EA MIDLANDS LEAPS - Box 2

local environment agency plan

SEVERN VALE

ACTION PLAN

FEBRUARY 2000

ENVIRONMENT AGENCY


Severn Vale Local Environment Agency Plan Map 2
ENVIRONMENT AGENCY
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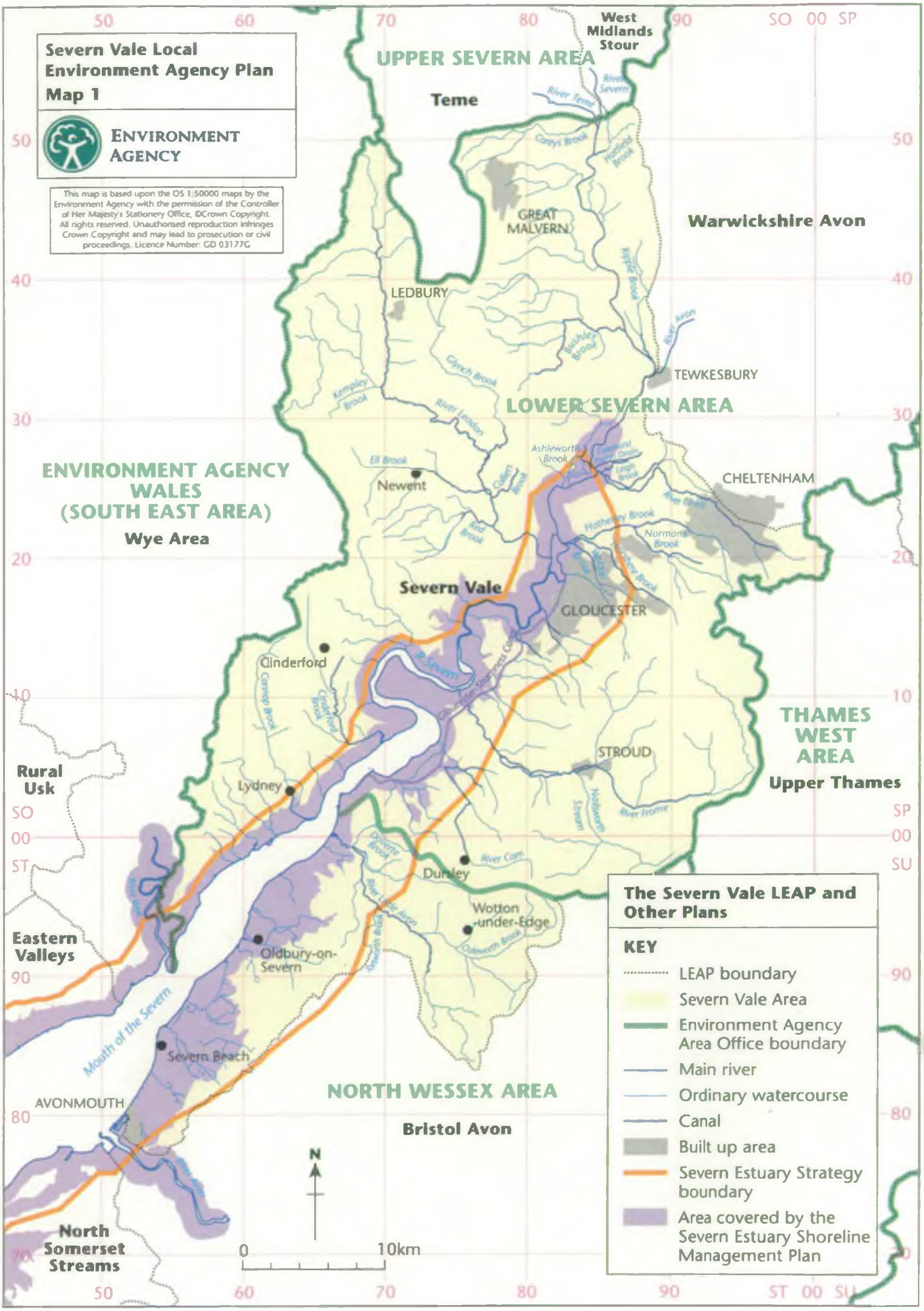
50 60 70 80 90 SO 00 SP
ST 00 SU
River Severn
Rhwnt Terns
Carey's Brook
Hatfield Brook
Wychavon
GREAT MALVERN
Malvern Hills
LEDBURY
WORCESTERSHIRE
HEREFORDSHIRE
Church Brook
Bushley Brook
River Avon
Hampton Brook
River Leadon
TEWKESBURY
Ell Brook
Newent
Isbourne
Tewkesbury
CHELTENHAM
Hatherley Brook
Cheltenham
Bird Brook
GLOUCESTERSHIRE
GLOUCESTER
Gloucester City
Cinderford
R.Severn
Gloucester-Sharpness Canal
Cotswold
Forest of Dean
Lydney
STROUD
Stroud
River Frome
Dursley
River Cam
SOUTH GLOUCESTERSHIRE
Wotton-under-Edge
Oldbury-on-Severn
Mouth of the Severn
Severn Beach
AVONMOUTH
CITY & COUNTY OF BRISTOL
N
0
10km
Local Authority Boundaries
KEY
Plan boundary
Main river
Ordinary watercourse
Canal
Built up area
County council/unitary authority boundary
District/borough council boundary
Land >400 feet


Severn Vale Local
Environment Agency Plan
Map 1
ENVIRONMENT AGENCY
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UPPER SEVERN AREA
Teme
West Midlands Stour
Warwickshire Avon
LOWER SEVERN AREA
ENVIRONMENT AGENCY WALES (SOUTH EAST AREA)
Wye Area
Severn Vale
THAMES WEST AREA
Upper Thames
Rural Usk
Eastern Valleys
North Somerset Streams
NORTH WESSEX AREA
Bristol Avon
GREAT MALVERN
LEDBURY
TEWKESBURY
CHELTENHAM
Newent
GLOUCESTER
Cinderford
Lydney
STROUD
Dursley
Wotton-under-Edge
Oldbury-on-Severn
Severn Beach
AVONMOUTH
Mouth of the Severn
R. Severn
River Avon
River Frome
10km
The Severn Vale LEAP and Other Plans
KEY
LEAP boundary
Severn Vale Area
Environment Agency Area Office boundary
Main river
Ordinary watercourse
Canal
Built up area
Severn Estuary Strategy boundary
Area covered by the Severn Estuary Shoreline Management Plan

Foreword

Welcome to the Environment Agency's local action plan for the Severn Vale area. This plan sets out the work that the Agency and others will carry out over the next five years to tackle those local environmental issues and problems that have been identified and can be addressed locally.

The document has been produced after extensive public consultation following the launch of the Severn Vale LEAP Consultation Draft in March 1999. We are grateful to the many individuals and organisations who responded at this stage. Their comments have allowed us to evaluate the issues raised in the Consultation Draft and refine them for this action plan. As a result of the consultation, four additional issues have been included in the plan. Three more issues have been included following renewed internal consultation within the Agency.

The progress of the plan will be monitored. Annual reviews will be produced and sent out free of charge to those who responded to the Consultation Draft, and to key partners and any other interested groups. The reviews will also report on changes in the local environment, new legislation and any new issues that arise.

The work of the Agency is increasingly being implemented through partnerships, as it becomes recognised that more can be achieved by working together. Many of the issues in this plan reflect the need for co-operation, bringing together the complementary responsibilities, powers and finances of different groups. Reducing the amount of waste produced by local companies, restoring and creating new wetland habitats, and providing an effective flood warning system all illustrate the need for collaborative working.

I am convinced that the implementation of this Action Plan will lead to improvements in the environment of the Severn Vale area. I hope you will find the action plan of interest. If you have any comments or wish to become actively involved in addressing the issues raised, we would like to hear from you.

Bill Forbes
Lower Severn Area Manager

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 an integrated and long-term approach to protecting and enhancing the environment. A sustainable environment is one where there is a balance between economic, social and environmental factors.

We will manage our activities and duties to address local concerns and promote environmental enhancements that are sustainable. The successful management of the local environment will also require us to respond effectively to the ever-increasing pressures exerted on it and to target resources where they are most needed.

The Environment Agency has developed the following set of objectives to clearly focus its efforts to achieve a better environment in the Severn Vale. They relate to our national objectives and to the powers and duties given to us by Government.

Our Key Environmental Objectives for the Severn Vale are:

- To achieve major and continuous improvements in the quality of air, land and water.
- To realise opportunities for the conservation and enhancement of natural resources, animals and plants.
- To control pollution and manage the river basin in an integrated way.
- To maintain, operate and improve protection against flooding from rivers and the sea, where appropriate, and continue to improve our flood warning service in flood risk areas.
- To improve recreational facilities along watercourses, including promotion of the Severn Way.
- To reduce the impact of waste management on the environment by encouraging the minimisation, re-use and recycling of waste, and by improving standards of waste disposal.
- To manage water resources and encourage their proper use in order to achieve the proper balance between society's needs and the environment.
- To work with other orgar
  reclaim contaminated lar
- To improve, develop and
  and freshwater fisheries.
- To educate and provide i
  the key to changing the
  individuals and industry.
- To work with local author
  the impacts of land use p
  environment.
- To have regard to the pro
  archaeological, heritage a
  features in carrying out ou
- To set priorities and work
  that society can afford.

We will achieve these objectives by:

- Being open and consulting with others about our work
- Basing our decisions around sound science and research
- Valuing and developing our employees
- Being efficient and business-like in all we do
- Regulating the activities of those who have a potential impact on the environment by setting and enforcing consistent standards.
- Setting an example by demonstrating best practice in our own activities
- Developing partnerships and securing the involvement of others
- Encouraging the prudent u
  resources

Tackling the issues in this plan will contribute to the achievement of these objectives. Some of these objectives compliment each other, whilst others may require a degree of compromise. Achieving sustainable development in the Severn Vale will require long term planning, careful balancing of priorities and the commitment of everyone who uses or manages the environment. By working together, we can make this vision become reality.

"Severn Noose" by Steve Hyslop

CONTENTS

Contents

3.0 Review of Public Consultation

4.0 A Better Environment Through Partnership

5.0 Actions

6.0 Future Review and Monitoring

7.0 Appendices

1.0 Introduction

This Action Plan is the second stage in the Local Environment Agency Plan (LEAP) process for the Severn Vale area, a process that commenced with the publication of the Consultation Draft LEAP in March 1999. The plan sets out a programme of work (see Section 5) to be undertaken by the Agency and others over the next five years and will form the basis for improvements to the environment in the Severn Vale. It also focuses on education and partnerships as a means of addressing wider, longer-term issues. Progress against the Action Plan will be monitored and reported annually.

1.1 The Environment Agency

The Environment Agency is one of the most powerful environmental regulators in the world. As 'Guardians of the Environment' we have legal duties to protect and improve the environment throughout England and Wales. The Agency was created through the 1995 Environment Act and started work on 1st April 1996. It inherits the many varied responsibilities of the National Rivers Authority, Her Majesty's Inspectorate for Pollution, the Waste Regulation Authorities, and some technical units of the former Department of the Environment.

The Agency has eight Regions in England and Wales, as shown on the back cover of this document. These are sub divided into twenty-six Areas. Most of the Agency's work operates at this local level, allowing an integrated and personal approach to managing the environment.

The Severn Vale catchment falls within the Environment Agency's Lower Severn Area (Midlands Region) and its North Wessex Area (South West Region), as shown in Map 1. Local Authority boundaries are shown in Map 2. These maps can be found inside the front cover of this document.

The Agency has a broad remit to protect, monitor and improve the environment in its widest sense, ultimately contributing to the goal of sustainable development. Our principal and immediate concerns are laid out in our national strategy, *'An Environmental Strategy for the Millennium and Beyond'*, and relate to nine themes, which represent the Agency's holistic approach to environmental management. A tenth theme focuses on improving the environment in partnership with others. These themes 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

The issues that have been identified in this plan have been grouped under these themes to demonstrate how efforts to solve local problems in the Severn Vale fit into our national environmental strategy.

The strategic nature of the LEAP as a planning tool means that it is not designed to reflect fully the routine activities that we carry out. Our everyday work commits substantial resources to managing the environment, including extensive monitoring and survey operations, responding to incidents, and regulating a wide range of activities that may pose threat to the environment or harm to human health. A summary of the Agency's principal duties is given in the box on page 2.

Duties of the Environment Agency

- Information: Monitor and report on the state of pollution and other aspects of the environment;
- Air Quality: Regulate industrial processes with the greatest potential to pollute so as to prevent or minimise pollution to the environment as a whole;
- Radioactive Substances: Regulate the disposal of radioactive waste and, except on nuclear licensed sites, the keeping and use of radioactive material and accumulation of radioactive waste;
- Waste Management: Regulate the management of waste, including the treatment, storage, transport and disposal of controlled waste so as to prevent pollution of the environment, harm to human health, or serious detriment to the local amenity;
- Water Quality: Protect, manage and, where possible, enhance the quality of controlled waters through powers to control, prevent or remedy pollution of water;
- Water Resources: Take any necessary action to conserve, redistribute, augment and secure the proper use of water resources;
- Flood Defence: Exercise a general supervision over all matters relating to flood defence, including powers to take certain flood defence measures as approved by Regional Flood Defence Committees;
- Fisheries: Maintain, improve and develop salmon, trout, coarse and eel fisheries;
- Navigation: Maintain or improve non-marine navigation in some parts of the country but not the Severn Vale;
- Contaminated Land: 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 economy and environment;
- Nature Conservation: Further nature conservation, wherever possible, when carrying out water management functions and promote the conservation of flora and fauna that are dependent on an aquatic environment;
- Recreation: Promote recreational use of the water environment;
- Landscape: Further landscape conservation and enhancement when carrying out water management functions and promote the conservation and enhancement of the natural beauty of rivers and associated land;
- Archaeology: Consider the impact of our activities upon archaeology and heritage, and implement mitigation and enhancement measures where appropriate.

1.2 The Local Environment Agency Plan Process

The Agency is committed to delivering environmental improvements at the local level. One of the ways it seeks to do this is through Local Environment Agency Plans (LEAPs). LEAPs are non-statutory action plans based on river catchments. They help to fulfil the Environment Agency's principal aim of contributing to sustainable development through integrated environmental management and improvement. They also play a role in:

- Prioritising the Agency's work through an action plan for managing and improving the local area over the next five years;
- Promoting openness and accountability;
- Developing closer links with the public, local communities and other organisations;
- Educating and informing the public on local environmental issues;
- Realising the environmental potential of the area;
- Forming joint actions and partnerships for environmental improvement.

This document transforms the proposals put forward in the Consultation Draft into agreed actions, taking into consideration those comments received through the consultation process. It will guide the Agency's activities in the area for the next five years and will hopefully influence the activities of other key bodies. Public participation in this Action Plan will increase awareness of environmental issues and it is hoped this will lead to involvement in, and a feeling of responsibility for, our local environment.

Regular monitoring and updating of the plan will be an integral part of the process. To this end annual progress reports will be published and the full consultation process will be repeated every five years.

Where more background information or greater detail on an issue is required, reference should be made to the Severn Vale LEAP Environmental Overview, available from our Tewkesbury office.

1.2.1 Leaps and Other Plans

The Agency shares the regulation and management of the environment with others. These include a wide range of statutory and non-statutory organisations, and our partnerships with some of these are discussed in Section 4. Whilst LEAPs are the Environment Agency's plans, their content and development reflect these shared responsibilities. LEAPs will complement other organisations' plans such as:

- Development Plans (see Issue 39)
- Waste Local Plans (see Issue 1)
- Local Air Quality Management Plans (see Issue 6)

They will also link with plans and strategies produced in collaboration with others, including:

- The Association of Severn Estuary Relevant Authorities (ASERA) Management Scheme for the Severn Estuary European Marine Site (see Issue 32);
- The Strategy for the Severn Estuary
- The Severn Estuary Shoreline Management Plan (see Issue 11).
- Local Biodiversity Action Plans (see Issue 33);
- Local Agenda 21 Strategies;
- Community Plans

(The areas within the Severn Vale that are covered by the Strategy for the Severn Estuary and the Severn Estuary Shoreline Management Plan are shown in Map 1).

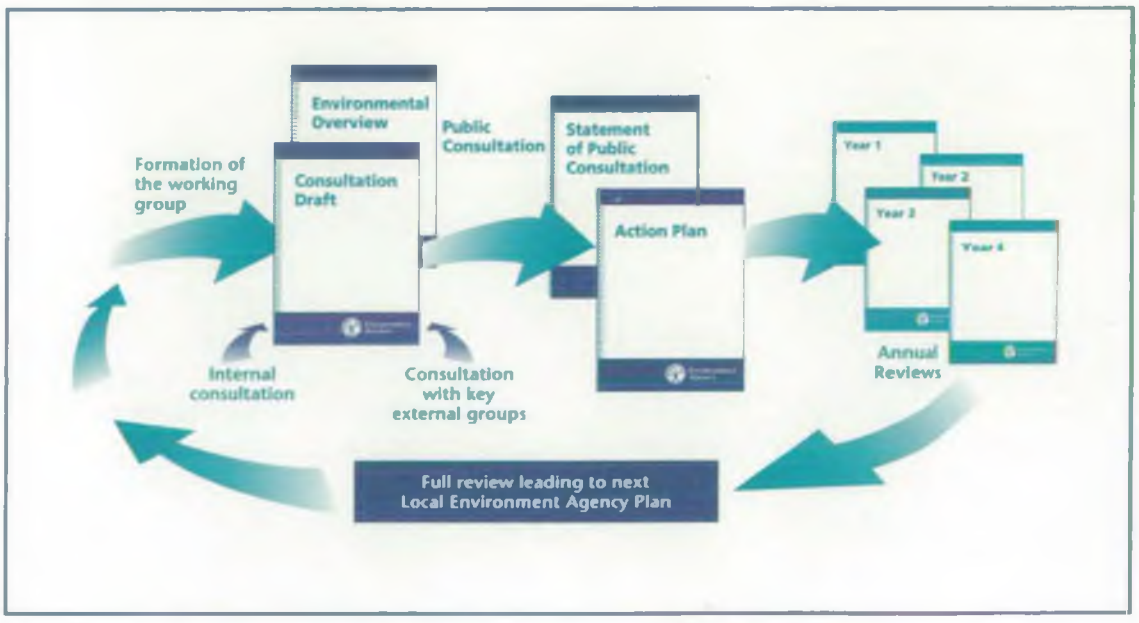


Figure 1: The LEAP process and main outputs in the five-year cycle.

Finally, LEAPs will compliment and further facilitate other Environment Agency Strategies and Plans.

The Severn Vale LEAP has been produced with these other plans in mind. Ongoing consistency between the LEAP and these plans will be ensured through the annual review processes.

Association of Severn Estuary Relevant Authorities (ASERA) Management Scheme

The Severn Estuary is designated a Special Protection Areas for Birds (SPA) under the EC Birds Directive, and a proposed Special Area of Conservation (SAC) under the EC Habitats Directive.

The Conservation (Natural Habitats & c.) Regulations 1994 (or 'Habitats Regulations') translate the Habitats Directive into UK law. These regulations make provisions for the development of a management scheme for the SPA and pSAC sites. The management scheme should aim to ensure maintenance or restoration of the site's natural habitats and species at or to favourable condition. This will require the review of all existing and proposed authorisations and any proposed works affecting the Estuary. In addition, any plans or strategies that may affect the Estuary must take in to account the Habitats Regulations.

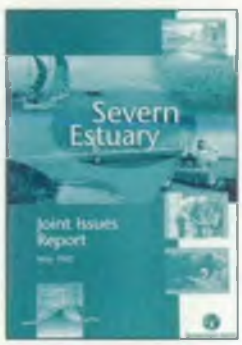
The Association of Severn Estuary Relevant Authorities (ASERA) has been formed by some of the organisations with relevant statutory responsibilities (i.e. Relevant Authorities) within the Estuary to establish a Severn Estuary European Marine Site management scheme. ASERA members include organisations such as Local Authorities, the Conservation Agencies (English Nature and the Countryside Council for Wales), Harbour Authorities, the Environment Agency and others.

The Severn Estuary management scheme will be the only estuary-wide scheme that has a statutory basis. However, the Estuary's status as a SAC is currently under review. ASERA is therefore developing a shadow management scheme until the status of the SAC has been decided by Europe.

The Severn Estuary Strategy

The Severn Estuary Strategy is an independent partnership involving and supported by Local Authorities, Government agencies (including the Environment Agency), industry and other organisations. The Strategy aims to develop a framework that will enable those who have an interest in the Estuary to work towards protecting and enhancing the environment of this unique area and equating this with social and economic improvements in the context of sustainable development.

The Severn Estuary Strategy and the Environment Agency produced a Joint Issues Report in May 1997, following public consultation on issues relevant to the Estuary. A draft *'Strategy for the Severn Estuary'* is currently being developed for public consultation. The strategy document and a regular review process will provide a strategic framework for management guidance throughout the next decade.



The Severn Estuary Shoreline Management Plan

The coastline of England and Wales has been divided into lengths, which form a series of "coastal cells". Each coastal cell boundary has been set to reflect the natural physical processes acting along that section of coast.

Coastal Groups have been formed with representatives from each Maritime Local Authority and other bodies (including the Environment Agency) who have an interest in managing the coastline. The Severn Estuary Coastal Group covers the coastline for this LEAP area as shown in Map 2. The main task of the Group is to produce a Shoreline Management Plan (SMP) for the Severn Estuary. The plan will provide a strategic framework for decisions on managing coastal defences, taking account of coastal processes, other environmental issues and human needs. The final report is expected in the Spring of 2000.

1.2.2 Statutory and Advisory Committees

In order to ensure openness, objectivity and accountability, the Agency is required by law to consult committees on all aspects of its work. Membership of these committees consists of local people drawn from public life, including Local Authorities, other regulatory bodies, industry, agriculture and recreational and environmental groups.

Three different statutory committees serve each of the Agency's regions:

- Regional Environment Protection Advisory Committees (REPACs)
- Regional Flood Defence Committees (RFDCs)
- Regional Fisheries, Ecology and Recreation Committees (RFERACs)

1.2.3 Area Environment Groups

Each of the Agency's 26 Areas is also served by their own advisory, non-statutory Area Environment Group (AEG). Membership consists of 20 local people who live or work in the Area and who represent a wide range of interests. Again, these include Local Authorities, other regulatory bodies, industry, agriculture, fisheries, and recreational and environmental interests. AEGs advise the Agency on LEAPs and the delivery of local services, and act 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 public. A list of current members of the Lower Severn or North Wessex AEGs and further information is available from our Area offices. A sub-group of the Lower Severn AEG, consisting of ten members, has been involved in the development of this LEAP.

1.3 Sustainable Development, Biodiversity and Global Climate Change

1.3.1 Sustainable Development

The Environment Agency is required and guided by the Government to use its duties and powers in order to help achieve the objective of sustainable development. Sustainable development, as defined by The Brundtland Commission, is:

> *"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs"*

The Government published a revised strategy for sustainable development for the UK, 'A Better Quality of Life', in 1999. The strategy is guided by 10 principles, as shown in the box below. The Environment Agency has a clear role within the strategy, in ensuring effective protection of the environment and the prudent use of natural resources. LEAPs are an important part of this process at the local level.

10 Guiding principles for 'A Better Quality of Life' (DETR, 1999)

- Putting people at the centre
- Taking a long term perspective
- Taking account of costs and benefits
- Creating an open and supportive economic system
- Combating poverty and social exclusion
- Respecting environmental limits
- The precautionary principle
- Using scientific knowledge
- Transparency, information, participation and access to justice
- Making the polluter pay

At the heart of sustainable development is the integration of human needs with the environment in which we live. This does not necessarily mean less economic development. One of the challenges is to

encourage more environmentally friendly economic activity, and to discourage or control environmentally damaging activity.

Achieving sustainable development will require action from all parts of society. The Local Agenda 21 process is one way in which this is being pursued (see Section 4.3).

1.3.2 Biodiversity

Biodiversity is a term used to describe the variety of animal and plant life.

At the United Nations Conference on the Environment and Development (or 'Earth Summit'), held in Rio de Janeiro in 1992, the UK signed the International Convention on Biodiversity. This signalled recognition that biodiversity should be conserved and enhanced both for its own sake and as a resource to meet human needs.

In order to meet commitments under this Convention, the document *'Biodiversity: The UK Action Plan'* was published in 1994. This sets out a strategy for the conservation, restoration and enhancement of threatened habitats and species in the UK over the next 20 years, with an overall goal to:

> *"Conserve and enhance biological diversity within the UK and to contribute to the conservation of global diversity"*

The document recognises that biodiversity is ultimately lost or conserved at the local level. The development and implementation of local Biodiversity Action Plans (BAPs) is therefore essential in maintaining and enhancing biodiversity, and is the key vehicle through which national biodiversity targets will be met. Local BAPs are being compiled through a partnership approach (see Section 4.4).

The Agency has significant responsibilities regarding the implementation of BAPs (see Issue 33), particularly for those species and habitats for which it is the national contact point or a lead partner. Species and habitats of particular concern in the Severn Vale are given in Issue 33.

Our commitment to biodiversity will be fulfilled through pursuing opportunities for the conservation and enhancement of species and habitats in our operational and regulatory activities. Additional work will also be needed, and will require collaboration with other bodies.

1.3.3 Global Climate Change

The climate has always been changing, but the rate of change appears to be increasing in recent years. There is a broad consensus of scientific opinion that such changes are occurring because of the impact of human activities on the global atmosphere, in particular the burning of fossil fuels.

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 range of economic, social and environmental parameters.

Regardless of their cause it is essential to allow for changes to the UK's climate in the foreseeable future. The balance of evidence indicates a rise in average global temperature but the likely impacts at a regional scale are less certain. Annual precipitation is predicted to increase by between 1 and 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 from the present pattern long-term average.

To address climate change the Agency is working to the following objectives:

- Help to ensure that the Government's greenhouse gas emission reduction targets are met by regulating emissions from industry.
- 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.
- Demand a more efficient use of water by the Water Companies and by industry, and encourage more efficient use of water by the public.
- Develop techniques to identify changes in plant life, using remote sensing, to measure the effects of different weather patterns in sensitive areas.
- Contribute our knowledge and expertise to national and international forums dealing with climate change.

Gloucester Docks (Courtesy of The Citizen)

2.0 The Severn Vale

2.1 Introduction

The area covered by the Severn Vale LEAP encompasses the catchment of the River Severn from its confluence with the River Teme, just south of Worcester, to just below its tidal limit at Gloucester, and the catchments of several rivers that drain into the upper Severn Estuary (see Map 2). The total population within the catchment is approximately 545,000, of which 39% is located around Gloucester and Cheltenham.

The River Severn is a prominent feature in the area's history and landscape 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, famous as a spa town, has some of the finest architecture in the country. Gloucester's old docks have been renovated in recent years with the river now a feature again. Perhaps the most characteristic feature of the river is the Severn Bore, which occurs at times of high tide, attracting many sightseers.

The Severn Bore

The River Leadon is a rural catchment and traditionally an area for hop growing. Some rivers in this catchment suffer from diffuse pollution from agriculture and may also suffer from low flows.

The Forest of Dean is a popular area for heritage tourism and outdoor recreation, but opencast and deep mining has led to past and potential future environmental problems.

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 in the past and is currently under scrutiny for its potential for hydropower generation. The river is amongst the most hydrologically complex in the UK, and is naturally subject to low flows.

The Gloucester-Sharpness Canal is navigable in its entirety, and there is considerable interest in the restoration of three other canals in the area. The Gloucester-Sharpness Canal is not only of interest as a recreational feature but, along with the River Severn, supplies drinking water to Bristol and settlements in the Severn Vale.

The Rivers Cam and Little Avon and the South Gloucestershire levels are protected from frequent flooding by coastal defences. Avonmouth is criss-crossed by linear, part-saline water-bodies or 'rhines' which have been culverted in many cases to act as discharge channels for the extensive chemical works here.

2.2 Summary of Uses, Activities and State of the Environment

A detailed assessment of the Severn Vale LEAP area is given in the *'Severn Vale Environmental Overview'*. The following provides a summary of key points.

2.2.1 Geology and Topography

The Severn Vale consists of five main areas of relief:

- The Cotswold Hills, an escarpment of young limestone, rising up to around 300m, with a steep scarp slope on its western side forming the eastern boundary of the Severn Vale;
- To the south-west the Forest of Dean, at between 100m and 200m above sea level, is a heavily wooded series of ridges and basins composed of limestones and cyclic sequences of shale, coal seams, sandstone and clays;
- The Malvern Hills, formed of Pre-Cambrian volcanic rocks, form a very localised prominent ridge rising to around 400m in the north-west.
- The low-lying central corridor of the Severn, with its broad alluvial floodplain, and the upper Estuary form the central part of the Severn Vale. Softer clays and mudstone, overlain with superficial deposits dominate this area.
- Gently undulating land is found either side of the River Leadon, underlain by sandstones.

2.2.2 Land Use

The Severn Vale is predominantly rural, with urban land use constituting only 8.3% of the area. The majority of development is concentrated around the existing urban areas of Avonmouth, Cheltenham, Cinderford, Gloucester, Great Malvern, Lydney, Stroud, Tewkesbury and Thornbury. Future development is led by the Statutory Development Plans of the Local Planning Authorities.

A large proportion of the total land area is under grass cover (43%). The Forest of Dean and parts of the Leadon, Frome and Cam sub-catchments have significant woodland, making 11.6% of the Severn Vale forested. There are also large areas of arable farmland (34% of the total land area) in Malvern Hills, the Leadon catchment, and along the Cotswold ridge.

2.2.3 Housing

Gloucestershire Structure Plan has allocations for 50,000 new houses, along with some industrial and commercial development, located in the central Severn Vale, principally around Cheltenham and Gloucester. Some land is also set aside in the relevant Development Plans for development around Great Malvern and at a few sites in South Gloucestershire, notably Severnside.

Both the location and design of new housing may have significant impacts on the environment. There are implications for waste management and the use of water, energy, and transport, as well as for landscape, wildlife, and flood risk.

2.2.4 Infrastructure

Five motorways cross the Severn Vale. The principal motorway is the M5, which conveys traffic north and southwards between Bristol and Birmingham. Four motorway arteries radiate from the M5: the M50 joins north of Tewkesbury taking traffic west towards Wales; the M48 directs traffic across the first Severn Bridge into Wales; the M4 joins north of Bristol; and the M49 takes traffic from Avonmouth to the second 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 via either the Severn Tunnel or Chepstow, Filton to Avonmouth, and Bristol to Severn Beach.

2.2.5 Industry

The Environmental Protection Act 1990 defines two lists of industrial processes for the purposes of regulation. Part A processes are those with the greatest potential to pollute the environment and their discharges to air, land and water are subject to a system of Integrated Pollution Control (IPC), for which the Agency is responsible. Part B processes have less potential to pollute and their discharges to air are regulated by local authorities under a system of Local Authority Air Pollution Control (LAAPC). IPC and the regulation of

some processes under LAAPC will be replaced by the Integrated Pollution Prevention and Control regime.

There are 36 IPC authorisations in the Severn Vale. A number of heavy industries concentrated in Avonmouth are authorised, including specialist chemical manufacture, chemical recovery, gasification and incineration. Within the rest of the plan area there are additional authorised processes including plating works, precious metal recovery and specialist chemical manufacture. There are significant emissions to air from these processes, and other wastes are disposed of direct to controlled waters, via sewer as trade effluent, and to land.

Kingsweston Rhine, Avonmouth

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

2.2.6 Minerals

The diverse geology of the Severn Vale, comprised mainly of sedimentary rock types, provides significant mineral deposits of actual or potential economic worth. These provide aggregates and natural building materials including limestone, sandstone, coal, compacted clay, iron ore, sand and gravel. Current workings include sandstone, hard limestone and small-scale coal extraction in the Forest of Dean, soft limestone working along the Cotswold escarpment, and sand and gravel extraction in the corridor of the Severn.

The exploitation of minerals may have significant impacts on the environment, including the degradation of land resources, transport of minerals, disposal of wastes, impacts on water resources, wildlife and landscape, and dust and noise. Minerals Planning Authorities are required to prepare Minerals Local Plans containing detailed policies to control and guide all future mineral development, including the winning and working of minerals, the deposit of mineral wastes, and restoration of sites.

2.2.7 Waste Disposal

It is estimated that around 1.5 million tonnes of waste is produced in the Severn Vale each year, from households, industry and commerce. There are 80 licensed waste management sites in the plan area which manage this waste and other wastes from outside the area.

The management of waste at these sites may have a significant impact on the local environment, including contamination of water resources, emissions to air, and impacts on wildlife, landscape, noise, odour and dust. Waste imported into the area or exported elsewhere for disposal is also of concern, as there will be impacts associated with the transport of this waste.

Waste collection and disposal is the responsibility of the District or Unitary Authorities. County and Unitary Authorities have a duty to produce Waste Local Plans which identify future waste management strategies. Gloucestershire County Council's Waste Local Plan is currently at pre-deposit consultation draft stage and highlights the key issues as reduction of waste, materials recovery, waste to energy recovery and disposal. For the plan period 1998-2007 no further disposal sites are being considered as new sites may discourage recovery operations.

The South Gloucestershire Waste Local Plan Deposit Draft identifies an urgent requirement for further waste management facilities. In order to meet the requirements of the Waste Hierarchy, this Council is seeking the development of material

recovery facilities linked to landfill. Two sites within the Severn Vale LEAP area have been identified as having potential - Tytherington Quarry, near Thornbury, and Churchwood Quarry, near Wickwar. The Environment Agency has serious technical reservations over the feasibility of lining both sites as they are situated within near vertical wall carboniferous limestone sub water table quarries.

In Avonmouth, Compact Power has proposed a waste pyrolysis plant to take some of Bristol's waste.

Waste management facilities are mostly run by private operators, whom 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 Sharpness.

The Agency is encouraging landfill operators to use landfill gas to produce energy. This has direct benefits and also reduces emissions of gases that contribute to the Greenhouse Effect. The Hempsted site at Gloucester and the Harnhill site at Olveston already produce energy from landfill gas, and feasibility studies are underway for the Bewick Farm site at Hallen.

Sudmeadow Landfill Site, Hempsted, Gloucester

2.2.8 Water Resources

The River Severn below Worcester provides a 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 resources as they provide a significant proportion of Bristol's water in winter months.

The Severn Vale is subdivided into five catchments for water abstraction licensing purposes: Lower Mid Severn (the Severn from Worcester to Tewkesbury), Severnside (the Severn below Tewkesbury), the Leadon, the Frome and the Little Avon. There are a total of 630 abstraction licences within these sub-catchments, allowing for a maximum of 20,715 Ml/a to be abstracted from groundwater and 286,324 Ml/a from surface water sources. Approximately two thirds of licences are for agricultural purposes and spray irrigation.

The main uses[1] of surface and ground water as a percent of the total volume of water licensed for abstraction in the Severn Vale are as follows:

- Public Water Supply (67%);
- Hydropower (22%);
- Cooling Water (3%);
- Industrial processes (2%);
- Transfer of Water (2%);
- Spray Irrigation (1%);
- Miscellaneous (3.3%).

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 at Purton for Bristol.

The catchment has two main units for groundwater abstraction - the Oxenhall and Bromsberrow units, both near Newent. The Agency has a duty to protect this resource which is vulnerable to over abstraction. For the Bromsberrow unit, remedial measures have been taken to improve base flows to the Glynch Brook. Some further resource development can be considered in the Oxenhall unit. There are also a number of other groundwater supplies within the Cotswold limestone and aquifers of the Forest of Dean.

[1]Some of these uses are non-consumptive (e.g. hydropower)

2.2.9 Water Quality

The watercourses of the Severn Vale are many and varied in their nature, from shallow upland brooks draining the Cotswold escarpment, to deep lowland rivers such as the Severn itself and the drainage rhines. Their quality similarly varies from virtually unpolluted streams, to nutrient rich rivers suffering oxygen depletion in summer and streams degraded by sewage and trade effluents.

The quality of watercourses in the Severn Vale as classified under the Agency's General Quality Assessment (Chemical) Scheme is shown in the table below.

General Quality Assessment (Chemical) Grades (1998)

GQA (Chemical) Grade	Km of watercourse	% of total classified reaches
A (Very Good)	78.8	17.1%
B (Good)	236.2	51.2%
C (Fairly Good)	93.7	20.3%
D (Fair)	28.7	6.2%
E (Poor)	20.25	4.4%
F (Bad)	3.8	0.8%

Those that fall into the categories 'Good' or 'Very Good' (A or B) can support game fisheries, while those that fall into the categories 'Fair' or 'Fairly Good' (C or D) can support coarse fisheries. Some tributaries of the Severn and a stretch of the Chelt downstream of Cheltenham fall into the 'Poor' or 'Bad' (E or F) category, owing mainly to sewage inputs. The rhines of Avonmouth 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.

As the River Severn enters the catchment below Worcester, it is subject to opposing influences, namely pollution from Worcester Sewage Works and the diluting effect of the clean River Teme. Quality remains good throughout the stretch to its confluence with the Avon at Tewkesbury. 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 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 watercourse and becomes tidal, with unstable bed and physical conditions that 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 as far as Gloucester. The discharge from Gloucester Sewage Works into this stretch has had a significant influence on quality in the past, although this is now much improved due to the installation of secondary treatment.

Confluence of the Rivers Severn and Avon, Tewkesbury, with Mythe Water Treatment Works in the foreground (Courtesy of The Citizen)

Water quality in the Leadon Catchment is affected by pollution from agriculture, including run-off of pesticides (see Issue 17). At Ledbury, the Leadon receives effluent from the sewage works and urban and industrial drainage, which promotes 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 mine-waters from abandoned coal mines, for example the Cannop Brook and River Lyd. There are also a number of 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 in lower reaches. 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 remains of poor quality until entering the Gloucester-Sharpness Canal.

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

2.2.10 Flood Defence and Flood Warning

Flood Defences

In the Severn Vale there is a total of 162 km of raised flood defences. From Worcester to Tewkesbury there are 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, providing essential protection or relief from flooding for property both in this reach and downstream.

From Tewkesbury to Gloucester there are 34 km of embankments protecting 5,000 ha of flood plain to an annual standard.

Tidal defences at Severn Beach

Unprotected areas around Tewkesbury and the Avon confluence flood more frequently.

The Estuary lowlands, from Gloucester to Beachley on the west bank and Avonmouth on the east bank, 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 must cope with the second largest tidal range in the world - the mean spring tidal range of the Severn at Avonmouth is 12.3m.

There are of course a host of other tributaries and lesser watercourses on which the drainage of the furthermost parts of the catchment depends. Many of these are 'ordinary watercourses' and as such are 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, causing 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 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 IDBs 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

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

Reach S10	River Severn between Worcester and Tewkesbury
Reach S11	River Severn from Tewkesbury to Upstream of Gloucester
Reach S12	River Severn at Gloucester

A storm tide warning service, limited to the immediate area of the settlement, is provided for Severn Beach 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, although there is a "Floodline" message base specifically for estuary winds and tides.

2.2.11 Fisheries

A broad variety of fish species are present in the catchment. Both coarse (cyprinid) fish, such as the roach, chub and barbel, and game (salmonid) fish, such as the resident brown trout and migratory salmon are fished by anglers. In addition, there are commercial fisheries for eels and elvers as well as salmon in the Estuary. The catchment is also home to other migratory fish, such as the river and sea lamprey, flounder and rare Twaite Shad.

There are 40.6 km of river designated as salmonid fishery under the EC Fisheries Directive, including stretches of the Rivers Leadon and Frome and Cannop Brook. There are also 76.3 km of designated cyprinid fisheries, including stretches of the Rivers Leadon, Frome, Little Avon and the Bushley Brook, as well as the Gloucester-Sharpness Canal and the Severn itself.

2.2.12 Biodiversity

The lower reaches of the Severn contain a wide variety of habitats and species of conservation interest. Within the Biodiversity Planning process, the Agency has responsibilities relating to a number of water-dependant habitats of key conservation value that are found here, including eutrophic standing waters, wet woodland, reedbeds, fens, and coastal and floodplain grazing marsh. Rivers and streams, disused canals, standing open water, and some urban habitats are also of conservation interest.

However, natural and semi-natural habitats, once extensive in the Severn Vale, have been reduced in size, degraded, or damaged as a result of human activities. These include river engineering, land drainage, fragmentation, clearance for agricultural intensification and urban development, unnatural barriers to species movement, over-abstraction and alterations to natural water regimes, introduction of invasive species, and pollution from domestic, industrial or agricultural sources.

There are also a number of rare or threatened water-dependent species found in the Severn Vale. Fauna include water voles, a remnant population of which has recently been found in the rhines around Avonmouth, and otters, now beginning to recolonise the lower reaches of the Severn as far as the River Frome. Other species include the White-clawed Crayfish, Twaite and Allis Shad, Great Crested Newt, Marsh Fritillary, Aquatic Warbler, Bittern, Reed Bunting, Common Scoter, and several species of wading bird and bats. Flora include the Ribbon Leaved Water Plantain, True Fox Sedge, Tassel Stonewort, and Black Poplar.

Snipe

The Severn Vale has several sites of international importance for wildlife conservation (see Issue 32). Both Walmore Common and part of the Severn Estuary are designated Ramsar sites, due to the internationally important numbers of wildfowl that use them. These sites are also designated Special Protection Areas (SPAs) under the EC Birds Directive.

Under the EC Habitats Directive, a larger area of the Estuary is a proposed Special Area of Conservation (pSAC). There are three candidate Special Areas of Conservation (cSAC's) in the Forest of Dean which support breeding roosts for lesser and greater horseshoe bats, and two in the Cotswolds - the unimproved limestone grassland of Rodborough Common and the beech woodland of the Cotswold Beechwoods.

The Severn Vale has 120 Sites of Special Scientific Interest (SSSI's). SSSI's are sites of national importance for their flora, fauna or geological or physiographic features. Of these 43 are water-dependent biological sites, 46 are sites of other biological interest and 31 are of geological interest.

One National Nature Reserve (Cotswold Commons and Beechwoods), eleven Local Nature Reserves, and approximately 796 non-statutory sites of ecological interest are found within the Severn Vale. Alongside statutory sites, the conservation of non-statutory reserves and non-designated areas of the wider countryside is extremely important.

2.2.13 Recreation and Navigation

The Severn Vale varies greatly in actual or potential recreational opportunities depending upon demand 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 opportunities for outdoor pursuits and heritage tourism. Other highlights include the Wildfowl and Wetlands Trust at Slimbridge and the restored Gloucester Docks.

There is a steadily increasing demand for water sport activities, such as canoeing, boating and sailing. For larger vessels, the Severn is navigable from Stourport in the north (outside of this LEAP area) to Gloucester in the south (above the Gloucester Weirs and links), via the River Avon and various canals into the inland waterway system. British Waterways is the Navigation Authority for this length. Gloucester Harbour Trustees act as Harbour Authority for the Severn from Gloucester to just below Severn Beach. Navigation of the river here 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. Navigation in the Estuary from just below Severn Beach falls under the jurisdiction of the Bristol Port Company.

Other recreational activities, although land based, by their nature attract people to the river environment, such as walking, picnicking, cycling, horse riding and bird watching. Angling is prevalent throughout the area. All of these pursuits use access routes to and alongside waterways.

Long distance footpaths include The 'Severn Way', which follows the river upstream of Severn Beach and is now complete on the left bank, and part of the Cotswold Way.

2.2.14 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 may be significant and the Agency works closely with Local Authorities to establish the contributions of various sources to overall air quality.

The major concern in the area is in regard to possible breaches of National Air Quality Standard for oxides of nitrogen (NO_x). There are significant levels of NO_x, sulphur dioxide (SO_2) and small particulate matter (PM^{10}) in and around Cheltenham, Gloucester and Avonmouth. The main contribution to these levels is thought to be from traffic moving through the dense road system. There is also a noticeable effect on levels of NO_x and PM^{10} from traffic on the M5 north of Cheltenham.

However, there are also significant discharges of SO_2 and NO_x from the industrial complex at Avonmouth where there are a number of processes controlled under IPC. Avonmouth, as well as South Wales, may also affect air quality in more rural areas.

2.2.15 Landscape, Archaeology and Heritage

Various natural and human influences shaping the landscape of the Severn Vale have given rise to its attractive and characteristic landscape features. The upland landscapes of Areas of Outstanding Natural Beauty (AONBs), such as parts of the Malvern Hills, Cotswold and Wye Valley AONBs, contrast with the broad expansive floodplain of the Severn. There are also several Special Landscape Areas (landscapes of countywide importance), historic landscapes and historic parks and gardens.

View from Leckhampton Hill, Cotswold AONB

Landscape assessments of river corridors are necessary in determining their character and helping in the control of development. Several watercourses, owing to past engineering and maintenance practices, are in need of renovation and improvement to restore them to their former character (see Issue 26).

The Severn and its tributaries have throughout history served as a principal arterial route into the heart of Britain. As such, the archaeological remains along side them represent a rich and varied heritage. There are nearly 237 Scheduled Ancient Monuments (SAMs) in the Severn Vale Area, identified and protected by English Heritage as monuments of national importance.

In addition, areas of high archaeological potential have been identified by English Heritage, notably along the shoreline of the Estuary. These areas may contain extensive prehistoric landscapes and evidence of past environments, archaeological evidence of coastal human settlements, sea defences, and wrecks.

Important archaeological and palaeoecological evidence may be contained within the alluvium of marshes. Their preservation is dependent on the anaerobic conditions maintained by high groundwater levels, and is thus threatened by abstractions or drainage. Proposals relating to sea defence schemes and managed retreat in response to rising sea levels also have implications for the archaeological resource of the area.

The Severn Vale is also rich in historic buildings and settlements, many of which reflect the commercial and strategic importance of the Severn and its tributaries, such as at Gloucester, Ledbury, Tewkesbury and Stroud. Historic use of water is evident at spa towns such as Cheltenham and Great Malvern. There are many listed buildings, including the Severn Bridges.

The Agency has a duty to consider the impact of all its activities upon archaeology and heritage, and to ensure its protection through mitigation and enhancement measures where appropriate. We do this by

consulting with English Heritage and Local Authorities on a routine basis, and by carrying out an extensive environmental impact assessment prior to any new engineering works. Actual and potential archaeological heritage is also being considered in the preparation of the Severn Estuary Shoreline Management Plan (see Section 1.2.1) and of Water Level Management Plans (see Issue 32).

2.2.16 Contaminated Land

The full extent and nature of land contamination in the Severn Vale is not currently known. This will be rectified when Local Authorities undertake inspections of land in their areas, following introduction of the Contaminated Land (England) Regulations 2000. However, the Agency is aware of several contaminated sites, including old landfill sites, gas works, mine shafts and former industrial sites, at Gloucester, Cheltenham, Avonmouth, and in the Forest of Dean.

2.2.17 Radioactivity

The Agency carries out monitoring of radioactivity on beaches and in public water supplies, while MAFF monitors radioactivity in the food chain and the sea. Recent data shows radioactivity levels in the environment of the Severn Vale are close to background levels, except for some increased activity in sediments of the River Severn, due to discharges from Oldbury and Berkeley nuclear power stations. In all cases, doses to the public are negligible.

Those storing or disposing of radioactive wastes must gain an authorisation under the Radioactive Substances Act 1993. These are issued by the Environment Agency. There are 8 authorised sites in the Severn Vale, including the two power stations and other sites using radioactive substances for agricultural, pharmaceutical and research purposes.

2.2.18 The Estuary

The upper Severn Estuary is a significant feature of the Severn Vale. The Estuary is one of Britain's largest and has one of the greatest tidal ranges in the world. The concentration of human activity along the coastal zone places immense pressures on the shoreline and water body of the Estuary. There is considerable economic activity in and around the Estuary associated with ports and shipping, industry, aggregates and other mineral extraction, agriculture, fisheries, tourism, recreation, and transport.

Issues affecting the coastal zone are, by their very nature, inter-related. Moreover, natural and human activities well inward or seaward may have an effect on the Estuary, its shoreline, and waters beyond. Issues facing the Severn Estuary are laid out in the Severn Estuary Joint Issues Report, and their integrated management is being pursued through the Strategy for the Severn Estuary (see Section 1.2.1). The Estuary is also a site of European and international importance for nature conservation, and is subject to the requirements of the Habitats and Birds Directives (see Section 1.2.1 and Issue 32).

The Severn Estuary and Second Severn Bridge

3.0 Review of Public Consultation

3.1 Introduction

The Environment Agency is committed to full consultation during all stages of the Local Environment Agency Plan process. During the compilation of the Severn Vale LEAP Consultation Draft, informal consultation took place with Local Authorities in the catchment. Formal public consultation then took place during a three-month period following the launch of the Consultation Draft in March 1999.

3.1.1 Informal Consultation

In November and December 1998, the Agency held meetings with Local Authorities in the plan area to discuss an initial list of issues and problems affecting the local environment. All comments from this initial information gathering exercise were considered and, where appropriate, were incorporated into the Consultation Draft.

We would like to thank all those who commented at this early stage in the development of the plan. These include: Gloucestershire County Council, Stroud District Council; Forest of Dean District Council; Gloucester City Council; Tewkesbury Borough Council; and Malvern Hills District Council.

A sub-group of the Lower Severn Area Environment Group made a valuable contribution to the development of both the Consultation Draft and this Action Plan.

3.1.2 Formal Consultation

The Severn Vale LEAP Consultation Draft was launched to the press on 29th March 1999. The launch marked the start of a three-month consultation period. The document was sent out to over 300 individuals and organisations with the opportunity to comment on the report and on local environmental problems. Written responses were received as letters and completed questionnaires.

During the consultation period, the LEAP was promoted through:

- Radio interviews, press releases, full-page advertisements and public notices in the local press.
- Presentations to Stroud District Council Environment Committee and Bristol, Gloucestershire and Somerset Environmental Protection Committee.
- Wide distribution of 2000 summary leaflets advertising the main document, including 600 sent to local businesses through Gloucestershire Green Business Club.
- Display boards about the LEAP, which toured 6 libraries in the plan area, Malvern Three Counties Show, Malvern Spring Garden Show, Gloucestershire Green Business Club, and Cheltenham and Gloucester College of Higher Education.
- Copies of the report being available at Local Authority offices and libraries.

The Environment Agency would like to thank all those who responded to the Consultation Draft. A list of those who responded is given in Appendix 3.

3.2 Summary of Responses

This section provides a brief summary of the results of the consultation. A more detailed review of the comments, including individual responses, is given in our 'Severn Vale LEAP Statement of Public Consultation', available from our Tewkesbury office.

A total of 82 written responses to the consultation were received - 44 letters and 50 questionnaires (with some respondents sending both questionnaires and letters). The response was very encouraging and represented a wide cross section of

interests. All letters and questionnaires were acknowledged and detailed follow-up letters were sent to those who made extensive comment.

All comments have been considered and, where appropriate and practicable, incorporated into the Action Plan. A number of changes to the issues and proposed actions have been made as a result of the comment received. Many organisations expressed an interest in working in partnership with the Agency towards resolving the issues highlighted in the plan. We also received many helpful and welcome suggestions. Errors in and omissions from the Consultation Draft were also highlighted, and are summarised in Appendix 4.

The consultation process has been essential in producing a more rounded Action Plan by provided the Agency with a more comprehensive understanding of some of the issues facing the local environment and of the concerns of local people and other organisations. This Action Plan reflects a balance between the opinions expressed during consultation and the need to ensure a feasible and workable plan.

The questionnaire included in the Consultation Draft asked respondents to identify which five of the issues presented were the most important to them. The most important issue was deemed to be "Promoting environmental awareness and understanding" (21 respondents), reflecting the general interest in matters relating to the environment and the realisation that everyone has a part to play in achieving sustainable development. The second most important issues was deemed to be "The impacts of inadequate sewerage facilities on water quality" (19 respondents), and the third most important was "The impact of new development on the environment" (18 respondents). Other issues considered to be amongst the most important include "Managing flood risk and floodplains", "The effects of nutrients on the catchment", and "Waste minimisation in the Severn Vale". All the issues presented in the Consultation Draft were highlighted as being important.

The letters and questionnaires also raised a number of new issues, as shown in the Statement of Public Consultation. Four new Issues have been added as a result of comments received. These are:

- Issue 5: Public Concern over Increasing Incidents of Fly Tipping
- Issue 8: Implementation of the Pollution Prevention and Control Regulations in the Severn Vale
- Issue 16: Proper Use of Water Resources
- Issue 27: Proposals to Restore Canals

Three more issues have been included following renewed internal consultation within the Agency:

- Issue 23: Dangerous Substances Directive Non-Compliance for List II Substances in the Severn Estuary
- Issue 26: Restoring River Corridors
- Issue 31: Contamination of the Kingsweston Rhine System due to Past Practices at the Rhodia Ltd Landfill Site, Kingsweston Lane, Avonmouth.

3.3 Further Action

The many offers of partnership from organisations and groups will be taken forward during the plan period. Ongoing consultation with key partners will take place at the annual review stage (see Section 6.0), through discussions with those who are jointly responsible for actions within the plan.

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, it is often less clear how it interacts with all other aspects of the local, regional, national and global environment. Even local environmental impacts can have knock-on effects on other parts of the environment, as well as impacting on the economic potential of an area and its social well-being. It is this kind of understanding that led to the Rio Earth Summit in 1992, the adoption of Sustainable Development principles in the UK, and a 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 enforcement, the provision of advice and information, and the way we carry out our own activities. However, achieving environmental improvements often depends on co-operation with others. Many environmental problems, such as reducing emissions of greenhouse gases and the amount of waste produced, will require action from society as a whole.

The Memorandum of Understanding between the Agency and the Local Government Association sets out how we will work with Local Authorities in protecting and improving the environment. A 5-year joint working plan entitled *'Working Together Better'* was produced in November 1999, containing proposals for better integration of our work and for ensuring the best use is made of resources.

Partnerships will enable the key objectives and the long-term vision of this LEAP to be realised. Implementation of the LEAP will require the collaborative efforts of a number of organisations, such as Local Authorities, Government departments, businesses, voluntary organisations and community groups, as well as 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. Development Plans set out the main considerations on which planning applications are decided. Policies and proposals within them are of primary importance for shaping land use change, and provide an early opportunity to safeguard and enhance the environment, and to prevent future problems arising as a result of development.

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 LPAs prior to policies in a Development Plan being approved or a planning application being determined.

4.2.2 LEAPs

In addition to providing a vision, objectives, and a framework of action for improving the local environment, LEAPs provide an important source of information to Local Planning Authorities on problems and issues within the catchment. This is recognised in the Government's draft PPG 12 *'Development Plans'* which indicates that LEAPs (as successors to Catchment Management Plans) should be taken into consideration by Local Planning Authorities when preparing Development Plans. Similarly, the Agency considers Development Plans and consults with Local Planning Authorities when preparing LEAPs.

4.3 Local Agenda 21

Agenda 21 is one of four main agreements signed by the UK at the United Nations Conference on the Environment and Development (The Earth Summit) 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 1999 the Government produced a revised strategy for sustainable development for the UK, entitled *'A Better Quality of Life'*. This is an environmental action plan for the 21st century, which recognises the central role of local action and the value of partnerships between local authorities and local communities in achieving this. This reflects the concept of thinking globally, while acting locally.

In the Severn Vale, Local Authorities are working with communities to produce their own Local Agenda 21 programmes:

- A charitable company, 'Welcome to the Future', is currently bing set up by a number of partners to take forward the Local Agenda 21 action plan for Worcestershire and Herefordshire.
- Vision 21, Gloucestershire's Local Agenda 21, 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.
- A Local Agenda 21 Forum for South Gloucestershire, managed by a partnership Steering Group, is working on a number of projects.
- Following a stakeholder conference in March 1999 and consultation draft in autumn 1999, a Local Agenda 21 Strategy for Bristol was launched in January 2000.

As directors and members of steering groups and working groups of Local Agenda 21 initiatives, Agency staff will advise, provide information and facilitate action where possible.

There are a large number of other locally based groups working towards community capacity building for sustainability, such as Gloucestershire Energy and Water Forum, Dean Environment Forum, Stroud Valleys Project, and Energy 21.

4.4 Biodiversity Action Plans

The UK's national biodiversity strategy, *'Biodiversity: the UK Action Plan'*, will be met through the implementation of Local Biodiversity Action plans (BAPs). These are being compiled and implemented by a wide range of organisations in partnership, including the Environment Agency, Local Authorities, other conservation organisations, and businesses.

Local BAPs will include targets for specific habitats and species. Those relevant to this LEAP area are listed in Issue 33. The conservation and enhancement of this biodiversity will be a key indicator of sustainable development in the Severn Vale.

Local BAPs within the Severn Vale are:

- Worcestershire BAP, published in April 1999 by Worcestershire Biodiversity Partnership
- Herefordshire BAP, being produced by a number of partners
- Gloucestershire BAP, recently produced by Gloucestershire Biodiversity Partnership
- South Gloucestershire BAP and Bristol BAP are being produced by the relevant Unitary Authorities.

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

4.5 Waste Minimisation

In 1999 the Government produced its draft strategy for sustainable waste management in the UK, *'A Way with Waste'* (1999). Key objectives of the strategy include minimising the amount of waste produced and, where waste is produced, minimising the potential for pollution from waste management activities.

Waste minimisation can profit both business and the environment. The Agency, in partnership with other organisations, is promoting waste minimisation and best practice in waste management to industry through Waste Minimisation Schemes and other initiatives (see Issue 2). A number of initiatives have been or are being carried out within the Severn Vale:

- Gloucestershire Waste Minimisation Initiative;
- Worcestershire Waste Minimisation Group (formerly Hereford and Worcester Waste Minimisation Group);
- Sustainable Business in Action (SABINA), a demonstration project involving industries around the Severn Estuary;
- South Gloucestershire Waste Minimisation Club;
- Our North Wessex Area 'Industrial and Commercial Waste Minimisation and Recycling Directory';
- Our Midlands Region 'Environmental Services Directory' provides information on the reuse, recovery and disposal of different types of wastes;
- Gloucestershire Waste Exchange seeks to match-up wastes being produced by one company with the material requirements of another.

4.6 Pollution Prevention

Oil Care/Oil In Your Local Environment

The spillage or inappropriate disposal of waste oil can cause pollution of land and water. The Agency funds a national Oil Care campaign to encourage people to take their waste oil to designated centres for recycling and proper disposal. The campaign also provides advice on how to handle, store and dispose of oil products without harm to the environment. A Regional campaign, Oil In Your Local Environment (OIYLE), seeks to take this forward in the Midlands by working with suppliers and users of oil products (see Issue 18).

Work with Fire Services

The Agency works closely with the Fire Services in providing a quick and effective response to pollution incidents (see Issue 18).

Construction Sites

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.

4.7 Other Collaborative Work

Some examples of other joint initiatives that the Agency is involved in, at national, regional and local levels, are given below:

- Joint Regulation with Local Authorities - We will be working closely with Local Authorities on implementing recent and proposed legislation through exchange of information and technical expertise. This includes the Air Quality Regulations (see Issue 6), Pollution Prevention and Control Regulations (see Issue 8), and Contaminated Land (England) Regulations (see Issue 29);
- Life cycle Assessment (LCA) - The Agency has developed a Life Cycle Assessment tool, 'WISARD'. This computer model has been designed to assist Local Authorities in identifying the impacts of different waste streams and in developing their waste management strategies;
- Gloucestershire Environmental Business Forum (see Issue 2);
- National and Local Fly Tipping Stakeholders Fora (see Issue 5)
- Gloucestershire Water and Energy Forum;
- Local Drainage Groups and Sustainable Urban Drainage Systems (SUDs) (see Issues 24 & 25);

- Encouraging Agri-environmental Best Management Practices (BMPs) (see Issue 17);
- Water Conservation and Water Use Minimisation (see Issue 16);
- Severn and Avon Vales Wetlands Project (see Issue 33);
- The River Severn Otter Project (see Issue 33);
- The Severn Way (see Issue 28);
- The Safer Severn Initiative (see Issue 28);
- The development of Lydney Docks through the Lydney Docks Partnership (see Issue 36);
- Rural Initiative Fund - The Agency contributes a small amount of money to the Gloucestershire Rural Initiative Fund. Projects supported include habitat creation, parish mapping, and energy & water efficiency measures in Village Halls.

4.8 Funding and Local Environmental Initiatives

The Agency has limited finances and the actions set out in this plan represent our priorities in the Severn Vale over the next five years. The majority of our funds are allocated to our statutory work. However, work such as river and habitat restoration or enhancement, improving recreational opportunities, demonstration projects, promotion of best practice and educational initiatives can often only be achieved in partnership with others.

Funding for environmental and educational initiatives is available from a range of other sources. Where partnerships can be developed, opportunities exist to increase fundraising potential and add value to projects. Some potential sources of funding are outlined below.

4.8.1 European Union Funding

Structural Funds

About one third of the total EU budget is distributed through the Structural Funds. These funds do not always have an explicit environmental purpose, but because of the scale of investment, it is inevitable that there will be an impact on the environment.

The European Regional Development Fund (ERDF) is the principal EU instrument for promoting regional economic development. Funds can be used for investment in environmental projects.

The European Agricultural Guidance and Guarantee Fund (EAGGF) supports agricultural development and the rural infrastructure. Particular areas of interest are the diversification of land use, village protection and woodland use.

The Financial Instrument for Fisheries Guidance (FIFG) funds the protection of fisheries and supports the fisheries industry.

LIFE Programme

LIFE (Financial Instrument for the Environment) exists to support the development and implementation of the Community environmental policy. The Programme consists of two parts.

LIFE - Environment provides support for innovative and demonstration projects designed to promote sustainable development in industrial activities and land use, including coastal zone management, waste and water management, and air quality.

LIFE - Nature funds the protection of endangered species and habitats, particularly projects that contribute to the conservation of sites protected under the Habitats Directive and sites classified as Special Protection Areas under the Birds Directive.

4.8.2 Landfill Tax Credits

A proportion of the Landfill Tax raised can be donated by landfill operators to approved bodies for spending on certain environmental objectives. These are:

- Land restoration and reclamation.
- Reducing pollution from contaminated sites.
- Encouraging more sustainable waste management practices through research and development, education and the

dissemination of information on waste management practices.

- Provision, maintenance or improvement of public parks or other public amenities.
- Maintenance, repair or restoration of churches or other buildings of historic interest that are open to the public.

Money from landfill tax has been used to fund the Worcestershire Waste Minimisation Group, Gloucestershire Waste Minimisation Initiative, and Gloucestershire Waste Exchange.

4.8.3 The National Lottery

The National Lottery is managed by the Department of Culture, Media and Sport.

The Heritage Lottery Fund aims to safeguard and enhance those heritage assets that have been important in the formation of the character and identity of the United Kingdom. It plans to distribute around £60m a year for land and countryside capital schemes.

The New Opportunities Fund has funds available for projects relating to green spaces and sustainable communities.

4.8.4 The Environmental Action Fund

The Department of the Environment, Transport and the Regions manages this grant scheme which helps voluntary groups in England to advance the government's environmental policies. Funding of around £4 million a year is available for grants of between £10,000 and £75,000.

4.8.5 Other Funding Sources

Many National and Local *Charitable Trusts* support environmental projects. Information on these can be obtained from the Directory of Social Change.

Community Councils can be approached for smaller grants related to community based projects below £10,000.

Rural Action for the Environment runs a grant initiative for supporting environmental improvements and habitat creation and management.

4.9 Education

One of the Agency's 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. We therefore need to have a greater involvement in education at all levels. The Agency's national education strategy, *'Green Shoots'* (1997), considers environmental education into the next century. A strong partnership approach will be required for this to succeed.

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.

There are 4 key target audiences that the Agency wishes to reach. These are:

- Urban and ethnically diverse communities
- Educators (or trainers) in different sectors
- Key partners (e.g. other regulators, conservation groups, those we regulate)
- Youth and community

At the national and regional levels, we are supporting several educational initiatives in partnership with the formal education sector, including CREST Awards and The Eco-schools scheme. We have recently produced a strategy for environmental education in the Midlands, and a local

educational strategy for the Severn Vale is currently being developed (see Issue 38).

4.9.1 Information

The production of this LEAP is one step towards increasing the accessibility of information about our local environment. The Agency has a wide range of leaflets and publications (see Appendix 5), which are available from the Customer Contact Teams at our Lower Severn or North Wessex Area offices. Information and links to other sources of environmental information are also available at our web site.

INTERNET WORLD WIDE WEB
www.environment-agency.gov.uk

ECOFACTS℠ 'FAX BACK' SERVICE
0881 88 22 88

ENVIRONMENT AGENCY NATIONAL PHONE LINES:

GENERAL ENQUIRY LINE
0845 9333111

FLOOD WARNING INFORMATION
For information on protecting persons and property from flooding:

FLOODLINE
0845 988 11 88

Please help us to protect the environment by reporting environmental incidents and emergencies:

EMERGENCY HOTLINE
Freephone 0800 80 70 60
(Open 24 hours a day)

LOCAL OFFICES IN THE SEVERN VALE:

LOWER SEVERN AREA OFFICE
01684 850951

NORTH WESSEX AREA OFFICE
01278 457333

5.0 Actions

5.1 Implementation

Implementation of the plan is based on tackling the 39 issues set out on the following pages. Many of the options presented in the Consultation Draft have been carried through to this plan, but many new actions have been added and new approaches taken as a result of consultation.

The issues are presented with a number of actions, a target timetable and the identification of responsible parties. We have sought to ensure that all actions are SMART (Specific, Measurable, Agreed, Realistic and Time based). Where possible, costs have been outlined for the period covered by the plan. This does not necessarily reflect the total cost of the schemes, particularly where the costs of action by others are unknown. In some cases costs are estimated, and can be more accurately provided later. A number of the actions will require feasibility studies and an appraisal of options prior to work commencing. In some cases, depending on the outcome of these studies, further action may not be required or may not be feasible. The timescales for actions may vary depending on future political or economic change.

The objectives shown for each issue relate to the Agency's National Environmental Strategy and are used in this plan to show how these objectives are being delivered locally. Many of the issues within the LEAP will require effective multifunctional working from the Agency.

This plan represents the non-routine investment by the Agency and others in the catchment. It is produced in good faith, recognising current priorities, both within the Agency and in other organisations.

5.2 List of Issues

The numbering of the Issues listed below does not necessarily correspond to that of the Consultation Draft LEAP, as several new Issues have been added (See Section 3.2).

	Managing Waste	Key Related Issues
Issue 1:	Making Waste Work in the Severn Vale	2
Issue 2:	Waste Minimisation in the Severn Vale	1, 16 & 38
Issue 3:	Pollution, Health and Amenity Risks from Existing Inadequate Waste Management Licences.	
Issue 4:	Public Concern over the Regulation of Land Spreading of Materials for Agricultural Purposes, in particular the Spreading of Abattoir Waste.	20 & 32
Issue 5:	Public Concern over Increasing Incidents of Fly Tipping	

	Improving Air Quality	
Issue 6:	Managing Air Quality - Strategies and Information	7, 8 & 9
Issue 7:	The Impact of the Cleansing Services Group Ltd Chemical Treatment and Recovery Plant, Sandhurst, Gloucester, on Local Air Quality	6

Regulating Major Industries

Issue 8:	Implementation of the Pollution Prevention and Control Regulations in the Severn Vale	6, 9 & 32
Issue 9:	The Potential Impact of Proposed Gas Power Stations at Avonmouth on Air Quality	6, 8 & 32
Issue 10:	The Control Of Major Accident Hazards Involving Dangerous Substances (COMAH)	

Addressing Climate Change

Issue 11:	Climate Change Leading to Increased Flood Risk	24, 25, 32, 33, & 39
Issue 12:	The Potential for Non-Fossil Fuel Energy from Hydropower and Landfill Gas	1, 21, 22, 25, 32, 33

Managing Our Water Resources

Issue 13:	Maintaining River Severn Flows to the Estuary	14, 32 & 33
Issue 14:	Low River Flows	13, 15, 21 , 32 & 33
Issue 15:	The Need for Improvements to River Gauging Stations	14
Issue 16:	Proper Use of Water Resources	2, 13, 14, 24 & 39

Delivering Integrated River-Basin Management

Issue 17:	The Impact of Changing Land Use Practices on the Water Environment	18, 20-22, 32 & 33
Issue 18:	Pollution of Surface Water Intended for Public Water Supply	17, 19-24 & 32
Issue 19:	The Impacts of Inadequate Sewerage Facilities on Water Quality	18, 19-21, 32 & 33
Issue 20:	The Effects of Nutrients on the Catchment	17, 19, 21, 22, 32, 33 & 35
Issue 21:	Failure to Comply with River Quality Objectives	4, 14, 17-20, 22, 27, 32, 33 & 35
Issue 22:	Review of River Quality Objectives	21, 32 & 33
Issue 23:	Dangerous Substances Directive Non-Compliance for List II Substances in the Severn Estuary	32
Issue 24:	Managing Surface Water Drainage from Developed Areas	16, 18, 21, 22, 25 & 33
Issue 25:	Managing Flood Risk	11, 12, 15, 24, 26, 27, 32, 33, 36 & 39
Issue 26:	Restoring River Corridors	25, 28, 32 & 33
Issue 27:	Proposals to Restore Canals	13, 14, 21, 25, 28, 32 & 33
Issue 28:	Recreational Use of, and Access to, Waterways	13, 14, 19-23, 26, 27, 32-36, 38 & 39

Conserving The Land

Issue 29:	Implementation of the Contaminated Land (England) Regulations in the Severn Vale, Including the Potential to Develop Partnerships	30, 31 & 39
Issue 30:	The Impact of Contaminated Mines on the Surrounding Environment in the Forest Of Dean	29 & 32
Issue 31:	Contamination of The Kingsweston Rhine System due to Past Practices at the Rhodia Ltd. Landfill Site, Kingsweston Lane, Avonmouth.	29

Enhancing Biodiversity

Issue 32:	Managing Designated Conservation Sites of National (SSSI), European (SPA & SAC) and International (Ramsar) Importance	4, 8, 9, 11-14, 17-23, 25-27, 30, 33-36 & 39
Issue 33:	Enhancing Biodiversity	32*

Managing Freshwater Fisheries

Issue 34:	Management of The Elver Fishery - Eels Stocks And Operation	27, 28, 32 & 33
Issue 35:	Concerns Regarding Small Populations of Salmon in the River Severn Catchment	13, 20-22, 27, 28, 32 & 33

Managing The Environment In Partnership

Issue 36:	Development of Lydney Docks	11, 12, 25, 28, 32, 39
Issue 37:	Managing Environmental Information - Air Quality, Biodiversity and Waste Management	1-9 & 33
Issue 38:	Promoting Environmental Awareness and Understanding	**
Issue 39:	The Impact of Development on the Environment	1, 6, 9, 11, 12, 16 - 19, 21, 22, 24 - 29, 32 - 33, 36 & 38

** Most of the Issues in the LEAP have positive or negative implications for biodiversity.*
*** Education in its broadest sense will be essential in tackling most of the Issues in the LEAP.*

5.3 Action Tables

The list of Agency officers and key below will assist with interpreting the action tables. Please also refer to the abbreviations in Appendix 3.

ENVIRONMENT AGENCY OFFICERS

Lower Severn Area Office			
P Bailey	Area Water Resources & Flood Defence Manager	R Mair	IPC/RAS Inspector
C Beeching	Team Leader Conservation & Recreation	M Portsmouth	Team Leader Flood Defence
J Banks	Team Leader Projects	P Quinn	Area Environment Protection Manager
B Blake	Environment Protection Team Leader (Tidal Severn)	P Ridley	Team Leader Hydrometry
S W Branchett	Team Leader Flood Warning	K Riglar	Team Leader Consents
A Churchward	Area Fisheries, Ecology and Conservation Manager	W Reed	Team Leader Environmental Assessment
J D Crabbe	Team Leader Development Control	M Scott	Team Leader Biology
A Clements	Biologist	J Sherwood	Team Leader Water Resources
A Dannatt	Team Leader Customer Contact	M Stringer	Team Leader Waste Licensing
J K Davies	Area Customer Services Manager	A Starkie	Team Leader Fisheries Management
B Forbes	Lower Severn Area Manager	C Tucker	Environment Protection Team Leader (Severn Vale)
M Langdon	Projects Officer	R Wade	Area Environment Planning Manager
J Leather	Campaigns Officer	C Ward	Team Leader Planning Liaison
Upper Severn Area Office			
C Daley	Campaigns Officer		
Midlands Regional Office			
J Batty	Regional Water Quality Officer	A Boyd	Emergency Planning Officer
K Boulton	Project Manager Feasibility	G Davies	Regional Hydrologist
N Edginton	Regional Capital Works Manager	C Warren	Regional Education Co-ordinator

ENVIRONMENT AGENCY OFFICERS (Continued)

North Wessex Area Office			
R Broome	Tactical Planning Officer	S Morgan	Team Leader PIR/RAS
R Callender	Team Leader Water Resources	P Morley	Team Leader Waste Licensing
S Chandler	Area Environment Planning Manager	I Nutter	Team Leader Consents
D Crowson	Team Leader Development Control	R Owen	IPC/RAS Inspector
K Daily	Team Leader Tactical Planning	J Poole	Team Leader Abstraction Licensing
V Dennis	Team Leader Environment Protection (Greater Bristol)	B Smith	Team Leader Planning Liaison
J Flory	Team Leader Biology	M Smith	IPC/RAS Inspector
I Legge	Area Environment Protection Manager	S Young	Team Leader Customer Contact
P Mitchell	Team Leader Investigations		
South West Regional Office			
N Garwood	Emergency Planning Manager		
Welsh Region, South East Area Office			
N Birula	Team Leader Planning Projects		

KEY TO COSTS AND TIMESCALES

✔ Action in the year indicated (cost figures given if known).

R Recurring - no costs additional to annual budgetary provision.

U Unknown costs at this time.

K £1000s

ISSUE 1 Making waste work in the Severn Vale

OBJECTIVES:

- Contribute to achievement of national waste strategy targets for reduction of waste produced and increase in recycling and recovery;
- Implement the Producer Responsibility Obligations (Packaging Waste) Regulations 1997.

In 1995 the Government issued a Waste Strategy entitled *'Making Waste Work - A Strategy for Sustainable Waste Management in England & Wales'*, which set targets for reducing the proportion of waste sent to landfill. This was to be achieved by encouraging waste minimisation, re-use, recycling and recovery to gain environmental improvement and ultimately reduce waste production as far as possible. In addition, increasing disposal costs will make the alternatives to landfill more attractive waste management options. At the time of writing this LEAP the Government published *'A Way with Waste: A Draft Waste Strategy for England & Wales'*. This strategy was published in response to comments regarding the consultation paper *'Less Waste More Value'* which develops the aims and objectives described in *'Making Waste Work'*.

The Environment Agency has a duty to advise the Secretary of State on the development of the National Waste Strategy. County and Unitary Councils produce Waste Strategies and Waste Local Plans, which assess the need and make provisions for new waste management sites. As a statutory consultee, the Agency has a significant

Materials reclamation at Cheltenham's Central Depot

involvement in these, through the provision of information on waste arisings and void space. We also aim to ensure protection of the environment, encourage the development of waste management options towards the top of the waste hierarchy, and ensure the principle of proximity and best practicable environmental option are central to the options being considered. We have commented in detail on Gloucestershire County Council and South Gloucestershire Council Waste Local Plans.

The Agency is also responsible for enforcing the Producer Responsibility Obligations (Packaging Waste) Regulations 1997. Under this legislation, companies that have a turnover in excess of £2m and handle over 50 tonnes of packaging a year are required to recover and recycle a certain proportion of their packaging. This approach also encourages companies to reduce the amount of packaging they use overall.

ACTIONS	RESPONSIBILITY LEAD	RESPONSIBILITY OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
1.1 Attend Waste Local Plan Policy Panel meetings at Local Authorities and provide information.	EA	LAs	R	✔	✔	✔	✔	✔		R Wade S Chandler
1.2 Undertake 25 visits to industry per annum to increase the recovery and recycling of packaging waste.	EA	Packaging Industry	R	✔	✔	✔	✔	✔		P Quinn
1.3 Provide 2 seminars to industry on the Packaging Regulations.	EA	Packaging Industry	5	3	2					R Wade

ISSUE 2 Waste minimisation in the Severn Vale

OBJECTIVES:

- Work with Industry and others to reduce the quantity of waste disposed to landfill;
- Encourage and inspire industry to develop new and improved methods for the management of resources, e.g. waste, energy and water, and to make the best use of these resources.

Launch of the Gloucestershire Energy Roadshow

The Government's White Paper, *'Making Waste Work - A Strategy for Sustainable Waste Management in England & Wales'* identified a hierarchy for waste management. Waste reduction or minimisation represents the most desirable option within the waste hierarchy. Waste minimisation involves reducing waste at the manufacturing stage, in terms of raw materials and energy used in the production process as well as a reduction in general commercial and domestic waste. By avoiding the production of waste, we also avoid the environmental and financial costs associated with the disposal or recovery of waste. Policies for minimising waste are at the heart of the White Paper and are taken forward in the Government's *'A Way with Waste: A Draft Waste Strategy for England & Wales'*.

The Agency has developed a guide entitled *'Waste Minimisation - Environmental Good Practice for Industry'* and is a lead partner in a number of waste minimisation initiatives. These seek to provide guidance and assistance to industry in managing resources in a more sustainable way, and include Gloucestershire Waste Minimisation Initiative, involving 14 companies to date, and South Gloucestershire Waste Minimisation Club. The Agency has also been a lead partner in the Worcestershire Waste Minimisation Group, involving 80 local companies to date. Future plans for this group are not set at the time of writing, although promotion of waste minimisation in both Herefordshire and Worcestershire is planned through routine visits to local companies.

We have also been involved in setting up the Gloucestershire Environmental Business Forum, a group of over 25 businesses, organisations and regulators from Gloucestershire. This provides businesses with information and advice on environmental management issues and arranges educational seminars on an annual non-profit basis. Projects emerging from the Forum include the Gloucestershire Waste Exchange database, a recent Sustainability Conference and the Gloucestershire Waste Minimisation Initiative. Proposed new projects include an ISO14001 networking club and Green Transport Projects.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
2.1 Complete the delivery of the first phase of the Gloucestershire Waste Minimisation Initiative.	EA	Local Companies	2	2						P Quinn
2.2 Deliver the second phase of the Gloucestershire Waste Minimisation Initiative.	EA Industry Business Link C&GCHE	Local Companies	10	10						J Leather
2.3 Deliver the South Gloucestershire Waste Minimisation Club.	WPSD	EA South Glos. Council Filton Econet	3	3						K Daily
2.4 Promote waste minimisation to local companies in Worcestershire and Herefordshire.	EA	Local Companies	R	✔	✔					C Daley
2.5 Develop the Gloucestershire Environmental Business Forum to promote better environmental practices at work and at home.	EA Industry C&GCHE Business Link Others		U	2	✔	✔	✔	✔		R Wade

ISSUE 3 Pollution, health and amenity risks from existing inadequate waste management licences

OBJECTIVE:

- Improve standards of waste disposal through the review of waste management licences.

The Environment Agency has inherited the role of issuing and supervising licences from 83 former Waste Regulation Authorities in England & Wales. The main objective of waste management licensing is to ensure that waste management activities do not cause pollution of the environment, harm to human health or serious detriment to amenities of the locality.

We regularly review licences to ensure that the conditions remain appropriate and effective in achieving this objective.

The Agency has examined all licences across the Severn Vale in order to identify sites that pose a higher risk to the environment, human health and amenity, where we feel that licensing controls can be improved. From that study, we have prioritised sites for licence review. All priority sites are those whose licences have been inherited from the former Gloucestershire County Council Waste Regulation Authority. 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 to the environment, human health and local amenity.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
3.1 Undertake technical licence and working plan reviews on 6 identified priority sites.	EA	Licence Holders	R	✔	✔	✔				R Wade
3.2 Undertake technical licence and working plan reviews on remaining licences, prioritised according to risk to the environment and human health.	EA	Licence Holders	R		✔	✔	✔	✔		R Wade

ISSUE 4 Public concern over the regulation of land spreading of materials for agricultural purposes, in particular the spreading of abattoir waste

OBJECTIVE:

- Improve standards of land spreading of waste for agricultural purposes to ensure such activities are not detrimental to the environment, human health and local amenity.

Land spreading of specified controlled organic waste, such as waste from abattoirs and food processing, is an activity deemed exempt from waste management licensing under the Waste Management Licensing Regulations 1994 (schedule 3, paragraph 7), providing it is beneficial to agriculture or results in ecological improvement. This does not include sewage sludge from sewage treatment works, as the spreading of this waste on land is controlled under the Sludge (Use in Agriculture) Regulations 1989.

The Waste Management Licensing Regulations state that the Agency must be supplied with details of exempt activities including a description of the waste, and an estimate of the quantity, location and intended date of spreading, before spreading is to take place.

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, particularly blood and gut contents from abattoirs. The Parish's concerns related to the potential for spread of pathogens from this source. Other complaints related to malodour, and there are also concerns over the potential for pollution and eutrophication of surface or ground waters from this source.

The Agency registers and monitors such activities. There is however, a need to ensure that those involved in land spreading are aware of the requirements of the legislation. Liaison with Local Authorities is needed to ensure that they are aware of the time and location of spreading for environmental health purposes.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
4.1 Targeting of farmers to ensure that spreading of waste on land is of benefit to agriculture.	EA	Farmers	R	✔	✔	✔	✔	✔		P Quinn
4.2 Hold liaison meetings with appropriate consultants.	EA	Consultants	R	✔	✔	✔	✔	✔		P Quinn
4.3 Liaise with other land spreading contractors as appropriate.	EA	Contractors	R	✔	✔	✔	✔	✔		P Quinn
4.4 Liaise with Local Authorities regarding exempt activities.	EA	LAs	R	✔	✔	✔	✔	✔	✔	P Quinn

ISSUE 5 Public concern over increasing incidents of fly-tipping

OBJECTIVE:

- Work with local authorities and others to obtain information on fly-tipping and devise a means of combating it.

There is concern over what is seen to be an increasing incidence of waste being fly-tipped and the impact this has on the environment.

During 1999 the Agency, with support from a number of organisations such as the Local Government Association, the NFU and the Tidy Britain Group, established a National Fly-Tipping Stakeholders Forum to develop and implement a co-ordinated approach to dealing with fly-tipping. We are now seeking to establish local fora involving Local Authorities, landowners and others to take action to combat fly tipping. Outputs from the fora will be:

- A contact list of those who deal with fly tipping issues;
- An agreement on who responds to fly-tipping incidents and the level of response;
- A co-ordinated approach to enforcing against those fly-tipping wastes.

Fly-tipped chemical drums

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
5.1 Establish a local Fly Tiping Stakeholders Forum for the Forest of Dean.	EA	Forest of Dean DC Forest Enterprise Gloucester -shire Police	R	✔	✔	✔	✔	✔		P Quinn
5.2 Establish further local Fly Tipping Stakeholder Fora.	EA	LAs Police LOs	R		✔	✔	✔	✔		P Quinn

ISSUE 6 Managing air quality - strategies and information

OBJECTIVE:

- Work with local authorities to achieve National Air Quality Standard.

The Environment Act 1995 introduced the system of Local Air Quality Management (LAQM). Under LAQM, Local Authorities have a statutory responsibility to carry out periodic Air Quality Review and Assessments in their areas, and to produce Local Air Quality Plans. The purpose of this is to ensure compliance with standards and objectives given in the Air Quality Regulations 1997 and National Air Quality Strategy 1997.

Each Air Quality Review and Assessment is a three-stage process:

Stage I: Identification of sites that may have a significant impact on air quality

Stage II: Analysis of quantity of substances released and possible effects on air quality

Stage III: Designation of Air Quality Management Areas (AQMAs) where the standard of a specific pollutant is likely to be exceeded in 2005.

All local authorities monitor for some air quality parameters using diffusion tube networks, and some have on line monitors. The Environment Agency monitors discharges to air from Part A Processes in order to check the monitoring carried out by the operator as required by their IPC authorisation.

Under LAQM, the Agency is acting as a statutory consultee and is providing information to Local Authorities relating to the impact on air quality of Part A processes. This has already been done for South Gloucestershire and Bristol, who have now progressed to Stage III of LAQM. Some ongoing liaison is required with regard to proposed gas fired power stations in Avonmouth (see Issue 9). No Part A processes exist within those parts of Herefordshire or Worcestershire that fall within the Severn Vale.

Local Authorities in Gloucestershire have progressed to Stage II of LAQM, and have commissioned an emissions inventory based on available data for transportation, industrial and domestic sources throughout the county. The inventory shows the predominant contribution of transport in relation to releases of carbon monoxide, oxides of nitrogen and VOCs. Transport also contributes significantly to emissions of sulphur dioxide.

Part A Processes are unlikely to have a significant impact on air quality within Gloucestershire. Nevertheless, industrial emissions can impact at the local level, for example emissions from coal burning or quarrying. Furthermore, as Gloucestershire is predominantly rural, ambient pollutant concentrations may also be a factor of the prevailing winds blowing pollution into the county from industry elsewhere, for example Avonmouth or South Wales.

ACTIONS	RESPONSIBILITY LEAD	RESPONSIBILITY OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
6.1 Collaborative project with Local Authorities to identify the effects of Part A Processes on Gloucestershire air quality.	LAs	EA	4	2	2					R Wade

ISSUE 7 The Impact of the Cleansing Services Group Ltd chemical treatment and recovery plant, Sandhurst, Gloucester, on local air quality

OBJECTIVES:

- Assess the impact of emissions from the Cleansing Service Group Ltd site on human health and the local environment;
- Ensure high standards of waste disposal at the site.

In the summer of 1997 the Agency received numerous complaints of malodour in the locality of Cleansing Services Group (CSG) 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 the possible health effects of long and short-term exposure to gaseous emissions from this site. The complaints have continued but have reduced in numbers.

CSG operate a licensed waste management facility. The site conducts processes for the treatment of waste for final disposal both on and off site. It also has facilities for the 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.

Under the Environmental Protection Act 1990 the Environment Agency has a duty 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. This is enforced through the issue of a waste management licence with conditions that can be modified and subject to periodic review.

The conditions of the licence were modified in May 1999 to impose more stringent controls on the operations at the site. A comprehensive consultation exercise was undertaken before the modification was issued. The licence modification addresses key areas of concern, including waste acceptance and sampling procedures, storage, monitoring, flooding, and requires the licence holder to undertake a risk assessment and implementation plan for remedial measures.

Many of the parties involved in this issue attend the Local Liaison Group meetings. This group includes representatives of Cleansing Services Group Ltd, Gloucestershire County Council, Tewkesbury Borough Council, Sandhurst, Maisemore and Longford Parish Councils and the Agency.

The Agency has been monitoring ambient air quality in the area surrounding the site since April 1998. Sampling tubes have been in place at several locations in the surrounding parishes and are sent to the Agency laboratory for analysis for a small suite of indicator volatile organic compounds (VOCs). This type of monitoring seeks to assess the long-term impacts of emissions. For the future, we wish to increase the number of sampling points and look at short-term monitoring both on and off site to help identify sources of emissions and assess the impact of individual occurrences.

Sampling of waste to ensure safe practices at Cleansing Services Group Ltd.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
7.1 Extend and improve current monitoring programme.	EA		R	✔	✔	✔	✔	✔		R Wade
7.2 Use portable monitoring equipment to measure emissions from individual activities or occurrences.	EA		R	✔	✔	✔	✔	✔		R Wade
7.3 Establish the potential impact of the emissions on human health and identify levels at which harm may occur.	EA	Tewks. BC HSE Glos. Health Authority	R	✔	✔	✔	✔	✔		R Wade
7.4 Produce summary reports for Residents' Liaison Group.	EA	Tewks. BC	R	✔	✔	✔	✔	✔		P Quinn

ISSUE 8 Implementation of the Pollution Prevention and Control Regulations in the Severn Vale

OBJECTIVES:

- Implement the proposed Pollution Prevention and Control Regulations;
- Develop practical working relationships with fellow regulators, in particular Local Authorities.

The Pollution Prevention and Control Act is scheduled to come into force in June 2000. The necessary regulations have been drafted by the Department of the Environment, Transport and the Regions and have been published for their fourth consultation.

Integrated Pollution Prevention and Control (IPPC) promises to be one of our most comprehensive and flexible tools for securing environmental improvements. It is based on an EC Directive that builds on the UK's Integrated Pollution Control (IPC) framework used to regulate releases to air, land and water from the 2000 most significant industrial processes since 1990.

IPPC covers a greater number of industries - some 6000 installations - including some waste sites, pig and poultry farming and food production. It covers a wider range of environmental issues including energy conservation, waste minimisation, noise, odour and site restoration. Most significantly it builds on the principle of looking at all the environmental impacts together.

The regulation of IPPC will be the shared responsibility of the Environment Agency and Local Authorities. In some cases environmental aspects previously dealt with by one organisation may now be dealt with by the other, for example noise and discharges to watercourses for smaller installations. This will require close co-operation between the Agency and Local Authorities in the sharing of information and technical expertise. With new industries coming under these regulations there is also a requirement to inform relevant companies about the issues involved.

The Act will be phased in over eight years. Only new permits and substantial changes to existing IPC authorisations and waste management licences will require immediate attention. Phasing gives time to develop the skills that will be needed as they are needed, and initial training is planned from now until March 2001. We will also gain experience in the best way of organising for IPPC.

The provisional timetable is:

2000: Act in force. Regulations issued. First permits to be issued for new installations and for substantial change to existing authorisations. Less than 150 of these expected in 18 months. Cement and lime, paper and pulp industries come under regulation. About 200 permits expected.

2001: Non-ferrous metal and glass industries come under IPPC. About 200 permits expected.

2002: Food and milk industries and large volume organic chemical production regulated under IPPC. About 1500 permits expected.

2003: Intensive poultry farming (about 500 permits), landfill sites (about 900) and surface treatment of metals (about 500) regulated under IPPC.

2004: Intensive pig rearing (about 500 permits), waste disposal and recovery other than landfill or incineration (about 1000 permits) regulated under IPPC.

2005 to 2007: All other industries covered by IPPC including large energy production plants.

October 2007: IPPC implementation complete.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
8.1 Liase with Local Authorities on implementation of the IPPC Regulations, including exchange of information and expertise.	EA	LAs	R		✔	✔	✔	✔	✔	R Wade S Chandler
8.2 Disseminate information on the requirements of IPPC to companies likely to be covered by the Regulations.	EA	Companies	R		✔	✔	✔	✔	✔	R Wade S Chandler

ISSUE 9 The potential impact of proposed gas power stations at Avonmouth on air quality

OBJECTIVES:

- Regulate major industry effectively, to achieve continual improvements in air quality;
- Work with local authorities to achieve National Air Quality Standards

Levels of Oxides of Nitrogen (NOx) in the Bristol area are a matter of concern to Bristol City Council and South Gloucestershire Council in respect of ensuring compliance with National Air Quality Standard (NAQS). The major contribution to NOx levels in the area is thought to be from traffic moving through the dense road system and the M5 and M4.

Industry at Avonmouth also makes a contribution, particularly Britannia Zinc and Terra Nitrogen (UK). Over the next few years however, there could be an increasing contribution from new gas turbine power stations. Currently, Seabank power station is completing the commissioning of a twin turbine unit, and has recently proposed construction of a third unit. There are also planning proposals from other developers for two smaller gas-fired power stations at Avonmouth, to meet peak electricity demands in the Southwest. 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 under conditions where the NOx abatement equipment does not work at full efficiency. This leads to higher NOx emissions

Seabank Power turbines: phase 1 construction

than during normal running and there is potential for the NAQS for NOx to be breached during 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 Management in the area. Bristol City Council has modelled NOx 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. The IPC Authorisation for the Seabank Power site includes restrictions on the number of turbines that can be started simultaneously and these considerations might need to be extended to other sites, depending on the potential overlap of impact. 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.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
9.1 Work with Bristol City Council & South Gloucestershire Council to determine conditions under which NAQS for NO_x might be exceeded in the Avonmouth Area.	Bristol City Council	EA South Glos. Council	R	✔	✔	✔	✔	✔	✔	R Owen

ISSUE 10 The control of major accident hazards involving dangerous substances (COMAH)

OBJECTIVE:

- Implement the requirements of the EC Seveso II Directive in order to ensure Control Of Major Accident Hazards involving dangerous substances.

In order to meet requirements under the EC Seveso II Directive (96/82/EC), the UK will introduce the Control of Major Accident Hazards (COMAH) Regulations over a three-year period, beginning in April 1999. The Health and Safety Executive and the Environment Agency will act as a joint Competent Authority in enforcing these regulations.

Albright & Wilson UK Ltd., Avonmouth

Under COMAH, sites with inventories of certain dangerous substances may fall into either top tier or lower tier categories. The difference between these categories relates to the quantity of material that is or could be on site.

All COMAH sites must have a Major Accident Prevention Policy (MAPP). For top tier sites this must be supported by the submission of a Safety Report that is reviewed by the Competent Authority. All sites must be inspected against the Competent Authority's inspection plan.
The objective is for operators of sites to take proportionate measures to reduce risks at such sites to "As Low As is Reasonably Practicable" (ALARP).

In assessing submitted reports, the Competent Authority seeks to identify any deficiencies. The Competent Authority has powers, if serious deficiencies exist, to take regulatory action.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
10.1 Site notification and classification.	Operator	Competent Authority	R		✔					R Mair R Owen M Smith
10.2 Submission & assessment of Safety Report.	Operator	Competent Authority	R			✔	✔	✔		R Mair R Owen M Smith
10.3 Generation of site specific emergency plans and tests.	LAs	Operator Competent	R			✔	✔	✔		A Boyd N Garwood
10.4 Inspection to ensure compliance.	Competent Authority		R			✔	✔	✔	✔	R Mair R Owen M Smith
10.5 Formal notification to Europe of any COMAH incidents.	DETR	Operator Competent Authority	R			✔	✔	✔	✔	R Mair R Owen M Smith

ISSUE 11 Climate change leading to increased flood risk

OBJECTIVE:

- Take into account the potential effect of climate change when planning flood defence maintenance and improvement programmes.

There is now a broad scientific consensus that, for whatever reason, the climate is changing. Predicted changes in rainfall pattern are likely to result in increased surface run-off during winter, so increasing the risk of flooding. Furthermore, the relationship between climate change, sea level rise, land use planning and the response in terms of mitigating flood risk has significant implications for the sustainable development of the coastal zone.

Extreme flood events on fluvial watercourses may 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. Locations where it is not feasible or justifiable to undertake improvement works are likely to experience deterioration in the standard of protection from flooding in the future.

The direct consequence of climate change in the Severn Estuary is sea level rise. Designs for sea and tidal defences in the Estuary take this into account by incorporating a 5mm/year increase in height, over and above that required to protect to the correct standard for estuary defences, for their designed life-span. As well as increased fluvial flooding and flooding from storm and tidal surges, foreshore erosion in the Estuary may also increase.

Under the Habitats Directive (see Section 1.2.1 and Issue 32), all proposed works affecting the Severn Estuary European Marine Site are subject to review.

Flood protection and managed retreat are considered and planned for in the Severn Estuary Shoreline Management Plan (SMP). The SMP seeks to improve understanding of coastal processes, predict the likely future evolution of the coast, identify assets at risk and improve consultation between organisations with an interest in the shoreline. The plan will consider options for shoreline management, outline preferred approaches, recommend monitoring programmes and identify potential environmental enhancements. A Stage 1 scoping study has been completed and a Stage 2 report is expected in the spring of 2000.

Flood protection, managed retreat and sea level rise should also be taken into consideration in Coastal Zone Planning as set out in Government Planning Policy Guidance: PPG 20. In addition, the development of methods for retaining surface water where it falls can play a crucial role in addressing changes in seasonal rainfall and reducing flood risk (see Issue 24).

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
11.1 Identify defences in the Severn Estuary where capital improvements are not economically viable.	EA		R				✔	✔		MF Portsmouth
11.2 Develop a strategy for future maintenance regimes and/or managed retreat (see also Issue 25.3.3).	EA	MAFF LAs	R				✔	✔		MF Portsmouth

ISSUE 12 The potential for non-fossil fuel energy from hydropower and landfill gas

OBJECTIVES:

- Support the development of sustainable energy options where possible within the remit of our statutory obligations;
- Provide copies of our revised internal guidance on hydropower to external parties on request.

The Agency supports the development of renewable energy, including wind, solar, biomass, landfill gas, wave and tidal generation, as a sustainable way of producing energy and as one way of reducing emissions of greenhouse gases from human activities. However, we have no duty or powers relating to energy supply or demand, nor do we have the power to commit public funds to projects in private ownership. Furthermore, individual proposals for all forms of energy generation need to be considered carefully and in terms of their impacts on the environment as a whole.

There are proposals to promote small-scale hydropower generation schemes within the Severn Vale, principally on the Rivers Frome, Cam and Lyd. The Agency has a duty to ensure that any development affecting the riverine system or any water use does not cause detriment to the environment or to third parties. Our application of this principle is the same for hydropower as for any other use. The Agency would be failing in its duty if it were to allow any change to go ahead without adequate proof that this would not adversely affect the riverine system. As with all changes, the burden of proof is on the developer.

We will assess any hydropower proposals put to us by considering the impact on water quality, ecology, fisheries, water resources, land drainage, flood defence, and the effect on other lawful users and riparian owners.

We are currently revising our internal guidance on hydropower to update it in light of our experience in dealing with hydropower applications. We intend to give the British Hydropower Association the opportunity to comment on this guidance. Once completed, the guidance will be made more widely available on request, although it will be primarily aimed at an internal audience. The guidance will be available in the summer of 2000.

Sites in the ownership of the Agency at other locations within the Lower Severn Area will also be considered for their potential for hydropower generation. In particular, we will consider the feasibility of developing a renewable energy

Tilt gate, fish pass and turbine on the River Cam

demonstration site at Lydney Docks, to be developed and managed under the Lydney Docks Management Trust (see Issue 36).

The biodegradation of waste in landfill sites produces methane gas, which can be used for power generation. Methane is a greenhouse gas, and so its use for power generation both reduces emissions from landfill sites and provides an alternative to fossil fuel sources. Two sites in the Severn Vale LEAP area already produce energy from landfill gas; the Hempsted site at Gloucester and the Harnhill site at Olveston. Feasibility studies are also underway at the Berwick Farm Landfill site at Hallen. We will encourage other landfill operators to generate electricity where appropriate.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
12.1 STROUD VALLEYS: assess any proposed developments and deal with any formal applications when submitted.	EA	LOs LAs Developers of Hydropower BHA	R	✔	✔	✔	✔	✔		J Banks J Sherwood
12.2 RIVER LYD: Investigate the feasibility of developing a renewable energy demonstration site at Lydney Docks.	Lydney Docks Manage-ment Trust	SWEA Energy 21	U	✔	✔	✔				J Banks W Reed
12.4 Investigate hydropower potential for weirs in Agency ownership in Lower Severn.	EA	LAs	58	5	✔	✔	✔			J Banks
12.5 Identify landfill sites where energy generation is possible.	EA Landfill operators DTI		R	✔	✔	✔	✔	✔		R Wade S Chandler
12.6 Make available to external parties the revised Agency internal guidance on hydropower.	EA		R	✔	✔	✔	✔	✔		J Sherwood

ISSUE 13 Maintaining River Severn flows to the estuary

OBJECTIVES:

- Manage water resources in order to achieve the proper balance between society's needs and the environment
- Maintain a minimum flow to the Estuary
- Meet the requirements of the EC Habitats Directive.

There are many demands on the water resources of the River Severn. From its source to the Estuary, the river supports many uses including abstractions for public water supply, agriculture and industry, in addition to in-river uses such as navigation and recreation.

The Agency must balance the demand for water with the need to protect the wider environment, considering issues such as water quality, wildlife, public health and fisheries. This balance is achieved by following the Severn Control Rules. These specify when releases of water should be made from Llyn Clwedog, Lake Vrynwy and a network of boreholes in Shropshire in order to maintain statutory flow requirements at Bewdley and support to flows in the Estuary. The river flow measured at the Agency's gauging station at Bewdley provides a trigger for releases to be made. To improve our management of the Severn we need to re-consider whether the

Control Rules properly reflect the balance needed. We are also presently developing a drought contingency plan for the Severn system that will help us to operate it in a sustainable way during periods of low rainfall.

Our management of the Severn Estuary must be in line with the requirements of the EC Habitats Directive (see Section 1.2.1). To this end, we will be undertaking a review of existing and new abstraction licences in line with the Directive, so that our actions do not compromise the conservation objectives for the Estuary (see also Issue 32).

Water is taken by British Waterways into the Gloucester Sharpness Canal both for navigation purposes and to support abstractions made from the canal. The largest abstraction from the canal is made by Bristol Water and a recent operating agreement was put in place to modify the pumping regime from the Severn so that the amount of water taken during adverse conditions is reduced.

Dealing with the siltation of the canal and the East Parting at Gloucester is also an issue. British Waterways dredge the canal to remove silt deposited, and the East Parting must also be maintained at a navigable depth. Options to manage siltation are being considered.

To meet water demands in the South East there is a possible option to transfer water from the River Severn to the River Thames catchment. This would have a range of potential environmental effects on both the Severn and Thames catchments and is not currently a favoured option. Where this option to be pursued, the onus would be on Thames Water to assess the environmental impacts and prove that the development is sustainable.

The Severn Estuary Shoreline Management Plan and Strategy for the Severn Estuary (see Section 1.2.1) are currently in preparation. These plans will act as a strategic guide for the Control Rules and their effect on the maintenance of an acceptable flow from the river's lower reaches into the Estuary.

ACTIONS	RESPONSIBILITY LEAD	RESPONSIBILITY OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
13.1 Review of the river operation rules for reservoirs and Shropshire Groundwater to provide flows to the Estuary at Gloucester.	EA	WCs BW SES NFU CLA EN	R	✔	✔	✔	✔	✔		G Davies
13.2 Review of the maintenance and frequency of operation of Sharpness Docks to prevent loss of freshwater from locks during operation.	BW	EA	U		✔	✔				J Sherwood
13.3 Feasibility study of adjustable weirs at Maismore and Llantony.	BW Bristol Water EA	EN LAs VCOs	R	✔	✔					P Bailey
13.4 Ensure that existing and new water abstraction licences do not adversely impact on sites of international importance for wildlife (see also Issue 32).	EA	EN Abstractors	R	✔	✔	✔	✔	✔		J Sherwood J Poole

ISSUE 14 Low River Flows

OBJECTIVES:

- Investigate the causes of low flows in rivers and develop a programme for restoring flows where appropriate;
- Manage water resources to achieve a sustainable balance between the needs of society and the needs of the environment;
- Ensure that there is no deterioration in the quality of the aquatic environment;
- Contribute to the delivery of Biodiversity Action Plan targets for water dependent habitats and species.

Low flows can have a detrimental effect on the ecology of a river. Decreasing flows and resultant lowering of the ground water table may reduce the ability of the river and associated habitats to support wildlife and fisheries. Water quality can deteriorate as dilution of contaminants decreases, and dissolved oxygen may be reduced. Abstractors are also concerned when river flows decrease as this may prevent them from abstracting the water they need. Where low flows occur in tributaries, the combined effect on the receiving watercourse can be significant.

Many factors can cause the flow in rivers to be reduced. For example, during drought periods when there is little rainfall to replenish them, river flows may decrease or in some instances stop completely. This is part of the natural cycle of a riverine system. However, there are also instances when human activity, such as abstracting water or changing the flow patterns as a result of urban development, can cause unacceptably low flows in rivers. Finding out what has caused the low flow is the first step in deciding whether action is necessary or indeed possible.

A reduction in dissolved oxygen can lead to river stretches failing their River Quality Objectives (see also Issue 21). Appendix 6 shows those stretches where low river flow may be a factor in an RQO failure. In the Leadon catchment the Red Brook is an example where RQO failures may be linked to rapidly dropping flows during dry summer months. These and other similar situations require further investigation.

Low flows have been reported in the River Lyd and River Frome catchments. The flow in Blackpool Brook in the Lyd catchment may have decreased and the upper reaches of the River Frome may also be suffering from low flows. Initially there is a need for improvements in the monitoring of flows in both these catchments. This may require the installation of an additional gauging station in the lower reaches of the Lyd and in the upper reaches of the Frome (see Issue 15).

Any additional action beyond flow monitoring will be dependent on the results of that monitoring.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
14.1 Identify stretches of river that fail their RQOs because of low flows.	EA		R	✔	✔	✔	✔			P Quinn
14.2 Investigate potential solutions for those water courses failing their RQOs because of low flows. Prioritised for those supporting BAP habitats and species (see also Issue 33).	EA	Abstractors			✔	✔	✔	✔		J Sherwood
14.3 Where flow measurement is feasible (See Issue 15.2 & 15.3), use flow measurement data to determine what action is appropriate on the Frome and the Lyd.	EA	LOs Abstractors WC	R					✔	✔	J Sherwood

ISSUE 15 The need for improvements to river gauging stations

OBJECTIVES:

- Improve existing flow measurement and river level gauging stations to ensure accurate and reliable data for the sustainable management of water resources and to help protect people and property from the risk of flooding;
- Assess the potential for new flow measurement sites to investigate low flows and to aid flood forecasting and warning.

The Agency is responsible for managing water resources and for providing an effective flood warning system. For these reasons it needs to maintain a hydrometric network which provides good quality data.

A review of the data from the Berkeley flow measurement station on the River Little Avon has shown that the required standard for accuracy and reliability is not being met. Options for improvements to the station will be evaluated in 2000/2001, and plans prepared for improvements.

Several rivers in the catchment are perceived to suffer from periods of low flow (see Issue 14). These include the Rivers Lyd and Frome. There is a need to provide flow measurement on these rivers to gain a better understanding of the causes of these low flows.

The floods of 1998 highlighted the need for an extensive network of flow and level gauges (see also Issue 25.4.2). In the Severn Vale new gauges are proposed for the River Severn and its flood plain, for the River Chelt, River Frome and the Hatherley and Horsbere Brooks. The time scale for installation of these gauges is subject to finance being available and the agreement of landowners.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
15.1 Evaluate options for improvements to the gauging station at Berkeley and prepare work plans.	EA		5	5						R Callendar
15.2 Investigate feasibility of and if appropriate provide new flow measurement station on the River Lyd.	EA	LOs	160	16		14 4				J Sherwood P Ridley
15.3 Investigate feasibility of and if appropriate provide new flow measurement station on the upper reaches of the River Frome.	EA	135					15	12 0		J Sherwood SW Branchett
15.4 Installation of gauges for improved flood warning/flood defence planning:	EA	LOs LAs								S W Branchett P Ridley
Kempsey			45		45					
Longdon Marsh			8		8					
Hasfield Ham			20	20						
Hatherley/Horsbere			8		8					
Cheltenham			10	10						

ISSUE 16 Proper use of water resources

OBJECTIVES:

- Manage water resources to achieve a sustainable balance between society's needs and those of the environment;
- Promote in an appropriate way the concepts of demand management and water use efficiency so as to ensure that new sources of water are developed only where necessary;
- Encourage water conservation initiatives and provide information about minimising water use.

Each of us today in the Severn Vale LEAP area uses between 130 and 160 litres of water daily. With a population rise predicted for the Severn Vale and the construction of more houses proposed, demand for public water supply is increasing. Predictions suggest that if demand is not managed water use in the Severn Vale will increase by 9% by 2020.

The Agency believes that water resources must be managed in a sustainable manner. This means that, as far as possible, the development of any new resource should not have an irreversible negative impact on the environment. We seek to achieve this through a system of abstraction licensing.

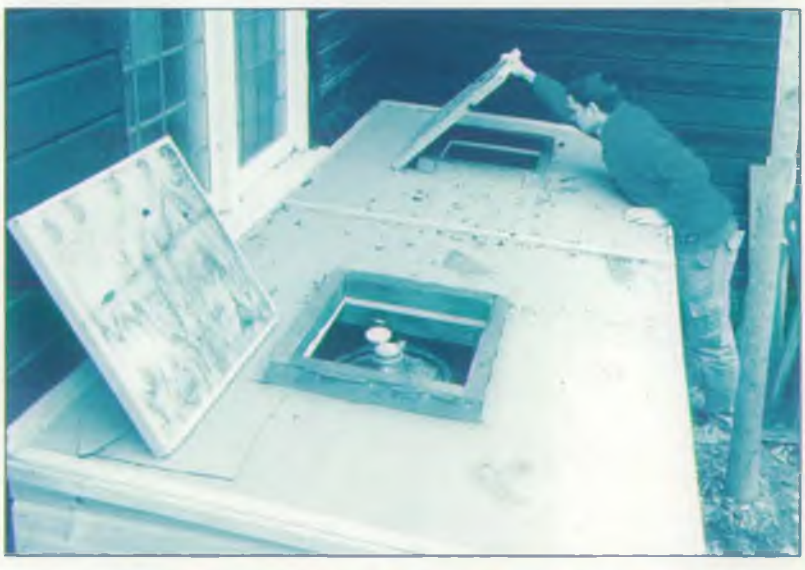
With a few exceptions, no-one may take water from rivers, lakes or underground without an abstraction licence from the Agency. The licence will specify how much water can be taken and may include conditions that stop the licence holder from using water if continued use might damage the environment. Such conditions are usually designed to protect rivers or wetlands during periods of low rainfall. New licences are usually time limited to allow the Agency to review the licence and its environmental impact at regular intervals. In considering a new application for an abstraction licence, we aim to ensure that the abstraction from the environment will remove only the amount of water that is truly needed.

The Agency works with the Water Companies and OFWAT to encourage a reduction in the public's demand for water. When a Water Company needs to make more water available to its customers, we expect them to consider, alongside resource development, options to:

- Use water efficiently at sources and at water treatment works
- Manage losses in the water distribution system, for example by pressure reduction and repair of leaks. This should achieve an agreed level of leakage which is less than 100 litres per property per day by 2020.
- Modify their customers' demands for water, for example by promoting low water use appliances in the home or simple devices that reduce toilet flush volumes, as well as education programmes.

We also encourage farmers and growers to build winter storage reservoirs and use irrigation scheduling and soil moisture measurement in order to target their water use efficiently. Where appropriate, we will also work in partnership with others to help them minimise their water use.

Although it is the duty of the Water Companies to promote water conservation to their customers, we also raise awareness of wise use of water by providing educational information on how to save water.



Rainwater harvesting system, St. Aldate's Centre, Gloucester

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
16.1 Water Use Minimisation: Industrial and farm audits.	EA	Abstractors MAFF LEAF	R	S		✔	✔	✔		J Sherwood
16.2 Water Conservation Initiatives: education and promotional material.	EA	WCs LAs	S		S					J Sherwood
16.3 Where appropriate, work with others in water conservation and water use minimisation projects.	Waste Minimisation Groups GEBF NFU WCs	EA	U	✔	✔	✔	✔	✔		J Sherwood

ISSUE 17 The impact of changing land use practices on the water environment

OBJECTIVES:

- Restore, and increase the number of, rivers and still waters capable of supporting viable fish and invertebrate populations, by reducing sediment deposition in the catchment;
- Restore spawning grounds for freshwater fish, by reducing sediment deposition in the catchment
- Control eutrophication associated with sediment deposition, 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.

Over the past fifty years there have been dramatic changes in rural land use and practices. Agriculture has intensified, become industrialised and more specialised. The use of chemicals, particularly mineral fertilisers and pesticides, is now standard practice in agriculture. Significant changes have also taken place in forestry, mineral extraction, construction for transport and urbanisation, as well as recreational use of the land. Activities associated with these changes can impact on soil quality, soil erosion, and it's run-off to watercourses.

The Government's strategy for sustainable development, *'A Better Quality of Life'*, states that soil will receive equal protection to air and water in the future. The Department of the Environment, Transport and the Regions will be making a draft soil strategy for England and Wales available for public consultation shortly.

Damage and disturbance to the soil often occurs in wet conditions and may be caused by animals' hooves, cultivation, excavations and vehicles travelling over the land. The consequence is the generation of sediment-laden water on the land, which can run-off into watercourses. Sediment deposition in watercourses can seriously affect the survival of salmonid fish and the diversity and abundance of invertebrates. The entry of phosphorus into watercourses from diffuse sources is usually sediment associated and so sediment loss from agricultural land can also contribute to eutrophication of watercourses.

There is therefore a need to identify those land use practices which contribute most to sediment loss from land to watercourses, and to raise awareness within the farming community of soil erosion and the impacts of sedimentation in watercourses.

Parts of the Severn Vale support sheep farming, cereal and fruit crops. The pesticides used in these activities pose a potential threat to the water environment. During 1997, Environmental Quality Standards were exceeded four times for water quality in the Leadon catchment, as identified through our permissive sampling programme. In all cases the exceedences were for agricultural pesticides. The pesticides found were diazinon, propetamphos and mevinphos. There was also an exceedence on the Gloucester Sharpness canal for endosulphan. These

problems may occur in other areas within the Severn vale, and there is a need to establish the extent to which this is so.

The Agency has chosen the Leadon catchment as the subject of a study into the effects of agricultural run-off and siltation on water quality and the river ecosystem. The catchment will also be the subject of a pilot campaign to promote Best Management Practices (BMPs) to reduce sediment loss to watercourses. These BMPs must be cost-effective and easily introduced into farm management. The benefits of this initial campaign will be assessed and the potential for similar campaigns in other parts of the Severn Vale will be examined.

We have also begun a targeted monitoring programme to identify pollution from diffuse sources in the Severn Vale, initially focussing on the Leadon catchment. This will be developed in other parts of the Severn Vale in due course. A campaign to encourage best practice in the use of pesticides will also be carried out where problems are identified.

MAFF have already produced a number of BMPs on the protection of soil and control of soil erosion. The Agency has also produced BMPs, which were open to public consultation between October and December 1999.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
17.1 Identify land at high risk from soil erosion and associated sediment pathways in the upper reaches of the Leadon catchment.	EA	Coventry University	16	14						M Scott
17.2 Raise awareness of soil erosion in the farming community and implement BMPs to reduce sediment loss from land to watercourses in the Leadon catchment.	EA Hereford-shire FWAG	LOs	32	8	8	8	8			M Scott
17.3 Assess the potential for similar studies and campaigns in other parts of the Severn Vale, and carry out where appropriate.	EA FWAG		R				✔	✔		M Scott
17.4 Instigate a targeted pesticide monitoring programme to identify possible pollution from pesticides, e.g. sheep dip, in the Severn Vale.	EA		R	✔	✔	✔	✔	✔		P Quinn R Wade
17.5 Promote good practice in the use of pesticides, where appropriate.	EA Hereford-shire FWAG	LOs	5		2	1	1	1		R Wade

ISSUE 18 Pollution of surface water intended for public water supply

OBJECTIVES:

- Ensure that all waters are of sustainable quality for their different uses;
- Deliver continuous improvements in overall water quality.

The Environment Agency is responsible for monitoring the quality of water abstracted at Surface Water Intakes for drinking water purposes. We ensure that the water complies with the limits for certain substances as specified in the EC Surface Water Abstraction Directive. Responsibility for the quality of drinking water supplied to consumers, however, lies with the Drinking Water Inspectorate.

Surface waters can be polluted from a variety of sources including road traffic accidents, industrial trade effluent, agricultural and road run-off, and failures of sewage treatment plants. Consequently, water abstracted for public water supply does intermittently fail to meet the requirements of the Surface Water Abstraction Directive.

Action is therefore required to minimise pollution and, where possible, eliminate these failures. Much of the routine work of Agency Officers is aimed at this, for example commenting on planning applications and requesting pollution prevention measures where necessary. We also provide pollution prevention advice. In addition, some actions aimed at minimising diffuse pollution from agriculture are included in Issue 17. Further action is required, however, to raise awareness of potential pollution problems, reduce the associated risks, and improve emergency response to pollution incidents, as discussed below.

The Fire Services are normally first on the scene at road traffic accidents and major industrial accidents including chemical spillage. This gives them a unique opportunity to deal with any potentially polluting spillage before it reaches 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 Services immediately notify the Agency of any potentially polluting spillage or significant fires so that our staff can be on site to give advice when required and to carry out any necessary follow up actions.

There is a Surface Water Intake on the Gloucester-Sharpness canal at Purton, operated by Bristol Water. The water is used to supply a large part of Bristol. British Waterways are the navigation authority for the canal, and abstract water from the Severn to maintain the navigable depth. There is already an agreement between Bristol Water and British Waterways on water resource matters (see Issue 13). A similar agreement for water quality matters would enable existing arrangements to be reviewed and formalised.

The Agency began work on a River Severn Risk Assessment project in 1997. This identified 250 premises that store substances that pose a significant risk to the water supply catchment. Visits to these sites are being carried out to assess the actual risks and discuss the necessary pollution prevention measures.

Building on the success of the national Oil Care campaign (see Section 4.6), Oil In Your Local Environment (OIYLE) is a Midlands Region campaign which aims to work in partnership with oil distributors. OIYLE will target industrial and domestic users of oil to raise awareness of the problems caused by oil pollution and encourage good practice in the storage, use and disposal of oil products.

Where a major pollution incident occurs, a number of parties will be involved in emergency response, depending on the nature of the incident. There is a need to update our emergency procedures with these parties.

Surface water intake on the Gloucester-Sharpness Canal, Purton

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
18.1 Continue to fund and develop the Fire Service initiative.	EA	CCs	20	4	4	4	4	4		J Batty
18.2 Promote an agreement on water quality issues with Bristol Water Ltd and British Waterways to ensure that the needs of both organisations are met.	EA	Bristol Water BW	R		✔					P Quinn
18.3 Complete the River Severn risk assessment project.	EA	Industry Farmers NFU	R	✔	✔					C Tucker
18.4 Conduct the OIYLE campaign targeting householders, farms, industry, schools and rural parish councils.	EA	FPS Oil Distributors	7.5		5	2.5				J Leather
18.5 Update emergency procedures for pollution incidents with Local Authorities and other Agencies.	EA	Government Oil Pipeline Agency LAs Government Depts.	R	✔	✔					P Quinn

ISSUE 19 The impacts of inadequate sewerage facilities on water quality

OBJECTIVES:

- Deliver a continual improvement in overall water quality;
- Ensure that all waters are of sustainable quality for their different uses.

Increase in population size and consequently in development leads to an increase in the quantities of household waste produced. The disposal of this waste can contribute to the pollution of the water environment. There are two related problems:

a) First time rural sewerage

There are many areas in the catchment which are not connected to mains sewerage, and inadequate facilities in these areas often lead to pollution. These include septic tanks located on soils of poor drainage and poorly maintained private sewage treatment works.

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 this is cost effective and existing facilities can be shown to be resulting in an adverse environmental impact. Areas where improvements to sewerage facilities in the Severn Vale may be required under this provision are listed in Appendix 7.

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

The Agency issues Consents to Discharge to controlled waters. However, some Consents to Discharge, were set a long time ago and consequently they do not reflect the standards that we now expect.

The mechanism for bringing about improvements at Water Company Sewage Treatment Works is known as the Periodic Review. The sites where improvements are required to meet statutory and non-statutory

standards in watercourses are initially identified by the Agency. Negotiations are held between DETR, the Office of Water Services (OFWAT), the Water Companies and the Environment Agency to determine what improvements the Water Companies will carry out. There have been 3 Reviews so far; AMP (Asset Management Plan) 1, AMP2 and we are currently in the midst of AMP3 (2000-2005).

The actions outlined below aim to identify those Sewage Treatment Works (STWs) that may have the potential to cause failures and to remedy them through the Asset Management Planning process. For example, improvements have already been carried out at Bristol Waste Water Treatment Works, Avonmouth, during AMP2 and further improvements are expected during AMP3. Continuous discharges that will be improved under AMP3 are given in Appendix 7. In addition, there will be improvements to intermittent discharges at approximately 31 sites in the Severn Vale.

Secondary treatment tanks under construction, Bristol Waste Water Treatment Works, Avonmouth

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
19.1 Investigate areas of sewage pollution and identify potential Section 101A applications.	EA	DCs	R	✔	✔	✔	✔	✔		B Blake C Tucker V Dennis
19.2 Provide technical response to Section 101A applications.	EA		R	✔	✔	✔	✔	✔		B Blake C Tucker V Dennis
19.3 Instigate Joint Workshop with Local Authorities on Section 101A.	EA	LAs	1	1						C Tucker
19.4 Monitor implementation of AMP3 programme.	EA	WCs	R	✔	✔	✔	✔	✔		K Riglar R Broome
19.5 Construct SIMCAT model of catchment to set standards to ensure statutory and non-statutory compliance and to identify sources of nutrients.	EA		30		30					R Wade
19.6 Identify STWs where improvements are required under AMP 4 to ensure statutory and non-statutory improvements in water quality.	EA	WCs	R				✔	✔		R Wade S Chandler

ISSUE 20 The effects of nutrients on the catchment

OBJECTIVES:

- Implement the Requirements of the EC Urban Waste Water Treatment Directive;
- Contol eutrophication, where feasible, in order to enhance biodiversity;
- 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;
- Assist in the achievement of favourable conservation status for water-dependent SSSIs and County Wildlife Sites.

In recent years the increased concentration of plant nutrients, a process known as eutrophication, in the rivers and lakes of the catchment has resulted in two related issues:

a) Changes in the ecology of rivers and canals

Eutrophication has increased the growth of plants and algae. This can in turn contribute to:

- Reduction in channel width and capacity;
- Daily variation in the concentration of oxygen in the river, placing stress on fish;
- Changes in the appearance of the river and the presence of blue-green algae.

Under the Urban Waste Water Treatment Directive, waters that show signs of eutrophication and receive sewage effluent from populations of greater than 10,000 should be designated as Sensitive Areas (Eutrophic). In 1998 the Rivers Leadon, Cam, Frome, and Chelt and the Gloucester - Sharpness Canal were all designated Sensitive Areas (Eutrophic). This means that phosphorus removal will be required at Ledbury STW, Coaley STW, and Stanley Downton STW by 2004.

b) Nitrate Vulnerable Zones

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

Nitrates are an important plant nutrient used in agriculture and are derived from farm animal waste or artificial fertilisers, amongst other sources. Sewage effluent also contributes to levels of nitrates in water.

Nitrates from agricultural sources must be controlled if they are found to exceed 50mg/l in catchments used for drinking water supply. If this is the case, the catchment must be designated a Nitrate Vulnerable Zone (NVZ) under the EC Nitrate Directive. This Directive is aimed at reducing nitrates from agriculture only.

There are two groundwater NVZs within the Severn Vale catchment. The larger of these is part of the Triassic sandstone aquifer around Bromsberrow. A smaller area of NVZ covers part of the Cotswold spring system that feeds the Hewlett Reservoir, but which naturally flows into the River Chelt. Within these Zones, farmers must follow the Action Programme for Nitrate Vulnerable Zones (England and Wales) Regulations 1998 when applying fertilisers.

Clearing excessive plant growth on the Gloucester-Sharpness Canal (courtesy of British Waterways)

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
20.1 Identify, designate and review any Sensitive Areas (Eutrophic) under the Urban Waste Water Treatment Directive.	EA	DETR	R		R					R Wade
20.2 Carry out investigation into eutrophication and devise action plans for areas suffering from eutrophication, eg Newent Lake.	EA		2				2			R Wade
20.3 Ensure Action Plans are implemented in NVZs.	EA	Farmers	R	✔	✔	✔	✔	✔		R Wade
20.4 Investigate impacts of eutrophication on water dependent SSSIs and County Wildlife Sites (see also Issues 32.6 & 33.3).	EA	EA VCOs	U	✔	✔	✔				R Wade

ISSUE 21 Failure to comply with river quality objectives

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;
- 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.

The Environment Agency has set water quality objectives for rivers and canals. These are known as River Quality Objectives (RQOs) and are used for planning the protection and improvement of the quality of watercourses. Achieving these objectives will help to sustain the use of water-courses for recreation, fisheries and wildlife and protect the interests of water abstractors. The Agency uses RQOs to guide discussions and actions to control and prevent pollution; for example they provide a basis for setting standards for Consents to Discharge. Appendix 6 lists significant failures in the Severn Vale based on data from 1996 to 1998. Twenty-three stretches of river failed to comply with their long term RQO's over this period.

Action plans will be developed to improve water quality on these stretches. Some actions have already been identified, as shown in Appendix 6. These include:

- The review of discharge consents where appropriate (see also Issue 19);
- The identification of low flows on relevant stretches and remedial action, where possible (see Issue 14); and
- The identification of and action to control diffuse and point sources of pollution (see also Issues 17 and 18).

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
21.1 Investigate reasons for RQO failures and produce Action Plans to ensure improvements.	EA	Dischargers, Abstractors, Farmers	R	✔	✔	✔	✔	✔		R Wade P Quinn S Chandler I Legge

ISSUE 22 Review of river quality objectives

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;
- 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.

River Quality Objectives (RQOs) have already been set for the Severn Vale catchment, but have been translated from a set of objectives dating back to 1979. As part of the Agency's efforts to achieve major and continuous improvements in water quality, we aim to review all RQOs for the catchment to ensure that they are still appropriate. This review does not mean that the Agency will change all RQO's, but some may need to be altered due to changes in the use of the watercourse.

Draft National guidelines have been produced on methods for reviewing RQOs. These are currently being considered by DETR and no work will proceed until these guidelines have been accepted by DETR.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
22.1 Review all River Quality Objectives in the Severn Vale catchment.	EA	All interested parties, e.g. Dischargers, Abstractors, Riparian Landowners	R			✔				R Wade S Chandler

ISSUE 23 Dangerous substances directive non-compliance for list II substances in the Severn Estuary

OBJECTIVES:

- Ensure that all waters are of sustainable quality for their different uses;
- Deliver a continual improvement in water quality.

The EC Dangerous Substances Directive sets out a framework to control the pollution of water by dangerous substances. The types of substances are split into two categories: List I and List II. Under the Directive, the Agency is required to monitor downstream of any site that is 'liable to contain' a dangerous substance.

There are two sample points in the Severn Estuary that have failed to comply with the standards set in the Directive. These failures have been for List II substances, which, although less toxic than List I substances, can have a harmful effect on the water environment. This is of particular concern for the Severn Estuary due to its status as a proposed Special Area of Conservation (pSAC), under the EC Habitats Directive (see Issue 32).

One of these failures, in the Estuary just off the Kingsweston Rhine at Avonmouth, is due to zinc concentrations. An investigation is underway to determine the source of this contamination.

There have also historically been failures for copper concentrations in the Estuary just downstream of Lydney STW, although in recent years the trend seems to be decreasing.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
23.1 Continue investigations to establish the source of zinc failure at Kingsweston Rhine.	EA		R	✔	✔					P Mitchell
23.2 Investigations to establish the source of copper failures in the Upper Estuary.	EA		R		✔					P Quinn

ISSUE 24 Managing surface water drainage from developed areas

OBJECTIVES:

- Work with local authorities and others to promote the use of sustainable drainage systems in order to control pollution and manage the river basin in an integrated way;
- Deliver continuous improvements in the quality of surface and ground waters;
- Ensure the sustainable use of water resources, particularly recharge of groundwater;
- Protect people and property against flooding from rivers;
- Conserve and enhance river and wetland habitats.

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

- Alterations to the natural flow regime:
  - Natural infiltration into the ground is inhibited, reducing groundwater recharge;
  - Larger quantities of storm water are discharged to watercourses more quickly, causing new or worsening existing flooding problems;
- Surface waters are polluted by oil, solids, metals, pesticides, and foul water due to wrong connections, accidental spillage, deliberate disposal to drains and the accumulation of pollutants over time.
- Impacts on wildlife and their habitats as a result of exaggerated channel erosion, siltation, and pollution (including mobilised bed material).

The choice of how to manage surface water drainage from developed areas, both existing and new, is thus a key issue in protecting the water environment. Traditionally, these problems have been treated individually and on a site-by-site basis, with little attempt at combining solutions or considering their impact on the water environment as a whole. The 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 increasingly difficult to sustain. Problems that are inter-related require solutions that are inter-related, and need to be managed within the context of the wider catchment.

Alternative approaches, known as Sustainable Urban Drainage Systems (SUDS) can alleviate the above problems in many cases, and the Agency is encouraging the use of these where appropriate and practicable. Groundwater recharge can be improved and flood risk reduced through the adoption of surface water source-control techniques such as porous paving and parking areas or infiltration drainage trenches or basins to return water directly to the ground. Flood risk can also be reduced through permeable conveyance systems that slow the speed of run-off, such as filter drains or grass swales.

The problems of polluted run-off can be reduced by the provision of natural or passive treatment systems, which allow for settlement, filtration and percolation into the ground. Such systems include grass swales, filter strips, detention basins, retention ponds and reedbeds. Both

retention ponds and reedbeds can develop significant wildlife value. However, their purpose as effective treatment systems relies on regular maintenance and thus disturbance.

Successful development and implementation of a sustainable drainage strategy for the catchment, including the application and maintenance of source control techniques, requires the close co-operation of a number of key players. These include Central Government, Local Planning Authorities, Highway Authorities, the Environment Agency, developers, Water Companies, industry, landowners and householders.

The Town and Country Planning process will be the principal tool for instigating change. Local Authorities will need to incorporate relevant policies in their Development Plans. South Gloucestershire Council already have such a policy in their emerging Draft Local Plan.

The Environment Agency and others, including the Scottish Environment Protection Agency, the International Association on Water Quality, the Construction Industry Research and Information Association, and Local Authorities have already produced best practice guidance for SUDS. The Environment Agency is also lobbying for SUDS to become a requirement in new developments under the forthcoming Building Regulations.

Local drainage groups have been established for Malvern Hills, Wychavon, Stroud and Forest of Dean (see also Issue 25.1.3), involving the Agency, Local Authorities and Internal Drainage Boards. The intention is to establish groups covering the entire Severn Vale. The Environment Agency and South Gloucestershire Council have also formed the South Gloucestershire Environment and Water Management Group, which recently produced a SUDS guide for developers. Amongst other things, these groups seek to promote the use of SUDS through the Town and Country Planning process, land drainage maintenance and meetings with developers.

ACTIONS	RESPONSIBILITY LEAD	RESPONSIBILITY OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
24.1 Identify Local Plan developments where SUDS will generate the most benefits.	EA	LAs	R	✔	✔	✔	✔	✔	✔	C Ward B Smith
24.2 Zoning study to identify areas that are suitable for infiltration drainage, flood detention or wetland treatment.	EA		5		5					J D Crabbe C Tucker
24.3 Discussions with Water Companies, District Councils and developers to lobby for acceptance of SUDS.	EA	WCs LAs Developers	R	✔	✔	✔	✔	✔		C Tucker J D Crabbe C Ward B Smith
24.4 Incorporate appropriate policies in Local Plans.	LAs	EA	R	✔	✔	✔	✔	✔	✔	C Ward B Smith
24.5 Disseminate design and maintenance guidance for infiltration systems and wetlands.	CIRIA EA	LAs	R	✔	✔	✔	✔	✔	✔	C Tucker J D Crabbe V Dennis
24.6 Promote best practice amongst developers.	EA	LAs	R	✔	✔	✔	✔	✔	✔	C Ward B Smith J D Crabbe C Tucker

ISSUE 25 Managing flood risk

OBJECTIVES:

- Work with local authorities and others to ensure that new development does not increase flood risk;
- Maintain, operate and improve protection against flooding from rivers and the sea, where appropriate;
- Continue to improve our flood warning service in flood risk areas;
- Promote and enhance biodiversity, wherever possible, when carrying out water management functions.

Floods can pose risk to life and property, as demonstrated by the Easter and October/ November 1998 floods. This risk can be reduced by managing human activities that have an impact on flooding. This includes regulating new development, maintaining river channels, and the provision of flood alleviation schemes and flood warning to allow individuals to limit flood damage. There are several organisations that can help by using their permissive powers, although the responsibility remains with the individual.

The inundation of floodplains is, however, both natural and desirable - where it can occur without risk to human life. Periodic flooding is essential for many habitats and their species (see also Issues 32 and 33), and allowing flooding to occur in some areas can alleviate flooding in others.

a) Development Control

Local Planning Authorities control new development through the Town and Country Planning System (see Issue 39). There are three main considerations relating to flood risk and new development:

- Proximity to a watercourse
- Flood plain conservation
- Surface water runoff (see Issue 24)

b) Regulating the Activities of Others

In addition to development control through the Town and Country Planning System, the Agency has direct powers to control certain works on and to watercourses. These powers are more extensive on Main Rivers which are also covered by Land Drainage Byelaws.

c) Maintenance and Improvement of Watercourses and Defences

The responsibility for maintenance of all watercourses rests with riparian owners. The Agency has permissive powers to carry out works on Main River channels and flood defences. Other bodies have similar powers over ordinary watercourses.

d) Flood Warning

The Agency provides a Flood Warning service in the Severn Vale as shown in Section 2.11. We are continuing to improve our flood warning service including implementing the recommendations made by the Independent Review of the Easter 1998 floods.

Issue 25.1 Development Control

ACTIONS	RESPONSIBILITY LEAD	RESPONSIBILITY OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
25.1.1 Continue to object to development that has an adverse effect on the river system, including flooding (see also Issue 39).	LAs	EA Developers RLOs	R	✔	✔	✔	✔	✔		J D Crabbe
25.1.2 Take advantage of redevelopment proposals to remove existing obstructions to flow and access, and to alleviate existing flooding problems.	LAs	EA Developers RLOs	R	✔	✔	✔	✔	✔		J D Crabbe
25.1.3 Set up Local Drainage Groups to ensure maintenance of ordinary watercourses and promote SUDS (see also Issue 24).	EA LAs	IDBs	R	✔	✔	✔	✔	✔		J D Crabbe

Issue 25.2 Regulating the Activities of Others

ACTIONS	RESPONSIBILITY LEAD	RESPONSIBILITY OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
25.2.1 Continue to ensure that new structures or works requiring Agency Consent do not exacerbate existing or cause new flooding problems.	EA	LAs IDBs Developers RLOs	R	✔	✔	✔	✔	✔		J D Crabbe
25.2.2 Carry out enforcement of permissive powers on Main Rivers.	EA	LAs IDBs Developers RLOs	R	✔	✔	✔	✔	✔		J D Crabbe
25.2.3 Carry out enforcement of permissive powers on Ordinary Watercourses.	LAs IDBs	EA Developers Riparian LOs	R	✔	✔	✔	✔	✔		J D Crabbe
25.2.4 Campaign to ensure that riparian owners fully understand their obligations and fulfil them to an acceptable standard	LAs IDBs EA	RLOs	R	✔	✔	✔	✔	✔		J D Crabbe

Issue 25.3: Maintenance and Improvement of Watercourses and Defences

ACTIONS	RESPONSIBILITY LEAD	RESPONSIBILITY OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
25.3.1 Ensure that Main Rivers are maintained to an appropriate standard.	EA	LAs IDBs RLOs	R	✔	✔	✔	✔	✔		MF Portsmouth
25.3.2 Ensure that Ordinary Watercourses are maintained to an appropriate standard.	LAs, IDBs RLOs	EA	R	✔	✔	✔	✔	✔		J D Crabbe
25.3.3 Identify potential biodiversity benefits from allowing flooding/managed retreat, and develop a strategy to deliver these through, e.g., capital works feasibility and projects such as the Severn and Avon Vales Wetland Project (see also Actions 11.2 & 33.6).	EA	Severn Wetlands Strategy Partnership LAs EN VCOs LOs	R (capital)	✔	✔	✔	✔	✔		MF Portsmouth C Beeching N J Edginton

Issue 25.4: Flood Warning

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
25.4.1 Identify all property owners and occupiers who would benefit from flood warning and who wish to participate in the present flood warning scheme.	EA	LAs Property owners and occupiers, Farmers.	R	✔	✔					SW Branchett
25.4.2 Improve accuracy and reliability of present flood warning system, i.e. rain and river gauge coverage (see Action 15.5) and forecasting models.	EA		R	✔	✔	✔	✔	✔		SW Branchett
25.4.3 Optimise involvement of Local Authorities, property owners and occupiers and emergency services in preparing for and managing flood emergencies.	EA	LAs Property owners and occupiers, Farmers Emergency services.	R	✔	✔	✔				SW Branchett
25.4.4 Investigate possible extension to the present flood warning scheme.	EA	LAs Property owners and occupiers Farmers.	R			✔	✔	✔		SW Branchett

ISSUE 26 Restoring river corridors

OBJECTIVES:

- Improve riverside landscapes;
- Work with local authorities and others to restore degraded watercourses and maximise the conservation and recreational value of our river basins;
- Use and promote best practice for the protection and restoration of river habitats.

Many watercourses, particularly in urban areas, have been straightened, deepened and cut to a uniform profile during the past in order to provide unobstructed flows. This has led to a loss of habitat and amenity value, and often gives a poor visual and landscape value to the watercourse as well.

A healthy watercourse requires sustained water flows, good water quality, a varied channel and sympathetic use of adjoining land. Rehabilitation requires an understanding of the complex issues surrounding the ecology, usage and flood characteristics of the watercourse, and a careful balancing of interests. There are many opportunities for river rehabilitation and improvement of both rural and urban watercourses in the Severn Vale.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
26.1 Identify watercourses that could benefit from river rehabilitation.	EA	LAs MAFF EN FRCA LOs	R		✔	✔	✔	✔		W Reed
26.2 Undertake feasibility studies on selected watercourses identified as benefiting from river rehabilitation.	EA	LAs MAFF EN FRCA LOs	6		✔	✔	✔	✔		W Reed
26.3 Identify and promote project partnerships for carrying out river rehabilitation works.	EA	LAs MAFF EN FRCA LOs	U		✔	✔	✔	✔		W Reed
26.4 Actively promote the strategic and opportunistic restoration and enhancement of watercourses through development proposals.	EA	LAs LOs Developers	U		✔	✔	✔	✔		C Beeching

ISSUE 27 Proposals to restore canals

OBJECTIVES:

- Ensure that the proposed restoration of canals results in no adverse impacts on the environment;
- Ensure that, where canals are restored, the environment and opportunities for recreation are enhanced.

There are three derelict canals in the Severn Vale whose restoration is being actively pursued by two charitable trusts in partnership with the Local Authorities. These are:

- Herefordshire and Gloucestershire Canal
- Stroudwater Canal
- Thames and Severn Canal

Herefordshire and Gloucestershire Canal Trust is promoting the restoration of the Herefordshire and Gloucestershire Canal, and in 1997 established a Steering Committee. The Agency is represented on this Committee.

The Cotswold Canal Trust is promoting the restoration of the Stroudwater Canal and the Thames and Severn Canal. A substantial part of the original route of the Stroudwater Canal remains in the ownership of the Company of Proprietors of the Stroudwater Navigation, who are also actively involved in its restoration. There is a Cotswold Canal Steering Committee, covering both of these canals, and a sub-group (Stroudwater Partnership Group), covering the Stroudwater Canal. The Agency is also represented on these fora.

Although these restorations would improve opportunities for the recreational use of waterways, as the principal regulator of the water environment, the Agency's primary role is to ensure that any restoration will not be at the expense of the wider environment. We are particularly concerned over potential impacts on:

- Water resources (see also Issues 13-14)
- Flood defence (see also Issue 25)
- Water quality (see also Issues 20 and 21)
- Nature conservation, ecology and fisheries (see also Issues 32 and 33)

The implications of any proposal will need to be considered in full and in the context of management of the whole catchment. The promoters must carry out a detailed environmental impact assessment before it will be possible to determine whether any scheme will have a beneficial or negative impact on the environment.

Both the Herefordshire and Gloucestershire Canal and the Thames and Severn Canal would link the Severn catchment with other major river basins. This poses the potential for water quality and ecological problems associated with the mixing of water from two separate catchments. Thames Water is no longer considering the use of the Cotswold canals to transfer water for supply purposes.

ACTIONS	RESPONSIBILITY LEAD	RESPONSIBILITY OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
27.1 Herefordshire & Gloucestershire Canal: Completion of current restoration feasibility study.	H&G Canal Trust	LAs EA	U	✔	✔	✔	✔	✔		J D Crabbe
27.2 Herefordshire & Gloucestershire Canal: Investigation of historic water rights.	EA	H&G Canal Trust LAs	U	✔						J Sherwood
27.3 Herefordshire & Gloucestershire Canal: Restoration proposals including environmental impact assessment.	H&G Canal Trust	LAs EA	U	✔	✔	✔	✔	✔		J D Crabbe
27.4 Cotswold Canals: Investigation of historic water rights.	EA	Cotswold Canal Trust LAs CPSN	U	✔						J Sherwood
27.6 Cotswold Canals: Production of definitive water reserves strategy for restoration.	Cotswold Canal Trust	EA LAs	U	✔	✔	✔	✔	✔	✔	J Sherwood
27.7 Cotswold Canals: Restoration proposals, including environmental impact assessment.	Cotswold Canal Trust	LAs EA	U	✔	✔	✔	✔	✔		J D Crabbe

ISSUE 28 Recreational use of, and access to, waterways

OBJECTIVES:

- Promote recreation on water and its associated land;
- Make best recreational use of Agency owned sites and to work with others to improve recreational opportunities at other sites;
- Take recreational opportunities into account in carrying out all our work.

Waterways provide opportunities for a wide range of recreational activities such as angling, walking, sailing, canoeing, cycling, horse riding, bird watching or quiet enjoyment. The provision and maintenance of access and associated facilities such car parks, overnight moorings, slipways, angling platforms, canoe launch points and way marking needs to be well planned so that people may enjoy their leisure without conflict and damage to landscape, flora and fauna.

British Waterways are the statutory navigation authority for the main River Severn as far as Gloucester and have helped to provide overnight mooring facilities at various locations. Marinas at Diglis (Worcester), Upton-upon-Severn 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 of the Severn 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. The Agency and others have carried out promotion of the Severn Way by leaflet and a guide.

The Severn Way, Gloucester – Sharpness Canal

The Severn Bore is popular with both sightseers and river users such as canoeists and surfers. The Agency provides predictive information on the Bore both in leaflet form and through interpretation boards at Minsterworth and Stonebench.

Canoeing throughout the catchment is facilitated by the Canoeists Guide to the River Severn, sponsored and printed by the Agency.

The Agency has a duty to maintain, improve and develop freshwater fisheries (see also Issues 34 and 35). We provide extensive free fisheries on the left bank of the Severn at Uckinghall near Ripple, and on the right bank just below Upton-upon-Severn. Both are available for match fishing by pre-booking.

Where rehabilitation of rivers or redevelopment of land adjacent to them is proposed, opportunities exist for improving access to the water environment and providing interpretation features, (see also Issue 26).

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
28.1 Refurbish angling platforms on Agency owned fisheries.	EA Canal Trust	EA	15	5	5	✔	✔	✔		C Beeching
28.2 Safer Severn Initiative: install signage at Gloucester Quay as part of collaborative project.	Gloucester -Sharpness Canal Users Forum	EA BW Glos. City Council	U	4						A Churchward
28.3 Improve access to watercourses, including overnight moorings and the provision of canoe launch points.	BW	EA RLOs BCU	U			✔	✔			C Beeching
28.4 Investigate the potential for canoeing in projects to construct new or refurbish existing river structures, e.g. white water facilities, safe exit routes and portage routes.	EA	BCU	U	✔	✔	✔	✔	✔		W Reed
28.5 Promote and maintain Severn Way from Worcester to Avonmouth.	County Councils	EA	U	U	U	U	U	U		C Beeching

ISSUE 29 Implementation of the Contaminated Land (England) Regulations in the Severn Vale, including the potential to develop partnerships

OBJECTIVES:

- Work with Local Authorities and others to identify, and report on the extent of, contaminated land;
- Regulate identified 'special' contaminated land sites effectively;
- Secure sustainable development of contaminated land that meets our environmental protection policies and targets.

The Department of the Environment, Transport and the Regions (DETR) has announced the implementation of Part IIA of the Environmental Protection Act 1990 and has published the final consultation draft Contaminated Land (England) Regulations and statutory guidance. DETR aim to bring the new regime into force on 1st April 2000.

Contaminated land is defined under Section 57 of the Environment Act 1995 broadly as land that, by reason of substances on or in it, poses a significant risk of pollution of controlled waters or harm to human health. To identify land as contaminated, the regulator must be satisfied that a linkage between a contaminant source, pathway and target are identified.

Under the new regime District and Unitary Authorities will have powers and duties to identify contaminated land and the appropriate person/s on whom to serve a remediation notice. Such notices must include prescribed information, including the nature of contamination, the significant harm or pollution and what remediation is the responsibility of each appropriate person.

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

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 joint training for Agency and Local Authority staff.

The Agency is already working with Local Authorities on remediation proposals, including the proposed redevelopments at Indalex, Cheltenham, and at Gloucester Business Park. Pro-active meetings between the Agency, Local Authority, developers, landowners and consultants prior to finalising remediation proposals can help to clarify the issues and address solutions to achieve sustainable development.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
29.1 Promote the use of sustainable remediation.	EA DCs & UCs		R		✔	✔	✔	✔	✔	R Wade
29.2 Establish partnerships to remediate Special Sites.	EA DCs & UCs	LOs RDAs	R		✔					R Wade
29.3 Exchange information with, and provide advice and guidance to, Local Authorities for sites prioritised on a risk basis.	EA	DCs & UCs	R		✔	✔	✔	✔	✔	R Wade

ISSUE 30 The impact of contaminated mineshafts on the surrounding environment in the Forest of Dean

OBJECTIVES:

- Identify the state and extent of groundwater pollution in the New Dun mine system;
- Regulate identified "special" contaminated land sites effectively, if applicable;
- Ensure that the nature conservation interest of these mines, in particular sites for breeding and hibernating horseshoe bats (see also Issue 32), are maintained and enhanced where possible.

Several mineshafts in the Forest of Dean have been filled with various waste materials without the benefit of regulatory control. The shafts enter Carboniferous limestone which is designated a Major Aquifer under the Agency's Groundwater Protection Policy. The prevention of pollution is of critical importance since, once polluted, groundwater can be extremely difficult to treat.

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

Furthermore, New Dun shaft has the potential to be designated a Special Site when the Contaminated Land (England) Regulations are implemented. If this is the case, our regulatory role may extend to include air quality in the mine workings. However, the initial investigation phase is unlikely to be affected by the new legislation.

The Mines Inspectorate also has concerns about the poor air quality in the mine system, thought to be a consequence of filling a number of ventilation shafts. Access to the mine workings around New Dun shaft is prohibited by the Mines Inspectorate due to the irrespirable atmosphere and will not be permitted until ventilation of the mine system is improved.

Gloucestershire County Council (as the former Waste Regulation Authority) and Watkins Engineering have commissioned site investigation reports. Remedial options have been discussed and, following a review of the options, the Agency is preparing a bid for capital funding through the Supplementary Credit Approval scheme. The funds will be used to improve ventilation within the mine system as a prerequisite to carrying out a groundwater risk assessment. A partnership involving the Agency, Forest of Dean District Council, Watkins Engineering, Forest Enterprise, the Deputy Gaveller, the Mines Inspectorate, English Nature, Clearwell Caves and Forest of Dean Cave Conservation and Access Group has been established to address this. The partnership will also address the wider issue of achieving a satisfactory solution to the issue in terms of environmental protection and public health and safety.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
30.1 Confirm partnership and clarify the responsibilities of each partner.	EA	Partners (see main text)	R	✔						R Wade
30.2 Tender and commission desk study, catchment survey and ventilation works (drilled ventilation and monitoring boreholes to intercept mine workings).	EA	Partners (see main text)	100		✔					R Wade
30.3 Sampling and analysis of groundwater and commission of groundwater risk assessment, depending on success of above actions and of the bid for capital funding.	EA	Partners (see main text)	50		✔	✔				R Wade
30.4 Cost-benefit review of remedial options.	EA	Partners (see main text)	U			✔	✔			R Wade

ISSUE 31 Contamination of Kingsweston Rhine System due to past practices at the Rhodia Ltd. landfill site, Kingsweston Lane, Avonmouth

OBJECTIVE:

- Investigate the specific risks and remediation needs of contaminated land at the Rhodia Ltd. (formerly Rhône Poulenc) landfill site.

There is contamination of the rhine system surrounding the landfill site at Kingsweston Lane, Avonmouth, which is operated by Rhodia Ltd. (formerly Rhône Poulenc). The contamination is likely to be due to the historic deposits of acidic based wastes deep within the site interacting with neighbouring deposits of metallic slags. These activities are historic prior to licensing controls.

The former owners of the site have carried out investigations into the sources and nature of the contamination. Information has also been gathered by the Local Authority, the Agency's predecessors, and by consultants for commercial interests seeking to develop land adjacent to the site. There is a need to collate this information, to consider appropriate remediation actions, and who will carry these actions out.

It is likely that the site and its environs will fall under the remit of the Contaminated Land (England) Regulations.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
31.1 Collate information on contamination at the site and its environs.	EA		R	✔						P Morley
31.2 Assess the options for remediation.	EA		R		✔					P Morley

ISSUE 32 Managing designated conservation sites of national (SSSI), European (SPA & SAC) and international (Ramsar) importance

OBJECTIVES:

- Play a full part in implementing the EC Habitats Directive and relevant regulations;
- Play a full part in delivering the UK's Biodiversity Action Plan, acting either singly or in collaboration with others;
- Improve the management of wetlands for conservation purposes;
- Assist in the achievement of favourable conservation condition for water dependent SSSIs.

The Conservation (Natural Habitats, & c.) Regulations 1994, which implement the EC Habitats Directive in the UK, are the most significant piece of nature conservation legislation since the Wildlife and Countryside Act 1981. Their main aim is to improve biodiversity through the conservation of natural habitats and wild fauna and flora in European member states. The regulations define and list these habitats and species and makes provision for identifying a series of Sites of Community Importance within which these habitats and species are represented. This series of sites is known as Natura 2000, and includes all Special Protection Areas (SPAs) and Special Areas of Conservation (SACs). The measures in the Habitats Directive are intended to maintain or restore certain natural habitats and species at or to 'favourable conservation status'.

Walmore Common and part of the Severn Estuary are designated as SPAs and Ramsar sites. The boundaries of these SPAs are coincident with the Ramsar boundaries and the internationally important species and numbers of birds that qualify them for SPA status are similar to those cited in the Ramsar Convention.

The Severn Estuary is also a proposed SAC (pSAC). The area of the Severn Estuary SAC is more extensive than that of its Ramsar and SPA designations as it includes a wider range of features including Atlantic salt marsh, a variety of mudflats and geomorphological processes. Three candidate SACs (cSACs) exist in the Forest of Dean which support breeding roost sites for lesser and greater horseshoe bats. The unimproved limestone grassland of Rodborough Common and the beech woodland of the Cotswold Beechwoods are also cSACs.

There are 120 Sites of Special Scientific Interest (SSSIs) in the Severn Vale. SSSI's are sites identified by English Nature as being of national importance for their flora, fauna, geological or physiographical features. The Environment Agency works with English Nature, landowners and others to protect and enhance these sites. The 43 water dependent SSSIs in the Severn Vale are most likely to be vulnerable to activities the Agency undertakes or regulates, such as flood defence works, water abstractions, and discharges. Four are thought to be in unfavourable condition

Walmore Common SSSI

due to water related issues.

MAFF requires all water-dependent SSSI's to have Water Level Management Plans (WLMPs) prepared for them by the appropriate operating authority. The integrated management of these aquatic habitats through WLMPs will be an important aspect of equating water level requirements for land drainage, agricultural and conservation needs. WLMPs have been written by the Agency for those four SSSIs where it is the operating authority. West Gloucestershire Internal Drainage Board's Water Level Management Plan for Walmore Common addresses some of the issues relating to its water dependency.

The Agency commissioned hydro-geological assessments of wetland SSSIs in the Midlands Region between 1995 and 1998, which examined their vulnerability to groundwater abstraction, in order to guide the management of water resources.

ACTIONS	RESPONSIBILITY LEAD	RESPONSIBILITY OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
32.1 Identify and review existing authorisations that may affect sites of European importance for nature conservation.	EA	Other Competent Authorities	U	✔	✔	✔	✔	✔		C Beeching
32.2 Undertake appropriate assessments of proposed activities that the Agency authorises or undertakes which are likely to have a significant effect on any European site.	EA	Other Competent Authorities	U	✔	✔	✔	✔	✔		C Beeching
32.3 Secure the protection of the Severn Estuary, a European Marine Site, through the development of a management scheme	EN	Relevant Authorities (including the Environment Agency)	U	✔	✔	✔	✔	✔		C Beeching N Birula
32.4 Implement agreed actions from WLMPs for which the Agency is the operating authority: Upton Ham SSSI, Upton-upon-Severn Severn Ham SSSI, Tewkesbury Old River Severn SSSI, Tewkesbury Coombe Hill Canal SSSI.	EA	EN WTs LOs NFU	U	✔	✔	✔	✔	✔		J Sherwood MF Portsmouth
32.5 Develop a prioritised water resources monitoring strategy for water-dependent SSSIs.	EA	EN WTs LOs	U	✔	✔	✔	✔	✔	✔	J Sherwood
32.6 Audit of the condition, threats, needs and opportunities of water related SSSIs.	EN	EA WTs LOs	U		✔	✔				C Beeching
32.7 Develop a prioritised programme of conservation measures for water related SSSIs.	EN	EA WTs LOs	U		✔	✔	✔			C Beeching

ISSUE 33 Enhancing biodiversity

OBJECTIVES:

- Play a full part in delivering the UK's Biodiversity Action Plan, acting either singly or in collaboration with others;
- Implement specific projects to restore and recreate habitats in rivers, lakes and floodplains;
- Improve river habitat quality as measured by the river habitat surveys;
- Improve the management of wetlands for conservation purposes.
- Assist the achievement of favourable conservation condition for water dependent County Wildlife Sites;
- Carry out research into the management of species in the aquatic environment in order to meet fully all Biodiversity Action Plan targets.

At the 1992 United Nations' Earth Summit, the UK signed an international Convention on Biodiversity. This entailed a commitment to the rehabilitation and restoration of degraded ecosystems and the promotion of recovery of threatened species, through the development and implementation of biodiversity plans. The UK response to this commitment was the document *'Biodiversity: The UK Action Plan'*, approved and published by the Government in January 1994. The plan identifies national targets for species and habitats that are priorities for conservation action.

The development and implementation of Local Biodiversity Action Plans (LBAPs) is a key vehicle through which national biodiversity targets will be met. Biodiversity Partnerships, involving the Agency, are formulating LBAPs which identify local priorities and targets.

The Environment Agency is the National Contact Point for several habitats and species, and thus has a key role in ensuring in ensuring that Habitat Action Plans (HAPs) and Species Action Plans (SAPs) are taken forward. Habitats and species known to occur in the Severn Vale, and for which the Agency is the national contact point, include Eutrophic Standing Waters, Water Vole, Otter, White-Clawed Crayfish, Depressed River Mussel, Ribbon Leaved Water Plantain, True Fox Sedge, and Tassel Stonewort.

We are lead partner for species such Twaite Shad and Allis Shad. The Agency is also responsible for over 100 actions, in whole or in partnership with others in 60 different Biodiversity Action Plans primarily relating to the aquatic environment. These relate to habitats and species known to occur in the Severn Vale including Wet Woodland, Reedbeds, Fens, Coastal and Floodplain Grazing Marsh (also known as Lowland Wet Grassland), Great Crested Newt, Marsh Fritillary, Aquatic Warbler, Bittern, Reed Bunting, and Common Scoter.

Several habitats and species do not currently have a national action plan but are considered to be of local importance and are the subject of local action plans, for example, rivers and streams, canals, standing open water, urban habitats and Black Poplar. The national Biodiversity Action Plan includes habitat statements for some of these.

One priority in the area is large-scale wetland recreation. Along with English Nature and the RSPB, the Agency commissioned a study in 1998 which identified 18 target sites suitable for wetland creation 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.

Whilst SSSIs and European sites represent the best sites for nature conservation efforts, many other important wetlands exist, and many of these are designated as County Wildlife Sites by the local Wildlife Trust. This year the Agency has paid for a re-survey of previously known wetland sites in Worcestershire.

White-clawed Crayfish

ACTIONS	RESPONSIBILITY LEAD	RESPONSIBILITY OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
33.1 Develop and implement Local Biodiversity Action Plans for counties within The Severn Vale	Worcester-shire BP Gloucester-shire BP Hereford-shire BP South Gloucester-shire BP	Partners include: EA EN/WTs LAs/ Farming & Landowning Organisations Businesses	U	2.5	2	4	✔	✔	U	C Beeching
33.2 Promote collection and collation of sound baseline data for species and habitats, including physical parameters.	EA	WTs LAs EN	U	✔	✔	✔	✔	✔	✔	A Churchward P Bailey
33.3 Undertake study into sensitivity of key species and habitats to changes in water quality.	EA	EN MAFF	U			✔	✔			R Wade
33.4 Support Local Biological Record Centres and the National Biodiversity Network.	LAs	WTs EN EA	U	2	✔	✔	✔	✔		C Beeching
33.5 Support and develop a comprehensive and objective network of County Wildlife Sites.	LAs	WTs EN EA	U	✔	✔	✔	✔	✔		C Beeching
33.6 Investigate and implement opportunities for restoration and re-creation of wetland habitats. (Largely through the Severn and Avon Vale Wetlands Project focussing on the 14 target sites in this LEAP area - see Appendix 8).	EA	EN/RSPB WTs/LAs NFU/FWAG/ ADA/IDBs CA Wildfowlers Associations	U	7	15	✔	✔	✔		C Beeching
33.7 Survey wetland sites to identify losses and opportunities for enhancement.	EA	WTs/EN/LAs LOs/RSPB	20		10	10				C Beeching
33.8 Continue to support River Severn Otter Project.	Worcs. Wildlife Trust	EA STW Fujihunt, Glos. Wildlife Trust	R	✔	✔	✔	✔	✔		C Beeching
33.9 Survey of a selection of ponds in Worcestershire and Gloucestershire to determine the presence of Great Crested Newt.	EA	WRAG	1	1						C Beeching
33.10 Carry out a repeat of the 1995 survey of Breeding Waders in the Severn Vale to assess the current status of populations.	RSPB	WWT EA	R		R					C Beeching
33.11 Determine the distribution of crayfish species.	EA	EN WTs	20		10		10			M Scott

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
33.12 Undertake experimetal removal of non-native crayfish from selected sites.	EA	EN WTs	U		✔	✔	✔			M Scott
33.13 Investigate the presence of Depressed River Mussel in the Severn catchment.	EA		U	✔	✔	✔				A Clements
33.14 Assess status and distribution of water vole and water shrew populations.	EA	EN LAs BW VCOs	U	0.8	10	10	8	U		C Beeching
33.15 Promote the planting of verified native and local provenance black poplars in river corridors.	EA	LAs VCOs LOs	U		3	✔	✔			W Reed
33.16 Support conservation and habitat creation for other rare and threatened species as identified in BAPs.	VCOs	EN EA WCs LAs	U	✔	✔	✔	✔	✔		C Beeching
33.17 Promote the conservation, restoration and creation of wetlands through agri-environment schemes, e.g. Countryside Stewardship Scheme.	MAFF	Countryside Agency EA NFU CLA/EN VCOs FWAG	U	✔	✔	✔	✔	✔		C Beeching

ISSUE 34 Management of the elver fishery - fish stocks and operation

OBJECTIVES:

- Maintain, improve and develop eel and elver stocks in order to optimise the social and economic benefits from their sustainable exploitation.

There is a long history of both eel and elver fishing in the Severn Vale area, with an international trade in the species. The legal requirement for a licence to use an elver net was introduced in 1980, under the Salmon and Freshwater Fisheries Act 1975.

During the past decade, elver catches on the River Severn have declined as compared, for example, with catches taken in the 1970's. This has caused concern that over exploitation of elvers may be occurring.

With an increase in the value of the catch, sales of licences rose during the mid-1990's, peaking at 1319 in 1997. This was probably a result of the high price paid for Severn elvers in 1996 (reaching over £200 per Kg) due to the shortage of elvers internationally and the demand from the Far East for European Eel elvers to offset the shortage of Japanese Eel elvers. The price has now dropped back to around £35 per Kg, and licence sales are also well down at 876 by December 1999 for the 1999/00 season.

The increased demand for available elvers during 1996/97 meant that increased numbers of licence holders were tending to fish longer and harder for comparatively small quantities of elvers. The increased incentive to fish for elvers also resulted in competition on the bank for fishing places (tumps) and some allegations of aggression, damage to fences etc., and trespassing.

Advice recently given by the International Council for the Exploration of the Seas to the EC in July 1998 concludes, inter alia, that with regard to the European Eel, "the eel stock is outside safe biological limits and the current fishery is not sustainable".

The Agency has the responsibility to licence elver fishing and seeks to maintain a sustainable fishery both in the local and European context. We have commissioned research and development to investigate the status of eel and elver stocks and to recommend management options. The Salmon and Freshwater Fisheries Review Group (an independent group) has also taken evidence on the management, regulation and conservation of fisheries including eel and elver fisheries, and is due to report to Ministers early this year. Government will then decide whether action is appropriate and, if so, what action (including changes in legislation).

The Salmon and Freshwater Fisheries Act 1975 does not allow the Agency to limit the sale of licences for elver or freshwater fishing. The Agency does, however, have the power to make bye-laws (with confirmation by the Minister), to protect, preserve and improve fisheries. At times in the past, fishing for and/or the sale of elvers has been prohibited by law, or a close season (a period when fishing is not permitted) has been in force. At the time of writing it is inappropriate for the Agency to take such action pending the recommendations of the Salmon and Freshwater Fisheries Review Group, although this may be desirable in the longer term.

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 to deal with some of the other issues referred to above.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
34.1 Boat & bank patrols.	EA		R	✔	✔	✔	✔	✔	✔	A Starkie
34.2 Joint patrols with the police.	Police	EA	R		✔	✔	✔	✔		A Starkie
34.3 Long term changes e.g. in exploitation and/ or legislation.	Fisheries Review Group	MAFF DETR EU EA	R	✔	✔	✔	✔	✔		A Starkie

ISSUE 35 Concerns regarding small populations of salmon in the River Severn catchment

OBJECTIVES:

- Maintain, improve and develop salmon stocks in order to optimise the social and economic benefits from their sustainable exploitation.

The Atlantic Salmon is a protected species listed under the EC Habitats Directive. The River Severn supports salmon spawning in its upper reaches (outside of the Severn Vale).

There has been concern in recent years over the decline in salmon stocks in the Severn. This is, in fact, a problem that 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. Some local actions to mitigate the effects are possible but others are being dealt with on a more appropriate national basis.

Under the Environment Act 1995, the Agency has a general duty to maintain, improve and develop salmon fisheries. We seek to balance the

long-standing exploitation of the fishery (both by commercial and rod fishers) with the protection of the spawning and the juvenile stocks of Atlantic salmon.

The survival of salmon entering the river system and their ability to spawn successfully and return to the sea depends on a number of factors. These include exploitation, predation by other species, barriers to movement upstream such as weirs or poor water quality (being tackled under Issues 20-22), and access to spawning gravels.

The Agency is committed to producing river-specific Salmon Action Plans for every principal salmon river in England and Wales by the year 2001. These plans will address the issue of the lack of multi-sea-winter fish.

National bye-laws were introduced in April 1999, aimed at improving the survival rate of these larger salmon once they enter the river system. Under these bye-laws, the commercial season is now considerably shorter, starting on 1st June. Furthermore rod fishers must now return all salmon caught before 16th June, as the majority of multi-sea-winter fish return to the river before then.

The Salmon and Freshwater Fisheries Review Group (an independent group) is currently taking evidence to examine the arrangements for management, regulation and conservation of salmon fisheries and to advise on how such arrangements may best be regulated and funded.

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
35.1 Promotion of new (1999) national bye laws.	EA	MAFF	R	✔						A Starkie
35.2 Promotion of voluntary 'catch-and-release' of Stale Salmon after 16th June.	EA	Salmon & Trout Association	R	✔	✔	✔	✔	✔		A Starkie
35.3 Production and review of Salmon Action Plans for the Severn and Estuary.	EA		R	✔	✔	✔	✔	✔		A Starkie
35.4 Long term changes, e.g. in exploitation and/or legislation.	Fisheries Review Group	MAFF EA Salmon & Trout Association	R	✔	✔	✔	✔	✔		A Starkie

ISSUE 36 Development of Lydney Docks

OBJECTIVES:

- Secure the most appropriate management systems and financial arrangements to ensure the sustainability of our navigational waters, in particular maintenance of the docks structures at Lydney Docks;
- Increase the number of Agency owned sites available for public recreation;
- Provide effective flood defence for Lydney and its industrial estates.

Lydney Docks, owned by the Environment Agency, is a Scheduled Ancient Monument due to its past importance as a port to the Forest of Dean for the export of coal, stone and timber. Commercial use ceased many years ago, and the Docks now see only occasional small boat traffic. The dock structures are deteriorating, and a floodgate collapsed in 1997. Flood protection for Lydney has been maintained by means of a temporary clay dam installed under emergency powers, but this must be removed and a permanent solution found.

The Agency formed the Lydney Docks Partnership, including representatives from the Forest of Dean District Council, Gloucestershire County Council, Lydney Town Council, English Heritage and Gloucestershire Development

Agency, in order to investigate possible options for the future of the Docks and associated land. The Partnership commissioned a feasibility study which identified several options involving differing levels of investment. A public exhibition was held in Lydney and responses sought as to the favoured option.

The results of this consultation indicated that the preferred option was one that involved a relatively high degree of investment, providing a wide range of recreational and water-based commercial development and involving the development of a renewable energy demonstration site. The Partnership is currently investigating in more depth the feasibility of these plans, and will be recommending a course of action. It is intended that the Partnership will in due course become the Lydney Docks Management Trust.

Lydney Docks

ACTIONS	RESPONSIBILITY LEAD	RESPONSIBILITY OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
36.1 Provide a flooddefence for Lydney-Cone Pill.	EA	MAFF	3300		1500	1500	300			K Boulton
36.2 Provide a flood defence for Lydney Harbour that is compatible with the development aspirations of the Lydney Docks Partnership.	EA		200-350		✔	✔				K Boulton
36.3 Form a Management Trust to oversee the funding and development of the docks.	Lydney Docks Partnership		R	✔						B Forbes W Reed
36.4 Seek external funding to bring dock structures into a good standard of repair.	Lydney Docks Management Trust		714 (bid)	✔	✔					B Forbes W Reed
36.5 Seek external funding to provide infrastructure for water-based commercial and recreational development and to investigate the feasibility of developing a renewable energy demonstration site in the dock area.	Lydney Docks Management Trust	SWEA Energy 21	744 (bid)	✔	✔	✔				B Forbes W Reed
36.6 Provide an annual income from the development sufficient to maintain the dock structures.	Lydney Docks Management Trust		35			✔	✔	✔	✔	B Forbes W Reed

ISSUE 37 Managing environmental information - air quality, biodiversity and waste management

OBJECTIVES:

- Improve our knowledge about the state of the environment, in particular air quality, biodiversity and waste management, in order to base our decisions around sound science and research;
- Communicate information to others in order to educate and inform them about environmental issues, and to consult with them about our work;
- Ensure that environmental data are exchanged openly between the Agency and other organisations, and to work with these in collecting, managing and disseminating this information.

The Government's sustainable development strategy, *'A Better Quality of Life'*, recognises that we as a society need to integrate the environment into decision making more fully if we are to achieve sustainable development. 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 the impacts that our society has upon it, in order to help us make decisions in our regulatory work and provide sound advice. Several of the issues in this LEAP require 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, particularly on air quality, biodiversity and waste management, is still developing. This LEAP forms part of that strategy. We wish to work with others, in particular Local Authorities, Government agencies (including Regional Development Agencies), research councils, Local Agenda 21 groups, biological record centres, non-governmental organisations, industry, and schools in order to achieve better collection, collation and dissemination of information on the environment.

The Agency has already published national, regional and local information about the state of the environment (see Appendix 5 for a list of our publications). This includes our *'Snapshot of the Environment in England and Wales'*, *'Midlands Environmental Reference Book'*, *'The South West's Environment'* and *'Severn Vale Environmental Overview'*. We are using new technology to help us manage and communicate information on the environment, for example by developing a Geographical Information System and our Internet site, and by producing CD ROMs.

ACTIONS	RESPONSIBILITY LEAD	RESPONSIBILITY OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
37.1 Implement a Geographical Information System in Lower Severn Area.	EA		141	26	27	17	30	21	20	M Langdon
37.2 Explore and take up opportunities for sharing information with other organisations.	EA	LAs Government Agencies & Depts. RCs LA21 groups NGOs BPs Industry	R	✔	✔	✔	✔	✔		JK Davies
37.3 Develop and implement a strategy to make information on the local environment more accessible to local people.	EA	LAs Government Agencies & Depts. LA21 groups Schools NGOs Industry	R	✔	✔	✔	✔	✔		JK Davies

ISSUE 38 Promoting environmental awareness and understanding

OBJECTIVES:

- Tell people about environmental issues by educating and informing, to ensure that care of the environment is central to everyday action and decision making;
- Be open and consult with others about our work.

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. Reducing the use of fossil fuels, demand for water, and the amount of waste we produce as a society, and increasing recycling and caring for our local environment are examples of where widespread education is needed if progress to be made.

Achieving greater environmental awareness and understanding requires the work and commitment of many organisations, including Local Authorities, business, schools, colleges and universities, Government agencies, the media, Local Agenda 21 and other non governmental groups, and the media, as well as the Agency. Different groups and individuals have different needs for environmental information and this will need to be provided in different ways.

Our national goals for education and the key audiences that we wish to target are given in Section 4.9. A Midlands regional education strategy and toolkit has been developed, the *'Practical Education Guide'*, and local strategies are currently being developed by Area Education Focus Groups. To add value, however, in the wider field of environmental education, it will be vital that the Agency works in partnership with other organisations.

Many of the proposals to tackle issues in this plan involve actions to promote awareness of issues and provide information about solutions. Regional and local education strategies will complement these efforts through a coordinated programme of education in its broadest sense. This will also help us to promote awareness of our own activities and encourage people to use our services.

Local Agenda 21 (see Section 4.3) is perhaps the most important area of work in raising awareness of sustainability issues and the role of the individual in changing society's attitudes to environmental issues.

ACTIONS	RESPONSIBILITY LEAD	RESPONSIBILITY OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
38.1 Develop a local education strategy, establish partnerships to deliver it, and update annually.	EA	SWEA	R	✔	5	✔	✔	✔		JK Davies
38.2 Promote the Eco-school Project; Select and train an assessor to cover the Severn Vale.	Tidy Britain Group Going for Green EA		U	✔						C Warren
38.3 Carry out a 12 month programme of Millennium Challenge educational projects in Lower Severn Area.	EA	SWEA	U	✔	✔					JK Davies
38.4 Awareness raising and promotion of Agency activities at local events.	EA		R	✔	✔	✔	✔	✔	✔	A Dannatt

ACTIONS	RESPONSIBILITY LEAD	OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
38.5 Increase work with local environmental groups on strategies and projects.	EA	Vision 21 WEP/SWEA Energy 21 Other LA 21 Groups & NGOs	R	✔	✔	✔	✔	✔		JK Davies
38.6 Increase access to environmental information by inner city communities through the Libraries 2000 project.	EA	Glos. Library Service SWEA	1	✔						JK Davies
38.7 Work with pupils to develop renewable energy projects in Gloucestershire schools	SWEA European Partnership	Schools	U		✔	✔	✔			N/A
38.8 Provide seminars for Local Authorities and community groups in Gloucestershire on renewable energy and facilitate the development of community renewable energy projects.	SWEA	LAs	U		✔	✔	✔			N/A
38.9 Train and support volunteers to provide energy efficiency advice within their own communities.	SWEA	Forest of Dean DC Stroud DC	U	✔	✔					N/A
38.10 Provide energy efficiency information, advice and incentives to homebuyers in Gloucestershire.	SWEA Forest of Dean DC	Stroud DC Cotswold DC South Glos. Council	U		✔	✔				N/A

ISSUE 39 The impact of development on the environment

OBJECTIVES:

- Promote the Agency's policies through our interface with Local Planning Authorities;
- Influence the Town and Country Planning System to prevent developments in the wrong place;
- Work with Local Authorities to ensure that local priorities are identified and dealt with locally;
- Work with others in order to achieve a better and more sustainable environment, and a better legislative basis to protect it.

The Severn Vale area is home to approximately 545,000 people. Major centres of development exist at Gloucester, Cheltenham and Avonmouth, and numerous towns and villages support these. The Severn Vale area is under significant pressure to release more land for housing, employment, and the infrastructure to support these, particularly around Cheltenham and Gloucester. Local Authorities are responsible for considering the potential impact of development proposals on the environment and for controlling the location of development through the land use planning system. The number of houses and amount of commercial land that each council needs to plan for is initially influenced by National and Regional Planning Guidance issued by the Secretary of State for Environment, Transport and the Regions.

For planning purposes, the Severn Vale lies both within the Government's South West Region (including Gloucestershire, South Gloucestershire and Bristol) and West Midlands Region (including Worcestershire and Herefordshire). Large tracts of land bordering the Severn Estuary fall within the "Coastal Zone" and thus warrant special control (Planning Policy Guidance: PPG 20 applies). Furthermore, any Development Plan having either a direct or indirect effect on the Estuary must have regard to the Conservation (Natural Habitats & C.) Regulations.

Development can have a wide range of impacts on the environment. As a Statutory Consultee, the Agency is an integral part of the Town & Country Planning process, advising planning authorities on drawing up development plans and determining planning applications. The factors that particularly interest the Agency are the pollution of air, land or water, flooding and flood risk, the demand for water, the generation of waste and impacts on the conservation value of the water environment and associated land including wetlands, river corridors and floodplains. In recent years there has been a shift in attitudes to address sustainable development through the planning system, and many planning authorities are working to achieve this. Our recommendations complement this approach.

In order to maximise our involvement in the Town & Country Planning process we are currently reviewing our approach with a view to increasing our emphasis on Development Plans. We will also be targeting those planning applications that pose the greatest risk to the environment. In addition, there is a need to influence developers to ensure that environmental enhancement and aftercare is designed into new developments.

ACTIONS	RESPONSIBILITY LEAD	RESPONSIBILITY OTHER	Cost (£K)	99/00	00/01	01/02	02/03	03/04	Future	Agency Officer
39.1 Target those planning applications that pose the most risk to the environment.	EA	LAs	R	✔	✔	✔	✔	✔	✔	C Ward B Smith
39.2 Reallocate resources to spend more time working with Local Authorities on Development Plans.	EA	LAs	R	✔	✔	✔	✔	✔	✔	C Ward B Smith
39.3 Promote environmental enhancement and aftercare programmes in developments.	LAs	Developers EA DETR LOs	R	✔	✔	✔	✔	✔	✔	C Ward B Smith

Reedbed treatment system under construction, Tewkesbury

6.0 Future Review and Monitoring

The Agency will be responsible, with those other organisations and individuals identified, for implementing this Action Plan. The Agency will monitor its progress and will seek to assess this on an annual basis alongside progress made by key partners. This progress will then be reported to all those involved in the plan and to any other interested parties.

The first Annual Review of the Severn Vale LEAP is due in April 2001.

The Annual Review will take the form of a short progress report and will:

- Examine the need to update the LEAP in light of changes in the plan area
- Compare actual progress with planned progress
- Explain any changes to the content or timing of actions
- Allow for new actions to be added
- Report on other matters, such as changes in legislation or new national initiatives affecting the LEAP
- Roll forward the detailed actions

Appendix 1

ABBREVIATIONS AND ACRONYMS

ADA	Association of Drainage Authorities	**ALARP**	As Low As is Reasonably Practicable
AMP	Asset Management Plan	**AONB**	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area	**ASERA**	Association of Severn Estuary Relevant Authorities
BAP	Biodiversity Action Plan	**BATNEEC**	Best Available Techniques not Entailing Excessive Cost
BC	Borough Council	**BCU**	British Canoe Union
BHA	British Hydropower Association	**BMPs**	Best Management Practices
BP	Biodiversity Partnership	**BPEO**	Best Practicable Environmental Option
BW	British Waterways	**C&GCHE**	Cheltenham & Gloucester College of Higher Education
CA	Countryside Agency	**CC**	County Council
CIRIA	Construction Industry Research & Information Association	**CLA**	Country Landowners Association
COMAH	Control of Major Accident Hazards	**CPSN**	Company of the Proprietors of Stroudwater Navigation
CSG	Cleansing Services Group	**DC**	District Council
DETR	Department of the Environment, Transport and Regions	**DTI**	Department of Trade and Industry
EA	Environment Agency	**EN**	English Nature
FPS	Federation of Petroleum Suppliers	**FWAG**	Forestry and Wildlife Advisory Group
GEBF	Gloucestershire Environmental Business Forum	**GWT**	Gloucestershire Wildlife Trust
HAP	Habitat Action Plan	**HSE**	Health and Safety Executive
IDB	Internal Drainage Board	**IPC**	Integrated Pollution Control
LAs	Local Authorities	**LA21**	Local Agenda 21
LAAPC	Local Authority Air Pollution Control	**LAQM**	Local Air Quality Management
LBAP	Local Biodiversity Action Plan	**LCs**	Local Companies
LEAF	Linking the Environment and Farming	**LEAP**	Local Environment Agency Plan
LOs	Land Owners	**LPA**	Local Planning Authority
Ml/a	Megalitres per annum	**MAFF**	Ministry of Agriculture, Fisheries and Food
MAPP	Major Accident Prevention Policy	**NAQS**	National Air Quality Standards
NASCO	North Atlantic Salmon Conservation Organisation	**NFU**	National Farmers Union
NGOs	Non Governmental Organisations	**NO_x**	Oxides of Nitrogen (NO and NO_2)

NVZ	Nitrate Vulnerable Zone	**OFWAT**	Office of Water Services
OIYLE	Oil In Your Local Environment	**OMDDs**	Operations which May cause Damage or Disturbance
PAH	Polycyclic Aromatic Hydrocarbon	**PIR**	Process Industry Regulation
PM^{10}	Particulate Matter less than 10 microns in size	**PPG**	Planning Policy Guidance
RCs	Research Councils	**RDAs**	Regional Development Agencies
RLOs	Riparian Land Owners	**RQO**	River Quality Objective
RSPB	Royal Society for the Protection of Birds	**SAC**	Special Area for Conservation (proposed or candidate)
SAM	Scheduled Ancient Monument	**SAP**	Species Action Plan
SES	Severn Estuary Strategy	**SINCs**	Sites of Importance for Nature Conservation
SMP	Shoreline Management Plan	**SO_2**	Sulphur Dioxide
SPA	Special Protection Area	**SSSI**	Site of Special Scientific Interest
STW	Sewage Treatment Works	**SUDS**	Sustainable Urban Drainage Systems
SWEA	Severn Wye Energy Agency	**UCs**	Unitary Council
VCOs	Voluntary Conservation Organisations	**VOC**	Volatile Organic Compound
WCs	Water Companies	**WEP**	Worcestershire Environmental Partnership
WLMP	Water Level Management Plan	**WPSN**	Western Partnership for Sustainable Development
WRAG	Worcestershire Reptile and Amphibian Group	**WTs**	Wildlife Trusts
WWT	Wildfowl and Wetlands Trust		

Appendix 2

GLOSSARY

Abstraction	The removal of water from any source, either permanently or temporarily.
Abstraction Licence	An authorisation granted by the Agency under section 38 of the Water Resources Act 1991 to allow the removal of water from a source.
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 by OFWAT as part of the periodic review of water company charges.
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.
Biodegradation	The process of breaking down organic matter by bacteria and fungi.
Biodiversity	Diversity of animal and plant life.
Biomass	The total mass of living organisms present in a given area.
Borehole	A well sunk into water bearing rock.
Carcinogen	Any agent that increases the chance of a cell becoming cancerous.
Carbon monoxide	A gas formed by the incomplete combustion of carbon fuels. At very high exposures, prolonged exposure to CO can be life threatening. A target pollutant in the UK National Air Quality Strategy.
Catchment	The total area from which a single river collects surface run-off.
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 baseline, including bed and channel which may for the time being be dry.

County Wildlife Site	Sites that have been identified as being of at least County importance for their wildlife interest - known as Key Wildlife Sites in Gloucestershire, Special Wildlife Sites in Worcestershire and Sites of Nature Conservation Interest (SNCIs) in the former Avon area.
Culvert	Artificial channel carrying water across or under a road, canal etc.
Cyprinid Fish	Coarse fish belonging to the carp family, like roach, dace and bream.
Diffuse Pollution	Pollution from widespread activities with no single discrete source.
Discharge Consents	See Consent to Discharge
Dissolved Oxygen	The amount of oxygen dissolved in water. Oxygen is vital for life so this measurement is an important, but highly variable, indicator of the 'health' of the water.
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.
European Marine Site	A site of European importance for nature conservation (SAC and/or SPA) which consists of marine areas.
Eutrophication	The biological effects of an increase in plant nutrients (nitrates and phosphates) on aquatic ecosystems.
Exemption	Any waste management operation which is exempt from Waste Management Licensing under the Waste Management Licensing Regulations 1994 (as amended). Many of these are registered with the Environment Agency.
Floodplain	Land adjacent to a watercourse that is subject to flooding.
Fluvial	Of or occurring in a freshwater river.
Foreign Water	Water that drains into an Internal Drainage Board area from outside.
Gauging Station	A site where the flow of a river is measured.
Geomorphological processes	Dynamic processes changing the natural physical environment.
General Quality Assessment	The Environment Agency's classification system for the quality of watercourses.
Groundwater	Water which saturates a porous soil or rock substratum (or aquifer).
Habitat	The locality or environment in which a plant or animal species lives.
Heavy metals	Metallic elements of high relative mass, many of which are poisonous and tend to accumulate and persist in living systems.
Hydrocarbon	Class of chemical compound containing only hydrogen and carbon. They are obtained principally from petroleum and coal tar
Hydrological	Relating to the location and movement of inland water above and below ground
Infiltration Drainage	A drainage system which allows water to seep into the ground rather than run-off the surface.
Integrated Pollution Control	A system of regulation operated by the Environment Agency under which a legal licence known as an authorisation is required for the operation of industrial processes that use or produce potentially polluting substances in significant amounts and release these to all three environmental media (air, land and water). Statutory; issued under the Environmental Protection Act 1990.
Internal Drainage Board	Local Sovereign authority for drainage.

ISO 14001	An international standard that organisations can become certified to upon implementing systems aimed at managing the impacts of their activities on the environment and which conform to specifications laid out in the standard.
Landfill	The disposal of waste into or onto land.
Life Cycle Assessment	An assessment of all the environmental impacts associated with any product or material, from its production ('cradle') to final disposal ('grave'). LCA can provide information for use in reducing these impacts through changes in design (e.g. materials, durability), manufacturing, and possible disposal options. In evaluating potential waste management options, LCA involves an assessment of environmental and resource impacts of different disposal processes and associated processes such as changing transport patterns and so on.
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.
Managed retreat	The realignment of tidal or sea defences further inland for environmental benefits, where economic and land use issues can be resolved.
Nitrate Vulnerable Zone	An area where nitrate concentrations in sources of public drinking water exceed, or are at risk of exceeding, the limit of 50 mg/l laid down in the 1980 EC Nitrate Directive. Those farming in NVZs are required to limit the application of nitrates to levels laid down in the Code of Good Agricultural Practice (MAFF).
Nutrient	A chemical essential for life.
Ordinary Watercourse	A watercourse not designated a Main River.
Oxides of Nitrogen	Air pollutants produced by traffic and industry. Associated with respiratory illness and acid rain. Target pollutants in the UK National Air Quality Strategy.
Part A Processes	Complex industrial processes with the potential to cause pollution. Regulated by the Environment Agency under the system of Integrated Pollution Control.
Part B Processes	Less complex processes where emissions to air are regulated by Local Authorities under the system of Local Authority Air Pollution Control.
Pathogen	A bacterium of virus that causes disease
Permeable conveyance systems	Systems which move runoff water slowly towards a receiving watercourse allowing storage, filtering and some loss of runoff water through evaporation and infiltration before the discharge point
Pesticides	Substances used to kill pests, weeds, insects, fungi, rodents, etc which can have significant harmful environmental effects.
Phosphorous	A non-metallic element which occurs widely and abundantly in minerals as phosphates and all living matter.
Precipitation	Water that falls to the ground from the atmosphere
Prescribed flow	A flow set to protect lawful downstream users and the aquatic environment.
Proximity principle	The principle that waste arisings should be managed or disposed of as close as possible to their sources of generation.
Pyrolosis	Decomposition of a substance by heating it to a high temperature in the absence of air.
Ramsar Site	A wetland of international importance for its conservation value, designated as such under the Ramsar Convention 1971.
Reach	A length of river.

Recharge	Water which percolates downward from the surface into groundwater.
Recovery (of waste)	Any of the operations provided for in Annex IIB to the EU Waste Directive (91/156). This includes the recycling of materials, composting or conversion of waste to energy.
Renewable energy	Energy produced from resources that are unlimited or can be rapidly replenished e.g. wind, water, sunlight, wave power, waste, or organic matter.
Rhines	Lowland drainage channels
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.
River Quality Objectives	Water quality targets set to secure specific minimum quality standards for specific stretches of water by given dates.
Runoff	The amount of water that flows off the land either through streams of over the surface
Salmonid fish	Game fish of the Salmon family, for example, trout and salmon.
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.
Siltation	The build-up of sediment in rivers
Sites 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.
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.
Special Area of Conservation	An area whose habitats and species are of European importance for nature conservation. Statutory; designated under the EU Habitats Directive (92/43)
Special Protection Area	An area whose habitats are of European importance for certain rare and vulnerable birds. Statutory; designated under the EU Bird's Directive (79/409).
Spray Irrigation	The watering of crops by spraying. Can have a high impact on water resources.
Stale Salmon	Salmon that have entered the river some time before the spawning season and are thus thinner, redder and no longer prized among anglers.
Sulphur Dioxide	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.
Sustainable Urban Drainage Systems	Physical structures built to receive surface water runoff including ponds, wetland, swales and porous surfaces. They may also provide treatment for water prior to discharge, using the natural processes of sedimentation, filtration, absorption and biological degradation.
Swale	Shallow grassed area allowing surface water run-off to infiltrate into the ground.
Tidal range	The difference in height between high tide and low tide.
Tide lock	Impaired drainage of a watercourse due to high tide

Trade effluent	Any effluent, except domestic sewage, produced in the course of trade or industry, including agriculture, horticulture and research. Surface water run-off that is significantly contaminated by site activities constitutes trade effluent.
Waste hierarchy	A framework for decision making which reflects the environmental and cost implications of waste management options. The hierarchy ranges from reduction of waste (having the least costs), through re-use, recycling and recovery, and finally disposal. The hierarchy may not always hold true, depending on local circumstances.
Waste Management Licence	A legal document issued by the Environment Agency authorising the deposit, recovery or disposal of controlled waste in or on land or the recovery or disposal of controlled waste using certain types of mobile plant. Statutory; issued under the Environmental Protection Act 1990.
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.
Working Plan	A document prepared by the operator of a waste management site or plant, which describes how they intend to prepare, develop, operate and restore that site or plant.

Appendix 3

ORGANISATIONS AND INDIVIDUALS WHO MADE WRITTEN RESPONSES TO THE CONSULTATION DRAFT

The Environment Agency would like to thank all those who responded to the Consultation Draft LEAP.

Mr R Coombes
Mr Ian Daycock
Mr R Docksey
Miss Christine Farr
Mrs J Horrabin
Mr Julian Jones
Mr M Neville
Ms Hilary Severn
Mrs I M Southall
Mr Will Watson
Arlingham Parish Council
Barbel Society
British Canoe Union (South West Regional Committee)
British Canoe Union (Access & Development)
British Energy
British Hydropower Association
Brookthorpe-with-Whaddon Parish Council
Cheltenham & Gloucester College of Higher Education
Committee for Archaeology in Gloucestershire
Cotswold Canals Trust
Council for the Protection of Rural England
Country Landowners Association
County of Herefordshire District Council
Dean Heritage Museum Trust
English Nature
Environmental Services Association
Forest of Dean District Council
Friends of the Earth
Gloucester Angling Club
Gloucester Harbour Trustees
Gloucester Sharpness & River Severn Canal Users Forum
Gloucestershire County Council (Corporate Services Department)
Gloucestershire County Council (Strategic Policy Unit)
Gloucestershire Farming and Wildlife Advisory Group
Gloucestershire Federation of Women's Institutes
Gloucestershire Wild Fowlers Association
Hardwicke Parish Council
Herefordshire & Gloucestershire Canal Trust
Inland Waterways Association
Maismore Parish Council
Ministry of Agriculture, Fisheries & Food (Rural & Marine Environment Division)
National Association of Boat Owners
National Farmers Union (Central Region & West Midlands Region)
Norton Parish Council
Oldbury-on-Severn Parish Council
Redmarley Parish Council
Seabank Power Ltd
Severn Navigation Restoration Trust
Shurdington Parish Council
South Gloucestershire Council
Sport England
Stanley Thornes (Publishers) Ltd
Stinchcombe Parish Council
Stroud District Council
Sustrans
The Bristol Port Company
The British Horse Society
The Clean Rivers Trust
The Countryside Agency
The Hawk & Owl Trust
The House Builders Federation (South Western Region)
The Wildlife Trusts (Gloucestershire, Worcestershire and Avon Trusts)
Tirley Parish Council
UK Glass Eels Ltd
Water Power Engineering
Wessex Water
Westbury-on-Severn Parish Council
Whittington Parish Council
Worcester City Council
Worcestershire County Council
Worcestershire Farming and Wildlife Advisory Group

In addition to the organisations and individuals listed above, 9 questionnaires were completed but returned anonymously.

Appendix 4

ERRORS & OMISSIONS IN THE CONSULTATION DRAFT

Section and page numbers refer to the Severn Vale LEAP Consultation Draft.

SECTION	Page No	Comments etc	Raised By
Contents Page	v	Section 1.4 should read 'nine' not 'none'.	South Gloucestershire Council
Contents Page	v	Section 2 numbering should be 2.1 etc, not 1.1 etc	South Gloucestershire Council/National Association of Boat Owners
General		No results identified for, water quality, flood defence work, fish populations. Nothing stated to identify what the angler can do to assist.	Barbel Society
General		Maps of adjoining LEAP areas would be helpful. The diagrammatic map on the back cover is unclear and possibly inaccurate in depicting the Environment Agency SouthWest Region extending to the north side ofthe Severn Estuary.	Gloucestershire County Council, Strategic Policy Unit
General		Major oversight in not recognising the approach of the Herefordshire and Gloucestershire Canal Trust in establishing the Herefordshire and Gloucestershire Canal Steering Committee.	Herefordshire & Gloucestershire Canal Trust
General		Omission of the Stroudwater Navigation and the Thames and Severn, and Herefordshire and Gloucestershire canals from the Severn Vale Area Map. Although not navigable at present, all of these waterways are under restoration and are key water features of the Severn Vale area.	Inland Waterways Association
General		The lack of references to archaeology and the historic environment is disappointing, especially as Appendix 1 of the Consultation Draft clearly sets out the Environment Agency's duties with respect to archaeology and heritage.	Gloucestershire County Council, Environment Dept.
General		No mention of hormone levels in drinking water.	Shurdington Parish Council
General		Insufficient reference is made to heritage and landscape matters and the influence which the need to 'conserve and enhance' these aspects of the environment has on the various dimensions of the Agency's remit.	South Gloucestershire Council
General		The Consultation Draft makes passing reference to the work of the Severn Estuary Strategy but, significantly, no mention of the work of the Association of Severn Estuary Relevant Authorities (ASERA) charged with the tasks of preparing the management scheme for the Severn Estuary European Site under the Conservation (Natural Habitats) Regulations 1994.	The Bristol Port Company
General		There is no acknowledgement of horse riding as an important recreation in the Severn Vale area.	The British Horse Society
General		It should be made clear in this document generally that 'heritage' issues cover not only known archaeological sites and features but also areas where the archaeological knowledge is limited and there is the potential for further finds.	South Gloucestershire Council

SECTION	Page No	Comments etc	Raised By
Section 1		The introduction makes only passing mention of the Estuary which is the dominant feature of much of the Severn Vale area.	South Gloucestershire Council
1	iv	The objective of 'protect and enhance' in relation to the Severn Vale should read 'conserve and enhance' to be more consistent with the vision at page 1.	South Gloucestershire Council
1.3		Both the Agency and this Council support the activities of the Severn Estuary Strategy in seeking to produce an estuary wide non-statutory management plan as well as the Association of Severn Estuary Relevant Authorities in relation to the pSAC. The relationship of these initiatives to others such as LEAPs causes confusion, mention should be made of the relationship of these plans.	South Gloucestershire Council
2		Mineral sites and waste management licence holders in the plan area should be included, particularly the latter as managing waste is identified as a specific issue in the document.	South Gloucestershire Council
2		The introductory text does not reflect the key role of the Estuary in determining the character and distinctiveness of the Severn Vale.	South Gloucestershire Council
2		This summary gives no recognition of the international status of the Severn Estuary. Given the interrelationships of land and estuary it is important that this aspect is given due consideration as appropriate throughout the document.	South Gloucestershire Council
2.2	7	It is suggested that the term 'Avonmouth subcatchment' is a misnomer, and should bear a name that reflects the land to which it refers of the South Gloucestershire levels and the industrial area referred to is Severnside/Avonmouth.	South Gloucestershire Council
2.2.	7	In setting the scene for the document it would be useful for this section to include a brief overview of development pressure within the Severn Vale area, including mention of the large areas with historic consents within South Gloucestershire	South Gloucestershire Council
2.5	8	Abstraction figures do not differentiate between abstraction returned to river or removed entirely.	Anonymous
2.6	8	The drainage rhines are not, nor do they behave as linear ponds and the description as such is considered to be wrong. The rhines: respond to tidal surge; are to a degree saline; receive water from a spring line catchment along the limestone ridge from Lyde Brook, Over Brook and Pool Brook - all flowing water courses.	South Gloucestershire Council
2.9	11	Makes no mention of the significant archaeological potential of the Severn Levels area.	South Gloucestershire Council
2.9	11	Mention could be made of the small part of the area that covers the Cotswold Hills ESA which can also help towards the achievement of environmental objectives.	Ministry of Agriculture Fisheries and Food
2.10	11	Should make reference to disused canals and future restoration.	National Association of Boat Owners
2.10	11	The Severn Way also runs through South Gloucestershire.	South Gloucestershire Council
2.10	11	The wording in this section could be misinterpreted in terms of the extension of navigation. There is a public right of navigation upstream of Stourport to Pool Quay near Welshpool.	British Canoe Union (Midlands)

SECTION	Page No	Comments etc	Raised By
2.11	11	The M48 goes across the first Severn Bridge, not the second Severn crossing.	Gloucestershire County Council, Environment Dept.
2.11	11	It in incorrect to state that the Severn Beach line is predominantly an industrial link.	South Gloucestershire Council
Key Details	13	The various navigation authorities in the LEAP area should be described.	British Energy
Key details	13	It is noted that no mention is made under "Key Details" of the existence of statutory harbour authorities with conservancy (for navigation) jurisdiction over relevant waters. Mention should also be made of the English Nature Teams that have conservation responsibility for parts of the Severn Vale. The City of Bristol has county status by historic charter but it constitutes a Unitary Council because it does not have any District Councils active within its boundary.	The Bristol Port Company
Issue 1	26	Para. 1 last sentence should refer to Enviromental Protection (not protections) Act.	South Gloucestershire Council
Issue 4	24	No mention is made of sewage sludge and the work being done by the CLA and the Water Supply Industry to avoid pollution in this way.	Country Landowners Association
Issue 4	24	The supporting text for this issue is misleading. The 1994 Waste Management Regulations control the disposal of non-agricultural waste to land. The statement that the Agency must be s upplied with details of the spreading of such waste including a description of the waste and an estimate of quantity is inaccurate in respect of organic "waste" such as slurry, manure and dirty water which are more frequently associated with agricultural practice.	National Farmers Union Central Region
Issue 5	26	The strong links between the Agency and the Council on this issue are not mentioned.	Forest of Dean District Council
	33	The opening sentence of this section should be changed to recognise that Britain is amongst those who are the net exporter of CO2, while there are other countries who are net importers of CO2.	South Gloucestershire Council
Issue 9	33	The need to prevent the building of houses in areaswhich are liable to flooding should be more clearly stated.	Country Landowners Association
Issue 9	33	A text link to issue 20 would be useful.	Gloucestershire County Council, Environment Dept.
Issue 10	35	Where is there mention of the EA's current initiative to purchase renewable based electricity for its own premises (GCC and others were involved in the consultations).	Gloucestershire County Council, Corporate Services Dept.
	37	Rainwater harvesting, on any scale, and the use of surface water as a resource do not feature as important.	Gloucestershire County Council, Corporate Services Dept.
Issue 11 &12	38 & 40	The reference to " Herefordshire & Gloucestershire Canal" should have the word "Trust" added.	Herefordshire & Gloucestershire Canal Trust
Issue 14	44	MAFF guidance is available on soil erosion and the comment in the third paragraph concerning the lack of recognition of the potential problems which exist from agricultural practices is unjustified.	Ministry of Agriculture Fisheries and Food

SECTION	Page No	Comments etc	Raised By
Issue 15	45	MAFF is not mentioned under 'Who is involved'. MAFF have produced a Green Code which is a code of practice for the safe use of pesticides on farms and holdings.	Ministry of Agriculture Fisheries and Food
Issue 15	46	'MAFF determines the suitability of water for human consumption' - This is not clear. Responsibility for the quality of drinking water fit for human consumption lies with The Drinking Water Inspectorate.	Ministry of Agriculture Fisheries and Food
Issue 15		It would be useful if the LEAP could include information on those areas which have been identified with farm pollution problems.	National Farmers Union Central Region
Issue 20	56	What is happening already? - It is suggested that this section includes mention of the fact that South Gloucestershire Council has already included material in its consultation draft local plan relating to the promotion of SUD's and that the Environment Agency is working in partnership with this authority to produce a guidance leaflet for developers.	South Gloucestershire Council
Issue 21	57	The discussion of flood risk management could have given greater expression to Government's 1993 policy and the benefits of flooding for the retention/recovery of wildlife habitats.	English Nature
Issue 21		Reference to Action 11.1 is incorrect it should read Action 9.1.	National Farmers Union Central Region
Issue 21	60	There is no mention in this section of flood defence exercises between the Environment Agency and local authorities which have been highlighted as a priority issue at the regular Environment Agency/FODDC liaison meetings.	Forest of Dean District Council
Issue 22	61	"Canoeing" should be included in the list of recreational activities in the opening paragraph.	British Canoe Union (South West) & (Midlands)
Issue 22	61	Mention should be made of recreational issues in the Stroud valleys associated with the water environment.	Cotswold Canal Trust
Issue 22	61	The importance of canals as recreational resources and the need to maintain good access to them has not been mentioned.	Inland Waterways Association
Issue 25	69	This section is loaded with acronyms and will be difficult to read for anyone who is not an expert in this field. Not all acronyms are defined in the glossary. "The proposed SAC" is referred to in the title but this reference is not then explained in the following text.	Forest of Dean District Council
Issue 26	71	The role of the local authorities as partners in connection with conservation and habitat creation for rare and endangered species should be recognised.	South Gloucestershire Council
Issue 30		No mention of GWEF (Gloucester Water and Energy Forum, formerly Hydro' Group).	Gloucestershire County Council, Corporate Services Dept.
4.2.2	85	The population of the Herefordshire part of the Severn Vale is 10,000 (Ledbury Town is 7,000).	County of Herefordshire District Council
4.2.2	85	The status of the County Structure Plan is different to that stated.	Worcestershire County Council
4.3.5	87	Spelling - severe drought	Seabank Power Ltd

SECTION	Page No	Comments etc	Raised By
Appendix 1		The Environment Agency has duties as a competent authority in relation to European sites which should be added to the conservation section. Appendix 4 should add the Habitats Directive to the listed EC Directive.	English Nature
Appendix 2		It would be helpful to clarify the Environment Agency's role in integrated pollution control as "authorising Part A prescribed processes", since Part B processes remain the responsibility of local authorities.	Forest of Dean District Council
Appendix 5		MAFF is not mentioned in the Appendix 5 Glossary.	Ministry of Agriculture Fisheries and Food
Appendix 5	100	Include definition of Ramsar sites.	Seabank Power Ltd

Appendix 5

ENVIRONMENT AGENCY LEAFLETS AND PUBLICATIONS

(Please tick the box next to the publication you require - subject to availability)

Addressing the Causes and Effects of Climate Change			
Climate Change in the Garden (water tolerant plants)	☐		
Regulating Major Industry			
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	☐	Industry in Avonmouth - a public guide to pollution management	☐
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	☐
Policy and Practice for the Protection of Groundwater	☐		
Delivering Integrated River-Basin Management			
Sustainable Urban Drainage – An Introduction (SEPA)	☐	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 (video)	☐
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 Indicents 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	☐	Sustainable Urban Drainage - An Introduction (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 Byelaws	☐	Environment Agency Policy Regarding Culverts	☐
Managing Freshwater Fisheries			
Anglers And The Agency	☐	Rod Fisheries Byelaws	☐
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	☐	Salmon Management Strategy	☐
Coarse Fisheries Strategy Consultation Document	☐	River Severn Salmon Action Plan	☐
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	☐
Water Vole Conservation Handbook	☐	Best Practice: Aquatic Weed Control Operation	☐
Best Practice: Disposal of Cut Vegetation	☐		
Business Development			
Warwickshire Avon LEAP	☐	Severn Estuary Joint Issues Report	☐
Severn Vale LEAP	☐	Severn Vale Environmental Overview	☐
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	☐
Planning & Acting For A Better Environment	☐	An Environmental Prospectus for South West England	☐
Education			
Activity Book For Primary Schools	☐	Environmental Research Challenge (CREST award scheme)	☐
Earthworks Comic - 7 to 12 year olds	☐	River Severn Newspaper Supplement	☐
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	☐	The South West's Environment	☐

Name.....

Address.....

.....

Please return this order form to: Customer Contact, Environment Agency, Lower Severn Area, Riversmeet House, Newtown Industrial Estate, Northway Lane, Tewkesbury, Glos GL20 8JG

Appendix 6

SIGNIFICANT RIVER QUALITY OBJECTIVE FAILURES 1996-98

The following stretches had significant RQO failures during the period 1996 to 1998. Each year, the data will be reviewed and the list of significant failures may change due to new failures occurring or old failures being improved.

River Name	Stretch Name	RQO	Comments	Actions
Little Avon	Southwood Farm - B6040	RE2	Farm discharges suspected.	A farm campaign is being undertaken in 99/00 and 00/01. This aims to improve management of slurry effluent on farms in the catchment. A campaign is also planned to prevent run-off from industrial sites.
			Impact of Wickwar suspected.	STW Desk study to be undertaken to gauge the impact of Wickwar STW on the Little Avon.
Little Avon	Works - Damery	RE2	Farm discharges suspected.	A farm campaign is being undertaken in 99/00 and 00/01. This aims to improve management of slurry effluent on farms in the catchment. A campaign is also planned to prevent run-off from industrial sites.
Little Avon	Damery - Confluence with Fal Brook	RE2	Farm discharges suspected.	As above
Little Avon	Confluence with Fal Brook - Hook St. (Estuary)	RE2	Farm discharges suspected.	As above
Ozleworth Brook	Works - Confluence with Little Avon	RE3	Farm discharges suspected.	As above
			Impact of Wotton under Edge STW.	Improvements to Wootton Under Edge STW are planned to be carried out under AMP3, but are subject to the pending OFWAT final determination.
River Frome (North Arm)	Ebley to confluence with South Arm	RE1	May be due to impact of industrial discharge.	Sampling programme amended to ensure river and effluent are sampled on same day to determine if it is impact of discharge. Discussions to be held with discharger and enforcement action taken if necessary.
River Frome (Southern Arm)	Stanley Downton STW to confluence with North arm	RE3	Ammonia failures due to Stanley Downton STW.	The STW is to be improved during AMP2 and further improvements are also planned for the AMP3 period.
Painswick Stream	Footbridge at Damsells to Stroudwater Canal	RE1	BOD failure thought to be due to a storm overflow and septic tanks.	Carry out an investigation to confirm the source of the pollution.
Red Brook	Confluence with Huntley Brook to River Leadon	RE2	Failure possibly due to agricultural pollution or low flows.	Investigate reasons for failure and carry out a farm campaign if necessary. See Issue 14 on low flows.
Glynch Brook	Bury Court Road Bridge to River Leadon	RE3	May be due to a low flow problem and also eutrophication.	Low flows are being addressed through a flow alleviation scheme. Continue to monitor and investigate possibility of eutrophication.
Preston Brook	Footbridge at Laddin farm to River Leadon	RE1	This DO failure is thought to be due to low flows.	See Issues 14 and 17

Kempley Brook	Whittocks End to Confluence with Preston Brook	RE1	Agricultural pollution is thought to be causing this ammonia, BOD and DO failure.	Investigate possible source of failure and carry out pollution prevention visits.
River Cam	Coaley STW Outfall to Waterend Farm	RE3	This unionised ammonia failure is thought to be due to Coaley STW.	Improvements are planned at this STW during AMP3.
Coaley Brook	Tickshill-Hydegate Bridge to River Cam	RE1	The BOD and DO failure is thought to be due to the effect of farm run-off.	A farm campaign is required targeting farms in this catchment. This will aim to prevent run-off from spreading activities and ensure that storage facilities are adequate.
River Twyver	Deansway Culvert entrance to River Severn	RE3	The Ammonia, unionised ammonia and DO failures are thought to be due to a closed landfill site.	The integrity of the existing surface water sewer needs to be investigated. Further re-development of the site will need to address all pollution issues.
River Twyver	Tredworth to Deansway Culvert entrance	RE2	This unionised ammonia failure is possibly due to sewage mis-connections or overflows.	Carry out an investigation to determine the source of the pollution.
Ashleworth Brook	Wick Ridge to River Severn	RE2	Suspect that this DO failure is due to low flows.	See Issue 14.
River Chelt	Footbridge near Becketts farm to River Severn	RE4	This ammonia and BOD failure is thought to be due to Cheltenham STW.	Improvements under AMP2 have been carried out and the quality of the river downstream has started to improve.
River Chelt	M5 culvert to footbridge near Becketts farm	RE4	The ammonia and BOD failures are again thought to be due to Cheltenham STW.	Improvements under AMP2 have been carried out and the quality of the river downstream has started to improve.
Leigh Brook	Coombe Hill to River Chelt	RE2	The DO failure is thought to be due to low flows and eutrophication. The ammonia may possibly be due to an unknown sewage source.	Investigate possible sewage sources and consider low flow problems (See Issue 14).
Ripple Brook	Bow Bridge to River Severn	RE2	This DO failure occurs in a ponded section of the Ripple Brook and so there is little movement of water, hence the low DO's.	The site is biologically rich and so no action is planned.
Ripple Brook	Stratford Road Bridge to Bow Bridge	RE2	This DO failure is thought to be due to a combination of slow flows, macrophyte growth and summer low flows.	See Issue 14
Pool Brook	B4209 Bridge Hanley Swan to River Severn	RE2	This DO failure is thought to be due to low flows.	See Issue 14.

Appendix 7

WATER QUALITY IMPROVEMENTS UNDER AMP 3

Continuous Discharges:

Discharge Name	**Receiving Water**
Cheltenham	River Chelt
Coaley	River Cam (Gloucester-Sharpness Canal)
Gloucester Longford	Innsworth Brook
Huntley	Springfield Brook
Ledbury	River Leadon
Longhope	Longhope Brook
Newent	Ell Book
Stroud (Stanley Downton)	River Frome
Welland	Marlbank Brook
Ashleworthe Quay	River Severn
Bishops Norton	Cox's Brook
Bristol Rd, Hardwicke	Dimore Brook
Brookthorpe	Tributary to Daniels Brook
Haresfield	Tribibutary to River Severn
Norton	Cox's Brook
Nupend	Tribibutary to River Severn
Old Hall Hardwicke Green	Shorn Brook
The Church, Hardwicke	Shorn Brook
Two Mile Lane	Tribibutary to River Severn
Churcham	Bulley Brook
Guarlford	Pool Brook
Avonmouth	Severn Estuary
Aust	Severn Estuary
Thornbury	Severn Estuary

First Time Rural Sewerage Schemes :

(Where there is an environmental impact from the existing sewerage facilities)

1. High Green, Severn Stoke
2. Longney, Gloucester
3. Claypits Eastington, Gloucester
4. Arlingham, Gloucester
5. The Lane, Lower Strensham
6. Pool Meadow, Gloucester

There are also approximately 31 schemes included in the AMP3 settlement that will require improvements to intermittent discharges.

Appendix 8

SITES OF POTENTIAL WETLAND RE-CREATION UNDER THE SEVERN AND AVON VALES WETLANDS PROJECT (THAT FALL WITHIN THE SEVERN VALE LEAP AREA)

Site Number	Site Name
2	River Teme and River Severn Confluence
3	River Severn, Kempsey Upper Ham and Lower Hams
4	River Severn, Pole Elm to Upton-upon-Severn
5	River Severn, Birch Green
6	River Severn, Upper and Lower Hams at Upton-upon-Severn
7	River Severn, Uckinghall to Tewkesbury
8	Longdon Marsh
9	River Severn, Tewkesbury to Longford
10	Coombe Hill
11	River Severn, Minsterworth Ham
12	River Severn, Elmore Bank to Longley
13	Walmore Common
14	River Severn, Awre
15	Wicksters Brook and The Moors, Slimbridge

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.

Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol BS32 4UD
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Fax: 01903 821 832

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Fax: 0118 950 0388

WALES
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St Mellons Business Park
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Cardiff CF3 0EY
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Fax: 029 20798555

ENVIRONMENT AGENCY
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0845 933 3111

ENVIRONMENT AGENCY
FLOODLINE
0845 988 1188

ENVIRONMENT AGENCY
EMERGENCY HOTLINE
0800 80 70 60

ENVIRONMENT AGENCY

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