

ENVIRONMENT AGENCY



055693

*"If you enjoy  
fishing, or  
watching people  
fish, or studying  
wildlife, or taking  
a picnic, or  
canoeing (slalom  
or otherwise), or  
rowing or sailing,  
or just messing  
about in boats, or  
simply cycling or  
strolling along ...  
whatever you  
enjoy doing on or  
around our rivers,  
we're working to  
make it even more  
enjoyable."*



**NRA**

*National Rivers Authority*

*Thames Region*

*Guardians of the Water Environment*

*"This is the water  
heritage of the Thames  
-and we want you to  
enjoy it to the full."*



*Sailing on  
the Thames*

**Pleasure park par excellence**

Here in Thames Region, you have some of the loveliest countryside in Britain, right on your doorstep.

And such variety too! There are hills and vales, lowlands and wetlands, broad lakes, lagoons and hidden ponds, tumbling streams and winding rivers, some with islands, all of them for some of their course skirting deep woods and flower-filled meadows. Then there's the Thames Estuary itself with its tides, mudflats and tang of the open sea.

Everywhere you go, you can savour the magic of the past - the Thames itself has been called 'liquid history'. There are bankside villages, famous river towns, stately homes, fierce castles, and the battlefields of long-forgotten wars. There are corn-mills and cottages, old inns, barns and bridges, follies and beauty spots, weirs and locks, plus many newly discovered relics of pre-history. And most of them are on or near the water.

You can also enjoy whatever's best in today's outdoor entertainment - regattas and race meetings, fun fairs and game fairs, gymkhanas and country shows, leisure parks, theme parks and safari parks.

You can sail, paddle or row. You can travel, sedately, by pleasure steamer. You can angle or ramble, watch birds or just watch. You can picnic on the grass, dine in style at riverside restaurants or take tea and cakes in any one of a myriad of teashops.

And everywhere you can see and admire all the wonderfully fascinating wildlife that thrives in our English waters.

This is the water heritage of Thames Region - and we want you to enjoy it to the full.

**Water for fun? It's our duty too!**

We're all enthusiasts for water at Thames Region. Those of us in 'Amenity and Recreation' are especially keen, every one of us, to ensure that the open waters in the



Region are used to the full by those who want to use them for fun.

We *want* to do it - but the fact is that we are legally bound to do it.

#### **Recreation is always on the agenda**

Parliament has laid down that the NRA should take account of recreation needs in everything the Region does.

This means, for instance, that when our Flood Defence specialists are planning flood defence works - which might involve diverting the course of a river, or rebuilding a weir - they must always try to ensure that the finished result protects existing recreational facilities or offers new ones. These could be anything from a footpath or picnic site to a new stretch of water for fishing or canoeing.

Or take our locks - and you've got a very big choice. We try to manage the surrounding area so that people can settle down there to watch all the activity or simply to have a picnic.

That's the general requirement - recreation is an intrinsic part of our overall task.

We also have a duty to preserve and maintain public access to places of natural beauty and to sites and other objects of archaeological, architectural and historic interest.

There's more! We must also ensure that all the water and land under our control is made available, wherever possible, for recreational purposes, taking particular care to cater for the needs of the disabled. Where appropriate, we also provide car-parks and toilet facilities.

#### **More examples**

- We have created camping sites on two islands in the Thames.
- The flood relief channel in the River Lee valley in Hertfordshire provides fishing in abundance.
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*Keeping the Thames tidy*



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- We have encouraged the local council to lease facilities for watersports on the Liden Lagoon near Swindon.
- Anglers can fish at any one of up to 17 locks on the Thames.
- We have restored many miles of towpath for walking or cycling - and have built, rebuilt or repaired all the necessary gates, footbridges etc.

#### **Watch the pipeline**

We plan to do much more. We are working on programmes to open up more sites to the public - with facilities such as information points, seats and tables for picnics. We are also improving the look of many riverside locations by landscaping and tree-planting (and at the same time, improving the sites as wildlife habitats).

Of course, *whatever* we do or build is designed to blend with the local environment. And we always consult widely with local councils, environmental organisations and other interested parties. Caring for the countryside in any way should always be a cooperative venture!

#### **Competing claims**

However, developing the waters of our Region so that people can enjoy them to the full is a complex task. Not everyone's idea of enjoyment is the same. More seriously, the sensible needs of one type of water user may sometimes be in conflict with the equally sensible needs of other water users - or would be without give and take on both sides.

For instance, canoeists often need to use every inch of the river to practise their skills. Usually, that might be all right. But what if an angler on that particular stretch of bank is concentrating on a particularly tricky fish?

Or take cruising? What could be more fun? - unless a rowing eight happens to get in the way.

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The Path also links up with other paths in the Region, including the Ridgeway, Kennet and Avon Canal towpath, Lee Valley Path and many circular walks.

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But times and expectations change. Our resources, skills and experience continue to develop. With the Sports Council, we are funding the production of a Recreation Strategy for the River Thames. Its key aim is to manage the recreational use of one of our busiest rivers to everyone's advantage as effectively as possible - and make sure that people can continue to enjoy the Thames and its many pleasures for generations to come.

### **Making the most of our heritage**

The rivers, streams and lakes of Thames Region are all part of everyone's heritage. We all have a responsibility to care for them and make the best use of them.

So we welcome all your ideas for ways of improving the amenity and recreational facilities on or around the Region's waters. Please contact us at Thames Region Head Office at Reading:

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Telephone: Reading (01734) 535000

When we're talking, we can give you more details of all our recreational services and facilities.

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You may also want to discuss a particular 'water-recreation' project of your own - with a view, perhaps, to NRA involvement or support, financial or otherwise. Again, we'd be delighted to hear about that too.

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Of course, over the years, the demands of industry have done far more harm to our wildlife than the demands of recreation.

Nevertheless, leisure activities have the potential to damage habitat. We try hard to ensure that none of the recreational pursuits we foster throughout the Region affect wildlife adversely.

In this case, we naturally rely to a great extent on the cooperation of the public. Almost invariably we get it. In fact we have reason to be optimistic. People now know more about wildlife and understand its special needs much better. And the development we carry out for recreational purposes is also designed to preserve and, where possible, enhance habitat.

#### **Laws last**

We have also been given powers by Parliament to pass bye-laws to regulate the way a particular water sport or pastime is conducted. However, our policy is to use bye-laws only as a last resort. In any case, we would only promote them after consultation with other relevant organisations.

#### **Cost discipline**

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#### **Free information - money too**

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- set up a wide variety of waterside facilities.
- purchased water-sports equipment for community use.
- assisted in the restoration of ponds and canals.
- supported many sporting and other recreational events.

We are always delighted to contribute articles, photographs or information to publications promoting water-related recreation. And we're very keen to help people or organisations, public or private, produce informative literature about any kind of water-based recreation in the Region.

For instance:

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...and with Wycombe District Council to produce a colourful and well illustrated booklet called 'England's River - a guide to the Thames from Remenham to Cookham'.

*continued on back page*

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The NRA's mission is to:

- protect and improve the water environment.
- reduce pollution.
- manage water resources.
- provide effective flood defence.
- improve and develop fisheries.

It has an advisory role too. For instance, it is consulted by planning authorities about major building or civil engineering developments that may affect the water environment. It also helps check the environmental assessments that potential developers have to make.

The NRA is 'sponsored' by the Department of the Environment (DoE) - in other words, the DoE is its main link with the Government. It also works closely with the Ministry of Agriculture, Fisheries and Food (MAFF), and the Welsh Office. It cooperates with other bodies such as local authorities, Her Majesty's Inspectorate of Pollution, the Drinking Water Inspectorate, the Office of Water Services and the Commission for the European Communities.

### Thames Region

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This collaboration extends well outside the NRA. In the Recreation Section, we work closely with anyone or any organisation interested in promoting the use of our open waters for recreational purposes.

Examples of some of these external 'partners' are shown below.

But the most important collaboration is with individual members of the public. Newspapers, magazines, TV and radio keep people informed about the water environment. Local groups can highlight any threats. But only public opinion can ensure that the water environment continues to be given the care and attention it needs.

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(in addition to ones mentioned above)

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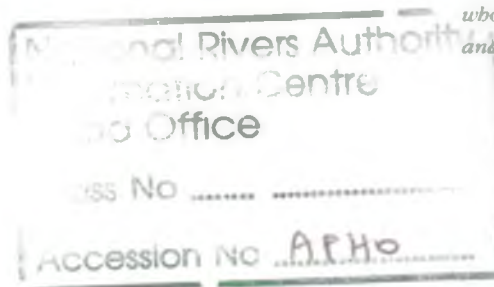
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Awarded for excellence



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*"Navigation on the Thames has been subject to legislation since 1350."*



*A crowded lock - no fun without safety*

### **Rivers of pleasure**

Today, the River Thames and its tributaries are among the most popular pleasure-boat waterways in the country.

It wasn't always so. In the distant past, the Thames had more serious business to handle. For the Romans it was a valuable trade route. The Saxons sailed up it to establish their settlements. The Vikings used it for their raiding expeditions.

Then, for most of the next thousand or so years, the Thames became the pre-eminent commercial thoroughfare of south central England. It brought the produce of the up-river farms down to London. And it brought the products of the city back to the country.

Because this navigation was so important, it was strictly controlled. In the eleventh century, Edward the Confessor's 'Ancient Laws' emphasised the importance of navigation rights on the Thames and demanded the removal of obstructions. The first Act of Parliament specifically concerned with navigation on the Thames was passed in 1350, and navigation on the Thames has been subject to legislation of one kind or another ever since.

### **All change**

The coming of the railway in the middle of the last century drastically reduced the role of the Thames as a commercial highway between the country and London (although the tidal Thames grew in importance as a international port). So far as the inland transport of cargo was concerned, the railway was obviously better, quicker and cheaper.

But the railway also carried people, making the whole length of the river accessible to thousands of would-be navigators (of one kind or another) from London and its suburbs, indeed from towns and cities all over the country.



In the last 100 years, as working hours shortened and holiday times lengthened, and as rail transport improved (road transport too), people became increasingly able to savour the delights available on and around the river. Yachtsmen, oarsmen, punters (in the literal sense), people who just like messing about in boats and people who just like sitting in boats while someone - or something - else propels them, were all able to do their thing on the river.

#### **Thousands of boats**

The river's popularity with amateur inland sailors has continued to grow, until today no fewer than 19,000 boats are registered with NRA Thames Region. Two thirds of them are motorised craft. And there are another 6,000 craft visiting the Thames from other waterways (they only need a short-stay certificate).

Registration is important - and compulsory! Every pleasure boat, including inflatables and tenders ('tenders' are small boats towed or carried by another larger boat), must be registered with the NRA before being used in any way on the River Thames upstream of Teddington Weir. Moreover, every boat with an engine must also have a licence to navigate. These licences are issued free to registered boats.

Without control, there would be conflict and danger. Just think - 25,000 pleasure boats on 217 kilometres of navigable river - about 8 metres per boat!

#### **Boating as part of the balance**

The number of boats is only the beginning of the problem. The Thames attracts hundreds of thousands of other river-lovers and river-users - anglers, naturalists, walkers, strollers, people on picnics, people who just want to sit and watch, and tourists from all over the world. 250,000 people between them make seven million visits to our locks each year.



*Inspecting  
a launch*



*Operating  
weir gates*

*"The Thames is an  
international landmark-  
one of the most famous  
rivers in the world...  
as well as a valuable  
community asset for those  
living on its banks."*

The River has many vital practical uses. It is essential for land drainage, for irrigation, as a source of drinking water, and as a disposal system for the treated outfalls from sewage works.

It is home to a wonderful variety of wildlife.

It is also an international landmark - one of the most famous rivers in the world, and part of our national heritage, as well as a valuable community asset for those living on or near its banks.

So, looking after the Thames is an immense privilege and an extremely demanding one. Not surprisingly for such an important asset, a management responsibility emerged over the centuries, mainly but not wholly concerned with navigation. The NRA inherited this responsibility. Our task is to bring it in line with today's needs, adding where necessary, but above all protecting it for future generations.

#### **The authority**

As the navigation authority for the River Thames between Cricklade near the source and Teddington Lock where the river becomes tidal, the NRA is responsible for providing a wide range of services for river-users and for managing the river on behalf of the whole community.

The task of balancing all the varied needs of all the different river-users lies at the heart of that responsibility. Like you, like every user, we want our rivers to remain in as unspoilt a condition as possible, and we want them to be shared, enjoyed and valued by present and future generations.

Our task in the Navigation Service is to make sure that boat-users play their part in creating and preserving an acceptable balance. Boat owners and users have to abide by rules governing safety, hygiene, respect for other users, and care for the environment.

### **MOT for boats?**

Licences are currently only granted to boats that comply with our stringent regulations on construction and the provision of safety equipment (such as fire extinguishers). With British Waterways and the Broads Authority, we are now working on a National Boat Safety Scheme. It will work rather in the same way as the MOT car testing scheme. Boats will have to be tested at regular intervals - perhaps every four years. The NRA will oversee the boat-yards and others that carry out the test. It is anticipated that the new scheme will come into operation during 1995.

### **We patrol the river**

Our patrol launches can make spot checks on all vessels on the rivers in our Region that come within our authority - and generally enforce the rules of the river, including speed limits. We have 14 such vessels, all of them purpose-built and easily recognisable, even by those new to the River (we like people to know that we're around!).

But regulation is only part of their duty. The main aim of our patrol crews is to help and advise anyone about the river, and particularly navigators, whenever help or advice is needed.

### **Navigation means more than that**

Our work extends beyond what the word 'Navigation' is normally taken to mean. We are, in fact, responsible for *managing* the rivers.

-We operate locks - and our lock keepers have the task of guiding craft safely on their way.

-Our Inspectors and lock keepers have a further vital job. By the control and operation of weir gates, water is held back by the weirs to levels needed for navigation and abstractors, nearly always the water companies. Without weirs holding the water back, the Thames in summer would only be about two foot deep, compared with the average present depth of eight feet.

-Our patrol boats and our lock and weir keepers have to be constantly on the alert for obstructions in the river - which could be anything

from a wrecked boat to a overhanging tree that looks likely to fall into the water at any moment.

-We have to watch over regattas held on the rivers in our Region. Henley Regatta is just one of them, the best known, but there are up to 400 others, all of them requiring our supervision and guidance.

### **Levels of service**

So far we've talked a lot about the responsibilities of river users and the rules and regulations they must follow.

The traffic, however, is two-way. We in the NRA have duties and responsibilities to you. A leaflet entitled 'Navigation Levels of Service' aims to list the ways in which we aim to help you, and defines the levels of service that we try to achieve. You may want to have your own copy. If you write to us, we'll send you one.

Here are examples of the levels of service we aim to achieve:

- We will provide staff to help river users through each lock.

- From April to October, we will provide bulk water supplies on average every ten miles and sewage disposal points on average every 15 miles.

- We will inspect all hire launches once a year.

- We will inspect the River by patrol launch and report and/or deal with all relevant issues in accordance with the following minimum criteria:

- i) Inglesham-Oxford - once per fortnight
- ii) Oxford-Teddington - once per week

- We will attend all major organised river events or activities ... to ensure optimum benefit to all river users.

- A recorded 'Navigation Information' service is available at all times on 0734 535520.

### **Settling differences**

Rivers have always been a source of contention. From the very earliest times, mill-owners have complained (or worse) about navigators who have complained

about fishermen who have etc etc. Disputes of all kinds are still common between one or other group of water users.

A particular common form of argument is between riparian owners and boat-owners - because, as there is no right of navigation on the tributaries of the Thames, the permission of the riparian owner is needed before the river can be used for boating or canoeing.

We are more than happy to offer our expertise, experience - and independence - to help reach agreements in any kind of disputes over competing rights or interests. In fact we see this intermediary role as one of our most important functions, one we are uniquely suited to fill. We are, after all, in the business of establishing a workable balance between all river users.

### **Searching for better ways**

Research and development within the NRA is a national responsibility - with every Region benefitting from the work. R&D covers two main areas: management and technology.

'Management' research covers, for instance, the development of monitoring and survey techniques that will help us to improve the facilities we offer and the levels of service.

'Technology' research includes the development of environmentally acceptable boat propulsion, bank protection systems, better engineering methods for navigation installations and design standards generally.

### **The next thousand years**

As we said earlier, the Thames has been a much used, much loved asset for a thousand years.

The next thousand years starts now.



**NRA**

*National Rivers Authority*

*Thames Region*

*Kings Meadow House*

*Kings Meadow Road*

*Reading Berkshire RG1 8DQ*



*"We have produced leaflets which give useful advice and information of direct interest to every river-user."*



*Keeping a weir free of obstruction*



*The eventful Thames*

#### **Responsible enjoyment rules - OK?**

In brief, we want people on boats to: care for the environment; respect the rights of riparian land owners (the people who own the riverbanks and often live there); and recognise and be considerate to the needs of other legitimate river users.

No-one would openly deny those ideals. But in order to implement them in everyday situations, a number of rules have been agreed, some of them in the form of laws (which the NRA is empowered by Parliament to promote and enforce). Most of the rules and laws are obvious common-sense.

Many of the controls are directly concerned with safety. It is not simply a question of whether a boat is river-worthy or not. No boat should ever be a cause of danger to others. The truth is that if a boat were to sink in mid-channel because it was not river-worthy, and no other vessels were in the vicinity, that would be a tragedy to those sailing in it, but no-one else need be seriously affected. If a boat caught fire in a crowded lock, that could be a tragedy not only for those in it, but for all the other people in nearby boats. Fire, often following an explosion, is a frequent cause of disaster. Petrol-engined launches which are not properly maintained and serviced are at the greatest risk of a fire or explosion. We must do everything we can by education and by law to reduce those risks.

Other rules relate to the environment and consideration for others, and enforce procedures that prevent pollution (from on-board lavatories, for instance). No-one should any longer think that the Thames is a personal dustbin.

#### **Read all about it**

We have produced leaflets which give useful advice and information of direct interest to every river-user - and summarise the rules which apply on the river.

The leaflets give succinct but comprehensive descriptions of the needs and likely problems of all the major types of river user. You are likely to be familiar with your own rights, aspirations and problems. In the heat of the moment, you may not always appreciate the rights etc of other people (who may just happen to be feeling the heat at the same time).

Here's a familiar situation where two sets of 'rights' clash and which could easily lead to hard feelings and broken tackle (perhaps worse):

"All craft have a right to navigate the full width of the river ... all anglers have a right to fish (provided they have a rod licence).

It so happens that some anglers choose to sit where they are hidden from the river by bankside vegetation. Assume that an angler has just felt a bite and is about to play the fish. Assume that a sailing dinghy is making a particularly difficult tack. Inevitably, the dinghy hits the line - with dire results. Who is to blame? Neither of them and both of them! Care, alertness and tolerances on both sides would have prevented the accident."

#### **Convenient addresses**

The leaflets also contain many useful addresses - where to launch your boat, where to moor it and where to pump out your sewage. They also give a table of distances and measurements of the headways of bridges for the whole length of the navigable river from Lechlade to Teddington.

*continued on back page*

### The National Rivers Authority (NRA)

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The NRA's mission is to:

- protect and improve the water environment.
- reduce pollution.
- manage water resources.
- provide effective flood defence.
- improve and develop fisheries.

It has an advisory role too. For instance, it is consulted by planning authorities about major building or civil engineering developments that may affect the water environment. It also helps evaluate the environmental assessments that potential developers have to make.

The NRA is 'sponsored' by the Department of the Environment (DoE) - in other words, the DoE is its main link with the Government. It also works closely with the Ministry of Agriculture, Fisheries and Food (MAFF), and the Welsh Office. It cooperates with other bodies such as local authorities, Her Majesty's Inspectorate of Pollution, the Drinking Water Inspectorate, the Office of Water Services and the Commission for the European Communities.

### Thames Region

In Thames Region, we have responsibilities for the rivers, streams, lakes, ponds and underground waters in the whole catchment area - that is, all the land which drains into the Thames. So the Region stretches from Wiltshire in the west to the Estuary in the east, from Luton in the north to the Surrey Downs in the south - nearly 13,000 square kilometres.

Navigation, the subject of this leaflet, is one of our key responsibilities. The others - Conservation, Environmental Quality, Fisheries, Flood Defence, Recreation and Water Resources - are covered in separate leaflets.

In reality, we can't treat these responsibilities separately. Whatever we do must be done in the context

of the whole catchment. This means that the work of one specialist department can only be effectively carried out in collaboration with the others. (So it's a good idea to read all the leaflets, and not just this one. In that way you'll get a better understanding of what we are trying to do.)

The collaboration extends well outside the NRA. In Navigation, for instance, we work closely with people and organisations who want to maintain and improve navigation on the rivers of our Region.

But the most important collaboration is with individual members of the public. The media - newspapers, magazines, TV and radio - help by keeping people informed about navigation problems. But only public opinion can ensure that the water environment continues to be given the care and attention it needs. That is why your interest and support is so critical.

### Some of our external 'partners'

(in addition to ones mentioned above)

- Royal Yachting Association.
- British Canoe Union.
- British Waterski Federation.
- Amateur Rowing Association and other representative organisations.
- British Waterways.
- Inland Waterways Association.
- River User Groups.
- British Marine Industries Association and other trade associations.
- Marine Safety Committees.
- English Nature and Countryside Commission - both statutory advisers to the Government.
- National Trust.

And, most importantly, thousands of individual river-users of all kinds

*"We receive valuable guidance from the Thames Regional Rivers Advisory Committee. Members represent relevant local and national bodies and bring a wide range of expertise and experience. Meetings of this Committee are open to the public."*



*The NRA's eight regions cover the whole of England and Wales.*



*"Our objective is to maintain and improve the quality of natural waters in the whole of the Thames Region."*



**NRA**

*National Rivers Authority*

*Thames Region*

*Guardians of the Water Environment*

*"Mankind has always used rivers as an easy way of disposing of waste."*



*Pollution  
by fuel oil  
in the River  
Kennet*

#### **Water for life**

Without water, there can be no life. But the *quality* of the water is critical. The more polluted it is, the less its ability to support life. If it is grossly polluted, it can actually *take* life.

Fish, plants, wildfowl, livestock, and wild animals are all at risk. So are all the micro-organisms on which the whole river ecology depends. And so too are people ... those who live or work on or near the water, and those who use it for recreation. So are all of us, when pollution threatens the purity of the water we drink.

#### **"Chuck it in the river"**

Mankind has always used rivers as an easy way of disposing of waste. Rivers are obliging. They can cope with a great deal of waste simply by breaking it down by natural processes into harmless materials. But they cannot cope with limitless amounts.

#### **No pollution?**

In an ideal world, all pollution would be completely neutralised before it entered the water environment. And the industrial and farming processes that now produce pollution would be superseded by those that didn't.

Such a happy state is unlikely to arrive. Our only realistic aim is to ensure that the amount of pollutant entering a river - the 'pollution load' - does not exceed its natural capacity.

#### **At work (and at home)**

Pollution *can* come from natural sources - from decaying plant life or from natural impurities in the soil - but not normally in sufficient quantity to cause problems.

Most pollution is, directly or indirectly, man-made. It is made in factories, farms, quarries, mines, refineries, transport depots, filling stations, car-parks - and, not least, in our homes.

Nearly 12 million people live within the Thames catchment area. The sewage they produce must be



treated to acceptable standards before it can be returned to the environment. It usually is, unless heavy rains cause the sewers to overflow - or if a wrong connection is made and foul water from, say, a washing machine, bypasses the sewage works.

Industry and agriculture produce waste in great quantities - which all must be treated. The damage caused when accidents happen is correspondingly great.

#### **Different forms, different damage**

Man-made pollution comes in various forms, each of which causes its own type of damage.

Untreated sewage or farm slurry can increase biochemical oxygen demand (BOD). As a result, dissolved oxygen, vital for water life, is depleted, fish die, and the river smells.

Ammonia, nitrates, oil, pesticides, solvents, cyanides, heavy metal compounds, and silt are all common pollutants.

- Ammonia kills fish and other water organisms.
- Nitrates can produce excessive blue-green algae which take oxygen from the water and can themselves become dangerously toxic.
- Oil in small quantities can form a film on the surface of the water, reducing the uptake of oxygen and making it difficult for fish to breathe. In large quantities it can kill birds and plants.
- Pesticides and solvents can poison groundwater.
- Cyanides and heavy metal compounds can cause severe environmental damage.
- Silt prevents light penetrating the water. It also blankets the river bed and the animals and plants that live there.



*Taking a routine river quality sample on the River Thames at Cookham Bridge*



*Analysing samples in the Thames Region Laboratory at Fobney near Reading*

*"A little pollutant can do a large amount of harm."*

- 'Heat' is also a pollutant. Water used in power station cooling towers and then passed into a river can raise the water temperature. A few degrees difference in temperature can damage a river's natural ecology.

#### **Little - and large**

A little pollutant can do a large amount of harm. For instance: pesticides can kill fish at levels well below one part in a billion; one litre of solvent can contaminate 100,000,000 litres of drinking water (enough to fill 50 Olympic size pools); five litres of oil, the result of one oil change for a medium-size car, can cover half a hectare of water - well over an acre.

#### **Prevention is best**

We are always ready to advise people on the best way of handling possible pollutants and of reducing their impact to an acceptable level.

That is our first and most significant role.

We can offer a wide range of help - from simple commonsense ("don't pour waste oil down a drain marked 'rainwater only'") to highly technical guidance.

Sometimes, we have to recommend radical changes - to buildings, equipment or systems. Sometimes inexpensive modifications will do the trick. Very often, all that is needed is a change of attitude among those concerned and a determination to take all the obvious precautions.

We are particularly pleased to be called in at the planning stage of a new development. And we welcome a call from anyone with a pollution problem. We will do all we can to help solve it - and we usually can.

#### **Read and watch**

We produce a very wide range of 'how-to-do-it' literature, nearly all of it aimed at individual industries and dealing with specific forms of pollution.

### Testing the Thames

On the tidal Thames, we operate a survey boat, called the Thames Guardian, which makes regular checks on water quality. The Thames Guardian has its own on-board laboratory - so our scientists can test the samples immediately. The boat can also trawl the river bed to catch fish and other organisms. These specimens can provide a great deal of information about conditions in the river.

### Action after accidents

If an accident does happen, and there is a risk of pollutants being released, our first aim is to prevent it entering a watercourse. If we are too late for that, then we minimise its effect by warning everyone, especially downstream abstractors and other river users of the danger. Where appropriate, we'll lay booms of absorbent material to trap floating pollutants.

### Enter ... the law!

We much prefer to prevent accidents happening rather than take action after they have happened. But if accidents do happen, there is no excuse in law. Polluters who say: "It was just bad luck", "Circumstance beyond our control", "We only tested the system yesterday" are wasting their breath. Causing pollution is a criminal offence - whatever the reason for it. So in addition to paying the clear-up costs, the polluter could be given further legal penalties, which may involve more than a money payment!

### The PPP

The 'Polluter Pays Principle' is now well established. It means that the NRA is empowered to recover the costs of controlling pollution from those who caused it. These costs are incurred in:

- issuing and enforcing discharge consents.
- monitoring the nature of effluents and their effect when they enter the water environment.
- carrying out work to prevent pollution.

- dealing with pollution incidents and restoring rivers, streams, ditches and ponds to their previous condition.

The total amount recovered after any one pollution incident can be considerable.

### Getting better - could be better still

The evidence is that our rivers are improving. In spite of the increase in population and in industry and agriculture, some 90% of surface water in the Thames Region is of good or fair quality. Moreover, although more pollution incidents are reported, the number of major incidents seems to be decreasing. However, complacency is not justified. Improvements will become harder to achieve. The risk of a fall in quality standards is always with us. Vigilance and a constant upgrading in technology and procedures continue to be imperative.

### Public Register

We are required by law to keep a Public Register of information on water quality. You can come and inspect it at our Reading office between 9.30 in the morning and 4.30 in the afternoon. Alternatively, you can write to us and we'll send you any particular extracts from the Register that interest you.

The Register includes: details of water quality classifications and objectives; applications for 'consents' to discharge water, whether the consents were granted; and - what is most important - whether the requirements of the consent are being met. It also gives sample data on effluents, and describes any action taken on the basis of the data.

### What you can do about pollution

We rely on you and other members of the public to help us in the fight against pollution. You need only follow a few simple and practical rules:

- Don't pour oil, petrol or garden chemicals down the drain or into a gutter.
- Don't throw any kind of rubbish into rivers, streams or ditches.

*"We much prefer to prevent accidents happening rather than take action after they have happened."*



*Taking samples to identify a pollutant on the River Wye at Wooburn Moor near High Wycombe*

- Ask our advice if you need to dispose of any potential pollutant.

And if you see any sign of pollution in any kind of watercourse, please ring us immediately. The number to call - free - at any hour of the day or night is:

**0800 80 70 60**

The environment is the responsibility of everyone, including us - and most definitely including you.



*National Rivers Authority  
Thames Region  
Kings Meadow House  
Kings Meadow Road  
Reading Berkshire RG1 8DQ*



*"The quicker the pollutant is spotted and identified, the easier it is to manage."*



Beckton  
sewage  
treatment  
works

We also produce videos giving the overall anti-pollution story.

Our intention is that people should know how to cope with the particular pollution they are likely to be responsible for - and that no-one should be able to say 'I wasn't told'.

#### **'Consent'**

We have legal powers over what precisely can be discharged into the water environment. Any such discharge needs a 'Consent'. This is a legally binding document specifying the amount and chemical composition of the effluent that can be released.

We check that the terms of the 'Consent' are met, and have the right to enter premises to do our checking.

But our policy is cooperation. We want to work with everyone - water companies, agriculture, industry and the public - to control pollution.

#### **Improving standards by setting standards**

All the rivers in the Region have been given standards of purity - a 'quality objective'.

We currently define the quality of water in rivers on the following scale:

*Class 1:* High quality waters able to supply water for drinking and to support salmon and other game fish.

*Class 2:* Fair quality waters able, when properly treated, to supply drinking water and to support coarse fish.

*Class 3:* Poor quality waters suitable for low-grade industrial use and able to support a restricted aquatic flora and fauna.

*Class 4:* Bad quality waters liable to cause a nuisance, with flora and fauna restricted to pollution-tolerant species.

We set specific quality objectives for each river. These will almost certainly differ along a river's length - the Thames at Teddington

cannot be expected to have the same quality standards as the Thames much further upstream at Lechlade.

The true value of set standards is that they give us a quick reliable means of knowing whether we are succeeding or failing, getting better or worse.

#### **Testing the water**

Every year, we take many thousands of water samples from watercourses in all parts of the Region. Some of the samples are biological, most of them are chemical.

By analysing the chemical samples, we can get a 'snap-shot' of river quality at the time the samples are taken. Biological analysis - that is, the analysis of different types of aquatic life - indicates if pollution has occurred in the period between the chemical surveys. By using the two methods we can keep ourselves informed on the *continuing* condition of the water.

#### **Automatic testing stations**

Much of the chemical sampling is done automatically. We have nearly 30 automatic stations. They take samples of the water several times a day, analyse them, and pass the information to the computer at our Reading head office. If dangerous levels of a pollutant are recorded, an alarm is triggered. Emergency action can then be taken.

#### **Instant action**

The quicker the pollutant is spotted and identified, the easier it is to manage. So in addition to all the regular sampling, automatic or otherwise, our pollution inspectors have special equipment to analyse samples on the spot. They do this during routine monitoring, and when called to emergencies. They can then act immediately to counter the pollution, trace it to its source and prevent further pollutants escaping.

*continued on back page*

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In reality, we can't treat these responsibilities separately. Whatever we do must be done in the context of the whole catchment.

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The collaboration extends well outside the NRA. In Environmental Quality, for instance, we work closely with a wide variety of people and organisations who have a particular interest in improved water quality. They include the water companies (of course), industrial and trade associations and individual companies of all types and sizes.

But the most important collaboration is with individual members of the public. Newspapers, magazines, TV and radio keep people informed about the water environment. Pressure groups can highlight any threats. But only public opinion can ensure that the water environment continues to be given the care and attention it needs.

### Some of our external 'partners'

(in addition to ones mentioned above)

- Industrial and Trade Associations - such as the Confederation of British Industry and the National Farmers' Union. These Associations help us to keep their members informed on water quality policies and to encourage working practices that reduce pollution.
- English Nature, the statutory advisor to the Government on nature conservation in England.
- The Countryside Commission, the statutory advisor to the Government on the conservation of landscape and access to the countryside.
- The Royal Society for Nature Conservation and other voluntary groups.
- Angling Clubs and other water recreation groups. Their support is indispensable. They are in a unique position to give early warning of pollution.

Note: We regulate some of the activities of the water companies operating in our Region - primarily Thames Water. We control their abstractions\* from rivers and underground aquifers and, in the case of Thames Water, discharges from their sewage treatment works. At all times, we must protect water supplies from pollution.

\*'Abstraction' is the term used to describe the act of taking water in quantity from natural sources. Abstraction is usually by pumping, sometimes by gravity.

*"We also receive  
valuable guidance  
from the Thames  
Regional Rivers  
Advisory Committee.  
Membership is drawn  
from a wide range of  
local and national  
bodies. Meetings of  
this Committee are  
open to the public."*



*The NRA's eight  
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*"Our job in  
Conservation is to  
conserve and  
enhance the  
wildlife and  
landscape of the  
whole river  
environment."*



*National Rivers Authority  
Thames Region*

*Guardians of the Water Environment*

*"Conservation is 'built-in' right from the beginning of any project."*



*Willow  
spiling to  
protect the  
river banks  
from  
erosion*

**Today, everyone expects more from the environment**

As individuals, we have two kinds of expectations from the environment.

On the one hand: we expect that we can take more land for housing, industry, and roads ... use more water at home and at work ... produce more waste and pollution.

On the *other* hand: we expect that rivers will stay clean, that fish, animals, flowers and plants will multiply, and that the countryside will be as beautiful as it always has been.

These two sets of expectations are difficult to reconcile - to put it mildly. But our job in Conservation is to help make sure that, as far as possible, they *are* reconciled.

**Conservation from the word 'go'**

It often happens that the best time to enhance wildlife environment is when our colleagues in other parts of the NRA are carrying out major works - for other purposes.

By far the biggest of these 'other purposes' is flood defence. Thames Region spends about £20 million every year on flood defence works. A significant percentage of that money is devoted to the improvement or creation of habitats for local flora and fauna - not only those that may be directly disturbed by the works, but any others that could benefit from the investment of our money, time and expertise. Conservation is 'built-in', right from the beginning of any project.

Here are some of the techniques we use to further conservation during flood defence works:

***Two-stage channels***

We create a flood 'berm' - a kind of wide ledge - immediately adjacent to the main channel of the river. When the river rises, the berm is covered with water, thus reducing the likelihood of flooding downstream. The berm can support a variety of habitats, from marshes



and reed-beds nearest the river to damp grassland further away.

#### *Flood bypass channels*

Another successful flood defence device is a bypass channel. This is used to carry flood water only and so take pressure off the main channel. It also acts as a ribbon of wetland habitat. This is always valuable, particularly in urban areas where such habitats are few.

#### *Willow 'spiling'*

Woven willow stems (or "spiling") can provide a living and long-lasting protection for river banks. The space between the spiling and the bank is backfilled with soil to enable the willows to root into the bank.

#### *Reed planting*

Where the threat of erosion is comparatively weak, reeds can be planted to provide protection. They also provide homes for many different types of animals and birds.

#### *Enhancing habitats and creating new ones*

Most rivers and streams in the Region have been damaged in one way or another by human activities - particularly during the last 200 years. So there is no shortage of opportunities to improve habitats.

We have a separate budget of over half a million pounds which we can spend as and when we think appropriate on the creation of new habitats. In order to decide on what enhancements should be carried out, and where, we commission river corridor surveys and landscape assessments for targeted catchments - ie particular rivers and the land they drain.

Sometimes we work entirely on our own. Sometimes we support schemes in which other bodies participate. The only proviso is that we want to be responsible for actually doing the work - we're not in the business of giving grants for conservation work.



*Hurdles for  
channel  
narrowing*



*Nesting  
boxes for  
Barn Owls*

*"If you have other  
ideas you think we  
could adopt, we'd be  
delighted to hear from  
you."*

Here are some examples of how we improve wildlife habitats:

- Many fish species need riffles (mini-rapids) and pools for feeding or breeding. We create riffles by introducing stones and gravel. The pools are simply parts of the channel that we have deepened.
- If a channel has been previously straightened, we restore the 'natural' curves with hurdles, groynes and such like.
- We reshape banks to make them shallower and to create terraces.
- We remove vegetation alien to the area which is smothering indigenous plants.
- Nesting and roosting sites for birds and bats are installed.
- We create new ponds and renovate existing ones.
- We plant trees, shrubs and plants on new sites close to watercourses.
- We like to create a mosaic of wetland habitat near watercourses. Such a habitat could include open water, reed-beds, muddy 'scrapes' for wading birds, and damp grassland.

Those are some of things we do. If you have other ideas you think we could adopt, we'd be delighted to hear from you.

#### **Taking care as we work**

The work of maintaining the flow of rivers and streams can itself harm the water environment - unless the right care is taken. 'Right care' takes many forms, among them:

When a river needs to be dredged in order to maintain its natural flow, we first prepare an environmental assessment. This summarises the species of flora and fauna that must be left undisturbed. It also specifies the precautions to be taken.

*"The beauty of the environment is worth preserving for its own sake."*

#### **Working with people**

People are becoming more and more concerned about the environment. New laws governing the way we all use it are becoming more rigorous. As a result, Thames Region has increased the number of expert staff who work directly on environmental projects. They include landscape architects and conservation specialists. But everyone in Thames Region makes environmental concern a prime requirement whatever the project.

The NRA recognises that economic systems depend upon ecological systems (you can hardly manufacture anything without using the products of agriculture, fisheries, quarrying or mining, not to mention even more basic materials, such as water, air and space!). The overall aim has to be sustainable development, best defined as 'development that meets the need of the present without compromising the ability of future generations to meet their own needs'.

Environmental conservation is vital for that reason alone. But there is another reason. The beauty of the environment is part of everyone's heritage. It is worth preserving for its own sake and for the sake of everyone who enjoys the sight, sound and smells of clear, clean water and all the wildlife that depends on it.

#### **Action - and influence too**

There are two ways of achieving any objective - do it yourself or make sure someone else does it.

In Thames, so far as conservation is concerned, we do both.

Some of our direct-involvement activities have been described on previous pages. We also have the authority - given to us by Parliament - to make sure that any individual or organisation with capacity to affect the water environment does nothing that would harm it and does what they can to improve it.



*Limestone current deflectors to vary flow conditions*

We also advise local authorities on any planning applications that may affect the river environment. This is a very important part of our work.

We are now recognised as the public body most concerned and most expert in all matters affecting the river environment.

Landowners know where to go when they need help and advice about the rivers, streams and ponds near or on their land. And anyone with a problem concerning the water environment now has someone who will listen and who has the expertise to help put it right.

Conservation is no longer an enthusiast's pipe dream. It is a practical and increasingly successful policy for the Thames Region of the NRA.



*National Rivers Authority  
Thames Region  
Kings Meadow House  
Kings Meadow Road  
Reading Berkshire RG1 8DQ*



*"One of the most gratifying conservation successes of recent years has been the return of otters to Thames Region."*



*Otters are sure signs of healthier rivers*

For instance, a dredger should normally only remove silt and debris from the river bed. Some silt and debris should be left at the river margins to allow a strip of vegetation (such as reeds) to grow. Coarser materials, such as gravel, which provide habitat for aquatic invertebrates and spawning salmonids (salmon and trout), should be left untouched. Features such as islands, cliffs, beaches, riffles and pools, ie the natural features of the river, should also be left intact.

Possible damaging effects of dredging are considered and where necessary avoided. One of them could be the lowering of the water levels in nearby land. This could seriously alter the habitat of wetland plant species, and make it difficult for wading birds such as redshank and snipe to probe the topsoil for invertebrates. Another problem comes if dredged silt is dumped on the bank. Important habitats can be destroyed.

Trimming of bankside trees and shrubs should be done lightly wherever possible - and outside the bird-breeding season.

Pollarding and coppicing of riverside tree species, such as willow, poplar and alder, prolong the life of the trees and reduce the chance of large dead branches falling off during a storm and blocking the watercourse.

We aim to burn cuttings only when wind speed and direction makes it safe to do so. In many cases, we leave a few logs and piles of brush wood to create habitats for fauna and fungal species.

#### **New homes for otters**

One of the most gratifying conservation successes of recent years - on a par with the reappearance of migrating salmon in the Thames - has been the return of the otters to Thames Region. Otters need plenty of space, clean water and secluded

holts (dens). In short, they are symptoms of healthy water and wetland.

Otter projects in the Region are excellent examples of that all-important collaboration. We continue to work with local Wildlife Trusts, the Ministry of Agriculture, Fisheries and Food, the Countryside Commission and local landowners to reduce pollution and improve the otter habitat generally. Current projects include one on the Wey in Hampshire, another in Hertfordshire, and a third on the upper Thames.

#### **Happy hunting for owls**

We are working with the Hawk and Owl Trust in a project to provide breeding sites for barn owls in the Region. Flood plains in the Thames catchment are happy hunting grounds for barn owls.

#### **Man-made and worth conserving**

Some of the most beautiful and historically interesting of our buildings are sited near - and on - our rivers and streams. Bridges, weirs and water mills represent only a few examples of the diversity. They need looking after - and that too is our job. We also help to make sure that any *new* buildings are designed to be in keeping with their setting and the local tradition.

*continued on back page*

### The National Rivers Authority (NRA)

The NRA is the largest environment protection agency in Europe. It was created by Parliament through the Water Act of 1989. Its duties were further defined in the Water Resources Act 1991.

The NRA's mission is to:

- protect and improve the water environment.
- reduce pollution.
- manage water resources.
- provide effective flood defence.
- improve and develop fisheries.

It has an advisory role too. For instance, it is consulted by planning authorities about major building or civil engineering developments that may affect the water environment. It also helps check the environmental assessments that potential developers have to make.

The NRA is 'sponsored' by the Department of the Environment (DoE) - in other words, the DoE is its main link with the Government. It also works closely with the Ministry of Agriculture, Fisheries and Food (MAFF), and the Welsh Office. It cooperates on a day-to-day basis with other bodies such as local authorities, Her Majesty's Inspectorate of Pollution, the Drinking Water Inspectorate, the Office of Water Services and the Commission for the European Communities.

### Thames Region

In Thames Region, we have responsibilities for the rivers, streams, lakes, ponds and underground waters in the whole catchment area - that is, all the land which drains into the Thames. So the Region stretches from Wiltshire in the west to the Estuary in the east, from Luton in the north to the Surrey Downs in the south - nearly 13,000 square kilometres.

Conservation, the subject of this leaflet, is one of our key responsibilities. The others - Flood Defence, Water Resources, Fisheries, Navigation, Recreation and Environmental Quality - are covered in separate leaflets. In reality, we can't treat these responsibilities separately. Whatever we do must be done in the context of the whole catchment.

This means that the work of one specialist department is best carried out in collaboration with all the others. (So it's a good idea to read all the leaflets, and not just this one. In that way you'll get a better understanding of what we are trying to do.)

This collaboration extends well outside the NRA. In Conservation, we work closely with many other environmental organisations.

Examples of some of these external 'partners' are given below.

But the most important collaboration is with individual members of the public. Newspapers, magazines, TV and radio keep people informed about the water environment. Local groups can highlight any threats. But only public opinion can ensure that the water environment continues to be given the care and attention it needs.

### Some of our external 'partners'

- English Nature, the statutory body responsible for nature conservation in England.
- Countryside Commission, the statutory body responsible for the conservation of landscape and promoting access to the countryside.
- County Wildlife Trusts.
- National Trust.
- Royal Society for Nature Conservation.
- Royal Society for the Protection of Birds.
- Council for the Preservation of Rural England.

And, most importantly, thousands of individual landowners.

*"We also receive  
valuable guidance  
from the Thames  
Regional Rivers  
Advisory Committee.  
Membership is drawn  
from a wide range of  
local and national  
bodies. Meetings of  
this Committee are  
open to the public."*



*The NRA's eight regions cover the whole of England and Wales.*



*"Our first job is to reduce the risk of flooding. To do that, we continue to improve our defences and advise against development on land liable to flooding. When flooding looks likely, we give urgent warnings to those at risk - and work to limit the damage."*



**NRA**

*National Rivers Authority*

*Thames Region*

*Guardians of the Water Environment*

*"We have to know everything there is to know about the 'floodability' of every square metre of land in our Region."*



*Thames  
Barrier,  
key to  
London's  
flood  
defence*

#### **Half of all we have**

In Thames Region, flood defence absorbs a good half of all our energies, our finances and our workforce.

We have four principal duties:

1. We must watch out for possible new building developments on land liable to flooding and alert local planning authorities of the risks.

In fact, we have to know everything there is to know about the 'floodability' of every square metre of land in our Region. Our specialists are continually carrying out studies to give us a better understanding of why floods happen and how their effects can be minimised.

This task is made more complex by the changing pattern of land use - which is why our advisory role in new building development is so critical.

2. We must carry on, enthusiastically, with everyday 'good housekeeping' duties. These include:

- removing obstructions.
- cutting back dead or dying trees that might fall and block the channel.
- removing reeds and weeds that could also cause blockages.
- dredging watercourses that have silted up.
- making sure that sluices, pumps, weirs and other essential structures work properly.

3. We have to assess where new flood defence works are needed - then design and build them. This could involve: strengthening river walls and embankments, realigning water courses, digging flood relief channels and building new weirs and sluices.

4. We are committed to providing effective flood warnings and emergency services. These are perhaps our highest profile tasks - they are certainly the ones that make the biggest impact in the news media.



### **Eye on the environment**

At all times, and in whatever we do for flood defence, we keep a firm eye on the needs of wildlife and of the environment as a whole. This is not just a negative, no-harm approach. The aim is to enhance the environment as we build better flood defences. Working with our conservation specialists, we take every opportunity to create new wildlife habitats as well as preserve existing ones.

### **Down from the heavens, in from the sea**

The Thames Estuary is particularly vulnerable to flooding - for a combination of reasons. The southeastern corner of the British Isles is slowly tilting downwards; London is sinking into its bed of clay; and sea levels are rising. As a result, the height of high tide in central London is rising at a rate of about 75cm per century.

There is another reason, more potent than the others. When a trough of low pressure, perhaps hundreds of miles across, moves eastwards across the Atlantic towards the British Isles, it raises the level of seawater beneath it by up to nine metres. If this 'plateau' of seawater passes north of Scotland and then down into the comparatively shallow basin of the North Sea, perhaps further heightened by strong winds from the North, it can cause excessively high surge tides.

When a surge tide also coincides with a high 'Spring' tide (which occur twice monthly), flooding becomes a serious possibility. Heavy rain in the Thames catchment adds to the threat.

### **The size of the problem**

Teddington weir is where the Thames becomes tidal.

On a typical summer's day, about 650 million gallons of fresh water will pass over it.

On a typical winter's day, the quantity will be at least four times as great, perhaps eight times.



*Flood Control Room, Reading*



*Work in progress on the Ravensbourne Flood Alleviation Scheme in south east London*

*"The cost in human terms would be incalculable".*

That's a typical winter's day.

But in the winter of 1947, the peak flood flow at Teddington was 13,572 million gallons a day, nearly three times that of a typical winter's day and 20 times more than on a typical summer's day.

The problem is made much worse when flood water from upstream meets a high surge tide coming up from the Thames Estuary.

### **London exists - how do we defend it?**

Over the years, a comprehensive flood prevention strategy has been developed and implemented.

The Thames Barrier is the central feature. Stretching 520 metres across the Thames at Woolwich, the Barrier can hold back the incoming tide completely. Land downstream of the Barrier is protected by about 32 kilometres of embankments and flood gates.

We can predict the height of incoming tides up to 12 hours before they actually arrive. To do this, we get continually updated weather information from the Meteorological Office and details of the heights of incoming tides from automatic recorders in Scotland and down the east coast of England.

We aim to close the Barrier about four hours before the danger high tide reaches it. Closure takes about 30 minutes. Before we close it, we tell the navigation service of the Port of London Authority, who in turn alert all shipping.

The Barrier took eight years to build - from 1974 to October 1982 when it became operable. It was first used in anger in February 1983 and officially opened by H.M. The Queen on May 8, 1984.

The final cost, including all the associated flood defence works, worked out at well over £500 million. Three quarters of the money came from central government, the rest from the relevant local authorities. Operating and maintenance costs approach £4 million a year.

In addition, they must supervise routine work on and around the rivers under their charge. Routine work includes dredging, keeping the channel clear, and maintenance, not only of the banks but of all the man-made structures, including weirs and locks.

Inspectors, because of their unique familiarity with the river, have special responsibilities in assessing when major works are needed, and the form they should take. This part of their duty - to consider the long term - is quickly described but vitally important. Looking after our rivers certainly calls for careful day-to-day work. But the inspectors have to take the long view as well.

#### **Protecting all the Region**

Our specialist staff keep a round-the-clock watch on weather conditions and river levels throughout the Region. They have at their disposal the very latest technology, including rainfall radar and telemetry. Rainfall radar gives early warning of approaching storms. The telemetry facility maintains a constant and automatic check on water levels at strategic points on all the main rivers and watercourses.

#### **Standby for action**

We have fully equipped and trained flood defence teams on stand-by at offices around the Region. In emergencies they can be quickly mobilised. Their tasks then are to keep all river channels free of obstruction to allow flood waters to escape, and to cooperate with the Police, Fire, Rescue and other emergency services who will also be involved.

The teams are also called on to help with other emergencies on or near the river, where their knowledge and experience of river conditions are particularly valuable.

#### **The complete solution is impossible!**

The complete solution to flooding might be to abandon any land liable to flooding. Rivers can then do precisely what they like without harm to human beings or their property.

But that's impossible - and undesirable. The best we can do is to discourage, as far as possible, any new building on threatened land. In the NRA, we have a duty to keep a check on any proposed developments. We advise planning authorities about flooding dangers, and encourage them to develop sites away from high flood-risk areas.

We also assess the other demands new developments may make on the environment. For instance, new housing estates need water - which our water resources management has to provide. There may be implications for wildlife conservation.

Our different functions really are interlocking - and that is to everyone's advantage.



*Dredger at work*

*"We advise planning authorities about flooding dangers, and encourage them to develop sites away from high flood-risk areas."*



**NRA**

*National Rivers Authority  
Thames Region  
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Kings Meadow Road  
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*"Floods hit the headlines. The day-to-day work of our Flood Defence Inspectors rarely does".*



*Clearing obstructions on a tributary of the Thames*

These are all vast sums. But the cost of just one flood in central London would be hundreds of times higher. The cost in human terms would be incalculable.

#### **Upstream safety**

To protect London's upstream suburbs when high freshwater flows down the river meet incoming high tides - but which are not high enough to justify the use of the Barrier - river bank defences upstream from Putney on the south side and from Hammersmith on the north have been strengthened.

Riverside walks, open to the public, were constructed as part of the overall project.

#### **A Cascade of vital information**

Both regionally and nationally, the NRA encourages the development of information technology that will make it easier to forecast floods accurately, respond to them effectively - and to alert the public more quickly.

In Thames Region, in addition to the vital information received from the Meteorological Office and elsewhere, we deploy a flood forecasting and warning system for non-tidal rivers that is particularly suited to our needs. The system, called Cascade, was developed within the Region by the NRA and, earlier, by the authorities who carried our responsibilities before we were formed in 1989.

Cascade is used within the London area and on the catchments of the rivers Lee and Roding. It is controlled from our Flood Warning Centre at Waltham Cross in Hertfordshire.

The system gathers data from a network of 55 telemetry rain gauges and 70 river level gauging stations. Information about rainfall is also received from the London Weather Radar at Chenies in Buckinghamshire. Further information comes from the London Weather Centre which gives heavy rainfall warnings and longer-term weather forecasts.

All this information is accessible to our forecasters via terminals based within the Waltham Cross Centre. Flood Duty Officers have terminals in their own homes.

As a result, we can monitor the development of potential flood dangers and take whatever precautions are necessary - and give early warning to those who might be affected.

#### **A day in the life ...**

Floods hit the headlines. The day-to-day work of our Flood Defence Inspectors rarely does. Yet without it, the risk of flooding - and of more 'flood crisis' headlines - would be greatly increased.

Our inspectors each have responsibilities for a particular catchment area, or part of one - perhaps as many as 600 kilometres of river each. They will aim to walk along the whole distance at least once every two years. Many stretches are visited every week - or even more often. Not surprisingly they come to know their rivers very well indeed. They know which stretches need special, even constant attention. By concentrating on these danger spots, they make best use of their time.

On a typical day, in addition to this river patrol, an inspector will keep appointments with a number of landowners, people whose property lies on or near a watercourse. All of them will have a specific problem to discuss. For instance ... the secretary of a golf club may think there's a risk of flooding on part of the course ... a farmer may want to put in extra drainage on part of his land ... an angling society asks what can be done about bank erosion.

Then there are the many small-scale emergencies - a householder rings up about a sudden flood in his garden ... a tree has fallen across a stream causing serious obstruction ... the bank of a ditch has caved in. They all need prompt attention by the inspectors.

*continued on back page*

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understanding of what we are trying to do.)

This collaboration extends well outside the NRA. In Flood Defence, for instance, we work closely with all the other organisations concerned with flood defence, including:

- Ministry of Agriculture, Fisheries and Food (MAFF).  
The Ministry is responsible for determining national flood defence policy. It is also responsible for appointing the Chairmen and some members of Regional Flood Defence Committees. These Committees work closely with NRA Regions. They may also set up local flood defence committees.
- Local Authorities.  
They have powers to carry out work on watercourses under our general supervision. Our liaison with local authorities is critical in preventing flood risks from being created - or extended. Local authorities also have an important role in responding to emergencies. And they supply, from the Council Tax, much of the money needed to pay for flood defence.
- The Police.  
Thames Region, in common with all other NRA Regions, gives flood warnings to the Police, for them to pass on to the general public. The Police will help people evacuate their homes - if that drastic step is necessary - and provide any other help that is needed.
- The Meteorological Office  
operates the weather radar network and gives warning of the onset of severe weather likely to cause flooding. Through its Storm Tide Warning Service (sponsored by the Ministry of Agriculture, Fisheries and Food) it also forecasts tidal surges.
- Research Centres,  
including those at universities, provide scientific information and insights to help us meet our flood defence challenges.

As always, we can rely on the public to give us all the help they can - not least by being generally supportive of our efforts. Individual members of the public are of enormous help in giving us prior warning of flood problems, either imminent or long-term. They are our eyes and ears. We continue to receive great help from the news media in alerting people to flood dangers and how they can be tackled.

*"The Thames Regional  
Flood Defence*

*Committee is especially  
important in our work  
because it has direct  
executive*

*responsibilities for  
Flood Defence*

*Activities in our*

*Region. Its members  
are drawn from*

*outside organisations,  
most of them local*

*authorities. Meetings  
of this Committee are*

*open to the public."*



*The NRA's eight  
regions cover the  
whole of England  
and Wales.*



*"Thriving fish are  
signs of a thriving  
river."*

*Our aim is to  
maintain and  
improve the health  
of both - for  
everyone's benefit  
and enjoyment."*



**NRA**

*National Rivers Authority*

*Thames Region*

*Guardians of the Water Environment*

*"As with any other  
NRA activity,  
cooperation is the  
key."*



*Sorting  
sample fish  
from the  
tidal  
Thames*

#### **Fish - recipe for success**

Our role in the Fisheries section of NRA Thames Region can be stated quite simply. It is to safeguard the fish in all the waters of our Region, protect their habitat and, where appropriate, work to increase their numbers.

Simple to state - more complex to carry out!

As with every other NRA activity, cooperation is the key. We join with other specialist departments in the Region to improve water quality and quantity. We also work with colleagues to ensure that flood defence works and other capital projects are designed and implemented to enhance rather than damage fish habitats. The emphasis is on pro-active development.

Collaboration with other water users is vital, most of all with anglers and angling associations.

We have our own specialist contribution to make:

- We monitor the health and numbers of fish in all our waters - and we are responsible for over 1,500 kilometres of riverine fisheries - ie fishing from river banks.
- We improve fish habitats and create new ones - pools, ledges, riffles etc (riffles are mini rapids).
- We respond quickly to emergencies that may endanger fish or fisheries.
- Where fish are at risk, we try and help them on the spot (by removing the cause of pollution, for instance). As a last resort, we move them to safer waters.
- We rear fish (or buy them in from outside) to restock depleted rivers.
- We install fish ladders to help salmon and sea trout return to their spawning grounds.
- We specify 'fish biomass' targets for particular stretches of river. ('Fish biomass' means the total weight of fish).
- We monitor any kind of development that may damage the fisheries.
- We are constantly on guard against activity in or out of season that might interfere with the good health of our fisheries.



### Getting better - but we're not relaxing

In recent years, there have been significant improvements in the water quality of our rivers. The water environment as a whole has become more favourable to fish and fisheries. The return of salmon to the Thames is the most spectacular evidence of this improvement.

But ... there is absolutely no room for complacency. The very fact that fish are now returning to rivers in the heart of London and other heavily built-up residential and industrial areas brings with it the risk of major pollution incidents. Thousands of fish could be killed and their habitat damaged.

We dare not relax our guard.

### How do we know how many fish there are?

We carry out regular surveys on all the principal rivers in the Region. The aim is to determine not only the numbers of fish (and their species), but their condition too. We also carry out special investigations into fish stocks in response to specific demands - after a pollution emergency, for instance.

We use a variety of survey techniques. On most watercourses, we use conventional electro-fishing techniques. On very small tributaries which may contain large numbers of young fish migrating to and from the main river, and where conventional electric fishing equipment is unwieldy, we now use specialised 'back pack' gear.

(Note: in 'electro-fishing', fish within a few feet of the equipment are temporarily and harmlessly stunned. After a quick examination, they are returned to the water before they realise they've left it! Electro-fishing is, of course, illegal except when carried out under strictly controlled conditions for official purposes.)

At key sites on main rivers, we use micro-mesh seine nets as well as trawl nets. ('Seine' nets hang vertically in the water with floats at the top and weights at the bottom.) The movements and numbers of migratory fish - salmon, sea trout and eels - are monitored with the help of fish counters, traps and the collection of trap returns.



*Electro-fishing*



*Seine-net fishing*

*"But ... there is absolutely no room for complacency."*

### Beam and boom

Two other techniques are now used on the Thames - dual beam sonar (biosonics) and the 'boom boat'.

Dual beam sonar, previously used only at sea, and very successfully too, has been developed by us for use in rivers. It can report quickly on the numbers, size and distribution of the fish. However, it cannot distinguish between species.

For that, another NRA development is needed - the boom boat. The boom boat can electro-fish in relatively wide and deep watercourses. Used in conjunction with the dual beam sonar, it gives us information about coarse fish that was previously unobtainable.

### Ideal homes

We spend £500,000 every year on improving fish habitats and creating new ones. That is 'extra' money, because everything we do in the NRA is done with the environment in mind. So, in Fisheries, we work with our colleagues to improve water quality and quantity. We also ensure that any improvements carried out on our rivers - for flood defence, navigation or recreation - result in better fisheries. After all, the NRA's overall remit is to create healthy rivers. And the best indicators of healthy rivers are healthy fish populations!

### Licence to fish

Anyone who goes fishing must have an NRA rod licence, renewable every year. In addition, a permit from the riparian owner will also be needed (A riparian owner, in this case the owner of land on the bank of a non-tidal river, also owns the land up to the centre of the river or as far as the other bank and has legal rights over the water itself.)

NRA licences are now available through post offices and from a limited number of other outlets. We also sell 'Lock and Weir' fishing permits allowing anglers to enjoy their sport at locks along the length of the Thames from Oxfordshire to Surrey.

### Pressure on the natives

Exotic species sound exciting but could be a threat to our native fish. It is, in fact, an offence to stock exotic species in any UK fishery without prior permission from the NRA and the Ministry of Agriculture, Fisheries and Food. The relevant legislation is the Salmon and Freshwater Fisheries Act, 1975 and the Wildlife and Countryside Act, 1981. Exotic species, as the name implies, are not native to this country. They may carry parasite fauna or diseases that are dangerous to our native species or may present unwanted competition for limited resources. Most exotics are 'one-off' accidental escapees from fish farms, garden centres or private collections. In these cases, the risk is limited. Sometimes, the risk is great and the culprit identified - and penalised. The next paragraph explains:

### The law can bite

In a recent test-case, a well-known fly-fishing club was awarded £10,000 damages plus interest against the former owners of a trout farm. It was alleged that the farm had allowed thousands of rainbow trout to escape into a prime stretch of a river famous for its brown trout. The rainbow trout 'stole' the food naturally and normally available for the brown trout. There was a serious risk that the river's ecology would be seriously damaged.

After the case, the Anglers Cooperative Association said that the judgement allowed them to go ahead with similar prosecutions in other parts of the country.

### Distress response

Hot dry weather can create distress in fish. Water levels are lowered, so are oxygen levels. And there may be problems with algal blooms - which also help to reduce oxygen levels. In the past, the answer would have been to remove the fish to safer waters, but the experience can be stressful, and often fatal.

Portable aerators now provide a much better response both in lakes and rivers. The aerators can raise oxygen levels from a disastrous 5%

to an acceptable 25% within a few hours - sufficient to keep the fish alive and undistressed until conditions revert to normal.

### Up at eels

Eels have been fished in the Thames for thousands of years. Before industrialisation and sewage blighted the river and its banks, shoals of elvers making their way up-river were one of the great sights of Spring. By the end of the last century, the building of major navigational weirs and a devastating reduction in water quality virtually ended eel migration.

Thankfully, during the last 30 years, continued improvement in water quality has encouraged the eels and elvers to return. The NRA has restocked five rivers with 160,000 elvers. Re-colonisation will be a slow process, and it is unlikely that there will ever again be sufficient stock to permit large-scale commercial exploitation. But anglers - and herons should continue to do better every year.

### Research for better development

We continue to improve our techniques and our equipment. We must also deepen our knowledge and understanding of our fish species and their habitats.

Research, and the better development that follows, are national responsibilities within the NRA.

Among the areas currently under urgent review by our research and development teams are:

- how can we enhance the condition and numbers of salmon and sea trout entering our rivers?
- what are the critical factors that restrict coarse fish populations in lowland rivers?
- is disease in fish an indicator of poor water quality?
- what is the most effective way of introducing hatchery-reared fish into rivers?
- are there more accurate ways of counting fish stocks?
- what are the 'best-practice' techniques for improving and enhancing fish habitats?



*Salmon ladder on the Thames at Romney Weir*

- can we develop new ways of restoring the land environment that will improve the water environment and restore damaged fisheries?

### Fishing in the future

We can be reasonably certain that over the next decades the demands made on the environment in general and the water environment in particular will intensify. We shall have to increase our effectiveness simply to keep up. We intend to do better than that.

We should also take into account the possibility of climate change - though this, if it happens, will be on a much larger time scale.

But whatever the future holds, we can be absolutely certain that the principles which have guided the NRA since it was formed in 1989 will still apply.

So far as fishing and fisheries are concerned, those principles are: to increase water quality and quantity; to restore natural habitats; and to manage fish stocks as efficiently as possible. The better we live up to those principles, the better fishing we will all enjoy in the future.



**NRA**

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Thames Region  
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*"We have about  
220,000 rod licence-  
holders in Thames  
Region. They are our  
customers."*



*Monitoring  
adult  
salmon*

We have about 220,000 rod licence-holders in Thames Region. They are our customers. We take great pains to ensure that neither their sport nor the fishery in general is spoiled by anglers operating without a licence.

Our Bailiffs continually patrol the sites and have the right to insist on seeing any angler's licence. They are also employed during the close seasons to enforce regulations.

In some areas, our Bailiffs are assisted by local police officers.

#### **Moving fish**

Anyone transferring fish from one water to another, risks transferring disease too. There's also the risk of attracting fish from other parts of the river to fill the 'gap' created - and thus disturbing other people's fishing. The law says that no fish can be moved without our written permission - and we look with great caution on all applications.

Applications to move fish often come about because of some dissatisfaction with the fishery. A more positive reaction is to remove the cause of the dissatisfaction. We are always pleased to offer our help and expertise.

#### **Family planning - NRA style**

We are continually looking for new ways of encouraging the right fish to breed more successfully in the wild - and in as natural a way as possible.

Innovative techniques for enhancing stocks of brown trout have been effectively tested in Cotswolds rivers.

Artificial spawning beds have been constructed in three rivers. Trials are being carried out to see if they work.

Trout incubation boxes are proving very successful. The boxes, just over half a cubic metre in capacity, are placed on the river's edge. Water upwells through a maximum of 50,000 eggs which are layered among gravel inside the box.

When the eggs have hatched, the young fish (called 'alevins') survive on their yolk sacs until, as fry, they seek the light and swim out through two small pipes that overhang the river. In this way they stock themselves, and are virtually 'natural fry'.

A third technique seeks to aid natural spawning by breaking up hard limestone 'pans' that form on the river bed and prevent trout reaching the spawning gravels easily. High pressure water jets are used to break up the pans and help remove silt. Alternatively, a tractor-mounted rotavator (a kind of revolving rake) can be used to break up the pans. Natural flows can then remove the silt.

#### **Restocking the watercourses**

Our fish farms produce a variety of both coarse and game fish for stocking out in the Region's rivers. In many cases, the fish are used to reinstate fisheries that have been affected by pollution. Chub, dace, barbel, tench, carp and rudd are among the coarse fish species reared and released.

Cage rearing is also used for brown trout production as well as for the production of juvenile salmon for the Thames Salmon Rehabilitation Scheme. In one recent year, about 60,000 smolts and 16,000 parr were stocked out. We hold our own adult salmon broodstock - fish that have returned to the river. But we also acquire many tens of thousands eggs from outside sources, usually Scotland and Ireland.

However, long-term prospects for a self-sustaining run of salmon depends on our producing a distinctive Thames strain of salmon, adapted to local conditions. We are all working to achieve this aim.

#### **Pass the fish**

The Thames Salmon Trust has virtually completed its programme of salmon passes on the Thames. Twenty-two were required, and all of them have been financed by outside sponsors. The final pass will be opened in 1995. Salmon will then have access to all the main potential spawning and nursery tributaries but more work will be needed to help the salmon reach the spawning grounds.

*continued on back page*

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The NRA's mission is to:

- protect and improve the water environment.
- reduce pollution.
- manage water resources.
- provide effective flood defence.
- improve and develop fisheries.

It has an advisory role too. For instance, it is consulted by planning authorities about major building or civil engineering developments that may affect the water environment. It also helps check the environmental assessments that potential developers have to make.

The NRA is 'sponsored' by the Department of the Environment (DoE) - in other words, the DoE is its main link with the Government. It also works closely with the Ministry of Agriculture, Fisheries and Food (MAFF), and the Welsh Office. It cooperates on a day-to-day basis with other bodies such as local authorities, Her Majesty's Inspectorate of Pollution, the Drinking Water Inspectorate, the Office of Water Services and the Commission for the European Communities.

### Thames Region

In Thames Region, we have responsibilities for the rivers, streams, lakes, ponds and underground waters in the whole catchment area, that is all the land which drains into the Thames. So the Region stretches from Wiltshire in the west to the Estuary in the east, from Luton in the north to the Surrey Downs in the south - nearly 13,000 square kilometres.

Fisheries, the subject of this leaflet, is one of our key responsibilities. The others - Conservation, Environmental Quality, Flood Defence, Navigation, Recreation, and Water Resources - are covered in separate leaflets.

In reality, we can't treat these

responsibilities separately. Whatever we do must be done in the context of the whole catchment.

This means that the work of one specialist department is best carried out in collaboration with all the others. (So it's a good idea to read all the leaflets, and not just this one. In that way you'll get a better understanding of what we are trying to do.)

The collaboration extends further. We work closely with the Region's Fisheries Advisory Committee, whose membership is drawn from local and national bodies with specific expertise in fish and fisheries. The Committee's meetings are open to the public.

And we work in partnership with a range of outside organisations. Some of them are listed below.

But the most important collaboration is with individual members of the public. Newspapers, magazines, TV and radio keep people informed about the water environment. Local groups can highlight any threats. But only public opinion can ensure that the water environment continues to be given the care and attention it needs.

### Some of our external 'partners'

- Sea Fisheries Committee.
- Fisheries Consultatives.
- Fishery owners - who might be private clubs and individuals or local authorities.
- Angling Clubs - angling is Britain's most popular participant sport; their support is essential to us.
- English Nature, the statutory body responsible for nature conservation in England.
- Countryside Commission, the statutory body responsible for the conservation of landscape and promoting access to the countryside.
- National Trust.
- Royal Society for Nature Conservation (The Wildlife Trusts Partnership).
- Royal Society for the Protection of Birds.

And, most importantly, thousands of individuals owning land on or near our rivers.

*"We work closely with the Region's Fisheries Advisory Committee, whose membership is drawn from local and national bodies with specific expertise in fish and fisheries. The Committee's meetings are open to the public."*



*The NRA's eight regions cover the whole of England and Wales.*



*"Water, water  
everywhere, and  
not a drop to  
drink?"*

*Not if we have  
anything to do  
with it!"*



**NRA**

*National Rivers Authority*

*Thames Region*

*Guardians of the Water Environment*

*"We must eliminate all waste in the ways we collect, store and deliver water ... and in the way we use it."*



*Borehole  
monitoring  
at the East  
Surrey Water  
Company  
Pumping  
Station at  
Leatherhead*

**If water comes from heaven, why do we have to pay for it?**

Rain is free, but tapwater costs money, as does all the water used by industry and agriculture. Why?

There are three main reasons:

- It costs money to deliver the water to the customer
- it costs money to ensure that the water is of sufficient purity.
- it costs money to ensure that there is always enough water to go round

The job of delivering water to the customer is the responsibility of the water companies.

The job of ensuring that the water is of sufficient purity is shared between the water companies and the NRA: the NRA is responsible for maintaining the quality of water in the rivers and underground aquifers (natural reservoirs) from which the water companies draw their supplies.

The job of ensuring that there is enough water to go round for users and for the environment falls on the NRA alone, in particular on Water Resources.

**We can't create water**

'Seeding' the clouds to trigger rainfall is not a practical proposition. Taking the salt out of sea water (desalination) is very expensive. There is no practical alternative to making the best use we can of the water that falls from the skies and ends up in the rivers, streams and underground aquifers.

So we must eliminate all waste in the ways we collect, store and deliver the water ... and in the way we use it.

In Thames Region, the problem is given a further twist. Not only do we have the highest density of population and therefore the highest demand for water, we also have the second lowest annual rainfall of any part of the country.



### Where does all the water go?

Everyone and nearly everything needs water - and for so many different purposes. That is the problem. Rivers and groundwaters everywhere have to meet a multitude of often conflicting needs. In the Thames Region, with its concentration of industry, agriculture and people, the needs could easily become overwhelming.

Just consider the demands made on our rivers:

- They act as a vast and complex drainage system. If we interfere with that system, we run the risk of damaging it. If we damage it, we could end up with waterlogged land and the continual risk of flooding.

- But our rivers also act as a vast waste disposal system. They dilute and dispose of all kinds of man-made effluent, taking it conveniently out to the Thames Estuary and the sea.

- Our rivers, streams and aquifers are the only source of drinking water.

- They provide essential water for industry and agriculture.

- They are essential highways for all kinds of river traffic.

- They offer food and homes to many different kinds of wildlife.

- And people look to them for recreation and as a never-failing source of beauty and delight.

Our responsibility is to assess the comparative validity of each of these requirements in a given situation, and try to arrive at a balance that is satisfactory all round.

We must also remember the principle of 'sustainability'. Is the balance that we create today likely to affect the chances of achieving acceptable balances in the future? This requirement compels us to adopt a play-safe attitude in considering whether to allow an abstraction or a discharge.



*Drought -  
the enemy  
of any  
river*



*The River  
Pang...  
restored*

*"Rivers and  
groundwaters  
everywhere have to  
meet a multitude of  
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needs."*

### Abstraction art

In trying to achieve the right balance between the needs of abstractors and the needs of the environment, our most effective tool is the 'abstraction licence'.

An abstraction licence always states how much water the licence holder can take, where from and how often. And we can impose special conditions.

For bigger abstractors, we will almost certainly require some kind of environmental assessment to be made. In other words, we need to know the likely effect of the application, if successful, on wildlife and habitats. We may require the licence-holder to construct a pond or reservoir in which water can be stored in winter and from which it can be used in the summer. Some licences may be only operative when river flows are above an agreed healthy level.

Licence-holders with the largest abstraction permission are the water companies and industrial companies. Farmers can be big users in hot weather when they want to use water for irrigation. However, on average throughout the year, only about 5% of water abstracted is used for agriculture, and most of that is for fish-farming and water-cress growing.

Licensing of abstractions was introduced in the 1963 Water Resource Act. The Act acknowledged existing obligations to many abstractors. These abstractors were granted 'Licences of Right' in perpetuity.

Some of the abstractions taking place under 'Licences of Right' are now having a damaging effect on several of our rivers. In the most severe cases, in cooperation with the water companies who hold the licences, we have set up major projects to restore some of the lost flow.

Many licences are now granted for a limited period of years - so that we can check whether they have

### Five river exercise

One of our major good housekeeping responsibilities is to ensure that our Region's rivers maintain a healthy flow of water.

Five rivers have been severely affected by abstractions taken under 'Licences of Right' - the Ver, Mishourne, Pang, Wey and Letcombe Brook.

The Ver, which runs through the Chiltern Hills, had lost 70% of its water to the public water supply. Some 10 kilometres of the river actually dried up. Abstraction has now been substantially reduced and the flow significantly improved.

The Mishourne also runs through the Chilterns. It has always had low flow problems, made worse by the abstraction of about 65% of its available water. We are working to restore an acceptable flow by helping the companies concerned to obtain alternative supplies.

The Pang joins the Thames at Pangbourne. Abstraction was taking 35% of its available water - now reduced to 12%. Future trends in river flow and water table levels are being carefully monitored.

The north branch of the Wey in Hampshire was losing 65% of its available water. With the local water company we are again looking for methods of reducing abstraction.

The Letcombe Brook, a tributary of the River Ock in Oxfordshire, was losing some 35% of available water to the public water supply. The abstraction continues, but at a low level. When necessary, additional water is pumped into the stream from a more distant borehole.

These 'case histories' indicate our tactical response to low-flow problems. Our long-term strategy is to tackle all serious low-flow problems caused by licensed but excessive abstraction of water and remove the problem once and for all.

### Water futures

Forecasting future water needs and matching them to likely future water supply are both of critical importance.

Future weather patterns are difficult to anticipate. We can hypothesise (or guess) but do not know for certain whether the rainfall patterns of the past will be repeated in the future. However, we shall continue

to extend and improve our already extensive network of monitoring facilities. These give us continuous measurements of water levels in our rivers and underground aquifers. We shall also continue to develop techniques enabling us to gain more usable information and guidance from all the data we gather.

Our cooperation with other organisations concerned with rainfall and climate will continue. We need to know all we can about the likelihood of climate change, the forms it might take and their impact on future water supply.

### Fewer leaks, less waste

Water demand is linked to economic activity. In a recession, less water is used. When business picks up and more people are better off, the demand for water rises.

Daily consumption of water in the Thames Region is about 151 litres per head. We reckon that the growth in consumption will be less rapid than in the past. At the most, the rate should only be a little more than 1%. It could be even lower.

There are two main reasons now for anticipating a slowing down in growth:

- The water companies are reducing the amount of water lost through leakage.
- People generally are using water more wisely - often with the help of appliances that are more water-efficient.

In the future there could be a third reason - 'metering'. 'Metering' means that people pay only for the water they use instead of paying a fixed rate. Currently fewer than 5% of households in Thames Region pay by meter. This percentage could increase very significantly - to 25% or even much more.

### Saving for a non-rainy day!

Reservoirs have a vital part to play in the overall water resource strategy. The NRA is not directly involved in the planning, building and operating of reservoirs. That is generally the responsibility of the water companies. But we are certainly consulted in the planning of such schemes and assessing their impact on the water environment.

A major example is now in the making:

Thames Water are investigating a major new reservoir near Abingdon in Oxfordshire. Its surface area would be 10 square kilometres (a quarter bigger than Derwentwater in the Lake District) and it would hold 150 million cubic metres of water.

Thames Region is carrying out a major Environmental Impact Assessment to determine the reservoir's possible effect on fisheries, land drainage and aquatic and other wildlife in the area. The task, as always, is to balance advantage in one area against disadvantage in another. The outcome has still to be decided.

### To Thames from Severn (and East Anglia too)

But with an item as vital to life as water, no-one can rely completely on forecasts. So we are investigating new schemes which could be implemented if more water supplies are needed.

The new reservoir in Oxfordshire has already been mentioned. Other proposals involve the transfer of water from the River Severn and from rivers in East Anglia into the Thames Region. Groundwater reservoirs under London could also be recharged artificially during times of high rainfall and used in times of drought.

Whether these and other schemes are in fact implemented will depend not only on future levels of demand, but on environmental impact, cost and technical feasibility.

Our overriding aim will remain. We have to ensure that there will always be 'water, water everywhere' - wherever and whenever it's needed - in our Thames Region.



*National Rivers Authority  
Thames Region  
Kings Meadow House  
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*"The tendency in the not-too-distant past was to think of water as a free commodity in endless supply."*



Borehole monitoring



Gauging the flow

any adverse effects or not. At the end of the licensed period, the abstractors must submit a new application and justify their need to continue abstracting.

#### **'Consumed' or returned**

Before we grant an abstraction licence and specify how much water can be taken, we need to know whether the water will be 'consumed' or returned to the local environment and river system. Some uses, such as spray irrigation and some industrial processes, are mainly consumptive - ie a large proportion of the water is 'lost' to the atmosphere.

Fortunately, the water taken by most major abstractors is returned. About 85% of all water abstracted in Thames Region goes to the public water supply, and about 80% of that is returned to the local river system and can be re-used. It has been estimated that rain falling in the Cotswolds and joining the infant Thames can be used up to eight times before it finally passes into the Estuary.

#### **Self-financing**

Licence-holders have to pay us for the privilege. We raise around £10 million a year in this way, which makes the Water Resources function in Thames Region (and all other Regions) self-financing. Most of the money we take goes on current expenditure - that is on staff and on studies, research and data collection for all the activities that are necessary for good management of water resources. About £12 million is spent on capital items, such as gauging stations for measuring river flow, bore holes for checking groundwater levels and schemes to restore flow to rivers badly affected by abstraction.

#### **Making the water go further**

The tendency in the not-too-distant past was to think of water as a free commodity in endless supply.

No-one can be in any doubt now that water is not free, and that bringing it to the point of use in good condition costs money.

But in a country with dozens of different words to describe rain, we still tend to think of water as inexhaustible. The severe drought of 1976 helped change some attitudes. However, the effect of old habits still lingers, most of all in the inefficient way that we use water, both at home, in the factory, and on the farm.

The NRA puts great importance on promoting more efficient ways of using water - as set out in the Government publication: 'Using Water Wisely'

#### **Data chain**

We need to gather a great deal of data about water quantities - how much rain falls; how much is lost through evaporation and transpiration (the loss of water to the atmosphere through plants); how much enters the underground reservoirs (the so-called 'recharge'); and how much is carried in streams and rivers.

The quantities are far greater in winter than in summer, at least four times as great. After a dry winter, when the aquifers and hence the rivers are less full, there will be an overall shortage of water - or at least there would be without man-made reservoirs. During a drought, we must watch the quantity of water in rivers and aquifers very carefully. We discuss with the water companies the need for restrictions - such as hosepipe bans - and can ourselves impose restrictions on quantities used for irrigation, whether on crops or golf courses!

#### **Good housekeeping**

Water resource management can, with justice, be described simply as good housekeeping - making the very best of what's available. Good housekeeping is essentially a cooperative affair - in our case, cooperation between the providers (the NRA) and the users (most often, the water companies). We must ensure that water is put to good use and that the water environment is protected.

*continued on back page*

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Note: We regulate some of the activities of the water companies operating in our Region - primarily Thames Water. We control their abstractions\* from rivers and underground aquifers and, in the case of Thames Water, discharges from their sewage treatment works. At all times, we must protect water supplies from pollution.

\*'Abstraction' is the term used to describe the act of taking water in quantity from natural sources. Abstraction is usually by pumping, sometimes by gravity.

*"We receive valuable guidance from the Thames Regional Rivers Advisory Committee. Members represent relevant local and national bodies and bring a wide range of expertise and experience. Meetings of this Committee are open to the public."*



*The NRA's eight regions cover the whole of England and Wales.*