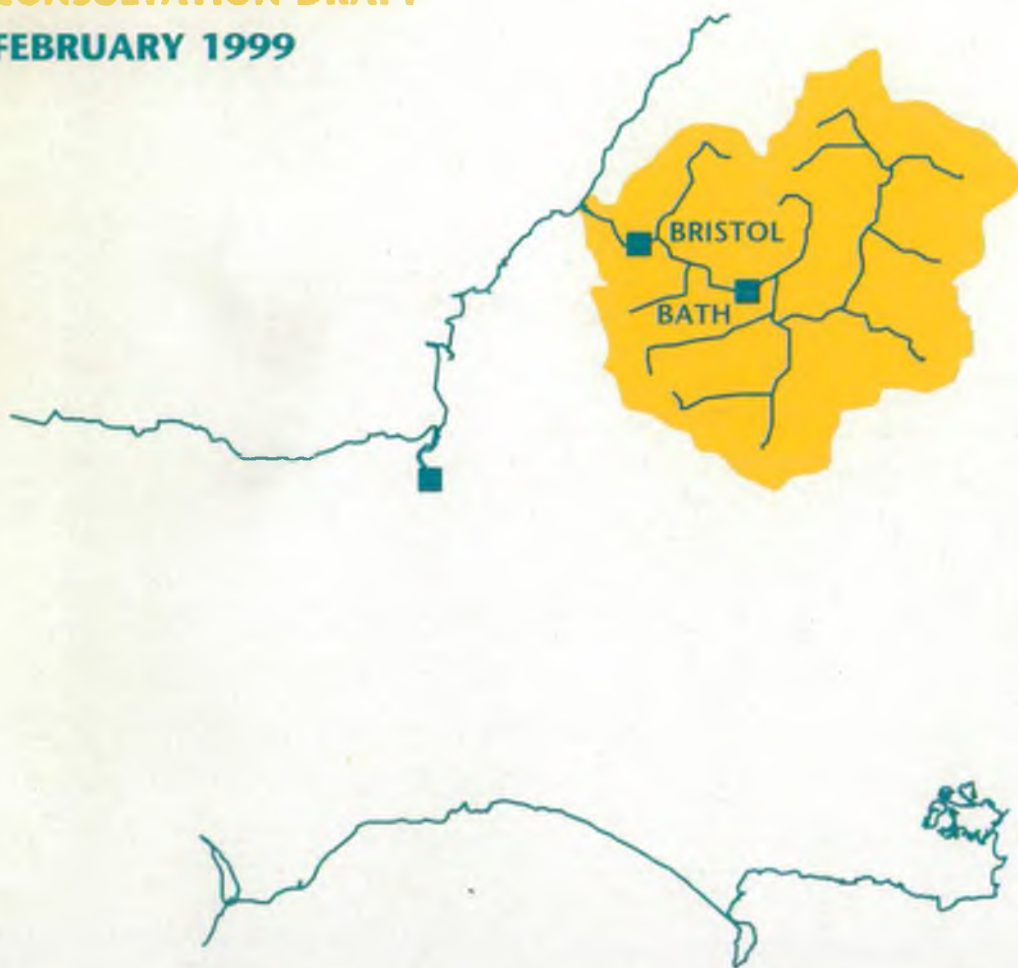


EA- SOUTH WEST LEAPS - BOX 8

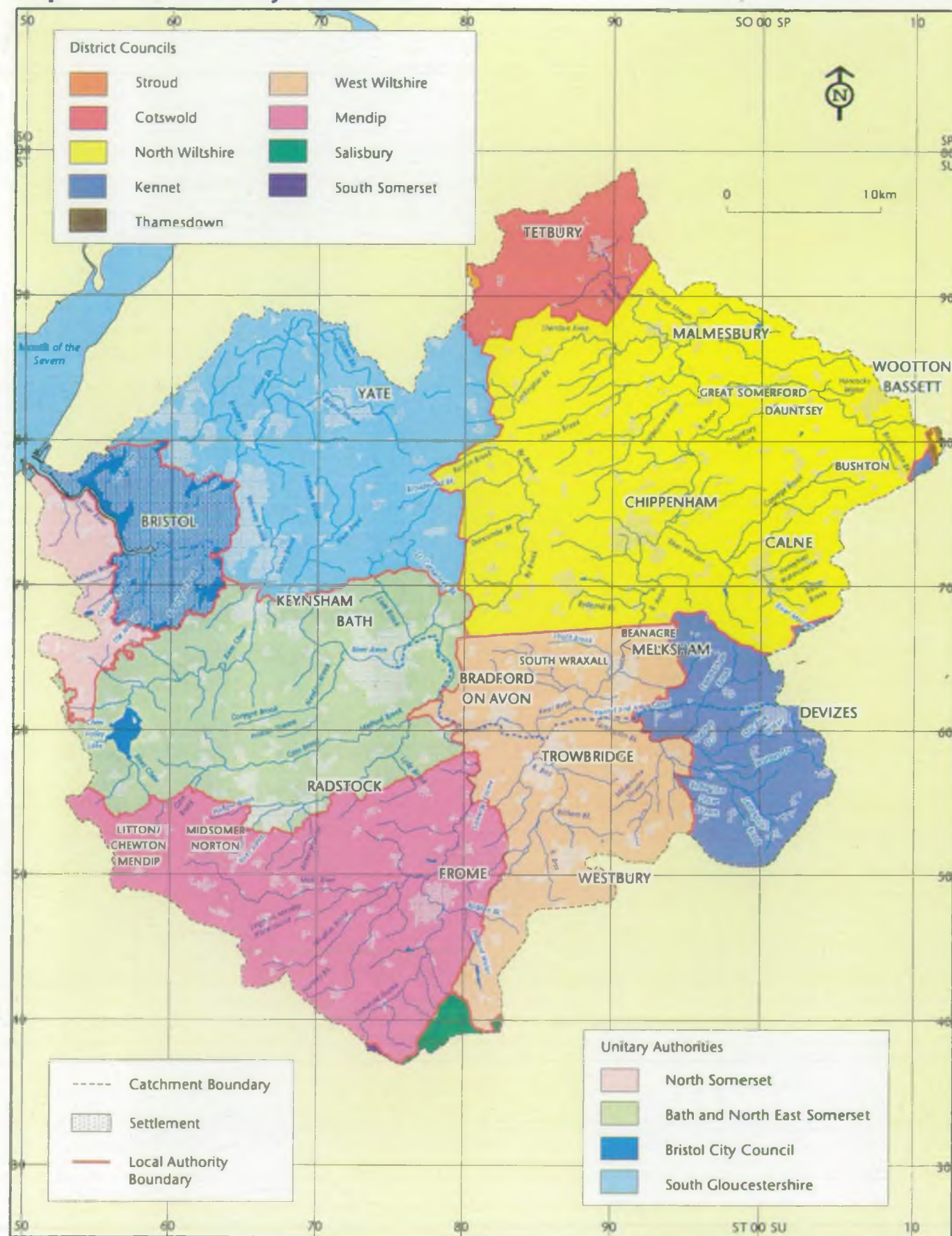
local environment agency plan

BRISTOL AVON
CONSULTATION DRAFT
FEBRUARY 1999

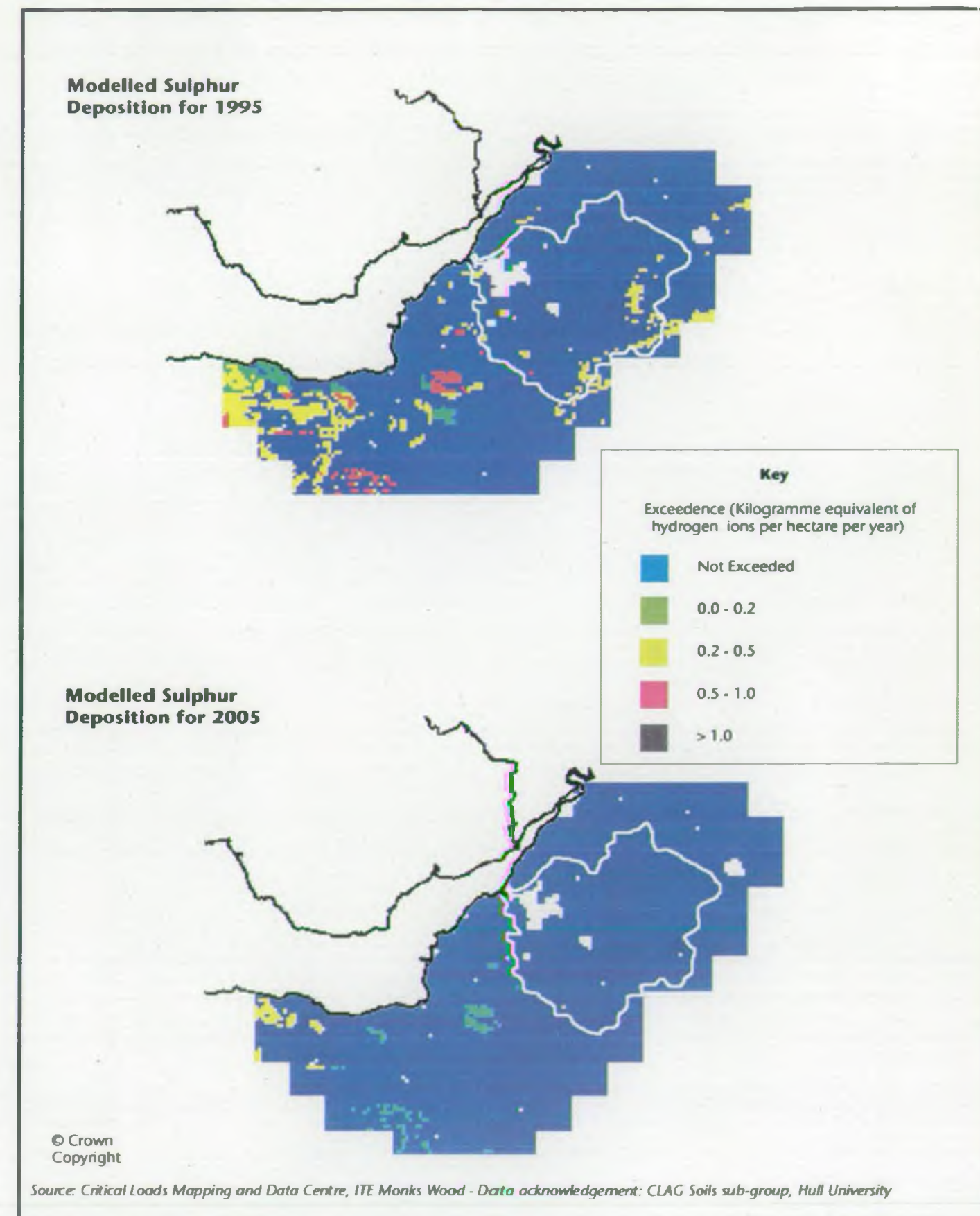


ENVIRONMENT
AGENCY

Map 1 - Local authority boundaries



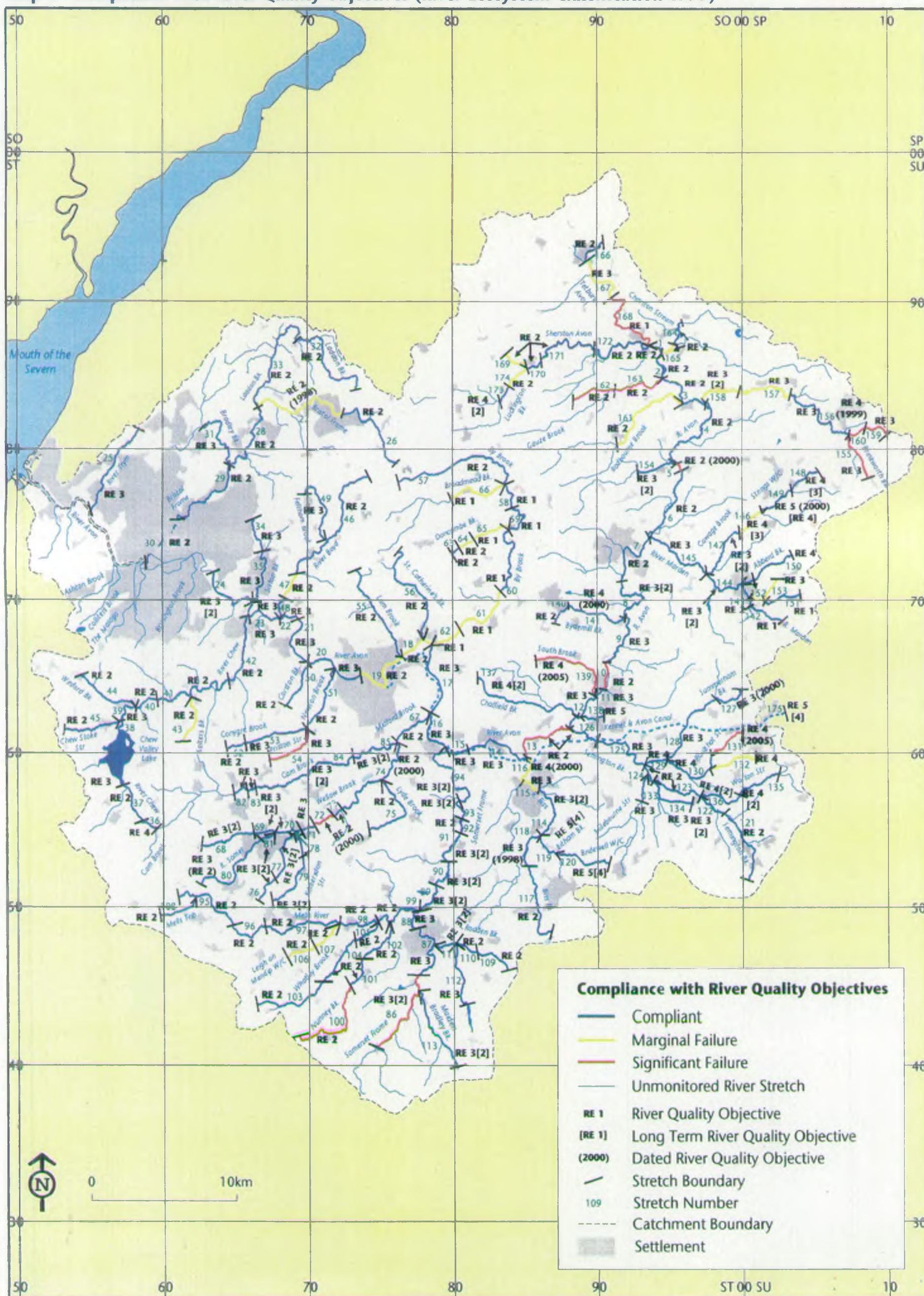
Map 2 - Exceedences of critical loads of acidity for soils



Map 3 - Bristol Avon Catchment Area



Map 4 - Compliance with River Quality Objectives (River Ecosystem Classification 1997)



Map 5 - EC Directives



Map 6 - STWs Causing or Contributing to Degraded Water Quality



Foreword

The Environment Agency is a major environmental organisation responsible for regulating waste disposal to land, industrial releases to air, and safeguarding and improving the natural water environment. Our aim of integrated environmental improvement in the Bristol Avon contributes to the achievement of global sustainability in accordance with the spirit of the 1992 Rio de Janeiro 'Earth Summit' agreement.

The Bristol Avon area shows great diversity. The Avon and its tributaries rise on the unspoilt hills of the Cotswolds, Salisbury Plain and the Mendips before flowing through increasing urbanisation and areas of intensively managed farm land to the sea beyond Bristol. We must all work to protect the beauty and wildlife of the area from the growing pressures of development and agriculture whilst recognising their importance in the local economy.

This Consultation draft sets out what we believe to be the environmental issues in the area together, with suggested actions both for ourselves and in partnership with others.

I invite you to read this draft, discuss it and then write to us with your views on how to improve it, so that when we re-publish it as our Action Plan in the autumn we will have the best possible plan for a more environmentally sustainable Bristol Avon.

A handwritten signature in dark ink, reading "Tony Owen". The signature is written in a cursive style. Above the signature is a horizontal line, and below it is a horizontal line with an arrow pointing to the left.

DR TONY OWEN
Area Manager (North Wessex)

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The Internet

For general information about the Environment Agency including our national 'State of the Environment Report' please visit our website at:

<http://www.environment-agency.gov.uk>

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Note: This is not a legally or scientifically binding document

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Introduction

1.1 The Environment Agency

The Environment Agency has a wide range of duties and powers relating to different aspects of environmental management. These duties together with those areas where we have an interest, but no powers, are described in more detail in Appendix 12.4. We are required and guided by Government to use these duties and powers in order to help achieve the objective of sustainable development. The Brundtland Commission defined sustainable development '*as development that meets the needs of the present without compromising the ability of future generations to meet their own needs*'.

At the heart of sustainable development is the integration of human needs and the environment within which we live. Indeed the creation of the Agency itself was in part a recognition of the need to take a more integrated and longer-term view of environmental management at a national level. We therefore have to reflect this in the way we work and in the decisions we make.

At a local level the local authorities are the focus for community action to work towards a more sustainable way of life. This is part of the global Local Agenda 21 initiative (see 11.1.4) which we are committed to support.

Taking a long-term perspective will require us to anticipate risks and encourage precaution, particularly where impacts on the environment may have long term effects, or when the effects are not reversible. We must also develop our role to educate and inform society as a whole, as well as carrying out our prevention and enforcement activities, in order to ensure continuing protection and enhancement of the environment. Our national corporate vision and aims are set out below.

Our vision is:

- a better environment in England and Wales for present and future generations

Our aims are:

- to achieve major and continuous improvements in the quality of air, land and water
- to encourage the conservation of natural resources, animals and plants
- to make the most of pollution control and river-basin management
- to provide effective defence and warning systems to protect people and property against flooding from rivers and the sea
- to reduce the amount of waste by encouraging people to re-use and recycle their waste
- to improve standards of waste disposal
- to manage water resources to achieve the proper balance between the country's needs and the environment
- to work with other organisations to reclaim contaminated land
- to improve and develop salmon and freshwater fisheries

- to conserve and improve river navigation
- to tell people about environmental issues by educating and informing
- to set priorities and work out solutions that society can afford

We will do this by:

- being open and consulting others about our work
- basing our decisions around sound science and research
- valuing and developing our employees and
- being efficient and businesslike in all we do.

1.2

Earlier Plans

In June 1994 the former National Rivers Authority (NRA) published the Upper Bristol Avon Catchment Management Plan Consultation Report and in March 1995 the Lower Bristol Avon Catchment Management Plan Consultation Report. The National Rivers Authority consulted approximately 1000 organisations and individuals directly about the issues which are outlined in the Upper and Lower Bristol Avon Catchment Management Plan Action Plans and received 113 formal responses before publishing Action Plans and subsequent Annual Reviews. In April 1996 the NRA became part of the new Environment Agency which took over the NRA's catchment plans. The Environment Agency now hopes to build on this good work by widening the scope of environmental issues tackled to include its additional areas of responsibility (mainly waste management and the regulation of heavy industry) by producing this Local Environment Agency Plan (LEAP), the first for the Bristol Avon area. The Agency also hopes to achieve greater involvement of interested organisations and individuals.

1.3

Local Environment Agency Plans (LEAPs)

One of the key outcomes of the United Nations 'Earth Summit' held in Rio de Janeiro in 1992 was agreement by governments that, in order to solve global environmental problems, local action is crucial: we must all therefore think globally but act locally. For our part we are committed at the local level to a programme of Local Environment Agency Plans (LEAPs) in order to produce our local programme of integrated action for environmental improvement.

LEAPs help us to identify and assess, prioritise and solve those local environmental issues within our remit and related to our functions, taking into account the views of our local customers. As a result LEAPs allow us to deploy our resources to best effect and optimise benefit for the local environment.

The LEAP process involves several stages as outlined below.

LEAP Action Plan Consultation Draft - The publication of the Bristol Avon LEAP Action Plan Consultation Draft marks the start of a three-month period of formal consultation. The purpose of the consultation period is to enable the Agency and all external organisations and the general public to liaise and reach a consensus about the management of the area.

LEAP Action Plan - The final LEAP Action Plan will take into account the results of consultation and views expressed and will be published by October 1999. It will contain a list of actions that take account of costs and benefits, identifying timescales and partner organisations. These agreed actions will be incorporated into the Agency's annual business plans.

Updating and reviewing this plan - About 14 months after publication of the Action Plan and then every 12 months thereafter we will publish an **Annual Review** to report on the progress in carrying out our planned actions, to both our Steering Group and the wider community. This will also be an opportunity to add new issues and actions as they may arise. **We invite readers to contact us at any time to raise new issues or suggest new actions - this ensures the LEAP process is a live one, which constantly evolves to meet the changing needs of the local environment.**

Many of the actions identified in the NRA's catchment management Plans have been carried out and some of the original issues have been resolved. Details can be found in the Upper and Lower Bristol Avon Annual Reviews. Unresolved issues and incomplete actions have been transferred to this LEAP. The Annual Reviews published in June 1998 are the last to be produced, as the work of the NRA in protecting and enhancing the environment of the Bristol Avon has now been extended to cover the wider range of responsibilities of the Environment Agency.

1.4

What we want from you

In March 1998 we wrote to approximately 60 organisations and individuals and invited them to give their views on what should go in this Plan.

Then on the 16 September 1998 we held a Forum of invited representatives of our key customers to discuss the environmental issues in the Bristol Avon area and start the process of working more closely together on their resolution.

Additionally we have set up a Bristol Avon LEAP Steering Group (a voluntary, advisory body) to help us produce this Plan. The membership of individuals and organisations reflects as many interests in the area as possible. A list of members and the interests they represent can be found in Appendix 12.3. This group met on 21 December 1998 to discuss improvements to the plan, and will meet again to discuss the amended plan following the public consultation period.

We now want everyone with an interest in the Bristol Avon environment to read this plan and write to us with answers to the following questions.

- **Is the information in the plan accurate?**
- **Have we identified all the issues? If not, what are the new issues?**
- **Are there any other viable actions to resolve the issues?**
- **Can you or your organisation contribute partnership funding, technical advice or other resources to enable any environmental enhancement projects to go ahead?**
- **If you are part of an organisation working in, or using, the environment can you suggest ways of improving liaison with us?**

1.5

Our National 'Environmental Strategy for the Millennium and Beyond'.

In September 1997 the Agency published its first national integrated environmental strategy entitled 'An Environmental Strategy for the Millennium and Beyond', subsequently referred to in this plan as the Millennium Strategy. This LEAP translates these national policies and objectives into **local actions** in the Bristol Avon area. Issues in this LEAP are grouped and summarised under the headings of the Agency's nine principal and immediate environmental concerns as set out in the Millennium Strategy.

- Managing our Water Resources

- Managing our Freshwater Fisheries
- Enhancing Biodiversity
- Conserving The Land
- Managing Waste
- Delivering Integrated River-Basin Management
- Regulating Major Industries
- Improving Air Quality
- Addressing Climate Change

1.6

The Bristol Avon Catchment

The Bristol Avon has a large complex catchment encompassing the two major cities of Bristol and Bath, diverse industry, varied agriculture and increasing tourism. The river basin is encircled by the beautiful hills of the Cotswold, Salisbury Plain and the Mendips. It runs through gentle pastoral landscapes and lovely old towns such as Bradford and Bath before bursting dramatically through the striking Clifton Gorge to the sea. This valuable resource is under pressure from human activity and this plan shows how the Environment Agency is protecting and enhancing it.

The upper catchment has three different geological areas which generate three distinct river types: those that drain the oolitic limestone in the west, those that drain the chalk escarpment in the south and east and those that drain the Oxford and Kimmeridge Clay lowlands in the north and central areas. The impervious clays result in 'flashy' streams with a rapid time to achieve peak flow and high peak flows – the Brinkworth Brook being a prime example. The colloidal properties of the Oxford Clay result in a reduction of clarity which is noticeable downstream of Malmesbury. By contrast chalk streams such as the River Marden have clear water and firmer, gravelly stream beds. Base flow is higher with a slower time to achieve peak flow. The water is clearer and more alkaline than clayland stream water which has a more constant temperature.

Similarly, the lower catchment drains different types of geology. The Cotswolds to the north and east of Bath form an oolitic limestone escarpment with steep interlocking valleys. The Mendip Hills in the south are carboniferous limestone which is harder than the soft oolite of the Cotswolds, with craggier landscape and steeper-sided gorges. The remaining areas are mainly clays such as Keuper Marl, Oxford Clay, Lias Clay and Coal Measures which tend to form the softer lowlands.

The main River Avon is a slow-flowing lowland clay river, which has been modified by impoundment, land drainage and flood alleviation engineering, and by intensive agriculture in the floodplain, so there are very few wetlands remaining in the catchment. Historically the river and many of its tributaries were impounded (ponded by means of weirs) to serve the many water mills along their length, but subsequent silting and changes to depth brought about changes in plant communities. However, the river corridor acts as a vital link between other scattered habitats and wildlife corridors to the wider countryside and is a valuable habitat in its own right.

The Bristol Avon catchment supports a diverse fish fauna and at least twenty species of coarse fish are known to be present. It is highly regarded as a coarse fishery and is important for match and pleasure fishing. This is due to the diversity of habitats afforded by a number of weirs which provide deep, slow-flowing reaches interspersed with shallow fast-flowing reaches. Roach, chub and dace are the dominant species but the river is also renowned nationally as a barbel fishery. In the upper reaches between Malmesbury and Dauntsey, brown trout co-exist with the coarse fish and grayling are also present. Several of the tributaries support

self-sustaining populations of brown trout, in particular the Sherston Avon, the Tetbury Avon, the River Marden and the Semington Brook. Other tributaries support good stocks of coarse fish.

The river corridors have many listed and important historical structures including bridges, water mills, weirs and hatches, as well as other archaeological features, because the development and wealth of the area was intimately linked with the river. In the wider catchment, changes in land use have brought about an impoverishment of the landscape so that the river corridors have become increasingly important linear landscape elements which must be conserved and enhanced where they have become degraded.

The Bristol Avon provides many opportunities for recreation and amenity. In addition to angling, the river itself is used for boating, particularly in the lower reaches, whilst in some places public footpaths and open spaces allow access to the banks for bird-watching and walking. In Bath trip-boats ply their trade. The stretch between Bath and Bristol is busy with a variety of boating activities and is linked to the Thames via the Kennet and Avon Canal. Bristol Floating Harbour is a major leisure boating facility. A river bus also operates from Temple Meads Station.

In recent years local groups have set up projects as part of the Local Agenda 21 initiative (see Section 11.1.4) to enhance the environment and amenity of the river corridor.

Land use in the upper catchment is mainly agricultural with arable farming predominant on the Cotswolds and Wiltshire chalk escarpment. Further down the catchment and outside the substantial and increasing urban areas, much of the pasture land of the rural catchment has been improved for dairy and beef production. There has also been an increase in the amount of land devoted to arable farming over the last thirty years. The steeper valleys of Mells, Cam, Wellow, By Brook and St Catherine's support more permanent pasture, often used for sheep grazing.

Industry and employment in the area is diverse. Most activity within the upper catchment is agriculture related. There are dairy and food processing plants in several of the settlements. In recent years light industry such as light engineering has become more widespread. The development of industrial estates has increased the problems of surface water runoff and chemical spillage in addition to the consented discharges to the river. Lower down the catchment, Bath and Bristol are centres of tourism and Bristol is also an important financial centre. The Ministry of Defence has a strong presence in the area. Rolls Royce and British Aerospace occupy a large complex in North Bristol. The food industry is well represented, e.g. Courage Brewery (Bristol), Cadbury (Keynsham) and Eden Vale Food Ingredients (near Frome). Printing and packaging are important activities being centred mainly in Bristol and the Midsomer Norton/Radstock area. A major manufacturer of wood-care products, Cuprinol, is based in Frome. Quarrying, mainly for limestone, and its associated industries are very important especially in the East Mendips. The Avonmouth industrial area is not part of this plan as the drainage is directly into the Severn Estuary. It will be covered in the Severn Vale LEAP and the Severn Estuary Management Plan (both due for publication in 1999).

The natural environment is under pressure from the large population in the area. Major settlements are: Bristol (390,000), Bath (82,000), Trowbridge (27,800), Chippenham (25,400), Yate and Chipping Sodbury (24,500), Devizes (13,850), Melksham (13,300), Calne (11,670), Wootton Bassett (10,850) and Corsham (10,289). In addition the area has to provide locations for a large number of new houses all of which will put extra demand on water resources and produce increased quantities of solid waste and sewage requiring disposal. Increased road traffic leads to increasing air pollution, particularly in towns and cities.

There is major public water supply abstraction of groundwater in the Malmesbury area and of surface water lower down the catchment so we must maintain good water quality to protect this valuable resource. We monitor 674.2 km of rivers and

canal in the Bristol Avon catchment and carry out a major review of chemical and biological quality every five years. Between 1990 and 1995 there was an overall improvement in chemical quality over 0.5% of the monitored network while biological quality improved by 13.1%. In biological terms, in 1995 78.4% of the monitored river lengths were of good or very good quality, 20% were fairly good, while the remaining 1.6% were of poor quality. In 1997, 53.81% of monitored river lengths in the catchment were of good or very good chemical quality, 28.33% were fairly good, while 16.76% were either fair or poor and 0.13% were of bad quality. The remaining 0.97% of river lengths were not monitored in 1997. Although water quality has recently improved there are parts of the catchment where it is not good enough. These shortfalls in quality are described in this consultation report. The next major review of these water quality statistics is due in the year 2000.

1.7

The Agency and Development

The Government has predicted a significant increase in the number of new houses, employment provision and associated infrastructure, which need to be planned for within the Bristol Avon area. New development can be beneficial for the social and economic health of the area but environmental impacts should also be considered to ensure a sustainable future.

Local planning authorities are the authorities empowered by the government to consider planning applications and to plan for sustainable development, and land use.

The Agency is the government's authority for environmental protection and enhancement and as such has a considerable interest in the work of planning authorities. The Agency is a statutory consultee and comments on individual planning applications as well as making a major contribution of technical advice to the Development Planning process (Structure Plans and Local Plans).

By working more closely we can be more effective in working towards more sustainable development. This LEAP identifies some issues of common interest. However, there are eleven local authorities in the Bristol Avon area and so we have recognised the need to provide easily accessible information to local planners relevant to their local authority boundaries. We have commissioned consultants to produce a draft document outlining the issues we want planners to be aware of. This is entitled 'Environmental Planning Issues in the North Wessex Area', December 1998. We intend to publish the final document and distribute it to all planning authorities in North Wessex by the end of 1999. Accompanying the document will be a map showing a variety of geographically-based issues such as the location of public supply source protection areas (SPAs).

We hope planners will use the LEAP or LEAPs for their area in conjunction with the new document to give more detail to some of the issues.

1.8

About this plan

The topic chapters which follow outline actions for resolving the issues identified in the Bristol Avon plan area.

The issues have arisen despite our considerable statutory work and the work of other organisations. Some issues can be resolved by re-prioritising and re-directing our resources within our statutory work programme, sometimes needing the help and co-operation of other bodies. Other issues require action over and above our statutory work and funding; resources for this work are not certain. Matched project funding is usually required in these cases.

Some issues require solutions beyond the scope of our existing budgets or technology – they are nevertheless valid issues and earn their place in this plan, in the hope that a solution may be found in the future.

Although the plan period is five years, because of the short-term nature of our funding we can often only firmly commit ourselves to action in the current and next financial years. Our priorities, policies and budget may change so changing our action programme. These changes will be reflected at each Annual Review.

We show **estimated costs** where we can but often we cannot give an estimate because the action is part of an Area, Regional or National Project or when the action is 'liaising', 'promoting', 'supporting' or 'influencing'. The costs shown are **indicative** only, to give the reader an idea of the relative size and resource implications of each section.

The financial years covered by this Plan are represented by a single date, for example, '98' represents the financial year April 1998 to March 1999. Where costs are shown by a '-' the action is detailed elsewhere in the plan. The same action may resolve or contribute to the resolution of more than one issue.

1.9

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10.2	The need for improved information on flood risk and development	64
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10.4	The impact of energy and fossil fuel use on climate	66

2. Water Resources

Water is an essential but finite resource that needs careful management to ensure its availability. We can help to develop public awareness of this issue and guide people towards a more sustainable use of water. (See Appendix 12.4 containing our full duties and responsibilities).

We have a duty under the 1991 Water Resources Act to conserve, redistribute, augment and secure the proper use of water resources in England and Wales. In fulfilling this role we must also carry out our general duties of environmental conservation and have regard to the statutory obligations of water companies. Water resources development is planned over long timescales to allow sufficient time to meet any forecast potential supply demand imbalance.

At the water summit in May 1997 John Prescott announced the way Government proposed to take the management of the water industry forward. Amongst the actions required as a result of this was a review of the water abstraction licensing legislation. The direction of changes proposed by the Department of the Environment Transport and the Regions (DETR) are set out in their consultation paper *'The Review of the Water Abstraction Licensing System in England and Wales'* (June 1998). The full nature and impact of changes will not be clear until the final papers are approved by Parliament. We will need to implement any changes that arise from this process and amend licensing policies as appropriate.

2.1

Issue: Securing future public water supplies

Major aquifers (layers of water-bearing rock) such as the Great and Inferior Oolites of the Malmesbury area, the Carboniferous limestone of the Mendip Hills and the Chalk near Westbury and Devizes provide large amounts of water for public supply, therefore the protection of groundwaters is particularly important in this catchment.

In this plan area approximately 92% of licensed water abstraction is for public supply. Part of the plan area is supplied by Bristol Water Company with water taken from both groundwater and surface water sources which are operated together. The remainder of the area is supplied by Wessex Water again from a combination of groundwater and surface water sources operated together. Water supply and demand forecasts up to 2021 for the water companies were published in the former National Rivers Authority's (NRA's) Water Resources Strategy document, *'Tomorrows Water'*. The demand forecasts show that under the low scenario of growth Bristol Water are likely to reach a deficit after 2001 and Wessex Water are likely to reach a deficit in this area after 2021. However these forecasts do not take account of the effects of demand management or the fact that the water companies have secured additional supplies in the last five years. Therefore these deficits are highly unlikely to occur on these timescales.

The water companies' improvement plan for the period 1995-2000 is known as Asset Management Plan 2 (AMP2). AMP2 was developed in 1994 along guidelines agreed between the former National Rivers Authority (now the Environment Agency), the former Department of the Environment (now the Department of the Environment, Transport and Regions) the water services companies and the Office of Water Services (OFWAT). OFWAT is undertaking a review of water prices which will result in a review of improvements required for the period 2000-2005; the outcome of this will be AMP3. The Environment Agency is currently reviewing, for agreement with DETR, those sewage discharges where improvement is required.

In parallel with OFWAT's current Third Periodic Review process the Agency requires water companies to produce a Water Resources Plan for the next 25 years. This will include revised demand forecasts, a review of resource availability and a consideration of any potential options to meet forecast deficits over the next 25 years. This information will enable us to revise the public water supply aspects of our Water Resources Strategy and thus our demand forecasts as mentioned above. The internal drafts of both Wessex Water's and Bristol Water's plans were submitted to the Agency in June 1998. A national review of all the draft plans was published by the Agency in October 1998 (Progress in Water Supply Planning). The Agency expects that both water companies will wish to make public the key aspects of their draft plans before submitting the final plans in April 1999. We expect to publish our revised Regional Water Resources Strategy, covering all aspects of water resource use, towards the end of the year 2000 following the outcome of the OFWAT Periodic Review by the end of 1999. In addition, in May 1998 the Agency published '*A Price Worth Paying*', which sets out the National Environmental Programme – the improvements in the environment that the Agency expects from the third periodic review.

Agency policy states that before water companies can develop any further resources the Agency has to be satisfied that the water company has applied a range of appropriate demand management and resource management options, as well as reducing leakage to an acceptable level. Demand management involves a number of different initiatives including metering; meters are installed in all new domestic properties. Bristol Water customers can have their homes metered at subsidised prices should they opt to and customers who have a garden sprinkler are required to pay a fixed licence fee or have a meter fitted. Wessex Water operates a free meter scheme for those customers who opt to have one fitted; they do not have a compulsory metering policy for garden sprinkler users but these customers are required to pay a licence fee.

The water companies have a duty to apply and demonstrate efficient use of water within the business and to their customers. They have published water efficiency plans which contain strategies to encourage water saving by customers. Wessex Water's plan details their free customer supply pipe repair, their free water audits and advice to business customers as well as their plans for education. Bristol Water's plan includes advice on how to save water in the home and garden, and for business customers free leakage surveys, and repair and water audit services on a commercial basis.

More efficient management of existing resources can increase the quantity of water that is available to supply customers. Both conjunctive use of sources and effective leakage control are key targets here. Wessex Water reported a 1997/98 leakage of 109.8 megalitres per day which is below their OFWAT target of 124 megalitres per day, as a result their target for 1998/99 has been set at 103 megalitres per day; the total amount of water available to the company – the deployable output – is 426.1 megalitres per day. Bristol Water's 1997/98 reported figure of 59.3 megalitres per day was also below their target of 60 megalitres per day and their 1998/99 target has been set at 56.5 megalitres per day; their deployable output is 341.5 megalitres per day.

Promotion of water saving measures – The Agency is a formal consultee on local authority structure plans. We assess the level of development and comment with respect to the available water resources in their area. We also comment on demand management measures which can be incorporated within new housing developments – for example: low flush toilets, normal showers instead of power showers, normal pressure hot water as opposed to mains pressure, low water use dishwashers and washing machines and provision of water butts.

The average family uses approximately 32,000 gallons/146,000 litres of water per year, and indications are that consumption will continue to grow. This suggests that there is a large potential for increasing the use of water saving measures. One area that has gained public prominence is the re-use of

'greywater' which is household waste water excluding spent toilet water ('blackwater'). The 'greywater' can then be recycled for use in toilet flushing or used externally for purposes such as garden watering.

The Agency has carried out small-scale practical trials into the effectiveness and applicability of greywater. The main factors considered were the water saving potential, water quality, customer acceptability and financial viability. A report on the trials has been published by the Agency's National Water Demand Management Centre, the results show that water consumption can be reduced by between 5 and 30 %, the report show that water consumption can be reduced by between 5 and 30%, the report is available from the centre. We support any safe and hygienic water saving measures which do not have a harmful effect on the environment. We also support further research and development of innovative water saving devices such as greywater recycling which has the potential to save up to 30% of the average domestic water consumption. This and other demand management research is carried out at our National Water Demand Management Centre.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
2.1.1 We will revise the Regional Water Resources Development Strategy based on information received in companies' water resources plans. Contact: Regional Senior Water Resources Planner	Agency	unknown			●		
2.1.2 We will disseminate information on demand management and water saving measures in conjunction with the National Waste Survey. Contact: Regional Senior Water Resources Planner	Agency	unknown	●	●			

2.2

Issue: The impact of water abstractions on river flows

Concern has been expressed about the effect of abstraction from the upper reaches of several of the rivers and brooks in the Bristol Avon catchment. This may cause a reduction to the discharge from the springs and extend the season of low flows and may have a harmful effect on water quality and the plants and animals in the river.

River Avon around Malmesbury - During the early part of the 1990s concern was expressed by the public regarding the decline in flows along the upper Bristol Avon and its tributaries. The catchment has been developed by both Wessex Water and Bristol Water for public water supply. The former National Rivers Authority commissioned WS Atkins to ascertain the reasons for the apparent reduction in flows.

The study concluded that abstraction by Bristol Water and Wessex Water significantly reduces river flows throughout the catchment. Both the Sherston and Tetbury tributaries suffer a loss of flow due to riverbed leakage caused by depressed groundwater levels in the Great Oolite around the abstraction boreholes near Malmesbury.

Wessex Water and Bristol Water are working closely with the Agency to effect improvements to river flows by implementing a combination of measures involving increased stream support and changing abstraction arrangements.

We will prepare a business case to support a reduction in abstraction of 10 megalitres per day by each water company. To determine the sustainability of these measures all parties agreed that trials should be implemented on a staged basis. These trials began in 1995 and are in progress.

One obstacle is the lack of an agreed flow target downstream of the abstractions. We will determine an environmentally acceptable flow regime at Great Somerford. We will engage the Institute of Freshwater Ecology to undertake an angling quality survey to objectively assess the potential benefits of changes in the flow regime on dry fly angling conditions for trout. The results will be used to help determine an acceptable flow regime which reflects a reasonable balance between competing demands for water use and the needs of the environment.

Both companies and the Agency are committed to implementing full and lasting remedies by the year 2005 at the latest.

In the past very low flows on the Sherston Avon in Malmesbury have been exacerbated by leakage from Daniels Well Leat. During 1995 and 1996 the Agency made a series of temporary repairs which significantly reduced leakage. During 1997 and 1998 plans were developed for more permanent restoration of the leat. The Agency will be consulting with all the relevant parties and if the preferred solution is acceptable we will implement it.

In addition to the Malmesbury low flow issue discussed above there are five other sites in the Bristol Avon catchment where we are investigating low flow issues. These were all included in our submission to Government in May 1998, '*A Price Worth Paying*', which set out our proposals for the National Environment Programme for Water Companies 2000-2005. The five sites in the Bristol Avon catchment are identified as problem sites that require further investigation to determine acceptable rates of abstraction.

For these Bristol Avon sites, we are currently reviewing the status and information available. Discussions are progressing with Wessex Water. The outcome of this review, and the outcome of the forthcoming periodic review by the Office of Water Services (OFWAT), will determine the priority and level of investigation that can be assigned to each problem site.

By Brook - Public concern, focused through Friends of the By Brook Valley, over perceived low flows in the By Brook catchment led to the Agency commissioning an external study in 1997/98 to determine the nature and scale of any low flow problems. The report concluded that the dominant factor contributing to low flows is the natural recharge but that there is the potential for some effects from groundwater abstractions.

The report's recommendations centred on increased environmental monitoring in the catchment and the development of a strategic plan for the management of the By Brook in collaboration with local organisations.

River Marden - Concern was expressed to the former National Rivers Authority that groundwater abstraction for public water supply was affecting flows in the river Marden, particularly the upper reaches. A review is currently underway to establish the level of future investigations.

St. Catherine's Brook - In 1992 Wessex Water received planning permission for works to upgrade their facilities at Newton Meadows, downstream of Bath. Concern was expressed at the time by the parish councils of St. Catherine's and Batheaston at low flows on the St. Catherine Brook. As a condition of the planning permission, Wessex Water and the then National Rivers Authority agreed to undertake a joint study into perceived low flows in the St. Catherine's Brook. A review of available data was completed in November 1993, but there has been little progress with this work since then. The planning permission has now lapsed.

Chalfield Brook - Localised concerns exist over perceived low flows at two locations within the catchment, at South Wraxall and at Lower Broughton Gifford. The Agency is currently reviewing options for further investigation.

Luccombe Springs - There has been increasing public concern over dwindling flows in a spring fed watercourse, the Milebourne at Bratton, which subsequently joins the

Semington Brook. The Agency is currently reviewing options for further investigation.

Wessex Water has a licence to abstract from the headwater springs for public water supply (2.2 MI/d). English Nature (EN) has no concerns regarding the flora and fauna in the area. Limited flow data has been collected. A base line fisheries and invertebrate survey completed in August 1997 indicates there is excellent water quality in the stream.

During periods of depressed groundwater levels all available flow is abstracted from the spring resulting in the drying out of the upper reaches of the Milebourne for a stretch of approximately 50 to 100 metres and resulting in very low flows through the village of Bratton. It appears that the problem is one of amenity rather than environment, with the exception of the dry Paradise Pool. The problem could be resolved through changing the operating regime of the pumping station.

Actions	Action By	Cost to Agency (£K)	Financial Year 98 99 00 01 02
2.2.1 We will produce a business case supporting a reduction of abstraction in the Malmesbury Avon of 10 megalitres per day by each water company and increased stream support, within the timetable for the OFWAT periodic review. Contact: Hydrologist, Regional Water Resources	Agency, Wessex Water, Bristol Water	-	
2.2.2 We will determine an environmentally acceptable flow at Great Somerford. Contact: Hydrologist, Regional Water Resources	Agency, Institute of Freshwater Ecology (IFE)	15	
2.2.3 We will use a computer modelling system to examine the sustainability and relative benefits of the alleviation options currently being trialled in the catchment. Contact: Hydrologist, Regional Water Resources	Agency	15	
2.2.4 We will modify stream support licence conditions by agreement with the water companies. Contact: Hydrologist, Regional Water Resources	Agency, Wessex Water, Bristol Water	-	
2.2.5 We will consult with relevant parties for the restoration of Daniel's Well Leat. Contact: Area Water Resources Team Leader	Agency	50	
2.2.6 We will implement the findings of the consultant's report for the By Brook. Contact: Area Water Resources Team Leader	Agency, Friends of the By Brook	-	
2.2.7 We will review options for further investigation of the River Marden. Contact: Area Water Resources Team Leader	Agency, Wessex Water	-	
2.2.8 We will review priority and need for further investigation of St. Catherine's Brook. Contact: Area Water Resources Team Leader	Agency, Wessex Water	-	
2.2.9 We will review options for further investigation of parts of Chalfield Brook. Contact: Area Water Resources Team Leader	Agency, Wessex Water	-	
2.2.10 We will review options for further investigation of Luccombe Brook. Contact: Area Water Resources Team Leader	Agency, Wessex Water	-	

2.3

Issue: The impact of quarrying

There is a need to recognise the economic importance of the quarrying industry and also the potential for biodiversity, amenity, recreation, employment, water, storage and supply etc. Opportunities should be harnessed through a co-ordinated approach.

Mineral extraction can affect both the quality and the quantity of ground and surface water. The lowering of groundwater levels to facilitate dry working can lead to the loss of water supplies from nearby wells and boreholes, the cessation of flow of natural springs which feed streams and the drying up of wetlands. The impact is often on headwater streams that are often of major ecological significance. The water table may in some cases be permanently lowered leading to irretrievable reduction or loss of spring flows. During quarrying the part of the unsaturated zone of an aquifer is also lost. This has potentially two effects. It removes part of the natural filtration mechanism that shields the groundwater from chemical and biological contamination. It can change the temporary storage capacity of the aquifer leading to flashier stream flows and possibly less summer base flow. Surface runoff from workings and spoil heaps, and discharges from mines and quarries often contain silt, and possibly other materials toxic to plant and animal life. The risk can continue after the mineral extraction is completed, and new risks can occur depending on the planned after use.

Mineral extraction sites in the Bristol Avon area

Active Sites	Inactive Sites
1 Whatley Quarry	1 Lime Kiln Hill Quarry
2 Holwell Quarry	2 Westdown Quarry
3 Torr works	3 Cloford Quarry
4 Halecombe Quarry	4 Asham Quarry
5 Gurney Slade Quarry	5 Barnclose Quarry
6 Moons Hill Quarry	6 Cookswood Quarry
7 Chelynych Quarry	7 Stoke Lane Quarry
8 Chilcompton Quarry	8 Emborough Quarry
9 Westwood Mine	9 Highcroft Quarry
10 Durnford Quarry	10 Tadhil Quarry
11 Westbury Claypit	11 St Andrews Quarry
12 Westbury Chalk Quarry	12 Farrington Quarry
13 Westwood Quarry	13 Clapton Quarry
14 Monks Park Quarry	14 Corsham Quarry
15 Knockdown Quarry	15 West Cranmore Quarry
16 Veizeys Quarry	
17 Sandridge Quarry	
18 Tytherington Quarry	
19 Chipping Sodbury Quarry	
20 Stowey Quarry	
21 Shortwood Claypit	
22 Upper Lawn Quarry	
23 Hayes Wood Mine	
24 Combe Hay Mine	
25 Wick Quarries	
26 North Wick Claypit	
27 Compton Bassett Quarries	
28 Compton Bassett Landfill	
29 Sands Farm Landfill	
30 Freemans Farm	

Several of the largest stone quarries in Europe are concentrated in the Mendip Hills. About 20% of the country's hard rock production comes from this area. Most of the rock extracted comes from major drinking water aquifers. This results in an inescapable conflict of interest that must be managed and balanced

so that all the needs of society can be met. This balancing role is primarily the function of the Mineral Planning Authorities. We see our role as one of continuing active participation in the planning arena so as to secure the best possible protection for water resources within the context of competing demands for stone, drinking water, and a high quality natural environment.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
<p>2.3.1 We will continue to monitor the Bath Hot Springs and water levels in the Mendips and other limestone aquifers, analyse the information, and thereby keep a check on their state of health. Contact: Hydrogeologist, Regional Water Resources</p>	Somerset County Council, local authorities, Agency, quarry producers	15 on new monitoring site	●	●	●	●	●
<p>2.3.2 We will continue to act on a range of fronts to combat possible threats to the Brinsham Stream. We will monitor the extensive network of observation boreholes and stream gaugings will be interpreted so that any impacts can be determined as soon as possible. Contact: Hydrogeologist, Regional Water Resources</p>	Agency	unknown	●	●	●	●	●
<p>2.3.3 We will continue our extensive involvement in the Mineral Planning process, by this means we stand greatest chance of getting what we need to secure environmental protection. We will use the Local Agenda 21 initiative as a vehicle for carrying the Agency's message to all stakeholders in the local community, thereby aiding wider support for our aims and objectives. Contact: Hydrogeologist, Regional Water Resources</p>	Agency, Somerset County Council, quarry operators	unknown	●	●	●	●	●
<p>2.3.4 We will continue to use the planning control process to secure maximum environmental protection and enhancement and limit the harmful effect of quarry working in the catchment. Contact: Hydrogeologist, Regional Water Resources</p>	Agency, Somerset County Council, quarry operators	unknown	●	●	●	●	●

2.4

Issue: The impact of the proposed restoration of the Wilts. and Berks. Canal


We are broadly sympathetic to the aims of local communities who are trying to restore abandoned canals. Once this canal is restored it will be a valuable recreational resource, but it is likely to be managed by British Waterways, who together with the Wilts. and Berks. Canal Trust and the local authority, will promote its use. Our role is restricted to water quality monitoring and water resources matters.

Scott Wilson Kirkpatrick have completed a feasibility study for North Wiltshire District Council on behalf of the Wilts. and Berks. Trust investigating the possibility of restoring the canal. The project could take anywhere between 15 years and 200 years depending on what finance is made available to the Trust. The 10% or so of canal which has already been restored is a series of unconnected pounds (ponds) which have filled with rainwater. Water is not yet lost to the system by boating traffic through locks. The water resource requirements have been identified in the report, and we may have to consider them in greater depth, in the long term, if restoration proceeds to the appropriate stage e.g. an abstraction licence application.

2.5

Issue: The impact of turbine and sluice operation at Worton Mill

Worton Mill is located on the Semington Brook at Worton. Formerly a working flour mill it is no longer used for that purpose. We have received complaints from riparian landowners downstream of the mill. Their perception is that the operation of the mill causes low flows on the Semington Brook, to the detriment of the river and themselves. The Agency is investigating the effect on flows of operations at the mill, and elsewhere on the Semington Brook. If the operations at the mill are proven to be detrimental, the Agency will try to negotiate a solution.

Actions	Action By	Cost to Agency (£K)	Financial Year 98 99 00 01 02
2.5.1 We will continue with the study to identify the causes of the problems. Contact: Flood Defence Team Leader Projects	Agency	2	

For a summary of our statutory duties, powers, and interests please see Section 12.4

3. Fisheries

This chapter deals with the fishery rather than the recreational activity of angling. It concentrates on our work to ensure healthy and thriving fish populations. Angling is different to other water-based recreation because fishing and fisheries are the subject of a considerable amount of legislation. The Environment Agency has a specific duty to assess the state of, and safeguard, freshwater fisheries and the waters which they inhabit. In 1978 an European Community (EC) Freshwater Fish Directive was adopted (78/659/EEC) with the purpose of setting water quality objectives, for designated stretches of water, to enable fish to live continuously or breed in favourable conditions. Two categories of water were identified: those suitable for salmonids (salmon and trout), and those suitable for cyprinid fish (carp, tench, barbel, rudd, roach), the essential difference between the two categories being that salmonid fish habitats are characterised by fast-flowing reaches of rivers which have a high oxygen content and a low level of nutrients, whereas cyprinid fish habitats are those of slower-flowing waters which commonly pass through actively-managed agricultural land. Various standards were set in relation to these categories, including values for dissolved oxygen, pH, non-ionised ammonia, total ammonium, total residual chlorine, zinc and, where thermal discharges occurred, temperature. We routinely monitor designated stretches and any non-compliance is reported in Section 7 as the effect of various impacts on water quality such as agricultural or sewage treatment works discharges. Actions to address this non-compliance are included.

We have recently re-classified the Bulkington Drove Watercourse from salmonid to cyprinid watercourse, following our earlier recommendation. Due to its physical characteristics, the Bulkington Drove Watercourse does not support a salmonid population. Survey work has shown only the presence of coarse fish and not salmonids; occasionally trout may occur but this is the exception rather than the rule. The watercourse is located in flat land at the foot of Salisbury plain and is in a mixed farming area with canalised or semi-canalised watercourses. In the summer months the watercourse consists mainly of land drainage. Even given the complete elimination of farm problems, this watercourse will never support salmonids. We have changed the status of the Bulkington Drove Watercourse to cyprinid and we consider this to be realistically achievable and sustainable.

As part of our work to maintain, improve and develop fisheries we will tackle the problems of:

- penning and low flows: these can lead to the development of algal blooms which cause or contribute to adverse effects on fisheries. Algal blooms and low flows can both cause or contribute to the exceedence of EC Freshwater Fish Directive Standards (see Sections 7.8 Issue: The impact of nutrient pollution and nutrient enrichment and 2.2 Issue: The impact of water abstractions on river flows).
- maintenance of rivers, particularly weedcutting, which often stirs up sediment causing oxygen depletion and distress to fish. Also the operation of sluices needs to take fisheries into account.

As well as adequate water quality the diversity of physical habitat is important for supporting good fish populations. We will take opportunities to improve habitat diversity (see Section 4 Biodiversity).

The lower to middle reaches of the Bristol Avon and its tributaries generally hold good stocks of coarse fish with the middle to upper reaches supporting, in general, good numbers of brown trout. Very occasionally salmon and sea trout have been found to enter the lower reaches of the river as far up as Keynsham.

We work hard to ensure good water quality and diverse habitat to enable fish populations to flourish. Because of this the fisheries of the Bristol Avon are in generally good condition and consequently relatively few issues have been raised.

We wish to see further developments take place to improve the fisheries within the catchment. Examples include:

- further fish passes as, and when, funds become available;
- habitat improvements both for coarse fish and trout and the restoration of disused back channels.

We will continue to advise and work with angling clubs and riparian owners to maintain and develop the diverse fisheries within the catchment.

3.1 Issue: The need for fish passes at major obstructions

In order to achieve diverse and healthy fish populations in all rivers we need to allow the free passage of fish within the catchment to take place, and so we need to build further fish passes at certain weirs. At present we do not have the resources to carry this out; however we are always seeking funding to enable us to start this work.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
3.1.1 We will continue to seek funding and opportunities to provide fish passes at impassable weirs causing obstruction to migrating fish. Contact: Fisheries Team Leader/Project Officer	Agency	unknown	●	●	●	●	●
3.1.2 We will carry out a feasibility study to find out if the impassable weir on the River Boyd at Bitton can be replaced/modified to form a series of passable stepped weirs. Contact: Fisheries Team Leader/Project Officer	Agency	2		●			

3.2 Issue: The possible impact of low flows on fishing in the Upper Avon

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
3.2.1 We will complete an angling survey to help set minimum environmentally acceptable flows at Great Somerford Contact: Fisheries Team Leader	Agency see 2.2.2	2	●	●			

3.3 Issue: The conservation of the native crayfish

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
3.3.1 We will map and monitor all known populations of crayfish Contact: Fisheries Team Leader	Agency	2	●	●			

For a summary of our statutory duties, powers, and interests please see Section 12.4

4. Biodiversity

The European Union is concerned about the decline in biodiversity (the variety of life on earth). As a result member states are producing Biodiversity Action Plans (BAPs) in an effort to halt and reverse the decline of species and habitats. The UK Biodiversity Action Plan lists key habitats and species which require conservation action, through Regional and Local Biodiversity Action Plans. *'The Regional Biodiversity Audit Plan for the South West'* was published in April 1996 and was followed by *'Action for Biodiversity in the South West'* in June 1997 - a series of habitat and species plans to guide delivery. Local Biodiversity Action Plans are currently being developed by local authorities, English Nature (EN) and others, to which we are providing some input.

Biodiversity is a key indicator of sustainable development

4.1

Issue: Maintaining and enhancing biodiversity

Over the next five to ten years, we will work with a number of organisations who are formulating and implementing habitat and species action plans at both regional and local levels. These include:

- Mendip District Council,
- Wiltshire County Council,
- South Gloucestershire Council,
- Bath and North East Somerset Council,
- Bristol City Council.

In addition British Waterways are developing their own local Biodiversity Action Plan for the Kennet and Avon Canal.

The Agency is developing National Species Action Plans and as a result of these plans has agreed to be the contact point for the chalk rivers habitat and 12 species of aquatic animals and plants. Of these the following are known to occur within the catchment: otter, water-vole and native crayfish. The Agency also has an important role to play in partnership with others in the conservation of other water-related habitats including lowland wet grassland, reedbeds, tufa depositing springs and headwater streams.

The Agency is committed to maintaining and improving the contribution that rivers and wetlands make to the biodiversity of the catchment (see Section 7.15 Issue: River rehabilitation and channel management). We aim to protect sensitive sites through our control over authorisations to abstract water, discharge effluents and dispose of waste.

The provision of good habitat, both in amount and diversity including the major aspect of good water quality, is our principal contribution to the biodiversity initiative. It enables a wide variety of birds, fish and other animals as well as plants to flourish.

In fulfilling its day-to-day role the Agency will give priority to:

- protecting the biodiversity of the most diverse stretches of river and remaining wetland areas

- enhancing biodiversity by improving water and habitat quality through channel improvements and protecting flow regimes
- restoring and improving degraded rivers and wetlands by working in partnership with others

Particular threats to biodiversity in this catchment include:

- invasive alien plants which dominate river margin vegetation (see Section 7.17 Issue: Alien invasive plants).
- extensive death of riverside alder trees due to the disease Phytophthora (see Section 7.16 Issue: Phytophthora).
- the increasing decline in native crayfish in their traditional habitats due to displacement by the introduced American signal crayfish (see Section 3.3 Issue: The conservation of the native crayfish).

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
4.1.1 We will implement a five-year plan of priority sites for restoration. Contact: Conservation Team Leader/Project Officer	Agency	see Action 7.15.1, for details	●	●	●	●	●
4.1.2 We will implement SW Regional BAP for Rivers and Streams by working with others to maintain and restore the quality and biodiversity of rivers and streams. Contact: Conservation Team Leader/Project Officer	Agency, Bath and North East Somerset Council, South Gloucestershire Council, Bristol City Council, Wiltshire County Council, Mendip District Council, Farming and Wildlife Advisory Group (FWAG) and The Wildlife Trust	unknown	●	●	●	●	●
4.1.3 Otters: We will provide suitable conditions, where appropriate, to enable colonisation of the catchment. Contact: Conservation Team Leader	Agency, Wildlife Trusts, riparian owners, FWAG	unknown	●	●	●	●	●
4.1.4 Water-voles: We will increase knowledge of distribution and abundance, and work in partnership with others to provide habitat enhancements. Contact: Conservation Team Leader	Agency, Wildlife Trusts, riparian owners, FWAG	unknown	●	●	●	●	●
4.1.5 Native crayfish: We will continue to survey and monitor native populations and the spread of signal crayfish particularly within the Sherston Avon, Chew and By Brook catchments to enable the formulation of a conservation strategy. Contact: Conservation Team Leader/Project Officer	Agency, Wiltshire Wildlife Trust	(see 3.3.1), unknown	●	●	●	●	●
4.1.6 Lowland wet grassland: We will seek opportunities to restore functional flood plains and wetlands in co-operation with riparian owners and wildlife trusts. Contact: Conservation Team Leader	Agency, riparian owners, Wildlife Trusts, FWAG	unknown	●	●	●	●	●

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
4.1.7 Tufa depositing springs: We will conduct a survey to assess value and develop conservation strategy particularly in the Mells Valley. Contact: Conservation Team Leader	Agency, Somerset Environmental Records Centre (SERC), FWAG, Wildlife Trusts	5	●	●			
4.1.8 Headwater streams: We will target headwater surveys towards chalk streams. Contact: Conservation Team Leader/Biology Team Leader	Agency, Wiltshire Wildlife Trusts	5-10	●	●	●		
4.1.9 We will identify further suitable sites for reintroduction of the native crayfish. Contact: Conservation Team Leader/Project Officer	Agency	unknown	●	●			
4.1.10 Locally important species (Lodden pondweed, river water dropwort, white water lily, scarce chaser dragonfly and water crowfoot): We will establish distribution within the catchment by undertaking River Corridor Surveys (RCS). Contact: Conservation Team Leader	Agency	unknown	●	●	●	●	●

For a summary of our statutory duties, powers, and interests please see Section 12.4

5. Conserving the Land

The Agency is committed to protecting the land from pollution and erosion and also to minimising the risk to people and property from flooding.

5.1

Issue: The impact of new development on drainage

We advise the following local planning authorities in the Bristol Avon area on the impact of development on flooding and drainage as statutory consultees to Development Plans:

- North Somerset Council
- Bath and North East Somerset Council
- Bristol City Council
- South Gloucestershire Council
- North Wiltshire District Council
- West Wiltshire District Council
- Kennet District Council
- Mendip District Council
- Cotswold District Council
- Wiltshire County Council
- Somerset County Council

We have supplied detailed **indicative** floodplain maps (so called Section 105 maps) to all the local authorities in this area to guide their work on steering development away from floodplains. Subject to funding, detailed flood maps at certain locations (Section 105 Level B maps) will be provided to local authorities.

We review and comment to the planning authority on all planning applications which may have environmental implications. Comments include recommending that planning permission is not granted unless certain conditions to protect the environment are attached. In some cases we formally object to a planning application either conditionally or outright. Nationally we are conducting an audit of the take up of our requirements in a 10% random sample of those applications to which we object, or ask for conditions to be attached to any planning approval.

The increase in runoff in terms of volume and velocity from paved areas (roads, car parks and pavements) is of concern to the Agency. To minimise this effect we recommend the use of Best Management Practices (BMPs) which can include such things as swales (a much improved 'ditch' – often grass with a very broad bottom and very gently sloping sides, which aids the settlement of pollutants), reed beds, wetlands, flow attenuation ponds and permeable paving. Developers are encouraged to enhance the ecological and wildlife value of their site as part of this work. For further guidance see our leaflet or video – 'Nature's Way'.

We seek the earliest opportunity to discuss new development proposals with the developer and the local authority to ensure environmental protection and

maximum sustainability. Particular development proposals in this area are: Emerson's Green where a Master Plan has been agreed; and Cribb's Causeway on the Trym where we have agreed a way forward to ensure developers comply with our environment regulations and policies.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
5.1.1 We will produce hydraulic models for identifying definitive floodplains for some local authority identified reaches for 1998/99. Contact: Flood Defence –Team Leader Development Control	Agency	292 total	70	147	75		
5.1.2 We will liaise with planning and highway authorities, consultants and contractors to ensure protection for the water environment before, during and after construction of developments. Contact: Flood Defence –Team Leader Development Control	Agency, local authorities, Highways Agency	40 total	20	10	10		
5.1.3 We will liaise with the local planning authorities to ensure that appropriate policies are included in their Development Plans. Contact: Team Leader Planning Liaison/Flood Defence Development Control	Agency, local authorities	20 per annum	●	●	●		

5.2 Soil erosion

This is not a widespread problem in this catchment and so a soil alleviation strategy is not needed here. We are, however, concerned about possible soil erosion on the Mendips if the intensive outdoor rearing of pigs spreads and the growing of fodder maize increases. We encourage farmers to follow the Ministry of Agriculture, Fisheries and Food (MAFF) Code of Good Agricultural Practice for the Protection of Soil. MAFF are preparing a Code of Good Practice for outdoor pig farming which is likely to include advice on stocking ratios.

5.3 Issue: Nitrate pollution

We are concerned about increasing nitrate in surface and groundwaters because high levels of nitrate may cause harm to human health. Levels in many places are approaching the European Community (EC) limit for drinking water quality (50 mg/l) which will result in expensive treatment of both private and public supplies being required. The major source of nitrate is from agricultural activity and hence the EC Directive Concerning the Protection of Waters Against Pollution Caused by Nitrates from Agricultural Sources (91/676/EEC) was implemented. This directive requires member states to monitor the nitrate concentration of fresh waters (surface and ground) and to review the eutrophic state of surface, estuarine and coastal waters to identify those that are or could be affected by agricultural nitrate. The land draining to these must be designated as nitrate vulnerable zones (NVZs). In England and Wales, we will implement government Action Plans to limit nitrate discharges from agriculture. The action programme includes a requirement for farmers in NVZs to control the timing and rate of application of nitrogen fertiliser and organic manures used on their land. Farmers are now required to keep formal records of their use of fertilisers and manures as a key part of a new anti-pollution measure. We will be responsible for the enforcement of the controlling Regulations. The Directive requires regular reviews to be carried out of existing NVZs and to identify potential new areas. The next review will be carried out in 2001. The European Union (EU) has recently criticised the UK Government's methodology used to identify NVZs. We do not know what the Government's response will be, but a changed approach is a possibility.

Excess nitrate may also contribute to eutrophication (see Section 7.8 Issue: The impact of nutrient pollution and nutrient enrichment). Other actions to reduce nitrate pollution are included in Section 7.7 Issue: The impact of agriculture on water quality.

Within this area there is one groundwater NVZ at Egford, near Frome. This was, until recently, a Nitrate Sensitive Area (NSA) which was the Ministry of Agriculture, Fisheries and Food, (MAFF) scheme of payments for voluntary changes of farming practice. NSA schemes have now finished. There are no surface water NVZs. Mandatory restrictions have applied since 18 December 1998.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
5.3.1 We will implement and enforce the government Action Plan for agricultural nitrate limitation. Contact: Principal Officer Regional Groundwater Protection	Agency	unknown	●	●	●	●	●
5.3.2 We will contribute to the four-yearly review process (2001). Contact: Principal Officer Regional Groundwater Protection	Agency	unknown				●	

5.4

Contaminated and derelict land

The Environment Agency will from July 1999 have specific duties under the Environment Act 1995 with respect to contaminated land. **This is defined as any land which appears to a local authority to be in such a condition - because of the substances it contains - that water pollution or significant harm is being, or is likely to be, caused.** This interpretation is subject to guidance issued by the Secretary of State. We will have a duty to prepare and publish a report on the state of contaminated land from time to time, or if specifically requested to do so by the Secretary of State.

Local authorities are the key regulators under the Act, with the Agency acting as a consultee and advisor. The local authority will carry out a survey to identify contaminated land in its area, and will then, in collaboration with the polluters and/or landowners, ensure that works are carried out to remove the identified risks. Some sites will be designated as 'special sites', in which case we will take responsibility.

Periodic surveys have, however, been made of derelict land. The two are not the same. **Derelict land is considered to be land which has become so damaged by industrial or other developments that it is incapable of beneficial use without treatment.** Such land includes:

- closed and disused waste tips;
- worked-out mineral excavations which are not subject to enforceable planning conditions or other arrangements providing for restoration;
- abandoned military or service installations;
- abandoned industrial installations;
- areas of land which are affected by actual surface collapse resulting from disused underground mining operations.

The contamination of land may cause damage to the soil and anything coming in contact with it - plants, wildlife, man or buildings. The contaminants can also spread by natural means to the air, surface water or groundwater and continue

to cause harm in these environments. Failing to renovate and re-use such sites increases the pressure to develop unused sites, resulting in the loss of farmland and valuable habitats.

Most contaminated and derelict sites are improved through redevelopment, with the cost of the work paid for by the development. The details of the clean-up will be controlled through planning permission. This is the best means of achieving re-use of land, and will continue wherever possible. Some sites which are larger or more heavily contaminated require preliminary work (often known as pump-priming) before developers can take over. This work may be done by national owners, such as British Gas or Railtrack, or by government-sponsored bodies such as the Development Agencies or English Partnerships.

We will contribute to the Development Planning process to ensure effective improvement of contaminated sites as and when they are proposed for development. We will work with national companies and other government bodies to ensure effective improvement of contaminated sites proposed for development.

5.5 Soil acidification

Some soils, particularly those which are naturally acidic such as granite-derived soils and peat soils are vulnerable to increased acidity. This effect is made worse by high rainfall typically in upland areas and also by extensive conifer plantations. If rain combines with certain airborne pollutants it becomes much more acidic and accelerates the process of soil acidification. The main pollutants are sulphur dioxide and the oxides of nitrogen (NO_x).

The acidification of soil leads to the leaching out of minerals essential for plant growth and many plants cannot survive - others are severely damaged.

In 1994, a protocol was agreed under the UN Economic Commission for Europe (UNECE) to reduce exceedences of critical loads - the rates of sulphur deposition which ecosystems and other targets can tolerate in the long term without suffering damage. The UK agreed to reduce its sulphur dioxide emissions by 80% by 2010 from a 1980 baseline.

The UK's sulphur strategy published in December 1996 (Reducing Emissions of Sulphur Dioxide, A Strategy for the United Kingdom) indicates that the UK will meet interim targets for 2000 and 2005. Compliance is also expected with the 80% reduction target for 2010. Critical load exceedences however will continue at some sensitive sites. In January 1997 the European Commission published a draft strategy on acidification which aims to further reduce critical load exceedences for both sulphur and nitrogen. See Map 2 for the current and forecast critical load exceedences for this area.

Air pollution does not remain within catchment boundaries and the air pollution causing the areas of critical load exceedence in this catchment come chiefly from Bristol and Avonmouth, and also from elsewhere.

There are no breaches of air quality standards known to be caused by authorised Integrated Pollution Control (IPC) processes in the area.

For a summary of our statutory duties, powers, and interests please see Section 12.4

6. Waste

The Environment Agency regulates the treatment, recovery, storage, movement and disposal of controlled wastes. Controlled waste includes household, commercial and industrial wastes. It excludes waste from agricultural, mining and quarrying operations, waste water, explosives and radioactive wastes. However, some agricultural and mine and quarry waste may become controlled waste in the near future.

The government's strategy for sustainable waste management in England and Wales is set out in a White Paper '*Making Waste Work*', published in December 1995. This sets out the waste hierarchy:

- Reduction
- Re-use
- Recovery - recycling, composting, energy
- Disposal.

The overall objective is to move the management of waste up the hierarchy thus reducing the volume of waste that is finally disposed to landfill. Landfill, however, will remain as a method of solid waste disposal in the UK for wastes that cannot be recovered and for the residue of some recovery methods such as incineration with energy recovery.

Government initiatives to move waste management up the hierarchy include legislative as well as financial incentives. Mechanisms already in place include;

- the requirement on local authorities to draw up Waste Local Plans as well as Recycling Plans to detail how household recycling targets are to be met;
- the Landfill Tax which was introduced on 1st October 1996;
- the Producer Responsibility Obligations (Packaging Waste) Regulations which were introduced in January 1997 placing responsibility on businesses that handle packaging to recover and recycle certain proportions of packaging materials.

The Government's latest thinking is set out in its consultation document '*Less Waste More Value?*' (1998)

The Landfill Tax is enforced by HM Customs and Excise. There are two levels of tax, £2 per tonne for inactive (inert) wastes and £7 per tonne (£10 per tonne from April 1999) for all other wastes disposed of at landfill sites. Landfill Tax is levied on the landfill site operators and before VAT is calculated. Site operators can contribute to enrolled Environmental Bodies for specific environmental projects. In return they can claim a tax credit worth 90% of any contribution to a maximum credit of 20% of their landfill tax liability.

We aim to encourage people to reduce their wastes and for the wastes that are produced to promote re-use and recycling.

6.1

Issue: Fly-tipping

Fly-tipping is defined as: 'The illegal deposit of controlled waste on land (excluding deposits at unlicensed sites designed or adapted for the reception of waste with a view to disposing of it). Fly-tipping can be a problem in this area and is very difficult to control. We rely largely on information supplied by members of the public. Apart from the usual reasons for fly-tipping such as avoiding commercial waste charges, one reason in the upper Avon area may be that the number of Civic Amenity sites is few in comparison with the adjoining areas which made up the former county of Avon. (There are none in the Bristol LEAP area part of Wiltshire). Wiltshire County Council are to address this in their forthcoming Waste Local Plan. A Household Recycling Centre has been granted planning permission at Stanton St. Quintin, and a Materials Recycling Facility has recently opened at the Compton Bassett landfill site. Householders there have to drive greater distances to dispose of bulky items of waste. It is acknowledged, however, that there is a good collection service from householders by the district councils. Either the local authorities or the Agency as appropriate will prosecute those responsible for fly-tipping where we can get sufficient evidence.

We will work with the local authorities to combat and remove fly-tipped waste according to the Memorandum of Understanding of 16 September 1998 between the Agency and the Local Government Association.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
6.1.1 We will encourage Wiltshire County Council, the Waste Disposal Authority, to provide more civic amenity sites through their contractor (Hills) Contact: Waste Licensing Team Leader	Agency	unknown	●	●	●	●	●

6.2

Issue: The need for a better informed and integrated Agency view on waste management

The UK government saw the need for a better informed and integrated strategy for waste management and so will produce its first Statutory Waste Strategy, due in a White Paper later in 1999. It will provide definitive guidance on best practice for waste minimisation and disposal.

Before the Strategy can be completed we need to find out what waste is produced where. This we are doing by carrying out a National Waste Production Survey which began in autumn 1998 and which will be complete by March 1999. It will be carried out using stratified statistical sampling of a range of local businesses.

This sample information will be used to produce national waste arisings figures and from these, estimates will be made of the waste arisings within each District Council or Unitary Authority area. This information will be used by local authorities to plan for waste collection and disposal, and will also be available for any other organisation or the general public.

Bristol City Council has recently gone through a public consultation to help put together a waste strategy. This will help inform both waste planning policy and waste management. The currently adopted Bristol Local Plan (1997) will be reviewed with a draft expected in 2000. The current plan has no waste policies so, pending the production of the replacement plan, policies will be produced during 1999 which will serve as supplementary guidance to the Avon County Structure Plan (1994). The Bristol Household Waste Management Strategy will cover the next 15 – 25 years. It is an independent document to the Waste Local Plan, though it is

closely related to it. The Government will require local authorities to produce waste management strategies instead of Recycling Plans in the next year or so.

Bath and North East Somerset (BANES) Council are beginning the process of producing their Local Plan which will contain their policies on waste planning. The Avon County Structure Plan (1994) contains the policies that BANES currently work to. Public consultation on their new Local Plan is expected in early 1999. BANES have produced a joint Draft Recycling Plan and Waste Strategy that has recently been approved by the committee and whose release is imminent.

South Gloucestershire Council is currently consulting on its Local Plan which includes its waste management policies.

Wiltshire County Council published, in February 1997, a Waste Strategy raising issues on waste management in the county. Work is currently underway on a Waste Local Plan draft for publication in late summer 1999, hopefully being finally adopted in 2000 or 2001.

Somerset County Council is currently working on a draft Waste Local Plan which will include its Waste Strategy for publication in draft form in June 2000.

We are also undertaking a £1.5 million programme of research into life-cycle techniques for waste management. Life-cycle assessment is a technique in which the inputs and outputs of a particular process or practice are systematically identified, quantified and costed from 'cradle to grave'. The various options for waste disposal are then considered in terms of their environmental and economic impact and the best practicable environmental option is chosen. This methodology will provide a central plank for local authorities in determining the provision of waste facilities in its area. It is expected that this more case-specific methodology of Life-cycle Analysis for waste management will supersede the Waste Hierarchy for Local Government when planning which waste management facilities and techniques to employ.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
6.2.1 We will contribute to National Waste Survey by collecting data in this plan area. Contact: Tactical Planning Team Leader	Agency	5 p.a.	●	●			

6.3

Issue: The over-creation of waste

Our consumer society is producing ever greater quantities of waste each year. It has been estimated that the amount of waste produced nationally in one year would fill Lake Windermere. Non-renewable resources are used once and then disposed of in ways which render them permanently unusable. Increased waste costs companies more and there is a potential for pollution from all methods of disposal. It is becoming increasingly difficult to find sufficient space to continue the use of landfill as our main disposal method and waste is often transported large distances. This is clearly not sustainable.

We are contributing to achieving the government's National Waste Minimisation Targets in a number of different ways.

- We encourage and guide industry to develop new and improved techniques for the management of special and other industrial wastes.
- For non-integrated Pollution Control (IPC) regulated industries we promote the Environmental Technology Best Practice Programme (ETBPP) and Waste Minimisation Clubs.

- We are carrying out a National Waste Arisings Survey (see Section 6.2 Issue: The need for a better informed and integrated Agency view on waste management).
- We are implementing Producer Responsibility legislation.
- We have produced our Waste Minimisation Video and Good Practice Guide which we use to promote best practice.
- We are trying to develop partnership initiatives with groups such as Western Partnership for Sustainable Development (WPSD) and Business, Environment Association for Bath and District (BEAB), Business Link West and the local authorities.
- We will promote best practice for farm waste management in partnership with organisations such as Farming and Wildlife Advisory Group (FWAG) who are currently giving advice as part of their 'Landwise' Review and the government's Farming and Rural Conservation Agency (FRCA).

Local authorities in the area are also working towards achieving the government's targets and local examples from South Gloucestershire Council include:

- 'Action on Waste' a project linking schools, businesses and communities to undertake a variety of measures such as composting and recycling directories,
- the SOFA project which is looking into recycling furniture from the council's bulky household waste collections or civic amenity sites.

Bristol City Council's example is:

- 'The Rubbish Revolution – making waste work for Bristol' project in conjunction with the French consultancy firm SITA and 'Resourcesaver'. It will be promoted throughout 1999.

Similar and other initiatives are happening in other local authority areas and we will contribute to these where we can.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
6.3.1 We will promote the creation of waste minimisation partnerships as appropriate. Contact: Tactical Planning Team Leader	Agency	1 p.a.	●	●	●	●	●
6.3.2 We will promote the setting up of waste minimisation clubs in industry and commerce. Contact: Tactical Planning Team Leader	Agency, WPSD, BEAB, local authorities	1 p.a.	●	●	●	●	●
6.3.3 We will work with FWAG, FRCA and others to give waste minimisation and best practice management advice to farmers Contact: Tactical Planning Team Leader	Agency, FWAG, FRCA	unknown	●	●	●	●	●

6.4

Issue: The need to review waste management facility licences

We are currently reassessing the adequacy of the pollution prevention controls upon waste management facilities in the area. This review covers the full range of licensed facilities, from landfill sites to recycling centres requiring improvements. Thirty-two site licences have been identified as top priority throughout North Wessex for revision and modification by 31 March 1999, 18 of these sites are in the Bristol Avon plan area. The identification of these top priority sites has been made on the basis of three criteria:

- risk of pollution of the environment and harm to human health;
- sensitivity of the locality and risk of serious detriment to its amenities; and
- enforceability of conditions to ensure modern standards of control.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
6.4.1 We will review 18 waste management facility licences and identify sites requiring improvement to licence conditions. Contact: Waste Licensing Team Leader	Agency	unknown	●	●			

Licence holders and locations of the 18 management sites in the Bristol Avon catchment

LICENCE HOLDER	LOCATION
J & T Beaven Limited	Field North of Hawcroft Holt
Western Solvents Ltd	Brook Lane, Westbury
Wiltshire Waste Recycling Limited	Tinkfield, Devizes
Westonbirt Girls School	Westonbirt, Gloucestershire
Hills Aggregates Limited	Compton Bassett Landfill
Wiltshire Direct Services	Penleigh No.3, Dilton Marsh
Premiere Environmental Limited	Engineer Road (oil treatment), Westbury
Premiere Environmental Limited	Chemical Road and Engineer Road, Westbury
Western Skip Hire Ltd	Transfer Station, Lime Kiln Hill Stone Quarry
Crapper & Sons Limited	Park Grounds Farm, Wootton Bassett
Mr and Mrs Hudd	Abberds Lane, Calne
Hughes Waste Management Ltd	Knockdown Quarry, Sherston
M J Church Plant Ltd	Star Farm, Marshfield
Portals (Bathford) Ltd	Bathford Paper Mills
T Green Metals	The Willows, Allington, Near Chippenham
G H Fowler and Son	Wood Lane, Chippenham
Permanite Asphalt Limited	Trinidad Work, Wanstow, Shepton Mallet
B.F.I. Ltd	Windsor Bridge Road, Bath

For a summary of our statutory duties, powers, and interests please see Section 12.4

7. Integrated River-Basin Management

Integrated river-basin management is a way of looking at the river and its surrounding land as a whole. It not only looks at the quality and quantity of water in the river but also at its physical environment including landscape, recreational use, flood control works, wildlife in the river and its corridor.

Water quality - we manage water quality by setting targets called River Quality Objectives (RQOs). These are intended to protect current water quality and future use and we use them as a basis for setting consents for new discharges and planning future water quality improvements. RQOs are based on a classification scheme known as River Ecosystem (RE) Classification. The five RE classes are summarised below:

RQO (RE Class)	Class Description
RE1	Water of very good quality suitable for all fish species
RE2	Water of good quality suitable for all fish species
RE3	Water of fair quality suitable for high class coarse fish populations
RE4	Water of fair quality suitable for coarse fish populations
RE5	Water of poor quality which is likely to limit coarse fish populations

For further details of RQOs, Long Term River Quality Objectives (LT RQOs) and dated RQOs please see Appendix 12.1

The rivers of the Bristol Avon catchment have been divided into 175 classified stretches and the RQOs that we have set are outlined in the table in the Appendix, Section 12.1 In that section we also outline the stretches in the Bristol Avon catchment for which we are proposing to upgrade the RQOs. We welcome your comments on the RQO upgrades which we are proposing.

The latest compliance with the targets we have set are shown on Map 4.

We also monitor biological quality and classify river reaches using a scheme of 6 classes.

Biological Class Descriptions

Biological Class	Description
a	Very good
b	Good
c	Fairly good
d	Fair
e	Poor
f	Bad

When classified in 1995, 94% of sites in the Bristol Avon catchment achieved class c or better. Works have been completed on some of the poorer quality water courses, and we would anticipate further class improvements when next assessed in 2000.

Flood defence - Riparian landowners have the responsibility to maintain the watercourses on their land although in fact the situation is rather different. Under the Land Drainage Act 1991 the more significant rivers are designated as

main river and the Act gives the Agency powers to maintain them, and in practice we maintain them using money obtained from a precept on the Council Tax. We are also responsible for a large number of water level management control structures. The current political climate for reducing direct taxation is resulting in downward pressure on our flood defence budgets, which in turn is having an effect on our priorities.

Local authorities have powers to maintain non-main river though in general they only exercise them where lack of maintenance is causing a significant flooding problem. The Agency has an overall duty to supervise flood defence matters. We do this by advising on whom is the appropriate person or body to deal with a problem.

Maintenance practices such as dredging and weedcutting can have a harmful effect on water quality and river life and so must be carefully managed to reduce impacts.

In accordance with the former Department of the Environment '*(DoE) Circular 30/92 Development and Flood Risk*' we advise planning authorities on flood defence matters. We also issue consents and byelaw approvals for certain works which are likely to affect the flow of water or impede any drainage work.

Levels of flood defence, tidal for the lower catchment, and fluvial for the upper catchment, are relatively high. However, increased development will require flood mitigation works so that any risk to third parties from increased surface water disposal can be reduced.

Flood defence works are an ideal opportunity to enhance the landscape, habitat diversity and sometimes the recreational potential of a river channel. We also take into account the archaeology and built environment of a site when considering proposals for flood defence and other river works.

Flood warning - Absolute flood protection is not possible. Because of this we need to warn people when there is a danger of flooding. We took over the role of warning the public and other organisations of likely flooding from the police on 1 September 1996. We have developed communication systems aimed at providing flood warnings to those members of the public most at risk. We have a strategy which details how the procedures operate, called the '*Flood Warning Dissemination Plan for Somerset and Avon areas*'; a copy is held in the Area office for public inspection.

Warnings are issued by direct contact and via local radio. Recorded information on current flood warnings is also provided. Leaflets are also available from Agency offices which fully explain the flood warning service.

A study of the level of service for flood warning is currently being carried out to determine whether the required standard is met. The results will identify additions and other changes to the flood warning service.

7.1

Issue: The impact of sewage treatment works on water quality

There are 61 public sewage treatment works (STWs) owned and operated by Wessex Water Services, in the Bristol Avon Catchment. There are numerous private STWs. These are mostly small private, domestic discharges of treated sewage effluent and larger discharges of treated trade effluent in the catchment. We regulate effluent disposal by issuing consents to discharge and by carrying out a major programme of monitoring to assess compliance of the discharges with their consents and of the receiving watercourses with their RQOs. STWs also contribute to nutrient enrichment (see Issue 7.7).

Improvements to Wessex Water Services Ltd.'s (WWSL) STWs are subject to available funding. The Water Company's improvement plan, known as Asset Management Plan 2 (AMP2), was developed based on guidelines agreed between the former National River Authority (NRA), the former DoE, the water service companies and Office of Water Services (OFWAT) in 1994. AMP2 runs from 1995 to 2000. OFWAT has recently initiated a five-year review of water prices which will result in AMP3, running from 2000 to 2005. We are currently identifying those STWs where improvements are required.

The following STWs cause or contribute to RQOs and Long Term (LT) RQO failures:

- Urchfont STW contributes to LT RQO failure in the Worton Stream
- Priston STW causes RQO failure in Priston Stream
- Hilmarton STW contributes to LT RQO failure in the Cowage Brook
- Westbury STW causes LT RQO failures in the River Biss and Bitham Brook
- Devizes STW causes RQO failure in the Old Park Watercourse
- Potterne STW caused RQO failure in the Drewspend Watercourse due to an isolated incident.

? Not AMP3 RQO.

The following STWs may cause or contribute to RQO and LT RQO failures:

- Marshfield STW may cause RQO failure in the Doncombe Brook
- Wootton Bassett STW may cause RQO and LT RQO failures in Hancocks water and Brinkworth Brook
- Wick STW may cause RQO failure in the Boyd
- Compton Bassett STW may contribute to RQO and LT RQO failures in Rivers Brook
- Stratton-on-the-Fosse STW may contribute to LT RQO failure in Snails Brook.
- Leigh-on-Mendip STW may contribute to RQO failure in Leigh-on-Mendip watercourse
- Improvements at Wootton Bassett STW were completed by Wessex Water Services Limited in September 1997.

- AMP2 scheme.

? Not AMP3

11

11

11

The following STWs, if operating at their consented maximum, will cause RQO or LT RQO failures:

- If Hullavington STW operates at its consented maximum it will cause RQO failure in the Gauze Brook

Is it still an issue?

- **If** Frome STW operates at its consented maximum it will cause RQO failure in the Somerset Frome
- **If** Lavington (Woodbridge) STW operates at its consented maximum it will cause LT RQO failure in the Semington Brook
- **If** Malmesbury STW operates at its consented maximum it will cause RQO failure in the Avon
- **If** Rowde STW operates at its consented maximum it will cause RQO failure in the Summerham Brook
- **If** Potterne STW operates at its consented maximum it will cause RQO failure in Drewspend Watercourse
- **If** Devizes STW operates at its consented maximum it will cause RQO failure in Old Park Watercourse
- **If** Marshfield STW operates at its consented maximum it will cause RQO failure of Doncombe Stream

Not Amp?
RQO.

The following STWs have exceeded their consents in the period from April 1997 to March 1998:

- Westbury STW, for ammonia
- Wootton Bassett STW, for suspended solids
- Thingley STW, for Biochemical Oxygen Demand (BOD) and ammonia
- Stanton Drew STW, for Biochemical Oxygen Demand (BOD)
- East Harptree STW, for suspended solids

We will take appropriate enforcement action in the above cases of consent exceedence.

The following STW may cause exceedence of the EC Freshwater Fish Directive:

- Westbury STW may cause exceedence of the cyprinid standards in the River Biss

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
7.1.1 We are seeking improvements to Urchfont STW in AMP3. Contact: Scientific Officer Regional Water Quality	Agency	0	●	●			
7.1.2 We are seeking improvements to Priston STW in AMP3. Contact: Scientific Officer Regional Water Quality	Agency	0	●	●			
7.1.3 We are seeking improvements to Hilmarton STW in AMP3. Contact: Scientific Officer Regional Water Quality	Agency	0	●	●			
7.1.4 We are seeking improvements to Westbury STW in AMP3. Contact: Scientific Officer Regional Water Quality	Agency	0	●	●			
7.1.5 We will monitor the effect of improvements to Devizes STW carried out by WWSL under AMP2. Contact: Scientific Officer Regional Water Quality	Agency, WWSL	0	●	●			
7.1.6 We are seeking improvements to Marshfield STW in AMP3. Contact: Scientific Officer Regional Water Quality	Agency	0	●	●			
7.1.7 Wick STW. We will undertake a desk study. If necessary we will seek improvements. Contact: Scientific Officer Regional Water Quality	Agency	5	●				
7.1.8 Compton Bassett STW. We will undertake a desk study. If necessary we will seek improvements. Contact: Scientific Officer Regional Water Quality	Agency	5	●				
7.1.9 Stratton-on-the-Fosse STW. We will undertake a desk study. If necessary we will seek improvements. Contact: Scientific Officer Regional Water Quality	Agency	5	●				
7.1.10 Leigh-on-Mendip STW. We will undertake a desk study. If necessary we will seek improvements. Contact: Scientific Officer Regional Water Quality	Agency	5	●				
7.1.11 We are seeking improvements to Hullavington STW in AMP3. Contact: Scientific Officer Regional Water Quality	Agency	0	●	●			
7.1.12 We are seeking improvements to Frome STW in AMP3. Contact: Scientific Officer Regional Water Quality	Agency	0	●	●			
7.1.13 We are seeking improvements to Lavington STW in AMP3. Contact: Scientific Officer Regional Water Quality	Agency	0	●	●			
7.1.14 We are seeking improvements to Malmesbury STW in AMP3. Contact: Scientific Officer Regional Water Quality	Agency	0	●	●			
7.1.15 We are seeking improvements to Rowde STW in AMP3. Contact: Scientific Officer Regional Water Quality	Agency	0	●	●			

Note: All AMP 3 improvements are subject to available funding.

A number of STWs may require nutrient reduction under AMP3. These are works which are, or may become, Urban Waste Water Treatment Directive qualifying discharges to a recently designated Sensitive Area (Eutrophic) within the period 2000-2005, (see Section 7.8 Issue: The impact of nutrient pollution and nutrient enrichment).

7.2

Issue: The impact of RAF Lyneham on water quality

RAF Lyneham is the base for the RAF's fleet of Hercules transport aircraft. It is a large, active base where considerable quantities of oil and chemicals are stored and used. In freezing conditions chemicals may be used to keep runways and aircraft free of ice. Surface runoff and sewage treatment works discharges degraded water quality.

Until recently the MoD enjoyed Crown Immunity but discharges are now the subject of control by means of discharge consents. The Agency has requested improvements to the STW, which has now been adopted by Wessex Water and is currently undergoing improvement works. These are expected to be completed in 1999.

Lyneham STW causes RQO and LT RQO failure in Cowage Brook and LT RQO failure in Strings Watercourse. Lyneham STW also causes exceedence of the EC Freshwater Fish Directive standards for salmonids in Cowage Brook.

Runoff from RAF Lyneham causes RQO and LT RQO failure in Cowage Brook and LT RQO failure in Strings Watercourse.

We will continue to negotiate with the RAF to secure improvements in the surface water runoff from the base

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
7.2.1 We will continue to negotiate with Wessex Water to ensure that the necessary improvements to the sewage works are carried out so that consent conditions appropriate to river needs can be applied. Contact: Discharge Consenting Team Leader	Agency	1.5	●	●			
7.2.2 We will also ensure that discharges from the Lyneham sewerage system are investigated and dealt with appropriately. Contact: Environment Protection Team Leader - Upper Avon	Agency	unknown		●	●	●	●
7.2.3 We will monitor surface water discharges from RAF Lyneham and continue to negotiate with the RAF to secure long-term improvements. Contact: Environment Protection Team Leader - Upper Avon	Agency	unknown	●	●	●	●	●

7.3

Issue: The impact of urbanisation on water quality

The Bristol Avon catchment is relatively heavily populated and urbanisation brings particular water quality problems.

Runoff from roads and car parks carries pollutants with it, such as oil residues and litter. Trading estates pose particular problems, with a risk to watercourses from service yard runoff, parking areas and poor pollution prevention measures. A large trading estate such as the West Wilts Trading Estate at Westbury, or the new Cribbs Causeway development may harbour a variety of problems for example, oil and chemical spillages and silt laden runoff. Vehicle washing effluents are often found discharging to the surface water system.

In some cases urban runoff and discharges from trading estates cause or contribute to the failure to comply with RQOs. We will work with planning authorities to ensure that best management practices for surface water runoff control are installed at new developments including adequate silt and oil traps where appropriate.

Urban runoff contributes to RQO and LT RQO failures in the Wellow Brook and RQO failure in the Bristol Frome from Yate to the confluence with the Ladden Brook. We will visit West Wilts Trading Estate (Wellow Brook) and Yate Trading Estates (Bristol Frome) to eliminate polluting discharges and improve pollution prevention.

We have recently been working in partnership with Bristol City Council to produce two detailed plans for local enhancement opportunities - one on the River Trym and the other on the part of the Bristol Frome which lies within the Bristol City boundary. The plans were published in August 1998. Actions will be implemented by the partners as and when funds become available (see Section 7.15.3).

As exemplified in the River Trym and Bristol Frome catchments, where possible we work alongside stakeholders to manage the impact of urbanisation. We try to develop partnerships to identify and implement enhancements by concentrating on site-specific priorities. Recommendations for improvements span the spectrum from major investments through to those of a scale suitable for implementation through direct community action.

Actions	Action By	Cost to Agency (£K)	Financial Year 98 99 00 01 02
7.3.1 We will carry out trading estate pollution control campaigns to reduce drainage related pollution problems Contact: Environment Protection Team Leaders – Upper Avon, Mid Avon and Greater Bristol	Agency	2.5 p.a.	● ● ● ● ●

7.4 Issue: Unknown causes of poor water quality

There are a number of river stretches which were not compliant with their River Quality Objectives (RQOs) in 1997, for reasons unknown to us. The watercourses containing such non-compliant stretches are as follows:

The Leigh-on-Mendip Watercourse	By Brook
Broadmead Brook	Doncombe Brook
Rivers Brook	Brinkworth Brook
Hancocks Water	Wellow Brook
Honeyball Watercourse	Somerset Frome
Avon	Gauze Brook
Charlton Stream	Tetbury Avon
Luckington Brook	Salters Brook
Rodbourn Brook	Sherston Avon
River Boyd	

We will investigate the causes of non-compliance and take appropriate action with significant non-compliance taking priority over marginal non-compliance.

Actions	Action By	Cost to Agency (£K)	Financial Year 98 99 00 01 02
7.4.1 Investigate cause of non-compliance on the Leigh-on-Mendip watercourse, By Brook, Broadmead Brook, Doncombe Brook, Rivers Brook, Brinkworth Brook, Hancocks Water, Wellow Brook, Honeyball Watercourse, Somerset Frome, Avon, Gauze Brook, Charlton Stream, Tetbury Avon, Luckington Brook, Salters Brook, Rodbourne Brook, Sherston Avon and River Boyd. Contact: Environment Protection Team Leader - Upper Avon, Mid Avon and Greater Bristol	Agency	unknown	● ●

7.5

Issue: The impact of low flows on water quality

Low flows may have an effect on water quality, primarily through their effect on reducing levels of dissolved oxygen in the water.

Low flows may have contributed to RQO and LT RQO failures in the following watercourses: River Avon, Somerset Frome, Leigh-on-Mendip Watercourse, Nunney Brook, Wellow Brook, Honeyball Watercourse, Brinkworth Brook, Luckington Brook and Sherston Avon.

Low flows caused exceedences of the EC Fresh Fish Directive standard for salmonids in the Somerset Frome and Tetbury Avon and contributed to exceedences of the EC Fresh Water Fish Directive standard for salmonids in the River Avon and Bulkington Drove Watercourse. The Bulkington Drove Watercourse has recently been classified as a cyprinid watercourse (see Section 3).

Low flows generally occur naturally due to reduced rainfall and warmer temperatures in the summer. This effect is particularly pronounced in winterbournes (streams with little or no flow in summer which often rise in, or flow over, permeable rock such as Chalk, Greensand or Carboniferous Limestone).

This is a natural effect and so we are unable to take action in the case of most of the above streams which are winterbournes. However we will explore possibilities for ensuring compliance in those streams which are not winterbournes, where non-compliance is persistent and not related to climate extremes.

Actions	Action By	Cost to Agency (£K)	Financial Year
			98 99 00 01 02
7.5.1 We will investigate the possibilities for ensuring RQO compliance in non-winterbourne low flow streams Contact: Environment Protection Officer - Upper and Mid Avon	Agency	unknown	

7.6

Issue: The impact of sewerage and unsewered areas

Discharges of raw, partially treated or dilute sewage and waste water from public sewers or private sewage arrangements may cause or contribute to RQO failures and poor amenity of watercourses in some areas.

Unsewered Areas - There are many rural areas where main drainage sewers do not exist and domestic sewage is treated satisfactorily by individual treatment plants, septic tanks or contained in cesspits. However, septic tank soakaways do not work well in certain soils and are a problem at the following locations where they affect amenity:

- South Wraxall
- Bushton
- Beanacre
- Chewton Mendip/Litton

At South Wraxall and Chewton Mendip/Litton, Wessex Water are proposing to construct secondary treatment systems. At Beanacre we will carry out a survey to establish the extent to which septic tank discharges are affecting water quality.

Septic tanks may contribute to RQO failure in the Broadmead Brook (see Action 7.4.1).

Combined Sewer Overflows - In urban areas where sewage and surface water is carried to the treatment works in combined sewers there are consented overflows originally designed to operate only in storm conditions. Some of these overflows operate prematurely due to overloading or sewerage infrastructure faults.

Many such problem overflows have already been identified by the Drainage Area Surveys carried out by Wessex Water and remedial work has been prioritised by agreement between Wessex Water and the Agency or its predecessors and has been funded under the Wessex Water's Asset Management Plans. For example, a major phased scheme is currently in progress throughout Bath. We will continue to liaise with Wessex Water and prioritise improvements under Asset Management Plan schemes.

Wrong Connections - In urban areas where sewage and surface water are carried in separate sewers, pollution of watercourses occurs when domestic appliances including toilets and washing machines are illegally plumbed into surface water drains instead of to the foul sewer. Wrongly connected appliances also put considerable pressure on the foul sewer system causing overflows to operate prematurely thus causing pollution to watercourses. The problem has been particularly bad in parts of Bristol for example the River Trym, Malago and Brislington Brook catchments.

For a number of years 'Operation Streamclean' jointly funded by Bristol City Council, Wessex Water and the Agency and its predecessors has been working to trace these wrong connections and get them corrected. This partnership initiative has successfully identified over 1000 wrongly connected appliances in Bristol discharging to local watercourses. The Agency will continue to participate in 'Operation Streamclean', funding for which has been secured until March 1999. We will make a bid for further funding each year until there is no more need for the project.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
7.6.1 We will carry out survey at Beanacre to determine effect of septic tank discharges on the watercourse. Contact: Environment Protection Officer – Upper Avon	Agency	2.4	●	●			
7.6.2 We will work with Wessex Water and Bristol City Council on the Bristol Frome to identify wrong connections. Contact: Environment Protection Team Leader – Greater Bristol	Agency	2	●	●			
7.6.3 We will continue to participate in 'Operation Streamclean', funding for which has been secured until March 1999. Success of funding determines the amount of work done each year. Contact: Environment Protection Team Leader – Greater Bristol	Agency	unknown	●	●			
7.6.4 We will implement where appropriate the recent Westbury Trym Action Plan. Contact: Environment Protection Leader – Greater Bristol	Agency	unknown	●	●			

7.7

Issue: The impact of agriculture on water quality

Agriculture is important to the local economy, due to the diverse topography and geology of the area. The nature of agricultural activity varies. Dairy and mixed farming predominate over much of the catchment but there are also areas of arable farming e.g. the Southern Cotswold plain around Badminton and Tormarton. Pig rearing is an important activity carried out intensively indoors in the Melksham/Calne area and outdoors in places on the Mendips.

Point source discharges still occur in places throughout the catchment, though much has been achieved by the Agency and its predecessors over the last 10-15 years in eliminating these discharges. This progress has been helped by the introduction of regulations, past grant aid and improved relations with the agricultural community.

Diffuse pollution and nutrient enrichment from agricultural activity are now more of a problem in the catchment (see Section 7.8 Issue: The impact of nutrient pollution and nutrient enrichment).

Agricultural pollution is or may be causing or contributing to non-compliance with River Quality Objectives (RQOs) and Long Term RQOs in:

the Somerset Frome, Leigh-on-Mendip Watercourse, Nunney Brook, Wellow Brook, River Somer, Somer Brook, By Brook, Broadmead Brook, Doncombe Brook, River Boyd, Worton Stream, Cowage Brook, Rivers Brook, Brinkworth Brook, Hancocks Water and Charlton Stream.

Agricultural pollution is causing exceedence of the EC Freshwater Fish Directive salmonid standard in the Worton Stream and may be contributing to exceedences of the EC Freshwater Fish Directive salmonid standard in the Somerset Frome and Bulkington Drove Watercourse. The Bulkington Drove Watercourse has recently been reclassified as a cyprinid watercourse (see Section 3 Fisheries).

We are planning a survey to determine the cause of RQO non-compliance in the Wellow Brook and River Boyd (see Section 7.4.1).

We will continue to investigate sources of pesticide inputs in the catchment whenever necessary (see Section 7.10 Issue: The need for groundwater quality monitoring).

Soil erosion due to agricultural practice may be giving rise to heavy silt loading on the Bristol Frome (see Section 5.2 Soil erosion). We will continue to investigate potential sources of farm and other pollution and will work with farmers and landowners to control both point source and diffuse pollution and to give advice on best practice. We have funded a partnership with Avon Farming and Wildlife Advisory Group (FWAG) to visit farms in the Midford Brook, Wellow, Somer, and Cam catchments to give advice on best practice for the management of land. We will work in partnership with FWAG and other organisations on best land management practice, diffuse pollution and habitat improvements.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
7.7.1 The Agency will visit all farms in the catchments to inspect effluent disposal facilities and to encourage best practice. Contact: Environment Protection Team Leader – Upper, Mid Avon and Greater Bristol	Agency	unknown	●	●	●	●	●
7.7.2 Farm visits on the Woodbridge Brook/Charlton Stream. Contact: Environment Protection Team Leader – Upper Avon	Agency	6	●				
7.7.3 Farm visits on the Bulkington Drove Stream. Contact: Environment Protection Team Leader – Upper Avon	Agency	1.2	●				
7.7.4 Farm visits on the Worton Stream. Contact: Environment Protection Team Leader – Upper Avon	Agency	1		●			
7.7.5 Farm visits on the Cowage Brook. Contact: Environment Protection Team Leader – Upper Avon	Agency	6		●			
7.7.6 To investigate the role of agricultural sources in the non-compliance with RQOs in the following catchments: Leigh-on-Mendip watercourse, By Brook, Broadmead Brook, Nunney Brook, Somer Brook, Doncombe Brook and Hancocks Water. Contact: Environment Protection Team Leader – Upper Avon	Agency	8	●	●	●		
7.7.7 Investigate role of agricultural sources in the Rivers Brook. Contact: Environment Protection Team Leader – Upper Avon	Agency	2		●			
7.7.8 Investigate role of agricultural sources in the Brinkworth Brook. Contact: Environment Protection Team Leader – Upper Avon	Agency	2		●			
7.7.9 Somerset Frome – visit all farms in the catchment within the next 18-24 months. Contact: Environment Protection Team Leader – Mid Avon	Agency	2	●	●			
7.7.10 We will operate our partnership with Avon FWAG who are advising on best agricultural practice in the Midford Brook, Wellow, Somer and Cam catchments. Contact: Environment Protection Team Leader – Mid Avon	Agency, FWAG	unknown	●	●			

Eutrophication is the accelerated growth of algae and higher plants such as duckweed (*Lemna*), which results from the enrichment of water by plant nutrients – mainly nitrogen and phosphorous. It causes a change in the ecological balance and a deterioration in water quality (particularly dissolved oxygen).

Nutrients enter watercourses from:

- point sources such as sewage treatment works (STWs) and some farm discharges
- diffuse runoff from farmland of excess organic and inorganic fertilisers

Sewage effluents contain nitrogen from the breakdown of human sewage and phosphate of which 30% to 50% comes from detergents and washing powders. Phosphate is the more important nutrient released into freshwater since it is often the limiting factor in promoting plant growth. Up to 30% of phosphate entering freshwater comes from agricultural sources. Phosphate is not removed by conventional sewage treatment. Phosphate stripping is costly and will only be installed at some large STWs as a requirement of the EC Urban Waste Water Treatment Directive (UWWTD).

Evidence of the eutrophic state of the Bristol Avon Chippenham STW to Netham (Bristol) has been considered by a National Environment Agency panel in the light of advice contained within the Department of Environment's Consultation Paper of March 1993 entitled '*Methodology for Identifying Sensitive Areas (Urban Waste Water Treatment Directive) and Methodology for Designating Vulnerable Zones (Nitrates Directive)*'. The panel agreed that the Bristol Avon candidate Sensitive Area satisfied the criteria for eutrophic status. This evidence was confirmed in July 1998 when the DETR designated the Bristol Avon a Sensitive Area under the Urban Waste Water Treatment Directive (UWWTD) and so the following STWs will be required to provide nutrient reduction by the end of 2004:

- direct discharges to the Avon: Chippenham, Saltford, Keynsham, Melksham, Trowbridge, Bradford-on-Avon and
- indirect discharges (those discharges going to a tributary of the River Avon): Calne, Frome, Radstock.

In addition, four further STWs may require nutrient reduction, subject to review in 2001; these are Devizes, Thingley, Westbury and Potterne. Furthermore, data are being collected in support of a new submission (in 2001) which would include extending the upstream boundary of the Bristol Avon Sensitive Area. This submission will investigate the potential requirements for nutrient reduction at Malmesbury STW (a direct discharge to the Avon) and Wootton Bassett STW (an indirect discharge to the Avon).

Within the Bristol Avon Catchment, there are some watercourses which are, or may become, eutrophic and which suffer periodically from algal and duckweed blooms. Such watercourses may require treatment to meet the requirements of the UWWTD and Nitrates Directive. A growing body of biological evidence points to adverse impacts from high levels of nutrients throughout the catchment, including the upper reaches upstream of all UWWTD qualifying discharges.

As there are no large, point sources of nutrients in these upper reaches, the high levels of nutrients are likely to be attributable to the cumulative effects of smaller discharges and diffuse inputs from the land. These inputs may well be intermittent or seasonal, and vary in magnitude and location within the catchment. Diffuse inputs may mask the potential benefits of improvements made in the quality of point source discharges from qualifying sewage treatment works under the terms of the UWWTD. We do not know the size of the impact

of these diffuse inputs to the catchment, which may or may not be greater than those from known point sources.

We will work with farmers and other interested groups to reduce inputs of nutrients from farms and farmland by:

- promoting the creation of buffer strips especially where arable land is close to a watercourse. Financial assistance may be available to landowners from the Ministry of Agriculture, Fisheries and Food (MAFF) Countryside Stewardship Scheme. *Buffer strips are bands of unfarmed land approximately 10 to 100 m wide immediately next to a river which, because of the dense vegetation which develops, absorb some of the excess nutrients in the farmland runoff. A guidance booklet is available from our offices.*
- promoting the MAFF Codes of Good Agricultural Practice for the Protection of Water and Soil;
- influencing and advising those involved in the spreading of waste to land under 'exemptions' from the Control of Pollution Act.
- consulting on and implementing our new national Eutrophication Strategy (Environment Agency (1998) Aquatic Eutrophication in England and Wales – a proposed management strategy – Consultative Report).

Algal blooms contribute to the exceedence of the EC Freshwater Fish Directive salmonid standards in the River Avon and Somerset Frome. Algal blooms also contribute to RQO non-compliance in the River Avon.

Nitrate pollution of both surface and groundwater can reach levels harmful to human health when used as drinking water. Water companies monitor public supplies, local authority environmental health officers monitor private drinking water supplies to ensure that public health standards are met.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
7.8.1 As the Bristol Avon has been designated a Sensitive Area nutrient reduction will be required at the following direct discharges to the Avon: Chippenham, Saltford, Keynsham, Melksham, Trowbridge, Bradford-on-Avon and at the following indirect discharges: Calne, Frome, Radstock. We will work with others to ensure compliance with the UWWTD. Contact: Scientific Officer Reg. Water Quality Planning	Agency, DETR, Wessex Water Services Limited	unknown	●	●	●	●	●
7.8.2 We will continue to assess the ecological impact of excess nutrients on the catchment. Contact: Biology Team Leader	Agency	unknown	●	●		●	
7.8.3 To produce a nutrient budget model for the whole catchment, allowing the size of the input from diffuse sources to be evaluated. Contact: Biology Team Leader	Agency	5		●			
7.8.4 Use the nutrient budget model to target investment if smaller point and diffuse sources are found to be significant. Contact: Scientific Officer Reg. Water Quality Planning	Agency	Dependent on above action					
7.8.5 We will promote the creation of buffer strips where appropriate. Contact: Biology Team Leader	Agency, FWAG, FRCA, Wildlife Trusts	unknown	●	●	●	●	●

7.9 Issue: The impact of agricultural pesticides on white-clawed crayfish populations

There is a threat to white-clawed crayfish populations and other invertebrates from synthetic pyrethroids used as agricultural pesticides.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
7.9.1 We will investigate the extent of the impact of pesticides on crayfish and if appropriate appoint a project officer. Contact: Environment Protection Team Leader – Upper Avon	Agency	10 p.a.	●	●			

7.10 Issue: The need for groundwater quality monitoring

The Agency has a requirement to monitor the quality of groundwater through a number of responsibilities. These include our general duty to monitor pollution of controlled waters, and our responsibility to monitor under the Regulations which implement the EC Nitrate Directive (although the DETR has decided that for the time being the Directive sampling will all come from Water Company boreholes). At present we have no nationally agreed network for groundwater sampling, but studies have been carried out to see what the needs are. The collection of groundwater quality data in the Bristol Avon catchment is at present limited, despite the significant areas of major aquifer that are within it (see Section 2.1 for the importance of groundwater to public water supply).

The effect of this lack of data is that the Agency is not able to comment authoritatively on the state of groundwater, or to note any significant trends in change in quality, which might indicate an adverse effect of human activity.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
7.10.1 We will consider the development of a more rigorous monitoring network, based where possible on existing supply boreholes, in line with the recommendations made by the British Geological Survey in 1994. Contact: Principal Officer Regional Groundwater Protection	Agency, Water Companies	unknown	●	●			

7.11 Issue: The state of the Abberd Brook

There is some local concern about the state of the Abberd Brook. The principal concerns are:

- excessive litter and debris in the watercourse
- channel overgrown with vegetation
- the River Quality Objective (RQO) is set too low

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
7.11.1 We will explore the possibilities for addressing the concerns about the Abberd Brook. Contact: Principal Officer Regional Groundwater Protection	Agency	unknown				●	

7.12 Issue: The need for improved flood defences

Over the years, the Agency's predecessors have instigated many improvement schemes which have provided an adequate standard of flood defence for most of the urban conurbations. Flood Defences in the Bristol Avon plan area are designed to meet the MAFF standard of withstanding a flood with a statistical chance of returning once in a hundred years. Exceptions occur where improvements could not be justified, or communities rejected proposed schemes. The exceptions are: Melksham, Calne, Frome, Chippenham, Chew Magna and Bradford-on-Avon.

Every opportunity is taken to improve defence standards where Treasury rules mean an improvement scheme can be justified. Justification is based on cost-benefit. If a scheme is proposed, and not justified on cost-benefit, it will not go ahead. If a scheme is justified, it might not come high enough on the MAFF priority list for grant aid. The scheme will then require some other funding. Where defences are currently below standard, the Agency can link funding with development proposals such as those currently in Melksham, Calne and Frome, or by setting up a partnership for bidding for other funds where there are significant environmental benefits, as in the River Green Project for Chippenham.

The Agency cannot force a scheme on a community. Various options for improvement schemes were drawn up for Bradford-on-Avon and Chew Magna. Public meetings were held with parish councils and the local community rejected the proposed improvement schemes. The community of Bradford-on-Avon wanted no disruption to their park, however temporary. At Chew Magna, the Agency proposed a scheme to stop floods which was rejected at the public meetings.

7.13 Issue: Flood warning

Warnings are issued by direct contact and via local radio. Recorded information on current flood warnings is also provided. Leaflets are also available from Agency offices, which fully explain the flood warning service.

Where flood defence schemes cannot be justified, the Agency seeks to improve its flood warning arrangements. Following the severe floods of Easter 1998, the Government instigated an independent review of events, the Bye Report. This recommended that improvements to the flood warning service in the Region should be made totalling £1million. We are carrying out a Regional review of our flood warning service which will identify the priorities and appropriate funding for the Bristol Avon catchment.

Actions	Action By	Cost to Agency (£K)	Financial Year 98 99 00 01 02
7.13.1 As part of the Regional study we will review Flood Warning and decide priorities for improvement in the Bristol Avon area. Contact: Flood Warning Manager	Agency,	1 million p.a. for the South-West Region	<div>● ● ● ● ●</div>

By June 1999, a Flood Warning Standards of Service (SoS) study will have identified what is at risk, and its level of protection throughout the Region. Future priorities for flood warning improvements will be set by a strategy based on the study's results.

7.14 Issue: Major Incident Plans

A later stage of the Agency's Flood Warning Dissemination Project is to produce, in conjunction with local authorities and emergency services, Major Incident Plans for urban areas protected by flood defences. The plans are funded by the Agency, but owned by the local authority. We will contribute to Major Incident Plans for Bath and Bristol which are planned to be in place by the end of 1998.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
7.14.1 Locations for Major Incident Plans in Wiltshire are being considered by the local authorities. Once locations are decided we will contribute to those plans. Contact: Flood Defence – Team Leader Projects	Agency	Dependent on Wiltshire County Council decisions					

7.15 Issue: River rehabilitation and channel management

Since the 1940s, land drainage schemes and intensive farming have drained most of the wetlands and in many places reduced the river corridor to a thin strip of bankside cover. This has reduced habitat diversity and channel shading and increased the amount of pesticides and nutrients reaching the river. We will promote buffer strips where appropriate, to reduce the amount of nutrients, silt and livestock waste entering the river and to improve habitat diversity and landscape value (see Section 7.8 Issue: The impact of nutrient pollution and nutrient enrichment).

Over the long term we wish to rehabilitate rivers by restoring river corridors and their functional floodplains to a more natural state, which will improve both their landscape and habitat diversity.

We will maintain and restore the biodiversity of rivers and streams in line with the South West Regional BAP. Rehabilitation will enhance the fisheries, ecology and landscape value of rivers and their corridors and may reduce the need for flood defence maintenance, improve water quality, and improve access to the river corridor. We are undertaking enhancement schemes on the Semington Brook (see Section 11.1.10, 'Make a Difference' environmental improvement projects).

Rivers can provide attractive landscapes in our towns but development has often resulted in built-up urban riversides. Town centre flood defence schemes such as those at Bitton, Bath and Frome have resulted in artificial channels which are unsympathetic to ecology and the landscape. We will continue to seek enhancement opportunities related to developments and local initiatives and to develop restoration schemes for some of the worst affected rivers in partnership with local authorities, developers and riparian owners.

We will also seek to be involved in collaborative projects which improve the habitat, water quality and amenity value of degraded streams in urban areas. Our success depends on the goodwill and co-operation of riparian owners and the support of other organisations such as local authorities, wildlife trusts, Countryside Commission, Farming and Wildlife Advisory Group (FWAG), local community and interest groups. An example is the Avon Valley Partnership.

Most river control structures are visually intrusive, and act as impassable barriers to fish (see Section 3.1 Issue: The need for fish passes at major obstructions). These structures can also act as silt traps, slow down flows and promote the growth of algae and aggressive water plants. We will continue our presumption against any further impoundments, whilst still considering any proposals on their

individual merits. We would not expect to permit an impoundment without mitigating works such as a bypass channel and fish pass. We will also examine options for altering and removing such structures to restore a more natural flow regime and improve habitat diversity. Examples include a stepped weir at Bitton on the Boyd and redesigning Abbey Mill on the Tetbury Avon. We will continue to advise and work with riparian owners with regards to best practice for the operation of control structures.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
<p>7.15.1 We will develop a five-year plan of priority sites for river restoration and prepare schemes for Make a Difference (MAD) project funding. See list of MAD projects in Protection through Partnership Section 11.1.10</p> <p>Contact: Conservation Team Leader /Project Officer</p>	Agency (see 5.1.2)	10-20 p.a.	●	●	●	●	
<p>7.15.2 With partners, we will continue to implement the Bristol Frome Action Plan, as funds become available (Ladden Brook Phase 3).</p> <p>Contact: Conservation Team Leader /Project Officer</p>	Agency, local authority	10 p.a.	●	●			
<p>7.15.3 We will contribute to a collaborative project with Bristol City Council to implement Bristol City Frome Action Plan and Hazel Brook and River Trym enhancements.</p> <p>Contact: Conservation Team Leader /Project Officer</p>	Agency, Bristol City Council, Forest of Avon, FWAG	20 p.a.		●	●	●	●
<p>7.15.4 We will continue to support the work of the Cotswold and By Brook Countryside Management Project.</p> <p>Contact: Conservation Team Leader /Project Officer</p>	Agency, Wiltshire Wildlife Trust, MAFF/FRCA, North Wiltshire District Council, English Nature	6 p.a.	●	●	●		
<p>7.15.5 We will continue to enhance the fisheries, ecology and recreation value of Semington Brook.</p> <p>Contact: Conservation Team Leader /Project Officer</p>	Agency	(see section 11.1.10) 25 total	●	●	●		
<p>7.15.6 We will identify river control structures for the feasibility of removal/redesign.</p> <p>Contact: Fisheries Team Leader/Project Officer</p>	Agency, riparian owners	18 total	15	3			
<p>7.15.7 We will work with our partners and industry to enhance degraded landscapes on sections of urban streams via the South Bristol Streams Project.</p> <p>Contact: Conservation Team Leader/ Project Officer</p>	Agency, Avon Wildlife Trust, Bristol Environment and Energy Trust, Allied Dominic and local industries	unknown		●	●		

7.16

Issue: Phytophthora

Alder trees are often abundant along watercourses, where they provide valuable cover for wildlife and their roots help to stabilise the bank. In 1993 it was discovered that alder roots can suffer from a fatal disease caused by a fungus called Phytophthora. Affected trees produce few, small, yellow leaves which often fall off early. The trunk of an infected tree often has tarry or rusty spots. These spots indicate that the bark is dead and that the tree is dying.

Phytophthora is of particular concern in this catchment due to the very large riparian alder population. We are seeking to establish the extent of this problem and to identify management options.

We are aware that a high proportion of alders on the Avon between Bath and Bristol are infected. The disease has also been recorded on the Frome and the Wellow Brook, which are both dominated by alder. A wide scale spread of this disease would have a dramatic effect on the landscape and decrease the habitat and cover available for wildlife. Loss of riparian alders may also result in bank erosion problems.

There is very little information on and experience of the management of Phytophthora, since it is a relatively new problem. The Agency and the Forestry Commission have produced a leaflet explaining the disease and giving guidelines for managing infected riparian alders. We will use this leaflet and other means to promote awareness of the disease. The Agency and the Forestry Commission would also like to know of new sightings of the disease.

We will monitor the distribution and status of the disease and assess its long-term impact and take remedial action when required. This may involve the planting of native trees: to replace lost alders in order to maintain bank stability and to provide wildlife habitats. Future management may also involve coppicing of dangerously diseased trees.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
7.16.1 To establish the extent of the problem, we will survey the alders of the Upper Bristol Avon catchment. Contact: Conservation Team Leader	Agency,	2.5	●	●			
7.16.2 We will identify management options, once the outcome of research into disease transmission is known. Contact: Conservation Team Leader	Agency, Forestry Commission	unknown	●	●	●		
7.16.3 We will formulate a management programme for bank side alders in partnership with others. Contact: Conservation Team Leader/Project Officer	Agency, Forestry Commission Forest of Avon, FWAG, Local Authorities, Avon Valley Partnerships and Wildlife Trusts	unknown	●	●	●	●	●
7.16.4 We will undertake remedial action where and when appropriate. Contact: Conservation Team Leader	Agency, Forestry Commission	unknown	●	●	●	●	●

7.17

Issue: Alien invasive plants

Japanese knotweed, giant hogweed and Himalayan balsam were introduced to Britain in the nineteenth century for ornamental reasons. These species have become aggressively dominant along road, rail and river corridors where human activities have aided their dispersal. They have become problematic along river corridors where they shade out native vegetation, increase river bank erosion following autumn die back, decrease flood storage capacity and devalue biodiversity. Giant hogweed is also a health hazard. Under the Wildlife and Countryside Act, 1981 it is an offence to plant or cause Japanese knotweed and giant hogweed to grow in the wild.

In 1997, we commissioned a study of the distribution and status of alien invasive plant species in the Lower Bristol Avon catchment with recommendations for appropriate management. We are undertaking a similar survey of the Upper Bristol Avon.

Japanese knotweed has a fragmented distribution within the Lower Bristol Avon and is often found in dense stands within the urban areas of Bristol, Bath and Frome. Its dispersal has been assisted by the movement of soil containing fragments of the plant. Through the planning process we will encourage developers to control Japanese knotweed at infected sites.

Many rivers are affected by Himalayan balsam, with extensive populations on the Bristol Avon, Bristol Frome and the Chew. Water is important for its dispersal and therefore this species is strongly associated with riparian habitats and tends to colonise downstream sites rapidly. It has not yet colonised the upper tributaries of this catchment, all of which are of high conservation value.

Giant hogweed does not appear to be a particular problem in the Bristol Avon at present. We will continue to monitor this problem and recommend appropriate control measures.

Accurate information on the distribution and status of alien species is the key to successful management. We will develop a management strategy, by establishing links with other interested parties to tackle the extensive problem of alien invasive plant species in the catchment.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
7.17.1 We will carry out a status and distribution survey of alien invasive plants in the Upper Bristol Avon catchment. Contact: Conservation Team Leader	Agency	2.5	●	●			
7.17.2 We will continue to monitor the distribution and status of invasive alien species. Contact: Conservation Team Leader	Agency	2 p.a.		●	●	●	●
7.17.3 We will set up a management group for Japanese knotweed, to identify management options and control mechanisms. Contact: Conservation Team Leader/Project Officer	Agency, English Nature, Local Authorities, Environmental Records Centre, Wildlife Trusts, British Trust for Conservation Volunteers (BTCV), Forest of Avon, Forestry Commission, Angling clubs	5 p.a.		●	●	●	●

The Bristol Avon river corridor is accessible to the large population of the area and is being increasingly used for recreation, such as walking, cycling, recreational boating and angling. There is great potential to develop and improve routes by waymarking and the provision of interpretation facilities. We will promote safe and environmentally sustainable recreation within the river corridor where appropriate by working with local authorities and others. We will work to ensure that local authorities include appropriate policies in their Local Development Plans.

The main Avon from just above Bath to Bristol is particularly heavily used. Conflicts of interest do arise. The Agency is not the navigation authority for any part of the Bristol Avon. We will work with other organisations to try to resolve conflicts between users and seek ways to reduce the environmental impact of boating by participating in the River Avon Users Consultative Committee. We encourage canoeists to join the British Canoe Union (BCU) and thus benefit from access agreements. The Agency will liaise with the BCU and angling clubs to increase access arrangements, where appropriate. There are at least sixteen affiliated canoe clubs in the catchment area, and at least three outdoor centres specialising in canoeing. All these along with many other youth organisations like Scouts and Guides and educational groups provide a considerable number of outdoor experiences for young people in canoeing.

We recognise that some canoeists enjoy the moving water and drops associated with weirs, fish passes and sluices but such activity is potentially dangerous. We will consider proposals from the BCU or canoe clubs to modify structures or channel shape, as well as considering the views of all other interested parties. Health and safety matters will be a high priority.

The Kennet and Avon Canal is a major recreational and amenity resource which is managed by British Waterways (BW). We monitor its water quality and work with British Waterways to improve water quality where possible. British Waterways is the lead organisation in a project to complete the restoration of the Kennet and Avon Canal and improve visitor facilities. The Partnership comprises all the riparian local authorities, the Kennet and Avon Canal Trust, and ACE – an organisation representing over 50 waterside businesses. The project will be carried out in accordance with a Conservation Plan published in early 1999, agreed by the Countryside Commission, English Nature (EN) and English Heritage.

We support the popular activity of angling largely through our work to maintain and improve fisheries (see Section 3).

We are a partner in the Avon Valley Partnership which will provide a towpath route along the Avon. The towpath will provide access for all users and a sustainable transport route between districts. The project will also raise awareness of and improve the river corridor by habitat enhancements, waymarking and the provision of interpretation facilities.

Early in 1998 the Countryside Commission, in conjunction with the Environment Agency and Bath and North East Somerset Council, commissioned a review of the recreation and conservation issues in the Bristol Avon Valley. It was recognised that there are many projects, initiatives and organisations associated with the area and that a strategic overview of their objectives and activities was necessary to optimise effectiveness and co-ordination. The review indicated clear benefits for the various groups and organisations in:

- developing guiding principles that all could follow to achieve mutual benefits
- sharing information

- identifying opportunities for collaborative projects for funding and networking

Cycling is a growing activity nationally and there is significant demand in the catchment. Examples of initiatives developing in the catchment are:

- The Chippenham Rivergreen project, which aims to enhance three miles of river corridor through Chippenham and to provide a riverside cycleway/footpath which will link into the national Sustrans network. Sustrans is a national group committed to providing a network of cycle routes throughout the country.
- A similar initiative is also being developed between Bath and Devizes with Sustrans.

The Agency owns very little land along the Bristol Avon but we will review the recreational potential of the land we own. We will balance the need for recreation with our duty to safeguard the river environment and to conserve wildlife.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
7.18.1 We will support the work of North Wiltshire District Council in promoting the Chippenham RiverGreen Project. Contact: Conservation Team Leader/Project Officer	Local authority (North Wiltshire District) Council, Cyclists Touring Club, Agency, Lottery, local business	-	●	●	●		
7.18.2 We will continue our involvement with Avon Valley Partnerships. Contact: Conservation Team Leader/Project Officer	Bristol City Council, South Gloucestershire Council, Agency, Forest of Avon, community groups	unknown	●	●			
7.18.3 We will work with others to improve the footpath in the Frome Valley walkway as part of the Bristol Frome Action Plan. Contact: Conservation Team Leader/Project Officer	Local authority, Agency, riparian interest and community groups	unknown	●	●			
7.18.4 We will review recreational and educational potential of Agency land at Pulteney Weir. Contact: Conservation Team Leader	Agency	unknown	●	●			
7.18.5 We will liaise with local planning authorities to ensure appropriate policies are included in Local Development Plans and Community Plans. Contact: Conservation Team Leader	Local authorities, Agency	unknown	●	●	●	●	●

Following prolonged and heavy rainfall events, sewage debris and litter is left stranded in riverside trees and other vegetation along the River Avon downstream of Bath and also along the Bristol Frome from Iron Acton to Bristol. The problem is particularly noticeable downstream of Bath and as far as Conham, Bristol, and gives rise to complaints from river users.

The City of Bath, in common with other older towns and cities has a combined drainage system. In past centuries both foul water and clean surface water were directed to the River Avon and tributary streams in the same sewers. At the turn of the century interceptor sewers were built to take sewage away from the river to a treatment works at Saltford. The sewage works would not be expected to treat an unlimited volume of dilute sewage that would be generated by a combined system during storm events. Provision is therefore made in combined systems for dilute sewage to overflow into watercourses which would be expected to be in spate conditions and to offer considerable and adequate dilution. Monitoring demonstrates that fair chemical water quality is maintained in the River Avon through Bath despite there being over 100 such combined sewer overflows (CSOs). Improvements to CSOs often require considerable capital expenditure. Wessex Water have already made improvements to some CSOs. This work was part of a programme of overall improvements for the Bath sewerage system included in their Asset Management Plan 3 (AMP 3) spending plans. We are pressing for the maximum progress possible to be included in the forthcoming AMP4 plan to bring about the earliest relief from this problem.

Plastic debris is particularly noticeable stranded on vegetation after spates. The main sources of this debris appear to be:

- sanitary items which have reached the river via CSOs,
- plastic bags and packaging materials that have been thrown, blown or washed into the river, from surrounding land.

The Agency has no direct responsibility for the control of litter, which falls to the local authorities and riparian owners. The local authority is often the riparian owner through towns and cities. Although we own very little land next to the Bristol Avon we will explore ways of controlling and removing litter at the sites we own. However, as resources allow, we will work with others to explore possibilities for reducing the amount of debris and litter reaching the river at the worst affected locations. We will trial the removal of debris at the Twerton (Bath) structures.

The 'Bag it and Bin it' campaign which was promoted to discourage the disposal of sanitary items via the sewerage system will be re-started. Potential partners are: Wessex Water, Bath and North East Somerset Council, local businesses and angling clubs.

Some litter or debris is fly-tipped into watercourses and this is dealt with in a separate issue see (Section 6.1).

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
<p>7.19.1 We will develop and implement strategies for dealing with litter on Agency owned land and property. Contact: Environment Protection Team Leader – Upper, Mid Avon and Greater Bristol</p>	Agency,	1					
<p>7.19.2 We will liaise with local authorities, other organisations and local groups, in the Bath area to explore possibilities for litter control. Contact: Environment Protection Team Leader – Mid Avon and Greater Bristol</p>	Agency, local authorities, local organisations and community groups	1					
<p>7.19.3 We will re-start the 'Bag it and Bin it' campaign in co-operation with Wessex Water. Contact: Environment Protection Team Leader – Upper, Mid Avon and Greater Bristol.</p>	Agency, Wessex Water	unknown					

For a summary of our statutory duties, powers, and interests please see Section 12.4

8. Major Industry

One of the Agency's key responsibilities is **Integrated Pollution Control (IPC)**. This process aims to prevent pollutants from major industrial processes being released to the air, water and land. Where releases do occur, we try to make sure they are minimised and made harmless. Regulations made under Part 1 of the 1990 Act identify industrial processes that use or produce potentially harmful substances in significant amounts - known as prescribed processes and substances. Broadly, these are the industrial processes with the greatest potential to cause pollution. The UK was one of the first countries in Europe to introduce such an integrated regulatory system, and many individual processes have now been authorised. A similar approach will be introduced throughout the European Union under the new Integrated Pollution Prevention and Control Directive, which must be transposed into UK law by 31 October 1999.

The IPC approach to pollution control considers releases to all three media (air, water and land) from industrial processes in the context of their effect on the environment as a whole. The option minimising impact on the environment as a whole is known as the best practicable environmental option (BPEO). Guidance on how to conduct such an appraisal is provided in the Agency's free publication '*Best Practicable Environmental Option Assessments for IPC: A Summary*'.

In addition, processes have to use the best available techniques not entailing excessive cost (BATNEEC) to prevent or minimise releases of prescribed substances into the environment and render all substances harmless.

Before IPC was introduced, releases of prescribed substances to the different environmental media (air, water and land) were dealt with under distinct sets of rules, enforced by separate regulators. This meant that industries barred from releasing hazardous pollutants into one environmental medium (such as to water in the nearest river) might be able to divert them into another medium where perhaps less stringent rules applied (such as to air by burning or to land by burying them). There was no means of ensuring that industry acted in the way that caused least harm to the environment as a whole.

For prescribed processes, control of releases to air, water and land have now been brought under a single regulatory scheme IPC - so the effects of these processes on the environment as a whole are properly considered. The system makes the effectiveness of IPC doubly sure by targeting entire industrial processes or sectors - not just listed substances - for systematic regulation.

Where an IPC authorisation does not cover the whole of a site, operators may also be subject to separate regulatory permits for aspects of Waste and Water Quality. However, the amalgamation within the Agency of the responsibility for regulations governing those aspects as well as IPC has been a further significant step in ensuring a consistent approach to environmental management.

Some major industry is not covered by IPC and local examples include limestone quarrying and the dairy/food industry. We regulate their discharges to water by issuing consents which restrict the type and amount of pollutants which can enter a watercourse.

The Environment Agency is the enforcement authority for England and Wales of the **Radioactive Substances Act (RSA) 1993**. This statute is concerned with the keeping, use and disposal of radioactive substances and, in particular, the regulation of radioactive waste disposal.

There are four types of authorisation under the Radioactive Substances Act 1993:

- Open Radioactive Source – radioactive material in a form that may be divided (for example, diluted). They include radioactive powders, gases, solutions or solids. There is potential for contamination of other materials.
- Closed Radioactive Source is firmly incorporated, or sealed, in solid, inert, non-radioactive material which prevents the dispersion of any radioactive material. Closed sources include foil or electro-deposited materials. They normally consist of one or more radionuclide.
- Mobile Radioactive Apparatus means apparatus, equipment, appliance or other radioactive material which is either constructed or adapted for being transported from place to place and used for testing, measuring or otherwise investigating any of the characteristics of a substance or article or used for releasing radioactive material into the environment or introducing it into organisms.

There are 99 closed or open sources, 16 sites holding mobile sources and 9 'accumulate and dispose' sites (listed below).

Sites authorised to accumulate and dispose of radioactive waste

- MOD, RNSA Copenacre, Hawthorn, Corsham, Wiltshire, SN13 0PW
- United Bristol Healthcare Trust, Bristol General Hospital, Guinea Street, Bristol, BS1 8EL
- Microbiological Research Authority, Public Health Laboratory, Myrtle road, Bristol, BS2 8EL
- United Bristol Healthcare NHS Trust, Bristol Oncology Centre, Horfield, Bristol, BS2 8ED
- Southmead Health Services NHS Trust, Southmead Hospital, Westbury on Trym, Bristol, BS10 5NB
- Frenchay Healthcare NHS Trust, Frenchay Hospital, Bristol, BS16 1LE
- Royal United Hospital NHS Trust, Royal United Hospital, Combe Park, Bath, BA1 3NG
- University of Bristol, Woodland Road Bristol

8.1

Issue: The impact of quarrying and sand extraction

The Bristol Avon area is an important area for mineral extraction. The Mendips are one of the most important sources of hard limestone in Britain. There are also many limestone quarries in South Gloucestershire and sand is extracted in the Calne/Compton Bassett area.

Water quality problems can arise due to contamination during dewatering of quarries and sand pits, vehicle and wheelwash effluents, mud carried out onto roads from vehicle wheels, and the effect of rain on dust deposits.

Consent standards may require tightening to ensure that discharges from the sandpits at Compton Bassett do not cause failures of River Quality Objectives/EC Directives for the Honeyball Watercourse/Rivers Brook.

Improvements to dust and effluent control may be required at some Mendip quarries to ensure that suspended solids levels in local streams are kept to acceptable levels to help conserve their wildlife. The Mells Valley which drains an area of quarrying is a high biodiversity area and needs all our efforts to maintain this status.

Quarrying may be contributing to RQO failure in the Leigh-on-Mendip watercourse and sand and gravel extraction may be contributing to RQO and LT RQO failures in Rivers Brook.

We will continue to set and monitor appropriate consents for point source discharges from quarries and sandpits. We will continue to participate in the Mendip Quarries Environmental Monitoring Group.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
8.1.1 We will investigate the impact on water quality of mineral extraction sites and depending on the outcome, review and revise consents as necessary. Contact: Environment Protection Team Leader – Mld Avon	Agency	1.2					

8.2

Issue: The impact of industry

Industry in the area is diverse. Light engineering of all descriptions is widespread and the packaging and printing industry is well established in Bristol and the Midsomer Norton area. The dairy/food industry is particularly well represented.

Not all industry generates effluent and many effluents that are produced are directed to foul sewers and receive treatment at the many local sewage treatment works operated by Wessex Water Services Ltd.

We do, however, give a number of industrial sites consents to discharge treated effluent or cooling water to a watercourse. These include creameries, and a poultry processing plant.

Currently there are no significant compliance problems at these sites but we carry out regular routine monitoring of effluent quality. Consents for some of these sites may need to have conditions tightened in the near future to ensure that River Quality Objectives (see Section 5) can be maintained; negotiations will be carried out with dischargers as appropriate.

As many of these sites have the potential to cause significant pollution due to contaminated surface water runoff all major industrial sites also receive regular

pollution prevention visits from Agency staff where inspections are carried out and advice is given on issues such as the storage of chemicals.

We will continue to monitor consented discharges from industrial sites to review consents as appropriate and to visit sites regularly to give pollution prevention advice.

The impact of industry has the following effects:

The food processing plant at Webbs Country Foods, Sutton Benger did not always comply with its discharge consent in the past and this has resulted in RQO non-compliance in the River Avon. However, a new effluent treatment plant has now been installed and we are currently reviewing the plant's discharge consent. In addition, surface water runoff from the food processing plant at Webbs Country Foods may have caused LT RQO failure in the Sutton Benger Brook.

The St Ivel Dairy Processing plant may contribute to RQO failure in Hancocks Water. A fertiliser treatment plant at Urchfont may contribute to RQO failure in the Worton Stream and a paper mill may contribute to RQO failure in By Brook. Incidents at Ushers Brewery may have caused RQO failure in the River Biss.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
8.2.1 We will make regular pollution prevention visits to major industrial sites. Contact: Environment Protection Officer – Upper Avon	Agency	0.8 p.a.	●	●	●	●	●
8.2.2 We will review the consent to discharge for Webbs Country Foods, Sutton Benger and if necessary revise it. Contact: Discharge Consenting Team Leader	Agency	1	●	●			
8.2.3 We will investigate the causes of River Quality Objective failure in the Hancock's Water and take appropriate action. Contact: Environment Protection Team Leader – Upper Avon	Agency	1	●	●			

8.3

Issue: The impact of tyre burning at Blue Circle Cement, Westbury

We have authorised a trial by Blue Circle Cement, at their Westbury Works, whereby whole scrap tyres will be used as a substitute fuel in place of up to 40% of the pulverised coal fuel.

Burning of scrap tyres has been previously trialled twice at the Westbury works during 1996, when up to 20% of the coal fuel was substituted. A substantial reduction in the principal process pollutant, oxides of nitrogen (NOx), was demonstrated. However, increased levels of sulphur dioxide were emitted from the process during the second trial when the addition of whole tyres was carried out in conjunction with cement kiln dust recycling. An application for authorisation to burn tyres on a continuous basis was withdrawn by the company when it became clear that a further trial would be necessary.

The determination of the application for trial was carried out in accordance with our procedure outlined in the draft Substitute Fuels Protocol recently published for consultation (SF protocol). The protocol sets out rigorous technical standards which must be followed. It also requires an enhanced consultation procedure.

We issued a public consultation document to explain the application, the main issues involved and our role in determining the application. Copies of this

document were placed on the public registers and sent to statutory and non-statutory consultees as required by the SF protocol. Two public meetings were held on 23 October 1997 and 19 February 1998 to hear local views on the application. Representations reflected that this was a contentious licence application. Extensive representations were received from the local campaign group - The Air That We Breathe Group.

The trial started on the 1 June 1998. However, on the 11 June we suspended the trial with an enforcement notice following a breach of the process authorisation. Monitoring records revealed that a process temperature limit had been exceeded and that we had been neither consulted nor informed within 24 hours of the breach.

To date, the trial remains suspended. It will not be allowed to resume until we are fully satisfied that sufficient steps have been taken by the company to remedy matters detailed in the notice. Details are on the public registers should anyone require further information. If there are any significant developments in the above situation, we will ensure consultees and the public are notified.

A number of representations express concern at the safety of cement manufacture, whether or not scrap tyres are being used.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
8.3.1 We will encourage the Government to undertake the epidemiological studies requested by the House of Commons Select Committee on the Environment Contact: IPC Inspector	Agency	unknown					

8.4

Issue: The impact of Premiere Environmental Ltd

On 26 March 1997 we served a suspension notice on Premiere Environmental Ltd of Westbury for a waste solvent solidification process after chemicals overheated on 14 March 1997. Over 20 people reported being affected by the fumes. Further reports of chemical emissions were also made from 22 to 24 March 1997.

We served a further notice on 26 March requiring the company to reduce the volume of waste stored on the site and to remove old waste from the site to comply with limits set on the waste management licence for the site. The company has now complied with the requirement to reduce the volume of waste stored on site.

We have continued to work with the company and allowed the company to conduct a trial of the method of processing solvent based waste. The trial took place on 2 May and was monitored by a specialist independent consultant. The suspension notice was re-imposed after the day-long trial.

Premiere Environmental appealed against the suspension notice in December 1997 to the Secretary of State for the Environment, and the public hearing to determine the appeal started on 6 January 1998. The Secretary of State subsequently dismissed the appeal and has supported our actions at the site.

The company has now installed a Thermal Oxidiser to abate emissions of volatile organic compounds from its waste solidification process, a process which is still subject to the suspension notice. We have authorised trials to assess the ability of this new abatement equipment. The trials are subject to stringent conditions. These include giving us due notice of any trials, the constant monitoring of stack emissions during a trial and immediate cessation of the trial if the abatement

equipment proves ineffective. The trials are extensive and designed to determine the impacts of different waste materials on the oxidiser's ability to abate emissions.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
8.4.1 We will continue to regulate and monitor the site to ensure that human health is not harmed nor the environment polluted. Contact: Environment Protection Team Leader	Agency	unknown	●	●	●	●	●
8.4.2 We will work with the company to ensure that new abatement equipment for the solvent solidification process is effective. Contact: Environment Protection Team Leader – Mid Avon	Agency	unknown	●	●	●	●	●

For a summary of our statutory duties, powers, and interests please see Section 12.4

9. Air Quality

In March 1997 the Government published a national strategy for air quality including:

- a framework of standards and objectives for the pollutants of most concern;
- a timetable for achieving objectives and the steps the Government is taking;
- the measurements it expects others to take to see that objectives are met.

We will be working closely with local authorities to help achieve the objectives of the National Air Quality Strategy, principally through our regulation of emissions to air from controlled ('Part A') major industrial processes under Integrated Pollution Control (IPC) (see Section 8 Major Industry). Local authorities are responsible for the regulation of smaller, less complex ('Part B') industrial processes and reducing traffic pollution.

Air quality standards are prescribed in regulations made by the Government and obligations placed on local authorities regarding the establishment and operation of local air quality management areas. Local authorities will have to carry out periodic reviews of air quality in their areas. Where standards are not being met or are not likely to be met they will make action plans to improve air quality in these areas. Bristol City Council have produced their first action plan for local consultation. Local authorities have the major responsibility for managing air quality.

Ambient concentrations of smoke and sulphur dioxide have generally declined in the UK as a whole over the last 20 years. Similarly, both the quantity released and the concentration of lead in the atmosphere at roadside sites has declined since the mid 1980s following the introduction of lead free petrol. However, the release of some pollutants such as nitrogen oxides (NO_x), carbon monoxide (CO) and volatile organic compounds (VOCs) have remained relatively constant during this period, although there may have been changes in their source. For example, releases of oxides of nitrogen from industrial sources have generally declined whilst emissions from road traffic have increased. Planned development in the area will lead to an increase in vehicle movement and therefore increase the amount of polluting discharges, especially oxides of nitrogen. With the exception of ground level ozone, ambient levels of these pollutants are generally lower in the South West of England than in many other parts of England and Wales.

All combustion processes in air produce oxides of nitrogen, mainly nitric oxide (NO). Nitric oxide however often reacts with ground level ozone, creating nitrogen dioxide (NO₂) and oxygen (O₂). Nitrogen dioxide is a gas which exacerbates respiratory illnesses. Both nitric oxide and nitrogen dioxide are indirect greenhouse gases, and are known collectively as NO_x.

Road transport accounts for 46% of the UK emissions of NO_x. Other large producers are the electrical power generation industry 22%, other industry and commerce 12% and domestic sources 2%.

In cities the proportion of total NO_x emissions which comes from vehicles increases dramatically. Studies done in London in 1993 and recently in the West Midlands attribute 76% and 85% respectively of NO_x emissions to vehicles. It is likely that similar figures are reached in Bristol.

Various EC legislation, EPAQS (Expert Panel on Air Quality Standards) and the World Health Organisation have set standards for different measures of NO_x emissions, and the UK Government has decided to accept an hourly mean of 150 parts per billion as the standard for nitrogen dioxide, with the achievement of the value by 2005 as a provisional objective. The Government has also decided to adopt a further provisional objective of 21 parts per billion as an annual mean to be achieved by 2005.

In order to meet these standards, reductions in NO_x emissions from road transport of the order of 48-62% will be required on 1995 levels in background urban locations and perhaps in excess of 70% at roadside locations.

We will help achieve the targets of the National Air Quality Strategy in a number of ways, for example we will work with local authorities, government agencies, and developers to ensure that developments make use of transport options producing the least pollutants. The Government's National Transport Strategy will have an important bearing on this issue. North Wessex area is also locally working on air quality through its membership of the steering group of the University of the West of England's Air Quality Management Centre.

The major industrial processes in this catchment are: the manufacture of cement/lime, the processing of inorganic chemicals, the production of pesticides, the incineration of cattle, and the recovery of organic solvents and oils.

9.1 Issue: Poor air quality in towns and cities

Air quality in towns and cities has declined as urban traffic has grown. Local authorities monitor their air quality and are producing Air Quality Management Plans to deal with the pollution. We are using the example of Bristol to illustrate the problem as Bristol is by far the largest urban area in the Plan area.

Air quality in Bristol in 1996 became worse after steady improvements in previous years. Background nitrogen dioxide (NO₂) levels in the city centre averaged between 24 and 27 parts per billion (ppb annual mean) for 1996/7 and the average for the whole of the Bristol City Council Area was 18.3 ppb, with roadside nitrogen dioxide levels reaching 36-49 ppb in the city centre and a Bristol City Council Area average of 29 ppb. Both background and roadside levels for the city centre are above the Government's target of 21 ppb. Other associated pollutants such as benzene from motor vehicles and particulate matter are also high in the city centre. The table below lists Bristol City Council's Air Quality Strategy results for 1997 in greater detail.

Bristol Air Quality Statistics 1997

POLLUTANT	SITE	EXCEEDENCES
pm10 (particulate matter in the 10 to 20 micron range).	Bristol Centre	EPAQS standard exceeded on 269 occasions in 19 days
Sulphur dioxide (SO ₂)	Bristol Centre	No exceedences of EPAQS standards
	Blaise Castle house museum (continuous monitor)	100 ppb exceeded on 20 days although this does not exceed the EPAQS 99.96%ile standard
Nitrogen dioxide (NO ₂)	Bristol Centre (continuous monitor)	No exceedences of EPAQS; annual average standard (21ppb) exceeded (23.2 ppb)
Nitrogen dioxide (NO ₂)	Bristol Old Market (continuous monitor)	No exceedences of EPAQS hourly average standard; EPAQS annual average standard (21ppb) exceeded (38.6 ppb)
Nitrogen dioxide (NO ₂)	Bristol (22 passive roadside sites)	EPAQS annual average standard (21ppb) exceeded at 17 sites
Nitrogen dioxide (NO ₂)	Bristol (34 background sites)	EPAQS annual average standard (21ppb) exceeded at 6 sites
Benzene	Bristol east (continuous monitor)	No exceedences of EPAQS standard (5 ppb)
Benzene	Bristol (22 passive roadside sites)	EPAQS standard (5 ppb exceeded at 8 sites)
Benzene	Bristol (34 passive background sites)	No exceedences of EPAQS standard (1 ppb)
1, 3 Butadiene	Bristol east (continuous monitor)	No exceedences of EPAQS standard (1 ppb)
Ozone (O ₃)	Blaise Castle House Museum (continuous monitor)	50 ppb exceeded on 33 days although this does not exceed the EPAQS 97%ile standard

EPAQS is Expert Panel of Air Quality Standards

Bristol City Council is charged with monitoring and reducing air pollution and has powers to stop vehicles to have their exhaust emissions checked and those breaking the law during 1998 were fined.

They are also charged with achieving the Government targets for certain emissions which include nitrogen dioxide, benzene and particulate matter. Where standards will not be met, they will have to make action plans to improve air quality in areas to be known as Local Air Quality Management Areas.

The Environment Agency is setting an example by:

- (i) aiming to achieve a 5% reduction in our annual mileage;
- (ii) requiring stricter environmental criteria for replacement Agency vehicles and promoting efficient driver training;
- (iii) increasing the use of public transport by our staff;
- (iv) promoting more video conferencing reducing the number of vehicles travelling to meetings;
- (v) reducing business mileage in the North Wessex Area by 5% and our overall fuel efficiency by 3 mpg on our 1996/97 figures.

Although Bristol City Council has the greatest part to play in improving Bristol's air quality we will work with them to help achieve their targets. The Environment Agency has a large presence in Bristol with two office headquarters, a national service office in nearby Bath and many vehicle movements in and around Bristol caused by everyday Environment Agency work, and consequently has a significant part to play in reducing the air pollution in central Bristol.

9.2

Issue: The impact of emissions to air from heavy industry

There are currently no known exceedences of air quality standards in the area arising from industrial emissions. However, we are aware of several potential Integration Pollution Control (IPC) applications for further gas turbine power stations in the Avonmouth area. We are concerned that if all of these proposed power stations were to start up at the same time, such as on a cold winter morning when electricity demand was high and atmospheric dispersion was low, then this could cause the standard for NO_x to be exceeded. Consequently we are working closely with Bristol City Council and South Gloucestershire District Council to investigate this issue in more detail.

Actions	Action By	Cost to Agency (£K)	Financial Year 98 99 00 01 02
9.2.1 We will work with Bristol City Council and South Gloucestershire Council to investigate the potential impact of increasing nitrous oxide emissions from the proposed power stations. Contact: Environment Planning Team Leader	Agency	unknown	● ●

For a summary of our statutory duties, powers, and interests please see Section 12.4

10. Climate Change

The climate has always been changing, but the rate of change appears to be increasing in recent years. There is a broad consensus of scientific opinion that such changes are occurring because of the impact of human activities on the global atmosphere, although the estimates of how big the change is are frequently revised.

It is now generally accepted in Europe that there is a high risk that some chemical emissions to the atmosphere may have a significant impact on the global environment. Emissions of a range of gases, notably carbon dioxide and methane, are adding to the natural 'greenhouse' effect, which may cause global warming. Estimated emissions of carbon dioxide nationally from large industrial processes and other sources in the UK in 1990 was 155 million tonnes. Methane is 20 to 30 times more damaging as a greenhouse gas than carbon dioxide. Methane is produced in landfills containing biodegradable waste and so we will work to reduce these emissions through the waste management licensing system (see Section 6, Waste). The international community is trying to get the major industrialised countries to sign up to achieving reductions of these 'greenhouse' gases. Currently Britain is committed to reducing emissions to 1990 levels.

It is estimated (1998) that because of global warming sea levels world-wide will rise by more than 500 mm in the next 100 years, although the present rate is probably about 2 mm per year in the Severn Estuary. With a rise of, say, 3 mm per year, tide levels which have a statistical probability of occurring once every 200 years on average at Avonmouth will be twice as frequent (once in 100 years) by 2006 and twice as frequent again (once in 50 years) by 2016. The Environment Agency uses these probabilities to design target standards for different land uses. Hence, a scheme designed to meet the standard of protection for high density urban development would only meet that appropriate for rural communities, by 2016, if additional action was not taken. The improvement of defences will take place within the strategic framework of Shoreline Management Plans (see Section 11.1.5, Shoreline Management Plans (SMPs)).

In addition we believe that storms will become more frequent and more violent as a result of global warming. Storms can raise sea levels above predicted levels and generate increased wave action, causing overtopping and increased erosion of existing defences.

We are reducing emissions to air from the most complex industrial processes within the catchment (see Section 9, Air Quality). The Environment Agency is responsible for authorising and regulating emissions to air from these processes, including power stations, refineries, steel and chemical works, cement and lime production and waste incineration by means of IPC Authorisations. A National Atmospheric Emissions Inventory is prepared each year for the Department of the Environment, Transport and the Regions (DETR) by the National Environmental Technology Centre (NETCEN).

We have set targets to reduce our own energy and fossil fuel consumption and we have appointed a Regional Officer to co-ordinate our internal environmental management. Our environmental management targets are set out in Section 11.2.

10.1 Issue: Tidal defence and sea level rise

When existing defences need refurbishment or renewal, the Ministry of Agriculture, Fisheries and Food (MAFF) require us to include an allowance to cover the predicted 250 mm sea level rise in the next 50 years, plus an allowance for increased storminess, provided that the cost/benefit test is still passed. Recent defences completed at Pill were constructed 600 mm above the existing 1-in-200 year level to allow for climate change. The option of retreat is not feasible on the River Avon Tidal Defences because of the property which would be affected.

We will advise Bristol City Council on the effect of the increased frequency of flooding on the A4 Portway below Clifton Suspension Bridge. Bristol City is the highway authority responsible for the Portway, a road which already suffers from frequent flooding.

As improvements/refurbishments arise, Agency will look at their sensitivity to climate change and will include appropriate allowances.

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
10.1.1 We will discuss flooding issues such as the A4 Portway, with Bristol City Council. Contact: Flood Defence Team Leader Projects	Agency, Bristol City Council	unknown	●	●			

10.2 Issue: The need for improved information on flood risk and development

The maps referred to in Local Action three are known as 'Section 105 maps'. The standard we use is a flood which has a statistical probability of happening once in 200 years for the coastal/tidal situation and once in 100 years for fluvial waters.

Indicative flood maps (Section 105 Level A maps) have been produced for all local authorities. Section 105 Level B maps are more detailed flood risk maps.

Level B maps have already been provided for West Wiltshire District Council and it is anticipated that, subject to funding, all local planning authorities will be provided with detailed flood risk maps for consideration in the current land-use planning round.

Subject to funding, the timetable for the period up to 2001 is:

South Gloucestershire Council	98/99
North Wiltshire District Council	98/99
Mendip District Council	98/99
North Somerset Council	99/00
Bath and North East Somerset Council	99/00

Actions	Action By	Cost to Agency (£K)	Financial Year				
			98	99	00	01	02
10.2.1 We will produce detailed flood risk maps (S105) for land-use planning within Local Development Plans according to the above timetable. Contact: Flood Defence Team Leader Development Control	Agency,	292 total	70	147	75		

10.3

Issue: The impact of methane produced by landfill sites

With the decay of biodegradable wastes in landfills, a mixture of gases generally known as landfill gas is produced. In the early years of decay carbon dioxide (CO₂) is the main contributor to landfill gas and its emission to the atmosphere. As available oxygen is used up within the landfill methane (CH₄) gas is produced and becomes the main contributor. Both carbon dioxide and methane are greenhouse gases; however, methane is estimated to be 20-30 times more damaging than carbon dioxide. Therefore, conversion of methane to carbon dioxide by burning is less damaging to the environment than allowing the landfill gas mixture to be discharged to the atmosphere unchanged.

The combustion of gas either in flares or as part of an energy recovery process converts methane to carbon dioxide, and should be undertaken whenever the landfill gas yield is capable of supporting combustion. However, only sites that are or have taken large quantities of biodegradable waste may be able to support combustion in some form or another. At these sites gas management is also carried out for health and safety reasons.

The following table outlines the licensed active and closed sites in the Bristol Avon plan area which have the potential to produce, or are currently producing, landfill gas, and what measures are being taken to deal with the gas.

Potential and actual landfill gas producing sites in the Bristol Avon plan.

Name	Location	Status	NGR	P	F	E	Comments
UK Waste Management Ltd	Codrington	Dormant	ST725783	*			Site not filled - insufficient waste deposited to justify any action at present
Durston Landfill Ltd	Shire Way, Yate	Dormant	ST702805	*			Insufficient gas produced to warrant flare or energy production
Terry Adams Ltd	Yanley	Active	ST556699			*	Energy generation plant running
Hills Aggregates Ltd	Compton Basset	Active	SU018711	*			Large household waste site will need a flare in next 2-5 years. The site is large enough to produce enough gas to convert to energy
Western Skip Hire	Trowle Common	Active	ST840585	*			Insufficient gas production to justify a flare at present. May need small flare in future, but only a small site therefore energy generation will never be feasible
Haul Waste Disposal Ltd	Westbury	Active	ST880528		*		Currently flaring. The new energy generation plant is now running.
Barge Waste Management Studley Grange Farm	Lydiard Tregoze	Active	SU105821		*		Temporary flare in place on current site. Energy generation a possibility if extension gets a licence but not feasible probably until about 5-10 years time
Haul Waste Ltd	Calne (Sands Farm)	Active	SU015712	*			Currently flaring gas.
Crapper and Sons	Park Grounds Farm	Inactive	SU050837	*			Insufficient gas production to justify a flare at present. May need a flare in the future, but not large enough for energy recovery

Key for table: P - passive venting, F - flaring, E - energy creation

Actions	Action By	Cost to Agency (£K)	Financial Year 98 99 00 01 02
<p>10.3.1 We will assess the need for improved methane control measures in the course of our review of 32 priority waste management facilities.</p> <p>Contact: Waste Licensing Team Leader</p>	Agency (see action 6.4.1)	unknown	● ●

10.4 Issue: The impact of energy and fossil fuel use on climate

Fossil fuel burning directly for heat, light or transport, or to generate electricity produces greenhouse gases - mainly carbon dioxide but also others.

In accordance with our aim of contributing to the attainment of sustainable development we need to promote the reduction of energy and fossil fuel use in industry and commerce, including the reduction of our own energy consumption.

We will:

- promote the efficient use of energy in industry
- seek reductions in direct heat output from industry and commerce
- seek reductions in the production of greenhouse gases such as carbon dioxide, methane and chloro-fluoro-carbons (CFCs).
- promote fuel efficient, integrated transport
- set targets for our own energy consumption and report on our progress.

Actions	Action By	Cost to Agency (£K)	Financial Year 98 99 00 01 02
<p>10.4.1 Reduce energy (electricity) consumption in our offices and depots by 20% compared to Energy Efficiency Office (EEO) typical, or 1991/92 consumption whichever is lower.</p> <p>Contact: Area Business Services Manager</p>	Agency	unknown	●
<p>10.4.2 Reduce business mileage in the North Wessex Area by 5% and our overall fuel efficiency by 3 mpg on our 1996/97 figures.</p> <p>Contact: Area Business Services Manager</p>	Agency (see Section 9 Air Quality)	unknown	●
<p>10.4.3 Seek greenhouse gas reductions from heavy industrial processes by means of IPC authorisations</p> <p>Contact: Environment Planning Manager</p>	Agency (see section 9 Air Quality)	—	— — — — —

For a summary of our statutory duties, powers, and interests please see Section 12.4

11. Protection Through Partnership

The Agency works in partnership with many organisations and individuals concerned with the protection and enhancement of the environment. In the UK as a whole much has been achieved already but much more is possible by working closely with others. The Agency is essentially a regulatory body and does not give grants (but see Section 11.1.10), so to achieve some of its aims it must co-operate with others such as the local authorities and the Ministry of Agriculture, Fisheries and Food (MAFF) to harness their financial resources and technical expertise. The Agency can also work towards its objectives by working with voluntary groups such as the wildlife trusts and recreational associations. In some cases partnerships are already well established with other statutory bodies, especially where there is joint responsibility, such as waste management.

11.1 Partnerships and opportunities

This section outlines some of these partnerships and indicates opportunities for new initiatives.

11.1.1 Local planning authority development plans – Although we can control some of the things which influence the quality of the environment or affect flood risk we have very little direct control over the way that land is developed. This is the responsibility of local planning authorities. Local planning authorities prepare statutory development plans. The policies in these plans will guide the way that land is developed in the future.

We have published guidance for local planning authorities to encourage them to adopt policies that protect the water environment from the harmful effects of development. Where we can, we will reinforce these policies when we comment on planning matters or if we are making our own decisions. We also advise planning authorities on planning matters related to industrial processes, waste management and the storage, use and disposal of radioactive material. We are working closely with Somerset County Council on the strategic environmental appraisal of their Minerals Local Plan.

11.1.2 Air quality – The Agency and local authorities are both responsible for aspects of air quality monitoring and management, although local authorities are responsible for producing and implementing Local Air Quality Management Plans. We will build partnerships with them to develop and implement their Local Air Quality Management Plans.

11.1.3 Amenity and recreation initiatives – Local authorities often own the riverside land in towns and we work with them together with developers and other riparian owners on schemes to enhance the town centre river corridor with, for example, landscaping, walkways and riverside seating. As part of such schemes nature conservation can be furthered by creating wildlife habitats including in some cases achieving a more natural river channel.

Recreation - We will promote safe recreation within the river corridor where appropriate by working with local authorities and others such as the Ramblers Association, Avon Valley Partnerships, recreational users and the British Canoe Union. We will work with other organisations to try to resolve conflicts between users. We are a partner of the Avon Valley Project which will provide a towpath along the Avon. The project will also raise awareness of and improve the river corridor by habitat enhancements, way marking and provision for interpretation facilities.

11.1.4 Local Agenda 21 – Across the catchment, all local authorities are assisting their local communities in developing local strategies and action plans for sustainable development. The approach adopted varies from district to district, with many Local Agenda 21 (LA 21) groups setting up working groups looking at specific issues. We feel that we can be most effective in assisting local communities in developing their Local Agenda 21 plans by offering expert advice on the state of the local environment. We can also supply some of the information that LA21 groups want; a leaflet is available from our Customer Contact Team.

11.1.5 Shoreline Management Plans (SMPs) – Shoreline Management Plans (SMPs) are being produced by coastal cell groups led by the maritime local authorities working together with other statutory bodies. They provide a forum for an integrated review of coastal processes and develop sustainable coastal defence policies to set objectives for the future management of the shoreline. The SMP that includes the coast adjacent to the LEAP is called the Severn Estuary Shoreline Management Plan. Coastal issues are covered in the Severn Estuary Strategy Joint Issues Report, May 1998.

11.1.6 Working with businesses – We are working in partnership with local businesses to promote pollution prevention and waste minimisation. Examples include:

- our '3 E's' campaign (Emissions, Efficiency, Economics) which aims to reduce waste, packaging, effluent and energy use and thereby both help the environment and save the business money;
- Operation Streamclean – an on-going campaign which is being carried out by Bristol City Council, Wessex Water and the Agency to reduce the number of wrongly connected household pipes polluting local streams;
- our oil care campaign;
- our training video for construction workers;
- pollution prevention guidelines which give advice relating to specific industries and activities e.g. dairies, vehicle service centres, surface water drainage;
- promoting the Government's Environmental Technology Best Practice Programme. Industries can call Freephone 0800 585794 for up to two hours of free advice on saving money through waste minimisation and energy efficiency measures;
- Best Management Practices. These are environmentally friendly methods of treating urban runoff, such as grass swales, reedbeds and retention ponds, which offer opportunities for habitat creation;
- farm waste management plans developed with farmers and the Farming and Rural Conservation Agency (FRCA);
- our work with the Farming and Wildlife Advisory Group (FWAG) to promote environmentally friendly farming practices.

11.1.7 Conservation – The Agency is participating in local and regional Biodiversity Action Plans and is committed to conserving important habitats and to maintaining and improving the biodiversity of rivers and wetlands. With our partners, we will continue to support the Bristol Frome Action Plan and By Brook Countryside Management Project and we will seek to be involved in other collaborative initiatives such as the South Bristol Streams Project. We will continue our presumption against further impoundments (weirs or sluices) and we will examine options for altering and removing them (see Section 15 Issue: River rehabilitation and channel management).

We have undertaken a study of the distribution and status of alien invasive plant species in the Lower Bristol Avon and we are undertaking a similar study of the Upper Bristol Avon. We will develop a management strategy with riparian owners and other relevant partners to tackle the problem.

Alder trees are a wetland species and often grow next to rivers. Their roots can suffer from a lethal disease called Phytophthora (see 7.16 Issue: Phytophthora). We are seeking to establish the extent of this problem, to identify management options and to assess its long-term impact on the river corridor.

11.1.8 Education – We recognise that broad-based education covering the community, educational and industrial sectors will result in a more informed society that is better able to understand the environment, its needs, and the impact of society's activities upon it. In particular, there is a need to:

- educate young people to equip them to make informed judgements about future environmental decisions;
- educate industry through consultation, collaborative activities and targeted campaigns to promote a culture of prevention rather than cure;
- raise public awareness of environmental issues to engender in society a common ownership of the environment and its challenges.

Each region has recently appointed an Education Co-ordinator to promote our education strategy at a local level. Our Customer Services Department can provide a list of available resources for schools. This includes packs relating to Key Stages 1 and 2/3 and activity booklets for younger children. We are also looking into more efficient ways to deliver environmental education for example offering training days to teachers.

Currently, we provide a wide range of information to all sectors of society, and in addition give many talks and presentations. The Agency has recently published a leaflet entitled '*Green Shoots our Vision for Environmental Education*'.

LEAPs in themselves are an educational resource within a local community. Each LEAP is guided by a Steering Group whose members are drawn from our key customers locally and include: local authorities, the Housebuilders Federation, industry, waste management industry, Lackham College, Wildscreen at Bristol, Farming and Rural Conservation Agency (FRCA), Farming, Wildlife Advisory Group (FWAG), Wildlife Trusts, fisheries interests, British Canoe Union, Ramblers Association, Friends of the Earth, British Waterways and water companies (see Appendix 12.3).

11.1.9 Pollution incidents – We are working in partnership with the public to identify pollution incidents through our Pollution Hotline 0800 80 70 60.

11.1.10 'Make a Difference' environmental improvement projects – Although we are not a grant awarding body we have created a small fund to finance a few low to medium cost projects each year which enhance the environment i.e. 'make a difference'. Where possible we seek partners to provide matching funding.

The list below gives some examples of the 'Make a Difference' (MAD) projects being co-ordinated by the Agency in this area.

- Biodiversity Action Plans - water vole surveys; phase II of alien species survey; crayfish and otter habitat protection/creation; headwater streams survey.
- Upper Bristol Avon Restoration Project - Semington Brook - restoration and improvement of the river corridor in the Upper Bristol Avon.

- Agency Issues Maps - to produce maps for all local planning authorities in the area to provide them with a reference tool for Agency Issues within their area.
- Bristol Frome Action Plan - long running project to protect and enhance the River Frome Corridor.
- By Brook Project - implementation of Countryside Management Project - River Wetland restoration and species surveys and monitoring.
- Waste Prevention and Minimisation in North Wessex - focus on industry and commerce. A series of partnership projects with green business/waste minimisation clubs, including: waste auditing; promotion of good practice; setting up a waste exchange database/network. Initial funding is required to kick start the projects that will become self funding.
- Easton Gray Project - habitat creation and enhancement on the Sherston Avon at Easton Grey - iffle creation, river narrowing and tree planting, in collaboration with the local fishing syndicate.
- Avon Wildlife Trust, Willsbridge Mill project - provision of interpretation/educational material for the Trusts visitor centre at Willsbridge Mill.

11.2 The Agency's own Environmental Management

The Agency is committed to the following environmental management practices:

11.2.1 Resources – To ensure the allocation of resources at all levels to achieve the implementation of effective environmental management action throughout the Environment Agency; to make line management responsible for the achievement of objectives and performance targets.

11.2.2 Targets – To support continuous environmental improvement by the establishment of demanding but achievable and measurable environmental performance targets determined and reviewed annually. These targets cover aspects of energy and resource use, waste minimisation and recycling.

Our current national targets are set out in the table below.

Environmental Performance Targets 1998/99

Target No	Target	Completion Date
Legislative Compliance		
1	Continue to ensure full compliance of all Agency sites with all relevant environmental legislation by undertaking a second round of DIY reviews and reporting, investigating and rectifying all environmental incidents caused by our own activities.	Review within first anniversary of inspection reporting by 30 November 1998
Energy Management		
2	Reduce energy use in offices and depots by 20% measured as kWh/m ² compared to Energy Efficiency Office typical or 1991/2 consumption, whichever is lower.	31 March 1999
3	Compile 'Green Transport Plans' to reduce commuter transport impacts at all key sites and to reduce mileage on Agency business (lease, badged, casual, essential, etc.) by 5% on 1996/7 figures.	Plans by 30 November 1999 Mileage by 31 March 1999
4	Improve overall fuel efficiency for badged vehicle fleet by 3 mpg on 1996/7 figures.	31 March 1999
Resource Management		
	Implement resource and waste management plans at each Agency site. Specifically to	
5	<ul style="list-style-type: none"> reduce water use in offices and depots to 30% below accepted norm for this type of office or 1996/7 consumption, whichever is higher; 	Water by 31 September 1998
6	<ul style="list-style-type: none"> reduce residual waste by 15% on 1997/98 levels. 	Waste by 31 March 1999
7	<ul style="list-style-type: none"> Ensure that at least 10% of construction aggregates used are from recycled/secondary sources. 	31 March 1999

12. Appendices

12.1 Our river quality objectives (RQOs)

In some cases, we may also manage water quality by setting long term RQOs (LT RQOs). LT RQOs must be realistic and are set where clear actions can be identified to bring about necessary improvements in water quality or to restore water quality to a former level, but no date is set for their achievement. Where LT RQOs are set, we measure compliance with our objectives against RQOs but use the LT RQOs as a basis for the setting of consents for new discharges, thus ensuring that these will not compromise the eventual achievement of LT RQOs.

Where the necessary steps to improve water quality in the future are committed within a 5-10 year horizon, we set dated RQOs rather than LT RQOs. Dated RQOs reflect the investment timetable for key dischargers, set out by the Agency, and indicate the date at which we expect our water quality targets to be met.

In 1996, the Environment Agency put forward proposals to the Secretary of State for the Environment for statutory water quality objectives (SWQOs) (i.e. statutory RQOs) to be set in eight pilot catchments, one of which was the Upper Bristol Avon catchment (from the headwaters of the Avon to Avoncliffe Weir at Bradford-on-Avon). These proposals are still being considered by the Secretary of State. As SWQOs are equivalent to RQOs, the term RQO is used throughout this LEAP for both the Upper and Lower Bristol Avon Catchments.

For one stretch in the Bristol Avon catchment, the Brinkworth Brook from confluence with Hancocks water to confluence with Thunder Brook (stretch 156), we cannot assess compliance for 1997 due to the monitoring point becoming inaccessible following the construction of a new bypass. We will relocate the monitoring point to a new site, representative of the water quality in this stretch.

We are proposing to upgrade the RQOs of some of the stretches in the Bristol Avon catchment: these are shown in the table below in bold. We welcome your comments on the RQO upgrades we are proposing.

Stretch Ref. No	River	Stretch	Current RQO (LT RQO)	Proposed RQO (LT RQO)
1	Avon	Confluence with Sherston to confluence with Charlton Stream	2	
2	Avon	Confluence with Charlton Stream to confluence with Gauze Brook	2	
3	Avon	Confluence with Gauze Brook to confluence with Brinkworth Brook	2	
4	Avon	Confluence with Brinkworth Brook to confluence with Sutton Benger Brook	2	
5	Avon	Confluence with Sutton Benger Brook to Malford	2 (2000)	
6	Avon	Malford to confluence with Marden	2	
7	Avon	Confluence with Marden to Blackwell Hams	2	
8	Avon	Blackwell Hams to confluence with Bydemill Brook	3[2]	2
9	Avon	Confluence with Bydemill Brook to confluence with Forest Brook	3	
10	Avon	Confluence with Forest Brook to confluence with Scotland Road	2	
11	Avon	Scotland Road to confluence with South Brook	3	
12	Avon	Confluence with South Brook to confluence with Semington Brook	3	
13	Avon	Confluence with Semington Brook to confluence with Biss	2	
14	Avon	Confluence with Biss to Turleigh	3	
15	Avon	Turleigh to confluence with Frome	3	
16	Avon	Confluence with Frome to confluence with Midford Brook	3	
17	Avon	Confluence with Midford Brook to confluence with By Brook	3	
18	Avon	Confluence with By Brook to confluence with Lam Brook	2	
19	Avon	Confluence with Lam Brook to Bath Central	2	
20	Avon	Bath Central to confluence with Corston Brook	3	
21	Avon	Confluence with Corston Brook to Swineford	3	2
22	Avon	Swineford to confluence with Boyd	3	
23	Avon	Confluence with Boyd to confluence with Siston Brook	3	
24	Avon	Confluence with Siston Brook to Conham	3	
25	Trym	Source to confluence with Avon	3	2
26	Bristol Frome	Old Sodbury to Yate	2	
27	Bristol Frome	Yate to confluence with Laddon Brook	2 (1998)	
28	Bristol Frome	Confluence with Laddon Brook to confluence with Bradley Brook	2	
29	Bristol Frome	Confluence with Bradley Brook to Broomhill	2	
30	Bristol Frome	Broomhill to Floating Harbour	2	
31	Bradley Brook	Stoke Gifford to confluence with Bristol Frome	3	
32	Laddon Brook	Sodbury Common to Bagstone	2	
33	Laddon Brook	Bagstone to confluence with Bristol Frome	2	
34	Siston Brook	Warmley to Cadbury Heath	3	2
35	Siston Brook	Cadbury Heath to confluence with Avon	3	
36	Chew	Chewton Mendip to Litton	4	
37	Chew	Litton to U/S Chew Valley Reservoir	2	
38	Chew	D/S Chew Valley Reservoir to confluence with Chew Stoke Stream	3	
39	Chew	Confluence with Chew Stoke Stream to confluence with Winford Brook	3	
40	Chew	Confluence with Winford Brook to Upper Stanton Drew	2	
41	Chew	Upper Stanton Drew to Woollard	2	
42	Chew	Woollard to confluence with Avon	2	
43	Salter's Brook	Penford STW to confluence with Chew	2	
44	Winford Brook	Winford to confluence with Chew	2	
45	Chew Stoke Stream	Strode to confluence with Chew	2	
46	Boyd	Doynton to The Green	2	
47	Boyd	The Green to Gold Valley	2	
48	Boyd	Golden Valley to confluence with Avon	3	2
49	Feltham Brook	St Aldams Ash Farm to confluence with Boyd	3	
50	Corston Brook	Newton Park College to confluence with Avon	2	
51	Newton Brook	Confluence Priston & Conygre Brooks to confluence with Avon	2	
52	Conygre Brook	Farmborough to U/S Castle Farm	2	
53	Conygre Brook	U/S Castle Farm to confluence Newton & Priston Brooks	3	
54	Priston Stream	Northfield to confluence Newton & Conygre Brooks	3	
55	Lam Brook	Langridge to confluence with Avon	2	
56	St Catherine's Brook	Source to confluence with Avon	2	
57	By Brook	Burton to confluence with Broadmead Brook	2	
58	By Brook	Confluence with Broadmead Brook to Rack Hill	1	
59	By Brook	Rack Hill to confluence with Doncombe Brook	1	
60	By Brook	Confluence with Doncombe Brook to D/S Lid Brook	1	
61	By Brook	D/S Lid Brook to Box Bridge	1	
62	By Brook	Box Bridge to confluence with Avon	1	
63	Doncombe Bk	Fuddlebrook to U/S Marshfield STW	2	

Stretch Ref. No	River	Stretch	Current RQO [LT RQO]	Proposed RQO (LT RQO)
64	Doncombe Bk	U/S Marshfield STW to D/S Marshfield STW	2	
65	Doncombe Bk	D/S Marshfield STW to confluence with By Brook	1	
66	Broadmead Bk	West Kington to confluence with By Brook	1	
67	Midford Brook	Confluence with Wellow Brook to confluence with Avon	2	
68	Wellow Brook	Ston Easton to Welton	3[2]	
69	Wellow Brook	Welton to confluence with Somer	3[2]	
70	Wellow Brook	Confluence with Somer to Tynning	3[2]	
71	Wellow Brook	Tynning to Foxcote	3	
72	Wellow Brook	Foxcote to Long Barrow	2 (2000)	
73	Wellow Brook	Long Barrow to Wellow	2 (2000)	
74	Wellow Brook	Wellow to confluence with Midford Brook	2 (2000)	
75	Lyde	U/S Hassage Farm to confluence with Wellow Brook	2	
76	Snails Brook	Stratton-on-the-Fosse to confluence with Westfield Stream	3[2]	
77	Snails Brook	Confluence with Westfield Stream to confluence with Kilmersdon Stream	3[2]	
78	Snails Brook	Confluence with Kilm Stream to confluence with Wellow Brook	3[2]	
79	Kilmersdon Str	Hackmead Farm to confluence with Snails Brook	3[2]	
80	Somer	Chilcompton to B3355	3[2]	
81	Somer	B3355 to confluence with Wellow Brook	3[2]	2
82	Cam Brook	Temple Cloud to Hallatrow	3	2
83	Cam Brook	Hallatrow to Hanham House	3	2
84	Cam Brook	Hanham House to Combe Hay	3[2]	
85	Cam Brook	Combe to confluence with Midford Brook	3[2]	
86	Somerset Frome	West Barn Farms to Tytherington	3[2]	
87	Somerset Frome	Tytherington to Innox Hill	3	
88	Somerset Frome	Innox Hill to confluence with Mells	3	
89	Somerset Frome	Confluence with Mells to Staplemead	3[2]	2
90	Somerset Frome	Staplemead to Lullington	3[2]	
91	Somerset Frome	Lullington to confluence with Henhamb Brook	3[2]	
92	Somerset Frome	Confluence with Henhamb Brook to Tellisford	2	
93	Somerset Frome	Tellisford to Pomperoy Farm	3[2]	2
94	Somerset Frome	Pomperoy Farm to confluence with Avon	3[2]	
95	Mells	Blackers Mill to Nettlebridge	2	1
96	Mells	Nettlebridge to Edford	2	
97	Mells	Edford to confluence with Leigh-on-Mendip Watercourse	2	
98	Mells	Confluence with Leigh-on-Mendip W/C to confluence with Whatley Brook	2	
99	Mells	Confluence with Whatley Brook to confluence with Frome	2	
100	Nunney Brook	Wanstrow to Holwell	2	
101	Nunney Brook	Holwell to Southfield House	2	
102	Nunney Brook	Southfield House to confluence with Mells Brook	2	
103	Whatley Brook	Cranmore to Asham Wood	2	
104	Whatley Brook	Asham Wood to Whatley Bottom	2	
105	Whatley Brook	Whatley Bottom to confluence with Mells	2	1
106	Leigh-on-Mendip Watercourse	Tadhill to Halecombe Quarry	2	
107	Leigh-on-Mendip Watercourse	Halecombe Quarry to confluence with Mells	2	
108	Mells Tributary	Gurney Slade Quarry to confluence with Mells	2	
109	Rodden Brook	Cley Hill Farm to Corsley	2	
110	Rodden Brook	Corsley to confluence with Redford Water	2	
111	Rodden Brook	Confluence with Redford Water to confluence with Frome	3[2]	2
112	Redford Water	Longleat to confluence with Roddon Brook	3	
113	Maiden Bradley Brook	Maiden Bradley to Confluence with Frome	3[2]	2
114	Biss	Confluence with Bitham Brook to confluence with Lam Brook	3[2]	
115	Biss	Confluence with Lam Brook to Trowbridge	3	
116	Biss	Trowbridge to confluence with Avon	4 (2000)	
117	Biss Brook	Penknap to Westbury Trading Estate	2	
118	Biss Brook	Westbury Trading Estate to confluence with Bitham Brook	3 (1998)	
119	Bitham Brook	Confluence with Bridewell Watercourse to confluence with Biss	5[4]	
120	Bridewell Watercourse	Heywood House to confluence with Bitham Brook	5[4]	
121	Semington Brook	West Lavington to U/S Woodbridge Farm	2	
122	Semington Brook	U/S Woodbridge Farm to confluence with Worton Stream	3[2]	

Stretch Ref. No	River	Stretch	Current RQO [LT RQO]	Proposed RQO (LT RQO)
123	Semington Brook	Confluence with Worton Stream to confluence with Bulkington Drove Watercourse	2	
124	Semington Brook	Confluence with Bulkington Drove Watercourse to confluence with Summerham Brook	2	
125	Semington Brook	Confluence with Summerham Brook to U/S Semington	3	
126	Semington Brook	U/S Semington to confluence with Avon	2	
127	Summerham Brook	Rowde to Smithwick Farm	3 (2000)	3
128	Summerham Brook	Smithwick Farm to confluence with Poulshot Stream	3	
129	Summerham Brook	Confluence with Poulshot Stream to confluence with Semington Brook	4	3
130	Poulshot Stream	Confluence Old Park Watercourse & Drewspend to confluence with Summerham Brook	4	
131	Old Park Watercourse	Devizes to confluence with Poulshot Stream & Drewspend	4 (2005)	
132	Drewspend Watercourse	Devizes to confluence with Old Park Watercourse & Poulshot	4	
133	Milebourne Stream	Hurst Farms to confluence with Semington Brook	3	2
134	Bulkington Drove Watercourse	Marston to confluence with Semington Brook	3	
135	Worton Stream	Urchfont to Cadley Farm	4[2]	
136	Worton Stream	Cadley Farm to confluence with Semington Brook	4[2]	2
137	Chalfield Brook	Great Chalfield to confluence with Avon	4[2]	
138	Berryfield Stream	U/S Bowerhill STW to confluence with Avon	5	
139	South Brook	Atworth to confluence with Avon	4 (2005)	
140	Bydemill Brook	Corsham to Bydemill	2	
141	Bydemill Brook	Bydemill to confluence with Rivers Brook	4 (2000)	
142	Marden	Ranscombe Bottom to Blackland	1	
143	Marden	Blackland to confluence with Rivers Brook	2	
144	Marden	Confluence with Rivers Brook to confluence with Cowage Brook	3[2]	
145	Marden	Confluence with Cowage Brook to confluence with Avon	3	
146	Cowage Brook	Confluence with Strings Watercourse to Bremhill House	4[3]	
147	Cowage Brook	Bremhill House to confluence with Marden	3[2]	
148	Strings Watercourse	Lyneham to Freegrove Farm	4[3]	
149	Strings Watercourse	Freegrove Farm to confluence with Cowage Brook	5 (2000) [4]	
150	Abberd Brook	Calne Sandpit to confluence with Marden	4	
151	Rivers Brook	Cherhill to D/S Hayle Farm	1	
152	Rivers Brook	D/S Hayle Farm to confluence with Marden	3[2]	
153	Honeyball Watercourse	D/S Hills of Swindon to confluence with Rivers Brook	3	
154	Sutton Benger Brook	Source to confluence with Avon	3[2]	
155	Brinkworth Brook	U/S Wootton Fields Farm to confluence with Hancocks Water	3	
156	Brinkworth Brook	Confluence with Hancocks Water to Thunder Brook	3	
157	Brinkworth Brook	Thunder Brook to Brinkworth	3	
158	Brinkworth Brook	Brinkworth to confluence with Avon	3[2]	
159	Hancocks Water	Source to Wootton Meadows	3	
160	Hancocks Water	Wootton Meadows to confluence with Brinkworth Brook	4 (1999)	
161	Rodbourne Brook	Stanton St Quinton to confluence with Avon	2	
162	Gauze Brook	Hullavington to Bradfield Farm	2	
163	Gauze Brook	Bradfield Farm to confluence with Avon	2	
164	Charlton Stream	Charlton to Lea	2	
165	Charlton Stream	Lea to confluence with Avon	2	
166	Tetbury Avon	Source to Slads Farm	2	
167	Tetbury Avon	Slads Farm to Fosseyway	3	
168	Tetbury Avon	Fosseyway to confluence Avon & Sherston Avon	1	
169	Sherston Avon	Crow Down Springs to confluence with Luckington Brook	2	
170	Sherston Avon	Confluence with Luckington Brook to Sherston STW	2	
171	Sherston Avon	Sherston STW to Twatley	2	
172	Sherston Avon	Twatley to confluence Avon and Tetbury Avon	2	
173	Luckington Brook	Luckington to Luckington Court	4[2]	
174	Luckington Brook	Luckington Court to confluence with Sherston Avon	2	
175	Kennet and Avon Canal	Devizes to confluence with Avon (Bath)	5[4]	

12.2 Area Environment Group (AEG)

Name	Representing
Mr L R Fortune	Chairman, appointed by Environment Agency
Mr M J Stoodley	Regional Committee Member
Mr J Comer	Regional Committee Member
Mr R W Wyatt	Water Resources
Mr S Hemmings	Waste Management
Mr M Hellings	Waste Management
Mr D Fish	Industry
Mr M W Minshall	Industry
Councillor N Jones OBE	Tourism
Ms J C Brookhouse	Conservation
Mrs A M Lennox	Recreation
Mr J L R Williams	Fisheries
Mr J B H Watkis	Flood Defence
Mrs L Bennett	Local Authority
Mr H P N Temperley	Local Authority
Mr C S W C Newbury	Local Authority
Professor G P Hammond	Education
Mr W H Warmington	Agriculture
Ms J Smith	Bristol City Council

12.3 Steering Group

Name	Representing
Mrs L Bennett	Area Environment Group
Mr M Stoodley	Fisheries
Mr A Cormie	Western Partnership for Sustainable Development
Mr A Aldous	Bristol Avon Flood Defence Committee
Mr J Lewis	The Five Valleys Trust
Mr T McGrath/ Mr G Morgan	Avon and Wilts Wildlife Trust (shared attendance)
Mr R Cripps	Lackham College
Dr A Finnie	Wildscreen at Bristol
Mr S Marston	Farming and Rural Conservation Agency (FRCA)
Mr S Eades	North Wiltshire Friends of the Earth
Mrs G Ellis-King	South Gloucestershire Council
Miss J Evans	West Wiltshire District Council
Mr E Gallia/ Mr A Moorhouse	Farming and Wildlife Advisory Group (FWAG) (shared attendance)
Mr O Jones	The House Builders Federation
Ms J Milling	Mendip District Council
Ms S Murtagh	Bath and North East Somerset Council
Mr D Rapley	Wiltshire County Council
Mr P Longden	British Canoe Union
Mr M Longman	Haul Waste Group
Mrs K Derrick	Bristol City Council
Mrs A Lennox	Ramblers Association
Mr P Hodge	Bristol Water
Mr M Venning	Wessex Water
Mr M Goodenough	British Waterways

12.4 Duties, powers and interests of the Agency

The Environment Agency has a wide range of interests in the areas of water management, waste management and pollution prevention and control. Whilst many of these interests are supported by statutory duties and powers, much of the Agency's work is advisory, with the relevant powers resting with other bodies such as local planning authorities. The following table therefore summarises the Agency's duties, powers and interests and their relationship to land-use planning.

Agency Duty	The Agency has powers to:	The Agency has an interest (but no powers) in:	Partnership
<p>Water Resources</p> <p>The Agency has a duty to conserve, redistribute, augment and secure the proper use of water resources.</p>	<ul style="list-style-type: none"> ● Grant or vary water abstraction and impoundment licences on application. ● Revoke or vary existing licences to reinstate flows or levels to surface waters or groundwater which have become depleted as a result of abstraction, and are subject to a liability for compensation. ● Serve Conservation Notices (S30) on Minerals Operators to control the process of dewatering in quarries. 	<ul style="list-style-type: none"> ● The more efficient use of water by water companies, developers, industry, agriculture and the public and the introduction of water efficiency measures and suitable design and layout of the infrastructure. ● Negotiating S106 Agreements that afford protections to the water environment. 	<ul style="list-style-type: none"> ● The Agency is committed to water-demand management and will work closely with water companies and developers, local authorities and relevant organisations to promote the efficient use of water. ● The Agency acknowledges that new resources may be needed in the future and supports a twin-track approach of planning for water resource development alongside the promotion of demand-management measures. ● The Agency seeks to influence planning decisions for new development by encouraging the inclusion of water conservation measures in new properties, particularly in areas where water resources are under stress, and by ensuring that planning authorities allow for the lead time for resource development. ● Negotiating S106 Agreements that afford protections to the water environment.

Agency Duty	The Agency has powers to:	The Agency has an interest (but no powers) in:	Partnership
<p>Flood Defence</p> <p>The Agency has a duty to exercise general supervision over all matters relating to flood defence throughout each catchment.</p>	<ul style="list-style-type: none"> ● Control, through Land Drainage consents, of development within 8 m of main river (Water Resources Act 1991, Section 109) or construction of a structure that would affect the flow of an ordinary watercourse (Land Drainage Act, 1991 Section 23). ● Produce flood risk maps for all main rivers under S105 of Water Resources Act 1991. ● Undertake works to main rivers using permissive powers. ● Issue flood warnings to the public relating to main rivers, local authorities and the police. ● Consent mineral working within 16 m of main rivers. 	<ul style="list-style-type: none"> ● Granting of planning permission throughout a catchment but especially floodplains where development can significantly increase flood risk. This permission is granted by local planning authorities. ● Installation of surface water source control measures e.g. flood attenuation structures. ● Supervising the maintenance of ordinary watercourses which is a local authority remit, but may impact on main rivers. ● Installation of buffer zones which reduce flood risk and have significant environmental benefits. ● Urban and rural land use and measures that can reduce flood risk or the need for watercourse maintenance. 	<ul style="list-style-type: none"> ● As a statutory consultee on planning applications within main river floodplains the Agency offers advice based on knowledge of flood risk. It also advises on the environmental impacts of proposed floodplain development. ● The Agency will encourage best practice, including source control measures and common standards, among local authorities and riparian owners to protect and enhance the environment. ● The Agency works with the civil authorities to prepare flood warning dissemination plans and supports their endeavours to protect communities at risk.

Water Quality

The Agency has a duty to monitor, protect, manage and, where possible, enhance the quality of all controlled waters including rivers, groundwaters, lakes, canals, estuaries and coastal waters through the prevention and control of pollution.

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| <ul style="list-style-type: none"> ● Issue discharge consents to control pollution loads in controlled waters. ● Regulate discharges to controlled waters in respect of water quality through the issue and enforcement of discharge consents. ● Issue 'works notices' where action is required to reduce the risk of pollution. ● Prosecute polluters and recover the costs of clean-up operations. ● Serve prohibition notices (with or without conditions) on highway authorities to require treatment and pollution measures for highway runoff. | <ul style="list-style-type: none"> ● The greater use of source control measures to reduce pollution by surface water runoff. ● Prevention and education campaigns to reduce pollution incidents. ● The provision of highway runoff control measures which is a highway authority remit. |
|---|--|
-
- | | |
|---|--|
| <ul style="list-style-type: none"> ● Issue discharge consents to control pollution loads in controlled waters. ● Regulate discharges to controlled waters in respect of water quality through the issue and enforcement of discharge consents. ● Issue 'works notices' where action is required to reduce the risk of pollution. ● Prosecute polluters and recover the costs of clean-up operations. ● Serve prohibition notices (with or without conditions) on highway authorities to require treatment and pollution measures for highway runoff. | <ul style="list-style-type: none"> ● The greater use of source control measures to reduce pollution by surface water runoff. ● Prevention and education campaigns to reduce pollution incidents. ● The provision of highway runoff control measures which is a highway authority remit. |
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● The Agency will liaise with local authorities, developers, the Highways Agency, industry and agriculture to promote pollution prevention and the adoption of source control measures. As a statutory consultee on planning applications, the Agency will advise local planning authorities on the water quality impact of proposed developments.

Agency Duty	The Agency has powers to:	The Agency has an interest (but no powers) in:	Partnership
<p>Air Quality</p> <p>The Agency has a duty to implement Part 1 of the Environment Protection Act 1990.</p>	<ul style="list-style-type: none"> ● Regulate the largest technically complex and potentially most polluting prescribed industrial processes such as refineries, chemical works and power stations including enforcement of, and guidance on, BATNEEC and BPEO. ● Have regard to the government's National Air Quality Strategy when setting standards for the releases to air from industrial processes. 	<ul style="list-style-type: none"> ● The vast number of smaller industrial processes which are controlled by local authorities. ● Control over vehicular emissions and transport planning. 	<ul style="list-style-type: none"> ● The Agency provides data on IPC processes and advice on planning applications to local authorities. The Agency is willing to offer its technical experience to local authorities on the control of air pollution. The Agency wishes to liaise with local authorities in the production of their Air Quality Management Plans. The Agency will advise and contribute to the government's National Air Quality Strategy.
<p>Radioactive Substances</p> <p>The Agency has a duty under the Radioactive Substances Act 1993 to regulate the use of radioactive materials and the disposal of radioactive waste.</p>	<ul style="list-style-type: none"> ● To issue certificates to users of radioactive materials and disposers of radioactive waste, with an overall objective of protecting members of the public. 	<ul style="list-style-type: none"> ● The health effects of radiation. 	<ul style="list-style-type: none"> ● The Agency will work with users of the radioactive materials to ensure that radioactive wastes are not unnecessarily created, and that they are safely and appropriately disposed of. The Agency will work with MAFF to ensure that the disposal of radioactive waste creates no unacceptable effects on the food chain. ● The Agency will work with the Nuclear Installations Inspectorate (NII) to ensure adequate protection of workers and the public at nuclear sites. The Agency will work with the HSE on worker protection issues at non-nuclear sites.
<p>Waste Management</p> <p>The Agency has a duty to regulate the management of waste, including the treatment, storage, transport and disposal of controlled waste, to prevent pollution of the environment, harm to public health or detriment to local amenities.</p>	<ul style="list-style-type: none"> ● Vary waste management licence conditions. ● Suspend and revoke licences. ● Investigate and prosecute illegal waste management operations. 	<ul style="list-style-type: none"> ● The siting and granting of planning permission for waste management facilities. This is conducted by the waste industry and local planning authorities. The Agency, as a statutory consultee on planning applications, can advise on such matters. 	<ul style="list-style-type: none"> ● The Agency will work with waste producers, the waste management industry and local authorities to reduce the amount of waste produced, increase re-use and recycling and improve standards of disposal.

Agency Duty	The Agency has powers to:	The Agency has an interest (but no powers) in:	Partnership
<p>Contaminated Land</p> <p>The Agency has a duty to develop an integrated approach to the prevention and control of land contamination, ensuring that remediation is proportionate to risks and cost-effective in terms of the economy and environment.</p>	<ul style="list-style-type: none"> ● Regulate the remediation of contaminated land designated as special sites. ● Prevent future land contamination by means of its IPC, Water Quality and other statutory powers. ● Report on the state of contaminated land. 	<ul style="list-style-type: none"> ● Securing with others, including local authorities, landowners and developers, the safe remediation of contaminated land. 	<ul style="list-style-type: none"> ● The Agency supports land remediation and will promote this with developers and local authorities and other stakeholders.
<p>Conservation</p> <p>The Agency will further conservation, wherever possible, when carrying out water management functions; have regard to conservation when carrying out pollution control functions; and promote the conservation of flora and fauna which are dependent on an aquatic environment.</p>	<ul style="list-style-type: none"> ● The Agency has no direct conservation powers but uses its powers with regard to water management and pollution control to exploit opportunities for furthering and promoting conservation. 	<ul style="list-style-type: none"> ● The conservation impacts of new development. These are controlled by local planning authorities. ● Protection of specific sites or species, which is a function of English Nature. The Agency does, however, provide advice to local authorities and developers to protect the integrity of such sites or species. ● Implementation of the UK Biodiversity Plan for which it is the contact point for twelve species and one habitat. 	<ul style="list-style-type: none"> ● The Agency supports action to sustain or improve natural and man-made assets so that they are made available for the benefit of present and future generations. Many development schemes have significant implications for conservation. The Agency will work with developers, local authorities, conservation bodies and landowners to conserve and enhance biodiversity.
<p>Landscape</p> <p>The Agency will further landscape conservation and enhancement when carrying out water management functions; have regard to the landscape when carrying out pollution control functions; and promote the conservation and enhancement of the natural beauty of rivers and associated land.</p>	<ul style="list-style-type: none"> ● The Agency must further the conservation and enhancement of natural beauty when exercising its water management powers and have regard to the landscape in exercising its pollution control powers. 	<ul style="list-style-type: none"> ● The landscape impact of new development, particularly within river corridors. This is controlled by local planning authorities. 	<ul style="list-style-type: none"> ● The Agency produces River Landscape Assessments and Design Guidelines which it uses when working with local authorities and developers to conserve and enhance diverse river landscapes.
<p>Archaeology</p> <p>The Agency has a duty to consider the impact of all of its regulatory, operational and advising activities upon archaeology and heritage, and implement mitigation and enhancement measures where appropriate.</p>	<ul style="list-style-type: none"> ● The Agency must promote its archaeological objectives through the exercise of its water management and pollution control powers and duties. 	<ul style="list-style-type: none"> ● Direct protection or management of sites of archaeological or heritage interest. This is carried out by local planning authorities, County Archaeologists and English Heritage. 	<ul style="list-style-type: none"> ● The Agency will liaise with those organisations which have direct control over archaeological and heritage issues to assist in the conservation and enhancement of these interests.

Agency Duty	The Agency has powers to:	The Agency has an Interest (but no powers) in:	Partnership
Fisheries The Agency has a duty to maintain, improve and develop salmon, trout, freshwater and eel fisheries.	<ul style="list-style-type: none"> ● Regulate fisheries by a system of licensing. ● Make and enforce fisheries byelaws to prevent illegal fishing. ● Promote the free passage of fish and consent fish passes. ● Monitor fisheries and enforce measures to prevent fish entrainment in abstractions. ● Promote its fisheries duty by means of land drainage consents, water abstraction applications and discharge applications. 	<ul style="list-style-type: none"> ● The determination of planning applications which could affect fisheries. 	<ul style="list-style-type: none"> ● Many development schemes have significant implications for fisheries. The Agency will work with anglers, riparian owners, developers and local authorities to protect fisheries.
Recreation The Agency has a duty to promote rivers and water space for recreational use.	<ul style="list-style-type: none"> ● The Agency contributes towards its recreation duty through the exercise of its statutory powers and duties in water management. 	<ul style="list-style-type: none"> ● Promotion of water sports. This is carried out by the Sports Council and other sports bodies. 	<ul style="list-style-type: none"> ● The Agency will work with the Countryside Commission, the Sports Council, British Waterways and other recreational and amenity organisations to optimise recreational use of the water environment.

13. Units

cm	centimetre
ha	hectare
km	kilometre
km ²	square kilometre
KeqH ⁺ per hectare per year	Kilogram equivalents of Hydrogen ions per hectare per year
kWh/m ²	Kilowatt hours per square metre
l/s	litres per second
m	metre
m ³ /d	cubic metres per day
m ³ /s	cubic metres per second (cumecs)
µg/l	micrograms per litre
µg/ m ³	microgram per cubic metre
mg/l	milligrams per litre
mg/m ²	milligrams per square metre
ml	millilitre
MI/d	megalitres per day
MI/y	megalitres per year
mm	millimetre
mpg	miles per gallon
ppb	parts per billion
ppm	parts per million
te	metric tonne

14. Useful Publications

- A Guide to Information Available to the Public, Environment Agency
- 'Air Quality A to Z' June (1995) Meteorological Office and Air Quality Division,
Department of the Environment (DoE) ISBN 0861803175
- Avon County Council Structure Plan 1994
- Bristol City Council Local Plan 1997
- British Geological Survey 1994
- Cordrey L (ed) (1997) Action for Biodiversity in the South-West - a series of
habitat and species plans to guide delivery, ISBN 0903138972
- Cordrey L (ed) (1996) The Biodiversity of the South-West - an audit of the South-
West biological resource, ISBN 0903138920
- EC Surface Water Abstraction Directive (75/440/EEC)
- EC Directive on pollution caused by the discharge of certain dangerous
substances into the aquatic environment (76/464/EEC)
- EC Directive on freshwater fish (78/659/EEC)
- EC Directive on the conservation of wild birds (79/409/EEC)
- EC Directive on the protection of groundwater against pollution caused by
certain dangerous substances (80/68/EEC)
- EC Directive on air quality standards for nitrogen dioxide (85/203/EEC)
- EC Directive Air Quality Standards for Nitrogen Dioxide (85/203/EEC)
- EC Directive concerning urban waste water treatment (91/271/EEC)
- EC Directive concerning the protection of waters against pollution caused by
nitrates from agricultural sources (91/676/EEC)
- EC Directive on species and habitats (92/43/EEC)
- Environment Agency (1997) An Environmental Strategy for the Millennium and
Beyond, HO-9-97-100K-D-BABF
- Environment Agency (1998) 1997 – 1998 annual review. HO-8/98-16k-D-BCPX
- Environment Agency (1998) 1999/2000 corporate plan summary. HO-8/98-16k-
D-BCQI
- Environment Agency (1998) Annual Environmental Report for the Agency's Own
Activities 1997/98 – Summary. HO-8/98-10k-C-BDGX
- Environment Agency (1998) A Price Worth Paying. The Environment Agency's
proposals for the National Environment programme for water companies
2000 – 2005, a submission to government, May. HO- 5/98-2k-C-BCKZ
- Environment Agency (1998) Aquatic Eutrophication in England and Wales – a
proposed management strategy – Consultative Report –HO-10/98-2K-
CBDWR
- Environment Agency (1998) Corporate Plan 1999 – 2000, Our Forward Look to
2002. HO-8/98-3k-A-BCQG
- Environment Agency (1994) Guidance for the Control of Invasive Plants near
Watercourses, Japanese Knotweed, Giant Hogweed and Himalayan Balsam.
HO-9/94-20k-C-AKVI
- Environment Agency (1997) Integrated Pollution Control: An Introductory
Guide. HO-12/97-10k-C-AZWT

- Environment Agency (1997) Liaison with Local Planning Authorities. HO-3/97-3.5k-C-AXFI
- Environment Agency (1997) Policy and Practice for the Protection of Floodplains. HO-01/97-10k-B-AXFQ
- Environment Agency (1998) Policy and Practice for the Protection of Groundwater. J 40899 4/98
- Environment Agency (1998) South West Regional Pollution Prevention and Control 1997 General Quality Assessment (GQA) and River Ecosystem – WQ Technical Series GQA15F
- Environment Agency (1996) The Environment Agency and Sustainable Development - MAFF B9709, 96EP189/1
- Environment Agency (1996) The Environment of England and Wales - A Snapshot, HO-4/96-5K-A-ATVT (updated on Agency Website)
- Environment Agency Understanding Buffer Strips - HO8965KDAVJK
- Environment Agency (1998) Waste Minimisation and Recycling Directory - North Wessex Area - SW1/98-5K-E-BAOT
- Environment Agency (1997) Annual Review of the Lower Bristol Avon Catchment Management Plan
- Environment Agency (1996) Annual Review of the Upper Bristol Avon Catchment Management Plan
- Environment Agency (1998) Second Annual Review of the Lower Bristol Avon Catchment Management Plan
- Environment Agency (1997) Second Annual Review of the Upper Bristol Avon Catchment Management Plan
- Environment Agency Nature's Way – A guide to surface water best management practices, the effective and economical answer to non-point source pollution - HO-5/97-20K-C-AYJI
- Environment Agency - Green Shoots our Vision for Environmental Education – HO-1/97-2K-D-AXFG
- Environment Agency and Local Government Association, Memorandum of Understanding (1998)
- Environment Agency Flood Warning Dissemination Plan for Somerset and Avon areas, North Wessex
- Environment Agency (1998) Severn Estuary Strategy Joint Issues Report, Severn Estuary Strategy
- HMSO (1990) Environmental Protection Act
- HMSO (1991) Land Drainage Act
- HMSO (1995) The Environment Act
- HMSO (1974) Control of Pollution Act
- HMSO (1989) Control of Pollution (Amendment) Act
- HMSO DoE Circular 30/92 Development and Flood Risk
- HMSO (1993) Radioactive Substances Act
- HMSO (1975) Salmon and Freshwater Fisheries Act
- HMSO (1991) Water Resources Act
- HMSO (1981) Wildlife and Countryside Act HO-6/94-5k-C JTG
- HMSO (1986) Control of Pesticide Regulations. SI 1510
- HMSO (1974) Health and Safety at Work Act
- HMSO (1980) The Control of Pollution (Special Waste) Regulations. SI 1709

- HMSO (1989) Sludge (Use in Agriculture) Regulations. SI 1263
- HMSO (1990) Code of Practice for the Safe Use of Pesticides on Farms and Holdings. MAFF
- HMSO (1992) Code of Good Agricultural Practice for the Protection of Air. MAFF/WOAD
- HMSO (1993) The Forests & Water Guidelines
- HMSO (1993) Code of Good Agricultural Practice for the Protection of Water. MAFF/WOAD
- HMSO (1993) Code of Good Agricultural Practice for the Protection of Soil. MAFF/WOAD
- HMSO (1994) Waste Management Licensing Regulations. SI 1056
- HMSO (1995) Making Waste Work. Department of the Environment and The Welsh Office – ISBN 0-10-130402-1
- HMSO (1998) Less Waste More Value DETR – 98EP0055
- HMSO (1995) Biodiversity: the UK Steering Group Report. London, 2 Vols.
- HMSO (1996) The Special Waste Regulations. SI 972
- HMSO (1996) A Review of the Potential Effects of Climate Change in the United Kingdom. UK Climate Change Impact Review Group
- HMSO (1993) Methodology for Identifying Sensitive Areas (Urban Waste Water Treatment Directive) Department of Environment Consultation Paper
- HMSO (1993) Methodology for Designating Vulnerable Zones (Nitrates Directive). Department of Environment Consultation Paper
- NRA (1992) Policy and Practice for the Protection of Groundwater – ISBN – 0-11-885822-X
- NRA (1995) Tomorrow's Water, NRA South Western Region Water Resources Strategy. SW-4/95-1k-B-ANOQ
- NRA (1995) Saving Water - The NRA's Approach to Water Conservation and Demand Management. HO-9/95-1.5k-B-AQHH
- NRA (1994) The Quality of Rivers and Canals in England and Wales (1990 to 1992) Water Quality Series 19. HO-6/94-5k-C JTG
- NRA (1991) The Quality of Rivers, Canals and Estuaries in England and Wales. Water Quality Series 14
- NRA (1995) Lower Bristol Avon Catchment Management Plan consultation report – NRA South West Region SW-6/94-1K-E-AKBE
- NRA (1994) Upper Bristol Avon Catchment Management Plan consultation report NRA South West Region SW-3/95-1K – E-AKBD
- The Vincent Wildlife Trust The Water-Vole (*Arvicola terrestris*) in Britain 1989-1990: Its Distribution and Changing Status – ISBN –0-94-6081-23-9
- Somerset County Council (1996) Waste Management Strategy for Somerset

Other information is available from our website at <http://www.environment-agency.gov.uk> including an up-to-date national 'State of the Environment Report'.

MANAGEMENT AND CONTACTS:

The Environment Agency delivers a service to its customers, with the emphasis on authority and accountability at the most local level possible. It aims to be cost-effective and efficient and to offer the best service and value for money.

Head Office is responsible for overall policy and relationships with national bodies including Government.

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Kings Meadow Road
Reading RG1 8DQ
Tel: 0118 953 5000
Fax: 0118 950 0388

WELSH

Rivers House/Plas-yr-Afon
St Mellons Business Park
St Mellons
Cardiff CF3 0LT
Tel: 01222 770 088
Fax: 01222 798 555



For general enquiries please call your local Environment Agency office. If you are unsure who to contact, or which is your local office, please call our general enquiry line.

ENVIRONMENT AGENCY GENERAL ENQUIRY LINE

0645 333 111


The 24-hour emergency hotline number for reporting all environmental incidents relating to air, land and water.

ENVIRONMENT AGENCY EMERGENCY HOTLINE

0800 80 70 60



**ENVIRONMENT
AGENCY**



All enquiries to:
**North Wessex Area
Rivers House
East Quay
Bridgwater
Somerset
TA6 4YS**