monitoring domestic consumption. Each company has the responsibility for its own demand forecast, but most accept the NRA forecast as a reasonable baseline.

The NRA forecasts for the Kent area are shown in the figure at the end of this paper.

Note the difference between the high line (leakage continues at present rate) and the low line (water companies meet their own leakage targets).

The NRA has analysed the extra growth in the high demand line to the year 2011;

- 40% is increase in per capita consumption
- 40% is the saving of leakage
- 20% is due to increased population and development

This leads the NRA to concentrate its attention on:

- (a) Persuading companies to achieve leakage targets;
- (b) Persuading companies to adopt domestic metering before new reservoir developments.

Conclusion

The NRA's role is to conserve water resources and ensure proper use. So we have a number of key issues which we would wish to discuss with promoters of a major resource development scheme.

NRA KEY ISSUES FOR NEW RESOURCE DEVELOPMENTS

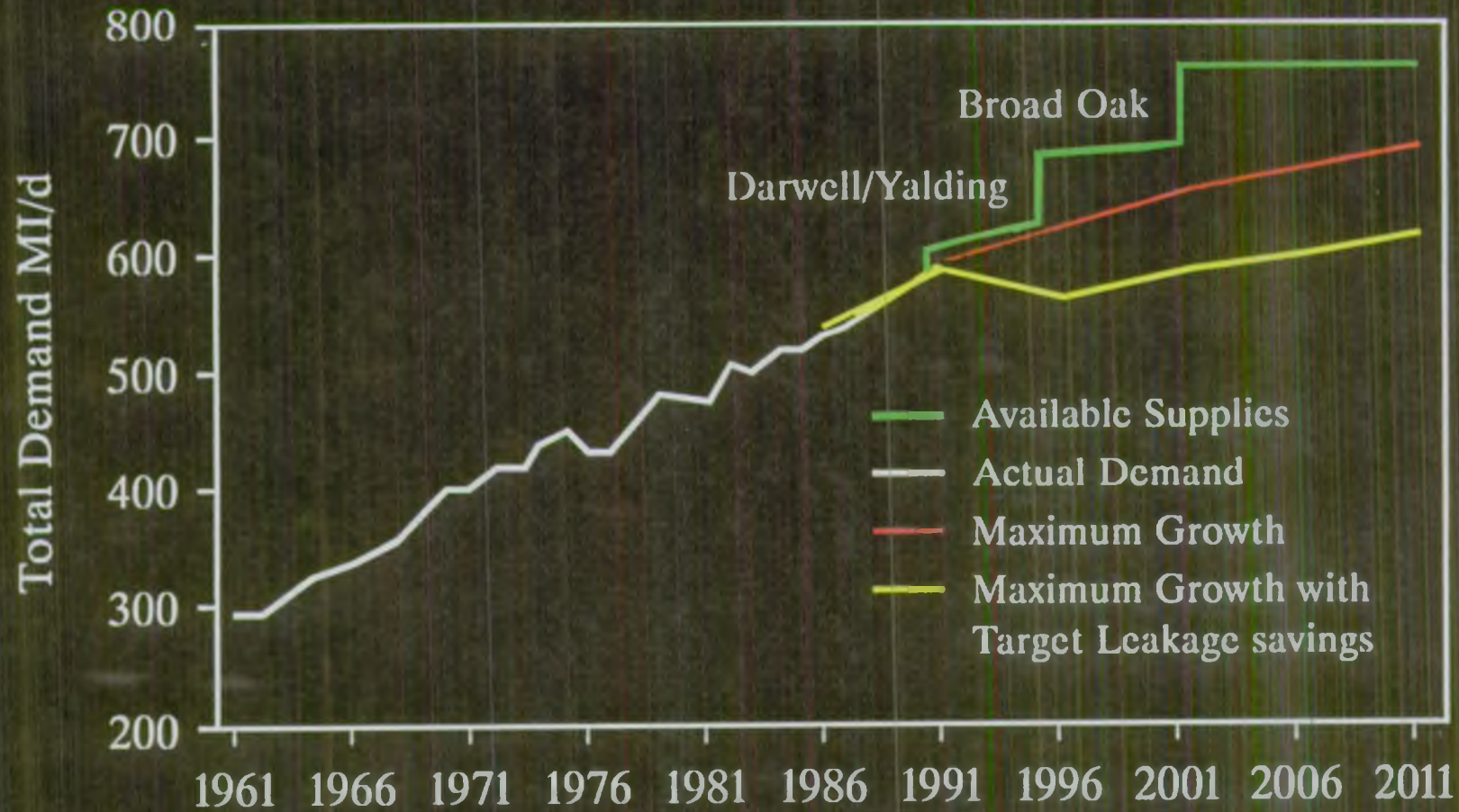
- * ACHIEVING LEAKAGE SAVINGS
- * "GRID" CONNECTIONS BETWEEN COMPANIES
- * EFFECT OF DOMESTIC METERING
- * TARGET LEVELS OF SERVICE
- * EFFECT ON RIVER FLOWS AND QUALITY
- * EFFLUENT RE-USE
- * OVER-ABSTRACTED CATCHMENTS
- * CLIMATE CHANGE

AND FOR RESERVOIRS

- * RESERVOIR SIZE
- * INTAKE LOCATION

We shall be inviting water companies to demonstrate proper use of water resources and environmental enhancement in all their proposals.

1990 Demand Forecast And Available Supplies



NRA PRESENTATION TO KENT COUNTY COUNCIL - 9TH OCTOBER 1990

ENVIRONMENTAL PROTECTION AND WATER RESOURCES DEVELOPMENT

Mike Beard, NRA Environmental Protection Manager

In Southern Region of the NRA the duties of the Environmental Protection Department include:

THE PREVENTION OF POLLUTION AND MANAGEMENT OF WATER QUALITY IN CONTROLLED WATERS.

THE MAINTENANCE, IMPROVEMENT AND DEVELOPMENT OF FRESHWATER FISHERIES.

THE RESPONSIBILITY TO ENSURE THE SOUTHERN REGION COMPLIES WITH ITS DUTIES FOR CONSERVATION OF THE AQUATIC ENVIRONMENT AND FOR RECREATION.

The prevention of pollution is the principal means by which NRA sets out to achieve its stated aim of improvement of water quality for the benefit of users.

Nevertheless the control of water quality cannot be divorced from the control of the water resource in terms of its quantity. The qualitative and quantitative aspects are entirely complementary and whilst the process by which these two elements of our work are carried out are very different and differently funded - the outputs are inextricably linked.

The Regional Water Resources Strategy calls for the re-use of water to be promoted wherever possible.

Clearly as demand grows and finite resources are placed under greater pressure the need for effluent re-use becomes ever more important. The result of turning abstracted water into effluent and returning it to the river is that the proportion of effluent increases.

Rivers are basically healthy ecosystems and are able to bear a surprisingly large polluting load without apparent deterioration. A point is reached however when the level of enrichment exceeds the natural cleansing power of the river and water quality falls.

River quality in the United Kingdom is defined by the River Quality Objectives set in 1975 under the NWC scheme, simplistic and rather unbalanced they may be but they are based upon the use to which water may be legitimately put and have survived as the effective target for the controlling of all discharges into inland waters for fifteen years.

CURRENT WATER QUALITY CLASSIFICATION

CLASS	DO	BOD	NH3	USE
1A RECOMMENDED AVERAGE	80	3 1.5	0.3	Potable abstraction
1B RECOMMENDED AVERAGE	60	5 2	0.7 0.5	Game Fishery
2	40	9	0.7	Potable abstraction Coarse Fishery
3	10	17		Industrial abstraction. Poor fishery.
4	FAILS CLASS 3			Grossly polluted. Likely to cause nuisance.

Most importantly they have established beyond reasonable doubt that the principle of controlling polluting inputs to meet an Environmental Quality Objective is superior to the system of uniform emission standards so beloved of Europe.

Their course is nearly done. The Water Act places a duty on the NRA to make proposals to the Secretary of State for Environmental Quality Objectives to be set for all controlled waters by the end of 1992. Acceptance by the Secretary of State will make these Objectives statutory instruments and they will dictate the course of Water Quality Planning for the foreseeable future.

The importance of these EQO's to the business of Resource Management cannot be over-emphasised. Once established, the quality of a controlled water cannot be derogated.

Hence discharges will be squeezed to provide progressively higher standards of effluent quality so as to ensure the EQO is maintained.

This will inevitably bring forward the point at which tertiary treatment of sewage effluents is required to reduce the nutrient loads below that attainable with the best-operated secondary system.

Where Recreational Objectives are established we will see the demand for removal of bacteria and virus from sewage effluent and the techniques are there to enable it to be done without the environmental damage associated with traditional disinfection.

Nothing is for nothing and it is at this point that the question arises as to the willingness of the public to pay the price for the enhancement of his water environment.

To address this question the NRA has built into it's Corporate Plan the basic element of it's Modus Operandi, the River Catchment Management Plan. Based upon a river catchment the RCMP's are in effect Business Plans for those catchments in which the use-based objectives are set out in terms of water quantity, water quality and topography. Costs of achieving and maintaining these objectives are set out in the Plans.

These Plans will be commenced in each major catchment (Medway and Stour in Kent) in 1991 and will be published.

Consultation is an essential part of the exercise. Within these Plans the interaction of quantitative and qualitative aspects of water management will be an important factor. An EQO can be achieved or maintained by stringent effluent standards or by the use of increased diluting flows. This latter is already used in Hampshire on the River Itchen with the pumped groundwater augmentation. In Kent, reservoir releases could become more important especially in view of possible recreational benefit.

An example of this situation working in reverse may be seen in the Lower Medway where the current Prescribed Flow (350 Ml/d) is maintained to provide a flushing of the long estuary where effluent may be detained for 42 days and water quality is far below objective.

The opportunity may exist to trade fluvial flow for increased effluent quality from the inputs to the Medway estuary.

I should like to conclude by looking very briefly at the other side of pollution prevention. 40% of all pollution is diffuse.

DIFFUSE POLLUTION

SIGNIFICANT PROPORTION OF POLLUTING LOADS

Arising from:

AGRICULTURAL ACTIVITY:	NITRATES; INSECTICIDE; HERBICIDE; FERTILISERS
INDUSTRIAL ACTIVITY:	SOLVENTS; METALS; PHENOLS; PCB; PAH
TRANSPORT ACTIVITY:	SOLVENTS; OILS; HERBICIDE
URBAN AND MOTORWAY RUN OFF:	SOLVENTS; OILS; FAECAL MATERIAL; ORGANIC MATERIALS; SOLIDS; DEBRIS
ACCIDENTAL INPUTS:	SILAGE; SLURRY; OIL; SOLVENTS; AGRICULTURAL AND INDUSTRIAL CHEMICALS ETC.

The NRA has powers under the Water Act which for the first time enable a regulatory body to take control of this very difficult area by dealing with the problems at source. The Farm Waste Regulations now control the storage on agricultural premises of silage, slurry and oil.

The Water Act also provides NRA with new powers to designate Nitrate Sensitive Zones to protect sources of water supply where Nitrate levels are in excess of the European Commission Limit value. These zones are carefully delineated areas around supply boreholes within which agricultural activities - particularly fertiliser application can be modified or prohibited.

In Southern Region we are aware of groundwater sources in the Thanet area which exceed the EC Quality criteria. These have been notified to DoE but have not been included in the Government Pilot Scheme whereby some twenty Nitrate Sensitive Areas are being operated with varying degrees of restraint on farming practice.

If all else fails, the NRA may, with the endorsement of the Secretary of State, designate Protection Zones. This power could be applied to a catchment or group of catchments to modify or ban activities deemed to be causing pollution.

Such powers are draconian. A means by which a substantial improvement can be achieved is by working with the County Councils. We welcome the Green Audit, especially in relation to activities of land management and those of highway contractors in the way in which chemicals and herbicides are used. We have some expertise in recommending suitable alternatives and we are promoting research and development to identify the compounds with the highest degradability.

DISCUSSION SESSION

Q. Could NRA explain the distinct roles of HMIP and NRA. Are they sufficiently resourced? Who will pay for research into the best methods of sewage disposal?

A. The recently published Corporate Plan contains an assessment of the resources the NRA believes it needs to meet its duties under the Water Act. The NRA hopes that Government will enable it to build up the proposed levels of activity as resources become available.

HMIP has been given the role in the Green Bill to oversee the control of pollution i.e. Integrated Pollution Control. Waste Regulatory Authorities will have responsibility for land and District Councils have responsibility for air pollution. In relation to water pollution, in a year's time HMIP will authorise discharges from scheduled processes which are those generating substances on the UK Red List. These are toxics and accumulative substances.

The NRA has a duty for research and development in its sphere of activity. Water Companies have the same responsibility in respect of their own activities. The Foundation for Water Research links these programmes.

Q. (Mrs. Christopher). In relation to water conservation, very few properties have showers. Could building programmes be used as a means of increasing the number? Why is it that racecourses can use sprinklers whilst gardeners cannot? Some car washes may operate and not others.

A. Water conservation measures in the home are a matter for the Water Companies though the NRA would support any such measures. In Germany the amount of water used by dishwashers has been reduced by half.

Water Companies are encouraging car washes to re-cycle. Racecourses and farmers using sprinklers may have their own storage facilities and may have an NRA licence permitting them to use water they have saved. NRA has inspectors to ensure that users do not exceed their licence conditions. If they are using mains water they are regulated by the Water Companies.

Q. (Mrs. Holan). Co-operation between the Water Companies and grid connections are important, can the NRA compel them to operate an integrated supply system?

A. The NRA can only use persuasion. OFWAT has powers to monitor investment by the Water Companies.

Q. (Mr. Neichall). What improvements have been made to the quality of coastal waters, what measures have been taken to control pollution? Is a National Water Grid a feasible project?

A. Coastal pollution generally stems from untreated sewage and short outfalls. A programme was devised at the time of privatisation to bring about improvements at designated bathing beaches. This aimed at compliance by 1995. But the Secretary of State this year announced new

measures requiring higher standards of treatment, primary or full treatment. The NRA will have the duty to set the new standards. The new requirements may take the full improvement timescale to the end of the century.

The technology is now here to develop a water grid, but water is heavy. The most feasible approach is to create many more links from one source to another. The economics are important. The NRA must be convinced that forecasts are properly researched and take account of the efficient use of existing resources.

Q. (Major Holden). The County Council is a large consumer, what is it doing to conserve supplied to its premises?

A. (By Charles Tanswell, KCC). £2 million is spent on water and sewage charges, 650 million gallons per year. In the last 12 months the Council has pursued conservation by reducing cistern capacities and adjusting automatic urinals. It estimates leakage on its premises to be 10% and is carrying out an audit of water conservation, starting with the largest 100 schools. The finance has been established to undertake repairs.

Q. (Dr. Simpson). What efforts can the NRA make to encourage Water Companies to detect leakage?

A. The NRA can exert influence via a water resource strategy.

A. (By Mr. Cross, Folkestone Water Co.). Some leakage goes back to the aquifer, however, we give leakage a high priority and new detection equipment is being developed.

A. (Graham Setterfield, Southern Water). I must comment that in the field of leakage we have been active. We have had a leakage campaign since 1980. It is attritional. We are spending money on detection and have reduced it by 22 million litres since 1982. This requires an investment of £1 million year and 15 men.

Q. (Mr. Cross). Some of the points proposed by the NRA have cost implications. How would these equate to environmental benefits, for example the cost of metering?

A. There are two approaches; the cost of an alternative strategy is one measure. The other, trying to assess the environmental cost of a dried up river or a polluted estuary is more difficult. Christopher Patten has taken advice on possible approaches to this.

Q. (Mrs. Kalachinski). The Darent Valley is a matter of great concern, it has been dry again this year.

Groundwater is taken by Thames Water causing water to leak through the river bed.

A. Lord Crickhowell, Chairman of the NRA visited the river a few weeks ago and was shocked. The NRA inherited a programme of looking at over-abstracted rivers. We are looking at a number of schemes. Eight boreholes were sunk in the 1950s during the post-war growth of London.

Abstractions were not licensed prior to 1963 and existing users were given Licences of Right. The boreholes in the Darent Valley are particularly problematic because of their close proximity to the river.

Lining of the river is one possible solution which has already been tried in Wessex and we have been monitoring the scheme. There are other possibilities such as recharging the river from more distant boreholes. The NRA may revoke or reduce licences. We are about to employ consultants to examine the problems of the Darent.

We have had good co-operation from Thames Water in the last 2-3 months. They have introduced a hosepipe ban, and have held pumping to 70% of the licensed amount. We have asked them to pump water back to certain sections to monitor the effectiveness of local recharge and to test the permeability of the bed.

Another over-abstracted river in Kent is the Little Stour/Nailbourne where resources are used by Folkestone Water Company. We hope to come up with the remedies there also.

Q. (Mr. Horton). Is desalination a possibility?

A. Desalination is generally thought expensive but it might have potential for "peak lopping".

Q. (Mr. Button). The lower reaches of the Medway carry a heavy pollution load; are illegal discharges monitored and do we need to do anything about disposal from yachts?

A. The NRA is confident it knows all the discharges of which there are a very large number. These are consented and subject to conditions restricting strength and volume. We monitor their performance though not all meet their consents at the moment. Discharges with outstanding problems have agreed to install treatment plant by the beginning of next summer. The Control of Pollution Act made it a duty for the appropriate Authorities to provide disposal facilities at moorings and marinas but it was never enacted. Now the NRA has byelaw powers but policing of them would be a problem. The matter is being taken forward.

Q. (Joyce Esterson). Is there is a risk of water costing more in Kent in view of the low rainfall?

A. The costs of the same level of service may be higher in areas of climatic extremes though the concept of unifying resources would even out the extremes. It highlights whether planning to meet demand in all but one year in fifty is the correct approach.

Q. (Mrs. Dean). What is the priority for metering, how successful have the pilot schemes been?

A. The Water Companies must have a new system of charging by the year 2000. The results of the trial on the Isle of Wight have been published. There are significant savings in use amounting to around 15% in the early stages. The NRA has an interest because at the moment "lost water" is unaccounted for. If it were metered at both ends we would have a more accurate picture of leakage. With leakage at about 25% in

the UK this would be an aid to the Water Companies. In times of drought metering allows upper tariffs to be imposed to discourage excessive use of water.

Q. (Major Holden). What triggers the creation of protection zones?

A. There is an EC Directive protecting drinking water standards. If a standard cannot be maintained in supply or a watercourse this triggers the designation of protection zones.



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