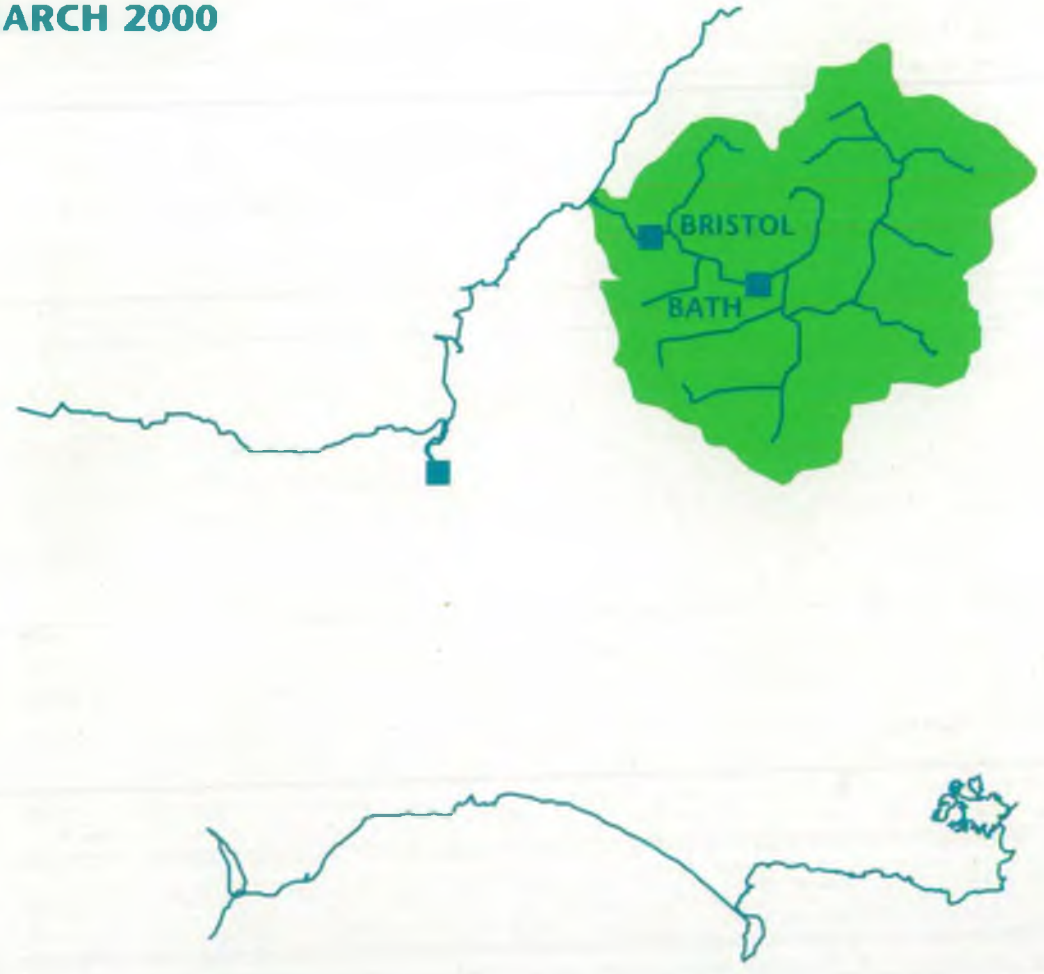
local environment agency plan

BRISTOL AVON

ACTION PLAN

MARCH 2000



ENVIRONMENT AGENCY

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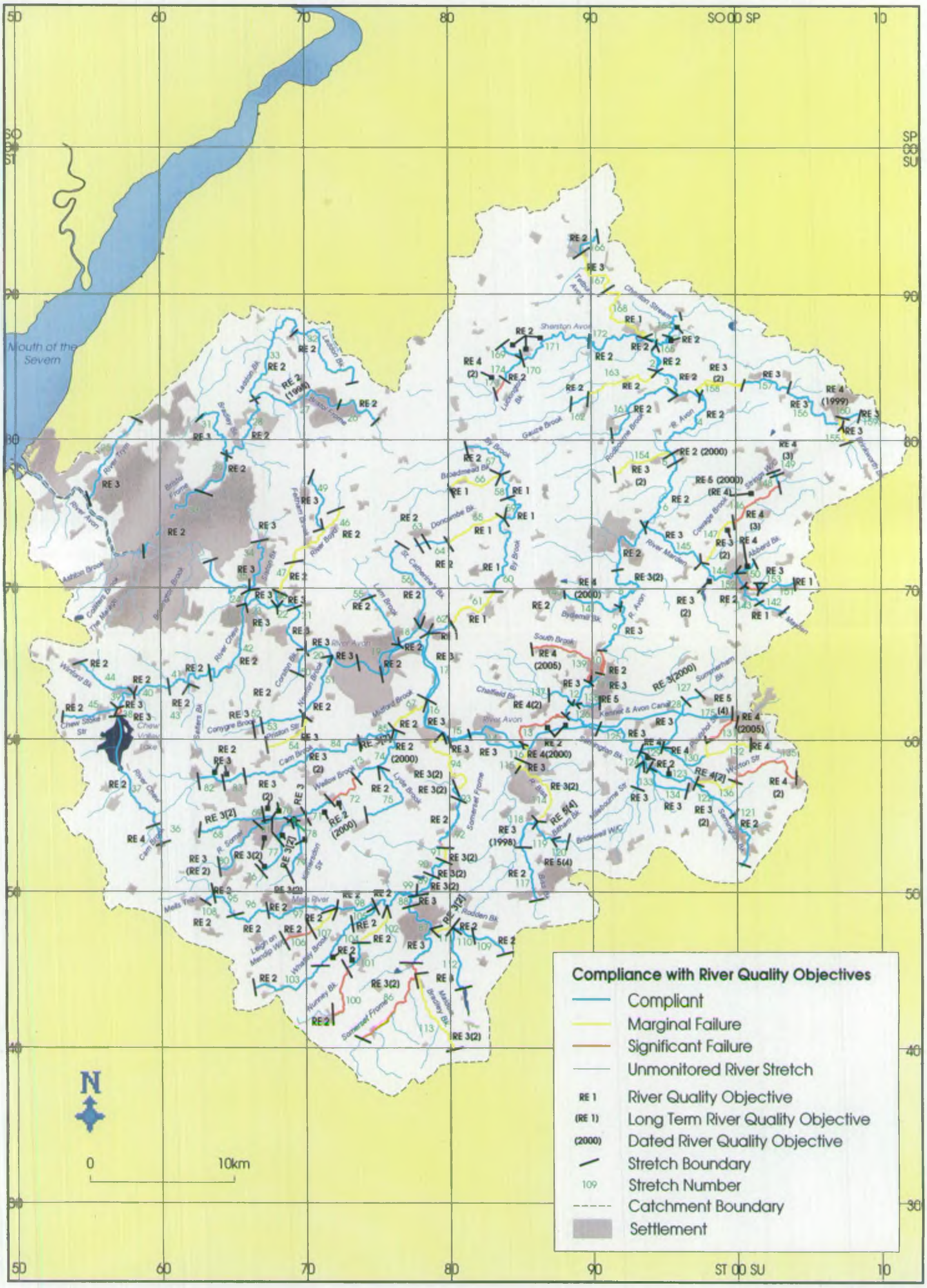

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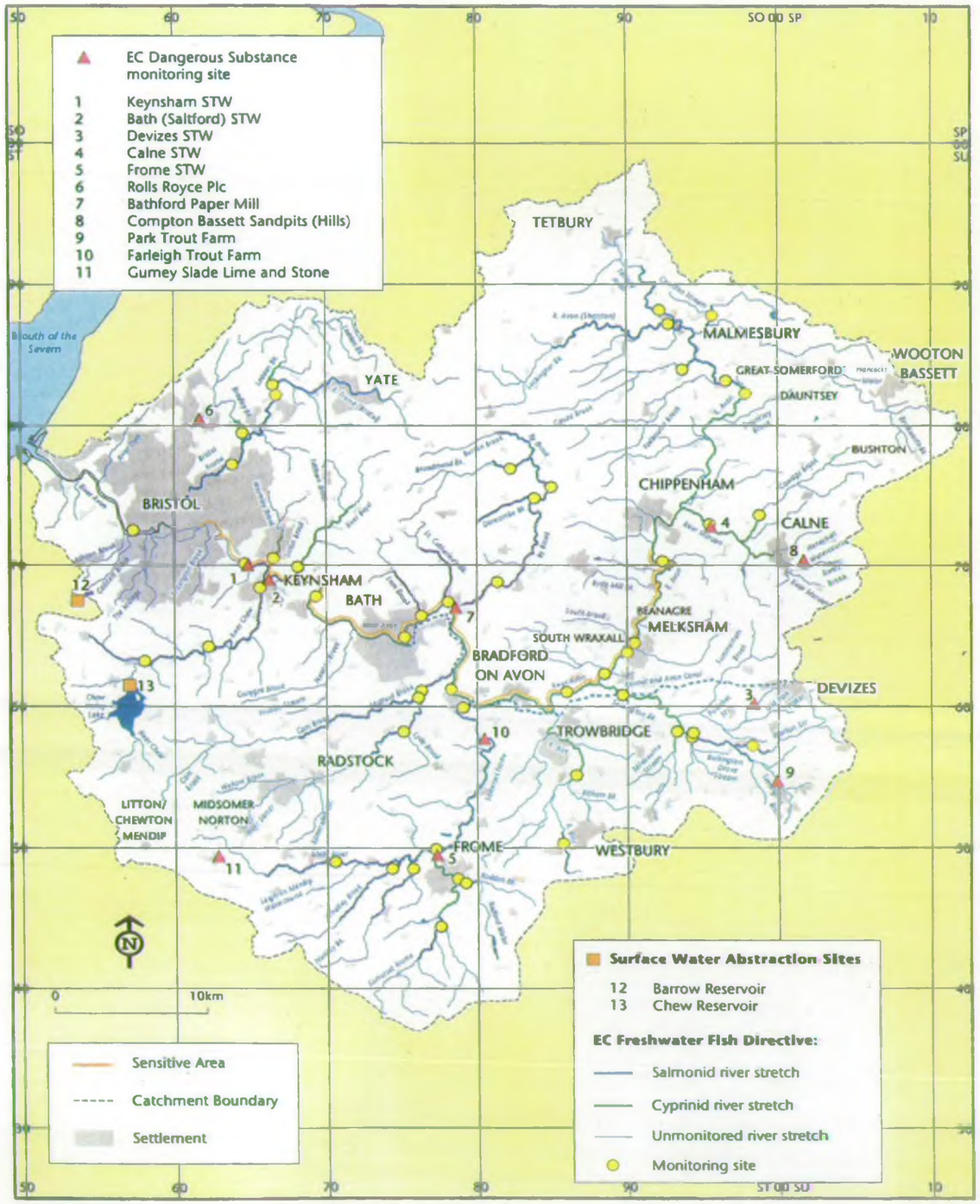

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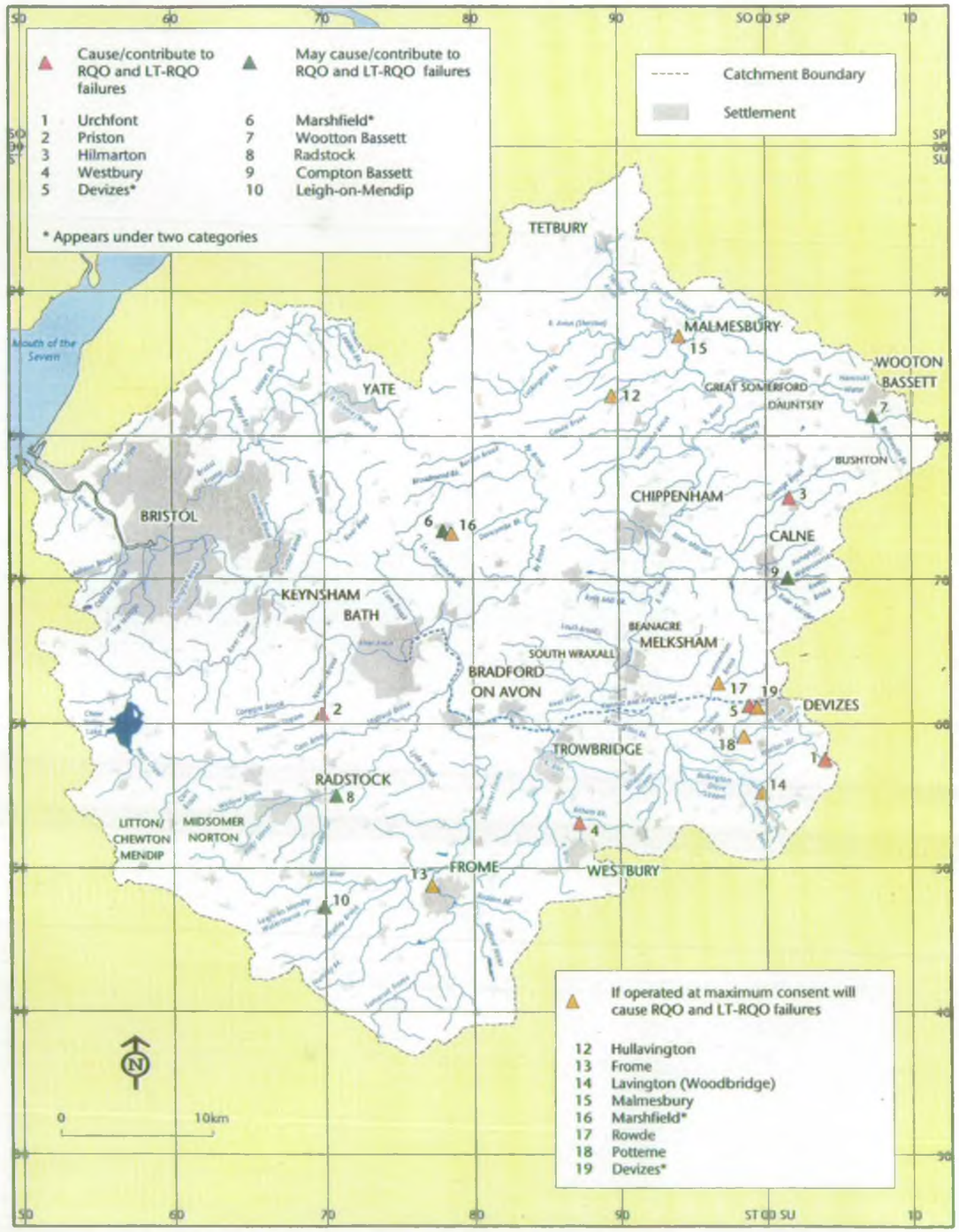

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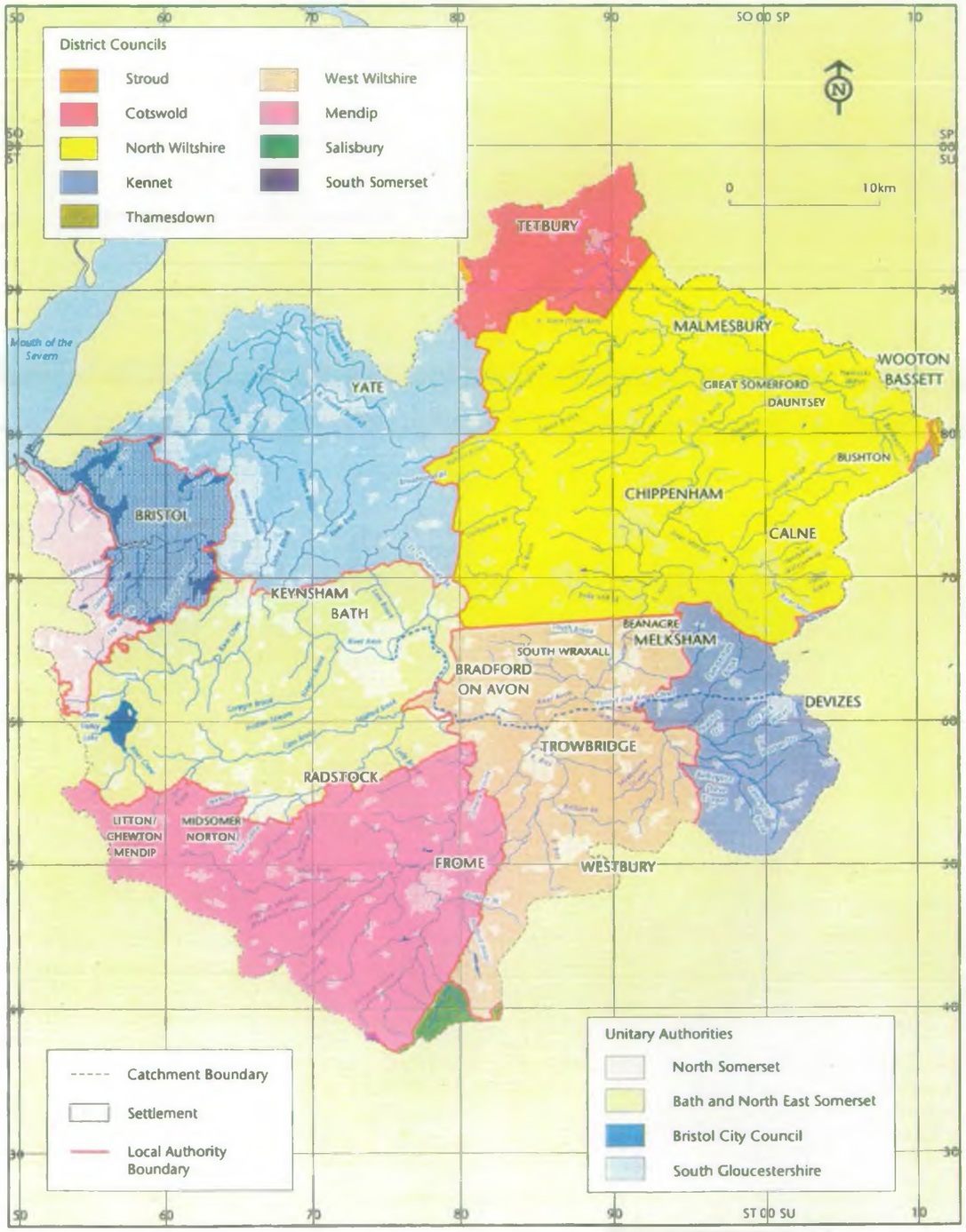
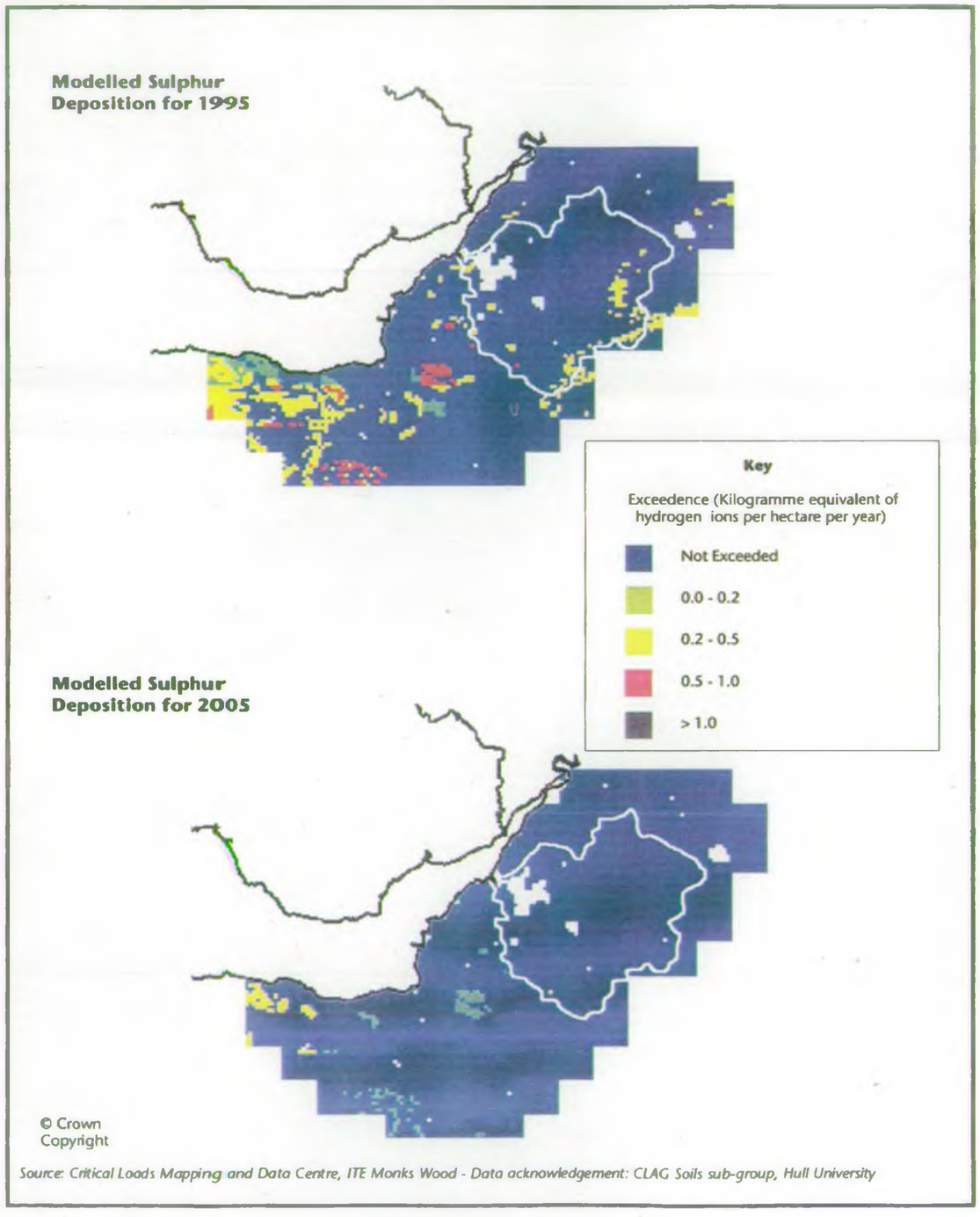


Map 2 - Exceedences of critical loads of acidity for soils



Source: Critical Loads Mapping and Data Centre, ITE Monks Wood - Data acknowledgement: CLAG Soils sub-group, Hull University

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 areas of intensively managed farm land and increasing urbanisation 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.

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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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1. 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 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. The creation of the Agency was a recognition of the need to take a more integrated and longer-term view of environmental management at a national level. We have to reflect this in the way we work and 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 Section 11.1.5) 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 are irreversible. We must develop our role to educate and inform society, as well as carry out our prevention and enforcement activities to ensure the environment is protected and enhanced. Our national corporate aims are set out in Appendix 12.2.

Our vision is:

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

1.2 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

1.3 About 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 to solve global environmental problems, local action is crucial: we must think globally, but act locally. We are committed to Local Environment Agency Plans (LEAPs) to produce our programme of integrated action for environmental improvement. These plans continue the work started by one of our predecessor organisations, the National Rivers Authority.

LEAPs help us to identify, 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 for the benefit of 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 was followed by a three-month period of formal consultation. The purpose of this was to enable the Agency, external organisations and the general public to liaise and reach a consensus about the management of the area. We have produced a report on the consultation which is available from our Bridgwater office.

LEAP Action Plan - This LEAP Action Plan takes into account the results of consultation and views expressed. It contains a list of actions that consider costs and benefits, and identify time-scales 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 arise. **We invite readers to contact us to raise new issues or suggest new actions - this ensures the LEAP process is a live one, evolving to meet the changing needs of the local environment.**

Many of the actions identified in the National Rivers Authority'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 Catchment Management Plan Annual Reviews, published in June 1998, are the last to be produced as the work of the National Rivers Authority 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.

The LEAP Process:

1.4 Earlier Consultation

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

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 Consultation Draft.

1.5 The Bristol Avon Catchment

The Bristol Avon has a large catchment encompassing the two major cities of Bristol and Bath, as well as diverse industry, varied agriculture and increasing tourism. The river basin is encircled by the hills of the Cotswolds, Salisbury Plain and the Mendips. It runs through gentle rural landscapes and old towns such as Bradford-on-Avon and Bath, before bursting through the Clifton Gorge to the sea. This valuable resource is under pressure from human activity and this Plan shows how the Environment Agency is working with its partners to protect and enhance it.

Annual rainfall varies from approximately 700 mm in the north-west of Bristol and the east of the catchment, to 1200 mm on the Mendips in the south.

The main River Avon is a slow-flowing lowland clay river, which has been modified by impoundment, land drainage and flood alleviation engineering. The intensive agriculture in the floodplain has resulted in there being 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. Subsequent silting and changes to depth has brought about changes in plant communities.

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 resulted in an impoverished landscape so the river corridors have become important linear elements which must be conserved and enhanced where they have become degraded.

The Bristol Avon catchment supports a diverse range of wildlife and plant species, including a number of key biodiversity species such as the otter, water-vole and native crayfish. Watercourses of particularly high conservation value include the Marden, the only true chalk stream in the Avon catchment, the By Brook and the River Mells, both spring-fed calcareous (containing dissolved limestone) rivers.

Small populations of native crayfish are known to occur in some of the Avon tributaries but are under threat from the spread of crayfish plague carried by signal crayfish. Water-vole, which are in serious decline across the UK, are also found in some of the upper tributaries. There is evidence of otter in parts of the catchment, suggesting that the River Avon may in the future be an important corridor for their movement and colonisation of the area. The nationally rare Loddon pondweed occurs in the River Avon below Bradford-on-Avon. Two nationally rare species of dragonfly, the white-legged damselfly and scarce chaser, have also been recorded.

The river corridor acts as a vital link between other scattered habitats and wildlife within the wider countryside. Even the rivers of highly urbanised sections of the catchment, such as the Bristol Frome, are important for wildlife providing the only semi-natural habitat within otherwise urban areas. At its mouth, the River Avon flows into the Severn Estuary which is internationally important for nature conservation,

reflected in its designation as a Special Protection Area, RAMSAR site and a candidate Special Area for Conservation.

The Bristol Avon catchment supports a diverse fish fauna and at least twenty species of coarse fish are present. It is highly regarded as a coarse fishery and is important for match and pleasure fishing. 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 coarse fish and grayling are 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.

There are many opportunities for recreation and amenity. In addition to angling, the river 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 11.1.5) 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 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. There are dairy and food processing plants in several of the settlements. In recent years 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. 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 Draft Strategy (the former due for publication in early spring 2000, the latter later in the year).

The natural environment is under pressure from the large population in the area. The major settlements are Bristol (390,000) and Bath (82,000). 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 increased 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. 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. Chemical water quality is measured annually and biological quality is measured every five years. In 1998, 62.91% of monitored river lengths were of good or very good chemical quality and 23.37% were of fairly good quality. Chemical water quality has improved considerably since 1997, although there are still parts of the catchment where it is not good enough. These shortfalls in quality are described in this Action Plan. The next major review of water quality is due later this year. In biological terms, in 1995 78.4% of the monitored river lengths were of very good or good quality and 20% were fairly good.

1.6 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 plan for sustainable development and to consider planning applications, and land use.

The Agency is the Government's authority for environmental protection and enhancement and has 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 with the planning authorities we can be more effective in working towards more sustainable development. This LEAP identifies some issues of common interest. There are eleven local authorities in the Bristol Avon area and 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 in spring 2000. 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.

1.7 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 redirecting 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 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 and so then will 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 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, '00' represents the financial year April 2000 to March 2001. 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.

2. Water Resources

Water is an essential but finite resource. One of the Agency's roles is to protect the water environment (rivers, lakes and wetlands) from over-abstraction and other forms of detrimental interference whilst considering the needs of the public, agriculture and industry.

The Agency is not responsible for the supply of water to households and industry but has a central role in water resources planning in England and Wales. We contribute to protecting the environment by looking at use of water in the home and at work, and the water that is available for these uses, without damaging the environment. This may involve correcting any imbalances or over-abstraction. We continue to protect the environment by comparing future demands for water with water availability and balancing the two in an environmentally sustainable manner. To achieve this we work closely with the water companies requiring them to submit detailed Water Resource Plans (see Section 11.1.8 Water Companies).

One of the tools available to the Agency to aid the management of water resources is the issue of abstraction licences for specified volumes, purposes and sources of supply. The abstraction licence may include conditions to control abstraction of water to minimise environmental impact. The abstraction licensing system for England and Wales was reviewed during 1997/98 and a number of changes were proposed and consulted on. 'Taking Water Responsibly', a paper detailing the Government decisions following consultation, was published in March 1999 and is available from the Department of the Environment, Transport and the Regions (DETR). The full nature and impact of changes will not be confirmed 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 (blocks 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 groundwater is particularly important in this catchment.

At the end of 1999, there were 499 active licences in the LEAP area, representing a total licensed quantity of 193,621,000 cubic metres per year and 742,000 cubic metres per day. The breakdown of these licences in terms of use is as follows:

	% of total licences	% of daily abstraction	% of annual abstraction
• General agriculture	45	0.4	0.5
• Spray irrigation (agriculture)	13	0.3	0.3
• Other spray irrigation eg golf courses	5	0.5	0.2
• Fish farming	4	4.1	4.5
• Industrial	10	25	24.3
• Public water supply	10	67	68.9
• Private supply	3	0.1	0.1
• Others	10	1.1	1.1

The area is served by both Bristol Water Company and Wessex Water Services Limited for public water supply.

Water resource planning is carried out over large geographic areas often extending over several LEAP boundaries. As a result it is difficult to obtain data for specific LEAP areas and the precise impact of

new development on water resources solely within the LEAP area can be difficult to predict. Before any new resources can be developed or those existing developed further, the Agency must be satisfied that water companies have looked in detail at a range of appropriate options. These include encouraging people to use water more efficiently (demand management), increasing the efficiency of uses of sources (resource management) and increasing efficiency of pipe networks (distribution management) as well as reducing their leakage towards an acceptable level.

Metering, combined with appropriate tariffs, is a major driver towards implementing demand management and water efficiency measures. All new domestic properties connected to public water supply are now metered and, from 1 April 2000, all domestic customers can choose to have a free meter fitted and be charged on metered use. At the end of the first year they have the choice to revert to charging based on rateable value if they wish, but after this the customers are not permitted to vary how they are charged for their water supply.

Water companies have a duty to promote efficient use of water and the Agency expects that they should pursue this duty with imagination and vigour. Both Bristol Water and Wessex Water have published water efficiency plans which contains strategies to deliver water savings by the customer. Bristol Water's plan includes advice on how to save water in the home and garden. For business customers there are details of free leakage surveys and repairs and commercial water audit services. The company have a number of other publications promoting water efficiency including an education pack for children. Wessex Water's plan includes details of their free customer supply pipe repairs and water audits. There are details of the initiatives to encourage business customers to save water such as advice leaflets and tariffs. Wessex Water also have an education officer, who works with and in schools across their area, and a number of education centres for example at Trowbridge which is within the Bristol Avon LEAP area.

Extra resources can be obtained from making savings through reducing leakage. The Water Companies are set leakage targets each year by the Government's Office of Water Services (OFWAT). They are bound to meeting these but can set lower targets if they wish. Bristol Water have a target of 54.8 million litres a day (Ml/d) for 2000/01, which is unchanged from 1999/00. Their actual leakage in 1998/99 was 56.4 Ml/d which was below their target for that year. Wessex Water have been set a target of 85.0 Ml/d for 2000/01 compared with a target of 89.0 Ml/d in 1999/00. Their actual leakage in 1998/99 was 100.3 Ml/d which was below their target for that year.

Bristol Water have a combination of surface and ground water sources with the main supplies for the LEAP area coming from the River Severn via the Gloucester and Sharpness canal and Chew Valley Lake; another significant source is the River Avon itself (see Issue 2.2). Wessex Water use areas known as Resource Zones in order to help manage the way in which they supply water. The Bristol Avon LEAP area is part of the North Resource Zone which supplies water to most of Somerset and parts of Dorset. The main supplies in this area come from the River Avon (see Issue 2.2) and a number of springs and smaller sources.

The average family uses approximately 146 cubic meters (32,000 gallons) of water per year and within the home there are many opportunities to help reduce this figure, for example...

- turning taps off, not washing or brushing teeth under a running tap, taking showers rather than baths;
- washer replacement, rapid repair of leaks;
- low flush toilets, normal rather than power showers, water efficient washing machines and dishwashers
- water butts, trigger switches on hose pipe nozzles, drought resistant garden plants, mulch on flower beds to retain moisture and restrict weed growth

The workplace and industry also offer many opportunities to reduce water use (and save money). Measures outlined above may be suitable together with process/site specific measures. Examples of these and other water efficiency measures are detailed in the document *'Saving Water on the right tracks 2'* which can be obtained from the Agency.

Rainwater collected from roofs and recycled household waste wash water (greywater) can be used for toilet flushing and garden watering. It offers potential for large water savings but to encourage more rapid development and take-up of suitable systems there is a need for water quality standards to be established for this use.

Actions	Action By	Cost to Agency (£K)	Financial Year 00	01	02	03	04
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	1	●				

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, including fish, 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 W S Atkins to ascertain the reasons for the apparent reduction in flows.

The study concluded that abstraction from the Great Oolite aquifer 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.

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. Stream support can be defined as the addition of groundwater to streams, usually during summer months when river flows are low, to help compensate for the effects of abstraction and minimise environmental impacts. In the Malmesbury area the stream support water is pumped from a deep aquifer, the Inferior Oolite.

The Director General of OFWAT, in his determination of water company prices for 2000-2005, did not include funding for the remedial scheme for the Malmesbury Avon presented by Wessex Water. The scheme was submitted by the company as a consequence of a requirement from the Agency that action should be taken before 2005 to reduce Wessex Water's abstraction by 10Ml/d (Bristol Water's submission, also involving a 10Ml/d reduction in licensed abstraction from their sources in the catchment, was included). The Minister for the Environment, while accepting OFWAT advice that the most cost-effective remedy deserved further study, announced that a scheme will need to go ahead in the pricing period to address these and other environmental problems elsewhere within Wessex Water's supply area. Officials of the DETR have been charged by Ministers to conduct a review of the options and to involve the Agency and other key organisations.

Both companies and the Agency are committed to implementing full and lasting remedies reflected in changed abstraction licences and operational practices by the year 2005.

The proposed reduction in licensed abstraction of 20Ml/d will lead to an improvement in river flows. To maximise the potential benefit from increased stream support, the Agency are in the process of determining an environmentally acceptable flow regime at Great Somerford. The Institute of Freshwater Ecology have been commissioned 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.

In the past, very low flows on the Sherston Avon in Malmesbury have been exacerbated by leakage from Daniel's 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.

There are five other sites in the Bristol Avon catchment where we are investigating low flow issues:

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 rainfall but that groundwater abstractions, may possibly have some effect.

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.

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 Broughton Gifford.

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

Actions	Action By	Cost to Agency (£K)	Financial Year 00 01 02 03 04
2.2.1 We will continue our work to identify an environmentally acceptable flow regime at Great Somerford and to evaluate how best to use increased stream support to balance the competing demands for water use, recreation and the environment. **Contact: Hydrologist, Regional Water Resources**	Agency, Institute of Freshwater Ecology (IFE)	15	●
2.2.2 We will continue to examine the sustainability and relative benefits of increased stream support via field trails and various modelling techniques. **Contact: Hydrologist, Regional Water Resources**	Agency	15	● ● ● ● ●
2.2.3 Public water supply licence conditions will be varied in agreement with Wessex Water and Bristol Water **Contact: Hydrologist, Regional Water Resources**	Agency, Wessex Water, Bristol Water	-	● ● ● ● ●
2.2.4 We will consult with relevant parties for the restoration of Daniel's Well Leat. **Contact: Area Water Resources Team Leader**	Agency	2	●
2.2.5 We will continue to implement the findings of the consultant's report for the By Brook. **Contact: Area Water Resources Team Leader**	Agency, Friends of the By Brook	40	● ● ●
2.2.6 We will investigate perceived low flow issues in the River Marden. The investigations are identified for completion by 2004. **Contact: Area Water Resources Team Leader**	Agency, Wessex Water	10	● ● ● ● ●
2.2.7 We will investigate perceived low flow issues in the St. Catherine's Brook. The investigations are identified for completion by 2004. **Contact: Area Water Resources Team Leader**	Agency, Wessex Water	10	● ● ● ● ●
2.2.8 We will investigate perceived low flow issues in the Chalfield Brook. The investigations are identified for completion by 2004. **Contact: Area Water Resources Team Leader**	Agency, Wessex Water	20	● ● ● ● ●
2.2.9 We will investigate perceived low flow issues in the Luccombe Springs. The investigations are identified for completion by 2004. **Contact: Area Water Resources Team Leader**	Agency, Wessex Water	10	● ● ● ● ●

2.3 Issue: The impact of quarrying on water resources

There is a need to recognise the economic importance of the quarrying industry and the potential for biodiversity, amenity, recreation, employment, water, storage and supply etc. Opportunities should be harnessed through a co-ordinated approach (see Issue 8.1).

Mineral extraction can affect both the quality and 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 of major ecological significance. The water table may in some cases be permanently lowered leading to reduction or loss of spring flows. During quarrying 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, and 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	Active Sites	Inactive Sites
1 Whatley Quarry	17 Sandridge Quarry	1 Lime Kiln Hill Quarry
2 Holwell Quarry	18 Tytherington Quarry	2 Westdown Quarry
3 Torr works	19 Chipping Sodbury Quarry	3 Cloford Quarry
4 Halecombe Quarry	20 Stowey Quarry	4 Asham Quarry
5 Gurney Slade Quarry	21 Shortwood Claypit	5 Barnclose Quarry
6 Moons Hill Quarry	22 Upper Lawn Quarry	6 Cookswood Quarry
7 Chelynch Quarry	23 Hayes Wood Mine	7 Stoke Lane Quarry
8 Chilcompton Quarry	24 Combe Hay Mine	8 Emborough Quarry
9 Westwood Mine	25 Wick Quarries	9 Highcroft Quarry
10 Durnford Quarry	26 North Wick Claypit	10 Tadhill Quarry
11 Westbury Claypit	27 Compton Bassett Quarries	11 St Andrews Quarry
12 Westbury Chalk Quarry	28 Compton Bassett Landfill	12 Farrington Quarry
13 Westwood Quarry	29 Sands Farm Quarry	13 Clapton Quarry
14 Monks Park Mine	30 Freemans Farm	14 Corsham Quarry
15 Knockdown Quarry & Landfill	31 Elm Park Mine	15 West Cranmore Quarry
16 Veizeys Quarry	32 Botleaze Wood Quarry	16 Eastlays Mine

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 a 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. Our role is one of active participation in the planning arena 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 00 01 02 03 04
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**	Somerset County Council, local authorities, Agency, quarry producers	15k on new monitoring site, 10k staff costs	● ● ●
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**	Agency	2.5	● ● ●
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**	Agency, Somerset County Council, quarry operators, Wiltshire County Council, Mineral Planning Authorities	10	● ● ●
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**	Agency, Somerset County Council, quarry operators Wiltshire County Council Mineral Planning Authorities	10	● ● ●

2.4 Issue: Canals

Kennet and Avon Canal - The Kennet and Avon Canal is a significant waterway in the upper part of the Bristol Avon, running from Claverton at Bath to the Caen Hill series of locks before leaving the catchment at Devizes. British Waterways were awarded a £25 million lottery grant in 1996 and a major programme of work to improve the canal infrastructure is in progress.

Wilts and Berks Canal - We are sympathetic to the aims of local communities who are trying to restore abandoned canals. 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 Canal Trust investigating the possibility of restoring the canal. The project could take at least 15 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 initial water resource requirements have been identified in the report, and we may have to consider them in greater depth if restoration is likely to proceed to the stage of requiring watering i.e. an abstraction licence/operating agreement will be required to supply any water. The environmental impacts and costs and benefits to both donor and recipient sources will require careful investigation.

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

Worton Mill, formerly a working flour mill, is located on the Semington Brook at Worton. The current owners operate a turbine for domestic electricity. 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 00	01	02	03	04
2.5.1 We will continue with the study to identify the causes of the problems and negotiate a solution if mill operations are detrimental. **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 and 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). 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 and are characterised by higher levels of nutrients. 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 those stretches of designated water which failed to comply with the standards are listed in Section 7 of this Plan, grouped according to which of the various impacts on water quality, e.g. agricultural discharges or sewage treatment works discharges, are likely to have affected the quality of water in that particular stretch. Actions to seek to reduce the incidence of non-compliance are included.

The DETR have recently reclassified the Bulkington Drove Watercourse from a salmonid to a cyprinid watercourse, following the recommendation of the Environment Agency. 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.

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

- Impoundment 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 Issue 7.8: The impact of nutrient pollution and nutrient enrichment and Issue 2.2: 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 hold good stocks of coarse fish with the middle to upper reaches supporting good numbers of brown trout. 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 when funds become available;
- habitat improvements both for coarse fish and trout, and the restoration of disused back channels.

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

We have successfully reintroduced native crayfish to sections of the Sherston and Tetbury Avon. We are trapping and recording the distribution and status of existing populations in the North Wessex Area and need to complete this before we target further sites for reintroduction. Previous reintroduction of crayfish indicate that populations stay local and a number of viable introductions along a river length would be necessary. In the summer of 1999, a student collated existing survey records and sightings of both native and signal crayfish for our biodiversity database. This information is currently used for screening purposes when assessing applications for licences, consents or planning. The issue of the conservation of the native crayfish is covered in Section 4: Biodiversity, Issue 4.3.

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 we need to build further fish passes at certain weirs. At present we do not have the resources to carry this out; we are seeking funding to enable us to start this work.

Actions	Action By	Cost to Agency (£K)	Financial Year 00 01 02 03 04
3.1.1 We will seek funding and opportunities to provide fish passes at impassable weirs causing obstruction to migrating fish. **Contact: Fisheries Team Leader**	Agency	10	● ● ● ● ●
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**	Agency	6	●

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

Actions	Action By	Cost to Agency (£K)	Financial Year 00 01 02 03 04
3.2.1 We (with the Institute of Freshwater Ecology) will complete an angling survey to help set minimum environmentally acceptable flows at Great Somerford. **Contact: Fisheries Team Leader**	Agency (see Action 2.2.1)	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 for particular habitats and species are currently being developed by local authorities, English Nature (EN), Wessex Water Services Limited and others. We are providing input to some of these plans.

Biodiversity is a key indicator of sustainable development.

Further to our work on the UK Biodiversity Action Plan, we will assist in the management of protected sites in the area such as: Sites of Special Scientific Interest, RAMSAR sites, Special Areas of Conservation (SAC) under the EC Habitats Directive, and Special Protection Areas (SPA) under the EC Birds Directive.

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,
- South Gloucestershire Council,
- Bath and North East Somerset Council,
- Bristol City Council.
- Wiltshire Wildlife Trust (in partnership with Wiltshire County Council, West Wiltshire and North Wiltshire local authorities)

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 has agreed to be the contact point for five habitats and twenty-nine 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, together with Wiltshire Wildlife Trust and British Waterways are in the third year of a strategic survey on water-voles. Avon Wildlife Trust and partners will be surveying South Gloucestershire and Bristol City Council streams this year. Flood defence are considering reducing maintenance on a number of Semington Brook tributaries where water-voles are present. The Agency also has an important role to play in partnership with others in the conservation of other water-related habitats including coastal and floodplain grazing marsh, 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 Issue 7.14 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

Specific problems to biodiversity in this catchment include:

- invasive alien plants which dominate river margin vegetation (see Issue 7.16: Invasive plants).
- extensive death of riverside alder trees due to the disease Phytophthora (see Issue 7.15: Phytophthora).
- the increasing decline in native crayfish in their traditional habitats due to displacement by the introduced American signal crayfish (see Issue 4.3).

Actions	Action By	Cost to Agency (£K)	Financial Year 00	01	02	03	04
4.1.1 We will implement a five-year plan of priority sites for restoration. **Contact: Conservation Team Leader**	Agency	see Action 7.14.1, 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**	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), Wiltshire Wildlife Trust and English Nature	15	●	●	●	●	●
4.1.3 Otters: We will provide suitable conditions, where appropriate, to enable natural colonisation of the catchment. **Contact: Conservation Team Leader**	Agency, Wildlife Trusts, riparian owners, FWAG	2	●	●	●	●	●
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	15	●	●	●		

4.1.5 Coastal and floodplain grazing marsh: 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	5	● ● ● ● ●
4.1.6 Tufa depositing springs: A survey has been completed to assess the value of this habitat. The results of this will be used to develop a conservation strategy, particularly in the Mells Valley. **Contact: Conservation Team Leader**	Agency, Somerset Environmental Records Centre (SERC), FWAG, Wildlife Trusts	5	●
4.1.7 Headwater streams: We will target headwater surveys towards chalk streams. **Contact: Conservation Team Leader/Biology Team Leader**	Agency, Wiltshire Wildlife Trusts	5-10	●
4.1.8 Locally important species (Loddon 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	4	● ● ● ● ●

Mink - some people perceive mink to be a serious threat to biodiversity while others take the view that mink have found a vacant niche and are settling down to reach a balance with their prey. The Agency is not responsible for the control of mink - this falls to the riparian owner. We have a leaflet which gives details on how to control mink which is available from our offices (*Mink - ST-12/95-40. K-C-AQW*)

4.2 Issue: The need for extra protection for key designated European nature conservation sites

The EC Birds Directive and the EC Habitats and Species Directive (which was transcribed into United Kingdom Law as the Conservation (Natural Habitats and Wild Fauna and Flora) Regulations, 1994) place additional responsibilities on us in addition to our normal conservation duties.

The aim of the legislation is to protect and conserve certain species and habitats that are threatened in the European context. The first stage in achieving this is through the establishment of a network of nature conservation sites that will be known as the Natura 2000 Network. The sites are Special Protection Areas (SPAs - designated under the Birds Directive), and Special Areas of Conservation (SACs - designated under the Habitats Regulations). It is Government policy that RAMSAR wetland sites will also be considered under the Regulations.

There are four sites in the Bristol Avon catchment, which will eventually become part of the Natura 2000 network. The Severn Estuary, which is a Special Protection Area, RAMSAR site and candidate Special Area for Conservation, is not included within the area covered by this Plan. The United Kingdom list of candidate Special Areas of Conservation have been criticised by the European Union who require the United Kingdom to propose further sites and amend the boundaries of existing sites to take account of further features of conservation interest. It is possible that further sites will be designated and existing sites will encompass more species and habitats prior to 2004.

Site	Designation	Qualifying Interests
Avon Gorge Woodlands	cSAC	Lime-Maple Ravine forest
Bath & Bradford-upon-Avon	cSAC	Greater Horseshoe bat
Chew Valley Lake	SPA	Shoveler (*Anas clypeata*)
Mells Valley	cSAC	Greater Horseshoe bat

The United Kingdom Government has decided that as soon as a site has been submitted to Brussels for confirmation (ie it has become a candidate site, or candidate Special Area for Conservation), the regulations will apply. This means that the Conservation Regulations already apply to the sites listed above.

Under the Regulations the Agency is a 'Competent Authority', and has extra responsibilities to safeguard the sites.

Any applications for new authorisations required from the Agency, which may have an effect on the conservation interests of a Natura 2000 site, will be subject to an assessment of the impact on the interests of the site. The application can only be granted where the Agency is sure that it will not adversely affect the integrity of the European site.

Further to this requirement, we are obliged to review all existing authorisations (eg consents to discharge, abstraction licences, waste licences etc.) and activities (eg land drainage or flood defence work) which may be affecting the sites, taking the advice of English Nature into account. These licences can be either inside or outside the site, as activities outside the boundary have the potential to affect the site.

Stage II of our review procedure is currently underway using a methodology agreed with English Nature to determine which authorisations are likely to adversely affect these sites. Bids to resource this process are currently being made. At present, a small number of authorisations in the catchment are likely to require review. The review process should be complete by 2004.

Actions	Action By	Cost to Agency (£K)	Financial Year 00	01	02	03	04
34.2.1 We are currently reviewing all authorisations and actions as required by the Habitats Regulations. **Contact: Regional Conservation Team Leader.**	Agency	5	●	●	●	●	●

4.3 Issue: The conservation of the native crayfish

The numbers of native crayfish found in their traditional habitat are diminishing as a result of the introduction of the American signal crayfish. In addition, noble crayfish (a European species) have been found in Litton Reservoir above Chew Valley Lake. The effect of noble crayfish on the native species ecology is not fully understood. At present the two species are not thought to be present in the same area - native crayfish are in the River Chew below Chew Valley Lake. We will continue to survey and monitor native crayfish populations and the spread of signal crayfish particularly within the Sherston Avon, Chew Brook and By Brook catchments to formulate a conservation strategy. There is a threat to native crayfish populations and other invertebrates from synthetic pyrethroids used as agricultural pesticides.

On 16th April 1998 the native crayfish population of the Luckington Brook was heavily reduced by a discharge of a synthetic pyrethroid insecticide. The source of the pollution was found to be the Beaufort Hunt Kennels at Badminton where hounds had been treated with cypermethrin in order to treat mange. The Agency subsequently prosecuted the Joint Master of the Beaufort Hunt.

The incident led to the realisation by Agency staff that the increasing use of synthetic pyrethroid insecticides posed a significant threat to native crayfish and other invertebrate populations. The initial intention was to appoint a project officer to investigate levels of synthetic pyrethroids in the Sherston Avon catchment.

Following an initial investigation this does not now appear to be an appropriate action due to the difficulty of analysing for chemicals which may not occur again in such significant quantities in this

catchment. It would be more productive to liaise with other Agency regions in order to establish the extent of the threat of synthetic pyrethroids to invertebrates nationally and to help develop a strategy to counter this.

Actions	Action By	Cost to Agency (£K)	Financial Year 00 01 02 03 04
4.3.1 We will map and monitor all known populations of crayfish. **Contact: Conservation Team Leader**	Agency	2	●
4.3.2 We will assess the results of the survey on native populations and the spread of signal crayfish particularly within the Sherston Avon, Chew and By Brook catchments to formulate a conservation strategy. **Contact: Conservation Team Leader**	Agency, Wiltshire Wildlife Trust	5	● ● ● ● ●
4.3.3 We will identify further suitable sites for reintroduction of the native crayfish. **Contact: Conservation Team Leader**	Agency	2	●
4.3.4 We will liaise nationally to establish the extent of the threat of the increasing use of synthetic pyrethroids to native crayfish and other invertebrates. **Contact: Environment Protection Team Leader - Upper Avon**	Agency	10	●

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 (Unitary Authority)
- Bath and North East Somerset Council (Unitary Authority)
- Bristol City Council (Unitary Authority)
- South Gloucestershire Council (Unitary Authority)
- North Wiltshire District Council
- West Wiltshire District Council
- Kennet District Council
- Mendip District Council
- Cotswold District Council
- Wiltshire County Council
- Somerset County Council
- Gloucester 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 (see Issue 7.3). To minimise this effect we recommend the use of Best Management Practices (BMPs) or Sustainable Urban Drainage Systems (SUDs) 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. We are working with South Gloucestershire District Council's Environmental Water Management Group which is promoting the use of SUDs by influencing development plans and through a joint project to develop a promotional leaflet for developers. 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 00 01 02 03 04
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	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	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	●

5.2 Soil erosion

We are 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 rates.

We support projects to work with farmers to develop better land management practices, which include measures to reduce soil erosion. The Agency and Bristol Water are currently co-funding research at the University of Bristol into the effect of land-use change on groundwater quality in the Mendips. The postgraduate study is due to be reported in late 2000.

Actions	Action By	Cost to Agency (£K)	Financial Year 00 01 02 03 04
5.2.1 We will contribute to research into the effects of land-use change on groundwater quality. **Contact: Area Water Resources Team Leader**	Agency, Bristol Water	1	●

5.3 Issue: Nitrate pollution

We are concerned about increasing nitrate in surface and groundwater because high levels of nitrate may cause harm to human health. Levels in many places are approaching the United Kingdom 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 diffuse 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 diffuse agricultural nitrate. The land draining to these must be designated as Nitrate Vulnerable Zones. In England and Wales, we will implement government Action Plans to limit nitrate discharges from agriculture within nitrate vulnerable zones. The action programme includes a requirement for farmers in nitrate vulnerable zones to control the timing and rate of application of nitrogen fertiliser and organic

manure used on their land, and to keep formal records of the use of these. Farmers are now required to keep formal records of their use of fertilisers and manure 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 Nitrate Vulnerable Zones and to identify potential new areas.

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

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

Actions	Action By	Cost to Agency (£K)	Financial Year 00	01	02	03	04
5.3.1 We will implement and enforce the Government Action Plan for agricultural nitrate limitation. **Contact: Area Water Resources Team Leader**	Agency	20	●	●	●	●	●
5.3.2 We will contribute to the four-yearly review process (2001). **Contact: Area Water Resources Team Leader**	Agency	10		●			

5.4 Contaminated and derelict land

The precise nature of contaminated land in the catchment is not fully known. New statutory guidance which will be enacted via the forthcoming 'Contaminated Land Regulations' (which implement the contaminated land provisions of the Environmental Protection Act 1990) will require local authorities to identify contaminated land within their area (records are currently held by the Environmental Health Department). Once these sites have been identified, it will be necessary to decide if remedial work is required. Any contaminated land issues will be reported in future Annual Reviews.

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 typical of 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 (see Section 9: Air Quality).

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. Clearly this is not a major problem in this catchment. Currently a few small parts of the Mendips and Wiltshire Downs are slightly affected but planned reductions in emissions, achieved via our regulation of major industry, should see this problem eliminated by 2005. We will include an update in our Annual Reviews.

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

There are no breaches of air quality standards known to be caused by authorised Integrated Pollution Prevention and Control (IPPC) processes in the area (see Section 8: Major Industry).

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.

We license waste management facilities, waste carriers and waste brokers. We have powers to vary, suspend or revoke licences and we investigate and prosecute illegal waste management activities. As a statutory consultee we comment on planning applications for waste management facilities. We do not manage waste management facilities; this is done by private contractors. We do not collect household waste - this is a matter for the Waste Collection Authorities which are part of the District or Unitary Councils.

We aim to encourage people to reduce their wastes and for the wastes that are produced to promote re-use and recycling, such as composting and energy recovery.

Sustainable waste management in England and Wales is set out in the Government's White Paper *Making Waste Work*, published in December 1995. This sets out the waste hierarchy:

Reduction
Re-use
Recovery - recycling, composting, energy
Responsible 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 planning authorities to draw up Waste Local Plans to deliver the land-use planning aspects of waste policy;
- the requirement on local authorities to draw up recycling plans to detail how household recycling targets are to be met;
- the Landfill Tax, introduced on 1st October 1996 and enforced by HM Customs and Excise;
- the provision of recycling credits by Waste Disposal Authorities to third party household waste recyclers;
- 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 draft waste strategy for England and Wales, *A Way with Waste* (1999). The Statutory Waste Strategy should be completed by summer 2000 and will give a blueprint on the steps needed to move towards a more sustainable waste management

system for the next 20 years. The draft strategy sets goals of:

- recovering 45% of municipal waste by 2010
- recycling or composting 30% of household waste by 2010
- reducing the amount of industrial and commercial waste landfill to 85% of 1998 levels.

There are two levels of Landfill Tax, £2 per tonne for inactive (inert) wastes and £10 per tonne 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.

6.1 Issue: The over-creation of waste

Our 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.

The way society views and manages resources is increasingly important if we are to attain the goal of sustainable development. The Environment Agency works directly with government, and in partnership with others, to inform, educate, influence and facilitate significant reductions in the generation of all types of waste so as to promote the sustainable use of resources.

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

- We have carried out the National Waste Production survey of industry and commerce to inform the government's waste strategy.
- We work with the Environment Technology Best Practice Programme (ETBPP) to provide free advice and guidance to companies in the form of seminars, publications and Information Technology materials, for example the Waste Minimisation Interactive Tool (WMIT).
- Our officers promote the ETBPP Free Environment and Energy Helpline on 0800 585794.
- We have produced a waste minimisation video and Best Practice Guide, available free on request.
- We are working in two main partnership projects which aim to improve the environmental performance of companies:
    - South Gloucestershire Waste Minimisation Club with South Gloucestershire Council, Western Partnership for Sustainable Development (WPSD), Filton college and Cory Environmental.
    - LOWEST (Local Waste and Environment Solutions) with North Somerset UA, Bath and Northeast Somerset UA, Business Link West, Bath Environment Centre and PayBack (Groundwork Trust)
- 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 Household Recycling Centres.

Bristol City Council's example is:

- 'The Rubbish Revolution - making waste work for Bristol' project. The Recycling Consortium are developing the Rubbish Revolution Programme from Landfill Tax funding from SITA (a major waste collection and disposal contractor) with the assistance of Bristol City Council, SITA Contract Services and Resourcesaver.

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 00	01	02	03	04
6.1.1 We will promote waste minimisation partnerships as appropriate. **Contact: Tactical Planning Team Leader**	Agency	1 p.a.	●	●	●	●	●

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 to be published in summer 2000. 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. The Agency has carried out a National Waste Production Survey which ran for 6 months and was completed in March 1999. The survey was carried out using stratified statistical sampling of a range of local businesses to find out what, and how much, waste is produced by industry and commerce.

By summer 2000 we will have produced a Strategic Waste Management Assessment for each of the eight Regional Planning Conference areas. The South West Region boundary includes the whole of Gloucestershire, Wiltshire and Dorset. The assessments will include the results from the National Waste Production Survey. Wherever possible the regional information will be broken down into the waste planning authority areas (ie district councils and unitary authorities). The information will be used to inform Waste Local Plans and to guide waste collection and disposal planning. It will also be available to 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. Waste policies will be incorporated into the 'Alterations' of the Bristol Local Plan and will guide the development of waste management facilities. Consultation on the Bristol Local Plan is expected to begin in Spring 2000. The Bristol Household Waste Management Strategy will cover the next 5-10 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.

The Joint Replacement Structure Plan (Deposit) covering the former Avon area, provides a hierarchical policy for the treatment and disposal of waste. The delivery of the Waste Local Plans will be provided by the individual unitary authorities making up the former county of Avon. One of those authorities, South Gloucestershire Council, has produced a Deposit Minerals and Waste Local Plan containing the waste management policies for the Council's area. The Agency provided its response to the plan in November 1999.

The Agency have had some preliminary discussions with Bath and North East Somerset in 1999 on, and provided data for, the preparation of their Waste Local Plan.

Wiltshire County Council published, in February 1997, a Waste Strategy raising issues on waste management in the county. The Waste Local Plan, now currently underway in Wiltshire, is a joint plan with Swindon Borough Council. An Issues and Options Report was circulated for consultation in early 2000 and the Plan is hoped to be adopted in late 2000 or in 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 00	01	02	03	04
6.2.1 We will contribute to strategic waste planning by producing a Strategic Waste Management Assessment (mid 2000) for each planning region, containing information on waste arisings, disposals and waste management facilities within that region. **Contact: Tactical Planning Team Leader**	Agency	4	●				

6.3 Issue: The need to review waste management facility licences

We are 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 January 2000, 18 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 00 01 02 03 04
6.3.1 We will review 18 waste management facility licences and identify sites requiring improvement to licence conditions. **Contact: Waste Licensing Team Leader**	Agency	5	●

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

LICENCE HOLDER	LOCATION	REVIEW PROCESS
J & T Beaven Limited	Field North of Hawcroft Holt	Complete
Western Solvents Ltd	Brook Lane, Westbury	Advanced stage of completion
Wiltshire Waste Recycling Limited	Tinkfield, Devizes	Complete
Westonbirt Girls School	Westonbirt, Gloucestershire	Operations ceased
Hills Aggregates Limited	Compton Bassett Landfill	Complete
Wiltshire Direct Services	Penleigh No.3, Dilton Marsh	Complete
Premiere Environmental Limited	Engineer Road (oil treatment), Westbury	Incomplete - scheduled for 2000
Premiere Environmental Limited	Chemical Road and Engineer Road, Westbury	Complete
Western Skip Hire Ltd	Transfer Station, Lime Kiln Hill Stone Quarry	Advanced stage of completion
Crapper & Sons Limited	Park Grounds Farm, Wootton Bassett	Complete
Mr and Mrs Hudd	Abberds Lane, Calne	Complete
Hughes Waste Management Ltd	Knockdown Quarry, Sherston	Applicant preparing own modifications - as a result of the Agency intention to impose licence modifications, the applicant requested to make a fee-paying licence modification to sweep up both the Agency's concerns and some of theirs.
M J Church Plant Ltd	Star Farm, Marshfield	Complete
Portals (Bathford) Ltd	Bathford Paper Mills	Advanced stage of completion - engineering works are being carried out at the site with a view to cessation.
T Green Metals	The Willows, Allington, Near Chippenham.	Incomplete
G Flower	Wood Lane, Chippenham	Currently in redevelopment programme
Permanite Asphalt Limited	Trinidad Work, Wanstow, Shepton Mallet	Advanced stage of completion - applicant to carry out engineering and monitoring works with a view to surrendering licence
B.F.I. Ltd	Windsor Bridge Road, Bath	Complete

6.4 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 Household Recycling Centres is few in comparison with adjoining areas. A Household Recycling Centre has been licensed at Stanton St. Quintin, and a Materials Recycling Facility has opened at the Compton Bassett landfill site; we have also licensed a site at Parton near Swindon (though this is not in the Plan area). As a result, the situation has improved and we expect further improvements to be made as the Wiltshire Waste Strategy identified the need for more sites which we will have to license. It is acknowledged 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 00	01	02	03	04
6.4.1 We will work with Wiltshire County Council to provide more Household Recycling Centres where needed through their contractor (Hills). **Contact: Waste Licensing Team Leader**	Agency	5	●	●	●	●	●

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 Appendix 12.1. In that section we also outline the stretches in the Bristol Avon catchment for which we are intending to upgrade the RQOs. The timing of the application of these upgrades will depend on policy regarding the upgrading of RQOs which is currently being agreed between the Agency and the Department of the Environment, Transport and the Regions (DETR). 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.

Biology - We also monitor biological quality and classify river reaches using a scheme of six 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. Since 1995 work has been completed on some of the poorer quality watercourses, 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 practice 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 responsible for a large number of water level management control structures. The current political climate for reducing direct taxation is resulting in downward political pressure on our flood defence budgets, which 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 must be carefully managed to reduce impacts.

In accordance with the former Department of the Environment document *(DoE) Circular 30/92 Development and Flood Risk*, we advise planning authorities on flood defence matters. We 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. 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 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. 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 provided and 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 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 owned and operated by Wessex Water Services Limited, in the Bristol Avon catchment. There are numerous private sewage treatment works. 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 River Quality Objectives (RQOs). Sewage treatment works can also contribute to nutrient enrichment (see Issue 7.8). A number of Wessex Water sewage discharges are known to cause or contribute to the exceedence of water quality targets. These discharges will be improved through the water companies' investment programme.

The water companies' investment programme for the period 2000-2005 is known as Asset Management Plan 3 (AMP3). AMP3 has been developed along guidelines agreed between the Environment Agency, the Department of the Environment, Transport and Regions, the water services companies and the Office of Water Services (OFWAT).

The Environment Agency has agreed with the DETR which sewage discharges require improvement during AMP3. OFWAT has now completed a review of water prices which allows for this programme of environmental investment and enables the companies to make the environmental improvements by 2005. Many of these schemes will be delivered before 2005.

The following sewage treatment works caused or contributed to River Quality Objective (RQO) and Long Term River Quality Objective (LT RQO) failures in 1998 (see Map 4):

- Urchfont STW contributes to LT RQO failure in the Worton Stream (stretch 135)
- Priston STW causes RQO failure in Priston Stream (stretch 54)
- Hilmarton STW contributes to RQO failure in the Cowage Brook (stretch 147)
- Westbury STW causes LT RQO failures in the River Biss (stretch 114)
- Devizes STW causes RQO failure in the Old Park Watercourse (stretch 131)

The following sewage treatment works may have caused or contributed to RQO and LT RQO failures in 1998:

- Marshfield STW may cause RQO failure in the Doncombe Brook (stretches 64, 65)
- Wootton Bassett STW may cause RQO and LT RQO failures in Hancocks Water (stretch 160) and Brinkworth Brook (stretch 158)
- Compton Bassett STW may contribute to LT RQO failures in Rivers Brook (stretch 152)
- Leigh-on-Mendip STW may contribute to RQO failure in Leigh-on-Mendip watercourse (stretch 107)
- Radstock STW may have contributed to RQO failure in the Wellow Brook (stretch 72)

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

- Hullavington STW will cause RQO failure in the Gauze Brook
- Frome STW will cause RQO failure in the Somerset Frome
- Lavington (Woodbridge) STW will cause LT RQO failure in the Semington Brook
- Malmesbury STW will cause RQO failure in the Avon
- Rowde STW will cause RQO failure in the Summerham Brook
- Potterne STW will contribute to RQO failure in the Drewspond Watercourse
- Devizes STW will cause RQO failure in the Old Park Watercourse
- Marshfield STW will cause RQO failure in the Doncombe Brook

The following sewage treatment works exceeded their consents in the period from April 1997 to March 1998:

- Westbury STW, for ammonia. Improvements have been carried out with positive results.
- Wootton Bassett STW, for suspended solids. Improvements to settlement and storm tanks have been made and Wessex Water are confident that they can now meet the conditions.
- Thingley STW, for Biochemical Oxygen Demand (BOD) and ammonia as a result of a single event.
- Stanton Drew STW, for Biochemical Oxygen Demand (BOD). Dialogue with Wessex Water has improved operational practices.
- East Harptree STW, for suspended solids. Dialogue is continuing with Wessex Water to investigate and remedy problems.

The following actions will be taken in the above cases of consent exceedences:

Actions	Action By	Cost to Agency (£K)	Financial Year 00 01 02 03 04
7.1.1 We expect improvements to Urchfont STW to be carried out in AMP3 to improve downstream water quality. **Contact: Tactical Planning Team Leader**	Wessex Water Services Ltd (WWSL)	0	● ● ● ● ●
7.1.2 We expect improvements to Priston STW to be carried out in AMP3 to improve downstream water quality. **Contact: Tactical Planning Team Leader**	WWSL	0	● ● ● ● ●
7.1.3 We expect improvements to Hilmarton STW to be carried out in AMP3 to improve downstream water quality. **Contact: Tactical Planning Team Leader**	WWSL	0	● ● ● ● ●
7.1.4 We expect improvements to Westbury STW to be carried out in AMP3 to improve downstream water quality. In addition, phosphate reduction may be required under the UWWTD as a result of the designation of the Bristol Avon as a Sensitive Area (Eutrophic). **Contact: Tactical Planning Team Leader**	WWSL	0	● ● ● ● ●
7.1.5 We expect improvements to Devizes STW to be carried out by WWSL under AMP3. In addition, phosphate reduction may be required under the UWWTD as a result of the designation of the Bristol Avon as a Sensitive Area (Eutrophic). **Contact: Tactical Planning Team Leader**	WWSL	0	● ● ● ● ●
7.1.6 We expect improvements to Marshfield STW to be carried out in AMP3 to improve downstream water quality. In addition, improvements to storm tanks are required. **Contact: Tactical Planning Team Leader**	WWSL	0	● ● ● ● ●
7.1.7 We expect improvements to Compton Bassett STW to be carried out in AMP3 to improve downstream water quality. **Contact: Tactical Planning Team Leader**	WWSL	0	● ● ● ● ●
7.1.8 Stratton-on-the-Fosse STW. We will undertake a desk study. If necessary we will seek improvements. **Contact: Tactical Planning Team Leader**	Agency	5	● ●
7.1.9 Leigh-on-Mendip STW. We will undertake a desk study. If necessary we will seek improvements. **Contact: Tactical Planning Team Leader**	Agency	5	● ●
7.1.10 We expect improvements to Hullavington STW to be carried out in AMP3 to protect downstream water quality. **Contact: Tactical Planning Team Leader**	WWSL	0	● ● ● ● ●
7.1.11 We expect improvements to Frome STW to be carried out in AMP3 to protect downstream water quality. In addition, phosphate reduction is required under the UWWTD as a result of the designation of the Bristol Avon as a Sensitive Area (Eutrophic). **Contact: Tactical Planning Team Leader**	WWSL	0	● ● ● ● ●
7.1.12 We expect improvements to Lavington STW to be carried out in AMP3 to protect downstream water quality. **Contact: Tactical Planning Team Leader**	WWSL	0	● ● ● ● ●
7.1.13 We expect improvements to Malmesbury STW to be carried out in AMP3 to protect downstream water quality. **Contact: Tactical Planning Team Leader**	WWSL	0	● ● ● ● ●
7.1.14 We expect improvements to Rowde STW to be carried out in AMP3 to protect downstream water quality. In addition, improvements to storm tanks are required. **Contact: Tactical Planning Team Leader**	WWSL	0	● ● ● ● ●

A number of other sewage treatment works may require phosphate 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 Issue 7.8: 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 have degraded water quality.

Until recently the MoD enjoyed crown immunity but discharges are now the subject of control by means of discharge consents.

Lyneham sewage treatment works and runoff from RAF Lyneham caused Long Term River Quality Objective failure in the Strings Watercourse (Lyneham - Confluence with Cowage Brook) in 1997 and 1998. In addition, Lyneham sewage treatment works and runoff from RAF Lyneham contributed to RQO and LT RQO failure in the Cowage Brook (Confluence with Strings Watercourse - Bremhill House) in 1997 and 1998 and RQO and LT RQO failure in the Cowage Brook (Bremhill House - Confluence with Marden) in 1997 and 1998. The Agency requested improvements to the sewage treatment works, which was adopted by Wessex Water. These improvements works were completed in the autumn of 1999.

We will continue to negotiate with the RAF to secure improvements in the surface water runoff from the base by changes in the de-icing chemicals used and the retention of polluted runoff.

Actions	Action By	Cost to Agency (£K)	Financial Year 00	01	02	03	04
7.2.1 We will ensure that discharges from the Lyneham sewerage system are investigated and dealt with appropriately. **Contact: Environment Protection Team Leader - Upper Avon**	Agency	1	●	●	●		
7.2.2 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	1	●	●	●		

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 spillage 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 and engineered wetlands where appropriate (see also Issue 5.1).

Urban runoff contributed to an RQO failure in the Bristol Frome (from Yate to the confluence with the Ladden Brook) in 1997; however this stretch complied with the objective in 1998. We will work with the tenants of West Wilts Trading Estate (Biss Brook), Devizes Trading Estates and Yate Trading Estates (Bristol Frome) to eliminate polluting discharges and improve pollution prevention.

We have 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 when funds become available (see Action 7.14.3).

As exemplified in the River Trym and Bristol Frome catchments, where possible we work alongside stakeholders to manage the impact of urbanisation. We 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 00	01	02	03	04
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	12.5	●	●	●	●	●

7.4 Issue: Unknown causes of degraded water quality

There are a number of river stretches which were not compliant with their current/long term River Quality Objectives (RQOs) for reasons unknown to us. These are shown below with the years in which they failed to comply with their objectives:

River Avon (Confluence with Forest Brook-Scotland Road), 1997 and 1998

Hancocks Water (Source-Wootton Meadows), 1997

Avon (Confluence with Semington Brook-Confluence with Biss), 1997 and 1998

Avon (Confluence with By Brook-Bath Central), 1997

Charlton Stream (Lea-Confluence with Avon), 1997

Luckington Brook (Luckington Court-Confluence with Sherston Avon), 1997

Rodbourne Brook (Stanton St Quintin-Confluence with Avon), 1997

By Brook (Downstream Lid Brook-Box Brook), 1997 and 1998

Brinkworth Brook (Confluence with Thunder Brook-Brinkworth), 1997

Somerset Frome (Pomperoy Farm-Confluence with Avon), 1997 and 1998

Gauze Brook (Hullavington-Confluence with Avon), 1997 and 1998

Tetbury Avon (Slads Farm-Confluence with Sherston Avon), 1997 and 1998

Salters Brook (Penford STW-Confluence with Chew), 1997

Boyd (The Green-Golden Valley), 1997,1998

Midford Brook (Confluence with Wellow Brook-Confluence with Avon) 1998

Rodden Brook (Confluence with Redford Water- Confluence with Frome) 1998

Maiden Bradley Brook (Maiden Bradley-Confluence with Frome) 1998

Worton Stream (Cadley farm-Confluence with Semington Brook) 1998

Rodden Brook and the Maiden Bradley Brook are both clay bedded and flow is largely rainfall dependent. Seasonal rainfall year to year can result in large flow variations and may be the cause.

Worton Stream may be affected by a combination of factors namely Urchfont STW, a fertiliser works and general farming activities. Farm visits are planned for the catchment (see Issue 7.7), Urchfont STW is in AMP3 (see Action 7.1.1) and action relating to the fertiliser works is in progress.

For those stretches which failed to comply with their RQO/LT RQO in 1997 and 1998, we will investigate the causes of non-compliance and take appropriate action. RQO failures are categorised as either significant failures (those where we are 95% certain that the river stretch has failed to meet its RQO) and marginal failures (those where we are less certain, between 50% and 95%, that the stretch has failed to meet its RQO). Investigations into significant failures will take priority over investigations into marginal failures. For those stretches which failed their RQOs/LT RQOs in 1997 but complied in 1998, we will continue to monitor the situation and investigate causes of non-compliance should failures recur.

Actions	Action By	Cost to Agency (£K)	Financial Year 00	01	02	03	04
7.4.1 Investigate cause of non-compliance on the By Brook, Brinkworth Brook, Hancocks Water, Somerset Frome, Avon, Gauze Brook, Charlton Stream, Tetbury Avon, Luckington Brook, Salters Brook, Rodbourne Brook, Broadmead Brook, Worton Stream and Maiden Bradley Brook. **Contact: Environment Protection Team Leaders - Upper Avon, Mid Avon and Greater Bristol**	Agency	10	●	●			

7.5 Issue: The impact of low flows on water quality

Low flows may have an effect on river water quality in two ways:

- lower dilution for "oxygen-grabbing" organic effluents such as sewage,
- reduced re-oxygenation because of lower energy levels.

As a result many low-flow rivers and streams suffer from reduced levels of dissolved oxygen, which has a harmful effect on the wildlife.

Low flows may have contributed to River Qualty Objective (RQO) and long term River Qualty Objective failures in the following watercourses in 1997 and 1998: Somerset Frome (stretch 86), Leigh-on-Mendip Watercourse (stretches 106 and 107), Honeyball Watercourse (stretch 153), Brinkworth Brook (stretch 155), Luckington Brook (stretch 173) and Sherston Avon (stretch 169).

Low flows also caused exceedence of the salmonid standard of the EC Freshwater Fish Directive in

the Tetbury Avon in 1997 and contributed to exceedences of the salmonid standard in the River Avon in 1995 and the Somerset Frome and Bulkington Drove Watercourse in 1995, 1996 and 1997. The Bulkington Drove Watercourse has recently been reclassified as a cyprinid watercourse (see Section 3: Fisheries).

Low flows generally occur naturally due to reduced rainfall and warmer temperatures in the summer. In some areas, due to the hydrogeology, springs which flow in the winter stop in the summer and the watercourses they feed dry up, these are known as winterbournes. This is a natural effect and we are unable to take action in the case of most of the above streams which are winterbournes. 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.

In addition, in some areas of the catchment some watercourses are affected by abstraction (see Issue 2.2).

Actions	Action By	Cost to Agency (£K)	Financial Year 00	01	02	03	04
7.5.1 We will investigate RQO failures that appear to be related to low flows and develop plans appropriate to each case. **Contact: Environment Protection Team Leader - Upper and Mid Avon**	Agency	5	●	●	●		

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 River Qualty Objective (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. 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

One possible solution is that under the Environment Act 1995 new duties were introduced on water service companies to provide public sewers for certain domestic properties where environmental problems exist. Any owners, occupiers or local authorities can apply to the sewerage undertaker to provide connection to the foul sewer. This is known as first time sewerage. The Agency can provide information to relevant bodies, and will act as an arbitrator in any dispute. We expect first time sewerage schemes to be provided at South Wraxall and Chewton Mendip/Litton.

A reedbed treatment plant is now in operation at Bushton. At Beanacre we are carrying 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). A large number of private sewage systems may have contributed to a 1998 RQO failure in the River Chew.

Combined Sewer Overflows - In urban areas, where sewage and surface water is carried to the treatment works in combined sewers, there are sewer overflows designed to operate only in storm conditions. Some of these overflows operate too frequently as a result of overloading or sewerage infrastructure faults.

Many such problem overflows have already been identified by the Drainage Area Plans 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.

Bristol has over 300 combined sewer overflows. Historically, the performance of some of these combined sewer overflows has not always been satisfactory. A number of sewer overflows have already been improved by Wessex Water as a result of their Drainage Area Plans and Asset Management Plan (AMP 2). We expect improvements to further combined sewer overflows to be carried out in AMP3 (from 2000 to 2005). Completed and planned improvements will decrease the amount of sewage debris found along the banks of small streams and brooks within the urban area of Bristol.

As part of AMP3, Wessex Water Services Ltd and the Agency are considering the construction of a large tunnel sewer to make significant improvements to the storm overflow operation in Bath. This should make a major contribution to reducing the presence of sewage-related debris in the River Avon downstream of Bath. Details of the extent and programme of construction of this tunnel sewer will be made available as the appraisal of the scheme progresses.

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 surface water drains 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 2000. We will make a bid for further funding each year while there is a need.

Actions	Action By	Cost to Agency (£K)	Financial Year 00	01	02	03	04
7.6.1 We will carry out a survey at Beanacre to determine the effect of septic tank discharges on the watercourse. **Contact: Environment Protection Team Leader - Upper Avon**	Agency	2.4	●				
7.6.2 We will continue to participate in 'Operation Streamclean', funding for which has been secured until March 2000. Success of funding determines the amount of work done each year. **Contact: Investigation Team Leader**	Agency, Wessex Water, Bristol City Council	40	●				
7.6.3 We will liaise with Wessex Water and relevant organisations to secure necessary improvements to the sewage infrastructure in the Bath area and Bristol Frome catchment. **Contact: Environment Protection Team Leaders - Greater Bristol and Mid Avon.**	Agency, Wessex Water	10	●	●	●	●	●

7.7 Issue: The impact of agriculture on water quality

Agriculture is important to the local economy. As a result of 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 Issue 7.8).

Agricultural pollution caused or contributed to non-compliance with River Quality Objectives (RQOs) and Long Term RQOs in the following watercourses:

> the Somerset Frome (stretch 91), Nunney Brook (stretch 100), Wellow Brook (stretches 69, 70 and 72), River Somer (stretch 80), By Brook (stretch 62), Worton Stream (stretch 135), Cowage Brook (stretch 147), Rivers Brook (stretch 152) and Brinkworth Brook (stretch 155).

We will investigate sources of pesticide inputs in the catchment whenever necessary (see Issue 7.9: 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 5.2 Soil Erosion). We will 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. A partnership with Avon Farming and Wildlife Advisory Group (FWAG) was funded during 1998/1999 to visit farms in the Midford Brook, Wellow, Somer, and Cam catchments to give advice on best practice for the management of land.

Farm visits were carried out on the Woodbridge Brook/ Charlton Stream, Bulkington Drove Stream and the Worton Stream in 1999.

Actions	Action By	Cost to Agency (£K)	Financial Year 00 01 02 03 04
7.7.1 We will carry out a campaign of farm visits on the Cowage Brook. **Contact: Environment Protection Team Leader - Upper Avon**	Agency	6	●
7.7.2 We will investigate the role of agricultural sources in the failure to comply with RQOs in the following catchments: Nunney Brook and Broadmead Brook. **Contact: Environment Protection Team Leader - Mid Avon**	Agency	8	●
7.7.3 We will investigate the role of agricultural sources in the failure to comply with Long Term RQOs in the Rivers Brook. **Contact: Environment Protection Team Leader - Upper Avon**	Agency	5.7	●
7.7.4 We will investigate the role of agricultural sources in the Brinkworth Brook. **Contact: Environment Protection Team Leader - Upper Avon**	Agency	9.1	●
7.7.5 We will carry out a campaign of farm visits in the Somerset Frome catchment within the next 18-24 months. **Contact: Contact: Environment Protection Team Leader - Mid Avon**	Agency	5.5	● ●

7.8 Issue: The impact of nutrient pollution and nutrient enrichment

Eutrophication is the accelerated growth of algae and higher plants such as duckweed (*Lemna* sp), 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 often the factor limiting plant growth in freshwaters. Up to 30% of phosphate entering freshwater comes from agricultural sources. Conventional sewage treatment removes a limited amount of phosphate. Phosphate reduction 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 from Chippenham STW to Netham (Bristol) has been considered by a National Environment Agency panel in the light of advice contained within the former 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)*. In July 1998, the DETR designated the Bristol Avon from Chippenham STW to Netham (Bristol) a Sensitive Area (Eutrophic) under the UWWTD. As a result of this, the following STWs will be required to provide phosphate 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 phosphate reduction, subject to review in 2001; these are Devizes, Thingley, Westbury and Potterne.

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. 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. Control of nutrient enrichment in watercourses can be addressed by the forthcoming National Eutrophication Strategy.

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 contributed to RQO non-compliance in the River Avon (Confluence with Forest Brook-Scotland Road) in 1997 and 1998.

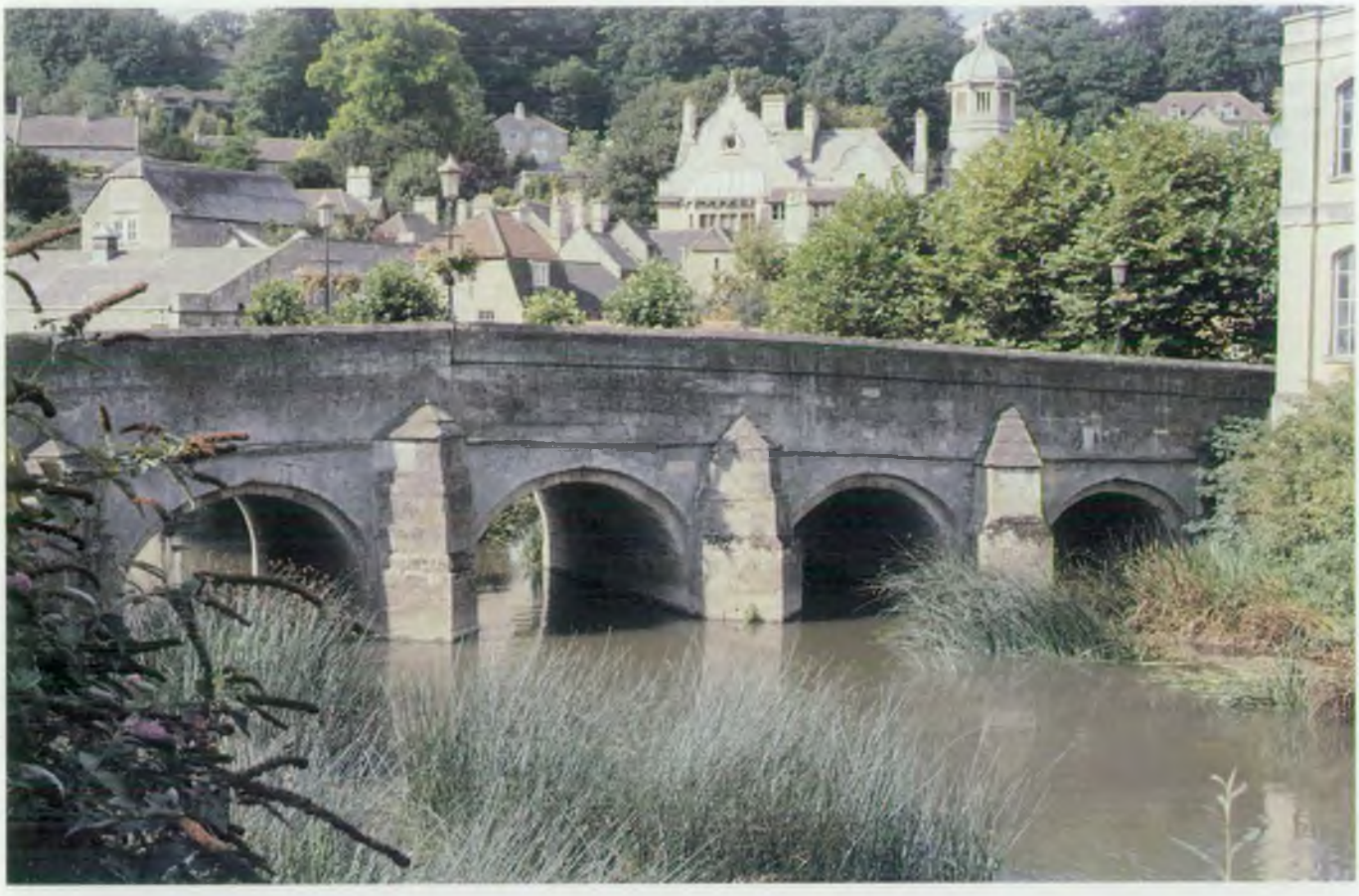
Algal blooms also occur in the Kennet and Avon Canal and contribute to the apparently poor water quality. The canal receives water from the Bristol Avon at Claverton and from the Summerham Brook via the Seend Feeder near Rowde. British Waterways are also seeking improvements to canal water quality and a reduction in nutrients.

It is anticipated that phosphate removal at major STWs on the River Avon will have an indirect benefit on the nutrient status of the canal via the water pumped into the canal at Claverton.

The Agency and British Waterways will undertake a joint investigation of the water quality of the Seend Feeder and its effect on the canal to determine what further action is necessary to control nutrient inputs from Rowde STW and diffuse sources in the Summerham Brook catchment.

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 00 01 02 03 04
7.8.1 As the Bristol Avon has been designated a Sensitive Area (Eutrophic) phosphate 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: Caine, Frome, Radstock. We will work with others to ensure compliance with the UWWTD. **Contact: Tactical Planning Team Leader**	Agency, DETR, Wessex Water Services Limited	5	● ● ● ● ●
7.8.2 We will continue to assess the ecological impact of excess nutrients on the catchment. **Contact: Biology Team Leader**	Agency	2	● ● ●
7.8.3 We will 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	● ●



Historic Bradford-on-Avon, a built Conservation Area

An exercise in deploying an oil boom

The River Avon

Fish pass at
Chippenham

Litter in the
Berryfield Brook

Carrying out a farm visit

Great crested grebe

The result of sewage pollution

Hills sand and gravel pits, Calne

Hard engineering as a method of bank protection, Avon Rubber/Cooper Avon Tyres, Melksham

The Kennet & Avon Canal at Semington

Carrying out a site visit to industry

Actions	Action By	Cost to Agency (£K)	Financial Year 00 01 02 03 04
7.8.4 We will 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 undertake a joint investigation with British Waterways into the water quality/nutrient status of the Seend Feeder and its effect on the Kennet and Avon Canal. **Contact: Environment Protection Team Leader - Upper Avon**	Agency, British Waterways	1.5	●
7.8.6 We will promote the creation of buffer strips where appropriate. **Contact: Conservation Team Leader**	Agency, FWAG, FRCA, Wildlife Trusts	25	● ● ● ● ●

7.9 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). 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 monitoring of groundwater is very costly compared with the cost of surface water monitoring. Our monitoring budget is under severe downward pressure so a major proposal such as this must be very carefully considered and funding secured before a programme of borehole drilling is started. The proposal is currently being considered at a national level - we are lobbying to achieve as speedy an appraisal as possible. We do monitor around the sites where there are specific threats to groundwater such as landfills or contaminated land sites.

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 need investigation or action.

Actions	Action By	Cost to Agency (£K)	Financial Year 00 01 02 03 04
7.9.1 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	5	●

7.10 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 00	01	02	03	04
7.10.1 We have identified actions to address concerns about the Abberd Brook and have begun to carry them out. **Contact: Environment Protection Team Leader - Upper Avon**	Agency	10	●				

7.11 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 where 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 protect against floods which was rejected at the public meetings.

7.12 Issue: Flood warning

Warnings are issued by direct contact and via local radio. Recorded information on current flood warnings is provided and leaflets are 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. In a Parliamentary Statement on 20 October 1998 on the Bye Report, the Agency was given clear targets to achieve a seamless and integrated service of flood forecasting, warning and response by April 2000. To achieve this the Agency is required to undertake a thorough review of the whole system to ensure the Agency is focused to deliver the required service, that management arrangements make this possible and that there are clear lines of accountability and responsibility.

The Agency, having considered the Bye Report, taken due regard of the Parliamentary statement, compared the needs of the Report with the findings of the Agriculture Select Committee on Flood Defence and Coastal Defence 30 July 1998 and considered comments from MAFF, have drawn up a comprehensive action plan.

The action plan will be implemented nationally and includes the following actions with current progress:

- Review flood warning dissemination plans and major incident plans.
- Review current supervisory duties and develop a new approach to their use.
- Review and publish consistent flood risk maps for use in regulating development - digital copies were passed to all local authorities in 1999.
- Review emergency response arrangements with local authorities and carry out joint exercises using new arrangements. This must include clear understanding of the roles of all organisations involved.
- Introduce improvements in the Agency network of telemetered river-flow monitoring.
- Carry out a complete visual survey of all flood defences including main river, ordinary watercourses, tidal and sea defences and in future carry out regular updates - an initial survey is on target for April 2000.
- Revise the Agency's National Flood Warning Strategy and establish a national flood warning centre - the National Centre has been established.
- Review ways of warning the public, improve provision of data from telemetry systems and its use in giving warnings.
- Target flood warning communications at vulnerable temporary locations such as caravan and camping sites.
- Work with Government to review research into the impact of climate change on flood frequency.

In general, the South West region is well advanced in dealing with the issues raised in the actions listed above. A very large additional work load is required to meet these actions within the time allowed. In addition, a National Flood Awareness campaign was launched in 1999, and the flood warning colour code system will be replaced in September 2000.

Actions	Action By	Cost to Agency (£K)	Financial Year 00	01	02	03	04
7.12.1 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	●	●	●	●	●

By March 2000, a Flood Warning Standards of Service 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.

7.13 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. A Major Incident Plan is in place for Bath, and in progress for Bristol.

Actions	Action By	Cost to Agency (£K)	Financial Year 00 01 02 03 04
7.13.1 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	2	●

7.14 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 bank side 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 7.8 Issue: The impact of nutrient pollution and nutrient enrichment).

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. It will also help to hold water and reduce the likelihood of flash flooding.

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 11.1.12, '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 seek enhancement opportunities related to developments and local initiatives and develop restoration schemes for some of the worst affected rivers in partnership with local authorities, developers and riparian owners.

We will 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 Agency, 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 Issue 3.1: The need for fish passes at major obstructions). These structures can 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 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 advise and work with riparian owners with regards to best practice for the operation of control structures.

A list of river rehabilitation priorities in the Bristol Avon catchment can be found in Appendix 12.5.

Actions	Action By	Cost to Agency (£K)	Financial Year 00 01 02 03 04
7.14.1 We will develop a five-year plan of priority sites for river restoration (see Appendix 12.5). **Contact: Conservation Team Leader**	Agency (see Action 4.1.1)	10-20 p.a.	● ● ● ● ●
7.14.2 With partners, we will continue to implement the Bristol Frome Action Plan, as funds become available (Ladden Brook Phase 3). **Contact: Conservation Team Leader**	Agency, local authority, Forest of Avon, FRCA, FWAG, Wildlife Trust and Forestry Authority	20	●
7.14.3 We will continue to work with Bristol City Council to implement both the Bristol City Frome Action Plan and the River Trym and Hazel Brook enhancements. There are currently no Agency funds available for this project. **Contact: Conservation Team Leader**	Agency, Bristol City Council, Forest of Avon Project, FWAG	0	●
7.14.4 We will continue to support the work of the Cotswold and By Brook Countryside Management Project. **Contact: Conservation Team Leader**	Agency, Wiltshire Wildlife Trust, MAFF/FRCA, North Wiltshire District Council, English Nature	6 p.a.	● ● ● ● ●
7.14.5 We will continue to enhance the fisheries, ecology and recreation value of Semington Brook. **Contact: Conservation Team Leader**	Agency	(see Section 11.1.12)	●
7.14.6 We will identify river control structures for the feasibility of removal/redesign. **Contact: Fisheries Team Leader**	Agency, riparian owners	6	●
7.14.7 We will work with our partners and industry to enhance degraded landscapes on sections of urban streams via the South Bristol Streams Project. **Contact: Conservation Team Leader**	Agency, Avon Wildlife Trust, Bristol Environment and Energy Trust, Allied Dominic and local industries	10	● ● ● ● ●

7.15 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.

A high proportion of alders on the Avon between Bath and Bristol are infected. The disease has 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 00	01	02	03	04
7.15.1 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	●	●	●	●	●
7.15.2 We will review management options, once the outcome of research into disease transmission is known. **Contact: Conservation Team Leader**	Agency, Forestry Commission	-	●	●	●	●	●
7.15.3 We will formulate a management programme for bankside alders in partnership with others. **Contact: Conservation Team Leader**	Agency, Forestry Commission, Forest of Avon, FWAG, Local Authorities, Avon Valley Partnerships and Wildlife Trusts	3	●	●	●	●	●
7.15.4 We will undertake remedial action where and when appropriate. **Contact: Conservation Team Leader**	Agency, Forestry Commission	5	●	●	●	●	●

7.16 Issue: 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 riverbank 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 ensure developers are aware of their responsibilities for controlling the spread of Japanese knotweed from infected sites. The successful eradication of Japanese knotweed requires significant funding and remedial action taken over many years. In discussion with others, we will identify key areas for

remediation, for example where the watercourse is of particularly high nature conservation value and/or at the head of the catchment.

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.

A number of species of plants on sale for use in ornamental water gardens and ponds are particularly invasive and are proving difficult to control. An example is *Crassula helmsii* which has been found in a pond near Frome. We will monitor the situation with regard to the spread of these plants. We discourage the use of the following plants: Water fern, Parrot's feather, Floating pennywort and Fringed water lily.

Accurate information on the distribution and status of alien species is the key to successful management. We will develop a management strategy to tackle the extensive problem of alien invasive plant species in the catchment, by establishing links with other interested parties, and we will continue to encourage riparian owners to take remedial action where appropriate.

Actions	Action By	Cost to Agency (£K)	Financial Year 00	01	02	03	04
7.16.1 We will carry out a status and distribution survey of alien invasive plants in the Upper Bristol Avon catchment and produce a report. **Contact: Conservation Team Leader**	Agency	2.5	●				
7.16.2 We will continue to monitor the distribution and status of invasive alien species. **Contact: Conservation Team Leader**	Agency	8	●	●	●	●	●
7.16.3 We will set up a management group for Japanese knotweed, to identify management options and control mechanisms. **Contact: Conservation Team Leader**	Agency, English Nature, Local Authorities, Environmental Records Centre, Wildlife Trusts, British Trust for Conservation Volunteers (BTCV), Forest of Avon, Forestry Commission, Angling clubs	20	●	●	●	●	●

7.17 Issue: Recreation pressure and opportunities

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, horse-riding, recreational boating and angling. There is great potential to develop and improve waterside 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. An example of this is a report commissioned by Bath and North East Somerset (B&NES) Council to investigate the impact of boat traffic on bank side erosion. We encourage canoeists to join the British Canoe Union (BCU) and 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 Agency, 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 and a sustainable transport route between districts. Its use will be a matter for the appropriate local authority. The project will also raise awareness of and improve the river corridor by habitat enhancements, waymarking and the provision of interpretation facilities. We promote access to and along rivers where this does not conflict with other interests such as conservation or flood defence. We would normally do this where a suitable opportunity arose such as commenting on a riverside development planning application or a flood defence scheme.

Early in 1998 the Countryside Agency, 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. Currently, and for the foreseeable future, we have no money to fund project work, so our contribution would have to be limited to technical advice by our staff. In some cases recreational enhancement work could be achieved as part of a flood defence scheme.

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

- The Chippenham River Green 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.

There is some pressure for increased use of riverside paths by horse-riders. We would consider whether to support such an application on its merits to ensure such use did not conflict with conservation or flood defence interests. Both cycling and horse-riding have the potential to cause accelerated bank erosion and the loss of vegetation. Both carry a risk of collision with other users. Horse-riding has the additional problem of path fouling. These problems will have to be carefully considered when developing new access routes.

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 00	01	02	03	04
7.17.1 We will support the work of North Wiltshire District Council in promoting the Chippenham River Green Project depending on funding availability. **Contact: Conservation Team Leader**	Local authority (North Wiltshire District) Council, Cyclists Touring Club, Agency, Lottery, local business	0.5	●	●			
7.17.2 We will continue our involvement with Avon Valley Partnerships. **Contact: Conservation Team Leader**	B&NES, Countryside Agency, Bristol City Council, South Gloucestershire Council, Agency, Forest of Avon and community groups	2	●	●	●	●	●
7.17.3 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**	Local authority, Agency, riparian interest and community groups and Forest of Avon	5	●	●			
7.17.4 We will review recreational and educational potential of Agency land at Pulteney Weir. **Contact: Conservation Team Leader**	Agency	2	●	●			
7.17.5 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	2	●	●	●	●	●
7.17.6 We will contribute to developing guiding principles for recreation and conservation issues in the Bristol Avon Valley. **Contact: Conservation Team Leader**	Agency	10	●	●	●	●	●
7.17.7 We will help to develop better mechanisms for sharing recreational conservation information between interested bodies. **Contact: Conservation Team Leader**	Agency	0.4	●	●	●	●	●

7.18 Issue: Sewage debris, general debris and litter in the river corridor

Litter and debris in rivers accumulates at weirs and sluices, gets caught up in bank side vegetation and is very unsightly. It gets there in a variety of ways:

- direct littering, particularly near food outlets and shops
- vandalism involving debris such as supermarket trolleys, bicycles, even cars
- wind-blown litter from streets, over-full litter bins or inadequate commercial storage
- fly-tipping (see Issue 6.4)
- from the sewerage system during heavy rain storms

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 sewer overflows,

- plastic bags and packaging materials that have been thrown, blown or washed into the river, from surrounding land.

We will only remove debris where it constitutes an obstruction to flood flows.

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 along the River Avon downstream of Bath and as far as Conham, Bristol, and gives rise to complaints from river users.

Sewage debris deposited by combined sewer overflows along the Avon in Bath and along many small streams and brooks within the urban area of Bristol is being addressed by Wessex Water as a result of their Drainage Area Plans and Asset Management Plans.

Improvements to sewer overflows often require considerable capital expenditure. Wessex Water have already made improvements to some of them. This work was part of a programme of overall improvements for the Bath sewerage system included in their Asset Management Plan 2 (AMP 2, from 1995 to 2000). The Agency regards this as a high priority and further improvements under AMP 3 (from 2000 to 2005) are expected to bring relief (see Issue 7.6: The impact of sewerage and unsewered areas).

We have 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. 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 restarted. Potential partners are: Wessex Water, Bath and North East Somerset Council, South Gloucestershire Council, agricultural and horticultural industries, local businesses and angling clubs.

Actions	Action By	Cost to Agency (£K)	Financial Year 00	01	02	03	04
7.18.1 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**	Agency, local authorities, local organisations and community groups	6.5	●	●	●	●	●
7.18.2 We will encourage Wessex Water and the Local Authorities to restart the 'Bag it and Bin it' campaign. **Contact: Environment Protection Team Leader - Upper, Mid Avon and Greater Bristol.**	Agency, Wessex Water, South Gloucestershire Council, B&NES	0.5	●	●	●	●	●
7.18.3 We will liaise with Wessex Water and relevant organisations to secure necessary improvements to the sewage infrastructure in the Bath area and Bristol Frome catchment (for details see 7.6.3) **Contact: Environment Protection Team Leaders - Greater Bristol and Mid Avon.**	Agency, Wessex Water	-	-	-	-	-	-

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 Integrated Pollution Prevention and Control (IPPC) Directive.

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*. 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.

When the IPPC Directive is transposed into UK legislation it will introduce a pollution control regime that will be both broader and deeper than the existing IPC legislation. More industrial sectors will be covered, for example food and drink processing and intensive agriculture will be regulated in this way for the first time, and many of the larger landfills and wastewater treatment plants will also be covered by IPPC. An IPPC permit will cover more aspects of the activity than IPC does at present; noise, energy efficiency, the site condition and prevention of accidents will be regulated.

The Agency also regulates establishments subject to the Control of Major Accident Hazards Regulations (COMAH) 1999. Establishments are divided into two tiers, depending on the level of hazard. The top tier sites will be required to prepare a safety report for assessment by the Agency jointly with the Health and Safety Executive (HSE), and also an on-site emergency plan. The local authority for such sites will be obliged to prepare and test an off-site emergency plan. The lower sites will be required to have a major accident prevention policy. COMAH sites will be inspected by both the Agency and the HSE.

The Environment Agency is the enforcement authority for England and Wales of the **Radioactive Substances Act (RSA) 1993**. The Agency grants authorisations to accumulate and dispose of radioactive waste, and registrations to keep and use radioactive sources.

There are three 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 radionuclides.

- 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.

Sites authorised to accumulate and dispose of radioactive waste

- 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 on water and air quality

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 of Wiltshire (see Issue 2.3).

Water quality problems can arise due to contamination during dewatering of quarries and sand pits, vehicle and wheelwash effluents, mud carried 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.

Sand extraction may have contributed to River Quality Objective and long term River Quality Objective failure in Rivers Brook (Downstream of Hayles Farm - Confluence with Marden) in 1997 and to long term River Quality Objective failure in this stretch in 1998.

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.

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 00 01 02 03 04
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 - Mid 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. These industries make a major and valuable contribution to the economy of the area. However, some industry produces polluting waste products and it is our job to ensure these are disposed of properly.

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 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 compliance with River Quality Objectives 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 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 monitor consented discharges from industrial sites to review consents as appropriate and 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 (Confluence Sutton Benger Brook-Confluence with Marden) in 1997 and 1998. 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 (Source-Confluence with Avon) in 1997 and 1998. Following a fire at the plant in 1999, the discharge consent review has been postponed until the plant is re-built and operating.

The St Ivel Dairy Processing plant may contribute to RQO failure in Hancocks Water. A fertiliser treatment plant at Urchfont may have contributed to RQO failure in the Worton Stream (Urchfont-Cadley Farm) in 1997 and to LT RQO failure in the same stretch in 1998. A paper mill may have contributed to RQO failure in By Brook (Box Bridge-Confluence with Avon) in 1997, although this stretch complied with its RQO in 1998. We will monitor the situation. Incidents at Ushers Brewery may have caused RQO failure in the River Biss (Confluence with Lam Brook-Trowbridge) in 1997 and 1998.

Actions	Action By	Cost to Agency (£K)	Financial Year 00 01 02 03 04
8.2.1 We will make regular pollution prevention visits to major industrial sites. **Contact: Environment Protection Officer - Upper Avon, Mid Avon and Greater Bristol**	Agency	4	● ● ● ● ●
8.2.2 We will review the consent to discharge for Webbs Country Foods, Sutton Benger and if necessary revise it. ***Action deferred pending rebuilding*** **Contact: Discharge Consenting Team Leader**	Agency	1	- - - - -
8.2.3 We are carrying out regular pollution prevention visits to reduce the risk of incidents. **Contact: Environment Protection Team Leader - Mid Avon**	Agency	0.8	● ● ● ● ●
8.2.4 We are considering taking formal action against the operator of the fertiliser plant at Urchfont and negotiating improvements to the fertiliser lagoon. **Contact: Environment Protection Team Leader - Upper Avon**	Agency	1	●
8.2.5 We will investigate the causes of River Quality Objective failure in Hancocks 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, was demonstrated. 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 Substitute Fuels Protocol recently published (SF protocol). The protocol sets out rigorous technical standards which must be followed. It 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.

Subsequently, the matters detailed in the notice were dealt with by the company and the trial was allowed to restart. The trial concluded in October 1999 and a report is being prepared. The company is expected to make an application for burning tyres as a substitute fuel on a permanent basis. The Agency 's selective licence application procedure may apply, with full public consultation during the process.

The House of Commons Select Committee on the Environment requested an epidemiological study which has been completed. Health issues have been identified as a priority for the Agency. We have liaised with the Department of Health and representatives from local health authorities to establish a protocol for health authorities to follow when consulted on IPC applications. Currently under IPC, health authorities are not statutory consultees, but are likely to become so under the proposed IPPC regulatory regime.

Actions	Action By	Cost to Agency (£K)	Financial Year 00	01	02	03	04
8.3.1 We will evaluate data from the third tyre-burning trial and consult on and determine Blue Circle's application for tyre-burning on a permanent basis once we have received it. **Contact: Team Leader Process Industry Regulation/ Radioactive Substances Regulation**	Agency	8	●				

8.4 Issue: The impact of Premiere Environmental Ltd

There is public concern about the risk to human health and the environment from this site following a number of incidents in recent years. In March 1997 the Agency served a suspension notice on Premiere Environmental Ltd of Westbury for a waste solvent solidification process after chemicals overheated. Over 20 people reported being affected by the fumes.

The company appealed against this notice but the appeal was dismissed by the Secretary of State. The company has now installed a Thermal Oxidiser to abate emissions of volatile organic compounds from its waste solidification process. Following successful trials of this equipment, modified licence conditions were accepted by the company which impose stringent controls on its operation.

We have also served two notices on the company to reduce the volume of waste stored on the site and to remove old waste to comply with limits set on the waste management licence. The company complied with the first notice following a short period of suspension and the second notice without suspension of the licence being necessary.

Actions	Action By	Cost to Agency (£K)	Financial Year 00	01	02	03	04
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 - Upper Avon**	Agency	125	●	●	●	●	●
8.4.2 We will work with the company to ensure that new abatement equipment (Thermal Oxidiser) for the solvent solidification process is effective. We have engaged consultants to monitor emissions. **Contact: Environment Protection Team Leader - Upper Avon**	Agency	10 p.a.	●	●	●	●	●

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

9. Air Quality

In January 2000 the Government published its National Air Quality Strategy, to replace that of the former administration in1997, 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 if deemed necessary. 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.

Air quality standards are set out in regulations made by the Government and obligations placed on local authorities to establish and operate Local Air Quality Management Areas. Local authorities will have to carry out periodic reviews of air quality. Where standards are not likely to be met by 2005 they will have to designate problem areas as Local Air Quality Management Areas and draw up action plans to improve air quality. Bristol City Council and South Gloucestershire Council have produced their statutory first phase assessment for local consultation and will have produced the final stage 3 review and assessment by September 2000.

The Agency is concerned about the health risks associated with air pollution. All combustion processes in air produce oxides of nitrogen, mainly nitric oxide. Nitric oxide often reacts with ground level ozone, creating nitrogen dioxide and oxygen. Nitrogen dioxide is a gas which aggravates breathing problems. Both nitric oxide and nitrogen dioxide are indirect greenhouse gases. In addition, nitrogen dioxide acts as a chemical source for the formation of ozone in the presence of sunlight. This reaction takes several hours and maximum ozone levels therefore occur away from the sources of primary pollutants. Ozone also aggravates breathing problems.

Ambient concentrations of smoke and sulphur dioxide have generally declined in the UK as a whole over the last 20 years. 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. Since the end of 1999 all petrol sold in the UK has been lead-free. The release of some pollutants such as nitrogen oxides, carbon monoxide and volatile organic compounds have remained relatively constant during the last twenty years, 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 will 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.

Road transport accounts for 46% of the UK emissions of nitrogen oxides. 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 nitrogen oxide emissions which comes from vehicles increases

dramatically. Studies done in London in 1993 and recently in the West Midlands attribute 76% and 85% respectively 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 nitrogen oxide emissions, and the UK Government has decided to accept an hourly mean of 105 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 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.

The Government responded to the consultation on the National Air Quality Strategy, reissued its thoughts as another consultation, then finalised the strategy in January 2000. 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. Our North Wessex area is also working locally on air quality through its membership of the steering group of the University of the West of England's Air Quality Management Centre and has contributed to the cost of running the Centre.

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 undertaking a review and assessment of current and future air quality in their area under the statutory process of Local Air Quality Management. We are using the example of Bristol as it is typical of all urban centres with traffic-generated air pollution and 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 but has reduced in 1997 and 1998. Background nitrogen dioxide levels in the city centre averaged 24 parts per billion (ppb annual mean) for 1998/9 and the average for the whole of the Bristol City Council Area was 16.6 ppb, with roadside nitrogen dioxide levels reaching 37 ppb in the city centre and a Bristol City Council Area average of 27 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. Benzene is highest at roadside sites and petrol stations. Measures taken to reduce nitrogen dioxide will also lower benzene. Average roadside benzene was 3.5 ppb. In 1998/9 Bristol City Council was one of the local authorities that carried out a pilot study of roadside vehicle emission testing. Those motorists whose vehicles exceeded the emission limits were issued with a fixed penalty notice. A decision on its future, by the Government, is still awaited. The table below lists Bristol City Council's Air Quality Strategy results for 1998 in greater detail.

Bristol Air Quality Statistics 1998

POLLUTANT	SITE	EXCEEDENCES
pm10 (particulate matter in the 10 to 20 micron range).	Bristol Centre	EPAQS standard exceeded on 269 occasions in 14 days
Sulphur dioxide	Bristol Centre	One exceedence of EPAQS standards
Sulphur dioxide	Blaise Castle house museum (continuous monitor)	100 ppb exceeded on 18 days although this does not exceed the EPAQS 99.96%ile standard
Nitrogen dioxide	Bristol Centre (continuous monitor)	Exceedences of EPAQS; annual average standard (21ppb)
Nitrogen dioxide	Bristol Old Market (continuous monitor)	One exceedence of EPAQS hourly average standard; EPAQS annual average standard (21ppb) exceeded
Nitrogen dioxide	Bristol (22 passive roadside sites)	EPAQS annual average standard (21ppb) exceeded at 15 sites
Nitrogen dioxide	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 5 sites)
Benzene	Bristol (34 passive background sites)	Twenty-one exceedences of provisional (by 31/12/2005) EPAQS standard (1 ppb)
1, 3 Butadiene	Bristol east (continuous monitor)	No exceedences of EPAQS standard (1 ppb)
Ozone	Bristol Centre (continuous monitor)	50 ppb exceeded on 7 days although this does not exceed the EPAQS 97%ile standard to be achieved by 2005

Ozone is not a problem in Bristol and therefore will not have to be addressed by Bristol City Council.

Bristol City Council is charged with monitoring and reducing air pollution and has powers to stop vehicles to have their exhaust emissions checked and during 1998 those breaking the law were fined. It is 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 videoconferencing 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. We have a large presence in Bristol with two headquarters offices, a national service office in nearby Bath and many vehicle movements in and around Bristol caused by our everyday work, and consequently we have a significant part to play in reducing the air pollution in central Bristol.

Actions	Action By	Cost to Agency (£K)	Financial Year 00	01	02	03	04
9.1.1 We will work with local authorities, Government agencies and developers to ensure that developments make use of transport options producing least pollutants. **Contact: Team Leader Planning Liaison**	Agency	0.5	●	●	●	●	●

9.2 Issue: The impact of emissions to air from heavy industry

There are no exceedences of air quality objectives in the area arising from industrial emissions but there are exceedences of the standard for sulphur dioxide at Blaise monitoring station. We are aware of several potential Integrated 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 nitrogen dioxide to be exceeded. We are working closely with Bristol City Council and South Gloucestershire Council to investigate this issue in more detail.

Actions	Action By	Cost to Agency (£K)	Financial Year 00	01	02	03	04
9.2.1 We will work with Bristol City Council and South Gloucestershire Council to investigate the potential impact of increasing emissions of oxides of nitrogen from the proposed power stations **Contact: Team Leader Process Industry Regulation/ Radioactive Substances Regulation**	Agency	0.5	●				

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

10. Climate Change

The climate is always changing, but in recent years the rate of change has increased. 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 United Kingdom in 1990 was 155 million tonnes, estimated emissions of methane from industrial processes, agriculture and other sources in the United Kingdom in 1994 totalled 4.25 million tonnes. Methane is more harmful as a greenhouse gas than carbon dioxide (see Issue 10.3) and is produced in landfills containing biodegradable waste. 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 11.1.6, Shoreline Management Plans (SMPs)).

In the South West, winter precipitation is predicted to increase by 5% by the 2020s, whilst summer precipitation is expected to be 5% lower. In terms of water resources there is likely to be reduced availability of water stocks, particularly in summer, coupled with an increase in demand for water. This will be especially significant in the South West where the population increases during the summer months.

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 00 01 02 03 04
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	20	●

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

In order to avoid property development in areas liable to flooding, we are producing detailed maps and information for local planning authorities to use. The extent of flooding depends on the severity of the flood event.

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	Planned for Feb 2000
North Wiltshire District Council	Planned for Feb 2000
Mendip District Council	Completed and issued
North Somerset Council	Planned for April 2000
Bath and North East Somerset Council	Planned for July 2000
Bristol City Council	Planned for July 2000

Actions	Action By	Cost to Agency (£K)	Financial Year 00 01 02 03 04
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	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 is the main contributor to landfill gas and its emission to the atmosphere. As available oxygen is used up within the landfill methane gas is produced and becomes the main contributor. Both carbon dioxide and methane are greenhouse gases; methane is estimated to be 20-30 times more damaging than carbon dioxide. 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 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	ST725 783	*			Site not filled - insufficient waste deposited to justify any action at present
Durston Landfill Ltd	Shire Way, Yate	Dormant	ST702 805	*			Insufficient gas produced to warrant flare or energy production
Terry Adams Ltd	Yanley	Active	ST556 699			*	Energy generation plant running
Hills Aggregates Ltd	Compton Basset	Active	SU018 711	*			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	ST840 585	*			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	ST880 528		*	*	Currently flaring. The new energy generation plant is now running.
Barge Waste Management Studley Grange Farm	Lydiard Tregoze	Active	SU105 821		*		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	SU015 712	*			Currently passive.
Crapper and Sons	Parks Ground Farm	Active	SU050 837	*			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 00 01 02 03 04
10.3.1 We will assess the need for improved methane control measures. **Contact: Waste Licensing Team Leader**	Agency (see Action 6.3.1)	2.5	● ●

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-fluorocarbons (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 00 01 02 03 04
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. **Contact: Area Business Services Manager**	Agency	Saving	●
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. **Contact: Area Business Services Manager**	Agency (see Section 9 Air Quality)	Saving	●
10.4.3 Seek greenhouse gas reductions from heavy industrial processes by means of IPC authorisations **Contact: Team Leader Process Industry Regulation/ Radioactive Substances Regulation**	Agency (see Section 9 Air Quality)	10	● ● ●

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.

The availability of water resources is an increasingly important issue across England and Wales. Whilst the Government has said that it does not expect water resources to be a reason for development proposals being rejected, the provision of adequate water supplies could have an influence on the timing of developments. The Agency comments on all county and district plans, and any individual planning applications that will have a significant water use, with respect to water resources and indeed water efficiency. As all new homes are now metered, water efficiency can reduce customers' bills. However we can only comment on water resources in general as the specifics depend on which sources the relevant water company would plan to use to supply the development. In the light of this we would wish to see water companies added to the list of statutory consultees that deal with planning applications.

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 Partnership, recreational users and the British Canoe Union. We will work with other organisations to try to resolve conflicts between users. We are a partner in the Avon Valley Partnership which will provide a towpath along the Avon. The project will also raise awareness of and improve the river corridor by habitat enhancements, waymarking and provision for interpretation facilities.

11.1.4 Sustainable transport links

We are committed to working towards more sustainable transport. We will, where possible, help groups such as Sustrans who are developing sustainable transport links, such as their Route 3 linking Bristol with Penzance. We can be of most help where a proposed route is along a riverbank which we own but unfortunately we do not own significant lengths in this catchment. We have to give consideration to a number of matters including conflict with other users, wildlife interests, flood bank erosion and health and safety. Bristol City Council have produced a *Provisional Bristol Local Transport Plan 2000/1-2004/5* following wide-ranging public consultation. This plan identifies a series of component strategies for cycling, walking, safer routes to school, road safety, air quality and access for disabled people.

11.1.5 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. Areas we are particularly keen to work on with Local Agenda 21 groups in the Bristol Avon catchment area are fly-tipping, waste disposal and the recording of alder disease and invasive non-native riparian plants. We can also supply some of the information that LA21 groups want; a leaflet is available from our Customer Contact Team.

11.1.6 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 this LEAP is called the Severn Estuary Shoreline Management Plan. Coastal issues are covered in the Severn Estuary Strategy Joint Issues Report, May 1998.

11.1.7 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.

11.1.8 Water Companies

Every five years the Office of Water Services (OFWAT) the Government's regulatory agency for the water industry, undertake a Periodic Review of Prices. This sets out what the water companies can charge their customers and how this money is to be spent by the water companies over the following five years. Crucial to this process is the development by the water companies of their strategic business plans which set out the improvements they plan according to guidelines agreed between the Agency, OFWAT and Government. These plans are also known as Asset Management Plans (AMP). In 1999, the third of these (AMP3) was completed for the period 2000-2005.

Detailed environmental obligations for the companies were established in relation to sewerage discharges and over-abstraction after a review by the Agency in liaison with English Nature and in agreement with the Department of the Environment, Transport and the Regions (DETR). In developing their plans, the water companies were required to take these into account. Agency and Government require these improvements to take place by 2005 but many of these schemes will be delivered before then.

At the end of 1999 OFWAT announced their final determination of prices for the period and set down the charges and expenditure for each water company in the period 2000-2005. Significantly, the expenditure and corresponding increase in charges for Wessex Water were not included in relation to the remedial scheme to address their portion of the reduction in abstraction to address the low flows in the headwater tributaries of the River Avon caused by existing abstraction. As described in Issue 2.2, the way forward on this issue is to be established after the review of options is completed as directed by the DETR.

Apart from the environmental obligation relating to the River Avon headwaters discussed above, there are also a number of other abstractions the Agency will be investigating in order to determine their impact; these are groundwater abstractions at Chalfield Brook and the River Marden and surface water abstractions from St Catherine's Brook and the Semington Brook. Initial investigations into the impact on the By Brook recommended increased environmental monitoring; the Agency is now reviewing options for further investigations/monitoring.

As part of AMP3, water companies were required to revise their water demand forecasts, review their water resources availability and consider any potential resource options to meet forecast deficits

within the planning horizon up to 2010. In parallel with this, companies were required to submit water resource plans to the Agency, setting out their demand forecasts and available resources over the next 25 years. Within these plans potential demand and resource management options, including leakage reduction, were considered with any resource development options that may be required to meet forecast demand. These plans were received in March 1999 and were judged by the Agency to be acceptable for Bristol Water and Wessex Water as set out in the publication *Planning Public Water Supplies (June 1999)*. The companies will be expected to update these plans annually.

11.1.9 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 Issue 7.14: River rehabilitation and channel management).

We have undertaken a study of the distribution and status of alien invasive plant species in the Upper and Lower 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. They can suffer from a lethal disease called Phytophthora (see Issue 7.15: 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.

11.1.10 Education

We recognise that broad-based education covering the community and 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 House Builders Federation, industry, waste management industry, Lackham College,

Wildscreen at Bristol, Farming and Rural Conservation Agency (FRCA), Farming and 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).

11.1.11 Pollution incidents

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

11.1.12 'Make a Difference' environmental improvement projects

Although we are not a grant awarding body, for a few years up to 1999 we created a small fund to finance a few low-to-medium cost projects each year which enhanced the environment i.e. 'make a difference'. Where possible we sought partners to provide matched funding. However from 1999, and for the foreseeable future, we have diverted all this money to implementing the actions identified in the Somerset Levels and Moors Action Plan. We are seeking to make a small fund available for projects in 2000/01 from savings achieved elsewhere.

We are still looking for opportunities to work in partnership with other bodies. We are particularly keen to secure external funding for 'Make a Difference' and LEAP actions, but in most cases our contribution would be limited to technical expertise. In some cases funding may be possible within existing budgets for our core work. The main areas for projects are: biodiversity, waste minimisation, recreation, Local Agenda 21 and land management.

The list below gives some examples of the 'Make a Difference' (MAD) projects 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 - riffle 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

We have developed our own Environmental Management System to monitor our environmental performance. An Environmental Management System is a systematic way to manage the environmental impacts of an organisation. The approach follows the simple cycle of planning what we will do, how we are doing it, checking that it is working and reviewing and modifying our approach. A successful system will deliver a continual improvement in our environmental performance and potential for substantial cost savings.

The Agency is committed to the following environmental management practices:

11.2.1 Resources

We aim to ensure the allocation of resources at all levels to achieve the implementation of effective environmental management action throughout the Environment Agency and 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.

Next year's draft targets are under discussion but have not been finalised. Our 1998/99 national targets are set out in the table below.

Environmental Performance Targets 1998/99

Target No	Target	Performance
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.	Of 193 sites identified as posing a risk to the environment, 184 have been inspected and are covered by an action plan.
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.	38 of 94 buildings achieved the target level for energy efficiency.
3	Compile "Green Transport Plans" to reduce commuter transport impacts at all key sites and reduce mileage on Agency business (lease, badged, casual, essential, etc.) by 5% on 1996/7 figures.	During 1998/99 we produced plans at 57 key sites, 77% of those targeted. We reduced our business mileage compared to 1996/97 by 3%.
4	Improve overall fuel efficiency for badged vehicle fleet by 3 mpg on 1996/7 figures.	The fuel efficiency of the fleet has deteriorated throughout the last two two years. We recorded 30.4mpg in 1998/99 against 31.8mpg in 1996/97.
Resource Management		
5	Implement resource and waste management plans at each Agency site. Specifically to • reduce water use in offices and depots to 30% below accepted norm for this type of office or 1996/7 consumption, whichever is higher;	We introduced resource management plans at 101 of 150 selected sites. We used 65,400m^3 water in our metered premises, a reduction of 30.4% on 1996/97. We produce about 163kg waste per person of which 51% is recycled.
6	• reduce residual waste by 15% on 1997/98 levels.	
7	Ensure that at least 10% of construction aggregates used are from recycled/secondary sources.	38% of materials used in construction projects were from recycled or secondary sources.

12. Appendices

12.1 Our river quality objectives (RQOs)

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 the River Ecosystem Classification; this scheme comprises five quality classes which reflect the chemical quality requirements of different types of river ecosystems (see Section 7).

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 the confluence with Hancocks water to the confluence with Thunder Brook (stretch 156), we cannot assess compliance for 1997 and 1998 because the monitoring point became 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 intending to upgrade the RQOs of some of the stretches in the Bristol Avon catchment: these are shown in the table below in **bold**. The timing of the application of these upgrades will depend on policy regarding the upgrading of RQOs which is currently being agreed between the Agency and the Department of the Environment, Transport and the Regions (DETR).

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 Ladden Brook	2 (1998)	
28	Bristol Frome	Confluence with Ladden 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	Ladden Brook	Sodbury Common to Bagstone	2	
33	Ladden 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	Salters 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 Golden 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	

Stretch Ref. No	River	Stretch	Current RQO (LT RQO)	Proposed RQO (LT RQO)
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 Catherines 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	
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 Tyning	3[2]	
71	Wellow Brook	Tyning to Foxcote	3	
72	Wellow Brook	Foxecote 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 Kilmersdon 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 Hay 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 Henham Brook	3[2]	
92	Somerset Frome	Confluence with Henham 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	

Stretch Ref. No	River	Stretch	Current RQO (LT RQO)	Proposed RQO (LT RQO)
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 Rodden 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 Brk	West Lavington to U/S Woodbridge Farm	2	
122	Semington Brk	U/S Woodbridge Farm to confluence with Worton Stream	3[2]	
123	Semington Brk	Confluence with Worton Stream to confluence with Bulkington Drove Watercourse	2	
124	Semington Brk	Confluence with Bulkington Drove Watercourse to confluence with Summerham Brook	2	
125	Semington Brk	Confluence with Summerham Brook to U/S Semington	3	
126	Semington Brk	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 & Drewspond to confluence with Summerham Brook	4	
131	Old Park Watercourse	Devizes to confluence with Poulshot Stream & Drewspond	4 (2005)	
132	Drewspond 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 Strm	U/S Bowerhill STW to confluence with Avon	5	

Stretch Ref. No	River	Stretch	Current RQO (LT RQO)	Proposed RQO (LT RQO)
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 Brk	U/S Wootton Fields Farm to confluence with Hancocks Water	3	
156	Brinkworth Brk	Confluence with Hancocks Water to Thunder Brook	3	
157	Brinkworth Brk	Thunder Brook to Brinkworth	3	
158	Brinkworth Brk	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 Brk	Stanton St Quintin 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 Fosseway	3	
168	Tetbury Avon	Fosseway 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 Brk	Luckington to Luckington Court	4[2]	
174	Luckington Brk	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	Avon Wildlife Trust
Mr M Lang	Wilts Wildlife Trust
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	Avon Farming and Wildlife Advisory Group (FWAG)
Ms L Coward	Wilts Farming and Wildlife Advisory Group (FWAG)
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
Mr G.E. Harman	Inland Waterways Association
Mr T Fell	Devizes Angling Club

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 direct powers) in:	Partnership
Water Resources The Agency has a duty to conserve, redistribute, augment and secure the proper use of water resources.	• 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.	• 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 (Town & Country Planning Act, 1990) Agreements that afford protection to the water environment. • Acting as a statutory consultee to the planning authorities to secure conditions and agreements to protect the environment.	• 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 protection to the water environment.

Agency Duty	The Agency has powers to:	The Agency has an interest (but no direct powers) in:	Partnership
Flood Defence The Agency has a duty to exercise general supervision over all matters relating to flood defence throughout each catchment.	• 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, local authorities and the police relating to main rivers. • Consent mineral working within 16 m of main rivers.	• 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.	• 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.	• 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.	• 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.	• 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 direct powers) in:	Partnership
Air Quality The Agency has a duty to implement Part 1 of the Environment Protection Act 1990.	• 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 the above industrial processes.	• The vast number of smaller industrial processes which are controlled by local authorities. • Control over vehicular emissions and transport planning.	• 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.
Radioactive Substances The Agency has a duty under the Radioactive Substances Act 1993 to regulate the use of radioactive materials and the disposal of radioactive waste.	• To issue certificates to users of radioactive materials and disposers of radioactive waste, with an overall objective of protecting members of the public.	• The health effects of radiation.	• 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.
Waste Management 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.	• Vary waste management licence conditions. • Suspend and revoke licences. • Investigate and prosecute illegal waste management operations. • License the carriers and brokers of waste. • Refuse licence applications in certain circumstances.	• 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.	• 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 direct powers) in:	Partnership
Contaminated Land 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.	• 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.	• Securing with others, including local authorities, landowners and developers, the safe remediation of contaminated land.	• The Agency supports land remediation and will promote this with developers and local authorities and other stakeholders.
Conservation 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.	• 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.	• 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 over forty species and four habitats.	• 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.
Landscape 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.	• 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.	• The landscape impact of new development, particularly within river corridors. This is controlled by local planning authorities.	• 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.
Archaeology 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.	• The Agency must promote its archaeological objectives through the exercise of its water management and pollution control powers and duties.	• Direct protection or management of sites of archaeological or heritage interest. This is carried out by local planning authorities, County Archaeologists and English Heritage.	• 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 direct powers) in:	Partnership
Fisheries The Agency has a duty to maintain, improve and develop salmon, trout, freshwater and eel fisheries.	• 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.	• The determination of planning applications which could affect fisheries.	• 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.	• The Agency contributes towards its recreation duty through the exercise of its statutory powers and duties in water management.	• Promotion of water sports. This is carried out by the Sports Council and other sports bodies.	• The Agency will work with the Countryside Agency, the Sports Council, British Waterways and other recreational and amenity organisations to optimise recreational use of the water environment.

12.5 River rehabilitation priorities in the Bristol Avon Catchment

- Semington Brook and tributaries - rolling programme of work in conjunction with Fisheries.
- Sherston Avon - enhancements to reduce siltation and protect important populations of crayfish and water-vole.
- Bristol Frome - long-term programme of work in conjunction with local authorities.
- Dauntsey Brook - continuation downstream of flood defence work in Dauntsey.
- Brinkworth Brook (completed).
- By Brook - enhancement through Cotswold and By Brook Project.
- Marden - enhancements in conjunction with North Wiltshire District Council.
- Avon (Chippenham Town Centre) - supporting Chippenham River Green Project.
- Avon at Melksham (completed).
- Avon in Malmesbury Town Centre - support for Malmesbury River Valleys Trust.
- South Bristol Streams in conjunction with Avon Wildlife Trust.
- Sections of the River Biss.
- Sections of the River Boyd.

NB Implementation will be totally dependent on funding being available.

12.6 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
Bristol City Council Provisional Bristol Local Transport Plan 2000/1-2004/5 (November 1999)
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
Department of the Environment, Transport and the Regions and the Welsh Office (1999) Taking Water Responsibly
Department of the Environment, Transport and the Regions (1999) A Way with Waste - A draft waste strategy for England and Wales
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 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 (1999) Annual Environmental Report for the Agency's Own Activities 1998/99. HO-9/99-7K-C-BEOV
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 (1999) Corporate Plan 2000/01. HO-8/99-5k-B-BEOP
Environment Agency (1999) South West - Regional review and forward look. HO-6/99-5k-C-BEPB
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 (1998) Bringing in integrated pollution prevention & control. HO-12/98-12k-C-BECR
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 1998 General Quality Assessment (GQA) and River Ecosystem - WQ Technical Series GQA 19F
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) 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'.

12.7 Our corporate 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.

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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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

For general information about flooding.

BECAUSE FLOODS DON'T JUST HAPPEN TO OTHER PEOPLE

ENVIRONMENT AGENCY
FLOODLINE
0845 988 1188

ENVIRONMENT AGENCY

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