local environment agency plan

SEVERN VALE

CONSULTATION DRAFT

MARCH 1999

ENVIRONMENT AGENCY

Our draft vision for the Severn Vale

The Environment Agency's overall aim is for a "better environment in England and Wales for present and future generations". We will achieve this by taking a sustainable and wide-ranging approach to the way we protect and enhance the environment. A sustainable environment is one where there is a balance between economic, social and environmental factors.

In the Severn Vale area we aim to meet this vision through the protection and improvement of the health and safety of people, property and the natural environment. We aim to manage our activities and duties to address local concerns and promote environmental enhancement in a manner which is sustainable for the future. The successful management of the area requires us to respond effectively to ever increasing pressures exerted on the environment of the Severn Vale and to target resources where they are most needed.

Our Key Environmental Objectives for the Severn Vale Area are (in non-priority order):

- Improving and maintaining water quality where water quality targets are not currently being met.
- Improving recreational facilities along the river corridors, including the promotion of the Severn Way.
- Maintaining, and where justified, improving protection against flooding.
- Continuing to improve our flood warning service in flood risk areas.
- Ensuring that the adverse impacts of contaminated land (including landfill sites and old mineworkings) are minimised to protect the environment as a whole from pollution.
- Realising the opportunities to improve the conservation value of the area, particularly focussing on river corridors and floodplains.
- Helping to ensure that waste minimisation targets are achieved, to reduce the amount of waste produced and the impact of waste management on the environment.
- Promoting education initiatives as the key to changing the actions of individuals and industry.
- Protecting and enhancing the important biodiversity in the area.
- Improving, developing and protecting the elver and salmon fisheries.
- Promoting the sustainable use of water resources.
- Working with local authorities to address the impacts of land use planning on the environment.
- Reducing the effects of plant nutrients from agriculture and sewage works on the water environment.
- Working with local authorities to ensure that Air Quality Standards are met.
- Ensuring that flows in rivers to the estuary protect important water resources and habitats.

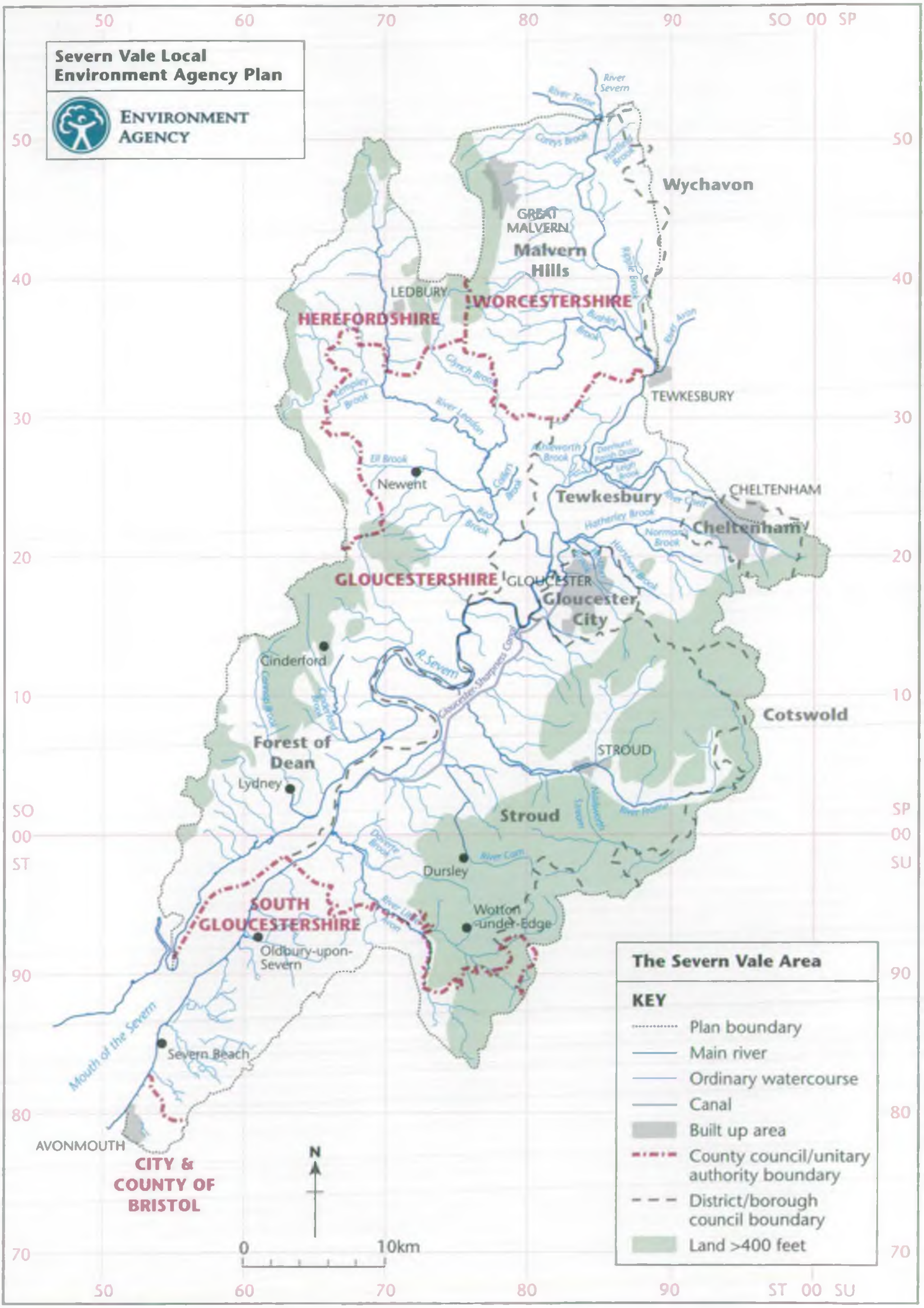
We propose to achieve this by:

- Developing partnerships and securing the involvement of industry, local authorities, environmental groups, educational establishments and others with an interest in the environment.
- Protecting and managing the natural resources of the area in a sustainable manner.
- Regulating the activities of those who have a potential impact on the environment by setting and enforcing consistent standards.

By working together, we can make this vision and our objectives become reality.

Bill Forbes,

Bill Forbes
Lower Severn Area Manager


Severn Vale Local Environment Agency Plan
ENVIRONMENT AGENCY
The Severn Vale Area
KEY
Plan boundary
Main river
Ordinary watercourse
Canal
Built up area
County council/unitary authority boundary
District/borough council boundary
Land >400 feet
50
60
70
80
90
SO 00 SP
ST 00 SU
40
30
20
10
SO
00
ST
SP
00
SU
90
80
70
River Severn
River Teme
Cowleys Brook
Hatfield Brook
Wychavon
GREAT MALVERN
Malvern Hills
Ripple Brook
LEDBURY
WORCESTERSHIRE
HEREFORDSHIRE
Bushley Brook
River Avon
Glynch Brook
Kempley Brook
River Leadon
TEWKESBURY
Ell Brook
Newent
Collin Brook
Chaceley Brook
Tewkesbury
CHELTENHAM
Cheltenham
Hatherley Brook
Norman's Brook
River Chelt
Red Brook
GLOUCESTERSHIRE
GLOUCESTER
Gloucester City
Horsbere Brook
Cinderford
R. Severn
Gloucester-Sharpness Canal
Forest of Dean
Lydney
Cotswold
STROUD
Stroud
River Frome
Doverte Brook
Dursley
River Cam
Wotton-under-Edge
SOUTH GLOUCESTERSHIRE
River Little Avon
Oldbury-upon-Severn
Mouth of the Severn
Severn Beach
AVONMOUTH
CITY & COUNTY OF BRISTOL
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0
10km

What is this report about?

This report highlights the specific environmental problems in the Severn Vale area, which are within the Environment Agency's remit or that can be addressed through partnerships. The Agency has identified the problems and made suggestions as to how they can be tackled. The Plan area is shown on the Map in this cover.

Why should you read it?

The Environment Agency wants to hear your views on the issues facing the environment of the area and what you think should be done about them. Sharing your views with us will enable you to contribute to environmental protection and improvement, and influence what the Environment Agency and other managers of the environment do. We will be pleased to receive any comments you wish to make but in particular we are very keen to know:

- are there problems or opportunities that you know of but which we have not included?
- how important do you think the issues are?
- what do you think of our proposals?
- what do you think should be done about them?
- whether you can help tackle any of the issues.

What will the Environment Agency do with your comments?

The Environment Agency will consider your comments prior to the production of the Local Environment Agency Plan (LEAP) which will set out proposals to protect and improve the environment of the area. If you want us to, we will reply to you on your specific comments, letting you know how they have influenced our actions. All comments will be treated as public information unless you request otherwise.

How can you make your views known?

We will be holding meetings during the consultation period (April to June 1999) that will provide an opportunity for you to discuss this plan with us. You can contact us by:

- using the questionnaire and freepost envelope included at the back of this report
- writing to us using the freepost envelope
- telephoning us on 01684 850951
- faxing us on 01684 296005
- or you can e-mail us at bernard hall@environment-agency.gov.uk

Please address all comments to:

Bernard Hall,
LEAP Planner,
Environment Agency
Riversmeet House
Newtown Industrial Estate
Northway Lane
Tewkesbury
Glos
GL20 8JG

Please return your comments to us by 30 June 1999

Questionnaire

The aims of the Severn Vale LEAP Consultation Draft are:

- To inform you of our vision and the issues we think need tackling,
- To receive your views and comments. This is your opportunity to tell us what you think and you can do this by filling in this questionnaire **or** by sending a separate written statement. All comments will be treated as public information unless you state otherwise.

i) **Please answer the following questions (it should only take 5 minutes)**
ii) **Please add any further comments on the back of the sheet.**
iii) **Detach the questionnaire and send it to us in the FREEPOST envelope provided**

Questions

1. Had you heard about the Environment Agency before hearing about this LEAP ? Yes/ No

2.How did you find out about this Local Environment Agency Plan? (please tick box)

Letter from the Environment Agency ..... ☐
Environment Agency displays ..... ☐
Radio ..... ☐
Television ..... ☐
Newspaper ..... ☐
Other (please state)
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3 If you would like to know more about the Environment Agency please say what information you would like below and write your name and address on the reverse of this questionnaire.
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Your views count

4 The Environment Agency has identified 32 issues in the area. Please circle the five that are most important to you:

1. Making Waste Work in the Severn Vale area.
2. Waste minimisation in the Severn Vale area.
3. Pollution, health and amenity risks from existing inadequate waste management licences.
4. Public concern about the regulation of land spreading of materials for agricultural purposes in particular the spreading of abattoir waste on land.
5. Managing Air Quality – strategies and information.
6. The impact of the Cleansing Services Group site on local air quality.
7. Proposals to build additional gas power stations at Avonmouth and their potential impact on air quality
8. The Control of Major Accident Hazards involving Dangerous Substances (COMAH)
9. Climate change leading to increased flood risk:
10. Potential for non-fossil fuel energy from hydropower and waste to energy.
11. Maintaining River Severn flows to the estuary:
12. Low river flows
13. The need for improvements to the gauging station on the Little Avon at Berkeley.
14. The impact of changing land use practice on the water environment, especially the Leadon Catchment.
15. Pollution of surface water intended for public water supply
16. The impacts of inadequate sewerage facilities on water quality
17. The effects of nutrients on the catchment
18. Failure to comply with River Quality Objectives.

19. Review of River Quality Objectives

20. Managed surface water drainage from developed areas

21. Managing flood risk and floodplains.

22. Recreational use of, and access to, the river corridor.

23. Implementation of the Contaminated Land and Special Sites Regulations including the potential to developing partnerships between the Agency and local authorities.

24. The impact of contaminated mines on the surrounding environment in the Forest of Dean.

25. Managing SSSIs, RAMSAR sites, SPA and the proposed SAC.

26. Enhancing Biodiversity

27. Elver fishery: management of the fish stocks and operation of the fishery.

28. Climate change and salmon survival leading to concerns regarding the small populations of salmon in the River Severn catchment.

29. Lydney Dock development.

30. Managing environmental information – air quality, biodiversity and waste management.

31. Promoting environmental awareness and understanding.

32. The impact of new development on the environment.

5 Are there any other important issues in the area which relate to the Environment Agency's responsibilities ?

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6. What best describes your interest in this LEAP?

- ☐ An officer working for a local authority or government agency/ department
- ☐ An officer/ representative of a national organisation
- ☐ A member of an environmental pressure group
- ☐ A representative of a private company
- ☐ A member of a local sports club
- ☐ A member of a local amenity society
- ☐ A local resident
- ☐ An individual interested in environmental matters,

Other (please specify)

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7 Are there any errors or omissions in the Report ? If so please specify:

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8 If you would like a reply to your comments or further information please write your name and address below. The Agency will not pass your details to anyone else or use them for any other purpose.

Name .....
Organisation (if relevant) .....
Address .....
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Postcode.....

Comments

If you have any further comments, please write them here or continue on another piece of paper.

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Contents

Page No

1.0 Introduction

1.1 The Environment Agency

The Environment Agency came into being on 1 April 1996 to protect, monitor and improve the environment in its broadest sense – ultimately contributing to the worldwide goal of sustainable development. We have become one of the most powerful environmental regulators in the world. By exerting our influence on the regulation of air, land and water, we have a unique opportunity to look at our environment in an integrated and holistic manner.

Our Vision is:

'A better environment in England and Wales for present and future generations'.

We will help make this vision a reality by achieving the following aims:

- 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.
- 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 achieve these aims 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 business-like in all we do.

The Environment Agency has a wide range of duties and powers relating to different aspects of environmental management (refer to Appendix 1) It is required and guided by government to use these duties and powers in order to help achieve the objective of sustainable development. Sustainable development is defined as "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

At the heart of sustainable development is the integration of human needs and the environment within which we live. Indeed, the creation of the Agency itself was, in part, a recognition of the need to take a more integrated and longer-term view of environmental management at a national level. The Agency has to reflect this in the way it works and in the decisions it makes. Local Environment Agency Plans such as

this one are part of the Agency's approach to planning to improve the environment and, importantly, are undertaken in consultation with interested parties.

Taking a long-term perspective will require the Agency to anticipate risks and encourage precaution, particularly where impacts on the environment may have long-term effects, or where the effects are not reversible. The Agency must also develop its role to educate and inform society as a whole, as well as carrying out its prevention and enforcement activities, to ensure continuing protection and enhancement of the environment. Many of the issues in this LEAP address education in one form or another and Issue 31 focuses on this aspect.

Although the Agency only has duties and powers to protect some environmental resources, it will need to contribute to other aspects of environmental management even if these are, in the first instance, the responsibility of others. The Agency can only do this effectively by working in partnership with and through others to set common goals and to achieve agreed objectives. The issues in this LEAP illustrate the need for partnership and 28 issues include other organisations in the proposals for action.

Photograph 1. Westbury-on-Severn

Much of the UK's environmental legislation originates from the European Union. To date, there have been five EC Environmental Action Programmes, which have collectively given rise to several hundred pieces of legislation of relevance to environmental protection; one of the most recent being the Directive on Integrated Pollution Prevention and Control. A number of other Directives are under consideration, covering issues such as water management, air quality, and the management of waste using landfill.

The Agency also has to work in a wider international context because it is now generally accepted that environmental changes are occurring on a global scale. Individual countries contribute to these changes, and respond to them, in different ways. The Agency's long-term strategy has to reflect these global issues, and it has to be delivered within the framework of international and national commitments that have been developed to address them.

Perhaps the major international issue is that of climate change. The UK is a contributor to the emission of gases such as carbon dioxide into the atmosphere, which are believed to contribute to long-term climate changes. The UK will also be affected in a complex way as and when the climate does change; it is therefore a signatory to the Framework Convention on Climate change, as agreed at the Rio Summit in 1992, and is taking an active part in international negotiations to obtain commitments beyond the year

2000 for credible, effective, and achievable reductions of greenhouse gas emissions. These international activities help set the context for more local responses to climate change as highlighted in Issues 9 and 10.

Another outcome 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 all therefore think globally but act locally. The Local Agenda 21 initiative set out actions needed to achieve sustainable development, including the need to make clear the links that exist between local life-styles and the use of resources. In the UK LA21 plans have now been formulated by local government and local communities to identify and address a wide range of environmental issues, including natural resource use, pollution, health, local amenity and quality of life. These programmes set out long-term solutions that take account of global implications, such as the use of resources that affect the global environment and thus local communities in other parts of the world. In the Severn Vale area the Agency contributes to several LA21 initiatives and through consultation on this LEAP, we hope to give local people further opportunities to influence the environment.

The Agency comprises seven regions in England and Environment Agency Wales sub-divided into twenty-six areas. The Midlands Region comprises four areas; the Severn Vale catchment is part of Lower Severn Area. Most of the Agency's work operates at a local level and this allows an integrated and personal approach to managing the environment. Scotland is covered by its own Scottish Environmental Protection Agency and Northern Ireland has an Environment and Heritage Service and Rivers Agency.

1.2 Regional Committees and Area Environment Groups

In order to support openness, objectivity and accountability, the Agency is required by law to consult committees on all aspects of its work. Members of the committees are local people drawn from public life including industry, agriculture, local authorities and environment groups.

The Midlands Region is served by three statutory committees:

- Regional Environment Protection Advisory Committee
- Regional Flood Defence Committee
- Regional Fisheries, Ecology and Recreation Advisory Committee

In addition, the Agency consults its own advisory Area Environment Group in the Lower Severn Area. The group advises the Agency on LEAPs, the delivery of local services and acts as a link between the local community, the Agency and its statutory committees. Meetings are held four times a year and are open to the media and the public. The Area Environment Group has set up sub-groups to consider all draft LEAP documents. Ten members are involved with the development of this LEAP.

1.3 Local Environment Agency Plans

The Agency is committed to delivering environmental improvement at the local level, and one of the ways to do this is through Local Environment Agency Plans (LEAPs). The plans will reflect our close contact with industry, the public and local government and will contribute towards achieving sustainable development. They are non-statutory integrated action plans based on local river catchments. They provide a focus for those concerned with the environment of the local area.

LEAPs help to fulfil the Agency's principal aim of contributing to sustainable development through integrated environmental management and improvement. They also play a role in:

- promoting openness and accountability,
- developing closer links with public, community and other agencies,
- educating and informing the public on local environmental issues,
- prioritising the Agency's work through an action plan for managing and improving the local area over the next five years,
- realising the environmental potential of the area,
- forming joint actions and partnerships for environmental improvement.

Six other LEAPs, the Middle Severn, the Teme, the Warwickshire Avon, the Wye, the Upper Bristol Avon and River Thames (Buscot to Eynsham) share boundaries with the Severn Vale area.

The LEAP Process

This LEAP builds on the successes of the River Severn Lower Reaches Catchment Management Plan published in 1995 by the former National Rivers Authority. That plan dealt with the water environment, but this LEAP deals with issues across the whole of the Environment Agency's responsibilities.

The LEAP process involves several stages as outlined below:

Environmental Overview

The Environmental Overview is a factual description and analysis of the local environment and its associated pressures. From this analysis a series of issues emerge which are then carried forward into the LEAP Consultation Draft for consideration by us, our partners and those individuals and organisations generally interested in the local environment. The Environmental Overview is not subject to public consultation but is available on request.

LEAP Consultation Draft

Following on from the Environmental Overview, the publication of the Severn Vale LEAP Consultation Draft marks the start of a three month period of formal consultation. The purpose of the consultation period is to enable the Agency and all external organisations and the general public to liaise and reach a consensus about the management of the area.

Your views will be considered in preparing the next phase, the LEAP Plan. At the end of the consultation period we will produce a Statement of Public Consultation, which will summarise the views expressed during the consultation process.

LEAP Plan

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

The Severn Vale LEAP is part of a national programme to ensure LEAP coverage of England and Wales, to consultation draft stage, by the 31 December 1999. If you want information about a LEAP for another area, please ask.

1.4 Introducing the Nine Themes

The Agency's principal and immediate environmental concerns are stated in our national strategy *An Environmental Strategy for the Millennium and Beyond* and relate to nine themes which represent the Agency's new holistic approach to environmental management and are as follows:

- Managing waste
- Improving air quality
- Regulating major industries
- Addressing climate change
- Managing water resources
- Delivering integrated river-basin management
- Conserving the land
- Enhancing biodiversity.
- Managing freshwater fisheries.
- Managing the environment in partnership

We will deliver this strategy at a local level by dialogue between ourselves and the various organisations involved in the protection and management of the environment. As a first step towards achieving our aims and delivering our strategy in the Lower Severn area, issues have been raised and proposed actions have been identified, highlighting which theme they contribute to. These issues are presented in section 3 of this document and your views on them are requested.

2.0 The Severn Vale Plan Area

2.1 Introduction

The Severn Vale LEAP covers the River Severn Corridor from its confluence with the River Teme, just south of Worcester, to just below its tidal limit at Gloucester plus the Avonmouth and Severnside areas. The total area of the catchment is shown on the Map in the cover. Issues relating to the estuary itself were covered in the Severn Estuary Joint Issues Report published in May 1997.

The corridor of the River Severn includes the Malvern Hills and the main towns of Malvern, Cheltenham, Gloucester and at the confluence with the Warwickshire Avon, Tewkesbury. Historically, the River Severn has featured highly in the landscape characteristics of this area and is a focal point for many recreational activities. It is an historic navigation and now provides water supplies to over 1.5 million people. Malvern is world famous for its bottled water source, and "Regency" Cheltenham has some of the finest architecture in the country. Gloucester old docks have been renovated in recent years with the river now a feature again. Perhaps the most characteristic feature of the area is the Severn Bore which occurs at times of high tide, attracting many sightseers.

Photograph 2. Gloucester Docks

The River Leadon is a rural catchment and traditionally an area for hop-growing. The main environmental issues in this area relate to water resources and diffuse sources of pollution as a result of agricultural activity.

The Forest of Dean is a popular area for visitors, but has historic and potential problems related to opencast and deep mining.

The River Frome is characterised by its shape. The steep-sided profile of the river valley with its resultant fast flows has been exploited for wool milling and is currently under scrutiny for its potential for hydropower generation. There is also considerable interest in canal restoration. The Gloucester-Sharpness Canal is not only of interest as a recreational feature, but also, along with the River Severn, supplies drinking water to Bristol and towns in this catchment.

The rivers Cam, and Little Avon and the Avonmouth area are protected from flooding by coastal defences. Avonmouth is criss-crossed by small drainage channels or "Rhines" which have been culverted in many cases to act as discharge channels from the extensive chemical works in Avonmouth.

2.2 Land Use

The Severn Vale area is predominantly rural, with the population centred on the main urban areas of Avonmouth, Cheltenham, Cinderford, Gloucester, Great Malvern, Lydney, Stroud, and Thornbury. The total population within the catchment is approximately 545,000, of which 39% is located around Gloucester and Cheltenham.

The majority of development is concentrated around the existing urban areas. Future development within the catchment is to be led by the Statutory Development Plans of the Local Planning Authorities.

A large proportion of the total land area is under grass cover. The Forest of Dean and areas of the Leadon, Frome and Cam sub-catchments contribute to 11.6% of the catchment being forested. There is also a significant area of arable farmland. Although a proportion of the Avonmouth sub-catchment is rural, the impact of the Avonmouth chemical industries is highly significant.

2.3 Industry

Industries with the greatest potential to pollute the environment are subject to a system of Integrated Pollution Control (IPC) for which the Agency is responsible under Part I of the Environmental Protection Act 1990. Within this Act two lists of processes have been presented by regulators for control – Part A processes controlled by the Agency and Part B processes which are controlled by local authorities with regard to their discharges to air under a system of Local Authority Air Pollution Control (LAAPC).

There are significant discharges of sulphur dioxide and nitrogen oxides from the industrial complex at Avonmouth where there are a number of processes controlled under Part A of the Act. Within the rest of the plan area there are additional authorised processes including plating works, precious metal recovery and specialist chemical manufacture. Wastes from these processes are disposed of direct to controlled waters, via sewer as trade effluent and to land.

Within the Severn Vale area there are three power stations. The nuclear power station at Berkeley is currently being de-commissioned. There is an operational nuclear power station at Oldbury and an operational gas fired power station at Hallen, near Bristol.

2.4 Waste disposal

Waste Collection is the responsibility of the District or Unitary Authority. Counties and Unitary Authorities also have a duty to produce Waste Local Plans. Gloucestershire County Council currently have a pre-deposit consultation on their Waste Local Plan and have highlighted the key issues as reduction of waste, materials recovery, waste to energy recovery and disposal. For the plan period 1998-2007 the plan considers that no further disposal sites need to be identified as this may discourage recovery operations. In Avonmouth, however, Compact Power is building a waste pyrolysis plant to take some of Bristol's waste.

Waste management facilities are mostly run by private operators who need both planning permission and a waste management licence to operate. Planning permission is granted by County or Unitary Authorities and the licence by the Agency. The Agency controls and is notified of all hazardous

waste movements and trans-frontier shipments of waste, such as those arriving at Avonmouth or Sharpness.

The Agency is also encouraging landfill operators to use landfill gas to produce energy. This has direct benefits and also cuts down the gases escaping to the atmosphere which contribute to the 'Greenhouse effect'. The Hempsted site at Gloucester already produces energy from landfill gas and feasibility studies are underway at Bewick Farm landfill site.

2.5 Water resources

The Severn below Worcester provides the water supply for around 1.5 million people. Cities and towns supplied include Bristol, Coventry, Gloucester and Cheltenham. The Rivers Frome and Cam, via the Gloucester-Sharpness Canal, are also major water supply rivers as they provide a significant proportion of the supply to Bristol in winter months.

The main uses of surface and ground water as a percent of total water quantity are as follows; Public Water Supply (67%), Hydropower (22%), Cooling Water (2%) Industrial processes (2%), Transfer of Water (2%), Spray Irrigation (1%), Miscellaneous (3.3%).

The catchment area is subdivided into five catchments for water abstraction licensing purposes, Lower Mid Severn, Severnside below Tewkesbury, Leadon, the Frome and the Little Avon. There are a total of 627 abstraction licences within these subcatchments allowing for a maximum 20,715 Ml/a (megalitres per annum) to be abstracted from groundwater and 286,324 Ml/a from surface water sources.

There are major abstractions for public water supply from the River Severn at Upton-on-Severn for Coventry, at Tewkesbury for Gloucestershire and from the Gloucester-Sharpness Canal for Bristol.

The majority of licences (405) are for agricultural purposes and spray irrigation, giving a total potential abstraction of 3,414 Ml/a, of which 1,087 Ml/a is from groundwater and 2,327 Ml/a from surface water for these purposes.

The catchment has two main areas for groundwater abstraction. These are Oxenhall and Bromsberrow units, both in the Newent area. The Agency has a duty to protect this resource which is vulnerable to over abstraction and is important in supporting surface waters through springs and base flows to rivers. The Bromsberrow Unit is considered to be over licensed and over abstracted with evidence of low flows, for example in the Glynch Brook. The drilling of new boreholes in the area by Severn Trent Water may lead to compensation water being added to the Glynch Brook at times of low flow. Some water resource development can be considered still for the Oxenhall Unit. There are also other limited groundwater abstractions such as in the Cotswold area where an increasing number of licences has prompted the need for further monitoring.

2.6 Water quality

The watercourses of the Severn Vale area include a wide variety of rivers and streams, from shallow upland brooks draining the Cotswold Escarpment, to deep lowland rivers such as the Severn itself and drainage rhines which are in effect linear ponds. Quality similarly varies from totally unpolluted streams, to nutrient rich rivers suffering oxygen depletion in summer and to streams whose quality is dominated by sewage and trade effluents.

The majority of rivers within this catchment, including the Gloucester-Sharpness Canal, fall into the categories "Good"(A-B) and "Fair"(C-D) under the Agency General Quality Assessment Scheme. This means that they can support game and coarse fisheries respectively.

Some tributaries of the Leadon and a stretch of the Chelt downstream of Cheltenham fall into the "Poor" category, owing mainly to sewage inputs. The Avonmouth rhines can be considered in a practical sense to be drainage channels or, as on industrial sites, culverts for effluent disposal. As such they are not classified under this scheme. 40% of current classified reaches fall into the highest GQA Chemical Grades A & B, 53% into GQA Grades C & D and 7% into Grades E & F.

As the River Severn enters the catchment below Worcester, it is subject to opposing influences, i.e. the polluting effect of Worcester sewage works and the diluting effect of the clean River Teme. Quality remains good throughout the stretch to Tewkesbury and the Avon confluence. Although of lower chemical quality than the Severn, the Avon has limited immediate impact because of the much greater flow in the Severn. However, the additional nutrient load from the Avon contributes to the periodic incidence of algal blooms in the Severn from this point on. The next influence is from the River Chelt, containing the treated effluent from Cheltenham Sewage Works. This also adds to the eutrophic effects of nutrient enrichment.

Below the tidal limit at Maisemore the Severn ceases to be an inland water and becomes a tidal river, with unstable bed and physical conditions which change violently during tide cycles. Vast quantities of silt are re-suspended and subsequently deposited with the passage of the tidal bore, which brings saline estuary water up to Gloucester. The discharge from Gloucester Sewage Works into this stretch has been an important influence on quality, however, it is much improved due to the installation of improved treatment.

The Leadon Catchment is predominantly agricultural. Its quality is affected by pollution incidents from farms, including run-off of pesticides. At Ledbury it receives effluent from the sewage works, plus urban and industrial drainage, which promotes evidence of eutrophication, exacerbated by slow flowing conditions. Quality improves as it nears the River Severn.

Streams in the Forest of Dean are mostly fast flowing and uncontaminated, except where they receive minewaters from abandoned coal mines, e.g. Cannop Brook and River Lyd. There are also a number of continuing industrial influences.

The Frome starts as an excellent quality river, but urban influences and historic industrial use throughout the Stroud valleys lead to a lowering of quality. At Stanley Downton, it receives the treated effluent from Stroud Sewage Works but recovers its quality before reaching Whitminster, where it flows mainly into the Gloucester-Sharpness Canal and partly into the Severn Estuary.

The Cam is also of excellent quality in its upper reaches, but is affected by the discharge from Coaley Sewage Works, and is recorded as of poor quality until it enters the Gloucester-Sharpness Canal.

The Little Avon is mostly of good quality. However, there are some stretches of fair quality owing to localised problems.

2.7 Flood Defence

In the Severn Vale from Worcester to Tewkesbury there are a total of 28 km of flood defence embankments protecting 4,600 ha of flood plain to a nominal 1 in 5 year standard. The remaining flood plain areas at Kempsey, Upton and Longdon Marsh still flood annually. All these flood plain areas provide essential protection or relief from flooding for property both in this reach and downstream. Impoundment for navigation purposes (e.g. weirs) can impede drainage of low lying areas.

In the Severn Vale from Tewkesbury to Gloucester there are 34 km of embankments protecting 5;000 ha of flood plain to an annual standard. Unprotected areas around Tewkesbury and the Avon confluence flood more frequently.

The Estuary lowlands, from Gloucester to Beachley on the west and Avonmouth on the east, are protected by 100km of sea/tidal defences, with 15,600 ha of land lying below high tide level. This area contains around 2000 properties. Drainage of these areas is a problem owing to low levels, tide-lock, slack gradients and "foreign water" drainage from the extensive uplands which back them. Defences in the tidal reach have to cope with the second largest tidal range in the world - the mean spring tidal range at Avonmouth is 12.3m.

There are of course a host of other tributaries and lesser watercourses on which the drainage of the farthermost parts of the catchment depends. Many of these are "ordinary watercourses" and as such primarily the concern of District Councils. Over the winters of 1992-93 and 1993-94 and at Easter 1998 there was extensive local flooding on these minor drainage systems which caused much alarm and distress to the property owners involved.

Lowland Drainage

The lowlands of the Severn comprise the flood plain above Gloucester and the coastal lowlands below. Both lie below river or tide flood levels and have local drainage problems. This problem is illustrated by the fact that all four Internal Drainage Boards (IDBs) which lie within Lower Severn area are located along this part of the Severn.

The Boards are: Longdon & Eldersfield IDB, North Gloucestershire IDB, West Gloucestershire IDB and South Gloucestershire IDB.

These are all sovereign authorities responsible for the internal drainage of non-maintained watercourses within their own areas.

Flood Warning Service:

A full flood warning service to Agency national standards is operated on three reaches of the Severn:

Reach	Location
S10	River Severn between Gloucester and Tewkesbury
S11	Mythe Bridge to Ashleworth Quay
S12	Ashleworth Quay to Minsterworth.

A storm tide warning service, limited to the immediate area of the settlement, is provided for Severn Beach near Avonmouth to the national standard.

A limited flood warning service is provided on the Frome below Stroud. This does not cover the main urban areas but is targeted primarily at the Gloucester-Sharpness Canal to enable flood control sluices to be operated for the protection of the Canal. At present there is no flood warning service in operation in the estuary, however, there is a "floodcall" message base specifically for estuary winds and tides.

2.8 Fisheries

A broad variety of fish species are present in the catchment. Both coarse (cyprinid) and game (salmonid - salmon and trout) fish are fished by anglers. In addition, there are commercial fisheries for eels and elvers as well as salmon in the estuary. Stretches of the Rivers Leadon, Frome and Little Avon are designated as salmon fisheries under the EC Fisheries Directive. Stretches of the Rivers

Severn, Leadon, Longdon Brook, Cannop Brook and the Gloucester-Sharpness Canal are designated cyprinid fisheries under this Directive.

2.9 Conservation, Landscape and Heritage

The lower reaches of the Severn contain a wide variety of habitats and landscape features as well as being a popular tourist area. There are historic settlements, small towns such as Ledbury and Stroud and larger towns with a wider range of cultural interest such as Tewkesbury, Gloucester and Cheltenham. The attractive upland landscape of Areas of Outstanding Natural Beauty (AONBs) such as the Malvern Hills contrasts with the broad expansive floodplain of the Severn. However, there are a number of watercourses which, owing to past maintenance practices, are in need of renovation and improvement.

In the Forest of Dean, both the quality and landscape value of the environment are affected by mining activities. In the urban areas many of the watercourses have in the past been canalised or culverted for various reasons which has degraded the river habitat. The Avonmouth area is characterised by the rhine system which supports a remnant population of water vole, now a protected species. It does, however, carry a legacy of industrial and agricultural land usage. In addition to renovation or restoration, riverside amenity development is a feature in the Severn Vale area. The integrated management of aquatic habitats via 'Water Level Management Plans' will be an important aspect of equating land drainage and conservation needs.

2.10 Recreation and Navigation

The Severn Vale area varies greatly in actual or potential recreational opportunities depending upon the locality and the mix of natural and man-made resources.

The Forest of Dean has possibly the greatest identity and individual character as a recreational and tourist area, with other highlights being the Wildfowl Trust at Slimbridge and the restored Gloucester Docks. Some recreational activities are land based, but by their nature attract people to the river environment, eg. walking, picnicking and bird watching. Angling is prevalent throughout the area. There is a steadily increasing demand for water sport activities and various forms of boating and sailing. The 'Severn Way' long distance footpath follows the river throughout Gloucestershire and is now complete on the left bank.

The River Severn is navigable from Stourport in the north (outside of this LEAP area) to Gloucester in the south (ie. above the Gloucester Weirs and links) via the River Avon and various canals into the inland waterway system. British Waterways is the Navigation Authority. Gloucester Harbour Trustees act as Harbour Authority for the Severn below Gloucester. Navigation of the river below Gloucester is possible but hazardous. The navigable waterway below Gloucester Docks, therefore, is the Gloucester-Sharpness Canal, which gives access via Sharpness Docks to the Bristol Channel and the open sea.

2.11 Infrastructure

Five motorways cross the Severn Vale, the principal motorway is the M5, which conveys traffic north and southwards. Four motorway arteries radiate from the M5, the M50, which joins north of Tewkesbury, the M48 directs traffic across the Second Severn Crossing, the M4 joins north of Bristol and the M49 takes traffic to Severn Beach and the Severn Bridge. These motorways are served by an extensive network of A and B roads.

Rail transport consists of main lines to Bristol and Birmingham, Gloucester to Swindon via Stroud, Gloucester to South Wales, Filton to Avonmouth and the predominantly industrial link to Severn Beach.

2.12 Air Quality

The responsibility for monitoring air quality and achieving National Air Quality standards and objectives lies with local authorities. However, the impact of industry, for example in Avonmouth, may be significant and the Agency work closely with local authorities to establish the contributions of various sources to overall quality.

The major concern in the plan area is in regard to possible breaches of National Air Quality Standard for oxides of nitrogen. The major contribution to the levels in the area is thought to be traffic – contributed from the dense road system. Industry in Avonmouth also makes a contribution and air quality in the more rural areas may be affected by both Avonmouth and South Wales.

KEY DETAILS

Severn Vale Details	Area	2022km^2
	Population	545,000
Topography	Minimum Level	<10m Above Ordnance Datum
	Maximum Level	425m Above Ordnance Datum
Tidal Range (Avonmouth)	Mean Spring Tides	12.3m

Administrative Details

County Councils	Gloucestershire County Council Worcestershire County Council City and County of Bristol
Unitary Councils	County of Herefordshire District Council South Gloucestershire Council
District Councils	Cheltenham Borough Council Cotswold District Council Forest of Dean District Council Gloucester City Council Stroud District Council Tewkesbury Borough Council Malvern Hills District Council Wychavon District Council
Environment Agency	Midlands Region, Lower Severn Area South West Region, North Wessex Area
Water Companies	Severn Trent Water plc Bristol Water Company plc Welsh Water plc Thames Water plc Wessex Water plc
Internal Drainage Boards	Longdon & Eldersfield IDB North Gloucestershire IDB West Gloucestershire IDB South Gloucestershire IDB
British Waterways	Gloucester-Sharpness Canal River Severn

Main Towns and Land Use

The total population of the Severn Vale area is approximately 545,000. Main towns and settlements in the area are Gloucester, Cheltenham, Malvern, Avonmouth and Thornbury, Stroud, Ledbury, Cinderford, Lydney and Newent. The main land uses in the catchment are grass 43%, arable 34%, woodland 12% and the urban area 8.3%.

Water Quality

Total classified length 459.3 km

Lengths of classified watercourse in each GQA Grade (km.)

	Chemical	Biological
Grade A	113.9	94.35
Grade B	165.3	125.6
Grade C	129.2	158.9
Grade D	33.9	43.4
Grade E	14.5	9.8
Grade F	2.5	6.75

Water Resources

Mean flow of Severn (at Haw Bridge)	8,980 Ml/d
Total licensed abstraction	305,944 Ml

Flood Defence

Length of main river in catchment	374.187 km
Length of raised flood defences	162km
Number of properties at risk	2000

Fisheries

Length of watercourses designated under EC Directive for Freshwater Fisheries (78/659/EEC).

Salmonid	40.6km
Cyprinid Rivers & Canals	51.3km
Gloucester-Sharpness Canal	25km

Conservation

Number of Sites of Special Scientific Interest (SSSIs) 116
(43- water based, 46 -other biological, 27 - geological)

Number of Scheduled Ancient Monuments (SAMs) 237

Integrated Pollution Control (IPC) and Radioactive Substances

IPC authorisations	35
Radioactive substances authorisations	8

3.0 Issues and Proposed actions

3.1 Introduction

This section provides a detailed description of the issues which, the Environment Agency considers, need to be addressed in the Severn Vale Area. An issue is a problem that needs tackling or an opportunity that should be realised. For each issue the text describes the problem or opportunity, who is involved in it and what is being done about it already. Then the Environment Agency's proposals are laid out in a table showing what is proposed, who is involved, the benefits of the proposal and the constraints on it, and finally how long it will take to achieve.

The Agency will use these tables of proposals as the basis for a five year action plan, which will include more details of what will happen, when and how much it will cost. This consultation draft will be important in determining what the Agency does in the coming years. The LEAP Plan will be published in December 1999 covering the financial years 1999/2000 to 2004/5

Photograph 3. Sharpness Docks

The issues have been identified by examining the uses and activities in the area, the pressures on the environment and the state of the environment. They are what the Agency considers to be the most important issues facing the catchment, taking into account:

- the knowledge of Agency staff
- the informal views of a range of other organisations
- information about the current state of environment.

The Environment Agency's main aim in publishing these issues is to ask for **your views** about the issues and the proposals. We will welcome any comments, and would be particularly pleased if you could answer the questionnaire included in the front cover, which asks you to consider the following questions:

- whether there are problems or opportunities that you know of but which we have not included,
- how important you believe the issues are,

- what you believe should be done about them, and especially what do you think of our proposals,
- whether you can help tackle any of the issues.

The issues are wide ranging and cover all the aspects of the environment which the Agency is responsible for managing alone, or in partnership with others. It does not include other environmental issues in which the Agency is not, and cannot be, involved.

The issues are organised in ten groups which follow the agency's nine themes that were: explained in section 1.4 with the addition of a tenth group 'Managing the environment in partnership'.

- Managing waste
- Improving air quality
- Regulating major industries
- Addressing climate change.
- Managing our water resources
- Delivering integrated river-basin management
- Conserving the land
- Managing our freshwater fisheries
- Enhancing biodiversity
- Managing the environment in partnership

The issues are numbered to help identification, but the order of the groups and the issues within the groups does not indicate any order of priority. Some of the issues relate to a number of the group headings, but for the purposes of this document have been included where most appropriate.

3.2 Summary of Issues

The River Severn Lower Reaches Catchment Management Plan (CMP) was published in May 1995 and highlighted 38 issues of environmental concern. In preparing the issues list for this LEAP, outstanding issues from the CMP were considered alongside other environmental issues affecting the Severn Vale. Encouragingly only 20 issues from the CMP are still issues of sufficient priority to be included in this LEAP. These have been highlighted with * in the list of issues below.

Issues list

Managing waste

1. Making Waste Work in the Severn Vale area.
2. Waste minimisation in the Severn Vale area.
3. Pollution, health and amenity risks from existing inadequate waste management licences.
4. Public concern about the regulation of land spreading of materials for agricultural purposes in particular the spreading of abattoir waste on land.

Improving air quality

5. Managing Air Quality – strategies and information.
6. The impact of the Cleansing Services Group site on local air quality.

Regulating major industries

7. Proposals to build additional gas power stations at Avonmouth and their potential impact on air quality
8. The Control of Major Accident Hazards involving Dangerous Substances (COMAH)

Addressing climate change

9. Climate change leading to increased flood risk:
10. Potential for non-fossil fuel energy from hydropower and waste to energy.*

Managing water resources

11. Maintaining River Severn flows to the estuary:*
12. Low river flows *
13. The need for improvements to the gauging station on the Little Avon at Berkeley.

Delivering integrated river basin management

14. The impact of changing land use practice on the water environment, especially the Leadon Catchment.
15. Pollution of surface water intended for public water supply *
16. The impacts of inadequate sewerage facilities on water quality.*
17. The Effects of nutrients on the catchment *
18. Failure to comply with River Quality Objectives.*
19. Review of River Quality Objectives.
20. Managed surface water drainage from developed areas.
21. Managing flood risk and floodplains.*
22. Recreational use of, and access to, the river corridor.*

Conserving the land

23. Implementation of the Contaminated Land and Special Sites Regulations including the potential to developing partnerships between the Agency and local authorities.*
24. The impact of contaminated mines on the surrounding environment in the Forest of Dean.*

Enhancing biodiversity

25. Managing SSSIs, RAMSAR sites , SPA and the proposed SAC.*
26. Enhancing Biodiversity.*

Managing freshwater fisheries

27. Elver fishery: management of the fish stocks and operation of the fishery.*
28. Climate change and salmon survival leading to concerns regarding the small populations of salmon in the River Severn catchment.

Managing the environment in partnership

29. Lydney Dock development.
30. Managing environmental information – air quality, biodiversity and waste management.
31. Promoting environmental awareness and understanding
32. The impact of new development on the environment.*

Managing Waste

The managing of waste is influenced by the availability and cost of disposal options. However, the need to dispose of waste safely and in an environmentally sustainable way should not be neglected by consideration of those two factors. It is preferable not to produce waste in the first place, but, as this is inevitable we all have a responsibility to reduce the amount of waste we produce. The DETR's consultation paper 'Less waste more value' sets out the Government's policy framework for the management of waste. It identifies ways in which waste can be managed in more sustainable ways and sets targets for achieving that aim. The emerging national waste strategy is based on three main objectives:

- to reduce the amount of waste produced;
- to make the best use of waste produced; and,
- to choose waste management practices which minimises the risk of immediate and future environmental pollution and harm to human health.

The following are our national aims as detailed in *An Environmental Strategy for the Millenium and Beyond.*

We will:

- Provide a high quality waste regulation service;
- Develop an overall database of waste arisings and disposals;
- Measures the effectiveness of taxation to reduce waste and to encourage its re-use and recycling;
- Obtain information on fly-tipping and devise means of combating it;
- Implement the 'producer responsibility' regulations;
- Develop life-cycle assessment methodologies for dealing with waste;
- Encourage and inspire techniques for the management of special and other industrial wastes;
- Ensure achievement of national waste strategy targets for the reduction of waste disposed of to landfill;
- Ensure achievement of national targets for the recovery, recycling and composting of municipal waste;
- Combat organised crime, at national and international level, involving the illegal trading in waste;
- Research into the technical needs of successful waste management, including best practice and best practicable environmental options;
- Secure high quality management of radioactive waste in industry;
- Ensure that any proposals for solid radioactive waste disposal will provide the necessary high level of protection for man and the environment; and
- Commission research into the potential effects of wastes entering the environment, including the potential effects of radioactive wastes.

Issue 1. Making Waste Work in the Severn Vale Area

In July 1998, the Department of Environment, Transport and Regions (DETR) published a consultation paper on the waste strategy for England and Wales, "Less waste more value" which set out the Government's policy framework for the management of waste, and which aimed to encourage more sustainable waste management.

The Government has introduced legislation to ensure that some of the environmental costs of waste production are reflected in the economic costs, in other words, the implementation of the polluter pays principle. For example,

- fees and charges for Waste Management Licensing
- waste sent to landfill is subject to landfill tax,
- fees have been introduced for the movement of Special Waste, and
- companies above specified turnover and packaging throughput thresholds are required to recover and recycle a certain tonnage of packaging waste.

In this way, it is thought that increasing disposal costs will make minimisation, reuse and recycling more attractive waste management options.

One of the Agency's main objectives is to provide information and guidance on the national waste strategy to the Secretary of State. To ensure a waste strategy is based on accurate information it is important that the source, quantity and type of waste produced and the proportions recycled, incinerated or landfilled are accurately monitored. Therefore, one of our first priorities is to carry out a waste production survey to enable the quantity of waste that is currently being produced to be measured, and enable us to calculate whether we have achieved the required target of reducing the quantity of waste being produced.

The Agency is also working with Local Authorities and others to develop Life Cycle Assessment (LCA) and Best Practicable Environmental Option (BPEO) methodologies to identify sustainable waste management options.

Who is involved?

Environment Agency, local authorities, householders, industry and commerce.

What is happening already?

The Agency has a duty to advise the Secretary of State on the development of the National Waste Strategy. The National Waste Production Survey is due to be completed by the Agency in March 1999, and the information gathered will inform the National Waste Strategy which is due to be published by the Secretary of State later in the year.

County and unitary councils produce waste strategies and waste local plans. The Agency has had significant involvement and has commented in detail on the Gloucestershire County Council Waste Management Strategy. Agency officers attend Waste Local Plan Policy Panel meetings at Gloucestershire County Council, and have regular liaison meetings with the Waste Disposal Authorities to discuss issues relating to promoting the objectives of the national waste strategy. The Agency will provide input to the appropriate strategies and plans elsewhere in the Severn Vale Area.

Local authorities also produce recycling plans on which the Agency is consulted and provides detailed comments.

Objectives

The Environment Agency's objective is to contribute to the achievement of targets for the reduction of waste disposed of to landfill in the emerging national waste strategy.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Undertake 25 visits to industry per annum to increase the recovery of packaging waste	Environment Agency	Packaging Industry	The environmental impacts of disposal of packaging waste to landfill are reduced.	Potential legislative changes may change the priority to other waste streams	Year 1	Likely
Provide 2 seminars to industry on the Packaging Regulations	Environment Agency	Packaging Industry	The environmental impacts of disposal of packaging waste to landfill are reduced	Potential legislative changes may change the priority to other waste streams	Year 1	Likely
Attend Waste Local Plan policy panel meetings at Local Authorities and provide information	Environment Agency	Local Authorities	Best Practicable Environmental Option considerations will be taken into account in planning sites for waste management facilities	Staff resources	Year 1	Likely

Issue 2 Waste minimisation in the Severn Vale Area

The Government's objectives for waste management given in the 1995 White Paper, 'Making Waste Work – a Strategy for Sustainable Waste Management in England and Wales' were to:

- reduce the amount of waste that society produces,
- make best use of the waste that is produced,
- choose waste management practices which minimise the risks of immediate and future environmental pollution and harm to human health.

Identified within this strategy is a hierarchy for waste management. Waste reduction or minimisation occupies the top level in the waste hierarchy with disposal being the least favoured option. By avoiding the production of waste, we also avoid the costs associated with the disposal or recovery of waste. Policies for minimising waste are at the heart of the White Paper.

Companies who take steps to reduce the amount of waste they produce can save themselves the cost of inputs to the production process, as well as the costs of managing the waste produced. Focussing on waste minimisation (raw materials, water and energy) therefore can be of considerable benefit to businesses' competitiveness. In addition to this, the cost of waste disposal in England and Wales is likely to continue to rise, in part reflecting the introduction of the landfill tax and higher environmental standards for landfill. Therefore, it makes good business and environmental sense to anticipate these effects by reductions at source.

Who is involved?

The Environment Agency, local authorities, industry, Business Link, Cheltenham & Gloucester College of Higher Education and other partners.

What is happening already?

The Gloucestershire Waste Minimisation Initiative was developed by the Agency to provide a step by step approach to implementing a waste minimisation programme within industry through the use of the Waste Minimisation Environmental Good Practice Guide for Industry.

As part of the first phase of the initiative the Agency is currently working with four small to medium sized enterprises (SMEs) helping them to implement a waste minimisation programme. The second phase of the initiative has recently been launched as a partnership with Business Link Gloucestershire and Cheltenham and Gloucester College of Higher Education. For the second phase it is hoped to work with up to 10 SMEs implementing a similar programme as used in phase 1.

The Gloucestershire Environmental Business Forum was formed in September 1998. The aim of the Forum is to enable a co-ordinated approach to be taken to providing environmental information to industry and others within Gloucestershire. Partners of the Forum include representatives from industry, Business Link, Local Authorities, Severn Trent Water Ltd, the Agency, Cheltenham and Gloucester College of Higher Education and other interested parties.

Objectives

The objectives of the Gloucestershire Waste Minimisation Initiative are to:-

- Promote waste minimisation to industry on the basis of business benefits; cost savings, risk reduction, compliance and market positioning. It is recognised that benefits must be demonstrable in financial and business terms.
- Enable participants to improve the competitiveness and profitability of their business by providing a dynamic forum where total process efficiency and good environmental management practice is encouraged.
- Help the companies involved to help themselves by providing tools, skills and real life case studies, encouraging development of their own specific objectives and action plans, sharing experiences and the transfer of best practice and actually delivering a reduction in the volume of waste within their organisation and associated costs.
- To eventually disseminate the results to local businesses, to raise awareness and encourage more companies to adopt waste minimisation as an important element in business strategy.

The objectives of the Gloucestershire Environmental Business Forum are to ensure that a comprehensive and co-ordinated approach to providing environmental information to industry and others in Gloucestershire is provided through the Forum.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Complete the delivery of the Gloucestershire Waste Minimisation Initiative Phase 1.	Environment Agency Industry		Reduction in the production of waste leading to environmental and economic benefits. Demonstration of benefits and cost savings associated with waste minimisation.	Industry acceptance of waste minimisation ideas. Senior management commitment within the companies involved.	Year 0	Definite
Deliver the second phase of the Gloucestershire Waste Minimisation Initiative	Environment Agency Industry, Business Link, C&GCHE		Reduction in the production of waste leading to environmental and economic benefits. Demonstration of benefits and cost savings associated with waste minimisation.	Requires involvement of a wide range of partners. Industry's acceptance of waste minimisation ideas.	Year 0-2	Probable
Develop the Gloucestershire Environmental Business Forum to co-ordinate promotion and implementation of better environmental practices at work and at home.	Industry Environment Agency C&GCHE Business Link Others		To ensure information and guidance to industry and others in Gloucestershire is provided in a co-ordinated way to avoid duplication and confusion.	Staff resources.	Year 0 - 5	Probable

Issue 3: Pollution, health and amenity risks from existing inadequate waste management licences.

Anyone who keeps, treats or disposes of waste will normally require a waste management licence for that activity. This includes a wide range of activities including landfill sites, waste transfer stations, scrap yards and treatment plants. The Agency has inherited the role of issuing and supervising licences from the 83 former Waste Regulation Authorities in England and Wales. The main objective of waste management licensing is to ensure that the waste management activities do not cause pollution of the environment, harm to human health or become seriously detrimental to the amenities of the locality. One of the Agency's roles is to regularly review licences to ensure that the conditions remain appropriate and effective in achieving their objective.

A significant number of the licences the Agency inherited from the former Gloucestershire County Council Waste Regulation Authority do not meet current standards. Many of the licences do not have a comprehensive set of conditions, for example they lack conditions covering environmental monitoring and waste acceptance procedures and many of the associated operational working plans are deficient. This has led to unenforceable licences and therefore increased risks of pollution, harm and detriment to the amenity.

Who is involved?

Licence holders, Environment Agency, local authorities.

What is happening already?

A legal review has been undertaken in consultation with licence holders and the relevant authorities on all licenses issued by the former Gloucestershire Waste Regulation Authority. As a result, all administrative errors have been rectified and all licenses are now enforceable.

Six licensed facilities have been identified as priority sites for technical licence and working plan reviews to be undertaken. These sites have been prioritised on pollution potential, size and public concerns.

Objectives

Ensure that all licences and their associated operational working plans are comprehensive and effective in ensuring that the authorised activities do not cause pollution of the environment harm to human health or become seriously detrimental to the locality affected by the activities.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Undertake technical licence and working plan reviews on 6 identified priority sites	Environment Agency	Licence holders	Comprehensive, enforceable and effective licences and working plans	Staff resources Licence holders failing to submit required documents	Years 0-2	Definite
Undertake technical licence and working plan reviews on remaining licences issued by GCC. Priorities based on risk to the environment and human health.	Environment Agency	Licence holders	Comprehensive, enforceable and effective licences and working plans	Staff resources Licence holders failing to submit required documents	Years 3-5	Probable

Issue 4 Public concern about the regulation of land spreading of materials for agriculture purposes in particular the spreading of abattoir waste on land.

During 1997 the Environment Agency received a number of complaints for example from the parish of Westbury relating to the land spreading of organic wastes including blood and gut contents from abattoirs. Although these incidents had a relatively minor impact on local watercourse they gave rise to public concern relating to malodour. The primary cause of the problems was the over-application of organic wastes and/or inappropriate application on unsuitable land or in adverse weather conditions.

Land spreading of specified organic waste is an activity deemed exempt from licensing by the Waste Management Licensing Regulations 1994 (schedule 3, paragraph 7), providing it is beneficial to agriculture or results in ecological improvement. The Agency must be supplied with details including a description of the waste, an estimate of quantity, location and intended date of spreading.

The Agency has a duty to ensure that the terms of the exemption are complied with and the operation does not give use to pollution of the environment or harm to human health.

Who is involved?

The Environment Agency's remit includes a duty to enforce waste legislation relating to exempt activities (i.e. inspecting sites and checking that exemptions are complied with), and to maintain water quality, primarily through the appropriate enforcement of the relevant water legislation (Water Resources Act 1991) where pollution has occurred. Regulatory involvements from other bodies include local authorities (in this particular case Forest of Dean District Council), with a responsibility to enforce public health legislation relating to nuisance. This includes dealing with smell and dust complaints. In terms of the Westbury incidents, the major interested party has been Westbury Parish Council.

What is happening already?

In order to ensure that the relevant exemptions are being complied with, the Environment Agency has held meetings with the major contractor involved with land spreading in the area. This has resulted in improved liaison and better controls over the activity. Improved notification procedures have been agreed, and contractors are now providing the Agency with detailed analyses of what is being spread, full location details, suitability of sites etc. This includes evidence that organic waste-derived nutrients are being spread at the correct ratios and in the correct quantities to be of benefit to agriculture. The Environment Agency has also liaised with the Forest of Dean District Council Environmental Health Department to ensure that there is a co-ordinated approach to enforcement. On a national level, the Agency is currently carrying out detailed research into land spreading and its environmental impacts. In addition, the issue has been raised in the House of Commons, and the Government is currently considering a change in legislation.

Objectives

In tackling this issue, the Agency hopes to:

- Achieve a reduction in the number of water pollution incidents resulting from the land spreading of organic wastes.
- Ensure that sites deemed exempt from the Waste Management Licensing Regulations 1994 are compliant with the terms of those exemptions.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Targeting of farmers to ensure that land spreading is of benefit to agriculture.	Environment Agency	Farmers	To reduce the incidence of water pollution and to ensure compliance with exemption.	Staff resources	Years 0-2	Likely
Hold liaison meetings with appropriate consultants.	Environment Agency	Consultants	Ensure that land spreading is carried out under appropriate conditions and on appropriate sites in order to minimise the impact on the environment and local amenity.	Staff resources	Years 0-2	Likely
Liaise with other land spreading contractors as appropriate.	Environment Agency	Contractors	Ensure that contractors are aware of their legal obligations and notification procedures prior to carrying out land spreading activities, in order to minimise the impact on the environment and local amenity to ensure compliance with exemptions.	Staff resources	Years 0-2	Likely

Improving air quality

Air quality can be discussed in both global and local terms. It is affected by air pollutants which can be particulate or gaseous in nature. Particulate air pollutants vary greatly; they can be organic or inorganic in nature and range from fine aerosols to wind-borne soil particles. Gaseous air pollutants include substances such as sulphur dioxide, carbon monoxide and ozone. The immediate impact of air pollutants is usually local but these emissions can lead to global problems, for example, acid rain. Because of this the Agency is committed to implementing the National Air Quality Strategy in collaboration with industry and local authorities. Under the Environment Protections Act 1990 responsibility for the control and monitoring of air quality is placed upon the local authorities and the Agency.

The following are our national aims as detailed in *An Environmental Strategy for the Millenium and Beyond.*

We will:

- Help the Government to deliver its air quality strategy
- Ensure emissions from the major industrial processes to the atmosphere are reduced;
- Ensure specific emissions of sulphur dioxide and oxides of nitrogen, which contribute to acid rain, are reduced.
- Discourage the use of solvents in industry, which contribute to the production of ozone, the major photochemical pollutant; and
- Set an example in reducing emissions from vehicles by reducing our own mileage and increasing the use of public transport.

Issue 5 Managing air quality – strategies and information

Part IV of the Environment Act 1995 requires local authorities to assess and review air quality in relation to objectives given in the Air Quality Regulations. As the local authorities in Gloucestershire have undertaken a co-ordinated review of the air quality in the larger part of the Severn Vale Area much of the detail here is taken from their report. This excludes the area around Avonmouth which is covered as a specific issue (Issue 7).

The findings of the report show that pollutant emissions are not high – mainly due to the predominantly rural nature of the county. At a regional level the major source of pollution is from transportation with the urban areas in and around Gloucester and Cheltenham identified as the largest sources. The M5 motorway and other major arterial routes also show up as major sources of pollution – particularly nitrogen dioxide and fine particulates (PM_{10}). Carbon monoxide is also of potential concern.

Industrial emissions within the county are considered unlikely to have a significant impact on air quality. Nevertheless industrial emissions can impact at the local level – for example dust from quarry operations in the Forest of Dean. Domestic coal is still widely used in the Forest of Dean and Stroud areas so emissions of sulphur dioxide (SO_2) may cause potential problems for air quality.

As Gloucestershire is predominantly rural ambient pollutant concentrations may be as much a factor of the prevailing winds blowing pollution into the county from outside. This may have specific

consequences in Stroud District Council and the Forest of Dean for air moving from Avonmouth and South Wales.

Who is involved?

Local Authorities, Environment Agency DETR, companies with atmospheric discharges, motorists.

What is happening?

The local authorities in Gloucestershire commissioned an emissions inventory based on available data for transportation, industrial and domestic sources throughout the county. The inventory highlighted the predominant contribution of mobile source emissions in relation to releases of carbon monoxide (90%), oxides of nitrogen (86%) and VOCs (63%). Transport also contributed significantly to emissions of sulphur dioxide (31%).

All local authorities monitor for some air quality parameters – all using diffusion tube networks and some have on line monitors. The Environment Agency check monitors for discharges from Part A Processes although most monitoring is undertaken by the authorised firms themselves.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Collaborative project with local authorities to identify effect of Part A Processes on Gloucestershire air quality	Local authorities	Environment Agency	Better understanding of air quality issues.	Funding	Years 1-2	Likely

Issue 6 The impact of the Cleansing Services Group site on local air quality

In the summer of 1997 the Agency received numerous complaints of malodour in the locality of Cleansing Service Group Ltd facility at Sandhurst, Gloucester. The complaints were from businesses and residents in the parishes of Sandhurst, Maisemore, Longford and Gloucester City. There is considerable public concern over possible health effects of long and short-term exposure to gaseous emissions from this site and their impact on local air quality. Since 1997 the complaints have continued but have reduced in numbers.

Cleansing Service Group Ltd operate a licensed waste management facility. The site conducts processes for the treatment of waste for final disposal on and off site. It also has facilities for storage of waste materials prior to transport to other facilities around the country. The site licence conditions permit special wastes, those that are dangerous or difficult to handle, to be accepted on site. Examples of the types of wastes include interceptor waste, batteries, solvents, acids and alkalis. The facility is unique in the Lower Severn Area.

The malodour is thought to be attributed to presence of Volatile Organic Compounds (VOCs) in the air. One of the problems in identifying sources is that there are many different types of VOC. In some instances the odour threshold level, the lowest concentration of a chemical which you can smell in air, may be lower than the detection limits of analytical equipment. In other words problems can be detected by smell but not confirmed by analysis. Limited information exists on odour thresholds of mixtures of such chemical species. Other possible sources of VOCs are car exhausts, incinerators and industrial processes including those using printing inks, paints and solvents.

Waste Management Regulations place a duty on the Agency to inspect sites to ensure that waste is recovered or disposed of without causing pollution of the environment, harm to human health and serious detriment to the local amenity.

The Agency believes that through a combination of actions the situation could be improved by:

- reviewing of the conditions of the waste management licence to ensure that best practice occurs on site,
- improving liaison between interested parties and complainants, and
- monitoring ambient air quality in the locality.

Who is involved?

Many of the parties involved in this issue attend the Local Liaison Group meetings. These have included representatives from the following interested parties; Cleansing Service Group Ltd, Tewkesbury Borough Council and Gloucester City Council Environmental Health Officers, Sandhurst Maisemore and Longford Parish Council, local district and county councillors, Gloucestershire County Council Planning Department, complainants and the Agency.

What is happening already?

Site inspections were increased and two site audits were conducted. The site was asked to improve site management and review waste acceptance criteria.

The Agency commissioned Coal Research Establishment (CRE) to produce a report in September 1997 based on the results of a seven day sampling period in August. They sampled VOCs at 16 sites around the site boundary and in the community. There are no regulatory standards for VOCs emitted from such sites but the Agency has produced Environmental Assessment Levels, based on Health and Safety Executive occupational exposure limits. The report concluded that VOC levels were generally highest around the operational facility. However from the data the only long-term assessment level that would have been exceeded was for benzene. The highest benzene level was not found on site. The results obtained from locations in the community were not consistent with prevailing weather conditions at the time of sampling and indicated the need to carry out further work.

It was concluded that the conditions of the current waste management licence are inadequate and needed to be updated to reflect current standards. The new licence conditions are currently out to consultation with the parish council and other interested parties. The new conditions include risk assessments of site processes and waste streams to Agency agreed standards.

Cleansing Service Group Ltd have developed a programme of site monitoring and have installed a weather station on site.

The Agency has been monitoring long-term ambient air quality since April 1998. Passive diffusion tubes have been place at seven locations in Sandhurst and Maisemore and have been removed approximately every month. They have been analysed for a small suite of indicator VOCs. For future monitoring we wish to increase the number of points and look at short-term, real time monitoring to help to identify sources.

Objectives

- To ensure that the facility will not cause pollution of the environment, harm to human health and serious detriment to the local environment amenity.
- To understand local ambient air quality issues.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Extend and improve current monitoring programme	Environment Agency		Understanding of long term air quality and possible impacting sources	Monitoring techniques and cost of analysis	Years 0-1	Likely
Purchase new monitoring equipment for real time monitoring of VOCs	Environment Agency		Real time results, hot spot source identification using a limited range of indicator VOCs	Range of VOCs	Years 0-1	Likely

Regulating major industries

The effective regulation of industries can ensure that the whole environment can be protected from pollution whilst respecting economic and employment considerations. This can be accomplished with powerful legislation but ultimately, success is achieved by developing excellent relationships with industry and also by the will of the industries themselves to instigate environmental improvements.

The following are our national aims as detailed in *An Environmental Strategy for the Millenium and Beyond.*

We will:

• Continue the efficient and effective delivery of Integrated Pollution Control; • Implement the requirements of the EC Directive on Integrated Pollution Prevention and Control;	• Implement the relevant requirements of the Control of Major Accident Hazards Directive;

The area covered by this LEAP is predominantly agricultural and contains little large or complex industry with the exception of the Avonmouth area. There are 35 authorisations issued under the Environmental Protection Act 1990 Part I to sites in the Severn Vale. There are no authorised processes beyond the boundary of this LEAP which are felt to have a major influence on the environment of this area.

All processes in this area are operating in compliance with their authorisation and any emissions from these processes are controlled so as not to have a detrimental impact on the local environment.

Issue 7 Proposals to build additional gas power stations at Avonmouth and their potential impact on air quality.

Levels of Oxides of Nitrogen (NO_x) in the Bristol area are a matter of concern to Bristol City Council and South Gloucestershire Council because of the potential for breaches of the National Air Quality Standard (NAQS) for NO_x. The major contribution to NO_x levels in the area is thought to be from traffic, considering the density of the road system and the presence of the M5 and M4 motorways.

Industry at Avonmouth also makes a contribution, particularly Britannia Zinc and Terra (UK). Over the next few years however, there could be an increasing contribution from new gas turbine power stations. Currently the Seabank power station is completing the commissioning of a twin turbine unit, and they have recently stated they intend to fit a third unit to increase output. There are also planning proposals for two further gas-fired power stations at Avonmouth, to meet peak electricity demands in the South West. All of these stations have or will need Integrated Pollution Control authorisations in order to operate.

These stations may potentially all start up at the same time, probably on cold winter mornings when electricity demand is at a maximum and air dispersion is poor. On start-up gas turbines must run for a period on reduced power (known as diffusion mode) and under these conditions the NO_x abatement equipment does not work efficiently. This leads to much higher NO_x emissions than during normal full power running and there is a risk that the NAQS for NO_x may be breached at these periods.

The Agency has already discussed this potential problem with Bristol City Council and South Gloucestershire Council, which are the planning authorities and the authorities responsible for air quality in the area. Bristol City Council is carrying out modelling of NO_x levels, with input from the Agency on industrial sources, to determine whether there is a real problem. If there is, then this will need to be addressed in the IPC authorisations, after discussion with the gas turbine operators. It may be that the number of turbines that can be started simultaneously will have to be restricted or the period of diffusion running limited. The Agency's aim will be to require BATNEEC to be used at all times, although tighter conditions may have to be applied as we cannot authorise a breach of national air quality standards.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Work with Bristol City Council & South Gloucestershire Council to determine conditions under which NAQS for NO_x might be exceeded in Avonmouth area	Bristol City Council	Environment Agency, South Glos. Council	Better understanding of relative contributions to NO_x concentrations in air.	Lack of control over traffic contribution Need for power stations to meet peak electrical demands.	Year 0-1	Certain

Issue 8 The Control of Major Accident Hazards involving Dangerous Substances (COMAH)

The EC Directive on COMAH (96/82/EC) will replace the previous Directive on "Control of Industrial Major Accidents & Hazards" when implemented on 3 February 1999.

The previous legislation was enforced by the Health and Safety Executive (HSE) and applied mainly to the manufacturing industry that also had certain inventories of hazardous chemicals. Following a number of internationally reported incidents the original directive was amended to concentrate on inventory and not manufacturing process. This was confirmed as being appropriate by the HSE, through a UK survey of major incidents.

UK regulations are in the process of being drafted to implement the COMAH Directive. The HSE and the Environment Agency will act as a joint competent authority in enforcing these regulations.

Who is involved?

Environment Agency, Health and Safety Executive (HSE) and industry.

What is happening already?

The HSE and Environment Agency have been working together for over a year to set up the regulations, consulting on the proposals and running pilot exercises to arrange for adequate communication between HSE, the Agency and industry to be established.

The Environment Agency has worked at National, Regional and Area level to prepare for implementation. Training courses have been run and joint documentary frameworks for implementing guidance and contacts drawn up. The initial work will be undertaken with the HSE taking the administrative lead.

The operator of a site with these inventories can fall into either top tier or lower tier categories. The sole difference between these categories is the quantity of material that is or could be on site. For the top tier sites the operator must submit a safety report to explain his systems and identify the risks. Once the potential problems have been identified, the report should identify the risk and minimisation actions to achieve control to "As Low As Is Reasonably Practicable". The report is assessed by the joint competent authority for the content. The objective is to ensure that the report does not have "substantial deficiencies". In addition the report needs to be adequate for the offsite emergency planning to be undertaken. There may also be Agency involvement with this process.

It is estimated that ten sites in the Severn Vale Area will be affected by these Regulations.

Objectives

- To prevent accidents from dangerous substances.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
The identification of the sites with the storage of high risk materials.	Operator	HSE Environment Agency	Relevant sites identified.	None	Year 1	Certain
The review in the Public Domain of the operator's controls to identify and control all risks to as low as is reasonably practicable.	HSE Environment Agency	Operator	The identification of risks and action to minimise the safety and environmental effects to ALARP	Resources to review the proposals and inspect sites. Final charging system to make Regulations self financing is still to be published	Year 2-5	Certain
The generation of site specific emergency plans and tests.	Local Authority	Operator HSE and Environment Agency	On and off site emergency plans to be formed and tested	Resources to review the proposals and inspect sites. Final charging system to make Regulations self financing is still to be published	Year 2-5	Certain
Formal notification to Europe of the incidents.	HSE and Environment Agency	Operator	Reporting on the most significant incidents to identify causes and actions	The delay in reporting due to definitions could cause some early actions to be delayed	Year 2-5	Certain

Addressing climate change

The UK, like all countries, emits gases such as carbon dioxide into the atmosphere. These gases are believed to contribute to long-term climatic changes. The UK is likely to be affected in complex ways as and when the climate does change. It is a signatory to the Framework Convention on Climate Change, as agreed at the Rio Summit in 1992, and is taking an active part in international negotiations to obtain commitments beyond the year 2000 for credible, effective and achievable reductions of greenhouse gas emissions.

Ultimately, the National Air Quality Strategy will address this issue and will involve the collaboration of the Agency, local authorities, industry and power generators.

The Agency needs to ensure that we incorporate best estimates of climate change into our estimates of flood risk, design for flood defence structures and options for water resources management.

The following are our national aims as detailed in *An Environmental Strategy for the Millenium and Beyond.*

We will:

- Help to ensure that the Government's greenhouse gas emission reduction targets are met;
- Develop methods to improve our estimates of the emission of methane into the atmosphere from landfill sites;
- Promote tax incentives to reduce energy production from burning fossil fuels;
- Set an example by reducing our own energy and fossil fuel consumption;
- Invest in research to predict the likely effects of climate change on the environment of England & Wales, and how to manage them;
- Provide improved mapping of low-lying coastal areas at risk from sea-level changes;
- Contribute our knowledge and expertise to national and international forums dealing with climate change.
- Develop techniques to identify changes in plant life, using remove sensing techniques, to measure the effects of different weather patterns in sensitive areas; and
- Invest in research to predict the likely effects of climate change on the environment of England & Wales, and how to manage them;

Higher temperatures and reduced summer rainfall will generally lead to increased evaporation and higher soil moisture deficits. Therefore, greater winter rainfall will be required to reduce this deficit before infiltration and significant aquifer recharge can commence and so, although there may be higher winter rainfall in the future, groundwater recharge may become less effective. Lower groundwater levels may become a long-term problem in the next century.

The great uncertainty for water management is the degree of risk of greater extremes for floods and droughts.

Issue 9 Climate change leading to increased flood risk

On the basis of current knowledge and predictions of the potential effects of climatic changes, it appears that, over the coming decades, there may be significant environmental impacts. These include sea-level rise, altered patterns of rainfall, increased water demand, and changing patterns of land use, with consequent impacts across a wide section of economic, social and environmental

issues. The Agency believes that there should be a concerted national programme to monitor changes in climate, to improve the accuracy of modelling and to plan for the impacts. Dealing with climate change should be a key theme of the revised UK Sustainable Development Strategy

The balance of evidence indicates a rise in average global temperature but the likely impacts at a regional scale for the Midlands are less certain. Annual precipitation is predicted to increase by 1-5%, although the monthly rain pattern may change by becoming more concentrated between November and March but drier between April and October. Summer rainfall may actually decrease form the present pattern long-term average. These predicted changes in rainfall pattern are likely to have the effect of increasing surface run-off during winter, so increasing the risk of flooding, whilst decreasing run-off in summer resulting in summer resources being more limited.

The direct consequence of climate change in the Severn Estuary is sea level rise. Designs for sea and tidal defences in the estuary include for this by incorporating a 5mm / year increase in height, over and above that required to protect to the correct standard for estuary defences, for the designed life-span of the defence.

Extreme flood events on fluvial watercourses might become more common and a balance both in terms of economics and environmental effects will have to be made for provision of defences to cope with such eventualities..

Who is involved

Environment Agency, landowners, local authorities

What is happening already

The Agency incorporates an allowance for sea level rise into the design of new or improvements to existing sea and estuary defences. Locations where it is not feasible or justifiable to undertake improvement work, are likely to experience a deterioration in the standard of protection from flooding in the future.

Flood protection, managed retreat and other related coastal defence topics are considered and planned in the Severn Estuary Shoreline Management Plan. These issues are related to the allied topic of Coastal Zone Planning as set out in DoE PPG 20.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Identify defences in the Severn Estuary where capital improvements are not economically viable.	Environment Agency		Reduced capital expenditure.	Political pressures. Legal restraints. Compensation payments. Long term lowering of standard of protection due to 'sea level rise'	Years 4-5	Likely
Develop a strategy for future maintenance regimes and/or managed retreat.	Environment Agency		Reduced capital expenditure	Political pressures. Legal restraints. Compensation payments. Long term lowering of standard of protection due to 'sea level rise'	Years 4-5	Likely

Issue 10 Potential for non-fossil fuel energy from hydropower and waste to energy.

Hydropower
There are proposals to promote small scale hydropower generation schemes within the Severn Vale area particularly on the Frome, the Cam and the Lyd but other sites in the ownership of the Agency are also being considered.

The Agency supports hydropower as a sustainable way of producing energy but must bear its environmental responsibilities in mind when considering any scheme.

The Agency will consider any scheme put forward from the point of view of its impact on quality, fisheries, water resources, land drainage, flood defence, and its effect on other lawful users and riparian owners. It must be born in mind that all construction work for these stations will be in the flood plain of the watercourse concerned.

Waste-to-energy
The Agency's 10 Point Action Plan also highlights the need to produce power from gas generated on landfill sites. This has a double benefit as it also reduces the release of these gases to the atmosphere where they contribute to global warming.

Who is involved?
Environment Agency, landowners, landfill operators, Department of Trade and Industry, local authorities and conservation bodies

What is happening already?

Hydropower
A scheme has been promoted for the River Frome and is currently under consideration by the bodies concerned. The Agency has conducted its own investigation into the possibility of using the sites identified as being suitable in a study commissioned by the Gloucestershire County Council and has funded the production of a hydraulic model which shows the effect of the schemes on the local reaches.

A further proposal is at the feasibility stage, for a scheme on the River Lyd at Norchard in association with The Forest of Dean Railway Ltd. preservation society. The Agency is funding this study. Further sites will be identified and scoping studies undertaken as opportunity arises.

Where weirs are under the ownership of the Agency there is a commitment to undertake scoping and feasibility studies and some work has been carried out in this area already.

Waste-to-energy
There are sites in the Severn Vale area which already produce energy from the gas generated by waste in landfill. An example is Hempsted in Gloucester. The Agency will encourage other landfill operators to generate electricity where appropriate.

Objectives

- To support the promotion of sustainable energy development.

In this respect the Agency does not have power to commit public funds to such projects in private ownership.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
River Frome: assess proposals in the light of studies completed.	Agency	Land owner Local authorities Developers	Achieve sustainable energy generation	Water resources quality fisheries flood defence land drainage concerns.	Years 0-5	Aspirational
River Lyd: promote feasibility study	Agency	Railway Local authorities	Achieve sustainable energy generation Possible flow measurement at Norchard Drift.	Water resources quality fisheries flood defence land drainage concerns	Years 0-5	Aspirational
River Lyd: investigate sites suitable for hydropower.	Agency	Land owners Local authorities.	Achieve sustainable energy generation	Water resources quality fisheries flood defence land drainage concerns.	Years 1-5	Likely
Investigate hydropower potential for all weirs in Agency ownership	Agency	Local authorities	Achieve sustainable energy generation	Water resources quality fisheries flood defence land drainage concerns.	Years 1-5	Likely
Identify possible landfill sites where energy generation is possible.	Landfill operators Agency DTI		Production of energy. Reduction of greenhouse gases.	Costs	Years 0-5	Likely

Managing water resources

The Agency seeks to manage water resources in a sustainable manner to balance the needs of the environment with the needs of abstracters and to the benefit of all. Examples include: protecting wetland Sites of Special Scientific Interest (SSSI), meeting water supply demands and supporting rivers during periods of low flow. We monitor river flows, groundwater levels, rainfall and climate to assess the available water resources and, during dry summers, manage the resources and water transfers day-to-day. Abstraction is regulated by issuing licences. Agricultural, industrial and domestic abstraction licences are monitored on a planned basis by the Agency's enforcement staff.

The Agency is committed to reviewing our water resources strategy in 1999-2000 when we will consider our needs until 2025. It will highlight the need for the Agency, water companies, Office of Water Services (OFWAT) and local authorities to continue to work together to encourage awareness on water conservation, and promote efficient water use and supply.

The following are our national aims as detailed in *An Environmental Strategy for the Millenium and beyond.*

We will:

- Demand a more efficient use of water by the water companies and by industry in general;
- Encourage a more efficient use of water by the public and a change in public attitude to water usage;
- Promote the development and sale of low-water domestic appliances, supported by legislative changes if necessary;
- Demand reductions in leakage by the water companies before considering any cases for investment in new reservoirs;
- Support the imposition of compulsory selective metering where water supplies are under stress and where meters are economically sensible to install;
- Support the voluntary acceptance of water meters when accompanied by other water-saving incentives for the customer;
- Vigorously apply our Groundwater Protection Policy to ensure that the quality and use of our groundwaters is improved:
- Examine water transfer schemes carefully to ensure that no environmental damage would result from their introduction;
- Not approve the exploitation of new environmental resources until water saving measures have been introduced;
- Implement the current programme of alleviating low-flow rivers as quickly as possible;
- Seek new legislative powers to reform the use of "licences of right" to abstract water from the environment;
- Seek new powers to facilitate the inter-basin transfer of water, and for the open and transparent provision of plans and information relating to such schemes in order to broaden the public debate on these important issues;
- Ensure that the practical limitations arising from water supply and treatment are fully considered by providing planning authorities with all information relevant to new housing or industrial developments;
- Ensure that the UK's experience and needs are reflected in the scientific and technical discussions within the development of the EC's Water Framework Directive;
- Ensure that all environmental needs are fully taken into account within the next Asset Management Plans (AMP) negotiations with the water companies; and
- Research into more efficient methods for the management of water, and into the potential risks for the aquatic environment arising from its mis-management.

Issue 11 Maintaining River Severn flows to the Estuary

There are many demands on the water resources of the River Severn. From its source to the estuary abstractions are made for public water supply, agricultural use, industrial use and in addition there is need to maintain river levels for navigation.

The Agency must balance all these demands with the need to protect the wider environment, considering issues such as water quality, wildlife, public health and fisheries. This balance is generally achieved by regulating the river at times of low flow in accordance with the existing River Severn control rules. Under these rules water can be released from the reservoirs at Llyn Clywedog and Lake Vernwy and pumped from a network of boreholes in Shropshire. The trigger point for the operation of the releases is the Bewdley gauge but this cannot take account of the abstractions occurring between Bewdley and Gloucester and in the tributary Avon catchment as Bewdley is situated some 75km upstream of Gloucester.

Major abstractions from the river are made under licences issued under the Water Resources Act 1991 with the exception of the abstraction made by British Waterways to the Gloucester Sharpness Canal to maintain navigation levels and to support the abstraction made under licence by Bristol Water from the canal.

British Waterways has a responsibility to maintain levels in the river so that there is a sufficient depth for navigation and silting up of the river channel is an issue here. The East parting at Gloucester is the navigation channel below Maisemore and also the source of the abstraction made to the Gloucester Sharpness canal. Silt laden water pumped from the river into the canal impacts upon British Waterways as the silt deposited in the canal needs to be removed by dredging. The East Parting at Gloucester itself must also be maintained at an acceptable depth and the silting effect of the spring tides needs to be addressed.

A scheme may be promoted for the River Severn to supply water to the South East areas of the country via the Severn-Thames Water Transfer Scheme. This has a range of potential environmental effects on both the Severn and Thames catchments.

Who is involved?

Environment Agency, Severn Trent Water plc, Wessex Water, Bristol Water plc, British Waterways, English Nature, Gloucestershire Wildlife Trust, Wildfowl and Wetlands Trust, Cotswold Canals Trust, Herefordshire and Gloucestershire Canal and local authorities.

What is happening already?

Work will continue to identify a framework within which the current set of operating rules for the regulation of the river might be developed and the issues outlined above will be specifically recognised. The Agency will continue to consult with all interested parties to promote and protect all environmental aspects.

Existing abstraction licences will be enforced and new licence applications will be determined with regard to the developing operating rules. To account for abstractions occurring below Bewdley and in the River Avon catchment new licences in the lower reaches of the River Severn may be issued with restrictions tied to the maximum regulation discharge from Llyn Clywedog or the Agency's flow measuring station at Deerhurst rather than Bewdley.

Recently an operating agreement has been made with British Waterways regarding the pumping regime at Gloucester to support the abstraction made by Bristol Water from the Gloucester-Sharpness Canal. This will reduce the amount of water taken from the river under adverse conditions.

Local Authorities are continuing to exercise planning controls following consultations with the Agency and other interested bodies. Local development plans are being or have been prepared in partnership with the Agency. Future planning controls will be developed such that clear policy statements are contained within development plans. Then applicants will be aware of the Agency's policy by reference to these plans.

The Severn Estuary Shoreline Management Plan, the Coastal Zone Management Plan and the Severn Estuary Management Plan (being produced jointly by the Severn Estuary Strategy and the Environment Agency) are in preparation. These plans are concerned with all aspects of estuary management and will impinge upon the control rules and their effect in the maintenance of an acceptable flow from the river's lower reaches into the Estuary. The requirements of the EC Habitats Directive will be taken into account in these considerations.

Objectives

By consideration of the above factors it should be possible to obtain optimum use of the water resources in the Severn Vale area and meet the needs of the environment and maintenance of an acceptable minimum flow to the Estuary.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Review of the river operation rules for reservoirs and Shropshire Groundwater to provide flows to the Estuary at Gloucester.	Environment Agency	British Waterways Water companies Estuary Strategy	More effective use of water resources. Maintenance of flows to the estuary at Gloucester.	Costs increased if flow support required.	Years 0-5	Likely
Use of Gloucester Sharpness Canal to store water when pumping at Gloucester is restricted	British Waterways	Bristol Water Environment Agency	Increase in resource	Deterioration of water quality and increased risk of algal blooms. Increase in flood risk	Years 0-5	Likely
Bankside storage	British Waterways	Bristol Water Environment Agency	Increase in water resources Use for conservation and recreation	Cost Access Visual aspect	Years 0-5	Likely
Review of operations at Sharpness Docks to prevent loss of freshwater from locks during operation.	British Waterways	Bristol Water	Increase in water resources	Saline intrusion Interference with traffic flow Construction effects	Years 0-5	Likely

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Provide adjustable weirs at Maisemore and Llantony	Gloucester Harbour Trust British Waterways	Environment Agency Conservation Bodies Local authorities	Increased water resources Improved water quality above weirs. Reduced silt deposition above weirs. Increased flow at spring tides	Fisheries concerns Increased pollution effect for water held above weirs. Damage to wetlands due to higher water levels Effect on drainage of riverside land.	Years 0-5	Likely
Use of Deerhurst flow-measurement station for abstraction control.	Environment Agency	Licence holders MAFF	Better control of river flows in lower reaches.	Cost of variation of existing licences.	Years 0-5	Likely
Severn Thames Transfer. Appraisal of environmental impact on Severn and Thames.	Environment Agency	Canal Trusts Conservation groups Estuary Strategy and Coastal Groups.	Better use of water resources.	Costs Impact on Thames and Severn water quality and resources.	Years 0-5	Likely

Issue 12 Low river flows

Low flows have been reported in the River Leadon catchment and the River Lyd. In the Leadon catchment, the Ell Brook, the Red Brook and the Peacock Brook are prime examples where flows drop rapidly during dry summer months. Abstracters cannot take the water they need and there is little water left to support wildlife and fisheries. The causes are not known and therefore a study is required to identify the problems and some possible solutions. The effects of low flows on biodiversity are examined in Issue 25.

The Environment Agency proposes to commission a scoping study which will highlight any further organisations that may be involved such as water companies and conservation bodies. The ultimate objective will be to restore flows in these watercourses during dry periods if possible but achievement of this will be dependent upon the conclusions of the study.

The River Lyd in the Forest of Dean supports a major abstraction for local industry. Flows in the River Lyd are partly dependent on the discharge from Norchards Drift – the lowest drainage point of the abandoned Forest of Dean Coalfield. Flows may therefore be affected by any new mining activities in the Forest. Mining activity has already been suggested as the possible cause of low flows in the Blackpool Brook. Initially there is a need for improvements in the monitoring of flows in the area, which may require the installation of an additional gauging station in the lower reaches of the Lyd.

Two canal restoration trusts are working toward the restoration of two long abandoned canals situated on the lower reaches of the River Severn near Gloucester. These are the Stroudwater/Thames Severn canals (Cotswold Canals Trust) and the Herefordshire and Gloucestershire Canal. When these canals are restored there will be impacts on flows in the rivers Frome and Leadon, and possibly the flow in the lower reaches of the Severn and the Estuary.

Who is involved?
Environment Agency, abstracters, canal restoration trusts, local authorities.

What is happening already?
The Agency is working in partnership with the canal restoration trusts toward achieving a satisfactory way forward balancing the needs of the canals and the environmental impact in areas of water resources, flood defence, quality, fisheries and ecology.

A study of the current legal standing in relation to the water supplies as contained in the Enabling and Abandonment Acts is currently being undertaken. This study has been funded by the Agency. The first stage will be completed by April 1999.

Objectives
To proceed in partnership with all interested bodies towards satisfactory completion of the projects.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Undertake a scoping study to understand the catchment.	Environment Agency	Water companies Conservation Bodies	Better understanding of the problem	The lack of flow data for these brooks and tracking down the historical problems. Costs. Lack of water resources	Years 0-5	Certain
Provide new flow measurement on the River Lyd	Environment Agency	Land owners	Improved quality of flow data on the Lyd	Costs of new gauging station	Years 0-5	Uncertain
Restoration of canals-work with involved bodies in partnership	Canal restoration trusts	Environment Agency, local authorities, Environmental groups	Better recreation amenities and improved navigation.	Water quality in rivers Thames, Leadon and Wye. Available water resources.	Years 0-5	Uncertain

Issue 13 The need for improvements to the gauging station on the Little Avon at Berkeley

There is evidence to suggest that the quality of data provided by the gauging station at Berkeley is often very poor, with a severe under-estimation of flows on occasions.

The Agency is responsible for managing water resources and to this end needs to maintain a hydrometric network which provides good quality data. At Berkeley flow measuring station this objective is not being met by the present measuring arrangements.

Currently there is little use made of data obtained at Berkeley flow measuring station. However, this data could be required for the determination of Agency authorisations and for flood forecasting work in future.

Who is involved?
Environment Agency

What is happening already?

A preliminary study was carried out in 1997/8 and recommendations were made. The site has been evaluated under the Water Resources Capital Expenditure scheme to ascertain future priority spending. Works for improvement were identified as being "low priority" ie in 3-5 years. The site will be re-evaluated on an annual basis, along with other schemes.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Review the rating equation for the station and the costs and benefits of improvements to the flow measuring station at Berkeley	Environment Agency		Makes best use of existing data Identifies costs and benefits of improving the flow measuring station. Provides justification for expenditure.	Staff resources.	Year 0	Likely

Delivering integrated river basin management

Integrated river basin management is the need to look at river corridor habitats as a single entity, through an integrated approach, rather than looking at individual uses or users in isolation, and with the aim of balancing conflicting needs.

The following are our national aims as detailed in *An Environmental Strategy for the Millenium and Beyond.*

We will:

- Manage river-basins in an integrated way, via Local Environment Agency Plans;
- Ensure that all waters are of sustainable quality for their different uses;
- Deliver a continual improvement in overall water quality;
- Provide effective flood defence;
- Provide an effective flood warning system;
- Increase the number of rivers and still waters capable of supporting viable fisheries;
- Enhance and conserve inland navigations, as national assets of environmental, economic, social and recreational value;
- Secure the most appropriate legislation, management systems, and financial arrangements to ensure the sustainability of our navigational waters;
- Work with others to improve and develop inland waterways as an integrated network;
- Improve river habitat quality, as measured by river habitat surveys;
- Improve wetland management;
- Improve riverside landscapes;
- Improve bathing water quality;
- Improve estuarine waters for shellfisheries;
- Increase the number of Agency-owned sites available for public recreation; and
- Work with local authorities to maximise the conservation and recreational use and value of our river-basins.

Issue 14 The impact of changing land use practice on the water environment, especially the Leadon catchment.

Over the past fifty years there have been dramatic changes in rural land use and practices. Agriculture has intensified, become industrialised and more specialised. Farms and fields have increased in size and machinery has become more sophisticated and powerful. The use of chemicals, particularly mineral fertilisers and pesticides, is now standard practice in agriculture. Changes have also been experienced in forestry, mineral extraction, construction for transportation and urbanisation, as well as recreational use of the land.

Mechanisation, technical, financial and social pressures have transformed the speed and scale of activities and changes. These pressures have also reduced farmer's sensitivity to weather and ground conditions, which in the past moderated most aspects of rural land use and management. The power of modern machinery now means that work can proceed under most circumstances. Damage and disturbance to the soil usually occurs in wet conditions and may be caused by animals' hooves, cultivation, excavations and vehicles travelling over the land. The inevitable consequence is the ready generation of sediment-laden water on the land. Wheel lines and tracks form routes for rainfall to runoff quickly towards watercourses. Research indicates that most of the sediment lost from land to watercourses is of agricultural origin.

Sediment deposition in watercourses can seriously affect the survival of salmonid fish. During spawning, the first stage in the life cycle, a female digs a redd in the gravel substrate of the watercourse. She sweeps each gravel particle and may dislodge fine sediment up into the flowing column of water. This produces a clean substrate where she lays her eggs. Water can flow down into the egg zone to provide dissolved oxygen throughout the incubation period. When a land surface run off event occurs carrying a larger than normal amount of sediment load, sediment can be trapped in the egg zone of the substrate thus depriving the eggs of oxygen. This sediment intrusion can cause a major fish kill. Sediment deposition may also restrict the diversity and abundance of invertebrates, which are the natural food source for these fish.

Sediment loss from agricultural land also contributes to the eutrophication of watercourses (see Issue 17). The entry of phosphorus into watercourses from diffuse sources is usually sediment associated. This may occur through soil erosion, surface run off or leaching.

Pollution from diffuse sources such as agricultural land is now recognised within the UK as a source of contamination of surface and groundwater. Currently, the majority of UK government policy and guidance is geared towards either point source (eg effluent from Sewage Treatment Works) pollution or specific problems such as nitrate leaching, without a recognition of the potential problems which exist from agricultural practices.

In response to this problem Best Management Practices (BMPs) have been developed to reduce diffuse pollution. The key to the successful use of these practices is for them to become accepted as long term farm management practices, which fit into the commercial environment in which farmers operate.

Who is involved?

The Environment Agency, Farming and Wildlife Advisory Group, Coventry University and the farming community.

What is happening already?

An investigation into sediment loss from agricultural land in the upper reaches of the River Leadon catchment is currently being undertaken by Coventry University. The Leadon catchment contains types of soil which are vulnerable to erosion. Long stretches of the river are heavily silted and consequently fish and invertebrate populations are poor. The River Leadon is also rich in nutrients (eutrophic) and is designated a Sensitive Area (Eutrophic) under the EU Urban Waste Water Treatment Directive (see Issue 17).

Farming and Wildlife Agency (FWAG) advisers have visited the majority of farms in the study area to talk to farmers about soil erosion and the loss of sediment to watercourses. Using the information provided by the Coventry University study the FWAG advisers will be able to identify BMPs which can be targeted to deal with the problem at source. The challenge will be to demonstrate to farmers that BMPs can easily integrate into improving the overall management of a farm objective including adding economic wealth.

Objectives

- To raise awareness of soil erosion and the impact of sedimentation in watercouses in the farming community
- To identify those land use practices which contribute most to sediment loss from land to watercourse
- To identify BMPs to reduce sediment loss which are cost-effective and easily introduced into farm management
- To reduce sediment deposition in the River Leadon and restore fish and invertebrate populations

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Identify land which is high risk for soil erosion in the upper reaches of the Leadon	Environment Agency Coventry University		Target limited resources for maximum benefit		Years 0-5	Likely
Implement BMPs to reduce sediment loss from land to watercourse	Environment Agency FWAG	Landowners	Reduce loss of soil for the farmer. Improved environment for fish and invertebrates		Years 0-5	Likely

Issue 15 Pollution of surface water intended for public water supply

In the Severn Vale catchment nearly all water used for domestic supply is from surface water sources. The River Severn is abstracted at Strensham and Mythe by Severn Trent Water Ltd., and the Gloucester Sharpness Canal at Purton by Bristol Water Works Ltd. In Summer approximately 80% of the water in the Gloucester Sharpness Canal is abstracted from the Severn at Gloucester by British Waterways, the remainder being supplied from the Rivers Frome and Cam.

The Severn Vale catchment has several oil pipelines going through it and there is a potential for major pollution of surface waters from these. Other sources of water pollution include industrial, agricultural and road accidents, failures of sewage treatment plants and run-off from industrial and agricultural land resulting from heavy rainfall.

Pesticides (i.e. insecticides and herbicides) are widely used throughout the catchment in agriculture and by local authorities. While the most toxic and persistent organochlorine pesticides such as DDT and Dieldrin have long been banned, other chemicals in current use can be equally persistent. Recent years have seen a large growth in herbicide usage on cereals and other crops as well as wide scale use by local authorities and British Rail.

Who is involved?

Environment Agency, water companies, British Waterways, highway authorities, fire service, government Oil Pipeline Agency, Health and Safety Executive, farmers, National Farmers Union, agrochemical suppliers, contract sprayers.

What is happening already?

The Environment Agency currently undertakes an extensive sampling programme to identify trends in levels of pollution and water quality. If a specific area is highlighted as a potential problem then the Agency undertakes pollution prevention visits to sites. Currently the River Cam catchment is being surveyed because of intermittent levels of ammonia, nitrate and pesticides.

The water companies also conduct their own monitoring of abstracted water for supply to ensure compliance with the Drinking Water Directive. The Agency is informed of elevated levels of pollutants or failures of the Directive Standards.

A risk assessment project on the River Severn catchment is being undertaken currently.

The Agency has agreed an initiative with County Fire Services whereby they hold and deploy equipment (on a purpose built trailer) at incidents so that spillages at road traffic accidents and industrial premises are contained and cleaned up. This is working particularly well in Gloucestershire with the bulk of the costs (both Agency and County) being recovered from the polluters.

After prolonged periods of very cold weather sewage treatment plants can fail to nitrify which will increase the ammonia levels in the final discharge. This is not a problem in the River Severn, but due to the long residence time (slow flow) in the Gloucester Sharpness canal the abstraction directive for ammonia can be exceeded at Purton. The Agency is currently discussing with Severn Trent Water Ltd improved treatment and operating systems for those sewage works discharging to the Gloucester Sharpness Canal. The Agency intends to review the discharge consents and press for improvements to the treatment works.

The concentrations of pesticides have been regularly monitored over the last 11 years. The Ministry of Agriculture Fisheries and Food (MAFF) determines the suitability of water for human consumption. Pesticides levels have declined significantly in the Severn Vale over the last few years.

The Agency is attempting to persuade all users of weed killer (concentrating on major users such as Local Authorities) to switch to using Glyphosphate, which breaks down rapidly to phosphates and has no persistent effect. Unfortunately Glyphosphate is sometimes less effective and maybe more expensive than alternative products due to its lack of residual activity. Gloucestershire County Council and British Waterways now use Glyphosphate to treat weed growth as do the Agency's own flood defence work force. The Agency advises on the use of pesticides and authorises use in or near controlled waters. We also liaise closely with the agrochemical industry.

Detailed discussions have been held with the Government Oil Pipeline Agency (responsible for emergency procedure for all pipelines) and emergency procedures agreed. These need to be revised following the formation of the Environment Agency as they were agreed with the former National Rivers Authority.

The Agency is a statutory consultee to planning authorities and advise on development plans and planning applications where there is a risk to surface water supplies.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Continue to fund and develop the fire service initiative	Environment Agency	County Councils	Immediate response to accidental spillages leading to containment. Pollution prevented	Cost. If costs are recovered, none.	Years 1-5	Certain
Promote an agreement with Bristol Water Ltd and British Waterways on operation of abstraction to ensure adequate supply of water.	Environment Agency	Bristol Water and British Waterways	Polluted water would not be abstracted or continue to be abstracted into the Gloucester Sharpness Canal.	Statutory duties of British Waterways regarding navigation	Year 1	Certain

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Complete the River Severn risk assessment project and follow up with further detailed surveys	Environment Agency	Industry and Farmers	Major risk areas identified. Containment systems installed. Emergency procedures developed	Agency staff resources.	Year 0-2	Certain
Review sewage works discharge consents where ammonia discharges are problematic and identify capital improvements for STW Ltd AMP III programme	Environment Agency	STW Ltd DETR OFWAT	Eliminate elevated ammonia levels at Purton abstraction	Water companies expenditure regime to be agreed by OFWAT.	Years 0-1	Certain
Carry out specific campaigns targeting farms or industry in areas of known identified pollution problems	Environment Agency	Farmers industrial-ists MAFF NFU CBI	Will eliminate point source pollutions and reduce diffuse pollutions	Agency staff resources	Years 0-5	Certain
Continue campaign to persuade all users of weed-killer to change to Glyphosphate	Environment Agency	British Rail, local authorities farmers, landowners, utilities	Reduced numbers of serious incidents. Residual levels of persistent chemicals in environment will fall Reduced threat to water supplies	Costs of using Glyphosphate. Glyphosphate may be less effective and more applications may be required. Compliance with campaign is voluntary	Years 1-5	Certain
Develop the use of bio assay methods for pesticide identification and toxic monitors for toxins	Environment Agency	Commercial companies	Early indication of a problem (pollution) together with biological survey will locate source. Prevent further inputs and obtain evidence for enforcement	Cost/shelf life of test kits. Frequency of incidents/ resources.	Years 0-2	Likely

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Promote good agricultural practice including specific schemes such as that for isoproturon	Environment Agency	NFU Health and Safety Executive, suppliers, farmers	Reduction in incidents more efficient use of pesticides background levels reduced	Staff resources, new duties and priorities	Years 0-5	Certain
Update emergency procedures with government oil pipeline agency	Environment Agency	Government oil pipeline agency, other government departments	Procedures understood by all New communication channels	Resources	Year 0-2	Certain

Issue 16 The impacts of inadequate sewerage facilities on water quality

a) First time rural sewerage

Sewage pollution from historic lack of adequate sewerage systems and sewage treatment is a problem in a number of rural communities in the Severn Vale. The pollution degrades local amenity, affects the quality of watercourses, the value of wildlife habitats and the potential use of the water for irrigation and agricultural purposes. It can also threaten public water supplies drawn from groundwater.

The increase in domestic water use and development of housing in villages has overloaded many existing systems. This is particularly so where the local soil is heavy and impervious, so that effluent cannot soak away. Individual solutions for individual houses, such as package treatment plants are often not appropriate in a village environment. Sealed cesspits offer a solution, but the high cost of emptying (over £1000 a year) is a major burden on householders. This can lead to misuse and illegal connections to ditches and watercourses. Also, the energy consumed in the transport of large volumes of sewage by tanker cannot be considered sustainable in the wider context.

In many cases, a public sewer and sewage treatment is the most effective solution in dealing with the pollution.

The Environment Act 1995 introduced a new provision (Section 101A, Water Industry Act 1991) which requires water companies to provide a public sewer for existing properties in circumstances where it is cost effective and an environmental impact can be demonstrated. Landowners or parish and district councils can now apply to the Water Company and ask them to provide a public sewer. If the request is refused, the applicant may appeal to the Environment Agency to make a decision on the application.

In considering such applications, the Water Company should explore all practicable options for a public sewer in order to ensure that any scheme meets the requirements in a cost-effective manner. Conventional systems preferred by Water Companies tend to involve high capital costs, which may well be un-economic and un-justified in rural locations. Section 101a can be expected to prompt the use of unconventional systems such as vacuum sewerage and innovative "low-tech" treatment using reed-beds, biomass crops such as willow coppice for fuel and possibly composting toilets. In this way, local treatment can be provided sustainably and at low cost.

Who is involved?

Severn Trent Water, Environment Agency, parish and district councils, landowners.

What is happening already?

The former National Rivers Authority undertook a study of rural sewerage and the report "Rural Sewage Pollution in the '90s" identified 23 communities in the Severn Vale catchment where there were problems of inadequate sewerage. Discussions have been held with district councils to agree priority actions and a number of Section 101A applications have been submitted and determined in the Severn Vale Area.

Applications accepted: Longney, Glos: Clay Pits, Eastington, Glos: Arlingham, Glos: High Green, Severn Stoke, Worcs: Deblin's Green, Malvern, Worcs: Pool Meadow, Gloucester: Green Street, Kempsey, Worcs:

Applications refused: Poolhay Close, Corse Lawn, Glos:

Applications yet to be determined: Loop Road, Beachley, Forest of Dean

The Agency has contributed to a project run by the Water Research Centre, seeking to establish good practice in the administration of Section 101A applications. Several Water Companies have also taken part and it is hoped that the joint input to the project will lead to greater consistency in decisions on Section 101A applications and fewer appeals.

Objectives

- deliver a continual improvement in overall water quality.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Investigate areas of new sewage pollution and identify potential Section 101A applications	Environment Agency.	District councils	New problems highlighted can be considered for improvements.	Staff resources.	Years 0-5	Likely
Provide technical response to Applications submitted	Environment Agency.		Appropriate evidence submitted to enable environmental impact to be assessed	Extent of records and loss of previous knowledge through staff change	Years 0-5	Likely
Joint workshop with local authorities	Environment Agency	Local authorities	Fuller understanding of process		Years 0-1	Likely

b) The potential for consented discharges to cause failures of statutory and non-statutory objectives.

All significant discharges to rivers are controlled under terms set out in Consents to Discharge. Some of these consents were set at a time when knowledge of, and concern for, the environment was less than nowadays and they do not reflect the current standards we expect. There are three main causes of concern.

- Consents to discharge for sewage treatment works generally include conditions which limit the load of suspended solids, Biochemical Oxygen Demand and ammonia. In this way the impact on the receiving watercourse is controlled to ensure compliance with water quality objectives.

However, there are a number of sewage treatment works in the catchment which for historical reasons, do not have an ammonia Consent condition. The Environment Agency has no control on the ammonia concentrations of these discharges.

- There are also some sewage treatment works where performance is significantly better than the consented limits require. In some of these cases, operating the works down to the consented limits would result in a failure of River Quality Objective in the receiving watercourse. The Agency would therefore like to review the consents to protect current water quality.

- There is also the potential for pollution from intermittent discharges, many of which are consented. These include combined sewer overflows (CSOs)from urban sewerage systems, sewage pumping stations and storm tanks at sewage works. There are historic problems from CSOs in the Stroud Valley and also in Malvern.

Who is involved?

Environment Agency, Severn Trent Water Ltd., district councils

What is happening already?

Improvements to sewage treatment works and in particular intermittent discharges from combined sewer overflows are negotiated through the Asset Management Planning process, which is undertaken every 5 years. AMP1 covered the period 1990/95, AMP2 covers 1995/2000 and AMP3 will cover 2000/05. The negotiations involve the DETR, Environment Agency, the Office of Water Services (OFWAT), and the Water Companies.

AMP2 (to be completed by 2000) includes improvements at a number of sewage treatment works in the Severn Vale catchment. These include Hayden (Cheltenham), Stanley Downton (Stroud), Blakeney and Frampton, resulting in improved quality in the River Chelt, River Frome and the Severn Estuary. The schemes in AMP3 (2000/05) are currently being prioritised and will be published later. (It should be possible to include significant AMP3 schemes in the Action Plan). The Government has set objectives for the AMP3 process of improving at least 50% of the long-term failures of River Quality Objectives and 66% of the unsatisfactory combined sewer overflows.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Identify where improvements are required to ensure statutory and non-statutory improvements in water quality.	Environment Agency		Priorities for environmental improvements clearly identified.		Year 0	Certain
Construct water quality models to set the consent standards to maintain statutory and non-statutory compliance.	Environment Agency		Improved knowledge and awareness of needs.	Costs. Staff resources. Lack of flow and quality data at some sites.	Years 0-5	Certain

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Undertake improvements to discharges to meet new consents at priority works	Severn Trent Water Ltd	Environment Agency.	Improved water quality.	Costs of improvements to the consumer.	Years 0-5	Certain
Monitor implementation of AMP3 agreement	Environment Agency	Water companies	Improved water quality	Costs of improvements to the customer	Years 0-5	Certain

Issue 17 The effects of nutrients on the catchment

In the Severn Vale LEAP catchment area, the Rivers Cam, Frome, Leadon, Chelt and the Gloucester Sharpness canal are all affected by eutrophication (the increasing concentrations of plant nutrients). There are also groundwaters which are affected such as the in Bromsberrow area.

a) Changes in the ecology of Rivers and canals

In catchments such as the Cam and the Frome, there are large towns producing considerable quantities of sewage effluent and intensively farmed agricultural land. Each of these activities gives rise to point and diffuse sources of nutrients arising from human and household waste, detergents and fertilisers.

Under certain conditions, these nutrients can give rise to eutrophication, leading to a variety of problems such as:

- Decreased channel width and capacity, leading to restrictions in navigation, loss of spawning grounds and angling margins.
- Daily variation in the oxygen concentrations in the river placing stress on the fish population and in extreme cases may kill fish.
- Changes in the appearance of the river.
- Presence of blue-green algae in the rivers, which can affect the treatment of water for drinking and be toxic to people, livestock and animals.

Who is involved?
Environment Agency, Severn Trent Water, Department of the Environment, Transport and the Regions.

What is happening already?
In 1991 the European Community (EC) Urban Wastewater Treatment Directive (UWWTD) (91/271/EEC) was introduced. This Directive requires regular reviews of eutrophication in waters. If they are found to exceed the limits specified by Department of the Environment Transport and Regions for eutrophication, nutrient inputs from sewage treatment works exceeding a population of 10,000 must be controlled.

In the Severn Vale catchment, the reviews led to the following watercourses being designated as Sensitive Areas (Eutrophic) under the UWWTD: River Cam, River Frome, Gloucester Sharpness Canal, River Leadon, and River Chelt.

The Agency has recently published a consultation document which proposed a management strategy to tackle eutrophication entitled "Aquatic Eutrophication in England and Wales". This strategy aims to promote a partnership approach to deal with eutrophication.

Objectives

These proposals will work towards achieving the following Environment Agency objectives to:

- implement the requirements of the EC Urban Waste Water Treatment Directive;
- control eutrophication, where feasible, in order to enhance biodiversity;
- ensure that there is no deterioration in the quality of the aquatic environment, and
- deliver significant improvements in river and still water quality by tackling diffuse pollution of them.

Proposals for action

Action	Responsibility		Benefits	Constraints	Timescale	Likelihood
	Lead	Other				
Build a SIMCAT model of the Severn Vale catchment	Environment Agency		Improve knowledge of sources of nutrients in the catchment	Staff and resources	Year 1	Likely
Identify and designate Sensitive Areas (Eutrophic) under Urban Waste Water Treatment Directive	Environment Agency		Improvement in river ecology by reduction in phosphorus load	Costs to the Agency and STWL	Year 2	Certain

b) Nitrate Vulnerable Zones (NVZ's)

Nitrate from agricultural activities can pollute surface and underground waters and reduce the quality of water. In areas where the groundwater is used for public water supply, the aquifers (water bearing rocks) are particularly susceptible to surface pollutants leaching down to the water table.

What is being done already?

The EC Nitrate Directive (91/676/EEC) aims to reduce water pollution by nitrates from agricultural sources, and prevent further such pollution. Where a waterbody used for public supply is defined as 'polluted' its catchment must be designated under the Directive as a Nitrate Vulnerable Zone.

As a result two Groundwater Nitrate Vulnerable Zones were designated in the Severn Vale catchment in 1996. Within these catchments farmers must follow the Action Programme for Nitrate Vulnerable Zones (England and Wales) Regulations 1998 when applying fertilisers

From 19 December 1998, anyone who farms land within an NVZ, either as a tenant or owner, is responsible for ensuring that the Regulations are followed on their land. The Agency is responsible for enforcing and assessing compliance with these Regulations through farm inspections.

There are two groundwater NVZ's in the Severn Vale area. The largest is part of the Triassic sandstone area around Bromsberrow. There is a smaller area which is part of the Cotswold spring system, which feeds the Hewlett Reservoir, but which naturally flows into the River Chelt. These are areas where the concentration of nitrates is showing an upward trend and where the groundwater is used for public water supply.

Proposals for action

Action	Responsibility		Benefits	Constraints	Timescale	Likelihood
	Lead	Other				
Implement Action Plans in NVZ's	Environment Agency	MAFF, farmers	Reduction in nitrates entering groundwaters, arising from agricultural practices	Limited Environment Agency resources	Years 0-5	Certain

Issue 18 Failure to comply with River Quality Objectives

The Environment Agency has set water quality targets for rivers and canals in England and Wales. These are known as River Quality Objectives. They are used for planning the protection and improvement of river quality. Achieving these objectives will help to sustain the use of rivers for recreation, fisheries and wildlife, and protect the interests of water abstracters.

The Agency uses River Quality Objectives to guide decisions and actions to control and prevent pollution, for example they provide a basis for setting standards for consents to discharge. The water quality classification scheme used to set River Quality Objectives is known as the River Ecosystem scheme. It is based on a rolling three year dataset. The River Ecosystem scheme classifies water quality into five classes which reflect differing chemical qualities and the ability of the water to support aquatic life. River Ecosystem Class 1 is the highest class, and would allow the river to support all fish species, whilst River Ecosystem Class 5 is the lowest class where water quality is likely to limit even coarse fish populations.

In the Severn Vale catchment there are 18 stretches of river which significantly failed to comply with their long term River Quality objectives in 1997 the most recent complete 3 year dataset available when this report was produced (See Appendix 3). These failures are due to a range of factors including the impact of discharges, pollution incidents, the cumulative effect of low flows, high summer temperatures, low dissolved oxygen concentrations and algal growth. Many of the failures may therefore be dealt with by other issues in this plan, see Issue 17.

Who is involved?

Environment Agency, discharges, abstracters, polluters.

What is happening already?

The Environment Agency, as part of its routine work is attempting to solve many of the problems which have led to these failures. Day to day activities include: chemical and biological monitoring of river sites and effluents. This provides an extensive range of information, which allows us to make decisions to improve and maintain water quality. The Agency also reviews consents to discharges, identifies sources of pollution, carries out pollution prevention visits, integrates water quality and water resources decisions and identifies a programme for investment at sewage treatment works.

Once the monitoring programme highlights the stretches which are failing, individual officers then strive to identify the reasons for failure and eliminate them. For some of the failures it may not be possible to instigate improvements as the failure is due to natural causes. In other cases, the legislation may not allow an immediate solution and so the Agency will work towards long term improvements.

Objectives

These proposals will work towards achieving the following Environment Agency objectives to:

- ensure that all waters are of sustainable quality for their particular uses;
- deliver a continual improvement in overall water quality;
- increase the number of rivers and still waters capable of supporting viable fisheries

Proposals for Action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Identify point sources of pollution	Environment Agency	Dischargers	Improved water quality	Resources	Years 0 -5	Likely
Review discharge consents where the receiving watercourses are failing their River Quality Objectives. Negotiate improvements with dischargers.	Environment Agency	Dischargers	Improved water quality	Resources	Years 0 -5	Likely
Review stretches that fail their objectives because of low flows and investigate potential solutions.	Environment Agency		Improved water quality	Existing licences, eutrophication	Year 0-5	Likely

Issue 19 Review of River Quality Objectives

River Quality Objectives have already been set for the Severn Vale catchment by translation from a previous set of objectives called the National Water Classification which were set in 1979.

As part of the Agency's aim to achieve major and continuous improvements in water quality, it aims to review all River Quality Objectives for the catchment to ensure that they are still appropriate. This review does not necessarily mean that the Agency will change River Quality Objectives but the changing uses of the watercourse may mean that some need to be altered.

The process of reviewing the objectives will involve reviewing several years data for each of the stretches. The actual current and planned uses of the stretch will then need to be taken into consideration. If the Agency decides to alter any of the stretches consultation will be undertaken through the LEAP process.

Who is involved?

This will vary from stretch to stretch but may include the following; Environment Agency, local authorities, interest groups, abstracters, dischargers and any other interested parties whose view will be taken into account.

What is being done already?

An extensive programme of monitoring is already undertaken for chemical and biological quality of all our classified river stretches. Fisheries surveys are also regularly undertaken. All this information together with local knowledge of a river will enable us to determine the uses of the river and hence decide if the long term River Quality Objectives is still appropriate.

Objectives

- Ensure that all waters are of sustainable quality for their different uses.
- Deliver a continual improvement in overall water quality.
- Increase the number of rivers and still waters capable of supporting viable fisheries.

Proposals for Action

Action	Responsibility		Benefits	Constraints	Time-scales	Likeli-hood
	Lead	Other				
Review all River Quality Objectives in the Severn Vale catchment	Agency	All interested parties	Ensure that the objective is appropriate for use. Allows for better targeting of resources.	Staff Resources	Year 0-5	Likely

Issue 20 Managing surface water drainage from developed areas

Development of land usually leads to the covering of substantial areas with impermeable surfaces, such as roofs, yards, roads, and parking areas; creation of piped drainage systems; and accumulation of potentially polluting materials. The consequences of this are:

- Natural infiltration into the ground is inhibited with a corresponding reduction in ground water recharge.
- Larger quantities of storm water are discharged to watercourses more quickly causing new or worsening existing flooding problems.
- The surface water can be contaminated by oil, solids, metals, pesticides, and foul water such as washing machine discharges. The causes of the contamination may be accidental spillage, wrong connections, deliberate disposal to drains and the natural accumulation of pollutants over time.

Traditionally these problems have been treated individually and on a site specific basis with little attempt at combining solutions or considering their impact on a wider scale. Thus solution of a localised problem may lead in time to the creation of new, or the worsening of existing, problems elsewhere. As development spreads, this approach becomes more and more difficult to sustain. Problems which are inter-related require solutions which are inter-related and need to be managed within the context of the wider catchment and effects on the whole water environment.

Reduction in ground water recharge can be addressed by careful siting of new development and by the adoption of infiltration drainage techniques to return water directly to the ground. The water so discharged may require treatment to avoid the risk of polluting the ground water and adoption of the techniques may be limited by unsuitable ground conditions and the need to protect aquifers used for water supply.

The increased flood risk can be compensated for either by off-site works to increase the capacity of the channel of the receiving watercourse or by on-site source control techniques. The former usually involves works on land not under the developer's control and may prove impracticable due to refusal of permission by the landowner, the extent of the works involved or nature conservation and similar objections. The latter may involve either flood attenuation measures or the adoption of infiltration drainage techniques.

The problems of polluted discharges can be minimised by the provision of natural treatment systems, which slow the speed of run-off allowing settlement, filtration and percolation into the ground. Such systems include grass swales, detention ponds, retention ponds and reedbeds. The Environment

Agency is actively promoting the use of these systems in the treatment of surface water from large developments.

Consideration of all of these problems is also subject to the overriding duty to further nature conservation and allied concerns of landscape and amenity where source control techniques tend to be more compatible.

The choice of how to manage surface water drainage from developed areas, both existing and new, is thus a key issue. Much more reliance will have to be placed on source control methods where problems may arise over how such facilities are best incorporated into the site and who will be responsible for future maintenance to ensure that they continue to perform as designed.

Successful development of the necessary catchment drainage strategy, including the application of source control techniques, requires the close co-operation of local authorities using their development control powers; the Environment Agency advising developers; developers incorporating them into their schemes; and Severn Trent Water being prepared to accept and incorporate the various installations into their drainage systems.

Who is involved?

The Environment Agency, Government, local planning authorities, highway authorities, developers, industry, landowners and individual householders.

What is happening already?

The Environment Agency, the Scottish Environment Protection Agency and the International Association on Water Quality have collaborated to produce "Nature's Way" a guide and video promoting the adoption of best management practices for surface water drainage. The Scottish Environmental Protection Agency and the Environment Agency have also produced 'A Guide to Sustainable Urban Drainage'. Recent research has focused on various source control techniques such as CIRIA (Construction Industry Research & Information Association) Report 156 on infiltration drainage and the work of the Standing Conference on source control organised by the School of the Built Environment at Coventry University. A new CIRIA design/best practice manual is due to be published in 1999.

The Environment Agency is promoting natural treatment systems for new development through planning consultations for major housing and industrial developments in Tewkesbury. Linear reed-bed treatment systems are being provided on stormwater outfalls for the 1500 house developments at Wheatpieces and Stonehills and a 6000 m^2 reed-bed is being provided to treat stormwater from the 28 ha Tewkesbury Business Park.

The Agency itself has recently created a pond and reed bed wetland system on the Wharrage Brook in Worcestershire, which drains some 2 km^2 of residential development on the west side of Redditch. This has already produced significant benefits for water quality, water resources, ecology, nature conservation and wildlife habitats.

Objectives

These proposals will work towards achieving the following Environment Agency objectives to:

- provide effective flood defence;
- ensure that there is no deterioration in the quality of the aquatic environment in particular, and deliver significant improvements in river and still water quality by tackling diffuse pollution of them;
- use and promote best environmental practice for the protection and restoration of river habitats;
- implement specific projects to restore habitats in rivers and lakes, increase the area of reed beds and other water plants, and improve river banks.

Action	Responsibility		Benefits	Constraints	Time-scales	Likeli-hood
	Lead	Other				
Identify Local Plan developments which the Agency wishes to target.	Environment Agency	Local authorities	Enables concentration on key developments where Sustainable Urban Drainage Systems (SUDS) will generate most benefit	Varying stage of development may hamper acceptance of SUDS	Year 1	Certain
Carry out Zoning study to identify areas which are suitable for infiltration drainage, flood detention or wetland treatment.	Environment Agency		Identify target areas	Groundwater quality issues – resources for specific studies	Year 1	Probable
Set up discussion meetings with water companies and relevant district councils and developers to lobby for acceptance of SUDS.	Environment Agency	Water companies Local authorities Developers	Expand awareness of sustainable drainage and environmental benefits	Established design procedures and institutional constraints eg. Water Industry "Sewers for adoption" Manual.	Year 1	Certain
Incorporate appropriate policies in Local Plans.	Environment Agency	Local authorities	Establish policy framework for SUDS within local authority planning system	Timescales of Plan preparation may mean policies not effective for several years	Years 0-5	Certain
Disseminate design and maintenance guidance for infiltration systems and wetlands	CIRIA	Environment Agency Local authorities	Assist developers and local authorities promoting increased confidence in design and operation	Resistance to innovative techniques	Years 0-5	Certain
Promote best practice amongst developers.	Environment Agency		Beacon sites to demonstrate advantages of SUDS	Resources for promotional effort	Years 0-5	Certain

Issue 21 Managing flood risk and floodplains

Flooding is a natural occurrence which cannot be prevented. However, flooding can be seen as a problem when it interferes with human activities. Where land in a floodplain is used for agriculture, buildings or transport routes, certain standards of protection against flooding are expected.

In some areas flood risks cannot be eliminated completely and so the Environment Agency gives flood warnings where this can be provided effectively and economically.

In the Severn Vale area, the issue of managing flood risks and flood plains breaks down into two aspects:

- Flood risks from the River Severn and Chelt
- Flood warning

a) Flood risks from the Rivers Severn and Chelt

Who is involved?
Environment Agency, the Government, local authorities, riparian landowners, conservation bodies, river users.

What is happening already?
To ensure that the appropriate standard of flood protection is being provided and to target resources where the need is greatest, the Agency carries out regular inspections of Main Rivers and is undertaking a detailed asset survey of flood defences. There is also a rolling programme of maintenance work and a capital programme for flood alleviation schemes. As well as flood risk, development on floodplain will reduce ground carrying capacity, increase run-off rates and this exacerbates flooding problems associated with the carrying capacity of the river channel. It is therefore the policy of the Environment Agency, when advising Local Planning Authorities, to oppose new development in vulnerable floodplain.

The role of the planning system operated by local authorities is extremely important with all aspects of the river system on a catchment scale, especially in relation to:

- floodplain conservation / restoration;
- sustainable urban drainage systems (Issue 20)

The watercourses not designated as Main Rivers by the Ministry of Agriculture Fisheries and Food, are termed ordinary watercourses. On ordinary watercourses existing flooding problems may be aggravated and new ones created if riparian owners and local authorities do not fulfil their obligations and exercise their powers in a responsible and consistent way.

Although the Environment Agency exercises a duty of supervision and co-ordination over flood defence matters generally, its principal powers to regulate, maintain and construct flood alleviation works are restricted by law to the channels of Main River and do not apply to ordinary watercourses. Our main control on the latter is through Land Drainage Consents for weirs and culverts.

On ordinary watercourses the ultimate responsibility for the care of the river rests with the riparian owners who have rights and duties under common law. Under statute law they are also subject to limited controls exercised by the Environment Agency and local authorities under the Land Drainage Act 1991 and the Public Health Act 1936. These cover primarily the construction of weirs and culverts, removal of obstructions and enforcement of channel maintenance.

Local authorities' powers on these watercourses are similar to the Agency's on Main River. Their regulatory powers enable them to require riparian owners to clear obstructions and carry out channel maintenance. They are also empowered to carry out publicly funded maintenance and flood alleviation works themselves. When acting as local planning authorities they also have the only powers to control or alleviate the effects of new development.

Problems occur where channel maintenance is inadequate, where blockages are allowed to develop, and where new development is permitted to encroach into the floodplain or its surface water drainage overloads the receiving watercourse. These problems can be avoided only when riparian owners and local authorities fulfil their obligations and use their powers in a responsible, consistent and planned way.

Achievement of this goal will depend on all parties fully understanding their duties, powers and responsibilities and being prepared to exercise them when required. Local authorities must also be prepared to manage the ordinary watercourse parts of the river system by monitoring changes, identifying problems, ensuring that riparian owners fulfil their obligations, maintaining channels themselves where the public interest demands and constructing flood alleviation works where these are practicable, justified and acceptable.

Proposals for Action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Continue with the implementation of the capital works programme in the Severn Estuary where schemes are found to be feasible (see action 11.1 for locations where capital schemes are not viable).	Environment Agency		Reduced risk of flooding.	Construction and future maintenance costs. Environmental considerations.	Year 5	Certain
Phased implementation of River Chelt flood alleviation capital scheme. (scheme comprises 8 phases).	Environment Agency		Reduced risk of flooding to Cheltenham Town.	Construction costs. Environmental considerations. Re-development opportunities.	Year 5	Certain
Provision of Flood alleviation scheme for Kempsey, Worcestershire (subject to feasibility study results).	Environment Agency		Reduce risk of flooding to the village of Kempsey.	Construction costs. Environmental considerations.	Year 4	Possible
Provision of Flood alleviation scheme for Purton, Gloucestershire (subject to feasibility and landowner negotiations).	Environment Agency		Reduce risk of flooding to 5 properties in the village of Purton.	Construction costs. Landowner / tenant negotiations. Environmental considerations.	Year 5	Possible
Flood defence repairs arising from the October 1998 floods.	Environment Agency		Ensure structural stability of flood defences. Maintain correct standard of flood protection.	Landowner negotiations. Costs. Environmental considerations.	Year 1	Certain
Working in conjunction with Gloucester City Council to identify and incorporate flood defence measures into any development that occurs in the environs of Gloucester City.	Environment Agency and Gloucester City Council		Reduce risk of flooding. Floodplain management, protection and enhancement.	Developers co-operation.	Year 0-5	Possible

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Identify areas on fluvial 'Main River' where it may become uneconomic to maintain the present standard of flood defence maintenance and develop a strategy for future maintenance regimes.	Environment Agency		Reduced revenue expenditure. Increased biodiversity.	Increased flood risk. Political pressures.	Year 5	Likely

b) Flood Warning

The Environment Agency provides a Flood Warning Service as follows:

- On the fluvial length of the River Severn from downstream of Worcester as far as the Gloucester area.
- On the tidal Severn Estuary at Severn Beach/New Passage near Avonmouth.

Who is involved?

The Environment Agency, local authorities, emergency services, flood wardens, owners/occupiers of property and farmers.

What is happening already?

A major change in this service was implemented on 1 September 1996. Responsibility for the dissemination of flood warnings was transferred to the Agency from the various police forces who had previously carried out this task. The Agency now issues warnings automatically direct to flood wardens or individuals by means of pre-recorded telephone, fax or pager messages. At the same time warnings are sent to the emergency services, local authorities, media and utilities. Further information about river conditions is available on a telephone voice bank system called Floodcall. More general information is broadcast by local radio, Teletext, AA Roadwatch and weather forecasts.

Now that implementation of this new flood warning dissemination system is complete the Agency is planning improvements to the quality of the service generally. These cover both the accuracy of warnings and coverage achieved and will include detailed risk identification, improved modelling of flood and additional field instrumentation. Any such enhancements will, of course, be subject to the usual tests of feasibility viability and acceptability. The targets are to achieve an 80% success rate in the issue of flood warnings to properties which are at risk from flooding and a 52% success rate in the recipients acting on the flood warning.

On 26 April 1998 the Agency set up an Independent Review into the flooding events of Easter 1998 covering incidents in Anglian, Midlands and Thames Regions, together with the Agency Wales, with Peter Bye, former Chief Executive of Suffolk County Council, as Chairman and Dr Michael Horner, Managing Director, Bullens Consultants, as Technical Adviser. A preliminary report was published at the end of May 1998 with the full report published at the end of September 1998.

In response to the Independent Review Report the Agency has published an Action Plan, which is currently being implemented. This covers all areas of the Agency's flood defence activities, together with our relationship with land owners/occupiers, local authorities and emergency services such that the public is provided with a seamless service.

Objective

- To provide an effective flood warning service and to respond to flood events.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Complete the identification of all property owners and occupiers who would benefit from flood warning and who wish to participate in the present flood warning scheme.	Environment Agency	Local authorities property owners and occupiers, farmers.	Warnings are targeted at recipients who need and want them. Flood damages are reduced.	Willingness of potential recipients to participate.	Years 0-2	Certain
Improve accuracy and reliability of present flood warning system, ie rain and river gauge coverage and forecasting models.	Environment Agency		Accuracy, timeliness and reliability of warnings are improved. Flood damages are reduced.	Technical feasibility of improvements to forecasting model. Overall improvements economically justified.	Years 0-5	Certain
Optimise involvement of local authorities, property owners and occupiers and emergency services in preparing for and managing flood emergencies.	Environment Agency	Local authorities property owners and occupiers, farmers emergency services.	Flood damages are reduced. Greater preparedness for post flooding recovery.	Willingness of third parties to become involved in preparing for flooding. Financial constraints.	Years 0-3	Certain
Investigate possible extension to the present flood warning scheme.	Environment Agency	Local authorities landowners, occupiers, farmers.	Greater number of people receive warnings. Flood damages are reduced.	Willingness of potential recipients to participate. Viability Practicability.	Years 3-5	Likely

Issue 22 Recreational use of and access to the river corridor

Rivers and their corridors provide opportunities for recreational activities such as angling, walking, sailing, quiet enjoyment, bird watching etc. The provision and maintenance of access and associated facilities such car parks, overnight moorings, slipways, angling platforms and way marking need to be well planned so that people may enjoy their leisure without conflict and damage to landscape, flora and fauna.

The Agency has the following duties with regard to recreation:

- To promote recreation on water and its associated land
- To make best recreational use of Agency owned sites
- To take account of recreation in the work the Agency carries out

British Waterways are the statutory navigation authority for the main Severn as far as Gloucester and have already helped to provide overnight mooring facilities at various locations. Marinas at Diglis (Worcester), Upton and Tewkesbury provide access to the river and extensive facilities for the holiday maker and boat owner. However, there is still a demand for overnight moorings and safe access to riverside towns.

The Severn Way was opened officially in 1998, and stretches from the source to Avonmouth. This was a major collaborative project between the Agency, County and District Councils, and a number of voluntary bodies. Way marking, promotion and maintenance are still required to sustain upkeep and usage.

Who is involved?

Environment Agency, local authorities, British Waterways, voluntary bodies.

What is happening already?

The Agency provides predictive information on the Severn Bore both in leaflet form and through interpretation boards at Minsterworth and Stonebench. It also provides extensive free fisheries on the left bank of the River Severn at Uckinghall near Ripple and on the right bank just below Upton-upon-Severn. Both are available for match fishing by pre-booking. Promotion of the Severn Way, by leaflet and a guide to be published shortly, has been carried out with other partners.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Refurbish angling platforms on Agency owned fisheries	Agency		Safer access	Time and cost	Year 0-1	Certain
Safer Severn Initiative - install signage at Gloucester Quay as part of collaborative project	Gloucester Sharpness Canal Users Forum	Environment Agency, British Waterways, Glos City Council	Safe boat access to Gloucester Quay and Gloucester Dock	Agreement with City Council and British Waterways	Year 0-1	Certain
Improve access to rivers – overnight moorings	British Waterways	Environment Agency, riparian owners	Reduction of illegal moorings and conflict	Agreement with landowners, local authorities	Years 1-2	Likely
Promote and maintain Severn Way from Worcester to Avonmouth	County Councils	Agency	Secure long term usage for wider public	Many local authorities involved	Year 0-5	Probable

Conserving the land

Land use is the single most important influence on the environment and land use change can have beneficial or detrimental implications for the environment. The Agency has a responsibility to protect and enhance the environment, however, we have limited control over the way land is developed. This is primarily the responsibility of local planning authorities with whom we liaise closely in order to achieve our environmental goals.

Problems arising from contaminated land are present in the area. Past industrial and waste disposal practices were subject to fewer controls than they are today and less account was taken of the by-products of manufacturing and extraction processes. Consequently, contamination occurred through a mixture of accidental spillage, casual disposal during the normal operation of a factory or plan and a lack of awareness of potential longer-term impacts of their actions. This contamination may stay within the ground until sites are re-developed and this may release potentially harmful substances to the atmosphere and/or into ground and surface waters. Any re-development of contaminated sites (including landfill sites) must be accompanied by a detailed site investigation.

Until now the problems associated with contaminated land have tended to be addressed almost exclusively in the context of site re-development. The Agency and its predecessors have worked through the Town & Country planning process to effect site clean-ups and protect the environment. The Agency will carry out site inspections in order to improve pollution prevention measures.

The Agency has existing responsibilities relevant to land contamination under its pollution control functions. The implementation of Section 57 of the Environment Act 1995 (expected July 1999) will provide a new legal framework for dealing with contaminated land. Under this regime, the Agency will have new duties and powers that complement those of local authorities.

The following are our national aims as detailed in *An Environmental Strategy for the Millenium and Beyond*.

We will:

- Influence the Town and Country Planning Systems to prevent developments in the wrong places;
- Implement the Flood and Coastal Defence policy as advised by MAFF and the Welsh Office;
- Secure an adequate level of investment in flood defence;
- Provide flood plain surveys to local planning authorities;
- Discourage development in flood plains;
- Work with nature to reduce coastal flooding;
- Develop new methods to survey and manage flood defences;
- Report regularly on the state of flood defences;
- Identify the state and extent of the problem of soil erosion;
- Develop a soil erosion alleviation strategy, including guidance on best practice;
- Work with local authorities to identify, and report on the extent of, contaminated land;
- Regulate identified "special" contaminated land sites effectively;
- Research into the specific risks and remediation needs of contaminated land;
- Identify the needs of, and alleviate the effects of, soil acidification in upland areas;
- Measure the effectiveness of steps taken to reduce nitrates in designated nitrate vulnerable zones; and
- Develop methods for monitoring the "state" and quality of soil with respect to its potential pollution.

Issue 23 Implementation of the Contaminated Land and Special Sites Regulations including the potential to developing partnerships between the Agency and local authorities

The Department of the Environment, Transport and the Regions (DETR) has announced the implementation of Part IIA of the Environmental Protection Act 1990 on 1 July 1999 through Statutory Guidance and Regulations. The regulations will lead to a change in the management of contaminated land.

Contaminated land is broadly defined in Section 57 of the Environment Act 1995, as land, which by reason of substances on or in the land, has a significant risk of causing pollution of controlled waters or harm. To identify land as contaminated the regulator must be satisfied that a contaminant source and target are identified and that a route exists along which the target can be affected by the contaminant.

Who is involved?

Anyone with a regulatory role, liability, potential or vested interest may be involved in site specific contaminated land issues. Such parties may include local authorities, landowners or developers, financial and insurance institutions, trade organisations, remediation facilitators such as English Partnerships and Development Corporations and the DETR.

Under the new regime local authorities will have powers and duties to identify contaminated land and an appropriate person responsible for remediation. After consultation with the Agency a remediation notice may be served requiring such remediation to be carried out and details of the notice placed on the public register.

The Agency will have a duty to provide guidance to local authorities, publish a report on contaminated land and act as regulator for contaminated land considered to be a Special Site (including contaminated land containing specified substances, occupied by the Ministry of Defence, or used for specified purposes). The Agency will also be required to carry out technical research and act as a centre of expertise.

What is happening already?

A number of initiatives have commenced to ensure that the Agency and local authorities develop a consistent and common approach to the new regulations. These include a Memorandum of Understanding between the Agency and Local Authority Associations on a Protocol for Land Contamination and a joint training initiative for Agency and local authority staff.

The Agency is already working with local authorities on site specific remediation proposals. Examples include the proposed redevelopment of part of the Indalex site in Cheltenham and Gloucester Business Park Pro-active meetings between the Agency, local authority, developers, landowners and consultants before remediation proposals are finalised help to clarify the issues and identify solutions to achieve sustainable development and environmental protection.

Objectives

- To develop close liaison with local authorities in the Severn Vale area to ensure a consistent approach to the new Regulations
- To secure sustainable development of contaminated land that meets our environmental protection policies and targets

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Promote the use of sustainable remediation	Environment Agency and local authorities		Consistent and cost-effective remediation	Planning approval, waste management licensing implications	Years 0-5	Likely
Establish partnerships to remediate Special Sites	Environment Agency	Local authorities, landowners, development agencies	Achieve appropriate remediation of the highest pollution potential sites on a priority basis	Staff and financial resources to manage or contribute to partnerships. Dependent on identification of Special Sites and successful bid for funding Approval	Years 0-5	Likely,
Exchange information and knowledge with local authorities	Environment Agency, local authorities		Efficient & effective use of existing information, improvements in public access to environmental information	Staff resources and finance to develop and maintain databases and information systems (GIS) Dependent on National and Regional priorities	Years 0-5	Likely

Issue 24 The impact of contaminated mines on the surrounding environment in the Forest of Dean.

A number of mineshafts in the Forest of Dean have been filled with a variety of waste materials without the benefit of regulatory control. The shafts breach Carboniferous limestone which is designated a major aquifer in the Agency's Groundwater Protection Policy.

The Agency, and it's predecessor bodies, have had concerns for a number of years about the pollution potential of a mineshaft, New Dun, within the curtilage of Watkins Engineering Limited site at Coleford. A number of substances have been identified both within made ground on the site and in the liquid within the shaft. These substances include asbestos, hydrocarbons, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs) and heavy metals, including cadmium and mercury. A number of the substances identified are toxic and known or suspected carcinogens.

The Mines Inspectorate also has concerns about the poor air quality in the mine system as a consequence of the infilling and specifically related to the type of waste known and suspected to have been deposited down New Dun shaft. Access to the mine workings around New Dun shaft is prohibited by the Mines Inspectorate due to the unbreathable atmosphere and will not be permitted until ventilation of the mine system is improved.

Who is involved?

This issue has had significant local interest for a number of years and continues to generate media interest. There has been, and continues to be, a number of parties interested in this site. These include, but are not restricted to, the Agency, Forest of Dean District Council, Watkins Engineering,

Forest Enterprise, the Deputy Gaveller, the Mines Inspectorate, English Nature, Clearwell Caves, Forest of Dean Cave Conservation and Access Group, local residents and the media.

The Agency has a duty to protect controlled waters, including groundwater. The prevention of pollution is of critical importance since, once polluted, groundwater can be extremely difficult to treat. Our regulatory role may extend as New Dun is likely to be designated a Special Site when the new contaminated land regulations are implemented.

What is happening already?

A number of meetings have been held between interested parties and site investigation reports have been commissioned by Gloucestershire County Council, (as the former Waste Regulation Authority) and Watkins Engineering.

Remedial options have been discussed and the Agency commissioned a feasibility study for excavating waste from Stephen's shaft, already 2/3 cleared, to improve ventilation within the mine system. A partnership has been established to address the clearance of Stephen's shaft and a bid for capital funding is in preparation.

Objectives

- To establish best practice for dealing with waste in mine shafts
- To improve ventilation of the mine system in order to gain access for sampling and inspection of the waste in New Dun shaft.
- To investigate the level of pollution within the aquifer and carry out an assessment of the risk to potential targets.
- To assess remediation options on the basis of cost-benefit.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Confirm partnership and clarify the responsibilities of each partner	Environment Agency	Forest of Dean District Council, Watkins Engineering, Deputy Gaveller, Mines Inspectorate	Enable a firm bid for capital funding (through Supplementary Credit Approval) based on positive intentions to commit to the partnership and acceptance of responsibilities.	Possibility of partner or partners backing out, success of bid dependent on DETR decision	Year 0	Likely
Tender and commission works on clearance of Stephen's shaft	Environment Agency	as above	Improved ventilation to the mine system with the potential to allow access for sampling and inspection	Capital funding needs DETR approval, air flow dynamics may not be sufficient to improve ventilation	Year 1	Likely

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Sampling and analysis of groundwater. Commission risk assessment	Environment Agency		Identify level and extent of pollution in the mine system, assess risk to other targets including water abstractions and surface water courses	Complex hydrogeology introduces uncertainty in assessment. Dependent on success of above and capital funding	Year 1-2	Likely
Cost-benefit review of remedial options	Environment Agency	as above	Public confidence that the issue is being addressed and appropriate solutions considered.	Potential capital cost of remediation options. Public reaction if the cost-effective solution is "do nothing".	Years 2-5	Probable

Enhancing biodiversity

Biodiversity, the variety of life on earth, is known to be declining at an alarming rate. In the UK alone, more than 100 species are believed to have become extinct this century and many wildlife habitats have been destroyed or degraded.

The Government's contribution to maintaining and enhancing biodiversity is being delivered at a national level through the UK Biodiversity Action Plan (BAP), published in 1994. This publication identifies and sets targets for those species and habitats considered both rare and in decline. The Agency is the contact point for chalk rivers and for the following 12 species:

- water vole* *(Arvicola terrestris)*
- otter* *(Lutra lutra)*
- vendace *(Coregonus alba)*
- white-clawed (native)/Atlantic stream crayfish* *(Austropotamobius pallipes)*
- southern damselfly *(Coenagrion mercuiale)*
- depressed river mussel *(Pseudonodonta complanta)*
- shining rams-horn snail *(Segmenta nitida)*
- little whirlpool rams-horn snail *(Anisus vorticulus)*
- glutinous snail *(Myxas glutinosa)*
- freshwater pea mussel *(Pisidium tenuilineutum)*
- river jelly lichen *(Collema dichotomum)*
- ribbon-leaved water plantain* *(Alisma gramineum)*

The Agency also has a key role to play in the conservation of the following priority biodiversity species and habitats

- bittern*
- aquatic warbler*
- great crested newt*
- marsh fritillary*
- twaite shad*
- allis shad*
- bats*
- pearl mussel
- reedbeds*
- fens*
- coastal and floodplain grazing marsh*
- standing open water*
- rivers and streams*
- canals*
- mesotrophic lakes
- wet woodland*
- eutrophic standing water
- aquifer fed and naturally fluctuating water bodies

* indicates species and habitats for which conservation action is required and which occur in the Severn Vale area

Biodiversity will be a key indicator of the successful implementation of sustainable development in the plan area. The National BAP targets will be delivered locally at a county level and facilitated by environmental organisation, including the Agency and local authorities.

The following are our national aims as detailed in *An Environmental Strategy for the Millenium and Beyond.*

We will:

- Play a full part in implementing the EC Habitats' Directive;
- Play a full and active part in delivering the UK's Biodiversity Action Plan by acting as the "contact point" for the chalk rivers plan, and for 12 species of aquatic animals and plants, including the otter, the water vole, and rare species of fish, and by acting as the "lead partner", either singly or in collaboration with others, for 10 of them;
- Ensure that all aspects of the Biodiversity Action Plan are incorporated into the Agency's guidance and become part of its Local Environment Agency Plans;
- Implement a series of regional projects, in partnership with local conservation groups, to deliver biodiversity targets at specific sites;
- Allocate specific resources to conservation projects aimed at increasing biodiversity;
- Control eutrophication, where feasible, in order to enhance biodiversity.
- Improve the management of wetlands for conservation purposes;
- Use and promote best environmental practice for the protection and restoration of river habitats;
- Develop and set conservation criteria for all of the Agency's environmental licensing activities;
- Implement specific projects to restore habitats in rivers and lakes, increase the area of reed beds and other water plants, and improve river banks;
- Ensure that there is no deterioration in the quality of the aquatic environment in particular, and delivery significant improvements in river and still water quality by tackling diffuse pollution of them; and
- Carry out research into the management of species in the aquatic environment in order to meet fully all biodiversity action plan targets.

Issue 25 Managing SSSIs, RAMSAR sites, SPA and the proposed SAC

Sites of Special Scientific Interest (SSSIs) are nature conservation areas identified by English Nature as being of national importance. There are some 43 water dependent ones in the Severn Vale area. The Environment Agency works with English Nature, landowners and others to protect and enhance these sites. For example, the Agency uses its abstraction licensing powers and policies to protect them from adverse changes in water levels.

However, some of the water dependent Sites of Special Scientific Interest have suffered from low water levels. In some cases the effects are principally due to the drought of recent years, but in many cases this has merely exacerbated another specific problem. Several sites are being affected by abstraction for public supply under Licences of Right. Others are being affected by changes in agricultural practices which have led to an increase in abstraction for irrigation and increased land drainage, which are gradually changing the overall hydrological system. Others may be affected by poor water quality.

It is a MAFF requirement that drainage authorities prepare Water Level Management Plans (WLMPs) for water dependent SSSI, identified by English Nature. The plans are to be prepared by the appropriate operating authority. The Environment Agency is deemed to be the operating authority for sites on or controlled by main rivers. Elsewhere that responsibility falls to Internal Drainage Boards, local authorities or landowners. Eight sites have been identified within the Severn Vale area, five of which are having WLMPs prepared for the Environment Agency.

Who is involved?

Environment Agency, English Nature, Wildlife Trusts, local authorities water companies, other abstracters, dischargers and landowners

What is happening already?

The Habitats Directive requires the Agency to review all authorisations, affecting SACs and SPAs (SSSIs of European Importance). National Guidance has been produced and the process has started.

The Agency commissioned hydrogeological assessments of wetland SSSIs in the Midlands Region which looked at their vulnerability to groundwater abstraction. Some were carried out by Aspinwalls in 1995 and the others by water management consultants in 1998.

A pilot scheme is being carried out on one wetland SSSI in each of the areas of the Midlands region installing any required water level monitoring equipment. The work on Ashmoor Common in this area will help tell us what needs to be done in a monitoring strategy.

The Agency published 'A price worth paying' in May 1998, which lists our proposals for water company environment programmes for 2000-2005. This identifies SACs, SPAs and SSSIs affected by water company abstractions. Of the seven sites within the Severn Vale area, only Ashmoor Common was seen as a probable problem with action and monitoring required. Severn Ham and Ashleworth Ham are described as having a possible problem and monitoring as required. Frampton Pools, Walmore Common and Aileshurst Coppice are seen as having no problem from water company abstractions.

A joint national English Nature/Environment Agency report listing Action Priority Categories and Vulnerability Assessments for a number of wetland SSSIs is to be published shortly. This supersedes the English Nature report on "Impact of Water Abstraction on Wetland SSSI's" published in August 1996. The independent "High and Dry" report by the Biodiversity Challenge Group (RSPB, FoE, WWF, Wildlife Trust etc 1997) still stands although much of its content will be repeated in the new English Nature/Environment Agency publication.

Whilst SSSIs and European sites are our best sites there are many other wetlands that are important for nature conservation, many of which are designated as key wildlife sites or SINCs by the local wildlife trust. The Environment Agency paid for a re-survey of previously known wetland sites in Worcestershire this year.

The Environment Agency investigates sites that are reported to be drying out to see if the cause is specific activities such as abstractions or impoundments. Where possible, the Agency negotiates with abstracters to arrange appropriate measures to reduce the effects on the site, for example by providing water from a new or existing bore-hole or from surface waters, or by recycling water into the site. Where the abstractions or impoundments are illegal, action is taken to stop them. The Agency has developed local licensing policies to give special protection to the most sensitive areas, including Sites of Special Scientific Interest.

Objectives

- Play a full part in implementing the EC Habitats Directive;
- Play a full and active part in delivering the UK's Biodiversity Action Plan, acting both singly and in collaboration with others;
- Implement specific projects to restore habitats in rivers and lakes,
- Increase the area of reed beds and other water plants and improve river banks;
- Improve river habitat quality as measured by the river habitat surveys;
- Improve the management of wetlands for conservation purposes.
- Contribute towards the local BAP process delivered at county level

Proposals for action

Actions	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Agree regional monitoring strategy categorizing water-based SSSIs on the basis of their vulnerability	Environment Agency	English Nature Wildlife Trusts Landowners	Prioritise action	Cost	Year 1	Certain
Review existing consents on sites of European importance for nature conservation principally: Walmore common SPA and RAMSAR and the Severn Estuary RAMSAR, SPA and proposed SAC.	Environment Agency	English Nature other conservation organisations local authorities, landowners	Legal requirement	Cost and lack of scientific data on which to make decisions	Years 1-2	Certain
Implement agreed actions from the even Water Level Management plans for which the Agency is responsible	Environment Agency	As above		Cost	Years 0-5	Likely
Survey wetland sites in Gloucestershire to identify losses and opportunities for enhancement.	Environment Agency	Wildlife Trusts English Nature, local authorities, landowners RSPB	Better able to carry out our regulatory duties and own work.		Years 0-5	Possible

Issue 26 Enhancing biodiversity

The decline in number, distribution and health of many species and habitats has been recognised internationally at the Rio Earth Summit in 1992 where the UK government signed the Biodiversity Convention. A national action plan on biodiversity was published and approved by the Government in January 1994. The plan identified national targets for species and habitats which need to be priorities for conservation action.

Who is involved?

The Biodiversity Action Plan process aims to include everybody from government and dedicated conservation organisations to businesses and the community. Key partners so far include the Environment Agency , English Nature, MAFF, wildlife organisations such as the Wildlife Trusts and the RSPB, local authorities, water companies, landowners, FWAG, National Trust, Forestry Commission, DETR, JNCC, Country Landowners Association (CLA), local Agenda 21 groups and the NFU.

What is happening already?

The Agency is working with local partner organisations to formulate and implement Local Biodiversity Action Plans (LBAPs) in order to identify local priorities and targets which can be fed into the LEAP

process. In Gloucestershire a Biodiversity Project Officer was appointed in December 1998 by the Gloucestershire Biodiversity Partnership and LBAPs will be produced in 1999. The Agency sits on the steering group; has contributed to the costs of a biodiversity project officer and sits on relevant habitat working groups. In Worcestershire, draft LBAPs have been produced and implementation should start in 1999. The Agency has contributed to the costs of a biodiversity project officer and sits on relevant habitat working groups.

The Agency has produced a Biodiversity Action Plan for Midlands Region, and will be working with others to implement the plan.

The Agency also has an extensive programme monitoring biological life in rivers and canals which includes information on target species, e.g. crayfish.

Along with English Nature and the RSPB, the Agency commissioned a study in 1998 which identified 18 target areas suitable for large-scale wetland recreation within the Severn and Avon Vales Natural Area. This year a pilot study is being undertaken on one of the sites, Longdon Marsh, and other interested parties have been invited to collaborate on any other potential sites.

Under the umbrella of the 'Severn Valley Wetlands Strategy' a large number of existing wetlands have been restored or created in the upper reaches of the Severn. We have identified a number of similar opportunities and needs in the lower reaches of the Severn which focus on restoration of existing but degraded wetlands such as old brickpits.

The Agency recognises the need to support activities already being undertaken and to undertake collaborative studies and projects wherever possible. All Agency input to its own activities and developments by others, on which the Agency is consulted, are considered in the context of biodiversity.

Objectives

- Play a full part in implementing the EC Habitats Directive;
- Play a full and active part in delivering the UK's Biodiversity Action Plan, acting either singly or in collaboration with others;
- Implement specific projects to restore habitats in rivers and lakes,
- Increase the area of reed beds and other water plants and improve quality of river banks as wildlife habitats;
- Improve river habitat quality as measured by the river habitat surveys;
- Improve the management of wetlands for conservation purposes

Proposals for action

Actions	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Promote collection of sound baseline data	Environment Agency	Wildlife Trusts, local authorities, English Nature	Identifies priorities for protection and enhancement	Cost Lack of resources	Years 1 & 2	Likely

Actions	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Identify key species vulnerable to deterioration in water quality.	Environment Agency	English Nature, MAFF	Target capital investment and water quality improvements	Cost Lack of resources	Years 2 & 3	Possible
Help develop and implement Local Biodiversity Action Plans in Worcestershire and Gloucestershire	Worcestershire Wildlife Trust Gloucestershire Biodiversity Partnership	Environment Agency, English Nature, Other key conservation organisations Local authorities Farming and land-owning organisations	Integrated and structured approach to help partners agree priorities and coordinate and record activities.	Large number of species and habitats Conflicting needs Lack of resources Cost	Years 1-5	Certain
Investigate and implement opportunities for restoration and re-creation of wetland habitats i)Severn and Avon Vale Wetlands Project ii)Severn Valley Wetlands Strategy	Environment Agency	RSPB, Wildlife Trusts. Local authorities	Contribute to national targets for habitats such as wet grassland	Large scale land-use change has to meet socio-economic needs of rural communities	Years 1-5	Likely
Support conservation and habitat creation for rare and threatened species eg:						
i)River Severn Otter Project ii)Assess status and distribution of water vole and water shrew populations.	Worcestershire Wildlife Trust Environment Agency	Environment Agency Wildlife Trusts Conservation organisations		Lack of resources		
iii) Promote the planting of verified native and local provenance black poplars in river corridors.	Environment Agency	Local authorities Conservation organisations	Extend range of declining native trees of great cultural and wildlife value	Large number of hybrid non-native specimens which look similar	Years 2-5	Likely

Managing freshwater fisheries

The Agency's long-term strategy for the maintenance, improvement and development of salmon, trout and coarse fisheries is being developed. Our visions is that all waters will be capable of supporting thriving fish populations and that everyone will have the opportunity to experience a wide range of good quality fishing. We will strive to maintain and improve the quality of a river's fisheries by effective regulation and enforcement and will measure our success by a commitment to a five-year rolling programme of survey work.

The following are our national aims as detailed in *An Environmental Strategy for the Millenium and Beyond.*

We will:

- Secure a more robust funding base for fisheries management by improved marketing and the setting of fair charges to anglers;
- Review the economic basis of fisheries management;
- Introduce a standard fisheries classification scheme;
- Monitor every river fisheries over a five year rolling cycle;
- Restore spawning grounds for freshwater fish;
- Tackle mine-water pollution at the head of streams to improve spawning grounds;
- Implement a programme of minimum acceptable flows for rivers;
- Develop specific longer-term strategies for salmon, trout and coarse fisheries;
- Reduce poaching to a minimum and bring rod licence evasion to under 10%;
- Consider the likely costs and benefits of fixed penalty fine schemes for rod licence offences;
- Consider the desirability of introducing mandatory rod licence display systems; and
- Research into the factors which affect the viability of our unique freshwater fisheries populations.

Issue 27 Elver fishery - management of the fish stocks and operation of the fishery

Elvers have been considered a great local delicacy for many centuries and have traditionally been caught from the bank using a hand net. At times, over the years, fishing for and/or the sale of elvers has been prohibited by law, or a closed season has been in force.

There has been concern in recent years over the decline in elver catches on the River Severn as compared, for example, with catches taken in the 1970's. This in turn has caused concern that over exploitation of elvers may be occurring. This is because of the high price currently being offered by the elver buyers, which has resulted from the increased demand for available elvers. Consequently elver fishers are tending to fish longer and harder for comparatively small quantities of elvers. The increased incentive to fish for elvers has also resulted in increased numbers of licence holders, with competition on the bank for fishing places (tumps) and some allegations of aggression, damage to fences etc. and access to the bank without permission from the landowner.

The problem of low elver catches is not unique to the River Severn. Catches of *Anguilla anguilla*, the European eel, have been low throughout Europe and the Japanese eel fishery has collapsed, increasing the demand for elvers of the European eel in the Far East. Interestingly there have also been times in the past when elver catches have been low. For example the Severn Fishery Board Annual Report for

1916 states (in relation to the Severn elver catch) "but the numbers showed a great falling off as compared with 18 or 20 years ago".

Who is involved

The fisheries duty of the Agency in relation to eels and elvers is contained within a number of different Acts, the principal one being the 1975 Salmon and Freshwater Fisheries Act. The Agency has the responsibility to licence elver fishing and has the power to make bye-laws (with confirmation by the Minister), to protect, preserve and improve fisheries as outlined in the Act. The Agency seeks to balance the long standing exploitation of the fishery with the protection of the riverine and spawning stocks of the European eel. At present elvers can be taken legally by licensed fishers using a hand held tagged net of limited size fished only from the bank.

The Agency has no responsibility or legal powers for the control of trespass, access, damage to property or disturbance, nor is it responsible for regulation of boats navigating on the Severn. These matters are the responsibility of the landowner, police and British Waterways respectively. Neither is the Agency responsible for the purchase of elvers for resale and/or export, control of the elver stations or the legal or financial implications of non-declaration of income from fishing in relation to income tax or benefit fraud.

What is happening already

The Agency's fishery bailiffs carry out regular patrols both on the bank and by boat to check that elver fishers have licences and are fishing in a legal manner. For several years joint patrols have also been carried out with the police in order that some of the other issues referred to above could also be dealt with. The situation regarding access for fishing is still contentious, with some landowners stating that they own the fishing rights on their bank and may either charge for the right to fish or deny access to the fishers. This applies particularly upstream of the Gloucester Weirs and hinges on the legal debate as to ownership of fishing rights, the upstream limit of so called "tidal waters" and the public's right to fish in those tidal waters.

An independent group, the Salmon and Freshwater Fisheries Review Group is currently taking evidence, to examine the arrangements for the management, regulation and conservation of eel and elver fisheries, with the involvement of all interested parties and to advise on how best such arrangements may be regulated and funded.

The Agency has recently commissioned additional eel and elver research to provide further information about the decline of eels, which it can then act on.

Objective

The Agency's principal objective is to

- maintain, improve and develop eel and elver stocks (the basic fisheries resource) in order to optimise the social and economic benefits from their sustainable exploitation.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Boat & bank patrols	Environment Agency		Improved regulation of the fishery re licensing & illegal fishing methods.	Limited staff, limited budget & powers mainly under 1975 act	Year 0-1	Definite

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Joint patrols with the police	Environment Agency	Police	Ability to deal with other problems associated with the fishery but outside the powers of the Agency.	Other emergencies may result in re-scheduling of pre-planned patrol work.	Year 0-1	Likely.
Long term changes e.g. in exploitation &/or legislation	Environment Agency	MAFF DETR EU AIR	Conservation of the species & enhancement of the European eel fishery.	Politically difficult to balance the needs of the different interests.	Year 1-2	Aspirational

Issue 28 Climate change and salmon survival leading to concerns regarding the small populations of salmon in the River Severn catchment

There has been concern in recent years over the decline in salmon stocks in the Severn. This is, in fact, a problem which has been highlighted for the Atlantic salmon throughout its range and applies to rivers in North America as well as Europe. In June 1998 the North Atlantic Salmon Conservation Organisation (NASCO) received international scientific advice that stocks of larger, multi-sea-winter salmon were dangerously low, due largely to changes in ocean climate. Consequently the major causes of this problem are likely to be beyond the immediate control of the Environment Agency, though local actions to mitigate the effects are still possible.

Who is involved?

The fisheries duty of the Agency is contained within a number of different Acts: the principal one being the Salmon and Freshwater Fisheries Act, 1975. The Act applies to salmon, trout, freshwater fish and eels. The general duty of the Agency to maintain, improve and develop salmon fisheries is contained within the Environment Act, 1995. The Agency seeks to balance the long-standing exploitation of the fishery (both by commercial and rod fishers) with the protection of the spawning and juvenile stocks of the Atlantic salmon.

Through its connections with MAFF the Agency can seek to influence Government policy and European initiatives.

What is happening already?

The Agency is committed to producing river-specific salmon action plans for every principal salmon river in England and Wales by the year 2001. Such plans will address the issue of the lack of multi-sea winter fish. In the meantime the Agency have proposed national bye-laws aimed at improving the survival rate of these larger salmon, once they enter the river system. These bye-laws have still to be approved by the Minister and have resulted in large numbers of objections from fishers.

The Salmon and Freshwater Fisheries Review Group is currently taking evidence, to examine the arrangements for the management, regulation and conservation of salmon fisheries, with the involvement of all interested parties and to advise on how best such arrangements may be regulated and funded.

Objectives

The Agency's principal objective is to

- maintain, improve and develop salmon stocks (the basic fisheries resource) in order to optimise the social and economic benefits from their sustainable exploitation.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Promotion of catch-and-release Voluntary release of 'stale' salmon	Environment Agency	Salmon & Trout Association	Anglers still able to fish but improved number of fish surviving to spawn	Voluntary scheme only, may not be adopted.	Year 0-5	Definite
Promotion of national baseline bye-laws	Environment Agency	MAFF	Increased (legal) protection for multi-sea winter salmon	Financial impact on both commercial & rod + line fisheries	Year 0-5	Uncertain
Production of Salmon Action Plan for Severn & Estuary (to address the issue of the lack of multi- sea winter salmon)	Environment Agency		Conservation of the species and enhancement of the fishery where possible	Politically difficult to balance the needs of the different interests	Year 1-2	Likely
Long term changes e.g. in exploitation &/or legislation	Fisheries Review Group	MAFF, Environment Agency Salmon & Trout Association. NASCO	Conservation of the species and enhancement of the fishery where possible		Year 0-5	uncertain

Issue 29 Lydney Dock Development

Lydney Harbour was originally developed as a port for coal mining in the Forest of Dean. It ceased operation as a commercial port in the early part of this century and is now principally used as a base for Lydney Yacht Club. Lydney Harbour is owned by the Agency as a recreational site and premises at Lydney Dock are rented from the Agency by Lydney Yacht Club. The harbour has been subject to a legal agreement to purchase with a planning permission, for the development of housing on one part of the site since the 1980s. The sale has now been abandoned and the Agency is once again searching for an appropriate use for the site.

The harbour itself is a Scheduled Ancient Monument with the constraints such a designation imposes. It is also critically located in an area which provides flood storage for the River Lyd as well as being in the flood plain of the tidal Severn. In 1997, the existing flood defence was breached during the high September tides and resulted in the construction of a temporary dam on the site of the outer lock gates. The replacement of these emergency works with a permanent defence is now urgent.

The site is immediately adjacent to the Severn Estuary SSSI, RAMSAR site, Special Protection Area and proposed Special Area for Conservation, all of which are areas that are internationally important for nature conservation.

The site has considerable cultural and physical character to commend it and local people are keenly interested in the possibility of rejuvenating the area.

Who is involved

Lydney Town Council, Forest of Dean District Council, the Yacht Club, Gloucestershire County Council, English Heritage and the Agency.

What is happening already?

The Lydney Dock Partnership has been formed from the parties above. A study is currently being carried out to the brief of the partnership with the view of developing the site to its full potential. Any proposals identified will probably require substantial funding. It will be necessary to seek funding sources and to provide as much local resource as is possible to get such a project underway.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scales	Likeli-hood
	Lead	Other				
Investigate the potential for the rejuvenation of Lydney Docks	Lydney Docks Partnership		Cultural, recreational, environmental	Designations (SAM, SSSI etc) Flood plain location	Year 1	Certain
Produce an action plan	Lydney Docks Partnership		Plan of action	Lack of information	Year 1	Probable

Action	Responsibility		Benefits	Constraints	Time-scales	Likeli-hood
	Lead	Other				
Involve local people in the planning process.	Lydney Docks Partnership.		Ownership of project	Communication and timescale	Year 1	Probable
Seek funding to promote appropriate development	Lydney Docks Partnership		Rejuvenation of area	Timescale and availability of funding sources	Year 2	Aspiration

Issue 30 Managing environmental information – air quality, biodiversity and waste management

As a society we need to work towards the goal of sustainable development and according to the Government's sustainable development strategy we need to integrate the environment into decision making more generally if we are to achieve this goal. This includes decisions that are principally about economic or social issues such as employment, education, travel and purchasing. The Environment Agency collects substantial amounts of information about the state of the environment and our effects upon it to help us make decisions about issues such as whether to grant permission for an activity and what limits to set on that activity. The Agency is committed to:

- improving our knowledge about the state of the environment
- managing the information efficiently
- communicating about this with others.

Several of the issues in this Plan include measures to improve our knowledge about the current state of the environment. This issue focuses on how we manage the information and how we communicate it to others.

The Agency's strategy for wider dissemination of environmental information is still developing. This Plan forms part of that strategy and the Agency wishes to work with others, in particular, local authorities, Local Agenda 21 groups and schools to achieve better dissemination of information.

Who is involved

Environment Agency, local authorities, industry, Government agencies, everyone with information about the environment.

What is happening already

The Environment Agency has published national and regional information about the state of the environment, for example:

- Snapshot of the Environment in England and Wales
- Midlands Environmental Reference Book
- The Quality of Rivers and Canals in England and Wales.

The Agency is using new technology to help us manage and communicate information, for example by developing a Geographical Information System to help manage and interpret information. The Agency has established an Internet site at www.environment-agency.gov.uk which contains environmental information and is being developed further.

The Agency is working with others to undertake the Habitat Biodiversity Audit for Coventry and Warwickshire and manage this information on a Geographical Information System.

Objectives

These proposals will work towards achieving the following Environment Agency objectives to:

- tell people about environmental issues by educating and informing;
- be open and consult others about our work;
- base our decisions around sound science and research.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scales	Likeli-hood
	Lead	Other				
Implement a Geographical Information System in Lower Severn Area.	Environment Agency		More efficient management of information.	Staff and financial resources Dependent on National Programme.	Years 0-5	Likely
Explore opportunities to share information with other organisations.	Environment Agency		Better environmental information available for decision makers.	Staff and financial resources	Years 0-1	Certain
Develop and implement a strategy to make local environmental information more accessible to local people.	Environment Agency		Local people are better informed about issues and can take and influence decisions more effectively.	Staff and financial resources	Years 0-5	Certain

Issue 31 Promoting environmental awareness and understanding

Achieving sustainable development requires the integration of environmental considerations into all society's decisions. In order to do this more effectively everyone needs to have a greater awareness and understanding of environmental issues, the consequences of their own actions and the ways in which they can reduce their environmental impact.

Achieving greater environmental awareness and understanding requires the work and commitment of many organisations, and these are listed below in 'Who is involved'. Different parts of society have different needs for environmental information and this will need to be provided in different ways. The Environment Agency has an important role in this and has set itself six goals to:

- build positive partnerships through consultation, joint ventures and sponsorship;
- help educate young people through teaching aids and other initiatives;
- improve understanding of environmental issues, through links with education, work placements and an awards scheme;
- work with industry and produce marketing campaigns to promote prevention of pollution rather than its remediation;
- foster public awareness of environmental issues to encourage responsibility for the environment and its challenges;

- build on established and create new, international relationships to further global sustainable development.

Many of the proposals to tackle issues in this plan involve actions to promote awareness of issues and provide information about solutions. The proposals in this issue aim to draw together actions from other issues to form a co-ordinated programme of measures. It also includes measures by the Agency to promote awareness of its own activities and responsibilities to encourage people to use its services.

Who is involved ?

Environment Agency, local authorities, business, schools, colleges and other educational establishments, Government agencies, voluntary groups, media.

What is happening already ?

There are many initiatives being promoted by the many organisations involved in this field - too many to mention here. Perhaps the most important area of work promoting a wide range of environmental issues within the context of sustainable development is Local Agenda 21. Local authorities are promoting Local Agenda 21 initiatives which have resulted in the creation and support of many groups of local people working to raise awareness and achieve environmental protection and improvement. The Agency is working with these groups to address issues relevant to the Agency's activities. Local Agenda 21 is likely to have a central role in the Agency's strategy to increase environmental awareness.

To develop the education strategy and co-ordinate its implementation, the Agency has recently appointed an education officer for the Region and has Customer Contact teams in each of the four area offices. Local plans will be delivered, taking into account the different area needs, whilst working towards the overall aim of the national strategy. To add value, however, in the wider field of environmental education, it will be vital that the Agency has a co-ordinated approach and works in partnership with other organisations.

Eco-schools

This project encourages and acknowledges whole-school action for the environment. The scheme is managed by the Tidy Britain Group and promoted and supported by the Going for Green campaign. The Agency has made the following commitments:

- To train 15 assessors per region
- To promote the Eco-schools scheme

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scales	Likeli-hood
	Lead	Other				
Develop a local education strategy and establish partnerships to deliver it.	Environment Agency		Target actions, secure resources and strengthen partnerships.	Staff resources	Years 1 & 2	Certain
Promote Eco-school Project. Select and train an assessor to cover Severn Vale area.	Tidy Britain Group, Going for Green, Environment Agency		Encourages whole-school action for the environment	Resources	Years 0-1	Certain
Promote environmental enhancement and aftercare programmes in developments.	Developers, Local Planning Authorities, Agency, DETR, Landowners		Preservation and creation of habitats, discouragement of fly-tipping	Maintenance costs	Year 1-5	Certain

Issue 32 The potential impact of new development on the environment

The Severn Vale area is home to approximately 545,000 people and has significant town ands developed areas, such as Gloucester, Cheltenham and Avonmouth. The area is also under significant pressure to accommodate more housing, factories and the infrastructure to support them.

Local authorities plan the location of development in each of their areas through the land use planning system. The number of houses and amount of commercial land which each council needs to plan for is specified in Regional Planning Guidance issued by the Secretary of State for Transport, Environment and the Regions. Most of the area lies within Goucestershire South Gloucestershire and Bristol and is therefore within the South West region for planning purposes. However, small areas lie within Worcestershire and Herefordshire and are therefore in the West Midland region.

New development can have a wide range of impacts on the environment and the Agency advises planning authorities on some of these so that they can be taken into account when the local authorities are drawing up development plans or determining planning applications. The impacts in which the Agency is particularly interested are the potential for pollution of air, land or water, the effects on flooding, the demand for water, the generation of waste, and the impacts on some aspects of wildlife.

Who is involved?

Government Offices for the South West and for the West Midlands, planning authorities, the Environment Agency, landowners and developers.

What is happening already?

Local authorities are responsible for considering the potential environmental impact of development proposals and for allocating land for particular uses. In recent years there has been a shift in attitudes to address the issue of sustainable development through the planning system, and many authorities are working to achieve this. Our own recommendations complement this approach.

As a Statutory Consultee, the Agency continues work closely with the local planning authorities when they draw up their Development Plans. As a progression from this statutory involvement Agency officers have acted as a co-opted member of the Gloucestershire County Council Policy Panels working on the formulation of their Minerals and Waste Local Plans. In addition the Agency's current review of its input to the Town & Country Planning process is moving towards an increased emphasis on the Development Plan system.

The Agency is also consulted by planning authorities when they are determining individual planning applications.

Proposals for action

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Increase work with local authorities on development plans	Environment Agency		Assist local authorities to consider environmental issues earlier in the planning process	Staff resources	Year 1	Certain

Action	Responsibility		Benefits	Constraints	Time-scale	Likeli-hood
	Lead	Other				
Decrease the number of planning applications considered by clarifying the Agency's responsibilities as a statutory planning consultee with local planning authorities	Environment Agency	Local authorities	More time to contribute to development plans work	Local authority's desire for advice. Risk of environmental harm	Year 1	Certain

4.0 A better environment through partnership

4.1 Introduction

Our natural environment is complex. Even where we do have a good understanding of a particular element of the environment, what is often much less clear is how it interacts with all other aspects of the local, regional, national and global environment. It is becoming clear that even local environmental impacts can have knock on effects on other parts of the environment. It is this kind of understanding that led to the Rio Earth Summit in 1992, the adoption of Sustainable Development principles and the commitment to manage the environment in an integrated way through partnership.

The Agency is well placed to influence many of the activities affecting the environment through its own activities, and by enforcing the Environment Act 1995 and other legislation. However, achieving environmental improvement often depends on co-operation between the Agency and others. The Memorandum of Understanding between the Agency and the Local Authority Associations sets out how we will work with local authorities in protecting and improving the environment. It seeks to establish a framework to promote better integration of our work and ensure the best use is made of resources.

Photograph 4 Severn Beach

Partnerships will enable the key objectives and the long term vision of this LEAP to be realised. Implementation of the LEAP will involve the joint action of a number of organisations, such as local authorities, businesses, conservation organisations and community groups, as well as actions by the Agency.

4.2 Land use planning and LEAPs

4.2.1 Planning Liaison

The control of land use change is primarily the responsibility of Local Planning Authorities (LPAs), through implementation of the Town and Country Planning Acts. Local development plans provide a framework for land use change and are the key consideration in the determination of planning applications.

The Agency is a statutory consultee on development plans and certain categories of planning application. This allows the Agency's views to be considered by the Council prior to a planning application being decided or policies in a Development Plan being approved. Guidance regarding the

applications the Agency would wish to see is contained in our publication *'Liaison with Local Planning Authorities'* (Environment Agency, March 1997). An annex to this document, *'The Environment Agency and Development Plans'*, is being published shortly.

4.2.2 LEAPs

In addition to providing objectives for improving the local environment, LEAPs set out problems, issues and actions within the plan area, providing an important source of information to Local Planning Authorities. This is recognised in RPG II *'Regional Planning Guidance for the West Midlands'* (Government Office for the West Midlands September 1995), which indicates that LEAPs (as successors to Catchment Management Plans) should also be taken into consideration by Local Planning Authorities when preparing Development Plans. Similarly, the Agency considers Development Plans and liaises with Local Planning Authorities when preparing LEAPs. The following table shows the current status of development plans :

Local Planning Authorities and Development Plans

Local Authority	Percentage of Severn Vale Area	Population Estimated in Severn Vale Area	Development Plan and Current Status
Bristol City Council	1%	6,580	
South Gloucestershire Council	9%	26,300	South Gloucestershire Local Plan - Consultation Draft Minerals Local Plan – Consultation Draft.
Former Avon County Council	10%	32.900	Joint Replacement Structure Plan Public Inquiry March 1999
Stroud District Council	23%	105,400	Stroud District Local Plan - Consultation Draft.
Gloucester City Council	1.5%	104,800	City of Gloucester (Pre and Post 1991 Boundary Extension) Local Plan – Modifications.
Cheltenham Borough Council	1.5%	106,700	Cheltenham Borough Local Plan – Adopted December 1997.
Cotswold District Council	7%	2,360	Cotswold District Local Plan – Modifications.
Forest of Dean District Council	26%	58,300	Forest of Dean Local Plan – Adopted 1996.
Tewkesbury Borough Council	10%	72,200	Deposit Draft.
Gloucestershire County Council	69%	449,760	Structure Plan - Second Alteration. Inspectors Report awaited. Minerals Local Plan – Consultation Draft. Waste Local Plan – Project Brief.
Malvern Hills District Council	20%	61,660	Malvern Hills District Local Plan Adopted January 1998.
Wychavon District Council	negligible	200	Wychavon District Local Plan. Adopted January 1998.
Worcestershire County Council	20%	61,860	Structure Plan – Project Brief.
The County of Herefordshire District Council	1%	500	Unitary Plan – Project Brief
Hereford & Worcester County Council	21%	62,360	Structure Plan - Second Alteration. Adopted March 1993. Minerals Local Plan – Adopted April 1997.
TOTAL	100%	545,000	

4.3 Partnerships with other groups

There are a number of joint initiatives with local authorities and other groups that have already been undertaken or are in progress.

4.3.1 Local Agenda 21

Agenda 21 was one of four main agreements signed at the Earth conference held in Rio de Janeiro in 1992. It is intended to be a:-

- "Comprehensive programme of action needed throughout the world to achieve a sustainable pattern of development for the next century".

In 1994 the Government produced a national sustainable development strategy and action plan for the UK. This is an environmental action plan for the next century, which recognises the central role of local authorities, the value of partnerships and the local community in achieving sustainable development.

At the local level, most local authorities are working with local communities to produce their own Local Agenda 21 programmes. It reflects the idea of thinking globally, acting locally. A Local Agenda 21 Action Plan has been drawn up in Hereford and Worcester, and working groups have been established to implement the actions identified.

Vision 21, the Local Agenda 21 project in Gloucestershire published "Sustainable Gloucestershire – the Vision 21 handbook for creating a brighter future" in 1996, and working groups have been established to convert the visions contained in that document into actions.

As members of steering groups and working groups, we will advise, provide information and facilitate action where practical.

4.3.2 Biodiversity Action Plans

The UK Biodiversity Action Plan published in 1994 sets out the broad strategy for conserving and enhancing wild species and wildlife habitats in the UK for the next 20 years. The stated overall goal is to 'conserve and enhance biological diversity within the UK and to contribute to the conservation of global diversity'. Biodiversity will be a key indicator of the successful implementation of sustainable development in the Severn Vale area.

At a local level, local authorities and environmental organisations, including the Agency, are compiling Biodiversity Action Plans (BAPs) which will include targets for specific habitats and species (14 of which are relevant to this LEAP area see Issue 26).

It is crucial to the success of the BAP process that a comprehensive ownership is achieved in a realistic timescale. The Action Plans should not only be the vision of participating organisations, but be shared by others throughout each county. Plans will not be achieved unless landowners, farmers and managers are involved in the decision-making process so wider community involvement is encouraged.

4.3.3 Waste Minimisation

The key objective for a more sustainable waste strategy is to minimise the amount of waste produced and to minimise the pollution from waste management activities. The Agency is promoting waste minimisation through Waste Minimisation Clubs, our own activities and by partnership with local

groups. In addition there is promotion of best practice in waste management and special waste regulations.

Within the Severn Vale area a number of initiatives exist to promote better resource management through partnership:

- Gloucestershire Waste Minimisation Initiative which provides guidance and assistance to industry in managing resources in a more sustainable way.
- Hereford and Worcester Waste Minimisation Group is a partnership between the Environment Agency, Hereford and Worcester Business Link, Beacon Waste Ltd and Hyder plc.
- Sustainable Business in Action (SABINA) encourages participating businesses to spread the waste minimisation message along the supply chain.
- North Wessex Area 'Industrial and Commercial Waste Minimisation and Recycling Directory'.

4.3.4 Pollution prevention projects

Oil care campaign
Waste oil can cause pollution to land and water through soil contamination and leaching into groundwater or rivers. In an effort to promote best practices for oil disposal, the Agency has funded a variety of campaigns to encourage people to take their waste oil to designated centres for recycling and proper disposal.

Work with Fire Services
The Agency works closely with the Fire Services in providing a first line of pollution prevention service.

The Fire Services are normally first on the scene at road traffic accidents and other major industrial accidents including chemical spillages. This gives them a unique opportunity to deal with any potentially polluting spillages before they reach a watercourse. The Fire Services have agreed to undertake this role where practicable and the Agency has provided training and pollution prevention equipment such as oil absorbent materials and sealants.

The Fire Service immediately notifies the Agency of any potentially polluting spillages or significant fires so that Agency staff can be on site to give advice when required and to deal with any necessary follow up actions.

Industrial estates
We are aiming to work with companies particularly in the building and construction industry to offer advice on how to minimise the impact of their work on the natural environment.

4.3.5 Raising awareness of water resources

Since 1990 the country as a whole has suffered some of the most sever droughts of the century. The last two years have been the driest for two centuries. Compounding the problem is the steadily rising demand for water. Each of us today uses between 140 and 190 litres of water daily. With a population rise predicted in the Severn Vale area and the construction of more houses proposed, public demand is increasing. Some predictions suggest that if demand in not managed each of us will use a third as much water again by 2020. The Agency is committed to raising awareness and encouraging wise and efficient use of water.

The Agency controls abstraction by issuing licences and enforcing licence restrictions when river levels are low, but is also working pro-actively with licence holders, particularly within the farming community to ensure effective use of water through irrigation scheduling and soil moisture

measurement. Farmers are encouraged to invest in winter storage reservoirs that enable them to abstract water during less critical periods of the year.

The Agency is also working alongside water companies and OFWAT to promote measures to manage public demand. This joint approach relates to various areas where reduction in demand can be achieved, thus enabling reduction in abstraction. The main areas of activity are:

- Education and information eg. roadshows, high street displays, school guides, gardening tips, help lines;
- Promotion of water efficient appliances eg. Low flush or dual-flush WCs, water efficient washing machines and dishwashers, trigger gun sprinklers, water butts;
- Promotion of low-cost retro-fit water-saving devices eg. Hippo bags in cisterns, low flush showerheads, sprinkler exchange schemes;
- Water audits eg. washer replacement schemes, fitting hippos, fitting urinal controllers, installing waterless urinals, water use surveys;
- Promotion of water recycling and re-use eg. grey water recycling systems, re-circulation systems, water butts;
- Waste minimisation scheme eg. industrial process audits, waste minimisation clubs.
- Leakage reduction programmes eg. active leak detection and repair, refurbishment and renewal programmes for supply pipes, communication pipes, distribution mains, service reservoirs, raw water mains and reservoirs, installation of pressure reduction systems.

These activities are co-ordinated by the Environment Agency's Demand Management Centre at Worthing in conjunction with regional co-ordinators.

4.3.6 Conservation, recreation and other collaborative projects

The following are projects between the Agency and many partners including English Nature, Wildlife Trusts and local authorities, and are being undertaken within the Severn Vale area:

- Severn Valley Wetlands Project
- Severn Way footpath
- Rural Initiative Fund. The Agency contributes in a small way to the Gloucestershire Rural Initiative Fund. Projects supported include habitat creation, parish mapping, and energy and water efficiency measures in Village Halls.

4.4 Education

One of our key objectives for environmental protection and improvement is education. Damage is often caused, not through malicious intent to harm the environment but through a lack of awareness. Therefore we feel we need to have a greater involvement in education at all levels. The Agency's education strategy 'Green Shoots' (1997) considers environmental education into the next century.

Our goals are to:

- Build positive partnerships through consultation, joint ventures and sponsorship;
- Help educate young people through teaching aids and other initiatives;
- Improve understanding of environmental issues, through links with education, work placements and an awards scheme;

- Work with industry and produce marketing campaigns to promote prevention of pollution rather than its remediation;
- Foster public awareness of environmental issues to encourage responsibility for the environment and its challenges;
- Build on established and create new international relationships to further sustainable development; and
- Increase awareness of more efficient waste disposal and avoidance of litter.

A Regional Education Co-ordinator has been appointed to translate these goals into actions at a regional level and consider the educational needs of the areas.

CREST Awards

CREST Awards have been running, since 1986, with over 100,000 students participating to date. The aim of the scheme is to educate young people to equip them to make informed judgements about future environmental decisions. The Environment Research Challenge, sponsored jointly by the Agency, the National Environment research Council and Unilever, was trialed in 1997 and launched in March 1998. The aim is to involve and reward young people as researchers in projects linked with their local environment. Challenges encompass eight subject areas – Natural Resources, Biodiversity, pollution, Waste Management, Global Change, Energy, Environmental Risks and Hazards, and Environmental Impact, although these are not exclusive.

The awards are aimed at students from 10 years upwards, and accreditation can be gained at one of four levels – bronze, silver, gold and platinum, depending on the hours of work involved in the project. The awards complement the National Curriculum in a number of subject areas and can be accredited and profiled for personal records of achievement. The Platinum Award has been credited by the Open University.

The Agency can support the scheme in a number of ways:

- Provide mentors for students undertaking challenges at the gold and platinum levels;
- Provide opportunities for student placements at gold and platinum levels, linking challenges with the needs of the Agency;
- Lend and supply equipment (subject to Health and Safety Guidelines);
- Provide information for studies on request; and
- Promote the scheme via Agency events.

A further educational scheme involving the Agency is Eco-schools a scheme which is managed by the Tidy Britain Group, and promoted and supported by the Going for Green campaign. The Agency's commitment is:

- To train 15 assessors per region
- To promote the Eco-schools scheme

The production of this LEAP is one step towards increasing the accessibility of information about the local environment. Many of the projects mentioned above, have helped and are helping to raise awareness of the issues facing our local environment. However, more needs to be done and we all have a role to play in making this happen.

The Agency has produced a wide range of leaflets and educational material and most of this information is free of charge and available from the Customer Services Team at our area Office.

Some of the leaflets produced are listed in Appendix 6. Information is also available on the Internet at our web site.

Some useful numbers are listed below:

Internet World Wide Web	www.environment-agency.gov.uk
ECOfacts[SM] 'fax back' Service	0881 88 22 88

Environment agency national phone lines:

General enquiry line	0645 333 111
Flood warning information	0645 88 11 88
Lower Severn area office	01684 850951

Information exchange and education is a two way process. Please help us to protect the environment by reporting environmental incidents and emergencies on our:

Emergency hotline	Freephone	0800 80 70 60 open 24 hours a day

Appendix 1 Duties, powers and interests of the Environment 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 our work is advisory, with the relevant powers resting with other bodies such as local authorities, for example we are not responsible for:

- noise problems (except if it is to do with our work)
- litter (unless it is restricting the flow of a river)
- air pollution arising from vehicles, household areas, small businesses and small industry
- collecting waste in your local area
- planning permission
- environmental health
- food hygiene

These are all dealt with by local authorities who will contact us if necessary.

We are not responsible for the quality or supply of drinking water at the tap or for treating sewage waste, although we regulate discharges from sewers and sewage treatment works.

The following table summarises our duties, powers and interests.

Water Resources: The Agency has a duty to conserve, redistribute, augment and secure the proper use of water resources.		
The Agency has powers to:	**The Agency has an interest (but no powers) in:**	**Partnership**
• 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. • Secure the proper use of water resources through its role in water-resources planning, the assessment of reasonable need for abstractions and promotion of more efficient use of water resources. • Monitor and enforce abstraction and impoundment licence conditions.	• 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.	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.
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, development or construction of a structure that would affect the flow of an ordinary watercourse (Water Resources Act, 1991 Section 109, 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 warning relating to main river to the public, local authorities and the police. • Consent mineral workings within 16 metres 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 or 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. •Prosecute polluters and recover the costs of clean-up operations.	• The control of runoff from roads and highways. This is a Highway Agency duty. •_The greater use of source-control measures to reduce pollution by surface-water runoff. • Prevention and education campaigns to reduce pollution incidents.	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.
Air Quality: The Agency has a duty to implement Part I 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 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 radio-active 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 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. •Suspended and revoke licences. •Investigate and prosecute illegal waste management operations	.•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 reuse and recycling and improve standards of disposal.
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 12 species and one habitat.	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 though the exercise of its water-management and pollution-control powers and duties.	• Direct protection or management of sites or archaeological or heritage interest. This is carried out by LPAs, 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.
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 bye-laws 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 Commission, the Sports Council, British Waterways and other recreational and amenity organisations to optimise recreational use of the water environment.
Navigation: The Agency has a duty to maintain and improve navigation.		
• Maintain river navigation. • Maintain and operate locks and associated weirs and sluices whilst providing access to these sites. • Provide services such as moorings and pump-out facilities. • Maintain navigation by a system of licensing. •Enforce navigation legislation.	• The management and operation of British Waterways navigations and other navigations within the region.	The Agency will work with British Waterways, navigation authorities and navigation users to improve navigations generally as valuable environmental, recreational, commercial and heritage resources.

Appendix 2 Routine work carried out by the Environment Agency

The Environment Agency has a number of roles and responsibilities which it fulfils to protect and improve the environment. These include:

Water Quality:

- consenting to and charging for discharges to rivers
- responding to pollution incidents
- prosecuting polluters
- sampling water quality
- carrying out biological and bacteriological surveys
- setting water quality targets
- protecting groundwater quality

Flood Defence:

- maintaining free passage of water by dredging, bank trimming and rubbish clearance
- identifying and constructing flood defence works
- forecasting and warning of flood situations

Water Resources:

- measuring rainfall, river flows and groundwater resources
- licensing water abstractions
- promoting water efficiency and conservation measures

Fisheries, Conservation and Recreation:

- surveying the health and numbers of fish populations
- rescuing fish in emergency situations
- regulating fisheries licences
- protecting and enhancing natural riverine habitats, including banks and floodplains
- promoting public access to rivers and the general enjoyment of the riverside

Planning:

- responding to planning application consultations
- promoting policies to protect and enhance the water environment in development plans
- ensuring that all development in or near rivers protects and enhances the water environment by issuing Land Drainage consents
- producing LEAPs to integrate the Environment Agency's work with activities being under taken by other organisations

Integrated Pollution Control:

- regulating air quality by operating Integrated Pollution Control (IPC) for certain industrial processes
- authorising prescribed processes and ensuring operators comply with the pollution prevention and control standards laid down
- making appropriate checks to ensure IPC authorisations are being complied with, investigating any complains and attending to serious pollution events
- regulating the holding, use and disposal of radioactive substances

Waste Regulation:

- licensing of waste management activities through the imposition of appropriate conditions
- supervision of licensed activities and the operation of enforcement procedures
- regulating and monitoring the movement of Special Waste i.e. those that are considered dangerous to life and require cradle to grave monitoring
- the Registration of Waste Carriers, Waste Brokers and activities exempt from licensing
- collecting of information about waste arisings and the preparation of a waste disposal plan
- promotion of Duty of Care

General:

- promoting rivers as valuable natural assets
- making information available through the Environments Agency's Public Register
- monitoring and enforcement action to ensure that all the above are implemented and complied with.

Appendix 3 River Quality Objective Significant Failures 1997

River Name	Stretch Name	RE CLASS (1997)	LTRQO (RE)	1997 Comment	Actions
Gloucester Sharpness Canal	River Frome to Sharpness Docks	RE3	RE2	Due to the effects of eutrophication in the canal.	The Gloucester Sharpness Canal was designated as a Sensitive Area (Eutrophic) in 1997. Phosphorus removal is required at Stanley Downton and Coaley STW by 2004.
Longhope Bk	Longhope STW to conf. with Westbury Bk	RE4	RE2	Poor quality recorded in 1995 due to very low river flows combined with the impact of the STW.	Longhope STW was included in the Area AMP3 submission.
Frome (North arm)	Ebley to conf. south arm	RE2	RE1	Due to the impact of Dairy Crest effluent.	Large discharge entering a RE1 stretch. Need to review the consent and the RQO.
Frome (Southern arm)	Stanley Downton STW to conf. north arm	RE4	RE3	Due to the impact of the discharge from Stanley Downton STW.	Stanley Downton STW to be improved in the AMP2 programme and also included in the area submission for improvements under AMP3.
Red Bk	Conf. with Huntley Bk to R. Leadon	RE4	RE2	Failure thought to be due to low flows.	Continue to monitor. Biological quality was grade a.
Preston Bk	Fb at Laddin Farm to R. Leadon	RE4	RE1	DO thought to be due to low flows.	Continue to monitor. Biological quality was GQA Grade B.
Kempley Bk	Whittocks End to conf. with Preston Bk.	RE4	RE1	Farm problems suspected.	A series of farm visits have been undertaken which will hopefully lead to improved farm practices and improved water quality.
Cam R	Coaley STW outfall to Waterend Farm	RE4	RE3	Due to Coaley STW discharge upstream.	Coaley STW identified as part of our AMP3 submission.
Coaley Bk	Tickshill-Hydegate Br to River Cam	RE3	RE1	Due to effect of farm run-off and discharges.	A series of farm visits be undertaken.
Ashleworth Bk	Wick Ridge St. to R. Severn	RE3	RE2	Suspect poor DO due to low flows	Continue to monitor.
Chelt R	Fb nr. Becketts Farm to R. Severn	RE5	RE4	Failure due to Cheltenham (Hayden) STW.	Improvements under AMP2 were finished in Autumn 1998.
Chelt R	M5 culvert to fb nr. Becketts Farm	RE5	RE4	Failures due to Cheltenham STW.	Improvements under AMP2 were finished in Autumn 1998.
Leigh Bk	Coome Hill to R. Chelt	RE5	RE2	Failure due to low flows, eutrophication and lack of dilution for effluents.	Continue to monitor.
Ripple Bk	Bow Bridge to R. Severn	RE5	RE2	This site is located in a ponded section of the Ripple Bk and so there is little movement of water, hence the low DO's. The site supports good biology.	No action planned.
Bushley Bk	0.5km ds of Horse Bridge to Mill Bk	RE3	RE2	Suspect intermittent farm pollutions, eutrophication and low flows.	To be investigated.
Pool Bk	B4209 bridge, Hanley Swan to R. Severn	RE4	RE2	Failure thought to be due to low flows.	Continue to monitor.
Pool Bk	Hanley Castle to B4209 br Hanley Swan	RE4	RE2	Due to a serious farm pollution incident.	Pollution prevention advice given.
Daniels Brook	U/S Brookthorpe to Glos./Sharpness Canal	RE3	RE2	This BOD failure only seems to occur in winter months. It may be due to intermittent farm pollutions	Carry out inspections to determine cause of pollutions

Appendix 4 National and European legislation

The Environment Agency's ability to act to maintain and, where necessary, improve the environment is dictated by National and European (EC) Legislation. The legislation imposes duties on the Agency that it must carry out. Other provisions take the form of powers that the Agency uses to fulfil its duties and meet its aims. This combination of duties and powers determines the broad allocation of effort and resource.

National Legislation

A summary of the most relevant legislation is given below:

- The Environment Act 1995
- Water Resources Act 1991
- Land Drainage Act 1991
- Salmon and Freshwater Fisheries Act 1975
- Police Act 1964 and the Police and Criminal Evidence Act 1984
- Environmental Protection Act 1990
- The Water Industry Act 1991
- Control of Pollution (Amendment) Act 1989

European Legislation

The Agency is responsible for enforcing some EC Directives. A directive is an item of legislation which is legally binding on Member States. A summary of the most relevant directives is given below:

- Dangerous Substances Directive (76/464/EEC)
- Freshwater Fisheries Directive (78/659/EEC)
- Surface Water Abstraction Directive (75/440/EEC)
- Urban Waste Water Treatment Directive (91/271/EEC)
- Nitrate Directive (91/676/EEC)
- Disposal of Waste Oils Directive (75/439/EEC)
- Waste Directive (75/442/EEC)
- Batteries and Accumulators Directive (91/157/EEC)
- Adapting to Technical Progress Directive (94/62/EEC)
- Packaging and Packaging Waste Directive (94/62/EEC)
- Incineration of Hazardous Waste Directive (94/67/EEC)
- List of Hazardous Waste Directive (94/67/EEC)
- Commission decision on the standard Consignment Note Referred to in Council Regulation (EEC (no 259/93 on Shipments of Waste (94/774/EC))

Appendix 5 Glossary

Abstract	To remove water from any source, either permanently or temporarily.
Abstraction	The removal of water from any source, either permanently or temporarily.
Abstraction Licence	An authorisation granted by the Agency to allow the removal of water from a source of supply. Statutory; section 38 Water Resources Act 1991.
Agenda 21	A comprehensive programme of world-wide action to achieve a more sustainable pattern of development for the next century.
Algae	Microscopic (sometimes larger) plants, which may be floating or attached. Algae occur in still and flowing water.
Algal Blooms	Rapid growth of phytoplankton in marine and freshwater which may colour the water and may accumulate on the surface as a green scum.
Ammonia	A chemical compound found in water often as a result of pollution by sewage and farm effluents. It is widely used to determine water quality. Ammonia can be toxic to fish.
Aquatic	Pertaining to the water environment.
Aquifer	A water bearing-stratum situated below ground level. The water contained in aquifers is known as groundwater.
Asset Management Plan	Water Companies Strategic Business Plans - initiated (eg AMP2) by OFWAT as part of the periodic review of water company charges.
Asset Survey	A periodic survey of flood defences on Main Rivers undertaken by the Environment Agency.
Augmentation	The addition of water to a watercourse under artificial control. Usually to "top up" low flows in summer by either groundwater pumping or via reservoir release.
Authorisation	A legal licence issued by the Environment Agency under the Environmental Protection Act 1990 for industrial processes which use or produce potentially polluting substances in significant amounts.
BAP	Biodiversity Action Plan
BATNEEC	Best available techniques not entailing excessive cost
Biodiversity	Diversity of animal and plant life.
Carbon Dioxide (CO_2)	Gas present in the atmosphere and formed during respiration, the decomposition and combustion of organic compounds (eg fossil fuels, wood etc). A greenhouse gas.
Catchment	The total area from which a single river collects surface run-off.
CIRIA	Construction Industry Research and Information Association
Coarse Fish	Freshwater fish other than salmon and trout.
Combined Sewer	Structure which carries both foul and surface water discharge
Confluence	The point at which two rivers meet.
Consent To Discharge	A licence granted by the Agency to discharge effluent of specified quality and volume. Statutory; Schedule 10 Water Resources Act 1991.

Controlled Waste	Industrial, household and commercial waste, as defined in UK legislation. Controlled waste specifically excludes mine and quarry waste, wastes from premises used for agriculture, some sewage sludge and radioactive waste.
Controlled Water	All rivers, canals, lakes, groundwaters, estuaries and coastal waters to 3 nautical miles from the shore, including bed and channel which may for the time being be dry.
Culvert	Channel carrying water across or under a road, canal etc.
Cyprinid Fish	Coarse fish belonging to the carp family, like roach, dace and bream.
DETR	Department of Environment, Transport and Regions
Diffuse Pollution	Pollution from widespread activities with no one discrete source.
Discharge Consent	See Consent to Discharge.
Ecosystem	A functioning, interacting system composed of one or more living organisms and their effective environment, in a biological, chemical and physical sense.
Effluent	Liquid waste from industrial, agricultural or sewage plants.
Eutrophication	The biological effects of an increase in plant nutrients - nitrates and phosphates - on aquatic ecosystems.
Fauna	Animal life
Floodplain	Land adjacent to a watercourse that is subject to flooding.
Flora	Plant life.
Gauging Station	A site where the flow of a river is measured.
General Quality Assessment (GQA)	Classification system for watercourses
Groundwater	Water which saturates a porous soil or rock substratum (or aquifer). Water held in storage below ground level.
Habitat	The locality or environment in which a plant or animal species lives.
HSE	Health and Safety Executive
Inert	Chemically un-reactive
Infiltration Drainage	A drainage system which allows water to seep into the ground rather than run-off the surface.
Internal Drainage Board (IDB)	Local Sovereign authority for drainage
Landfill	Site used for waste disposal into/onto land.
Local Agenda 21 (LA21)	The local implementation of Agenda 21 by Local Authorities
Main River	The watercourse shown on the statutory 'Main River maps' held by Environment Agency and MAFF. The Agency has permissive powers to carry out works of maintenance and improvement on these rivers.
Nitrate Vulnerable Zone	An area where nitrate concentrations in sources of public drinking water exceed, or at risk of exceeding the limit of 50 mg/l laid down in the 1980 EC Nitrate Directive, where farmers are required to limit the application of nitrates to levels laid down in the Code of Good Agricultural Practice (MAFF).

Nitric Oxide (NO)	Oxide of nitrogen (NO_x) produced by traffic and industry.
Nitrogen Dioxide (NO_2)	Oxide of nitrogen (NO_x) produced by traffic and industry.
Nutrient	A chemical essential for life.
OFWAT	Office of Water Services
Ordinary Watercourse	A watercourse not designated a Main River.
Oxides of Nitrogen (NO_x)	Associated with respiratory illness. NO_2 is a target pollutant in the UK National Air Quality Strategy.
PAH	Polycyclic Aromatic Hydrocarbon
Part A Processes	Complex industrial processes with the potential to cause pollution, regulated through Integrated Pollution Control by the Environment Agency.
Part B Processes	Less complex processes where emissions to air are regulated by local authorities.
Pesticides	Substances used to kill pests, weeds, insects, fungi, rodents etc which can have significant harmful environmental effects.
Phosphate	Salt of phosphoric acid used as fertilizer and in washing powders.
Prescribed flow	A flow set to protect lawful downstream users and the aquatic environment.
Reach	A length of river.
Recharge	Water which percolates downward from the surface into groundwater.
Renewable energy	Energy produced from resources that are unlimited or can be rapidly replenished eg. wind, water, sunlight, wave power or waste.
Riparian Owner	Owner of land adjacent to the river.
River Corridor	A stretch of river, its banks, and a varying amount of adjacent land that is affected by the presence of the river.
SAC	Special Area for Conservation
Salmonid fish	Game fish of the Salmon family, for example, trout and salmon.
SAM	Scheduled Ancient Monument
Sewage	Liquid waste from homes, businesses etc which is normally collected and conveyed in sewers for treatment and/or discharge to the environment.
Sewage Effluent	A liquid waste from sewage treatment works.
Sewerage	Means of conveying foul or surface water.
SME	Small and medium sized enterprises
Source Control	A collective term to describe the management of run-off at or near the point of impact of rainfall and before it reaches the traditional piped drainage and sewer system of urban areas.
SPA	Special Protection Area
Spray Irrigation	The watering of crops by spraying. Can have a high impact on water resources.
SSSI	Site of Special Scientific Interest. The best examples of the national heritage of wildlife habitats, geological features and landforms, designated by English nature and the Countryside Council for Wales.

	Statutory; notified under the Wildlife and Countryside Act 1981.
SUDS	Sustainable Urban Drainage Systems
Sulphur Dioxide (SO_2)	A gas which dissolves in water to give an acidic solution. It is an irritant when inhaled and may cause breathing difficulties. Emissions of SO_2 can lead to acid rain, affecting ecosystems and water quality. A target pollutant in the UK National Air Quality Strategy.
Trade effluent	Any effluent, except domestic sewage produced in the course of trade or industry, including agriculture, horticulture and research. Surface water run-off which is significantly contaminated by site activities constitutes trade effluent.
VOC	Volatile Organic Compound
Wetland	An area of low lying land where the water table is at or near the surface for most of the time, leading to characteristic habitats.

Appendix 6 Environment Agency leaflets and publications

Addressing the causes and effects of climate change

Climate Change In The Garden (Water Tolerant Plants)			

Regulating major industry effectively

Regulating Major Industries		General Fact Sheet On Our Duties	
Integrated Pollution Control – Introductory Guide		How to avoid it - pollution series	
Integrated Pollution Control And You			

Improving air quality

Solvent Pollution – How to avoid it			

Managing waste

What A Waste		Duty Of Care	
Special Waste Regulations – How They Affect You		New Packaging Regulations – How Do They Affect You?	
Classification Of Special Waste		Producer Responsibility Obligations	
Use Of The Consignment Note		The Registration Of Waste Carriers	
Obtaining And Sending Consignment Notes		Clinical Waste	
Waste Minimisation Good Practice Guide		Money For Nothing Your Waste Tips For Free	
Waste Regulation And You			

Managing water resources

Water Resources Fact sheet		Spray Irrigation	
Water Wise Are You Pouring Money Down The Drain?		Making The Most Of Your Spray Irrigation Abstraction Licence	
Water Abstraction Charges		Groundwater Protecting The Hidden Asset	
Water Abstraction Can Cause River Pollution		Groundwater Protection Zones	
Abstraction Licensing And Water Resources		Saving Water – on the right track	
Water Alert – Campaign For Water Conservation		Dowdeswell Water – A New Lease Of Life For The Reservoir	

Delivering integrated river-basin management

Leaps – Severn Vale And Warwickshire Avon		Managing Maize	
How To Avoid It Pollution Series		Masonry Bunds For Oil Storage Tanks	
Farm Waste Management Plans		Pollution Prevent Pays	
Farm Waste Minimisation		Nature's Way	
Oil Care Code		What's In The Water	
Pollution Prevention Guidelines (PPGs) 1-21		Water Quality Fact Sheet	
Building A Cleaner Future		Bathing Water Quality	
Water Pollution Incidents In England And Wales – Report Summary		Quality Of Rivers And Canals In England & Wales 1995	
Recovering The Cost Of Pollution		Recreation Sites (Midlands)	
Accreditation Scheme For Spill Response Contractors		Have Fun Have A Care – Information For Canoeists	
Assessing Water Quality		Enjoy Your Garden - Care For Our Environment	
Use Of Licences To Prevent Pollution		The Severn Way	
Ground Water Protection Zones		The Severn Bore And Trent Aegir	

Conserving the land

Flood Warning Information – What To Do If Your Property Is A Risk		Towards Urban Drainage Best Management Practice (SEPA)	
Flood Warning Information Hotline 0645 88 11 88 (Including The Dove, Tame And Upper Trent)		Urban Redevelopment for Industrial And Commercial Uses	
Schedule Of Main Rivers – Midlands Region		Protecting The Quality Of Our Environment – A Guide To Sustainable Development	
Living On The Edge – A Guide For Riverside Owners		Defying The Disaster	
Flood Defence Information Sheets 1 To 23		Safeguard The Environment – A Guide For Developers	

Flood Defence Fact Sheet		Policy And Practice For The Protection Of Floodplains	
Be Flood Aware (Poster)		Understanding Riverbank Erosion	
Application For Consent For Works Affecting Watercourses And/Or Flood Defence – Explanatory Notes		Contaminated Land Remediation	
Land Drainage Bye-laws			

Managing freshwater fisheries

Anglers And The Agency		Rod Fisheries Bye-laws	
Rod Licences		Useful Information For Angling Clubs	
Fishing Guide for Midlands Region		Fisheries Habitat Improvement	
Fisheries News (produced monthly)		Environments For Fish	
Buyers Beware – Your Guide To Stocking Fish		Water Plants Their Function & Management	
Freshwater Fisheries & Wildlife Conservation – Good Practice Guide		Management Of Specialist Stillwater Coarse Fisheries	
A Guide To Careful Salmon Handling			

Enhancing biodiversity

Rivers And Wetlands – Best Practice Guide		River Severn Otter Project	
Conservation – Work In The Midlands Region		Ponds And Conservation	
Mink		Pond Heaven – How To Create Your Own	
River Sowe Rehabilitation Project		Identifying Freshwater Invertebrates	
Conservation Designations		Blue-Green Algae	
Guidance For The Control Of Invasive Plants Near Watercourses		Hormone Disruption In Wildlife	
Wetland Creation/Management (3 Posters)		Phytophora Disease Of Alder	
Understanding Buffer Strips		River Life From Source To The Sea	

Business development

Warwickshire Avon LEAP		Severn Estuary Strategy	
Severn Vale LEAP		Planning & Acting For A Better Environment	
An Environmental Strategy For The Millennium And Beyond		A Snapshot - Environment Of England And Wales – April 1996	
Customer Charter		Complaints And Commendations	
A Guide To Information Available To The Public		Partnership In Environmental Protection	
Charging For Information		Recruitment Information	
A Better Environment For England And Wales		Action Plans For Each Of The Above Themes	
Emergency Hotline Card 0800 80 70 60		Environmental Services Directory	
Corporate Plan Summary Annual Report And Accounts		Environmental Policy For The Agency's Own Activities	
Agency Internet Site - Information Leaflet www.environment-agency.gov.uk		Managing Environmental Impacts Of The Agency's Own Activities	

Education

Activity Book For Primary Schools		Environmental Research Challenge (CREST award scheme)	
Earthworks Comic – 7 to 12 year olds		River Severn Newspaper Insert	
The Living Water Pack (Key stages 2 & 3)		Education Resources Pack (Key Stages 1 & 2)	
Pollution Prevention Pays Pack (Industry)		Building A Cleaner Future Pack (Industry)	
Green Shoots – The Agency Education Strategy		Animal Masks	

Regional and area facts

Midlands Region Map		Our Midlands Environment	
Midlands Environmental Reference Book		Area Maps And Fact Sheets	
Severn Bore And Trent Aegir		Regional Review And Forward Look - Midlands	
Environmental Issues In The Midlands			

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

ENVIRONMENT AGENCY